

SYMPOSIUM CH01

Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design
May 9 - May 24, 2022

Symposium Organizers

Arnaud Demortiere, Universite de Picardie Jules Verne
Madeline Dukes, Protochips, Inc.
Wenpei Gao, North Carolina State University
Yuzi Liu, Argonne National Laboratory

* Invited Paper

SESSION Tutorial CH01.00: Fundamentals and New Methods of In Situ Characterization
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SESSION CH01.01: In Situ Microscopy
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

10:30 AM *CH01.01.02

Connecting Atomic Scale Chemistry and Structure to Relaxor Ferroelectric Properties Using *In Situ* Scanning Transmission Electron Microscopy
James M. LeBeau; Massachusetts Institute of Technology, United States

11:00 AM *CH01.01.03

***In Situ* Investigation of the Evolution of Materials and Interfaces in Solid-State Batteries** Matthew T. McDowell; Georgia Institute of Technology, United States

11:30 AM CH01.01.04

GaP Nanowire VLS Growth Observed in a Closed Gas Cell *In Situ* TEM Setup Maximilian Widemann, David Krug, Felix Gruber, Andreas Beyer and Kerstin Volz; Philipps-Universität Marburg, Germany

SESSION CH01.02: Bio Imaging and Ultrafast
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

1:30 PM *CH01.02.01

Advancing High-Resolution Imaging of Human Viruses and Vaccines in Liquid Deb Kelly¹, GM Jonaid¹, William Dearnaley¹, Samantha Berry¹, Jennifer Gray¹, Michael Spilman² and Madeline J. Dukes³; ¹The Pennsylvania State University, United States; ²Direct Electron, LP, United States; ³Protochips, Inc., United States

2:00 PM CH01.02.02

Optomechanical Detection of Vibration Modes of Single Bacterium Eduardo Gil Santos¹, Jose Jaime Ruz¹, Oscar Malvar¹, Ivan Favero², Arestide Lemaitre³, Priscila Monteiro Kosaka¹, Sergio Garcia-Lopez¹, Montserrat Calleja¹ and Javier Tamayo¹; ¹Instituto de Micro y Nanotecnología, Spain; ²Universite paris diderot, France; ³Centre for Nanosciences and Nanotechnology, France

2:15 PM CH01.02.03

An *In Situ* Resonant Soft X-Ray Scattering (RSoXS) Study of a Blue Phase Liquid Crystal Martensitic Transformation Hyeong Min Jin; Chungnam National University, Korea (the Republic of)

2:30 PM BREAK

3:00 PM *CH01.02.04

Transient Lensing from an Electron Gas Imaged by Ultrafast Electron Microscopy Renske M. van der Veen^{1,2}; ¹Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ²University of Illinois at Urbana-Champaign, United States

3:30 PM CH01.02.05

Dynamics of a Light-Induced Phase Transformation Probed by X-Ray Photon Correlation Spectroscopy Anudeep Mangu^{1,2}, Vladimir A. Stoica³, Hao Zheng³, Huaiyu Wang⁴, Rui Zu⁴, Quynh L. Nguyen², Sanghoon Song², Matthieu Chollet², Yanwen Sun², Joshua J. Turner², John Freeland³, Haidan Wen³, Diling Zhu², Venkatraman Gopalan⁴, Yue Cao³ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³Argonne National Laboratory, United States; ⁴The Pennsylvania State University, United States

3:45 PM CH01.02.06

MerlinEM-Medipix3 Detector in Transmission Electron Microscope—Applications and Opportunities Matus Krajnak and John-Paul Stroud; Quantum Detectors Ltd, United Kingdom

4:00 PM CH01.02.07

Time-Resolved Dark-Field X-Ray Microscopy—Imaging Strain Waves Deep in the Bulk with Picosecond Time Resolution Theodor Secanell Holstad¹, Trygve M. Ræder¹, Erik B. Knudsen¹, Matt Seaberg², Tim van Driel², Bernard Koziolowski³, Jon Eggert³, Eric Folsom³, Leora E. Dresselhaus-Marais^{3,4,2}, Martin Meedom Nielsen¹, Henning F. Poulsen¹, Hugh Simons¹ and Kristoffer Haldrup¹; ¹Technical University of Denmark, Denmark; ²SLAC National Accelerator Laboratory, United States; ³Lawrence Livermore National Laboratory, United States; ⁴Stanford University, United States

4:15 PM CH01.02.08

Ultrafast Phase Contrast X-Ray Imaging of Mesoscale Structures Under Shockwave Compression Christopher Campbell^{1,2}, Dana Dattelbaum¹, Tali Natan¹, David Staack² and Zhehui Wang¹; ¹Los Alamos National Laboratory, United States; ²Texas A&M University, United States

4:30 PM *CH01.02.09

Probing Photoinduced Transient States and Material Response Under Microwave Excitations Using Ultrafast Electron Microscopy Yimei Zhu; Brookhaven National Laboratory, United States

SESSION CH01.03: In Situ Electron Microscopy

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

8:30 AM *CH01.03.01

Atomic-Scale Understanding of Cu Oxidation Revealed by Correlated *In Situ* Environmental Transmission Electron Microscopy and First-Principles Theoretical Simulations Judith C. Yang; University of Pittsburgh, United States

9:00 AM CH01.03.02

***In Situ* TEM Study of Shear-Migration Coupling of Grain Boundaries** Marc Legros¹, Romain Gautier¹, Nicolas Combe¹, Oliver Renk² and Frederic Mompou¹; ¹CEMES CNRS, France; ²Austrian Academy of Sciences, Austria

9:15 AM *CH01.03.04

Peering into the Self- and Directed-Assembly of Nanoparticles Hongyou Fan; Sandia National Laboratories, United States

9:45 AM BREAK

10:15 AM CH01.03.05

Multimodal Study of Dis-Sodiation Mechanisms within Individual Na₃V₂(PO₄)₂F₃ Cathode Crystals Using 4D-STEM-ASTAR and STXM-XANES and STEM-EELS Nicolas Folastre^{1,2,3}, Kirill Cherednichenko^{4,2}, François Cadiou⁴, Matthieu Bugnet^{5,6}, Quentin Ramasse⁵, Edgar Rauch¹, Jacob Olchowka⁷, Christian Masquelier^{4,2,8}, Laurence Croguennec^{4,2,8} and Arnaud Demortiere^{4,2,8}; ¹Laboratoire Science et Ingénierie des Matériaux et Procédés (SIMaP) – Grenoble INP/CNRS/UJF, France; ²Réseau sur le Stockage électrochimique de l'énergie (RS2E) CNRS FR 3459, France; ³University of Picardie, France; ⁴Laboratoire de Réactivité et de Chimie des Solides (LRCS) – CNRS UMR 7314, France; ⁵SuperSTEM, SciTech Daresbury Science and Innovation Campus, United Kingdom; ⁶MATEIS Laboratory – CNRS UMR 5510, France; ⁷Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB) – CNRS/Université de Bordeaux, France; ⁸ALISTORE-ERI – CNRS FR 3104, France

10:30 AM CH01.03.06

Visualizing the Interaction of Electron and X-Ray Radiation in Halide Perovskite Semiconductors Using Nano-Probe Diffraction Techniques Jordi Ferrer Ori¹, Tiarnan Doherty¹, Duncan Johnstone¹, Sean Collins², Hugh Simons³, Paul Midgley¹, Caterina Ducati¹ and Samuel D. Stranks¹; ¹Cambridge University, United Kingdom; ²University of Leeds, United Kingdom; ³Technical University of Denmark, Denmark

10:45 AM CH01.03.07

Direct Visualisation of Nucleation and Growth of Ga₂Se₃ Nanostructures from Liquid Coordination Complexes Studied by *In Situ* TEM Techniques Miryam Arredondo¹, Praveen Kumar¹, Tamsin I. O'Reilly^{1,2}, Anne McGrogan¹, Peter Nockemann¹ and Gosia Swadzba-Kwasny¹; ¹Queen's University Belfast, United Kingdom; ²University of Glasgow, United Kingdom

11:00 AM CH01.03.08

Investigating the Effect of Atmosphere on Domains in BaTiO₃ Using *In Situ* TEM Tamsin I. O'Reilly, Kristina M. Holsgrove, Praveen Kumar and Miryam Arredondo; Queen's University Belfast, United Kingdom

SESSION CH01.04: Characterization of Energy Materials

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

1:30 PM *CH01.04.01

Cathode Material for Battery Applications and Nanoparticles for OER Reaction Studied in a STEM at Cryogenic Temperature Martial Duchamp^{1,2} and Elizaveta Tiukalova¹; ¹Nanyang Technological University, Singapore; ²CNRS, Singapore

2:00 PM CH01.04.02

Structural Dynamics of Nanoalloy Catalysts Inside Fuel Cells by *In Operando* High-Energy X-Ray Diffraction Valeri Petkov; Central Michigan University, United States

2:15 PM CH01.04.03

Mechanistic Understanding of LMR-NMC Synthesis via *In Situ* Characterization Grace Busse¹, Peter Csernica¹, Will Gent¹, Kipil Lim^{1,2} and William C. Chueh^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

2:30 PM CH01.04.04

Chemo-Mechanical Characterization of Lithium-Ion and Lithium Metal Batteries Using *Operando* Acoustic Scanning Wesley Chang and Daniel Steingart; Columbia University, United States

2:45 PM CH01.04.05

Multichannel Imaging and *In Situ* Process Monitoring for Vacuum-Assisted Drying of Inkjet-Printed and Blade-Coated Perovskite Thin Films Fabian Schackmar^{1,2}, Felix Laufer¹, Roja Singh^{1,1}, Ahmed Farag^{1,1}, Helge Eggers^{1,1,2}, Saba Gharibzadeh^{1,1}, Bahram Abdollahi Nejad^{1,1}, Gerardo Hernandez-Sosa^{1,2}, Ulrich Lemmer^{1,1,2} and Ulrich W. Paetzold^{1,1}; ¹Karlsruhe Institute of Technology (KIT), Germany; ²InnovationLab, Germany

3:00 PM BREAK

3:30 PM CH01.04.06

Real-Time Characterization of Micro-Sized Si-Based Anodes Using *In Situ* Atomic Force Microscopy Jian Liu¹, Suyeon Lee², Hanna Cho¹ and Jung-Hyun Kim¹; ¹Ohio State University, United States; ²LG Energy Solution, Korea (the Republic of)

3:45 PM CH01.04.07

Complex Phase Transitions in Fast Charging Lithium-Ion Battery Anodes from *Operando* Synchrotron Diffraction and Complementary Techniques Kent J. Griffith and Kenneth R. Poeppelmeier; Northwestern University, United States

4:00 PM CH01.04.08

MaterialEyes—Acceleration of Materials Characterization Insights with Scientific Literature Weixin Jiang^{1,2}, Eric Schwenker^{2,1}, Trevor Spreadbury², Oliver Cossairt¹ and Maria K. Chan²; ¹Northwestern University, United States; ²Argonne National Laboratory, United States

4:15 PM *CH01.04.09

Oscillatory Dynamics at Catalytically Active Interfaces Studied by Multi-Scale *Operando* Electron Microscopy Marc Willinger; ETH Zürich, Switzerland

4:45 PM CH01.04.10

Real-Time *In Situ* Optical Tracking of Oxygen Vacancy Migration in Memristors Giuliana Di Martino¹, Angela Demetriadou², Weiwei Li¹, Dean Kos¹, Bonan Zhu¹, Xuejing Wang³, Haiyan Wang³, Judith MacManus-Driscoll¹ and Jeremy Baumberg¹; ¹Univ of Cambridge, United Kingdom; ²University of Birmingham, United Kingdom; ³Purdue University, United States

SESSION CH01.05: Poster Session I: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

CH01.05.01

Fabrication and Characterization of Ferroelectric Hafnium Oxide Thin Film Yujin Jeong, Sanghyun Sung and Keon Jae Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

CH01.05.02

Quantitative Measurement of Hardening Precipitate State in Al-Zn-Mg Alloys Using Atom Probe Tomography at Different Ageing Conditions Sohail Shah; NTNU, Norway

CH01.05.04

Rapid Downselection of Potential Fusion Structural Materials Using *In Situ* Ion Irradiation Transient Grating Spectroscopy Benjamin R. Dacus; Massachusetts Institute of Technology, United States

CH01.05.05

Imaging Dilute Atomic Impurities in a Monolayer Semiconductor by Conductive Atomic Force Microscopy Nam T. Vu¹, Goki Eda¹, Yuan Chen¹, Leyi Loh¹, Takashi Taniguchi² and Kenji Watanabe²; ¹National University of Singapore, Singapore; ²National Institute for Materials Science, Japan

CH01.05.06

***In Situ* Micro-Mechanical Testing of Cu-Pb Alloy Using High Resolution EBSD for the Study of Dislocation-Grain Boundary Interactions**
Dongyue Xie, Sumit Suresh, Jade Peng, Jonathan Gigax, Nithin Mathew, Darby Luscher, Abigail Hunter, Saryu Fensin and Nan Li; Los Alamos National Laboratory, United States

CH01.05.09

Reversible Switching of Non-Volatile Bistable Defect Charge States in Monolayer MoS₂ Bumsub Song, Seok Joon Yun and Young Hee Lee; Sungkyunkwan University, Korea (the Republic of)

CH01.05.10

Spatially and Temporally Resolved Electroluminescence (EL) Imaging Measurements to Probe the Degradation of Perovskite Solar Cells
Prabodika N. Kaluarachchi, Kshitiz Dolia, Zhaoning Song, Zahrah Almutawah, Jared Friedl, Tamanna Mariam, Abdul Quader, Shannon Costello, Adam Phillips, Yanfa Yan and Michael J. Heben; University of Toledo, United States

CH01.05.11

***In Situ* Nanoscale Dynamic Contact Mechanics of Compliant Materials** Syed Asif Syed Amanulla; Industron Technical Services Inc, United States

CH01.05.12

Investigation of Role of Oxobridge in the Immobilized Dinuclear Ir Complex for Electrochemical Oxygen Evolution Reactor by *In Operando* Raman Spectroscopy Sang Youn Chae¹, Eun Duck Park¹ and Oh-Shim Joo²; ¹Ajou University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

SESSION CH01.06/QT07.05: Keynote Presentation: Quantum Photonics at the Atomic Scale—Combined Optical and Electron Microscopy to Reveal, Create and Control Color Centers in 2D Materials and Nanoparticles
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

8:30 AM CH01.06/QT07.05.01

Keynote: Quantum Photonics at the Atomic Scale—Combined Optical and Electron Microscopy to Reveal, Create and Control Color Centers in 2D Materials and Nanoparticles Jennifer A. Dionne, Daniel Angell and Hendrik Utzat; Stanford University, United States

SESSION CH01.07: Quantum Materials Ultrafast
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

9:00 AM CH01.07.01

Quantitative Measurements of Anisotropic Thermal Transport in vdW Materials via Cross-Sectional Scanning Thermal Microscopy (xSThM)
Sergio Gonzalez-Munoz¹, Khushboo Agarwal¹, Eli Castanon², Zakhar Kudrynskiy³, Zakhar D. Kovalyuk⁴, Jean Spiege⁵, Olga Kazakova², Amalia Patane³ and Oleg V. Kolosov¹; ¹Lancaster University, United Kingdom; ²National Physical Laboratory, United Kingdom; ³The University of Nottingham, United Kingdom; ⁴Institute for Problems of Materials Science (NAS of Ukraine), Ukraine; ⁵Université Catholique de Louvain, Belgium

9:15 AM CH01.07.02

Optimized Cathodoluminescence Microscopy of Buried Interfaces by Nanoscale Heterostructure Design Luca Francaviglia¹, Jonas Zipfel¹, Fabrizio Riminucci¹, Sriram Sridhar^{1,2}, Daria Blach^{1,3}, Alexander Weber-Bargioni¹, Shaul Aloni¹, David F. Ogletree¹ and Archana Raja¹; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Purdue University, United States

9:30 AM CH01.07.03

Multi-Layer Multi-Semiconductor Characterization—Spectroscopic Toolbox for GaN HEMT Yury Turkulets and Ilan Shalish; Ben Gurion University of the Negev, Israel

9:45 AM BREAK

10:15 AM *CH01.07.04

Probing Electrically-Driven Phase Dynamics via Correlated Electron Scattering and Transport Aaron Lindenberg; Stanford University, United States

10:45 AM CH01.07.05

Probing Symmetry Breaking with Elemental Resolution in a Polar Metal Using Nonlinear X-Ray Spectroscopy Michael Zuerch^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

11:00 AM CH01.07.06

Probing Elusive Intermediates by Synchrotron VUV Mass Spectrometry—The Formation of Aluminium Containing Intermediates in the Gas Phase Sebastian Grimm¹, Seung-Jin Baik¹, Patrick Hemberger², Tina Kasper^{1,3}, Andreas Kempf^{1,3} and Burak Atakan^{1,3}; ¹University of Duisburg-Essen, Germany; ²Paul Scherrer Institute, Switzerland; ³Center for Nanointegration, Germany

11:15 AM *CH01.07.07

Operando Synchrotron Characterization of Ultrafast Phenomena in Metal Additive Manufacturing Tao Sun; University of Virginia, United States

SESSION CH01.08: X-Ray Technique and Ultrafast
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuze Liu
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

1:30 PM *CH01.08.01

X-Ray Nano-Imaging Applications in Material Designs [Xianghui Xiao](#); Brookhaven National Laboratory, United States

2:00 PM CH01.08.03

Ultrafast Laser Ablation Processes Allow for Simple Two-Point Calibration Methods to Determine Low-Levels of Boron and Phosphorous in Metallic Alloys [Garry M. McGuirk](#); Fluor Marine Propulsion, LLC, United States

2:45 PM CH01.08.04

Electric-Field Dependent Mapping of Nanotwin Variants and Elastic Energy in the Bulk [Jan Schultheiß](#)¹, Lukas Porz², Lalitha Kodumudi Venkataraman², Marion Höfling³, Can Yildirim⁴, Philip Cook⁴, Carsten Detlefs⁴, Semen Gorfman⁵, Juergen Roedel² and Hugh Simons³; ¹Norwegian University of Science and Technology, Norway; ²Technische Universität Darmstadt, Germany; ³Technical University of Denmark, Denmark; ⁴European Synchrotron Radiation Facility, France; ⁵Tel Aviv University, Israel

2:30 PM BREAK

3:00 PM CH01.08.05

Multi-Material Differential Strain Mapping with Reflectance Anisotropy Spectroscopy Microscopy [Joan Sendra](#), Micha Calvo, Henning Galinski and Ralph Spolenak; ETH Zürich, Switzerland

3:15 PM CH01.08.06

Digital Twin—A Theorist's Playground for Synchrotron Science and Interfacial Science [Jin Qian](#)^{1,2} and Ethan Crumlin¹; ¹Lawrence Berkeley National Laboratory, United States; ²California Institute of Technology, United States

3:30 PM CH01.08.07

Pseudo-4D X-Ray Imaging Strategy Captures the Solidification of a Polyphase Pattern [Paul Chao](#), George R. Lindemann and Ashwin J. Shahani; University of Michigan, United States

3:45 PM CH01.08.08

In Situ Time-Resolved Studies of Sub-Millisecond Metastable Phase Formation in Thin-Film Oxide Materials via Optical Imaging and Synchrotron X-Ray Diffraction [Aine Connolly](#), Ming-Chiang Chang, Katie R. Gann, Duncan Sutherland, R. Bruce van Dover and Michael O. Thompson; Cornell University, United States

4:00 PM CH01.08.09

Subsurface Dynamics and 3D Structure of Boundary Dislocations During Thermal Annealing with Dark-Field X-Ray Microscopy [Leora E. Dresselhaus-Marais](#)^{1,2}, Can Yildirim³, Philip Cook³, Henning F. Poulsen⁴, Jon Eggert⁵, Grethe Winther⁴, Mustafacan Kutsal⁴, Carsten Detlefs³ and Hugh Simons³; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³European Synchrotron Radiation Facility, France; ⁴Technical University of Denmark, Denmark; ⁵Lawrence Livermore National Laboratory, United States

SESSION CH01.09: Poster Session II: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuze Liu
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

CH01.09.01

In Situ X-Ray Scattering Methods for Probing Polymer Deconstruction [Sarah A. Hesse](#)¹, Bonnie Buss², Ana Rita C. Morais², Gorugantu Sri Bala³, Anjani K. Maurya¹, Jennifer Quigley², David Brandner², Avantika Singh², Scott R. Nicholson², Chris Takacs¹, Bryon Donohoe², Nicholas A. Rorrer², Linda J. Broadbelt³, Robert Allen², Gregg T. Beckham² and Christopher Tassone¹; ¹SLAC National Accelerator Laboratory, United States; ²National Renewable Energy Laboratory, United States; ³Northwestern University, United States

CH01.09.02

Potential Dependent Ion Arrangement Near the Electrode/Electrolyte Interface [Julian Mars](#)¹, Hans-Georg Steinrueck², Chuntian Cao³, Thomas P. Chaney¹, Chris Takacs⁴, Oleg Borodin⁵ and Michael Toney¹; ¹University of Colorado Boulder, United States; ²Universität Paderborn, Germany; ³Brookhaven National Laboratory, United States; ⁴SLAC National Accelerator Laboratory, United States; ⁵U.S. Army Research Laboratory—Science and Technology at the Energy and Power Division, United States

CH01.09.03

Operando Optical Tracking of Single-Particle Ion Dynamics in Batteries [Alice Merryweather](#), Christoph Schnederman, Quentin Jacquet, Clare P. Grey and Akshay Rao; University of Cambridge, United Kingdom

CH01.09.04

In Situ/Operando HERFD-XAS Study of Electrocatalytic Reduction of Carbon Dioxide with Transition Metal Diselenides [Khagesh Kumar](#), Alireza Ahmadi-paridari, Amin Salehi-Khojin and Jordi Cabana; University of Illinois at Chicago, United States

CH01.09.05

Spatially Resolved Electrochemical-Thermal Signatures in Lithium-Ion and Lithium-Metal Batteries [Divya Chalise](#)^{1,2}, Ruozhu Feng³, Joseph

Schaadt^{2,4}, Akshey Dhar^{1,2}, Yuqiang Zheng¹, Vijayakumar Murugesan³, Sumanjeet Kaur¹, Sean Lubner¹ and Ravi Prasher^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Pacific Northwest National Laboratory, United States; ⁴Stanford University, United States

CH01.09.06

Characterization of Twinning and Dislocation Slip in Magnesium and Magnesium-Gadolinium Alloys by High Spatio-Temporal Resolution Kristian Mathis¹, Michal Knappek¹, Andrea Szabóová¹, Petr Harcuba¹, Daria Drozdenko¹, Filip Šiška² and Andriy Ostapovets²; ¹Charles University, Czechia; ²The Czech Academy of Sciences, Czechia

CH01.09.07

In Situ Chemical Analysis of Complex Oxide Interfaces via Auger Electron Spectroscopy Harish Kumarasubramanian and Jayakanth Ravichandran; Mork Family Department of Chemical Engineering and Material Science, University of Southern California, United States

CH01.09.08

Enabling Real-Time Human/AI Collaboration During Data Intensive Synchrotron Light Source Studies with Constrained Matrix Factorization Daniel Olds¹, Phillip Maffettone¹ and Aidan Daly²; ¹Brookhaven National Laboratory, United States; ²Flatiron Institute, United States

CH01.09.09

Structural and Electronic Effects of X-Ray Radiation on Prototypical Catalysts Nathalie Fernando¹, Andrew Cairns², Claire Murray³, Amber Thompson⁴, Elspeth Garman⁴, Joshua Dickerson⁵, Nayera Ahmed¹, Laura Ratcliff² and Anna Regoutz¹; ¹University College London, United Kingdom; ²Imperial College London, United Kingdom; ³Diamond Light Source, United Kingdom; ⁴University of Oxford, United Kingdom; ⁵MRC Laboratory of Molecular Biology, United Kingdom

CH01.09.11

Quench-Dependent Kinetics and Dynamics of Strongly Coupled Nanocrystal Superlattice Self-Assembly in Electrolytic Environments Unveiled via In Situ X-Ray Scattering Christian Tanner¹, James Utterback¹, Joshua Portner², Igor Coropceanu², Matthew Hurley³, Leo Hamerlynck¹, Jacquelyn Ho¹, Avishek Das¹, Yanwen Sun⁴, Sanghoon Song⁴, Andrei Flueraşu⁵, Garth Williams⁵, Christopher Tassone⁴, David Limmer¹, Samuel Teitelbaum³, Dmitri V. Talapin² and Naomi S. Ginsberg¹; ¹University of California Berkeley, United States; ²The University of Chicago, United States; ³Arizona State University, United States; ⁴SLAC National Accelerator Laboratory, United States; ⁵Brookhaven National Laboratory, United States

CH01.09.12

Complexity and Evolution of a Three-Phase Eutectic Pattern Uncovered by 4D X-Ray Nano-Tomography George R. Lindemann, Paul Chao and Ashwin J. Shahani; University of Michigan, United States

CH01.09.14

A Novel Non-Destructive Probe for Rapid Grain Boundary Characterization on the Mesoscopic Scale—Lab-Based Diffraction Contrast Tomography Hrishikesh Bale¹, Jun Sun², Jette Oddershede², Florian Bachmann² and Erik Lauridsen²; ¹Carl Zeiss Research Microscopy Solutions, Ireland; ²Xnovo Technology ApS, Denmark

SESSION CH01.10: New Imaging Techniques I

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

8:30 AM CH01.10.01

Assessing Multiple Convolutional Neural Networks for Denoising In Situ TEM Images with Ultra-Low Signal-to-Noise Ratios Ramon Manzorro¹, Sreyas Mohan², Adria Marcos-Morales², Joshua Vincent¹, Eero P. Simoncelli², David S. Matteson³, Carlos Fernandez-Granda² and Peter A. Crozier¹; ¹Arizona State University, United States; ²New York University, United States; ³Cornell University, United States

8:45 AM CH01.10.03

Viewing the Effect of a Plasma In Situ in the High Resolution Transmission Electron Microscope Jean-Luc Maurice¹, Pavel Bulkin¹, Éric Ngo², Weixi Wang¹, Ileana Florea¹, Martin Foldyna¹ and Pere Roca i Cabarrocas¹; ¹École Polytechnique, Institut Polytechnique de Paris, CNRS, France; ²Université Paris-Saclay, CNRS, France

9:00 AM CH01.10.04

Combined In Situ Synchrotron X-Ray and Electron Microscopy Studies of Metal-Organic Framework Crystallization Angelica R. Talosig¹, Brooke Carpenter¹, Giuseppe DiPalma¹, Joseph Patterson¹ and Chenhui Zhu²; ¹University of California, United States; ²Lawrence Berkeley National Laboratory, United States

9:15 AM CH01.10.05

Mechanistic Insights into Shape-Controlled Synthesis of Polymer Nano/Microstructures Enabled by In Situ Long-Focal Range Microscopy Apoorva Jain, Soumyamouli Pal, Nicholas L. Abbott and Rong Yang; Cornell University, United States

10:00 AM *CH01.10.06

Giant Polarization and Abnormal Super-Elasticity in Freestanding Perovskite Oxides Xiaoping Pan; University of California, Irvine, United States

9:45 AM BREAK

10:30 AM CH01.10.07

Quantifying Temperature Susceptivity of Electron Scattering in Scanning Transmission Electron Microscopy Menglin Zhu and Jinwoo Hwang; Ohio State University, United States

10:45 AM CH01.10.08

Nucleation, Coarsening and Movement of MnAs Precipitates in Wurtzite GaAs Nanowire Shells During *In Situ* Annealing in transmission Electron Microscope [Anna Kaleta](#)¹, Slawomir Kret¹, Serhii Kryvyi¹, Abinash Kumar², Xi Chen², Michael Xu², Aubrey Penn², James M. LeBeau², Boguslawa Kurowska¹, Marta Biliska¹, Katarzyna Gas¹, Maciej Sawicki¹, Hannes Raebiger³, Soungmin Bae³ and Janusz Sadowski^{1,4}; ¹Polish Academy of Sciences, Poland; ²Massachusetts Institute of Technology, United States; ³Yokohama National University, Japan; ⁴Linnaeus University, Sweden

11:00 AM CH01.10.09

***In Situ* TEM Study of Oxygen Surface Exchange on Ceria-Based Oxides** [Mai Tan](#)¹, Ramon Manzorro¹, Matan Leibovich², Joshua Vincent¹, Carlos Fernandez-Granda² and Peter A. Crozier¹; ¹Arizona State University, United States; ²New York University, United States

11:15 AM CH01.10.10

True Atomic-Resolution Imaging Under Ambient Conditions via Conductive Atomic Force Microscopy [Saima A. Sumaiya](#) and Mehmet Baykara; University of California Merced, United States

SESSION CH01.11: New Imaging Techniques II

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

1:30 PM *CH01.11.01

Liquid Phase TEM: Imaging Soft Nanomaterials in Solution, in Motion and in Action [Nathan C. Gianneschi](#); Northwestern University, United States

2:00 PM CH01.11.02

***In Situ* Characterization of the Vegard Strain of Battery Electrode Materials by an Advanced Electrochemical Strain Microscopy Method** Sebastian Badur¹, Diemo Renz², Thomas Goeddenhenrich¹, Dirk Dietzel¹, Bernhard Roling² and [Andre Schirmeisen](#)¹; ¹Justus-Liebig-Universität Giessen, Germany; ²Philipps-University Marburg, Germany

2:15 PM CH01.11.04

Design of Electrochemical Systems for Simultaneous Neutron and X-Ray Tomography [Jacob LaManna](#)¹, Maha Yusuf^{2,3}, Michael C. Daugherty^{1,3}, Youngju Kim^{1,3}, Eli Baltic¹, Boris Khaykovich⁴, Johanna Weker⁵, Michael Toney⁶, Daniel Hussey¹ and David Jacobson¹; ¹National Institute of Standards and Technology, United States; ²Stanford University, United States; ³University of Maryland, United States; ⁴Massachusetts Institute of Technology, United States; ⁵SLAC National Accelerator Laboratory, United States; ⁶University of Colorado Boulder, United States

3:00 PM CH01.11.05

Imaging and Spectroscopy of Backscattered Electrons at Ultra-Low Energies—A New Characterization Approach for Beam Sensitive Organic Functional Materials [Daniel Ryklim](#)^{1,1}, [Franz Schmidt-Kaler](#)^{1,1}, [Deborah Wrege](#)^{1,1}, [Enrico Domenico Lemma](#)², [Kerstin Göpfrich](#)¹, [Irene U. Wacker](#)^{1,1} and [Rasmus R. Schröder](#)^{1,1}; ¹Heidelberg University, Germany; ²Karlsruhe Institute of Technology, Germany

2:45 PM BREAK

3:15 PM CH01.11.07

Multiscale *In Situ* Characterization of Deformation Dynamics in hcp Metals [Michal Knapek](#), Peter Minarik, Patrik Dobron, Klauudia Fekete and Frantisek Chmelik; Charles University, Czechia

3:30 PM CH01.11.08

Simulated X-Ray Spectroscopy and Dynamical Stability of Lithiated Graphite Anode Material [Sasawat Jammuch](#) and Tod Pascal; University of California, San Diego, United States

SESSION CH01.12: In Situ Imaging and Design of Nanomaterials

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 4, Kalakaua Ballroom A

8:30 AM CH01.12.01

Computing Optical Flow from Machine Learning for Spatio-Temporal Characterization of Ultrafast Electron Microscopy Datasets [Arun Baskaran](#), Faran Zhou, Thomas E. Gage, Haihua Liu, Ilke Arslan, Haidan Wen and Maria K. Chan; Argonne National Laboratory, United States

8:45 AM CH01.12.02

Imaging of Large Area Nanolattices with Simultaneous Reciprocal and Real Space X-Ray Imaging [Matias Kagias](#)¹, Seola Lee¹, Dula Parkinson² and Julia R. Greer¹; ¹California Institute of Technology, United States; ²Lawrence Berkeley National Laboratory, United States

9:30 AM CH01.12.05

Wide-Field Raman Microscopy with STORM Post-Processing—A Powerful Approach to Increase Spatial Resolution and Acquisition Speed in Raman Imaging [Joachim Jelken](#), Leila Mazaheri and François Lagugné-Labarthe; University of Western Ontario, Canada

9:15 AM BREAK

9:45 AM CH01.12.08

Automated, High Throughput Analysis of HRTEM Image Dataset [Dhruv Dhiraj Gamdha](#)¹, Ryan Fair², Balaji S. Pokuri¹, Enrique Gomez² and Baskar Ganapathysubramanian¹; ¹Iowa State University, United States; ²The Pennsylvania State University, United States

10:00 AM CH01.12.09

Heterogeneous Deformation in ($\alpha+\beta$) Titanium Alloys—From *In Situ* Microscopy/Diffractometry to Microstructural Design [Shaolou Wei](#) and Cem Tasan; Massachusetts Institute of Technology, United States

10:15 AM CH01.12.10

Seeing the Forces—Single Avalanching Upconverting Nanoparticles as Ultrasensitive Local Force Transducers [Natalie Fardian-Melamed](#)¹, Changhwan Lee¹, Hye Sun Park², Ayelet Teitelbaum³, Kevin Kwock¹, Thomas P. Darlington¹, Bruce E. Cohen³, Emory Chan³, Sang Hwan Nam², Yung Doug Suh² and P. James Schuck¹; ¹Columbia University, United States; ²Korea Research Institute of Chemical Technology, Korea (the Republic of); ³Lawrence Berkeley National Laboratory, United States

SESSION CH01.13: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design I

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Monday Morning, May 23, 2022

CH01-Virtual

8:00 AM CH01.13.01

Simulating Electron-Excited Energy Dispersive X-Ray Spectra with the NIST DTSA-II Open-Source Software Platform [Dale E. Newbury](#) and Nicholas Ritchie; National Institute of Standards and Technology, United States

8:15 AM *CH01.13.02

Nano-Scale *In Situ* TEM Observations of Electrodeposition/Dissolution Process of Zinc Metal onto a Platinum Electrode [Yuki Sasaki](#)¹, Kaname Yoshida¹, Akihide Kuwabara¹ and Yuichi Ikuhara^{2,1}; ¹Japan Fine Ceramics Center, Japan; ²The University of Tokyo, Japan

8:45 AM CH01.13.03

An Automated Scanning Transmission Electron Microscope Guided by Sparse Data Analytics Matthew Olszta¹, Derek Hopkins¹, Kevin Fiedler², Marjolein Oostrom¹, Sarah Akers¹ and [Steven R. Spurgeon](#)¹; ¹Pacific Northwest National Laboratory, United States; ²Washington State University, United States

9:00 AM *CH01.13.04

***In Situ* and *Operando* Force-Based Atomic Force Microscopy for Probing Local Functionality in Energy Storage Materials** [Nina Balke](#); North Carolina State University, United States

9:30 AM *CH01.13.05

***In Situ* and *Operando* Characterization of Water-Mediated Ion Intercalation in Transition Metal Oxides** [Veronica Augustyn](#); North Carolina State University, United States

SESSION CH01.14: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design II

Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu

Monday Afternoon, May 23, 2022

CH01-Virtual

1:00 PM CH01.14.01

***In Situ* ETEM Investigation of Size-Dependent Metallic Nanoparticle Oxidation—A Unified Oxidation Mechanism** Rajat Sainju, Dinithi Rathnayake, Haiyan Tan, George Bolla, Avinash M. Dongare, Steven Suib and [Yuan Yuan Zhu](#); University of Connecticut, United States

1:15 PM CH01.14.03

Cross-Sectional Functional Scanning Probe Microscopy for *In Situ* and *Post-Mortem* 3D Mapping of Nanoscale Physical Properties of Internal Structure of Advanced Optoelectronic Devices [Oleg V. Kolosov](#)¹, Andy Niblett¹, Marta Mucientes¹, Sam Shutts², Win Meredith², Iain Eddie², Mohsin Haji³ and Peter Smowton²; ¹Lancaster University, United Kingdom; ²Cardiff University, United Kingdom; ³National Physical Laboratory, United Kingdom

1:30 PM CH01.14.04

(2+1) D Temperature Mapping of Stacked Silicon Dies from X-Ray Diffraction Intensities [Darshan Chalise](#) and David Cahill; University of Illinois - Urbana Champaign, United States

1:45 PM CH01.14.05

Automated Time-Delay Characterization and Data Synchronization for *Operando* Gas and Heating Systems Fan Zhang^{1,2}, Merijn Pen³, Ronal Spruit³, Hugo Perez-Garza³, Wei Liu² and [Dan Zhou](#)³; ¹University of Chinese Academy of Sciences, China; ²DICP, China; ³DENSsolutions, Netherlands

2:00 PM CH01.14.06

Density, Viscosity and Surface Tension Characterization of Supercooled Liquids and Oxide Melts Using Levitation in Microgravity [Vrishank Subodh Menon](#)¹, Stephen K. Wilke¹, Jared Rafferty¹, Richard Weber¹, Takehiko Ishikawa², Chihiro Koyama², Hirohisa Oda² and Shinji Kohara³; ¹Materials Development Inc., United States; ²JAXA Tsukuba Space Center, Japan; ³National Institute of Materials Science, Japan

2:15 PM *CH01.14.07

Evolution Kinetics of Nanoparticles [Yugang Sun](#); Temple University, United States

SESSION CH01.15: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design III
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Monday Afternoon, May 23, 2022
CH01-Virtual

4:00 PM *CH01.15.01

Dynamic Multimodal Chemical Imaging of Biological, Environmental and Material Interfaces Xiao-Ying Yu; Pacific Northwest National Laboratory, United States

4:30 PM *CH01.15.02

Nanoscale Imaging of Structure and Dynamics Through Time-Resolved Hard X-Ray Diffraction Microscopy Martin V. Holt; Argonne National Laboratory, United States

SESSION CH01.16: Frontiers of In Situ Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design IV
Session Chairs: Arnaud Demortiere, Madeline Dukes, Wenpei Gao and Yuzi Liu
Tuesday Morning, May 24, 2022
CH01-Virtual

8:00 AM CH01.16.01

Scanning NV Magnetometry for Magnetic Memory Devices Umberto Celano¹, Peter Rickhaus², Hai Zhong², Florin Ciubotaru¹, Laurentiu Stoleriu³, Alexander Stark², Felipe Favaro de Oliveira², Mathieu Munsch², Paola Favia¹, Maxim Korytov¹, Patricia van Marcke¹, Patrick Maletinsky², Christoph Adelman¹ and Paul van der Heide¹; ¹IMEC, Belgium; ²Qnami AG, Switzerland; ³Alexandru Ioan Cuza University, Romania

8:15 AM CH01.16.02

Catalytic Transformation of Nano-Lepidocrocite (γ -FeOOH) with Fe(II)_(aq)—Non-Equilibrium Stages and Biomimetic-Like Behavior Yiwen Chen¹, Mario A. Gomez², Miao Song³, Dongsheng Li³, Alan S. Lea³, Yihang Duan⁴ and Yongfeng Jia⁴; ¹Shenyang University of Chemical Technology, China; ²Guangzhou University, China; ³Pacific Northwest National Laboratory, United States; ⁴Chinese Academy of Sciences, China

8:30 AM CH01.16.03

Tip Enhanced Rayleigh Scattering via a Gap Mode in Transmission Geometry Bharathi Rajeswaran and Yaakov R. Tischler; Bar-Ilan University, Israel

8:45 AM CH01.16.04

Ion-Gated Transistors as *In Operando* Diagnosis Tools for Battery Electrode Materials Jose R. Herrera¹, Clara Santato¹, Francesca Soavi² and Federico Poli²; ¹Polytechnique Montréal, Canada; ²Università di Bologna, Italy

9:00 AM CH01.16.05

Porous structures of ZrO₂ Fiber Insulation Tile Revealed By Synchrotron X-Ray In-Line Phase Contrast Microtomography Shengkun Yao¹ and Benxue Liu²; ¹Shandong Normal University, China; ²Qilu University of Technology (Shandong Academy of Sciences), China

9:05 AM CH01.16.06

Large-Area *In Situ* Multichannel Imaging on Blade Coated Hybrid Perovskite Thin Films Simon Ternes, Felix Laufer, Philip Scharfer, Wilhelm Schabel, Bryce S. Richards, Ian A. Howard and Ulrich W. Paetzold; Karlsruhe Institute of Technology, Germany

9:10 AM CH01.16.07

Return-Path Mueller Ellipsometry via Retroreflective Materials for Cryogenic Applications Christopher Lewis, Jacob Marchio, Drew Sellers and Michael Hamilton; Auburn University, United States

9:15 AM CH01.16.08

***In Situ* LP-TEM Visualization of Aqueous Dynamic Molecular and Particular Assembly of Amphiphilic Block Copolymer** Junho Hwang, Seon-mi Jin and Eunji Lee; Gwangju Institute of Science and Technology, Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM CH02

Ultrafast Probes in Emerging Materials
May 11 - May 23, 2022

Symposium Organizers

Margherita Maiuri, Politecnico di Milano
Carlos Silva, Georgia Institute of Technology
Ajay Ram Srimath Kandada, Wake Forest University
Parinda Vasa, Indian Institute of Technology Bombay

* Invited Paper

SESSION CH02.01: Ultrafast Dynamics in 2D Materials
 Session Chairs: Margherita Maiuri and Carlos Silva
 Wednesday Afternoon, May 11, 2022
 Hawai'i Convention Center, Level 3, 321A

1:30 PM *CH02.01.01

Having It All—Spatiotemporally Discerning Charge and Heat in Energy Transduction and Nanoscale Transport Hannah L. Weaver¹, James Utterback¹, Cora Went², Joeson Wong², Dipti Jasararia¹, Finn Babbe³, Jason K. Cooper³, Eran Rabani¹, Harry A. Atwater² and Naomi S. Ginsberg¹; ¹University of California, Berkeley, United States; ²California Institute of Technology, United States; ³Lawrence Berkeley National Laboratory, United States

2:00 PM CH02.01.02

Broadband and Ultrafast Optical Phase Modulation by Colloidal 2D Semiconductors Ivo Tanghe^{1,1}, Justinas Butkus^{2,3,4}, Kai Chen^{4,3,2}, Shalini Singh⁵, Dries Van Thourhout¹, Justinas M. Hodgkiss^{2,3} and Pieter Geiregat¹; ¹Ghent University, Belgium; ²MadDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand; ³Victoria University of Wellington, New Zealand; ⁴Dodd-Walls Centre for Photonic and Quantum Technologies, New Zealand; ⁵University of Limerick, Ireland

2:15 PM CH02.01.03

Exciton Dynamics in Functionalized Germanane Eugenio Cinqunta¹, Samir Sardar², Warren L. Huey³, Caterina Vozzi¹, Joshua E. Goldberger³, Cosimo D'Andrea^{4,2} and Christoph Gadermaier^{4,2}; ¹CNR-IFN, Italy; ²Istituto Italiano di Tecnologia, Italy; ³The Ohio State University, United States; ⁴Politecnico di Milano, Italy

2:30 PM BREAK

3:00 PM CH02.01.04

Ultrafast Optical and Magnetic Properties of the Liquid Phase Exfoliated Antiferromagnetic 2D Semiconductor NiPS₃ Andrii Shcherbakov¹, Stanislav Bodnar¹, Kevin Synnatschke², Jonathan Zerhoch¹, Lissa Eyre¹, Felix Eckmann¹, Claudia Backes³ and Felix Deschler¹; ¹Walter Schottky Institute Technical University of Munich, Germany; ²Trinity College Dublin, The University of Dublin, Ireland; ³University of Kassel, Germany

3:15 PM *CH02.01.05

Ultrafast Probes of Semiconductor Junctions Matthew C. Beard; National Renewable Energy Lab, United States

3:45 PM CH02.01.06

High-Efficiency Photoemission Due to Ultrafast Spin-Exchange Auger Interactions in Mn-Doped CdSe Quantum Dots Clement Livache¹, Whi Dong Kim¹, Ho Jin^{1,2}, Oleg Kozlov¹, Igor Fedin¹ and Victor I. Klimov¹; ¹Los Alamos National Laboratory, United States; ²The University of New Mexico, United States

4:00 PM CH02.01.07

Investigation of the Optical Properties and Ultrafast Plasmonic Dynamics of Digenite (C₉S₈) Thin Films Andrea Villa¹, Madina Telkhozhayeva², Fabio Marangi^{1,3}, Eti Teblum², Aaron M. Ross¹, Mirko Prato³, Luca Andena¹, Roberto Frassine¹, Francesco Scotognella^{1,3} and Gilbert Nessim²; ¹Politecnico di Milano, Italy; ²Bar-Ilan University, Israel; ³Istituto Italiano di Tecnologia, Italy

4:15 PM CH02.01.08

Ultrafast Dynamics of Strongly Correlated Metal Oxide Clusters Jacob M. Garcia and Scott G. Sayres; Arizona State University, United States

SESSION CH02.02: Poster Session: Ultrafast Probes
 Session Chairs: Margherita Maiuri, Carlos Silva and Ajay Ram Srimath Kandada
 Wednesday Afternoon, May 11, 2022
 5:00 PM - 7:00 PM
 Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

CH02.02.01

Visible and Near-Infrared Optical Properties of Indium Tin Oxide Nanoparticle Films Fabio Marangi^{1,2}, Maria Sygletou³, Francesco Bisio⁴ and Francesco Scotognella^{1,2}; ¹Politecnico di Milano, Italy; ²IIT - Istituto italiano di Tecnologia, Italy; ³Università di Genova, Italy; ⁴CNR-SPIN, Italy

CH02.02.03

Ultrafast Excited State Decay Pathways in Epigenetic Deoxycytidine Derivatives Piotr Kabacinski¹, Marco Romanelli², Eveliina Ponkkonen³, Vishal K. Jaiswal², Thomas Carell¹, Marco Garavelli², Giulio Cerrulo¹ and Irene Conti²; ¹Politecnico di Milano, Italy; ²Università di Bologna, Italy; ³Ludwig-Maximilians-Universität München, Germany

CH02.02.04

Computational X-Ray Photon Correlation Spectroscopy from Molecular Dynamics Trajectories Shaswat Mohanty¹, Mengning Liang², Chris Cooper¹

and Wei Cai¹; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

CH02.02.06

Phase-Sensitive Pump-Probe Spectroscopy of Organic Semiconductors Chad Cruz, John Stephenson, Jagannath Paul, Emily G. Bittle and Jared Wahlstrand; National Institute of Standards and Technology, United States

CH02.02.08

Charge Carrier Self-Localization in Organic Semiconductors Revealed via Time-Resolved THz Spectroscopy Paul D. Cunningham¹, Yilei Wu², Zhenan Bao² and Edwin J. Heilweil³; ¹U.S. Naval Research Laboratory, United States; ²Stanford University, United States; ³National Institute of Standards and Technology, United States

CH02.02.09

Vibronic Coupling and Nonradiative Relaxation in Cyanine Dimers on DNA Scaffolds Paul D. Cunningham¹, Brian S. Rolczynski¹, Youngchan Kim¹, Divita Mathur¹, Ryan Pensack², Azhad Chowdhury², Jonathan S. Huff², Daniel B. Turner², Paul H. Davis², Lance Patten², Jeunghoon Lee², Bernard Yurke², William B. Knowlton², Sebastian Diaz¹, Igor Medintz¹ and Joseph Melinger¹; ¹U.S. Naval Research Laboratory, United States; ²Boise State University, United States

SESSION CH02.03: Ultrafast Dynamics in Metal Halide Perovskites

Session Chairs: Carlos Silva and Ajay Ram Srimath Kandada

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 321A

8:30 AM *CH02.03.01

Photo-Induced Hot Carrier Cooling in Two-Dimensional Perovskite Single Crystals Studied by Transient Absorption and Time-Resolved Two-Photon Photoelectron Spectroscopy Weihua Lin¹, Sophie Canton², Luca Perfetti³, Kaibo Zheng¹ and Tonu Pullerits¹; ¹Lund University, Sweden; ²European XFEL, Germany; ³Ecole Polytechnique, France

9:00 AM CH02.03.02

Revealing Ultrafast Charge-Carrier Thermalization in Tin-Iodide Perovskites Through Novel Pump-Push-Probe Terahertz Spectroscopy Aleksander M. Ulatowski, Michael D. Farrar, Henry Snaith, Michael Johnston and Laura Herz; University of Oxford, Department of Physics, United Kingdom

9:15 AM CH02.03.03

Direct Visualization of Ultrafast Lattice Ordering via Resonant Electron-Phonon Coupling in 2D Perovskites Hao Zhang^{1,1}, Wenbin Li^{1,1}, Joseph Essman¹, Claudio Quarti^{2,3}, Isaac Metcalf¹, Siraj Sidhik¹, Jin Hou¹, Austin Fehr¹, Xijie Wang⁴, Uwe Bergmann^{5,6}, Mercuri Kanatzidis⁷, Claudine Katan², Jacky Even², Jean-Christophe Blancon¹ and Aditya D. Mohite¹; ¹Rice University, United States; ²Univ Rennes, France; ³University of Mons, Belgium; ⁴SLAC National Accelerator Laboratory, United States; ⁵PULSE Institute, SLAC National Accelerator Laboratory, United States; ⁶University of Wisconsin-Madison, United States; ⁷Northwestern University, United States

9:30 AM CH02.03.05

The Impact of Interfacial Energetics on Charge Extraction and Recombination Dynamics in MAPbI₃ Perovskite Solar Cells Tuo Liu^{1,2}, Rebecca Scheidt², Xiaopeng Zheng², Min Chen², Joseph Luther², Matthew C. Beard² and Kenneth R. Graham¹; ¹University of Kentucky, United States; ²National Renewable Energy Laboratory, United States

10:00 AM BREAK

SESSION CH02.04: Exciton Dynamics - Theory and Experiment

Session Chairs: Margherita Maiuri and Ajay Ram Srimath Kandada

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 321A

1:30 PM *CH02.04.01

Coherent Photoexcited Dynamics in Molecular Systems Sergei Tretiak; Los Alamos National Laboratory, United States

2:00 PM CH02.04.02

Unraveling Exciton Dynamics in van der Waals Heterostructures from First Principles Junyi Liu¹, Zi Li², Xu Zhang¹ and Gang Lu¹; ¹California State University Northridge, United States; ²Institute of Applied Physics and Computational Mathematics, China

2:15 PM CH02.04.03

Tracking Environment Sensitive Ultrafast Photophysics of Tryptophan with Sub-20-fs UV Pulses Piotr Kabacinski¹, Vishal K. Jaiswal², Irene Conti², Barbara E. Nogueira de Faria³, Marziogiuseppe Gentile², Ana M. de Paula³, Rocio Borrego-Varillas¹, Artur Nenov², Giulio Cerrulo¹ and Marco Garavelli²; ¹Politecnico di Milano, Italy; ²Università di Bologna, Italy; ³Universidade Federal de Minas Gerais, Brazil

2:30 PM CH02.04.04

Vibronic Coupling Within the Q-Bands in a Free-Base Porphyrin Unveiled via Multidimensional Spectroscopies Vasilis Petropoulos¹, Pavel Rukin², Mattia Russo¹, Frank E. Rodriguez², Luca Moretti¹, Ana L. Moore⁴, Thomas A. Moore⁴, Devens Gust⁴, Gregory D. Scholes⁵, Deborah Prezzi², Elisa Molinari³, Giulio Cerrulo¹, Carlo A. Rozzi², Filippo Troiani² and Margherita Maiuri¹; ¹Politecnico di Milano, Italy; ²Istituto Nanoscienze - CNR, Italy; ³Dipartimento FIM - Università di Modena e Reggio Emilia, Italy; ⁴Arizona State University, United States; ⁵Princeton University, United States

2:45 PM *CH02.04.05

The Photophysics of Molecular Polaritons in the Collective Regime Joel Yuen-Zhou; University of California, San Diego, United States

SESSION CH02.05: Ultrafast Microscopy/2D Materials/2D Spectroscopy

Session Chairs: Tonu Pullerits and Ajay Ram Srimath Kandada

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 321A

8:30 AM *CH02.05.01

Ultrafast Dynamic Microscopy of Exciton and Charge Transport Libai Huang; Purdue University, United States

9:00 AM CH02.05.02

Charge Dynamics Electron Microscopy Simone Gargiulo¹, Ivan Madan¹, Francesco Barantani^{1,2}, Gabriele Berruto¹, Michael Yannai³, Eduardo J. Dias⁴, Raphael Dahan³, Ido Kaminer³, Giovanni M. Vanacore³, F. Javier G. de Abajo^{4,6} and Fabrizio Carbone¹; ¹EPFL, Switzerland; ²University of Geneva, Switzerland; ³Technion-Israel Institute of Technology, Israel; ⁴ICFO-The Institute of Photonic Sciences, Spain; ⁵Università degli Studi di Milano-Bicocca, Italy; ⁶ICREA-Institució Catalana de Recerca i Estudis Avançats, Spain

9:15 AM CH02.05.04

Controlling Electrons with Strong Laser Fields—From 2D Materials to Topological Insulators Christian Heide^{1,2}, Tobias Boolakee², Yuki Kobayashi¹, Amalya Johnson¹, Heiko B. Weber², Fang Liu¹, Tony F Heinz¹, David Reis¹, Shambhu Ghimire¹ and Peter Hommelhoff²; ¹Stanford University, United States; ²Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

9:30 AM BREAK

10:00 AM *CH02.05.05

Understanding the Role of Dark Exciton Processes in Ultrafast Excitation Dynamics Eric Bittner; University of Houston, United States

10:30 AM CH02.05.06

Direct Evidence of Long-Range Polariton-Assisted Energy Transfer in an Organic Microcavity Probed by Two-Dimensional Electronic Spectroscopy Mattia Russo¹, Kyriacos Georgiou^{2,3}, Armando Genco¹, Giulio Cerrulo¹, David Lidzey³, Andreas Othonos², Margherita Maiuri¹ and Tersilla Virgili⁴; ¹Politecnico di Milano, Italy; ²University of Cyprus, Cyprus; ³The University of Sheffield, United Kingdom; ⁴Istituto di Fotonica e Nanotecnologie - Consiglio Nazionale delle Ricerche, Politecnico di Milano, Italy

10:45 AM CH02.05.07

The Persistence of Orientational Memory in Ionic Transport Probed by Time-Domain Nonlinear Optical Spectroscopy Andrey Poletayev^{1,2}, Mathias Hoffmann², James Dawson^{3,3}, Samuel Teitelbaum^{2,4}, Mariano Trigo^{2,2}, M. Saiful Islam⁵ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³The University of Newcastle, United Kingdom; ⁴Arizona State University, United States; ⁵University of Bath, United Kingdom

SESSION CH02.06: Ultrafast X-ray and Electron Probes

Session Chairs: Eric Bittner and Margherita Maiuri

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 321A

1:30 PM CH02.06.01

Non-Equilibrium Signature of Photoexcited Kitaev Interaction in Honeycomb Mott Insulator α -Li₂IrO₃ Hui-Yuan Chen¹, Rolf B. Versteeg² and Majed Chergui²; ¹École Polytechnique Fédérale de Lausanne, Switzerland; ²Ecole Polytechnique Federale de Lausanne, Switzerland

1:45 PM CH02.06.02

Coherent Excitation of Sub-Terahertz Coherent Dynamics of Polar Skyrmions by Terahertz Pulses and Probed by Ultrafast X-Ray Pulses Huaiyu Wang¹, Vladimir A. Stoica¹, Cheng Dai¹, Sujit Das², Tiannan Yang¹, Zhan Zhang³, Hari Padmanabhan¹, Quynh L. Nguyen⁴, Anudeep Mangu⁵, Yanwen Sun⁴, Mathias Hoffmann⁴, Patrick Kramer⁴, Silke Nelson⁴, Takahiro Sato⁴, Sanghoon Song⁴, Yue Cao³, Diling Zhu⁴, Aaron Lindenberg⁵, Lane Martin², Ramamoorthy Ramesh², Long-Qing Chen¹, John Freeland³, Venkatraman Gopalan¹ and Haidan Wen³; ¹The Pennsylvania State University, United States; ²University of California, Berkeley, United States; ³Argonne National Laboratory, United States; ⁴SLAC National Accelerator Laboratory, United States; ⁵Stanford University, United States

2:00 PM CH02.06.03

Recording Light-Induced Structural Dynamics in Quantum Materials via Ultrafast Electron Diffraction Daniel B. Durham^{1,2}, Frederick Cropp^{3,2}, Khalid M. Siddiqui⁴, Pietro Musumeci³, Sangeeta Rajpurohit², Liang Z. Tan², Colin Ophus², Robert A. Kaindl⁵, Abel Fernandez¹, Lane Martin¹, Wenjing You⁶, Yingchao Zhang⁶, Xun Shi⁶, Margaret Murnane⁶, Andrew M. Minor^{1,2} and Daniele Filippetto²; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³University of California, Los Angeles, United States; ⁴Aarhus University, Denmark; ⁵Arizona State University, United States; ⁶University of Colorado Boulder, United States

2:15 PM CH02.06.04

Fluctuations in Quantum Materials at the Linac Coherent Light Source Joshua J. Turner; SLAC National Accelerator Laboratory, United States

2:30 PM CH02.06.05

Photoinduced Structural Dynamics Across Metal-Insulator Transition in Nickelate Thin Films Jugal Mehta¹, Jianheng Li¹, Rahul Jangid¹, Scott Smith¹, Kenneth Ainslie¹, Toyonath Joshi², Nadia Albayati¹, Yu-Hsing Cheng¹, Pooja Rao¹, David Lederman², Donald Walko³, Haidan Wen³ and Roopali Kukreja¹; ¹University of California, Davis, United States; ²University of California, Santa Cruz, United States; ³Argonne National Laboratory, United States

States

SESSION CH02.07: Ultrafast Probes I
Session Chairs: Margherita Maiuri, Carlos Silva and Ajay Ram Srimath Kandada
Monday Morning, May 23, 2022
CH02-Virtual

8:00 AM *CH02.07.01

ZnO—Ultrafast Generation and Decay of a Surface Metal Lukas Gierster^{1,2}, Sesha Vempati^{2,3} and Julia Stähler^{1,2}; ¹Humboldt-Universität zu Berlin, Germany; ²Fritz Haber Institute of the Max Planck Society, Germany; ³Indian Institute of Technology Bhilai, India

8:30 AM *CH02.07.02

Multi-Dimensional Photoemission Spectroscopy of Semiconductor Heterostructures—Resolving Photoelectrons in Space, Time, Momentum and Energy Keshav M. Dani; Okinawa Institute of Science and Technology, Japan

9:00 AM CH02.07.03

Visualizing Ultrafast Structural Deformations in Nanocrystals Under Nonequilibrium Conditions Burak Guzel Turk; Argonne National Laboratory, United States

9:15 AM CH02.07.04

Photoluminescence Studies from ps to ms with High-Power Fast-Gate cw Pulse Pattern by a RGB Laser Excitation Source in Combination with a Laser Scanning Microscope Christian Oelsner, Volker Buschmann, Thomas Schönau and Rainer Erdmann; PicoQuant GmbH, Germany

SESSION CH02.08: Ultrafast Probes II
Session Chairs: Margherita Maiuri, Carlos Silva and Ajay Ram Srimath Kandada
Monday Morning, May 23, 2022
CH02-Virtual

10:30 AM *CH02.08.01

Tracking Ultrafast Charge Transfer Processes in Heterostructures of 2D Materials Veronica Policht¹, Oleg Dogadov¹, Chiara Trovattello¹, Xiaoyang Zhu², Stefano Dal Conte¹ and Giulio Cerrullo¹; ¹Politecnico di Milano, Italy; ²Columbia University, United States

11:00 AM *CH02.08.02

Exciton Dynamics Controlled by Twisted Angles in Semiconductor Moire Superlattices Xiaoqin E. Li; The University of Texas at Austin, United States

11:30 AM CH02.08.03

Strong Electron-Phonon Coupling in 2D Silver Phenyl Chalcogenolates Revealed by Ultrafast Impulsive Vibrational Spectroscopy Eric Powers, Watcharaphol Paritmongkol, Dillon Yost, Woo Seok Lee, Jeffrey C. Grossman and William Tisdale; Massachusetts Institute of Technology, United States

11:45 AM *CH02.08.04

Probing Ultrafast Spin and Electron Dynamics in Momentum Space and Time Martin Aeschlimann; University of Kaiserslautern, Germany

SESSION CH02.09: Ultrafast Probes III
Session Chairs: Margherita Maiuri, Carlos Silva and Ajay Ram Srimath Kandada
Monday Afternoon, May 23, 2022
CH02-Virtual

1:00 PM *CH02.09.01

Charge-lattice correlations probed by ultrabroadband THz spectroscopy David Cooke; McGill University, Canada

1:30 PM *CH02.09.02

Tracking Ultrafast Three-Dimensional Transport With Sub-10fs Time-Resolution and Sub-10nm Spatial Precision Using Interferometrically Enhanced Pump-Probe Microscopy Akshay Rao; University of Cambridge, United Kingdom

2:00 PM CH02.09.03

Two Regimes of Organic-Inorganic Vibrational and Electronic Interactions in Layered Hybrid Perovskites Shunran Li¹, Xiaotong Li², Linda Li¹, Mercuri Kanatzidis² and Peijun Guo¹; ¹Yale University, United States; ²Northwestern University, United States

##PAGE_BREAK##

SYMPOSIUM CH03

Advances in In Situ and Operando TEM Methods for the Study of Dynamic Processes in Materials
May 9 - May 25, 2022

Symposium Organizers

Ursel Bangert, University of Limerick
Martial Duchamp, Nanyang Technological University
Andrew Minor, University of California, Berkeley
Leopoldo Molina-Luna, Darmstadt University of Technology

* Invited Paper

SESSION CH03.01: Advances in In Situ TEM Methodology
Session Chairs: Andrew Minor and Leopoldo Molina-Luna
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 4, Ballroom C

10:30 AM CH03.01.02

Development and Demonstration of a Real-Time Machine Vision Platform for *In Situ* Microscopy Kevin G. Field^{1,2}, Priyam Patki¹, Kai Sun¹, Mingren Shen³, Ryan Jacobs³, Dane Morgan³ and Christopher R. Field²; ¹University of Michigan, United States; ²Theia Scientific, LLC, United States; ³University of Wisconsin–Madison, United States

SESSION CH03.02: In Situ Studies of Metals
Session Chairs: Ursel Bangert, Martial Duchamp, Andrew Minor and Mitra Taheri
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 4, Ballroom C

1:30 PM *CH03.02.01

Grain Boundary Shear-Migration Coupling in UFG Al Studied Using *In Situ* TEM and Other Advanced Methods Marc Legros and Romain Gautier; CEMES CNRS, France

2:00 PM *CH03.02.02

***In Situ* Straining TEM Experiments for the Characterization of Deformation Induced Phase Transformations** Djamel Kaoumi; North Carolina State University, United States

2:30 PM BREAK

3:00 PM *CH03.02.03

***In Situ* TEM Observations of Dislocation and Twinning Activities of Mg via Nanoindentation** Kelvin Y. Xie, Digvijay Yadav and Dexin Zhao; Texas A&M University, United States

3:30 PM CH03.02.04

***In Situ* TEM Observations on an Aluminium Alloy Elaborated by Laser Beam Melting** Nicolas Bello¹, Malo Jullien^{1,2}, Cassiopée Galy³, Céline Larignon³ and Joël Douin¹; ¹Centre d'Élaboration des Matériaux et d'Études Structurales, France; ²Institut Clément Ader (UMR CNRS 5312), France; ³IRT Saint Exupéry, France

3:45 PM CH03.02.05

Development of New Multiscale STEM-Based Techniques to Characterize Defects Sean Mills and Andrew M. Minor; University of California, Berkeley, United States

SESSION CH03.03: Poster Session: Advances in In Situ and Operando TEM Methods for the Study of Dynamic Processes in Materials
Session Chairs: Ursel Bangert, Martial Duchamp, Andrew Minor and Leopoldo Molina-Luna
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

CH03.03.02

Fluidic Liquid-Phase TEM - Evolving Methods for Flow Experiments from Fluid Dynamics and Reaction Kinetics Considerations Stefan Merckens¹, Giuseppe De Salvo¹, Joscha Kruse^{2,3}, Marek Grzelczak^{2,3} and Andrey Chuvilin^{1,4}; ¹CIC nanoGUNE BRTA, Spain; ²Centro de Física de Materiales CSIC-UPV/EHU, Spain; ³Donostia International Physics Center (DIPC), Spain; ⁴Ikerbasque, Basque Foundation for Science, Spain

CH03.03.03

Rapid Interpretable Incoherent Imaging with Dynamic Hollow-Cone Illumination TEM Jim Ciston¹ and Hamish G. Brown²; ¹Lawrence Berkeley National Laboratory, United States; ²University of Melbourne, Australia

CH03.03.04

Strain Mapping Using Precession Electron Diffraction Data Kelvin Y. Xie and Dexin Zhao; Texas A&M University, United States

CH03.03.06

Void Dynamics and Crystal Reconstruction in Double Perovskite Nanocrystals Revealed by *In Situ* TEM Sasha Khalfin, Noam Veber and Yehonadav Bekenstein; Technion, Israel

CH03.03.07

A Machine-Learning Approach to Characterization of Amorphous Materials with EELS-SI and 4D-STEM Jinseok Ryu, Sangmin Lee, Ingyu Yoo and Miyoung Kim; Seoul National University, Korea (the Republic of)

CH03.03.08

Unsupervised Learning to Understand the Structural Transformation of Ultrathin AuAg Nanowires into Double Helical Structures Using 4D-STEM Alexandra Bruefach¹, Audrey Von Raesfeld¹ and Mary Scott^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

CH03.03.09

III/V Semiconductor Precursor Decomposition in a Closed Gas Cell *In Situ* TEM Holder Maximilian Widemann, David Krug, Felix Gruber, Andreas Beyer and Kerstin Volz; Philipps-Universität Marburg, Germany

CH03.03.10

Optimizing and Understanding Neural Networks for Automated High-Resolution TEM Analysis Katherine Sytwu¹, Luis E. Rangel DaCosta², Catherine Groschner² and Mary Scott^{2,1}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

CH03.03.11

Blob Detection—A Computer Vision Technique to Accurately Track Atom Dynamics in Time-Resolved *In Situ* TEM. Ramon Manzorro¹, Yuchen Xu², Joshua Vincent¹, Roberto Rivera³, David S. Matteson² and Peter A. Crozier¹; ¹Arizona State University, United States; ²Cornell University, United States; ³University of Puerto Rico at Mayagüez, United States

CH03.03.12

Quantifying the Early Stages of Crystallization in Co-Based Magnetic Amorphous Nano-Composite Alloys Alicia Wadsworth¹, Alex Leary², Ronald Noebe², Tim Mewes¹, Claudia Mewes¹ and Gregory B. Thompson¹; ¹University of Alabama, United States; ²NASA Glenn Research Center, United States

CH03.03.13

ω - α Phase Transformation and Plastic Deformation in ω -Ti Lei Cao, Amir Zahiri and Jamie Ombogo; University of Nevada, Reno, United States

WITHDRAWN 5/9/22 CH03.03.16 *In Operando* Transmission Electron Microscopy Studies on Diffusion Induced Phenomena at the Dielectric-Electrode Interfaces in Ge₂Te₃-Based Memristor Devices Krishnamurthy Mahalingam^{1,2}, Austin Shalleross³, Cynthia T. Bowers^{1,2}, Albert Hilton^{1,2}, Sabyasachi Ganguli¹, Eunsung Shin³, Guru Subramanyam³ and Rohan Dhall⁴; ¹U.S. Air Force Research Laboratory, United States; ²UES, Inc., United States; ³University of Dayton, United States; ⁴Lawrence Berkeley National Laboratory, United States

CH03.03.17

Inorganic Self-Replicating Nanoparticles Connor McGlothlin and Nicholas A. Kotov; University of Michigan, United States

SESSION CH03.04: Memristors

Session Chairs: Martial Duchamp and Leopoldo Molina-Luna

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 4, Ballroom C

8:30 AM *CH03.04.01

Visualizing Dielectric Breakdown in Pt/HfO₂/Ti RRAM with STEM EBIC B C Regan^{1,2}, Jared J. Lodico¹, Ho L. Chan¹, Matthew Mecklenburg¹ and William A. Hubbard²; ¹UCLA, United States; ²NanoElectronic Imaging (NEI), Inc., United States

9:00 AM CH03.04.02

***In Situ* TEM Studies of Resistive Switching in HfO₂ Based Memristors** Robert Eilhardt, Alexander Zintler, Oscar Recalde, Despina Nasiou, Lambert Alff and Leopoldo Molina-Luna; Technical University of Darmstadt, Germany

9:15 AM CH03.04.03

Understanding Memristive Switching in Off-Stoichiometric SrTiO₃ for Neuromorphic Applications by Advanced *In Situ* Transmission Electron Microscopy Houari Amari¹, Tobias Schulz¹, Aykut Baki¹, Julian Stoeber¹, Joel Varley², Carsten Richter¹, Jens Martin¹, Klaus Irmscher¹, Jutta Schwarzkopf¹ and Martin Albrecht¹; ¹Institut für Kristallzüchtung (IKZ), Germany; ²Lawrence Livermore National Laboratory, United States

9:30 AM BREAK

SESSION CH03.05: In Situ Electrical and Magnetic Characterization

Session Chairs: Martial Duchamp and B C Regan

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 4, Ballroom C

10:30 AM CH03.05.01

In Situ and Operando TEM Studies on the Magnetic Textures in Permalloy Joseph V. Vas^{1,2}, Rohit Medwal², Aaron D. Mueller², Sourab Manna², John R. Mohan³, Yasuhiro Fukuma³, Rajdeep S. Rawat² and Martial Duchamp^{2,1}; ¹Université Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University, Singapore; ²Nanyang Technological University, Singapore; ³Kyushu Institute of Technology, Japan

10:45 AM CH03.05.02

Unraveling the Mechanism of Iridium Nanoparticle Exsolution through In Situ Scanning Transmission Electron Microscopy, Density Functional Theory and Machine-Learning Image-Analytics Eleonora Cali and David Payne; Imperial College London, United Kingdom

11:00 AM CH03.05.03

Novel FIB-Based Fabrication Routine of Operative Oxide-Based Devices for In Situ/Operando TEM Oscar Recalde¹, Tianshu Jiang¹, Robert Eilhardt¹, Despina Nasiou¹, Alexander Zintler¹, Esmacil Adabifiroozjaei¹, Yevheniy Pivak², Philipp Komissinsky¹, Hugo Perez-Garza², Lambert Alff¹ and Leopoldo Molina-Luna¹; ¹TU Darmstadt, Germany; ²DENSolutions, Netherlands

11:15 AM CH03.05.04

Direct Imaging of π - π Stacking and Its Mechanical Impact on the Kerogen Yujun Xie^{1,2}, Ruopeng Zhang², Younane Abousleiman³, Katherine Hull³, Andrew M. Minor^{2,1} and Peter Hosemann¹; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Aramco Research Center, United States

11:30 AM CH03.05.05

Improved FIB-Based Fabrication of an Operative Pt/HfO₂/TiN Device for Biasing and/or Heating TEM Using an In Situ FIB Method Yevheniy Pivak¹, Hugo Perez-Garza¹, Oscar Recalde², Robert Eilhardt², Alexander Zintler², Despina Nasiou², Tianshu Jiang² and Leopoldo Molina-Luna²; ¹Densolutions, Netherlands; ²TU Darmstadt, Germany

SESSION CH03.06: Ferroelectrics and Multiferroics

Session Chairs: Ursel Bangert and Leopoldo Molina-Luna

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 4, Ballroom C

1:30 PM *CH03.06.01

Domain Dynamics in Ferroelectric Materials Reinis Ignatans and Vasiliki Tileli; École Polytechnique fédérale de Lausanne, Switzerland

2:00 PM CH03.06.02

Thermally Driven Domains in BaTiO₃—An In Situ Study Tamsin I. O'Reilly¹, Kristina M. Holsgrove¹, Achim Strauch², Benjamin März², Thibaud Denneulin², Iaroslav Gaponenko³, Patrycja Paruch³, Knut Müller-Caspary² and Miryam Arredondo¹; ¹Queen's University Belfast, United Kingdom; ²Forschungszentrum Jülich, Germany; ³University of Geneva, Switzerland

2:15 PM CH03.06.03

Direct Probing of Electric-Field-Induced Resistance Switching of a Ferroelectric Oxide Tunnel Junction Min-Hyoung Jung¹, Hyun il Seo¹, Panithan Sriboriboon¹, Yunseok Kim¹, Woo Seok Choi¹, Young-Min Kim¹ and Hu Young Jeong²; ¹Sungkyunkwan University, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of)

2:30 PM *CH03.06.04

Probing the Dynamics of Multiferroic Domain Wall Topologies at the Atomic Scale Michele S. Conroy^{1,2}, Eoghan O'Connell², Kalani Moore², Sinead M. Griffin³, Ursel Bangert², Quentin Ramasse⁴, Roger Whatmore¹, Alexei Gruverman⁵, Marty Gregg⁶ and Colin Ophus³; ¹Imperial College London, United Kingdom; ²University of Limerick, Ireland; ³Lawrence Berkeley National Laboratory, United States; ⁴SuperSTEM, United Kingdom; ⁵University of Nebraska—Lincoln, United States; ⁶Queen's University Belfast, United Kingdom

3:00 PM BREAK

SESSION CH03.07: In Situ Imaging Methods

Session Chairs: Martial Duchamp and Leopoldo Molina-Luna

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 4, Ballroom C

3:30 PM *CH03.07.01

Data Analysis Pipelines for Low Dose In Situ SPLEEM and TEM Experiments Colin Ophus¹, Gong Chen^{2,3}, Steven R. Spurgeon⁴, Andreas Schmid¹, Kai Liu^{2,3}, Bethany Matthews⁴, Christopher Barr⁵ and Khalid Hattar⁵; ¹Lawrence Berkeley National Lab, United States; ²University of California, Davis, United States; ³Georgetown University, United States; ⁴Pacific Northwest National Laboratory, United States; ⁵Sandia National Laboratories, United States

4:00 PM CH03.07.02

Simultaneous Atomic Resolution Imaging and Electrical Characterization of 2D Quantum Devices Joachim D. Thomsen^{1,2}, Julian Klein¹, Frances Ross¹ and Prineha Narang²; ¹Massachusetts Institute of Technology, United States; ²Harvard University, United States

4:15 PM CH03.07.03

Direct Visualisation of Perovskite Microstructural Transformation Under Electrical Bias *Operando* TEM Lan L. Nguyen, Romika Sharma and Martial Duchamp; Nanyang Technological University, Singapore

4:30 PM CH03.07.04

***In Situ* Imaging of Anisotropic Layer-by-Layer Phase Transition in Few-Layer MoTe₂** Chia-Hao Lee¹, Huije Ryu², Gillian Nolan¹, Yichao Zhang¹, Gwan-Hyoung Lee² and Pinshane Y. Huang^{1,3}; ¹University of Illinois at Urbana-Champaign, United States; ²Seoul National University, Korea (the Republic of); ³Materials Research Laboratory, University of Illinois at Urbana-Champaign, United States

SESSION CH03.08: Catalysts I

Session Chair: Miaofang Chi

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 4, Ballroom C

8:30 AM *CH03.08.01

Elucidating Redox Dynamics of High Entropy Oxide Catalysts by Using *In Situ* and Cryogenic STEM Miaofang Chi; Oak Ridge National Laboratory, United States

9:00 AM CH03.08.02

***In Situ* EELS Study of Photonic Modes in Reducible Oxides** Yifan Wang, Piyush Haluai and Peter A. Crozier; Arizona State University, United States

9:15 AM CH03.08.03

Detecting Catalytic Turnover on a Single, Isolated Nanoparticle Under Real Reaction Conditions Tobias G. Bonczyk, Anton S. Bjørnlund, Hjalte Rørbech, Yanxin Liu, Edwin Dollekamp, Karl K. Toudahl, Julius L. Needham, Jerome Vernieres, Ke Zhang, Christian D. Damsgaard, Jakob Kibsgaard, Stig Helveg and Peter C. Vesborg; Technical University of Denmark, Denmark

9:30 AM CH03.08.04

Atomic-Level Dynamics Far from Equilibrium—Fluxionality of Metastable CeO₂ Ramon Manzorro¹, Yuchen Xu², Joshua Vincent¹, Ethan L. Lawrence¹, David S. Matteson² and Peter A. Crozier¹; ¹Arizona State University, United States; ²Cornell University, United States

9:45 AM BREAK

10:15 AM *CH03.08.05

Describing Chemically Induced Fluxional Behavior in Nanoparticles at the Atomic Level and Assessing its Impact on Functionality Peter A. Crozier; Arizona State University, United States

10:45 AM CH03.08.06

Transitional Structures of Continuous Variations in Atomic Positions Induce High Photocatalytic Efficiency Miao Song, Peng Ren, Zexi Lu, James De Yoreo, Peter Sushko and Dongsheng Li; Pacific Northwest National Laboratory, United States

11:00 AM CH03.08.08

Quantifying Fluxionality in Catalytic Nanoparticles from Large *In Situ* TEM Data Sets Advait Gilankar¹, Piyush Haluai¹, Mai Tan¹, Adria Marcos-Morales², Sreyas Mohan², Joshua Vincent¹, Eero P. Simoncelli², Carlos Fernandez-Granda² and Peter A. Crozier¹; ¹Arizona State University, United States; ²New York University, United States

SESSION CH03.09: In Situ Liquid TEM

Session Chairs: Martial Duchamp, Serin Lee and Leopoldo Molina-Luna

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 4, Ballroom C

2:00 PM CH03.09.01

***In Situ* TEM and STEM Characterization of Local Structure and Dynamics in Supercooled Liquids with an Ultrafast Camera** Shuoyuan Huang, Debadya Chatterjee and Paul Voyles; University of Wisconsin–Madison, United States

2:15 PM CH03.09.03

Temperature-Dependent Nanochemistry and Kinetics in Liquid Cell Electron Microscopy—Modeling and Nanomaterials Growth Serin Lee¹, Nicholas Schneider², Julian Klein¹, Shu Fen Tan¹ and Frances Ross¹; ¹Massachusetts Institute of Technology, United States; ²Renata Global, United States

2:30 PM BREAK

SESSION CH03.10: ETEM and Gas Cell

Session Chairs: Ursel Bangert and Peter Crozier

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 4, Ballroom C

3:30 PM *CH03.10.01

Intelligent Tracking of Catalytic Nanoparticles Trajectories During *In Situ* ETEM Experiments Thierry Epicier^{1,2}, Khuram Faraz^{3,2}, Thomas

Grenier² and Christophe Ducottet³; ¹Université de Lyon, UCBL, France; ²Université de Lyon, INSA de Lyon, UCBL, France; ³Université de Lyon, Univ. Jean Monnet, Institut Optique Graduate School, France

4:00 PM CH03.10.02

***In Situ* Hydrogenation of Single Bimetallic Nanoparticles Visualized by Environmental Transmission Electron Microscopy** Briley Bourgeois¹, Daniel Angell¹, Dayne Swearer¹, Wen-Hui Cheng², Michal Vadai¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²National Cheng Kung University, Taiwan

SESSION CH03.11: In Situ Liquid TEM

Session Chairs: Ursel Bangert and Thierry Epicier

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 4, Ballroom C

8:30 AM *CH03.11.01

***In Situ* Liquid Electrochemical TEM Investigation of LiMn_{1.5}Ni_{0.5}O₄ Thin-Film Cathode for Micro-Battery Application** Arnaud Demortiere; Université de Picardie Jules Verne, France

9:00 AM CH03.11.02

Lithium Metal Plating/Stripping Mechanism Studies Through Electrochemical Liquid Cell Transmission Electron Microscopy Seung-Yong Lee^{1,2}, Junyi Shanguan^{2,3}, Sophia Betzler², Judith Alvarado-Kim², Stephen Harris², Marca Doeff² and Haimei Zheng^{2,3}; ¹Hanyang University, Korea (the Republic of); ²Lawrence Berkeley National Laboratory, United States; ³University of California, Berkeley, United States

9:15 AM CH03.11.03

***In Situ* TEM for Dynamic Materials Behaviors in Li-Ion and Beyond-Li Batteries** Kai He, Jiang Cui and Hongkui Zheng; Clemson University, United States

9:30 AM CH03.11.04

Crystallization and 3D Structures of Nanoparticles by *In Situ* TEM Jungwon Park; Seoul National University, Korea (the Republic of)

9:45 AM BREAK

SESSION CH03.12: Data Processing

Session Chairs: Ursel Bangert and Colin Ophus

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 4, Ballroom C

10:30 AM *CH03.12.01

Automated Defect Detection in Electron Microscopy of Radiation Damage in Metals Dane Morgan¹, Ryan Jacobs¹, Priyam Patki², Matthew Lynch² and Kevin G. Field²; ¹University of Wisconsin--Madison, United States; ²University of Michigan--Ann Arbor, United States

11:00 AM CH03.12.02

Semantic Segmentation for Analysis of Melting of Nanoscale Ice via Convolutional Neural Networks Arun Baskaran, Yulin Lin, Jianguo Wen and Maria K. Chan; Argonne National Laboratory, United States

11:15 AM

WITHDRAWN 5/10/22 CH03.12.04 Ultra-High Energy Resolution STEM-EELS for *In Situ* Analysis Tracy C. Lovejoy; Nion, United States

SESSION CH03.13: Catalysts II

Session Chairs: Arnaud Demortiere and Martial Duchamp

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 4, Ballroom C

1:30 PM CH03.13.02

***In Situ* HRTEM of Facet Stabilization by Solute Partitioning** Jonathan Priedeman and Gregory B. Thompson; The University of Alabama, United States

1:45 PM CH03.13.03

Windowless Wet Environmental TEM—A Dedicated Approach for Water Condensation/Evaporation Experiments Joseph V. Vas^{1,2}, Francisco J. Santos Aires³, Eric Ehret³, Emmanuel Landrison³, Aaron D. Mueller² and Thierry Epicier³; ¹Université Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University, Singapore; ²Nanyang Technological University, Singapore; ³Université de Lyon, UCBL, IRCELYON, umr5256, France

SESSION CH03.14: Advances in In Situ and Operando TEM Methods for the Study of Dynamic Processes in Materials I

Session Chair: Leopoldo Molina-Luna

Wednesday Morning, May 25, 2022

CH03-Virtual

8:00 AM *CH03.14.01

Probing Electric Field and Charge Distributions at Interfaces Using Nanofluidic Liquid Phase Electron Holography Mads S. Larsen¹, Murat N. Yesibolati¹, Tavabi A. Hossein², Shibabrata Basak^{2,3}, Tayyaba Malik¹, Emil C. Jensen¹, Elisabetta M. Fiordaliso¹, Marco Beleggi¹, Rüdiger-A. Eichel³, Rafal E. Dunin-Borkowski² and Kristian S. Mølhave¹; ¹Technical University of Denmark, Denmark; ²Forschungszentrum Jülich, Germany; ³Forschungszentrum Jülich GmbH, Germany

8:30 AM CH03.14.02

Grain Rotation Mediated Deformation in Nano-Grained Mg-Gd Binary Alloy via *In Situ* TEM Indentation Yushun Liu and Guozhen Zhu; University of Manitoba, Canada

8:35 AM *CH03.14.03

***In Situ* TEM and Electron Holography Investigation of the Perpendicular Shape Anisotropy and Thermal Stability of STT-MRAM Nano-Pillars** Trevor Almeida^{1,2}, Steven Lequeux², Alvaro Palomino², Nuno Caçoilo², Aurélien Masseboeuf², Ricardo Sousa², Olivier Fruchart², Ioan Lucian Prejbeanu², Bernard Dieny² and David Cooper²; ¹University of Glasgow, United Kingdom; ²Université Grenoble Alpes, France

9:05 AM *CH03.14.04

Sub-Kelvin Thermometry for Evaluating the Local Temperature Stability Within *In Situ* TEM Gas Cells Erdmann Spiecker; Institute of Micro- and Nanostructure Research (IMN) & Center for Nanoanalysis and Electron Microscopy (CENEM), Interdisciplinary Center for Nanostructured Films (IZNF), Germany

9:35 AM *CH03.14.05

Recent Advances in Nanoscale Strain Mapping of Complex Materials During *In Situ* Deformation Christoph Gammer¹, Huaping Sheng¹, Daniel Kiener², Andrew M. Minor³ and Jürgen Eckert^{1,2}; ¹Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; ²Montanuniversität Leoben, Austria; ³Lawrence Berkeley National Laboratory, United States

SESSION CH03.15: Advances in In Situ and Operando TEM Methods for the Study of Dynamic Processes in Materials II
Session Chair: Leopoldo Molina-Luna
Wednesday Morning, May 25, 2022
CH03-Virtual

10:30 AM *CH03.15.01

***In Situ* TEM Measurement of Magnetic and Thermal Dynamic Process of Nano-Scale Structures** Kiyou Shibata; The University of Tokyo, Japan

11:00 AM CH03.15.02

Large Scale Ferroelectric Domain Mapping by 4D STEM Ursula Ludacka¹, Jiali He¹, Emil Frang Christiansen¹, Shuyu Qin², Zewu Yan³, Edith Bourret⁴, Antonius T. J. van Helvoort¹ and Dennis Meier¹; ¹NTNU, Norway; ²Lehigh University, United States; ³ETH Zürich, Switzerland; ⁴Lawrence Berkeley National Laboratory, United States

11:15 AM CH03.15.03

***In Situ* Dynamics of Metal-Oxides Nanofluids for Solar Thermal Applications** Praveen Kumar¹, Hussein Sayed Moghaieb², Davide Mariotti² and Miryam Arredondo¹; ¹Queen's University Belfast, United Kingdom; ²Nanotechnology and Integrated Bio-Engineering Centre (NIBEC), Ulster University, United Kingdom

11:30 AM CH03.15.04

Quantitative Comparison of Simulated and Experimental Electric Fields in Nanocapacitors Measured by *Operando* Electron Holography Kilian Gruel¹, Raphaël Serra¹, Leifeng Zhang¹, Aurélien Masseboeuf², Martin J. Hytch¹ and Christophe Gatel^{1,3}; ¹CEMES - CNRS, France; ²CEA, France; ³Université de Toulouse, France

11:45 AM CH03.15.05

***In Situ* Atomic-Scale Electron Beam Fabrication of 2D Materials with Automated Feedback-Control** Matthew G. Boebinger¹, Sudhjit Misra¹, Ayana Ghosh¹, Yiling Yu¹, Kai Xiao¹, Tyler Mathis², Yury Gogotsi², Andrew Lupini¹, Panchapakesan Ganesh¹, Maxim Ziatdinov¹, Sergei Kalinin¹, Stephen Jesse¹ and Raymond R. Unocic¹; ¹Oak Ridge National Laboratory, United States; ²A.J. Drexel Nanomaterials Institute, United States

12:00 PM CH03.15.06

Electron-Beam Induced Degradation Dynamics of BNNT *In Situ* The ETEM Hsin-Yun Chao^{1,2,3}, Adelaide Mei-Chun Nolan², Dmitri Golberg⁴, Cheol Park⁵, Yifei Mo², Renu Sharma³ and John Cumings²; ¹Oak Ridge National Laboratory, United States; ²University of Maryland, United States; ³National Institute of Standards and Technology, United States; ⁴Queensland University of Technology, Australia; ⁵NASA Langley Research Center, United States

12:15 PM *CH03.15.07

Liquid Phase Electron Microscopy as an Innovative Tool to Probe Pharmaceutical Crystallisation Jennifer Cookman¹, Victoria Hamilton², Harsh Barua^{1,1}, Sarah Hudson^{1,1}, Simon Hall² and Ursel Bangert¹; ¹University of Limerick, Castletroy, Ireland; ²University of Bristol, United Kingdom

SESSION CH03.16: Advances in In Situ and Operando TEM Methods for the Study of Dynamic Processes in Materials III
Session Chair: Martial Duchamp
Wednesday Afternoon, May 25, 2022
CH03-Virtual

9:00 PM *CH03.16.01

***In Situ* and Atomic-Scale Electron Microscopy Characterization of Relaxor Ferroelectrics** [Yukio Sato](#); Kyushu University, Japan

9:30 PM CH03.16.02

The Kinetics and Mechanisms of Light-Induced Phase Separation in a Mixed-Halide Perovskite [Siying Peng](#)^{1,2}, Yanming Wang³, Michael Braun¹, Yikai Yin¹, Andrew C. Meng⁴, Balreen Saini¹, Wanliang Tan¹, Kayla Severson¹, Ann Marshall¹, Katherine Sytwu⁵, John Baniecki¹, Jennifer A. Dionne¹ and Paul McIntyre¹; ¹Stanford University, United States; ²Westlake University, China; ³Shanghai Jiao Tong University, China; ⁴University of Pennsylvania, United States; ⁵Lawrence Berkeley National Laboratory, United States

9:45 PM CH03.16.03

Atomistic Observation on Diffusion-Mediated Friction Between Single-Asperity Contacts [Xiang Wang](#), Yang He, Zhenyu Liu, Guofeng Wang and Scott X. Mao; University of Pittsburgh, United States

10:00 PM *CH03.16.04

***In Situ* TEM Studies of Microstructure Control During Nanoscale Phase Transformation** [Judy Cha](#); Yale University, United States

10:30 PM *CH03.01.01

The New *Operando*—Incorporation Intelligent Decisions into *In Situ* TEM Mitra Taheri and [Jonathan Hollenbach](#); Johns Hopkins University, United States

##PAGE_BREAK##

SYMPOSIUM DS01

Integrating Machine Learning and Simulations for Materials Modeling, Design and Manufacturing
May 8 - May 24, 2022

Symposium Organizers

Mathieu Bauchy, University of California, Los Angeles
Mathew Cherukara, Argonne National Laboratory
Grace Gu, Massachusetts Institute of Technology
Badri Narayanan, University of Louisville

* Invited Paper

SESSION Tutorial DS00.00: Machine Learning in Materials Science—From Basic Concepts to Active Learning
, NaN,

SESSION DS01.01: Simulation and Machine Learning I
Session Chair: Mathieu Bauchy
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, Lili'u Theater, 310

9:00 AM DS01.01.01

Graph Neural Network for Improved Property Predictions of Molecules, Solids and Metal Organic Frameworks [Kamal Choudhary](#); National Institute of Standards and Technology, United States

9:15 AM DS01.01.02

Theoretical Prediction of the Electronic and Structural Properties of Van der Waals Heterostructures Using a Combined Machine Learning and Density Functional Theory Approach [Daniel Wilhelm](#)¹, Nathan Wilson¹, Raymundo Arroyave¹, Xiaoning Qian¹, Tahir Cagin¹, Ruth Pachter² and Xiaofeng Qian¹; ¹Texas A&M University, United States; ²Air Force Research Laboratory, United States

9:30 AM DS01.01.03

Efficient Pneumatic Gripper Simulator Using Machine Learning And Optimization [Zhizhou Zhang](#), Zeqing Jin and Grace Gu; University of California, Berkeley, United States

9:45 AM DS01.01.04

Accelerating Phase-Field Based Predictions via Surrogate Models Trained by Machine Learning Methods [Remi Dingreville](#); Sandia National Laboratories, United States

10:00 AM BREAK

10:30 AM DS01.01.05

A Machine Learning Framework for Damage Mechanism Identification from Acoustic Emission in Unidirectional SiC/SiC CMCs [Caelin Muir](#)¹, Bhavana Swaminathan¹, Kirk Fields¹, Amjad Almansour², Michael Presby², Kathleen Sevener³, Craig Smith², James Kiser² and Samantha Daly¹; ¹University of California, Santa Barbara, United States; ²NASA Glenn Research Center, United States; ³University of Michigan–Ann Arbor, United States

10:45 AM DS01.01.06

Computational and Machine Learning Approach to Electrochemistry of Disordered Rocksalt Cathode Materials [Peichen Zhong](#)^{1,2} and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

11:00 AM DS01.01.07

Automated Framework for the Inversion of Experimental Data to Atomistic Structure Using Computer Vision and Multi-Objective Evolutionary Algorithms [Venkata Surya Chaitanya Kolluru](#), Eric Schwenker, Davis G. Unruh and Maria K. Chan; Argonne National Laboratory, United States

11:15 AM DS01.01.08

Lightweight and Strong Lattice Structure Designs by Generative Machine Learning and Additive Manufacturing [Sangryun Lee](#), Zhizhou Zhang and Grace Gu; University of California, Berkeley, United States

11:30 AM DS01.01.09

Molecular Dynamics Simulations for the Molecular Polarization of Salt-Free and Salt-Containing Liquids with Stockmayer Fluids and Ensemble Neural Networks Tong Gao¹, Mark J. Stevens^{2,3}, Amalie L. Frischknecht^{2,3} and [Issei Nakamura](#)¹; ¹Michigan Technological University, United States; ²Sandia National Laboratories, United States; ³Center for Integrated Nanotechnologies, United States

SESSION DS01.02: Simulation and Machine Learning II

Session Chair: Mathieu Bauchy

Sunday Afternoon, May 8, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

1:30 PM *DS01.02.01

Neural Networks for Modeling Materials with Long-Range Interactions [Emine Kucukbenli](#)^{1,2}; ¹Boston University, United States; ²Harvard University, United States

2:00 PM DS01.02.02

Crystal Diffusion Variational Autoencoder for Periodic Material Generation [Tian Xie](#), Xiang Fu, Octavian Ganea, Regina Barzilay and Tommi Jaakkola; Massachusetts Institute of Technology, United States

2:15 PM DS01.02.04

Predicting Plastic Anisotropy Using Crystal Plasticity and Bayesian Neural Network Surrogate Models [David Montes de Oca Zapaiain](#)¹, Hojun Lim¹, Taejoon Park² and Farhang Pourboghra²; ¹Sandia National Laboratories, United States; ²The Ohio State University, United States

2:30 PM DS01.02.05

Using ML Tools to Enable High-throughput Studies of Amorphous Material Surfaces, and Its Application to Plasma Etching [Martin Siron](#)^{1,2}, Nita Chandrasekhar² and Kristin Persson^{1,3}; ¹University of California, Berkeley, United States; ²Intel Corporation, United States; ³Lawrence Berkeley National Laboratory, United States

2:45 PM BREAK

3:15 PM DS01.02.06

Predicting Compositional Changes of Organic-Inorganic Hybrid Materials with Augmented CycleGAN [Qianxiang Ai](#)¹, Alexander Norquist² and Joshua Schrier¹; ¹Fordham University, United States; ²Haverford College, United States

3:30 PM DS01.02.07

Learning to Simulate Time-Averaged Coarse-Grained Molecular Dynamics with Geometric Machine Learning [Xiang Fu](#), Tian Xie, Nathan Rebello, Bradley Olsen and Tommi Jaakkola; Massachusetts Institute of Technology, United States

3:45 PM DS01.02.08

Atomistic Modeling and Uncertainty Quantification for Mechanical Properties of Graphene Aerogels [Bowen Zheng](#), Zeyu Zheng and Grace Gu; University of California, Berkeley, United States

4:00 PM DS01.02.09

Predicting Solvent-Polymer Solubility with Machine Learning [Joseph D. Kern](#), Mona Amrihesari, Shruti Venkatram, Blair Brettmann and Rampi Ramprasad; Georgia Institute of Technology, United States

SESSION DS01.03: Simulation and Machine Learning III

Session Chairs: Ekin Cubuk and Badri Narayanan

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

10:30 AM *DS01.03.01

Polymer Informatics—Recent Advances in Algorithms to Solve Forward and Inverse Problems [Rampi Ramprasad](#); Georgia Institute of Technology, United States

11:00 AM DS01.03.02

Learning Hierarchical Synthesis Recipes by Spectral Shape Matching and Optimization on Hyperbolic Spaces [Kiran Vaddi](#), Huat T. Chiang and Lilo D. Pozzo; University of Washington, United States

11:15 AM DS01.03.03

Studying Disordered Material Dynamics Using a Simulator/Machine Learning Pipeline for X-Ray Speckle Analysis [Sathya R. Chitturi](#)^{1,2}, Youssef Nashed², Nicolas Burdet², Daniel Ratner², Thomas Lane^{3,2}, Yanwen Sun², Diling Zhu², Matt Seaberg², Chuck Yoon², Mike Dunne^{2,1} and Joshua J. Turner²; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³Deutsches Elektronen-Synchrotron DESY, Germany

11:30 AM DS01.03.04

Calibrating DFT Formation Enthalpy Calculations by Multi-Fidelity Machine Learning [Sheng Gong](#)¹, Shuo Wang², Tian Xie¹, Woo Hyun Chae¹, Runze Liu¹ and Jeffrey C. Grossman¹; ¹Massachusetts Institute of Technology, United States; ²University of Maryland, United States

11:45 AM DS01.03.05

Case Studies in Representation Learning for Inverse Materials Design Arindam Debnath, Seda Oturak, Debjyoti Bhattacharya and [Wesley Reinhart](#); The Pennsylvania State University, United States

SESSION DS01.04: Simulation and Machine Learning IV

Session Chair: Grace Gu

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

1:30 PM *DS01.04.01

Materials Discovery Using Deep Learning and Differentiable Physics [Ekin D. Cubuk](#); Google, United States

2:00 PM DS01.04.02

CO-Induced Restructuring of Pt Nanoparticles from Machine-Learning Molecular Dynamics—Bayesian Active Learning and Neural Network Approaches [Cameron J. Owen](#)¹, Jin Soo Lim¹, Lixin Sun¹, Yu Xie¹, Isabel Diersen¹ and Boris Kozinsky^{1,2}; ¹Harvard University, United States; ²Bosch, United States

2:15 PM DS01.04.03

Learning Hidden Elasticity with Deep Neural Networks [Chun-Teh Chen](#) and Grace Gu; University of California, Berkeley, United States

2:30 PM DS01.04.04

Fully Automated Nanoscale to Atomistic Structure from Theory and X-Ray Spectroscopy Experiments [Davis G. Unruh](#), Venkata Surya Chaitanya Kolluru, Eli D. Kinigstein, Xiaoyi Zhang and Maria K. Chan; Argonne National Laboratory, United States

2:45 PM DS01.04.05

Decision Trees in Continuous Action Space for High-Throughput Exploration of Potential Energy Surface of Nanoclusters [Sukriti Manna](#), Troy Loeffler, Rohit Batra, Suvo Banik, Henry Chan and Subramanian Sankaranarayanan; Argonne National Laboratory, United States

3:00 PM BREAK

3:30 PM DS01.04.06

High-Throughput Simulation for Machine Learning and Transfer Learning for Applications in Automated Characterization with High-Resolution Transmission Electron Microscopy (HRTEM) [Luis E. Rangel DaCosta](#)¹, Katherine Sytwa², Catherine Groschner¹ and Mary Scott^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

3:45 PM DS01.04.07

Many-Body Interatomic Potential with Bayesian Active Learning, an Application to SiC [Yu Xie](#)¹, Jonathan Vandermause¹, Senja Ramakers^{2,3}, Nakib Protik¹, Anders Johansson¹ and Boris Kozinsky¹; ¹Harvard University, United States; ²Robert Bosch GmbH, Germany; ³Ruhr-Universität, Germany

4:00 PM DS01.04.08

Process Modeling of Direct Ink Write 3D Printing Using Computer Vision and Machine Learning [Devin J. Roach](#), William D. Reinholtz and Adam Cook; Sandia National Laboratories, United States

4:15 PM DS01.04.09

A Critical Assessment of Neural Network Potentials for Water and the Role of Nuclear Quantum Effects Through the Van Hove Correlation Function [Murali Gopal Muraleedharan](#) and Paul Kent; Oak Ridge National Laboratory, United States

4:30 PM DS01.04.10

Machine-Learning Interatomic Potentials for Bulk Metallic Glasses [Nicholas Martinez](#), Gabriel Medrano and Oliviero Andreussi; University of North Texas, United States

4:45 PM DS01.04.11

Data Ecosystem of the Ultrahigh Temperature Refractory Alloys (ULTERA) Database [Adam M. Krajewski](#) and Zi-Kui Liu; The Pennsylvania State

University, United States

SESSION DS01.05: Simulation and Machine Learning V
Session Chairs: N M Anoop Krishnan and Badri Narayanan
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, Lili'U Theater, 310

8:30 AM *DS01.05.01

Active Learning of Neural Network Interatomic Potentials with Differentiable Uncertainty [Rafael Gomez-Bombarelli](#); Massachusetts Institute of Technology, United States

9:00 AM DS01.05.02

NequIP—Equivariance Enables Machine Learning Interatomic Potentials at Unprecedented Sample Efficiency and Accuracy [Simon L. Batzner](#)¹, Albert Musaelian¹, Lixin Sun¹, Mario Geiger², Jonathan Mailoa³, Mordechai Kornbluth³, Nicola Molinari¹, Tess E. Smidt⁴ and Boris Kozinsky^{1,3}; ¹Harvard University, United States; ²EPFL, Switzerland; ³Robert Bosch Research and Technology Center, United States; ⁴Massachusetts Institute of Technology, United States

9:15 AM DS01.05.03

Navigating to Islands of Photostability—Multi-Objective Optimization of Perovskite Absorber Compositions for Targeted Photovoltaic Applications Using High-Throughput Robotic Experimentation [Rishi Kumar](#), Moses Kodur, Jack Palmer, Connor Dolan, Deniz N. Cakan and David Fenning; University of California, San Diego, United States

9:30 AM DS01.05.04

Understanding Phase Stability and Phase Transition of Boron Suboxide Using First-Principles Based Potentials [Bin Liu](#); Kansas State University, United States

9:45 AM DS01.05.05

Exploring Kinetic Pathways for Ice Nucleation Using Evolutionary Reinforcement Learning [Anirban Chandra](#)¹, Rohit Batra², Amanda Dufek³, Suvo Banik¹, Isaac Tamblyn⁴, Pierre T. Darancet², Stephen Whitelam³ and Subramanian Sankaranarayanan^{2,1}; ¹University of Illinois at Chicago, United States; ²Argonne National Laboratory, United States; ³Lawrence Berkeley National Laboratory, United States; ⁴University of Ottawa, Canada

10:00 AM BREAK

10:30 AM DS01.05.06

Computer Vision and Artificial Intelligence for Smart Additive Manufacturing [Grace Gu](#); University of California, Berkeley, United States

10:45 AM DS01.05.07

Overcoming Data Scarcity in Materials Science with Meta-Learning [Rees Chang](#), Yu-Xiong Wang and Elif Ertekin; University of Illinois at Urbana-Champaign, United States

11:00 AM DS01.05.08

Free Energy Calculation of Crystalline Solids Using Normalizing Flow [Rasool Ahmad](#) and Wei Cai; Stanford University, United States

11:15 AM DS01.05.09

Ab Initio Modeling Data Based Autoencoder to Interpret ARPES Data and Assist Inverse Design of Semiconductor Heterostructures [Sanghamitra Neogi](#) and Artem Pimachev; University of Colorado Boulder, United States

SESSION DS01.06: Simulation and Machine Learning VI
Session Chairs: Rafael Gomez-Bombarelli and Grace Gu
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, Lili'U Theater, 310

1:30 PM *DS01.06.01

ML+Modeling for Materials Characterization and Design [Maria K. Chan](#); Argonne National Laboratory, United States

2:00 PM DS01.06.02

Designing New Forcefield Using Board AI [Troy Loeffler](#), Sukriti Manna, Henry Chan, Rohit Batra and Subramanian Sankaranarayanan; Argonne National Laboratory, United States

2:15 PM DS01.06.03

GDSPEC—Graph Order and Atomic Density Spectrum for Learning Chemical Environments [Suvo Banik](#)¹, Sukriti Manna¹, Debdas Dhabal², Valeria Molinero² and Subramanian Sankaranarayanan¹; ¹University of Illinois at Chicago, United States; ²University of Utah, United States

2:30 PM DS01.06.04

Multi-Reward Reinforcement Learning Based Inter-Atomic Potential Models for Silica [Aditya Koneru](#)^{1,2}, Henry Chan^{1,2}, Sukriti Manna^{1,2}, Troy Loeffler^{1,2}, Valeria Molinero³ and Subramanian Sankaranarayanan^{1,2}; ¹University of Illinois at Chicago, United States; ²Argonne National Laboratory, United States; ³The University of Utah, United States

2:45 PM DS01.06.05

Towards Systematically Improvable Deep Learning Interatomic Potentials with Deep Interatomic Cluster Expansions (DICE) [Albert Musaelian](#)¹,

Simon L. Batzner¹ and Boris Kozinsky^{1,2}; ¹Harvard University, United States; ²Robert Bosch Research and Technology Center, United States

3:00 PM BREAK

3:30 PM DS01.06.06

Multi-Objective Optimization of Graphene-Based Sensors with Batch Evaluations Hud Wahab, Todd Muller, Lars Kotthoff and Patrick Johnson; University of Wyoming, United States

3:45 PM DS01.06.08

High-Throughput Experiments and Holistic Integration with Computational Data to Accelerate Alloy Design Ji-Cheng Zhao; University of Maryland, United States

4:00 PM DS01.06.09

Bio-Inspired Computational Design of Vascularized Electrodes for High-Performance Fast-Charging Batteries Optimized by Deep Learning Po-Chun Hsu; Duke University, United States

4:15 PM DS01.06.10

Machine Learning for Exploration of Defects in 2D Grain Boundaries Jianan Zhang¹, Aditya Koneru^{1,2}, Srilok Srinivasan², Subramanian Sankaranarayanan^{1,2} and Carmen Lilley¹; ¹University of Illinois at Chicago, United States; ²Argonne National Laboratory, United States

4:30 PM DS01.06.11

Data Problems in Materials Modeling and Closed-Loop Experiments Henry Chan¹, Aditya Koneru², Subramanian Sankaranarayanan^{1,2}, Valeria Molinero³ and Jie Xu¹; ¹Argonne National Laboratory, United States; ²University of Illinois at Chicago, United States; ³The University of Utah, United States

SESSION DS01.07: Poster Session I: Integrating Machine Learning and Simulations for Materials Modeling, Design and Manufacturing I

Session Chairs: Rafael Gomez-Bombarelli and N M Anoop Krishnan

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS01.07.01

Machine Learning Model for Electrical and Thermal Conductivities of Copper – Carbon Nanotubes Composites Faizan Ejaz¹, Dong Su Lee², Jangyup Son², Jin-Sang Kim² and Beomjin Kwon¹; ¹Arizona State University, United States; ²Korea Institute of Science and Technology (KIST), Korea (the Republic of)

DS01.07.03

Machine Learning-Based Optimization of Biomimetic Hierarchical Porous Structures Inspired by the Sea Glass Sponge Ailin Chen, Sangryun Lee and Grace Gu; University of California, Berkeley, United States

DS01.07.04

Crystal Level Features Developed Using Edge Prediction on Graphs Derived from Crystals Divya Sharma, Xiangyu Chen, Haili Jia and Paulette Clancy; Johns Hopkins University, United States

DS01.07.05

Generative Machine Learning Approach for Asymmetric Cellular Architectures with Enhanced Mechanical Properties Shao-Yi Yu, Sangryun Lee and Grace Gu; University of California, Berkeley, United States

DS01.07.06

Machine-Learning Accelerated Synthesis of Nitride Materials—Prediction of Synthesis Pathways Linus Kautzsch, Aiden Reilly, Ram Seshadri and Stephen Wilson; University of California, Santa Barbara, United States

SESSION DS01.08: Simulation and Machine Learning VII

Session Chairs: Mathieu Bauchy and Valeria Molinero

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, Lili'u Theater, 310

8:30 AM *DS01.08.01

Investigating Atomic-Scale Mechanisms of Crystallization Using Machine Learning Rodrigo Freitas; Massachusetts Institute of Technology, United States

9:00 AM DS01.08.02

Data-Driven Decision Making for Autonomous Materials Synthesis Nathan Szymanski^{1,2}, Pragnay Nevatia^{1,2}, Yan Zeng², Christopher Bartel^{1,2} and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

9:15 AM DS01.08.03

A Cluster-Based Approach for Identifying and Meshing Crystalline Regions in Molecular Dynamics Simulation Thomas J. Barrett and Marilyn L. Minus; Northeastern University, United States

9:30 AM DS01.08.04

Automated Discovery of Chemical Reaction Kinetics for Carbon Dioxide Capture Solutions Theodore G. van Kessel, Benjamin H. Wunsch, Stacey Gifford, Flaviu Cipcigan, James McDonagh, Dmitry Zubarev, Alexander Harrison and Stamatia Zavitsanou; IBM, United States

9:45 AM DS01.08.05

A Data-Driven Approach to Predict Full-Field Nonlinear Stress Distribution and Crack Path in Microstructural Representation of Composites Maryam Shakiba and Reza Sepasdar; Virginia Tech, United States

10:00 AM BREAK

10:30 AM DS01.08.06

Differentiable Physics for Materials Discovery Samuel S. Schoenholz, Amil Merchant and Ekin D. Cubuk; Google, United States

10:45 AM DS01.08.07

Controlling Hydrogen Cottrell Atmospheres Around Dislocations in Austenitic Stainless Steels Through Alloying Using a Combined MD-DFT Pipeline Chris Nowak¹, Michael Foster¹, Ryan Sills² and Xiaowang Zhou¹; ¹Sandia National Laboratories, United States; ²Rutgers, The State University of New Jersey, United States

11:00 AM DS01.08.08

Machine-Learning Studies of Hydrogen Effects on Stacking Fault Energies in an Fe_{0.70}Ni_{0.11}Cr_{0.19} Austenitic Stainless Steels Xiaowang Zhou¹, Chris Nowak¹, Michael Foster¹, Ryan Sills², Joseph Allen Ronevich¹ and Chris San Marchi¹; ¹Sandia National Laboratories, United States; ²Rutgers University, United States

11:15 AM DS01.08.09

On Generalizability of Data-Driven Microstructure-Property Mappings in Organic Solar Cells Hao Liu¹, Nirmal Baishnab², Balaji S. Pokuri², Baskar Ganapathysubramanian² and Olga Wodo¹; ¹University at Buffalo, The State University of New York, United States; ²Iowa State University of Science and Technology, United States

11:30 AM DS01.08.10

Unsupervised Large-Scale 3D Phase-Contrast Imaging From Scanning Diffraction Measurements Philipp M. Pelz^{1,2}, Mingee Cho^{1,2}, Mary Scott^{1,2} and Colin Ophus²; ¹UC Berkeley, United States; ²National Center for Electron Microscopy, United States

SESSION DS01.09: Simulation and Machine Learning VIII

Session Chair: Mathieu Bauchy

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, Lili'u Theater, 310

1:30 PM *DS01.09.01

Elucidating the Mechanisms of Synthesis of Zeolites Using Data Science and Molecular Simulations Debdas Dhabal¹, Suvo Banik^{2,3}, Andressa A. Bertolazzo¹, Subramanian Sankaranarayanan^{2,3} and Valeria Molinero¹; ¹University of Utah, United States; ²University of Illinois at Chicago, United States; ³Argonne National Laboratory, United States

2:00 PM DS01.09.03

Ultra-Fast Interpretable Machine-Learning Potentials for Metals and Semiconductors Stephen R. Xie^{1,2}, Pawan Prakash², Robert Schmid³, Matthias Rupp³ and Richard Hennig²; ¹KBR at NASA Ames Research Center, United States; ²University of Florida, United States; ³Universität Konstanz, Germany

2:15 PM DS01.09.04

Data-Augmentation for Graph Neural Network Learning of the Relaxed Energy of Unrelaxed Structures Jason B. Gibson, Ajinkya Hire and Richard Hennig; University of Florida, United States

2:30 PM BREAK

3:00 PM DS01.09.05

Graph-Based Strategy for Microstructure Similarity in Large Datasets Parth Desai, Namit Juneja, Varun Chandola, Jaroslaw Zola and Olga Wodo; University at Buffalo, The State University of New York, United States

3:15 PM DS01.09.06

Data-Driven Field Inversion of Molecular Simulations to Construct Free Energy Landscapes of Organic Semiconducting Systems Baskar Ganapathysubramanian, Balaji S. Pokuri and Chih-Hsuan (Bella) Yang; Iowa State University, United States

3:30 PM DS01.09.07

Reinforcement Learning for Molecule Space Exploration: Conditioned Latent Representations via Large Scale Self-Supervised Learning Chih-Hsuan (Bella) Yang¹, Hsin-Jung Yang¹, Vinayak Bhat², Parker Sornberger², Balaji S. Pokuri¹, Chad Risko² and Baskar Ganapathysubramanian¹; ¹Iowa State University, United States; ²University of Kentucky, United States

3:45 PM DS01.09.10

Exploring the Necessary Complexity of Interatomic Potentials Joshua Vita and Dallas Trinkle; University of Illinois at Urbana-Champaign, United States

SESSION DS01.10: Poster Session II: Integrating Machine Learning and Simulations for Materials Modeling, Design and Manufacturing II

Session Chair: Valeria Molinero

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS01.10.01

Towards Interpretable Polyamide Property Prediction [Franklin L. Lee](#)¹, Jaehong Park², Sushmit Goyal¹, Yousef Qaroush¹, Shihu Wang¹, Hong Yoon³, Aravind Rammohan¹ and Youngseon Shim²; ¹Corning Incorporated, United States; ²Samsung Electronics Co, Ltd., Korea (the Republic of); ³Corning Precision Materials Co., Ltd., Korea (the Republic of)

DS01.10.02

Multiscale Neural-Network Quantum Molecular Dynamics and Molecular Mechanics for Polar Topological Structures [Ken-ichi Nomura](#)¹, Thomas M. Linker¹, Shogo Fukushima², Rajiv Kalia¹, Aravind Krishnamoorthy¹, Aiichiro Nakano¹, Kohei Shimamura², Fuyuki Shimojo² and Priya Vashishta¹; ¹University of Southern California, United States; ²Kumamoto University, Japan

DS01.10.03

Fast Assessment of Metal Performances Through Dislocation Physics and Machine Learning [Jaehyun Cho](#)^{1,2}, William Tucker^{1,2}, Kevin Wheeler¹ and Justin Haskins¹; ¹NASA Ames Research Center, United States; ²Analytical Mechanics Associates, United States

DS01.10.04

Calibrated Uncertainty for Molecular Property Prediction [Jonas Busk](#), Peter B. Jørgensen, Arghya Bhowmik, Mikkel N. Schmidt, Ole Winther and Tejs Vegge; Technical University of Denmark, Denmark

DS01.10.05

Learning Interatomic Potentials from First Principles Data Using Symbolic Regression [Bilvin Varughese](#)^{1,2}, Sukriti Manna^{1,2}, Troy Loeffler^{1,2}, Rohit Batra², Mathew Cherukara² and Subramanian Sakaranarayanan^{1,2}; ¹University of Illinois Chicago, United States; ²Argonne National Laboratory, United States

DS01.10.06

Motif-Based Graph Neural Networks for Predicting Quantum Molecular Properties Yifei Wang and [Pengyu Hong](#); Brandeis University, United States

DS01.10.07

Discovery of Structure-Property Relationships of Intercalated Graphite Compounds Using Machine Learning Mahit Dagar¹, Tyler L. Gerstein¹, Zachary H. Baughman¹, Ford J. Hodgkins¹, Henry L. Hunt¹, Samantha B. Lehman¹, Phillip M. Locke¹, [Olivia F. Milavetz](#)¹, Elena K. Barker¹, Daniel Carlebach¹, Maddy K. Eatchel¹, Anna K. Jiricko¹, Yuchen Yang¹, Natascha Knowlton^{1,2} and Kaci L. Kuntz^{2,1}; ¹Rowland Hall, United States; ²The University of Utah, United States

SESSION DS01.11: Simulation and Machine Learning IX

Session Chairs: Raymundo Arroyave and Mathieu Bauchy

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

8:30 AM DS01.11.03

Neuro-Symbolic Reinforcement Learning for Polymer Discovery [Sarathkrishna Swaminathan](#), Dmitry Zubarev, Tim Erdmann, Subhajit Chaudhury and Asim Munawar; IBM Research, United States

8:45 AM DS01.11.05

Predicting the Dynamics of Atoms in Liquids by a Surrogate Machine-Learned Simulator Han Liu and [Mathieu Bauchy](#); University of California, Los Angeles, United States

9:00 AM DS01.11.06

Machine Learning Force Field for B-C Systems and Applications to Mechanical Deformation [Qi An](#); University of Nevada, Reno, United States

9:45 AM DS01.11.07

Using Convolutional Neural Networks to Segment Scanning Electron Microscopy Images of Graphene [Aagam Shah](#), Joshua Schiller, Elif Ertekin and Sameh Tawfik; University of Illinois at Urbana-Champaign, United States

9:30 AM BREAK

10:00 AM DS01.11.08

Physically-Informed Machine Learning Enhances Predictive Design of Fluorescent DNA-Stabilized Silver Clusters [Peter M. Mastracco](#)¹, Alexander Gorovitz², Anna Gonzalez Rosell¹, Joshua Evans³, Petko Bogdanov² and Stacy Copp¹; ¹University of California, Irvine, United States; ²State University of New York at Albany, United States; ³Chaffey College, United States

SESSION DS01.12: Simulation and Machine Learning X

Session Chair: N M Anoop Krishnan

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

1:30 PM *DS01.12.01

Towards Microstructure-Aware Autonomous Alloy Design Raymundo Arroyave, Abhilash Molkeri, Danial Khatamsaz, Richard Couperthwaite, Jaylen James, Douglas Allaire and Ankit Srivastava; Texas A&M University, United States

2:00 PM DS01.12.02

Study of HfO₂ Phases Using Machine Learning Potentials Sebastian Bichelmaier^{1,2}, Jesús Carrete Montaña¹ and Georg K.H. Madsen¹; ¹Technical University of Vienna, Austria; ²KAI GmbH, Austria

2:15 PM DS01.12.03

Intelligent Design of Solid-State Mechanochemical Transformations for Supramolecular Structures Jan R. Gröls and Bernardo Castro-Dominguez; University of Bath, United Kingdom

2:30 PM DS01.12.04

Cost-Efficient Training of a Neural Network Potential by Means of Active Learning for Fast and Accurate Molecular Dynamics Simulations Sung-Ho Lee^{1,2}, Valerio Olevano^{3,2} and Benoit Sklénard^{1,2}; ¹CEA-Leti, France; ²Université Grenoble Alpes, France; ³CNRS, Institut Néel, France

2:45 PM BREAK

3:15 PM DS01.12.05

A-RAFFLE—The Search for New Materials Joe Pitfield and Steven P. Hepplestone; University of Exeter, United Kingdom

3:30 PM DS01.12.06

Hierarchical Molecular Time Dynamics Models Max Wilson, Arghya Bhowmik, Ole Winther and Tejs Vegge; DTU, Denmark

3:45 PM DS01.12.08

The Identification of Transition Mechanism and Estimation of the rate of Atomic Rearrangements Accelerated with Gaussian Process Regression Hannes Jonsson^{1,2}; ¹University of Iceland, Iceland; ²Faculty of Physical Sciences, Iceland

4:00 PM DS01.12.09

Machine Learning Assisted Modelling of a Ductile Fracture Sandra Baltic¹, Mohammad Zhian Asadzadeh¹, Patrick Hammer², Julien Magnien¹, Hans-Peter Gänser¹, Thomas Antretter³ and René Hammer¹; ¹Materials Center Leoben Forschung GmbH, Austria; ²Temple University, United States; ³Montanuniversität Leoben, Austria

SESSION DS01.13: Simulation and Machine Learning XI

Session Chair: Badri Narayanan

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, Lili'U Theater, 310

8:30 AM DS01.13.02

Unified Language of Synthesis Actions for Representation of Synthesis Protocols—Making Steps Toward Autonomous Materials Synthesis Zheren Wang^{1,2}, Kevin J. Cruse^{1,2}, Yuxing Fei^{1,2}, Ann Chia¹, Yan Zeng², Haoyan Huo^{1,2}, Tanjin He^{1,2}, Bowen Deng^{1,2}, Olga Kononova¹ and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

8:45 AM DS01.13.03

Structure and Dielectric Properties of Aqueous LiOH Solutions Using Neural Network Quantum Molecular Dynamics Ruru Ma¹, Aravind Krishnamoorthy¹, Nitish Baradwaj¹, Ken-ichi Nomura¹, Kohei Shimamura², Pankaj Rajak¹, Fuyuki Shimojo², Aiichiro Nakano¹, Rajiv Kalia¹ and Priya Vashishta¹; ¹University of Southern California, United States; ²Kumamoto University, Japan

9:00 AM DS01.13.04

Large-Scale Dynamics Simulations of Complex Liquid Electrolytes with NequIP Equivariant Machine Learning Nicola Molinari^{1,2}, Albert Musaelian¹, Simon Batzner¹ and Boris Kozinsky^{1,2}; ¹Harvard University, United States; ²Robert Bosch LLC, United States

9:15 AM DS01.13.05

A Reinforcement Learning-Based Approach to find the Global Minimum of Atomically Precise Nanoclusters Sukriti Manna, Suvo Banik, Troy Loeffler and Subramanian Sankaranarayanan; Argonne National Laboratory, United States

9:30 AM BREAK

10:00 AM DS01.13.06

Automation to Improve the Research Process via Human-Robot Interactions Anesia D. Auguste^{1,2}, Jennifer Ruddock^{1,2}, Erick Braham², Ezra Ameperosa² and Andrew Gillman²; ¹UES, Inc., United States; ²Air Force Research Laboratory, United States

10:15 AM DS01.13.07

Efficient Multiscale Multiphysics Modeling with Machine Learning Based Surrogate Models Joshua Stuckner; NASA Glenn Research Center, United States

10:30 AM DS01.13.08

Exploring Polymer Degradation Pathways Using Reinforcement Learning and Monte Carlo Tree Search Rohit Batra¹, Aditya Koneru², Suvo Banik², Henry Chan¹, Sukriti Manna², Jie Xu¹ and Subramanian Sankaranarayanan^{1,2}; ¹Argonne National Laboratory, United States; ²University of Illinois at Chicago, United States

10:45 AM DS01.13.09

Predicting Indium Phosphide Quantum Dot Properties Using Machine Learning on Synthetic Procedures Hao A. Nguyen, Florence Y. Dou, Nayon

Park, Shenwei Wu and Brandi Cossairt; University of Washington, United States

SESSION DS01.14: Simulation and Machine Learning XII
Session Chairs: N M Anoop Krishnan and Subramanian Sankaranarayanan
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, Lili'U Theater, 310

1:30 PM DS01.14.01

Deep Learning Techniques for Integrated Circuit Die Performance Prediction [Alexander Kovalenko](#)^{1,2}, Petr Lenhard¹ and Radomir Lenhard¹;
¹Inference Technologies, Czechia; ²Czech Technical University in Prague, Czechia

1:45 PM DS01.14.02

Understanding Self-Assembly Behavior with Self-Supervised Learning [Matthew Spellings](#)¹, Maya Martirosyan² and Julia Dshemuchadse²; ¹Vector Institute, Canada; ²Cornell University, United States

2:00 PM DS01.14.03

AI Physicist—Data-Driven Discovery of Mathematical Expressions via Natural Language Processing [Juwon Na](#) and Seungchul Lee; Pohang University of Science and Technology, Korea (the Republic of)

2:15 PM DS01.14.04

Deep Learning-Based Prediction of Electrical Properties of Polymers with Feature Extraction of Process Conditions [Hajime Shimakawa](#), Akiko Kumada and Masahiro Sato; The University of Tokyo, Japan

2:30 PM BREAK

3:00 PM DS01.14.05

Multi-Property Prediction of Polymers and Exploration of Optimal Polymer Structures with Deep Learning Chihiro Tateyama, [Hajime Shimakawa](#), Masahiro Sato and Akiko Kumada; The University of Tokyo, Japan

3:15 PM DS01.14.08

Informing Experiments Through Visualization and Machine-learned Representations of Text-Mined Materials Synthesis Conditions [Kevin J. Cruse](#)^{1,2}, Sanghoon Lee^{1,2}, Viktoriia Baibakova^{1,2}, Amalie Trewartha², Christopher Bartel², Maged Abdelsamie², Kootak Hong², Zheren Wang^{1,2}, Haoyan Huo^{1,2}, Tanjin He^{1,2}, Olga Kononova², Carolin M. Sutter-Fella², Anubhav Jain² and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

SESSION DS01.15: Simulation and Machine Learning XIII
Session Chairs: Mathew Cherukara and Badri Narayanan
Monday Morning, May 23, 2022
DS01-Virtual

10:30 AM *DS01.15.01

Modelling of Complex Energy Materials with Machine Learning [Nongnuch Artrith](#); Debye Institute for Nanomaterials Science, Netherlands

11:00 AM DS01.15.02

Optimization of Superconductors Fabrication by High-Throughput Experimentation and Machine Learning [Albert Queraltó](#)¹, Kapil Gupta¹, Adrià Pacheco¹, Lavinia Saltarelli¹, Diana G. Franco¹, Nerea Jiménez¹, Pablo Gallego¹, Cristian Mocuta², Susagna Ricart¹, Xavier Obradors Berenguer¹ and Teresa Puig¹; ¹ICMAB-CSIC, Spain; ²SOLEIL Synchrotron, France

11:15 AM DS01.15.03

Identification of Enzymatic Active Sites with Unsupervised Language Modelling Loïc Kwate Dassi, [Matteo Manica](#), Daniel Probst, Philippe Schwaller, Yves G. Nana Teukam and Teodoro Laino; IBM Research Europe, Switzerland

11:30 AM DS01.15.04

Regression Transformer—Blending Numerical and Textual Tokens for Concurrent Property Prediction and Conditional Generation [Jannis Born](#)^{1,2} and Matteo Manica¹; ¹IBM Research Europe, Switzerland; ²ETH Zürich, Switzerland

11:45 AM DS01.15.05

Disambiguation of Amorphous Magnetic Microwire Signatures [Akshar Varma](#)¹, Xiaoyu Zhang¹, Brian Lejeune¹, Laura Cebada Almagro², Rafael Perez del Real^{3,4}, M. Pilar Marin Palacios^{2,3}, O. Fitchorova^{1,1}, Laura H. Lewis^{1,1} and Ravi Sundaram¹; ¹Northeastern University, United States; ²Complutense University of Madrid, Spain; ³Unidad Asociada (CSIC), Spain; ⁴Instituto de Ciencia de Materiales de Madrid, Spain

12:00 PM DS01.15.06

Data-Driven Approaches for Defect Concentration Prediction of Microwave-Synthesized TiO₂ [Shuyan Zhang](#), Jie Gong, B. Reeja Jayan and Alan McGaughey; Carnegie Mellon University, United States

12:15 PM DS01.15.08

Application of Radiation Detection Materials for Radiation Source Mapping with Machine Learning [Ryotaro Okabe](#), Tongtong Liu, Shangjie Xue, Lin-wen Hu and Mingda Li; Massachusetts Institute of Technology, United States

12:20 PM DS01.15.09

Long Time-Scale Accuracy of Neural Network Potentials in Molecular Dynamics Simulations [Difan Zhang](#), Stefan Dernbach, Zhao Chen, Ethan Herron, Robert Rutherford, Aaron Tuor, Jan Drgona, Dragana Vrabie, Vanda Glezakou and Roger Rousseau; Pacific Northwest National Laboratory, United States

SESSION DS01.16: Simulation and Machine Learning XIV
Session Chairs: Mathew Cherukara and Grace Gu
Monday Afternoon, May 23, 2022
DS01-Virtual

1:00 PM *DS01.16.01

Controlled Conjugated Polymer Assembly by Autonomous Solution-Processing Platform [Jie Xu](#); Argonne National Lab, United States

1:30 PM DS01.16.02

Design of Graphene-Based Anhydrous Proton Conducting Materials Using Deep Learning Methods [Siddarth K. Achar](#)¹, Leonardo Bernasconi¹, Linfeng Zhang² and J. Karl Johnson¹; ¹University of Pittsburgh, United States; ²Beijing Institute of Big Data Research, China

1:45 PM DS01.16.03

Deep Neural Networks for Predicting Formation Energy and Synthesizability of Crystal Structures [Ali Davariashiyani](#)¹, Zahra Kadkhodaie² and Sara Kadkhodaie¹; ¹University of Illinois at Chicago, United States; ²New York University, United States

2:00 PM DS01.16.04

Insights from Computational Studies on the Anisotropic Volume Change of Li_xNiO₂ at High State of Charge (x < 0.25) [Juan C. Garcia](#), Joshua Gabriel, Noah Paulson, John Low, Marius Stan and Hakim Iddir; Argonne National Laboratory, United States

2:15 PM DS01.16.05

Accelerating the Prediction of Large Carbon Clusters via Structure Search—Evaluation of Machine-Learning and Classical Potentials [Bora Karasulu](#)^{1,2}, Jean-Marc Leyssale³, Patrick Rowe^{2,4}, Cedric Weber⁵ and Carla de Tomas²; ¹University of Warwick, United Kingdom; ²Happy Electron Ltd., United Kingdom; ³University of Bordeaux, France; ⁴University of Cambridge, United Kingdom; ⁵King's College London, United Kingdom

2:30 PM DS01.16.06

On-Demand Generation of Large Polymer Datasets for Accelerated Materials Discovery [Pedro L. Arrechea](#), Dmitry Zubarev, James L. Hedrick, Nathaniel Park and Tim Erdmann; IBM, United States

2:45 PM DS01.16.07

Finite-temperature Crystal Structure Prediction of Lithium Using Machine Learning Potentials [James Chapman](#) and Stanimir Bonev; Lawrence Livermore National Laboratory, United States

SESSION DS01.17: Simulation and Machine Learning XV
Session Chairs: Mathew Cherukara and N M Anoop Krishnan
Monday Afternoon, May 23, 2022
DS01-Virtual

6:30 PM *DS01.17.01

Inverse Design of Silver Nanoparticles Using Multi-Target Machine Learning Sichao Li and [Amanda Barnard](#); Australian National University, Australia

7:00 PM *DS01.17.02

Smart Systems Engineering Contributing to the Life Cycle of Material Discovery and a Net-Zero Future [Xiaonan Wang](#)^{1,2}; ¹Tsinghua University, China; ²National University of Singapore, Singapore

7:30 PM DS01.17.04

Computing Device Signatures in Resistive-Switching Memory Materials—Utilization of Machine Learning [Shao Xiang Go](#), Qiang Wang, Bo Wang, Yu Jiang, Natasa Bajalovic and Desmond K. Loke; Singapore University of Technology and Design, Singapore

7:35 PM DS01.11.02

Machine Learning the Scaling Property of Density Functionals via Data Augmentation [Weiyi Gong](#)¹, Tao Sun², Peng Chu¹, Hexin Bai¹, Anoj Aryal¹, Shah Tanvir-Ur-Rahman Chowdhury¹, Jie Yu¹, Haibin Ling², John P. Perdew¹ and Qimin Yan¹; ¹Temple University, United States; ²Stony Brook University, The State University of New York, United States

7:50 PM *DS01.13.01

Reinforcement Learning for Inverse Design of Materials [Subramanian Sankaranarayanan](#); Argonne National Laboratory, United States

SESSION DS01.18: Simulation and Machine Learning XVI
Session Chairs: Mathew Cherukara, Grace Gu, Jeong-Ho Lee and Jie Xu
Tuesday Morning, May 24, 2022
DS01-Virtual

10:30 AM *DS01.18.01

Discovering Interactions Laws of Multiparticle Systems with Lagrangian Neural Networks Ravinder Bhattoo, Sayan Ranu and N M Anoop Krishnan; Indian Institute of Technology Delhi, India

11:00 AM DS01.18.02

Images as Molecular Descriptors for Materials Discovery Matthew Wilkinson, Uriel Martinez Hernandez and Bernardo Castro-Dominguez; University of Bath, United Kingdom

11:15 AM DS01.18.03

Deep Reinforcement Learning for Autonomous Discovery of Atomic Transition Pathways Bjarke Hastrup, Jonas Busk, Peter B. Jørgensen, Tejs Vegge and Arghya Bhowmik; Technical University of Denmark, Denmark

11:30 AM DS01.18.04

Achieving Machine Learning Generalizability Using Out-of-Domain Prediction of Adsorption Energies on High-Entropy Alloys Ritesh Kumar and Abhishek K. Singh; Indian Institute of Science, India

11:45 AM DS01.18.05

Atomistic Simulation of Plasmonic Hot Carrier Dynamics Using Machine Learning Adela Habib, Benjamin Nebgen, Nicholas Lubbers and Sergei Tretiak; Los Alamos National Laboratory, United States

12:00 PM *DS01.18.06

Predicting New Materials that Exhibit Magnetocaloric Effects Using Concerted Text-Mining and Machine-Learning with Computational Screening Jacqueline M. Cole^{1,2}; ¹University of Cambridge, United Kingdom; ²ISIS Pulsed Neutron and Muon Source, United Kingdom

##PAGE_BREAK##

SYMPOSIUM DS02

Advanced Manufactured Materials—Innovative Experiments, Computational Modeling and Applications
May 9 - May 24, 2022

Symposium Organizers

Vitor Coluci, UNICAMP

Kun Fu, University of Delaware

Veruska Malavé, National Institute of Standards and Technology

Hui Ying Yang, SUTD

* Invited Paper

SESSION DS02.01: Metal Additive Manufacturing: Characterization, Properties, and Modeling I

Session Chair: Vitor Coluci

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 313C

8:30 AM *DS02.01.01

Electronically Available NIST/TRC Resource for Thermophysical Property Data of Metal Systems Boris Wilthan and Scott Townsend; NIST, United States

9:00 AM *DS02.01.02

Simultaneous X-Ray Imaging and Laser Absorption Radiometry—A Unique Combination for Simulation Validation Brian Simonds¹, Tao Sun², Saad Khairallah³, Edwin Schwalbach⁴, Nicholas Derimow¹ and Paul Williams¹; ¹NIST, United States; ²University of Virginia, United States; ³Lawrence Livermore National Laboratory, United States; ⁴Air Force Research Laboratory, United States

9:30 AM DS02.01.03

Experiment/Simulation Integration Approach to Investigate Microstructure and Plastic Deformation of AM 316L Stainless Steels Marissa Linne¹, Jean-Baptiste Forien¹, Nicolas Bertin¹, Margaret Wu¹, Tatu Pinomaa², Anssi Laukkanen², Kirubel Teferra³, Sylvie Aubry¹, Nathan Barton¹, Y. Morris Wang⁴ and Thomas Voisin¹; ¹Lawrence Livermore National Laboratory, United States; ²VTT Technical Research Centre of Finland, Finland; ³Navy Research Laboratory, United States; ⁴University of California Los Angeles, United States

9:45 AM BREAK

10:15 AM DS02.01.04

Influence of High-Intensity Ultrasound on Ti-6Al-4V Microstructure During Laser Powder Bed Fusion Solidification Conditions Brodan M. Richter, Samuel J. Hocker, Wesley A. Tayon, Erik Frankforter and Ji Su; NASA Langley Research Center, United States

10:30 AM DS02.01.05

The Additive Manufacturing Moment Measure—A Parallel Computation Technique for Determining Build Variance in the Laser Powder Bed Fusion Process J.-A. S. Hocker, Brodan M. Richter, Joseph N. Zalameda, Wesley A. Tayon, Erik Frankforter and Peter W. Spaeth; NASA Langley Research Ctr, United States

10:45 AM DS02.01.06

Fused Filament Fabrication of 316L Stainless Steel—Microstructures and Properties Arising from the Sintering Step Marius Wagner¹, Jona Engel¹, Jeffrey Wheeler¹, Amir Hadian², Frank Clemens², Mikel Rodriguez-Arbaizar³, Efrain Carreño-Morelli³ and Ralph Spolenak¹; ¹ETH Zürich, Switzerland; ²Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ³University of Applied Sciences and Arts Western Switzerland, Switzerland

11:00 AM DS02.01.07

A Novel Approach to Study the Sulfidation Kinetics of Ti-6Al-4V with and Without Iodine for Additive Manufacturing Applications Subbarao Raikar, Steven DiGregorio and Owen Hildreth; Colorado School of Mines, United States

11:15 AM DS02.01.08

Design of Cellular Lattices by Atom-Mimetics—How to reproduce Elastic Anisotropy of Metals Masaki Hosoda, Sosuke Kanegae, Masayuki Okugawa, Hayato Nagayama and Yuichiro Koizumi; Osaka University, Japan

SESSION DS02.02: Metal Additive Manufacturing: Characterization, Properties, and Modeling II

Session Chairs: Kun Fu and Brian Simonds

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 313C

1:30 PM *DS02.02.01

Applications of X-Ray Tomography to Additively Manufactured Materials Edward J. Garboczi; NIST, United States

2:00 PM DS02.02.02

Developing Capabilities to Predict Fatigue and Fracture Behavior of Additively Manufactured Parts Containing a Range of Pore and Grain Structures Jake Benzing, Orion Kafka, Newell Moser, Enrico Lucon, Tim Quinn and Nik Hrabe; National Institute of Standards and Technology, United States

2:15 PM BREAK

2:45 PM DS02.02.03

Solid-State Additive Manufacturing of Al-Si-Mg-Graphene Metal Matrix Composites Jessica Lopez¹, Malcolm B. Williams¹, Timothy W. Rushing², J. B. Jordan¹, Paul Allison¹ and Gregory B. Thompson¹; ¹The University of Alabama, United States; ²U.S. Army Engineer Research & Development Center, United States

3:00 PM DS02.02.06

Combating Localized Corrosion in Additively Manufactured 316L Using Ceramic Dopants Jason R. Trelewicz¹, David Sprouster¹, William S. Cunningham¹, Gary P. Halada¹, Sopcisak J. Joseph² and Steven M. Storck²; ¹Stony Brook University, United States; ²Johns Hopkins University Applied Physics Laboratory, United States

3:15 PM DS02.02.07

Hydrogel Infusion Additive Manufacturing of Mesoscale Metals and Alloys—Opportunities and Challenges for Modeling and Optimization Max Saccone¹, Daryl W. Yee², Rebecca A. Gallivan¹, Kai Narita¹ and Julia R. Greer¹; ¹California Institute of Technology, United States; ²Massachusetts Institute of Technology, United States

SESSION DS02.03: Poster Session I: Additive Manufacturing: Properties and Experimental and Modeling Characterization I

Session Chair: Hui Ying Yang

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS02.03.01

Additively Manufactured Bimetallic Turbine Blade Gwang Ho Jeong¹, Seok Kim^{1,2} and Young Tae Cho^{1,2}; ¹Changwon National university, Korea (the Republic of); ²Changwon National University, Korea (the Republic of)

DS02.03.02

Mechanical Strength Behavior of 3D-Printed Composites Manufactured According to the Difference in the Rotational Tool Path Ye Jin Kim, Seok Kim and Young Tae Cho; Changwon National University, Korea (the Republic of)

DS02.03.03

Performance Evaluation of Post-Processing Depending on Surface Roughness of the Additively Manufactured Metal Parts Hwi Jun Son, Seok Kim

and Young Tae Cho; Changwon National University, Korea (the Republic of)

DS02.03.04

Wire Arc Additive Manufacturing Using High Hardness Steel and Virtual Process of Robot Simulator Chang Jong Kim, Seok Kim and Young Tae Cho; Changwon National University, Korea (the Republic of)

DS02.03.05

Multiple Laser Beam Processing in Powder Bed Fusion Marco Rupp, Craig Arnold and Wenxuan Zhang; Princeton University, United States

SESSION DS02.04: Resin 3D Printing: Materials, Processes, Modeling, and Characterization I

Session Chairs: Hui Ying Yang and Mostafa Yourdkhani

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 313C

8:30 AM *DS02.04.01

Potential Applications of Computed Axial Lithography in Manufacturing Optical Elements Hayden Taylor, Joseph Toombs, Chi Chung Li and Yaxuan Sun; University of California, Berkeley, United States

9:00 AM *DS02.04.02

Multiphysics Modeling and Experimental Study of a Concurrent Polymerization and Vascularization Process for Manufacturing Polymer and Polymer Composites with Embedded Microvascular System Zhuoting Chen¹, Mayank Garg², Polette Centellas², Xiang Zhang¹, Nancy R. Sottos², Jeffrey Moore² and Philippe H. Geubelle²; ¹University of Wyoming, United States; ²University of Illinois at Urbana-Champaign, United States

9:30 AM BREAK

10:00 AM DS02.04.03

Predicting Char Yield of High-Temperature Resins Jacob Gissing and Kristopher E. Wise; NASA Langley Research Center, United States

10:15 AM DS02.04.04

Wrinkle Formation in Multilayer Polymer-Based Composite Materials Zeynab Mousavikhamene, Young-Ah L. Lee, Abhishek K. Amrithanath, Sridhar Krishnaswamy, George C. Schatz and Teri W. Odom; Northwestern University, United States

10:30 AM DS02.04.05

Self-Assembly in Supercritical Fluids: Using Photolithography for Additive Manufacturing Loren G. Kaake; Simon Fraser University, Canada

10:45 AM DS02.04.06

Harnessing Surface Tension Driven Flows During Frontal Polymerization for the Fabrication of Functional Materials Justine E. Paul, Julie Hemmer, Yun Gao, Liu Hong, Chamorro Charez, Philippe H. Geubelle and Nancy R. Sottos; University of Illinois at Urbana-Champaign, United States

11:00 AM DS02.04.07

Multi-Material 3D Printing with a Twist Natalie Larson¹, Jochen Mueller², Alex Chortos³, Zoey S. Davidson¹, David R. Clarke¹ and Jennifer Lewis¹; ¹Harvard University, United States; ²Johns Hopkins University, United States; ³Purdue University, United States

11:15 AM DS02.04.08

Responsive AM Feedstock Materials Caitlyn C. Krikorian (Cook), Elaine Lee, Johanna J. Schwartz, Dominique Porcincula, Maxim Shusteff, Erika Fong, Brian Howell, Eric Bukovsky and Eric Duoss; Lawrence Livermore National Laboratory, United States

SESSION DS02.05: Resin 3D Printing: Materials, Processes, Modeling, and Characterization II

Session Chairs: Veruska Malavé and Mostafa Yourdkhani

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 313C

1:30 PM *DS02.05.01

Frontal-Polymerization-Based 3D Printing of Thermoset Polymers and Composites—Experiments and Modeling Jia En Aw¹, Aditya Kumar¹, Xiang Zhang², Philippe H. Geubelle¹, Nancy R. Sottos¹ and Jeffrey Moore¹; ¹University of Illinois at Urbana-Champaign, United States; ²University of Wyoming, United States

2:00 PM DS02.05.02

Controlled Sequential Reactions for 3D Printing of Spatially Defined Multimodulus Materials Steven Adelmund¹ and Thomas Wallin²; ¹Crystal Equation, United States; ²Facebook, United States

2:15 PM DS02.05.03

Co-Printing of SiC Components Using Vibration Assisted Printing and Fused Filament Fabrication Kelly M. Raisch¹, Kenneth N. Wooten¹, Lekha Duvvooori², Troy Ansell¹ and I. Emre Gunduz^{1,3}; ¹Naval Postgraduate School, United States; ²University of California, Berkeley, United States; ³Purdue University, United States

2:30 PM BREAK

3:00 PM DS02.05.04

Visualizing and Mapping Resin Distribution During Thermal Debinding of Stereolithography Ceramics Using Neutron Imaging Eoin G. McAleer¹,

Boris Khaykovich², Daniel Hussey³, David Jacobson³, [Jacob LaManna](#)³, Richard Haber¹ and Enver K. Akdoğan¹; ¹Rutgers University, United States; ²Massachusetts Institute of Technology, United States; ³National Institute of Standards and Technology, United States

3:15 PM DS02.05.06

Contrast is Key—Step Growth Polymerizations in Volumetric Additive Manufacturing [Johanna J. Schwartz](#); Lawrence Livermore National Laboratory, United States

SESSION DS02.06: Poster Session II: Additive Manufacturing: Properties and Experimental and Modeling Characterization II

Session Chair: Veruska Malavé

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS02.06.02

FDM 3D Printing of Main-Chain Polybenzoxazine with Diels-Alder Moieties [E. A. Dineshi A. Peiris](#) and Douglas A. Loy; The University of Arizona, United States

DS02.06.04

Rugged Materials for Structural Electronics [Emily Huntley](#), Georgia Kaufman, Michael Gallegos, Adam Cook, Randy Schunk and Bryan Kaehr; Sandia National Laboratories, United States

DS02.14.05

Optimization of Mechanical Interlocking Joints at Additively Manufactured Bi-Material Composite Interfaces [Elizabeth Pegg](#), Andrew Y. Chen, Kahraman G. Demir and Grace Gu; University of California, Berkeley, United States

SESSION DS02.07: Poster Session: Computational Modeling of Additively Manufactured, Nanocomposite and other Modern Materials

Session Chair: Hui Ying Yang

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS02.07.01

Multi-Jet Fusion Printed Lattice Materials—Characterization and Prediction of Mechanical Performance [Andrew Y. Chen](#)¹, Ailin Chen¹, Jake Wright², Andrew Fitzhugh², Aja Hartman², Pierre Kaiser², Jun Zeng² and Grace Gu¹; ¹University of California, Berkeley, United States; ²HP Labs, United States

DS02.07.02

Simulation and Design of Piezoelectric Shape Morphing Geometries [Songhee Min](#), Neilabjo Maitra, Kahraman G. Demir and Grace Gu; University of California, Berkeley, United States

DS02.07.05

Mesoscale Modeling of Cold Spray Deposition of Tantalum Powders [Ching Chen](#)¹, Sumit A. Suresh¹, Seok-Woo Lee¹, Mark Aindow¹, Victor Champagne Jr.² and Avinash M. Dongare¹; ¹University of Connecticut, United States; ²U.S. Army Research Laboratory, United States

DS02.07.06

Creation of a Lattice Structure Showing a Thermally-Induced Phase Transition Using Bimetal Yuichiro Koizumi, [Hayato Nagayama](#), Sosuke Kanegae, Masayuki Okugawa and Masaki Hosoda; Osaka University, Japan

SESSION DS02.08: Computational Modeling of Additively Manufactured and Layered Materials I

Session Chairs: Vitor Coluci and Veruska Malavé

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 313C

8:30 AM *DS02.08.01

Machine Learning-Accelerated Molecular Design of Multi-Functional Polymers—Shifting from Thomas Edison to Iron Man [Ying Li](#); University Of Connecticut, United States

9:00 AM *DS02.08.02

Computational Thermal Multi-Phase Flow with Mixed Interface-Capturing/Interface-Tracking for Metal Additive Manufacturing Processes [Jinhui Yan](#); University of Illinois at Urbana-Champaign, United States

9:30 AM BREAK

10:00 AM DS02.08.03

Development of a Transferrable Force Field Using On-the-Fly Gaussian Process Method for Gallium Nitride Crystal Growth During the Additive Manufacturing Process [Xiangyu Chen](#), William Shao, Nam Q. Le, Jarod Gagnon and Paulette Clancy; Johns Hopkins University, United States

10:15 AM DS02.08.04

What is the Smallest Nano-Zeolite that Could be Synthesized? Debdas Dhabal, Andressa A. Bertolazzo and Valeria Molinero; The University of Utah, United States

10:30 AM DS02.08.07

Mechanical Properties of 3D-Printed Macroscopic Models of Schwarzites Vladimir Gaal¹, Levi C. Felix¹, Cristiano F. Woelner², Douglas S. Galvao¹, Chandra y S. Tiwary³, Marcos A. d'Ávila¹ and Varlei Rodrigues¹; ¹State University of Campinas, Brazil; ²Universidade Federal do Paraná, Brazil; ³Indian Institute of Technology Kharagpur, India

SESSION DS02.09: Computational Modeling of Additively Manufactured and Layered Materials II

Session Chairs: Vitor Coluci and Veruska Malavé

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 313C

1:30 PM *DS02.09.01

Investigation of Novel 2D Material Heterostructures Susan B. Sinnott; The Pennsylvania State University, United States

2:00 PM *DS02.09.02

Cooperative Development of Printable Alloys for Additive Manufacturing Through Metaheuristic Optimization Branden B. Kappes^{1,2}, Soumya Mohan³, Benjamin S. Rafferty⁴, Jeremy Iten⁴, Sridhar Seetharaman⁵ and Aaron P. Stebner³; ¹KMMD, LLC, United States; ²Contextualize, LLC, United States; ³Georgia Institute of Technology, United States; ⁴Elementum 3D, United States; ⁵Arizona State University, United States

2:30 PM DS02.09.03

First Principles Study of Electronic and Optical Properties of Type-II InAs/GaSb Superlattices Yun Hee Chang^{1,2}, Chul-Hong Park², Zahra Taghipour³, Sanjay Krishna³ and Hyun-Suk Kim¹; ¹Chungnam National University, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³The Ohio State University, United States

2:45 PM DS02.09.04

Extracting Anisotropy Strength and Interfacial Free Energy of Al-Cu Alloy under Rapid Cooling Conditions Using Molecular Dynamics Simulations Amrutdyuti Swamy and Pabitra Choudhury; New Mexico Institute of Mining and Technology, United States

3:00 PM BREAK

3:30 PM DS02.09.05

Tuning the Edge States of Bismuthene via Substrate Effects Chutian Wang, Yuefeng Yin, Michael Fuhrer and Nikhil Medhekar; Monash University, Australia

3:45 PM DS02.09.06

Simulation-Guided Thermal Process Discovery for Flash Lamp Annealing Crystallization of On-Chip HfO₂-ZrO₂ Ferroelectric Memories Manohar H. Karigerasi¹, Balreen Saini², Zhouchangwan Yu², Doug V. Campen¹, Apurva Mehta¹, Paul McIntyre^{2,1} and John Baniecki¹; ¹SLAC National Accelerator Laboratory, United States; ²Stanford University, United States

4:00 PM DS02.09.07

Superlattices of SnS₂ with other TMDCs for Use as Electrodes in Li-Ion Batteries Conor J. Price and Steven P. Hepplestone; University of Exeter, United Kingdom

4:15 PM DS02.09.08

Step-Edge Epitaxy for Borophene Growth on Insulators Qiyuan Ruan, Luqing Wang, Ksenia V. Bets and Boris I. Yakobson; Rice University, United States

4:30 PM DS02.09.09

Numerical Investigation of Macro-Scale Step Morphology in Long-Term Solution Growth of SiC Yifan Dang, Xinbo Liu, Can Zhu, Wancheng Yu, Koki Suzuki, Tomoaki Furusho, Shunta Harada and Toru Ujihara; Nagoya University, Japan

4:45 PM DS02.09.10

Geometric Design and Inverse Design of Multi-Axial Bistable Lattice Mechanical Metamaterial Inspired by Atomic Arrangement of Crystals Sosuke Kanegae, Masayuki Okugawa and Yuichiro Koizumi; Osaka university, Japan

SESSION DS02.10: Emerging Applications in Multifunctional Advanced Materials I

Session Chairs: Kun Fu and Veruska Malavé

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 313C

8:30 AM *DS02.10.01

3D Printing Active Electronic & Optoelectronic Devices Michael C. McAlpine; University of Minnesota, United States

9:00 AM *DS02.10.02

3D Printing of Bioelectronics and Soft Robots Xuanhe Zhao; Massachusetts Institute of Technology, United States

9:30 AM BREAK

10:00 AM DS02.10.04

Rheological Research of 3D Printable All-Inorganic Thermoelectric Inks for Direct Writing of Micro-Thermoelectric Generator Hyejin Ju, Fredrick Kim, Seong Eun Yang, Jae Sung Son and Han Gi Chae; Ulsan National Institute of Science and Technology, Korea (the Republic of)

10:15 AM DS02.10.05

An Automated Materials Optimization Approach for Large, Lightweight, Additively Manufactured Direct Drive Generators with Triply Periodic Minimal Surfaces Austin Hayes and Gregory L. Whiting; CU Boulder, United States

10:30 AM DS02.10.06

From 3D and 4D Printing of Carbon Architectures to Engineered Living Carbon Materials Monsur Islam¹, Jan G. Korvink¹ and Andrés D. Lantada²; ¹Karlsruhe Institute of Technology, Germany; ²Universidad Politécnica de Madrid, Spain

SESSION DS02.11: Emerging Applications in Multifunctional Advanced Materials II

Session Chairs: Kun Fu and Veruska Malavé

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 313C

1:30 PM *DS02.11.01

Additive Manufacturing of Multi-Functional Materials and Devices for Space Applications Gregory L. Whiting¹, John-Baptist Kauzya¹, Eloise Bihar¹, Elliot Strand¹, Brandon Hayes¹, Catherine Crichton¹, Charlotte Bellerjeau¹, Jorge Osio-Norgaard¹, Jamie Thompson^{2,1}, Megan N. Renny¹, Robert McLeod¹, Kent Evans² and Robert Street²; ¹University of Colorado Boulder, United States; ²Palo Alto Research Center, United States

2:00 PM DS02.11.02

Additive Manufacturing of Structured Electrodes for Lithium-Ion Batteries Soyeon Park and Kun Fu; University of Delaware, United States

2:15 PM DS02.11.03

Near-Field Electrospinning Facilitates the Fabrication of High-Aspect Ratio 3D Structures Ahsana Sadaf, Monsur Islam, Dario Mager and Jan G. Korvink; Karlsruhe Institute of Technology, Germany

2:30 PM BREAK

3:00 PM DS02.11.04

Interface Modification with Functionalized Carbon Nanotube Composite Films Processed by Electrophoretic Deposition and Characterization of Interfacial Properties Dae Han Sung^{1,1}, Sagar M. Doshi¹, Andrew N. Rider² and Erik T. Thostenson^{1,1,1}; ¹University of Delaware, United States; ²Defence Science and Technology Group, Australia

3:15 PM DS02.11.05

Facile Synthesis of Shape-Programmed Polymer Nanoparticles for Agile Manufacturing Rong Yang, Trevor Franklin and Apoorva Jain; Cornell University, United States

3:30 PM DS02.11.06

Tunable Non-Linear Stiffening by Deformation-Induced Topological Transitions in Mechanical Metamaterials Marius Wagner, Fabian Schwarz, Nick Huber, Lena Geistlich, Henning Galinski and Ralph Spolenak; ETH Zürich, Switzerland

3:45 PM DS02.11.07

Directed Energy Deposition of Additively Grown Carbon Fibers from Various Hydrocarbon Precursors Charles A. Cook¹, Justin L. Rife¹, Ryan J. Hooper² and Gregory B. Thompson¹; ¹The University of Alabama, United States; ²Dynetics, United States

SESSION DS02.12: Advanced Materials: Characterization, Modeling, and Applications I

Session Chairs: Veruska Malavé and Hui Ying Yang

Monday Morning, May 23, 2022

DS02-Virtual

10:30 AM *DS02.12.01

Material Extrusion 3D Printing of Polymer Matrix Composites for Energy Storage and Sensing Applications Junjun Ding; Alfred University, United States

11:00 AM *DS02.12.02

Fundamental Photopolymer Additive Manufacturing Using a Uniformly Illuminated, Individual-Pixel-Characterized Light Engine Callie I. Higgins, Jason Killgore, Dianne Poster and Cameron Miller; National Institute of Standards and Technology, United States

11:30 AM DS02.12.03

Mechanical Energy Absorption Properties of Nanoscale Hierarchical Schwarzite-Based Structures Applied to Additive Manufacturing Leonardo V. Bastos¹, Chandra y S. Tiwary², Douglas S. Galvao³ and Cristiano F. Woellner¹; ¹Federal University of Paraná, Brazil; ²Indian Institute of Technology Kharagpur, India; ³State University of Campinas, Brazil

11:45 AM DS02.12.04

Modeling Scaled 3D-Printed Electronic Mesostructures with Graph Theory Julia E. Huddy and William J. Scheideler; Dartmouth College, United States

12:00 PM DS02.12.05

3D Printing of Continuous Fiber/ Acrylate Resin-Based Thermoset Composites Arif M. Abdullah, Kai Yu and Martin Dunn; University of Colorado Denver, United States

12:15 PM DS02.12.06

3D Printing of Ultrahigh Viscosity Nanoparticle Suspensions via Acoustophoretic Liquefaction Zheng Liu^{1,2}, Thomas Wallin³, Wenyang Pan³, Kaiyang Wang¹, Yoav Matia¹, Artemis Xu¹, Jose A. Barreiros¹, Cameron Darkes-Burkey¹, Emmanuel P. Giannelis¹, Yigit Menguc^{3,4} and Robert Shepherd^{1,1}; ¹Cornell University, United States; ²University of Illinois Urbana-Champaign, United States; ³Facebook Reality Labs Research, United States; ⁴Oregon State University, United States

SESSION DS02.13: Advanced Materials: Characterization, Modeling, and Applications II

Session Chairs: Veruska Malavé and Hui Ying Yang

Monday Afternoon, May 23, 2022

DS02-Virtual

9:00 PM *DS02.13.01

Sequence-Conformation Relationship of Zwitterionic Peptide Brushes—Experiments, Theories and Simulations Jing Yu and Minglun Li; Nanyang Institute of Technology, Singapore

9:30 PM DS02.13.03

Optimization of Electron-Beam Melting Technique for Fabrication of Refractory Metal Ingot HyunChul Kim¹, Namhun Kwon¹, Jae-Jin Sim¹, Sung Gue Heo¹, Shin-Young Choi¹, Jieun Kim¹, Soong Ju Oh², Jong-Hyeon Lee³, Taek Soo Kim¹, Seok-Jun Seo¹ and Kyoung-Tae Park¹; ¹Korea Institute of Industrial Technology, Korea (the Republic of); ²Korea University, Korea (the Republic of); ³Chungnam National University, Korea (the Republic of)

9:45 PM *DS02.13.04

Modeling and Simulation of 2D and 3D Metamaterials for Microwave Application Balamati Choudhury; CSIR-National Aerospace Laboratories, India

10:15 PM DS02.13.05

Bistable Heterogeneous Reconfigurable Mechanical Metamaterials Latha Nataraj¹, Todd Henry¹, Shengqiang Cai², Nicolas Herard² and Nicholas Boechler²; ¹US ARL, United States; ²UCSD, United States

10:30 PM DS02.13.06

Carbide and Nitride Based MXene Substrates for SERS—Theoretical Consideration Hayk Minassian¹, Armen Melikyan² and Petros Petrosyan³; ¹Yerevan Physics Institute (NSL after A.Alikhanyan), Armenia; ²Russian-Armenian University, Armenia; ³Yerevan State University, Armenia

SESSION DS02.14: Advanced Materials: Characterization, Modeling, and Applications III

Session Chairs: Vitor Coluci and Veruska Malavé

Tuesday Morning, May 24, 2022

DS02-Virtual

8:00 AM *DS02.14.01

Engineered Two-Dimensional Voids as Angstrom-Scale Capillaries Radha Boya^{1,2}; ¹University of Manchester, United Kingdom; ²National Graphene Institute, United Kingdom

8:30 AM DS02.14.02

Crystallinity Controlled 3D Printing of Self-Assembled Dipeptides Jihyuk Yang and Ji Tae Kim; The University of Hong Kong, Hong Kong

8:45 AM DS02.14.04

3D Printing of Glass Imaging Optics with High Precision by Liquid Silica Resin Piaoran Ye, Zhihan Hong, Douglas A. Loy and Rongguang Liang; The University of Arizona, United States

8:50 AM DS02.14.06

3D Printing Tricalcium Phosphate-Polymer Composites for Biomimetic Bone Scaffolds Luis F. Arciniaga, Stephany R. Maldonado, Gerardo Figueroa, David A. Gonzales, Krishna Muralidharan, Barrett G. Potter, John A. Szivek, David S. Margolis and Douglas A. Loy; The University of Arizona, United States

SESSION DS02.15: Advanced Materials: Characterization, Modeling, and Applications IV

Session Chair: Veruska Malavé

Tuesday Afternoon, May 24, 2022

DS02-Virtual

9:00 PM DS02.15.02

Additive Manufacturing of Fins for Surfboards Marc In het Panhuis; University of Wollongong, Australia

9:15 PM DS02.15.03

3D Meta-Optics for Twisted Light Holography and Molecular Sensing [Haoran Ren](#); Macquarie University, Australia

9:30 PM DS02.15.04

CFD and Experimental Performance Evaluation of Grooved Fins for Surfboards Alhoush Elshahomi, Buyung Kosasih, James Forsyth, Grant Barnsley, Stephen Beirne, Julie Steele and [Marc In het Panhuis](#); University of Wollongong, Australia

##PAGE_BREAK##

SYMPOSIUM DS03

Phonon Properties of Complex Materials—Challenges in Data Generation, Data Availability and Machine Learning Approaches
May 11 - May 23, 2022

Symposium Organizers

Ming Hu, University of South Carolina
Sanghamitra Neogi, University of Colorado Boulder
Subramanian Sankaranarayanan, Argonne National Laboratory
Junichiro Shiomi, The University of Tokyo

* Invited Paper

SESSION DS03.01: Phonon Property Prediction and Characterization I

Session Chair: Pierre Darancet

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 313B

1:30 PM *DS03.01.01

High-Throughput Study of Lattice Thermal Conductivity Including Higher-Order Anharmonicity Yi Xia¹, Vinay Hegde¹, Koushik Pal¹, Xia Hua¹, Dale Gaines¹, Shane Patel¹, Jiangang He¹, Murat Aykol², Vidvuds Ozolins³ and [Christopher Wolverton](#)¹; ¹Northwestern University, United States; ²Toyota Research Institute, United States; ³Yale University, United States

2:00 PM DS03.01.02

Anharmonic Lattice Dynamics in Metastable Ternary Nitrides [Franziska S. Hegner](#)¹, Adi Cohen², Stefan Rudel³, Chang-Ming Jiang⁴, Wolfgang W. Schnick³, Omer Yaffe², Ian D. Sharp¹ and David A. Egger¹; ¹Technical University of Munich, Germany; ²Weizmann Institute of Science, Israel; ³Ludwig-Maximilians-Universität München, Germany; ⁴National Taiwan University, Taiwan

2:15 PM *DS03.01.03

Anharmonic Phonons, Superionic Diffusion and Ultralow Thermal Conductivity in Complex Argyrodite Cu₇PSe₆ Mayanak Gupta^{1,2}, Jingxuan Ding¹, Douglas L. Abernathy³, Georg Ehlers³, Naresh Osti³, Wolfgang Zeier⁴ and [Olivier Delaire](#)¹; ¹Duke University, United States; ²Babbha Atomic Research Center, India; ³Oak Ridge National Laboratory, United States; ⁴Univ. Muenster, Germany

2:45 PM DS03.01.04

Precisely and Efficiently Computing Phonons via Irreducible Derivatives: Characterizing Soft Modes [Sasaank Bandi](#) and Chris Marianetti; Columbia University, United States

3:00 PM BREAK

3:30 PM *DS03.01.05

Phonon Scattering in Compositionally Disordered Alloys Ramya Gurunathan¹, Suchismita Sarker², Logan Ward³, James Saal⁴, [Apurva Mehta](#)² and G. J. Snyder¹; ¹Northwestern University, United States; ²SLAC National Accelerator Laboratory, United States; ³Argonne National Laboratory, United States; ⁴Citrine Informatics, United States

4:00 PM DS03.01.07

Structural Effect on Phonon Attenuation in Metallic Liquids and Glasses [Jaeyun Moon](#)¹ and Takeshi Egami²; ¹Oak Ridge National Laboratory, United States; ²The University of Tennessee, Knoxville, United States

4:15 PM DS03.02.06

Poster Spotlight: Super-Suppression of Long Phonon Mean-Free-Paths in Nano-Engineered Si Due to Anticorrelated Heat Current Effects Seyed Aria Hosseini¹, Alatheia E. Davies², Ian Dickey¹, Alex Greaney¹ and [Laura de Sousa Oliveira](#)²; ¹University of California, Riverside, United States; ²University of Wyoming, United States

4:20 PM DS03.02.01

Poster Spotlight: Nonequilibrium Phonon Transport Induced by Finite Sizes—Effect of Phonon-Phonon Coupling [Tianli Feng](#)¹, Jiakuan Xu², Yue Hu², Xiulin Ruan³, Xinyu Wang⁴ and Hua Bao²; ¹University of Utah, United States; ²Shanghai Jiao Tong University, China; ³Purdue University, United States; ⁴Shandong University, China

4:25 PM DS03.02.03

Poster Spotlight: Accelerating Green's Function Molecular Dynamics Using Spatial Decomposition [Vitor R. Coluci](#)¹, Sócrates d. Dantas² and Vinod K. Tewary³; ¹University of Campinas, UNICAMP, Brazil; ²Universidade Federal de Juiz de Fora, Brazil; ³National Institute of Standards and Technology, United States

SESSION DS03.02: Poster Session: Phonon Properties Prediction and Characterization
Session Chairs: Ming Hu, Sanghamitra Neogi, Subramanian Sankaranarayanan and Junichiro Shiomi
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS03.02.01

Poster Spotlight: Nonequilibrium Phonon Transport Induced by Finite Sizes—Effect of Phonon-Phonon Coupling [Tianli Feng](#)¹, Jiakuan Xu², Yue Hu², Xiulin Ruan³, Xinyu Wang⁴ and Hua Bao²; ¹University of Utah, United States; ²Shanghai Jiao Tong University, China; ³Purdue University, United States; ⁴Shandong University, China

DS03.02.02

Predicting Thermal Conductivity from Green's Function Molecular Dynamics Simulations [Vitor R. Coluci](#)¹, Sócrates d. Dantas² and Vinod K. Tewary³; ¹University of Campinas, UNICAMP, Brazil; ²Universidade Federal de Juiz de Fora, Brazil; ³National Institute of Standards and Technology, United States

DS03.02.03

Poster Spotlight: Accelerating Green's Function Molecular Dynamics Using Spatial Decomposition [Vitor R. Coluci](#)¹, Sócrates d. Dantas² and Vinod K. Tewary³; ¹University of Campinas, UNICAMP, Brazil; ²Universidade Federal de Juiz de Fora, Brazil; ³National Institute of Standards and Technology, United States

DS03.02.04

Anomalous Dimensionality Dependence of the Phonon Heat Conduction in Poly (para-phenylene) Chains Using Molecular Dynamics Simulations [Cong Yang](#)¹, Jun Liu¹ and Xiaobo Li²; ¹North Carolina State University, United States; ²Huazhong University of Science & Technology, China

DS03.02.05

Phonon-Focusing and Rattler-Mode Interference in Thermal Conductivity Transitions of the Breathing Metal-Organic Framework MIL-53 [Masoumeh Mahmoudi Gahrouei](#)¹, Luping Han², Alatheia E. Davies¹, Quincy Reynolds¹, Agnieszka Truszkowska², Alex Greaney² and Laura de Sousa Oliveira¹; ¹University of Wyoming, United States; ²University of California, Riverside, United States

DS03.02.06

Poster Spotlight: Super-Suppression of Long Phonon Mean-Free-Paths in Nano-Engineered Si Due to Anticorrelated Heat Current Effects Seyed Aria Hosseini¹, Alatheia E. Davies², Ian Dickey¹, Alex Greaney¹ and [Laura de Sousa Oliveira](#)²; ¹University of California, Riverside, United States; ²University of Wyoming, United States

DS03.02.09

Blocking the Heat Radiation Properties of the High Entropy A2B2O7 Fluorite Oxide Containing Zn²⁺ [Myeongwoo Ryu](#), Dowon Song, Hyungjun Lee, Hojin Jeong and Taeseup Song; Hanyang University, Korea (the Republic of)

SESSION DS03.03: Phonon Informatics Approaches I

Session Chair: Andrea Cepellotti

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 313B

8:30 AM *DS03.03.01

Using Machine-Learning Models to Accelerate Interatomic-Force-Constant Calculations [Jesús Carrete Montaña](#); Institute of Materials Chemistry, TU Wien, Austria

9:00 AM DS03.03.02

Anharmonic Lattice Dynamics and Thermal Transport in Type-I Inorganic Clathrates Shraavan Godse, Yagyank Srivastava and [Ankit Jain](#); Indian Institute of Technology Bombay, India

9:15 AM *DS03.03.03

Data-driven Explorations of Materials Phase Stability for Improved Rational Design [Kristin A. Persson](#); University of California, Berkeley, United States

9:45 AM DS03.03.04

The Inelastic Light Scattering of Crystals at Finite Temperatures and the Correct Tensor to Describe It [Nimrod Benshalom](#)¹, Omer Yaffe¹ and Olle Hellman^{2,1}; ¹Weizman Institute of Science, Israel; ²Linköping University, Sweden

10:00 AM BREAK

10:30 AM *DS03.03.05

Comparison of Simulation Approaches for Thermal Transport Properties [Maria K. Chan](#); Argonne National Laboratory, United States

11:00 AM DS03.03.07

Describing Phonon Properties of Nanostructures: Perspective from Atomistic Modeling and Data Driven Techniques [Sanghamitra Neogi](#); University of Colorado Boulder, United States

SESSION DS03.04: Phonon Property Prediction and Characterization II

Session Chair: Olivier Delaire

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 313B

1:30 PM *DS03.04.01

Wavelet Analysis Unfolds Thermal Phonon Coherence [Sebastian Volz](#); The University of Tokyo, Japan

2:00 PM DS03.04.02

Thermoelectric Transport Properties from the Boltzmann Equation and Beyond [Andrea Cepellotti](#)¹, [Jennifer Coulter](#)¹, [Anders Johansson](#)¹, [Natalya Fedorova](#)^{1,2} and [Boris Kozinsky](#)¹; ¹Harvard University, United States; ²Luxembourg Institute of Science and Technology, Luxembourg

2:15 PM DS03.04.03

Thermal Conduction in Bulk Titanium Oxides with Natural Superlattice Structure Containing Coherent Interface for Phonons with Tunable Interspacing [Shunta Harada](#)^{1,1,2}, [Naoki Kosaka](#)¹, [Shunya Sugimoto](#)¹, [Takashi Yagi](#)^{3,4}, [Miho Tagawa](#)^{1,1} and [Toru Ujihara](#)^{1,1,3}; ¹Nagoya University, Japan; ²Japan Science and Technology Agency, Japan; ³National Institute of Advanced Industrial Science and Technology, Japan; ⁴Joan Science and Technology Agency, Japan

2:30 PM DS03.04.04

Novel Thermal Behaviors from Nanostructured Heat Sources—Experiments and Theory on Directional Channeling [Joshua Knobloch](#)¹, [Brendan McBennett](#)¹, [Hossein Honarvar](#)¹, [Albert Beardo Ricol](#)², [Jorge Hernández-Charpak](#)¹, [Travis Frazer](#)¹, [Begoña Abad Mayor](#)¹, [Lluc Sendra Molins](#)², [Javier Bafaluy](#)², [Weilun Chao](#)³, [Mahmoud Hussein](#)⁴, [Juan Camacho](#)², [F. Xavier Alvarez](#)², [Henry Kapteyn](#)¹ and [Margaret Murnane](#)¹; ¹STROBE, JILA, University of Colorado Boulder, United States; ²Universitat Autònoma de Barcelona, Spain; ³Lawrence Berkeley National Laboratory, United States; ⁴University of Colorado Boulder, United States

2:45 PM DS03.04.05

A Machine Learning Framework for Raman Spectrum Prediction [Nina Andrejevic](#)¹, [Michael J. Davis](#)², [Maria K. Chan](#)² and [Mingda Li](#)¹; ¹Massachusetts Institute of Technology, United States; ²Argonne National Laboratory, United States

3:00 PM BREAK

SESSION DS03.05: Phonon Informatics Approaches II

Session Chair: Subramanian Sankaranarayanan

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 313B

3:30 PM *DS03.05.01

Physics-Informed Deep Learning for Solving Phonon Boltzmann Transport Equation [Ruiyang Li](#)¹, [Eungkyu Lee](#)² and [Tengfei Luo](#)¹; ¹University of Notre Dame, United States; ²Kyung Hee University, Korea (the Republic of)

4:00 PM DS03.05.02

Machine-Learning-Assisted Prediction and Optimization of Lattice Thermal Conductivity of Superlattices [Yan Wang](#); University of Nevada, Reno, United States

4:15 PM *DS03.05.03

Machine Learning for Optimizing and Disrupting Thermal Transport Science [Xiulin Ruan](#); Purdue Univ, United States

4:45 PM DS03.08.02

Disorder Enhanced Raman Scattering [Matan Menahem](#)¹, [Maor Asher](#)¹, [Olle Hellman](#)^{1,2}, [Sam Safran](#)¹, [Nimrod Benshalom](#)¹, [Sigalit Aharon](#)¹, [Roman Korobko](#)¹ and [Omer Yaffe](#)¹; ¹Weizmann Institute of Science, Israel; ²Linköping University, Sweden

SESSION DS03.06: Phonon Informatics Approaches III

Session Chair: Tengfei Luo

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 313B

8:30 AM *DS03.06.01

A High-Throughput Database Of Phonons: Automation, Infrastructure, Machine Learning and Data-Driven Ferroelectric Materials Discovery [Geoffroy Hautier](#)^{1,2}; ¹Dartmouth College, United States; ²University Catholique de Louvain, Belgium

9:00 AM DS03.06.02

GPU-Accelerated Simulations of Thermal Transport using Machine Learning Molecular Dynamics Anders Johansson, Andrea Cepellotti, Boris Kozinsky and [Yu Xie](#); Harvard University, United States

9:15 AM DS03.06.03

Anomalous Thermoelectric Transport Phenomena Arising from Interband Electron-Phonon Scattering Boris Kozinsky^{1,2}, Natalya Fedorova¹, Andrea Cepellotti¹ and [Jennifer Coulter](#)¹; ¹Harvard University, United States; ²Bosch Research, United States

9:30 AM DS03.06.05

Phonon Dynamics in Complex Structures and Across Interfaces [Zhiting Tian](#); Cornell University, United States

9:45 AM BREAK

SESSION DS03.07: Phonon Property Prediction and Characterization III

Session Chair: Brian Foley

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 313B

10:30 AM *DS03.07.01

Giant Optomechanical Coupling and Nonlinear Phononics in Broken-Symmetry and Charge Density Wave Materials Anubhab Haldar¹, Cristian Cortes², Stephen Gray², Richard Schaller², Sahar Sharifzadeh¹ and [Pierre T. Darancet](#)²; ¹Boston University, United States; ²Argonne National Laboratory, United States

11:00 AM DS03.07.03

Theoretical Analysis of Phonons and Their Influence on Charge Transport in Novel Thienoacene Molecular Crystals [Nemo McIntosh](#)¹, Remy Jouclas², Samuele Gianini¹, Federico Modesti³, Vincent Lemaire¹, Peter Erk⁴, David Beljonne¹, Yves Geerts² and Jerome Cornil¹; ¹University of Mons, Belgium; ²Université libre de Bruxelles, Belgium; ³BASF SE, Germany; ⁴BASF Corporation, Germany

11:15 AM DS03.07.04

Temperature-Dependent Thermal Conductivity and Heat Capacity of InGaAs and InAlAs Thin Films [Carlos Perez](#)¹, Jae H. Ryu², Robert Lavelle¹, Shuqi Zhang², Shining Xu², Dan Botez², Luke Mawst² and Brian M. Foley¹; ¹The Pennsylvania State University, United States; ²University of Wisconsin-Madison, United States

11:30 AM DS03.07.05

Spatially Resolved Phonon Dispersion Relations Throughout the Brillouin Zone from Electron Thermal Diffuse Scattering [Dennis Kim](#), Xi Chen, Michael Xu, Aubrey Penn, Abinash Kumar and James M. LeBeau; Massachusetts Institute of Technology, United States

11:45 AM DS03.08.01

Universal Effective Medium Theory to Predict the Thermal Conductivity in Nanostructured Materials Seyed Aria Hosseini^{1,2}, Sarah Khanniche², Samuel Huberman³, [Alex Greaney](#)¹ and Giuseppe Romano²; ¹University of California, Riverside, United States; ²Massachusetts Institute of Technology, United States; ³McGill University, Canada

12:00 PM DS03.08.03

Accounting for Correlated Thermal Vibrations in Quantitative STEM Simulations [Xi Chen](#), Dennis Kim and James M. LeBeau; Massachusetts Institute of Technology, United States

SESSION DS03.09: Phonon Property Prediction and Characterization IV

Session Chairs: Ming Hu and Subramanian Sankaranarayanan

Monday Morning, May 23, 2022

DS03-Virtual

8:00 AM DS03.09.01

Phonon Transport in Ultrahigh Thermal Conductivity Materials Beyond the Relaxation Time Approximation [Nikhil Malviya](#) and Navaneetha Krishnan Ravichandran; Indian Institute of Science Bangalore, India

8:15 AM *DS03.09.03

Materials Property Prediction for Limited Datasets Pierre-Paul de Brueck, Matthew Evans, Geoffroy Hautier and [Gian-Marco Rignanese](#); Université catholique de Louvain, Belgium

8:45 AM DS03.09.04

Kohn-Sham Density Functional Perturbation Theory at Unprecedented Scale and Accuracy [Abhiraj Sharma](#); Georgia Institute of Technology, United States

9:00 AM DS03.09.05

Phonon Transport in Nanostructures Studied Using a Monte Carlo Solution of Frequency-Dependent Boltzmann Equation [Vasumathy Ravishankar](#), Nikhil Malviya and Navaneetha Krishnan Ravichandran; Indian Institute of Science, India

9:15 AM DS03.09.06

Optimization of Thermal Conductivity and Viscosity of Liquid Mixtures Using an Automated Continuous Flow System Jia Xin Peng¹, Yaerim Lee¹, Harish Sivasankaran¹ and Junichiro Shiomi^{1,2}; ¹The University of Tokyo, Japan; ²RIKEN Center for Advanced Intelligence Project, Japan

SESSION DS03.10: Phonon Property Prediction and Characterization V

Session Chairs: Ming Hu and Junichiro Shiomi

Monday Afternoon, May 23, 2022

DS03-Virtual

8:45 PM DS03.03.07

Deep Neural Network Potentials for >50 Elements and Applications to Phonon Dispersions and Lattice Thermal Conductivity Ming Hu; University of South Carolina, United States

9:00 PM *DS03.10.01

Integration of Materials Data and Substance Data Yibin Xu; National Institute for Materials Science, Japan

9:30 PM DS03.10.02

Effect of Four-Phonon Scattering on the Phonon Lineshapes in Weakly-Bonded Solids from First Principles Navaneetha Krishnan Ravichandran; Indian Institute of Science, India

9:45 PM *DS03.10.03

High Throughput Screening of Materials for Interfacial Thermal Transport Shenghong Ju; Shanghai Jiao Tong University, China

10:15 PM *DS03.10.04

Machine Learning-Driven Discovery of New Thermal Transport Mechanisms in Porous Materials Hua Bao¹, Han Wei¹ and Xiulin Ruan²; ¹Shanghai Jiao Tong University, China; ²Purdue University, United States

10:45 PM DS03.10.05

Searching Graphene-WS₂ Heterostructures with the Lowest Thermal Conductivity via Materials Informatics Wenyang Ding¹, Shiqian Hu², Masato Ohnishi¹, Cheng Shao¹, Bin Xu¹ and Junichiro Shiomi¹; ¹The University of Tokyo, Japan; ²Yunnan University, China

##PAGE_BREAK##

SYMPOSIUM DS04

Recent Advances in Data-Driven Discovery of Materials for Energy Conversion and Storage

May 8 - May 23, 2022

Symposium Organizers

Chibueze Amanchukwu, University of Chicago

Jeffrey Lopez, Northwestern University

Rajeev Surendran Assary, Argonne National Laboratory

Tian Xie, Massachusetts Institute of Technology

* Invited Paper

SESSION Tutorial DS04.00: MLOps for Materials Science—What Comes After Building a Machine Learning (ML) Model, NaN,

SESSION DS04.01: Accelerating Materials Discovery I

Session Chair: Jeffrey Lopez

Sunday Afternoon, May 8, 2022

Hawai'i Convention Center, Level 3, 313B

1:30 PM DS04.01.07

Atomistic Modeling and AI-enabled Energy Storage Materials Discovery Rajeev Surendran Assary; Argonne National Laboratory, United States

1:45 PM DS04.01.01

Simmate—A Framework and Toolbox for Materials Discovery and Its Application in the High-Throughput Search of Fluoride-Ion Conductors Jack D. Sundberg, Lauren McRae, Siona Benjamin and Scott Warren; University of North Carolina, United States

2:00 PM DS04.01.02

Autonomous Reinforcement Learning Approach for Development of Reactive Potentials for Energy Applications Aditya Koneru^{1,2}, Sukriti Manna^{1,2}, Henry Chan^{1,2}, Troy Loeffler^{1,2} and Subramanian Sankaranarayanan^{1,2}; ¹University of Illinois at Chicago, United States; ²Argonne National Laboratory, United States

2:15 PM DS04.01.03

A Flexible and Scaleable Scheme for Combining Formation Energies Computed with Different Density Functionals Ryan S. Kingsbury¹, Andrew Rosen¹, Ayush Gupta^{2,1}, Jason Munro¹, Shyue Ping Ong^{3,1}, Anubhav Jain¹, Shyam Dwaraknath¹, Matthew Horton¹ and Kristin Persson^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³University of California, San Diego, United States

2:30 PM DS04.01.04

Equivariant Graph Network for Fast Charge Density Estimation of Molecules, Liquids and Solids Peter B. Jørgensen and Arghya Bhowmik; Technical University of Denmark, Denmark

2:45 PM DS04.01.05

High-Throughput Characterization of Mixed-Metal Salt Hydrates for Heat Storage via Density Functional Theory and Machine Learning Steven G. Kiyabu¹ and Donald Siegel²; ¹University of Michigan, United States; ²The University of Texas at Austin, United States

3:00 PM DS04.01.06

Machine-Learning Based Optimization of Sorbent Materials for Energy Storage—A Case Study on Metal Organic Frameworks—MOFs Giovanni Trezza, Luca Bergamasco, Matteo Fasano and Eliodoro Chiavazzo; Politecnico di Torino, Italy

SESSION DS04.02: Data-Driven Advances in Energy Storage I

Session Chairs: Jeffrey Lopez and Nicola Molinari

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 313B

10:30 AM *DS04.02.01

Leaning Governing Relations in Battery Electrodes—Hybridizing Physics- and Data-Driven Approaches William C. Chueh and Vivek N. Lam; Stanford University, United States

11:00 AM DS04.02.03

Spectral Denoising for Accelerated Analysis of Correlated Ionic Transport Nicola Molinari^{1,2}, Yu Xie¹, Ian Leifer¹, Aris Marcolongo³, Mordechai Kornbluth² and Boris Kozinsky^{1,2}; ¹Harvard University, United States; ²Robert Bosch LLC, United States; ³University of Bern, Switzerland

11:15 AM DS04.02.04

Materials Design Principles of Amorphous Cathode Coatings for Lithium-Ion Battery Applications Jianli Cheng and Kristin Persson; Lawrence Berkeley National Laboratory, United States

11:30 AM DS04.02.02

Comprehensive Analytics for Massive and Diverse Li-Ion Battery Aging Datasets Vivek N. Lam¹, Bruis v. Vlijmen¹, Xiao Cui¹, Patrick Asinger², Devi Ganapathi¹, Dean Deng¹, Natalie R. Geise¹, Will Gent¹, Patrick Herring³, Richard D. Braatz² and William C. Chueh¹; ¹Stanford University, United States; ²Massachusetts Institute of Technology, United States; ³Toyota Research Institute, United States

SESSION DS04.03: Data-Driven Advances in Energy Storage II

Session Chairs: Shadow Huang and Rajeev Surendran Assary

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 313B

1:30 PM *DS04.03.01

A Data-Driven Approach to Understanding and Predicting the Early Formation of the Solid-Liquid Electrolyte Interphase Kristin A. Persson^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

2:00 PM DS04.03.02

High Dimensional and Low Sample Size Case Statistics for the Screening on Crystal Information of the Solid-State Electrolytes Hiroataka Sakamoto¹, Kazuyoshi Yata², Hisatsugu Yamasaki¹ and Makoto Aoshima²; ¹Toyota Motor Corporation, Japan; ²University of Tsukuba, Japan

2:15 PM DS04.03.03

Element Selection for Crystalline Inorganic Solid Discovery Guided by Unsupervised Machine Learning of Experimentally Explored Chemistry Andrii Vasylenko, Jacinthe Gamon, Benjamin Duff, Vladimir Gusev, Luke Daniels, Marko Zanella, Felix Shin, Paul Sharp, Alexandra Morscher, Ruiyong Chen, Alex Neal, Laurence Hardwick, John Claridge, Frederic Blanc, Michael W. Gaultois, Matthew Dyer and Matthew J. Rosseinsky; University of Liverpool, United Kingdom

2:30 PM BREAK

3:00 PM *DS04.03.05

The ElectroLab—An Integrated Platform for High-throughput Characterization of Redox-Active Materials Charles M. Schroeder, [Oliver Rodriguez](#), Michael Pence, Hung Nguyen, Edward Jira, Inkyu Oh and Joaquin Rodriguez-Lopez; University of Illinois at Urbana-Champaign, United States

3:30 PM DS04.03.06

Data-Driven Approach to Design/Discover Intercalating Ions and Layered Materials for Metal-Ion Batteries [Shayani Parida](#)¹, Avani Mishra¹, Arthur Doble², Barry Carter^{1,3} and Avinash M. Dongare¹; ¹University of Connecticut, United States; ²EaglePicher Technologies, United States; ³Sandia National Laboratories, United States

3:45 PM DS04.03.08

Computational Screening of Positive Electrode Materials for Ca-Ion Batteries Ankit Kumar¹, Dereje B. Tekliye¹, Xie Weihang², Pieremanuele Canepa² and [Sai Gautam Gopalakrishnan](#)¹; ¹Indian Institute of Science, India; ²National University of Singapore, Singapore

4:00 PM DS04.03.09

In Silico Paradigm for Predicting Green Battery Material Phenomena Hongjiang Chen and [Shadow Huang](#); North Carolina State Univ, United States

SESSION DS04.04: Accelerating Materials Discovery II

Session Chairs: Qizhi He and Tian Xie

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 313B

9:15 AM DS04.04.01

Predicting and Understanding Perovskite Nanostructure Formation Through Machine Learning and Data-Driven Modelling of In Situ Spectroscopic Data [Jakob Dahl](#)^{1,2}, Emory Chan² and A. Paul Alivisatos¹; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

9:30 AM DS04.04.02

Physics-Constrained Deep Neural Network Method for Estimation and Simulation of Vanadium Redox Flow Battery [Qizhi He](#)¹, Panos Stinis² and Alexandre Tartakovsky³; ¹University of Minnesota Twin Cities, United States; ²Pacific Northwest National Laboratory, United States; ³University of Illinois at Urbana-Champaign, United States

9:45 AM DS04.04.03

Remote and On-the-Fly—Artificial Intelligence Driven Science in Laboratories and Central Facilities [Phillip Maffettone](#); Brookhaven National Laboratory, United States

10:00 AM BREAK

10:30 AM *DS04.04.04

Controlling Polymorphism in Nanoporous Aluminosilicates from First Principles [Rafael Gomez-Bombarelli](#); Massachusetts Institute of Technology, United States

11:00 AM DS04.04.05

Inorganic Synthesis Recommendation by Machine Learning the Similarity of Materials from Scientific Literature [Tanjin He](#)^{1,2}, Haoyan Huo^{1,2}, Christopher Bartel^{1,2}, Zheren Wang^{1,2}, Kevin J. Cruse^{1,2} and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

11:15 AM DS04.04.06

Towards Materials "Synthesis by Design"—Assessing Selectivity of Solid-State Reactions Using Chemical Potential Differences at Interfaces [Matthew J. McDermott](#)^{1,2}, Brennan McBride³, James Neilson³ and Kristin Persson^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Colorado State University, United States

11:30 AM DS04.04.07

Research Data Infrastructure for Data-Driven Experimental Materials Science [Andriy Zakutayev](#), Kevin Talley, Robert White, David Evenson, William Tumas, Kristin Munch and Caleb Phillips; National Renewable Energy Laboratory, United States

11:45 AM DS04.04.08

Graph Convolutional Neural Network Modeling of Vacancy Formation for Materials Discovery in Solar Thermochemical Water Splitting [Matthew Witman](#)¹, Anuj Goyal², Tadashi Ogitsu³, Stephan Lany² and Anthony McDaniel¹; ¹Sandia National Laboratories, United States; ²National Renewable Energy Laboratory, United States; ³Lawrence Livermore National Laboratory, United States

SESSION DS04.05: Data-Driven Advances in Energy Conversion

Session Chairs: Rachel Woods-Robinson and Tian Xie

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 313B

1:30 PM DS04.05.01

Lessons Learned in Combining Computational and Experimental Materials Discovery—A P-Type Transparent Conductor Case Study [Rachel](#)

Woods-Robinson¹, Andriy Zakutayev² and Kristin A. Persson^{1,3}; ¹Lawrence Berkeley National Laboratory, United States; ²National Renewable Energy Laboratory, United States; ³University of California, Berkeley, United States

1:45 PM DS04.05.02

A Machine Vision Tool for Facilitating the Optimization of Large-Area Perovskite Photovoltaics Mathilde Fievez^{1,2}, Nina Taherimakhssousi³, Benjamin P. MacLeod³, Edward P. Booker³, Emmanuelle Fayard¹, Muriel Matheron¹, Matthieu Manceau¹, Stéphane Cros¹, Solenn Berson¹ and Curtis P. Berlinguette³; ¹CEA, France; ²Stanford University, United States; ³The University of British Columbia, Canada

2:00 PM DS04.05.04

Using High-Throughput Calculations and Machine Learning to Understand Electronic Transport in Semiconductors Alex M. Ganose¹, Junsoo Park² and Anubhav Jain²; ¹Imperial College London, United Kingdom; ²Lawrence Berkeley National Laboratory, United States

2:15 PM BREAK

2:45 PM DS04.05.05

High-Throughput Discovery of Multiferroic Materials Based on *Ab Initio* Calculations Francesco Ricci^{1,1,2}, Ella Banyas^{1,1}, Stephanie Mack^{1,2} and Jeffrey B. Neaton^{1,2,3}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Kavli Energy NanoScience Institute, United States

3:00 PM DS04.05.06

Anisotropic Conductance Descriptor for *Ab Initio* Screening of Next-Generation Interconnect Metals Sushant Kumar, Christian Multunas, Daniel Gall and Ravishankar Sundararaman; Rensselaer Polytechnic Institute, United States

SESSION DS04.06: Poster Session: Recent Advances in Data-Driven Discovery of Materials for Energy Conversion and Storage

Session Chairs: Jeffrey Lopez and Tian Xie

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

DS04.06.03

Iterative Peak-Fitting of Frequency-Domain Data via Deep Convolution Neural Networks Seong-Heum Park¹, Hyeongseon Park¹, Hyunbok Lee^{2,1} and Heung-Sik Kim^{2,1}; ¹Institute for Accelerator Science, Kangwon National University, Korea (the Republic of); ²Kangwon National University, Korea (the Republic of)

SESSION DS04.07: Data-Driven Advances in Electrocatalysis

Session Chairs: Jeffrey Lopez, Rajeev Surendran Assary and Tian Xie

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 313B

8:00 AM *DS04.07.01

Machine-Learning Assisted discovery of Catalytic Materials Richard Tran¹, Zachary Ulissi¹, Duo Wang², Jain Anubhav² and Ryan Kingsbury²; ¹Carnegie Mellon University, United States; ²Lawrence Berkeley National Laboratory, United States

8:30 AM DS04.07.02

High Throughput Screening of Metal-Oxide Systems for Facile OER Kinetics in Electrochemical Mining Jaclyn Lunger, Naomi Luntz and Yang Shao-Horn; Massachusetts Institute of Technology, United States

8:45 AM DS04.07.03

High-Throughput Electrocatalyst Screening and Machine Learning for Feature Selection and Prediction of Alkaline Fuel Cell Catalysts Jeremy Hitt and Thomas Mallouk; University of Pennsylvania, United States

9:00 AM DS04.07.04

Predicting Electronic and Photophysical Properties of Photocatalytically Active Metal-Organic Frameworks Andres A. Ortega Guerrero, Kevin Jablonka and Berend Smit; EPFL, Switzerland

9:15 AM DS04.07.05

High-Throughput study of Tellurium-Containing Semiconductors for Photocatalysis Martin Siron^{1,2,2}, Oxana Andriuc^{1,2,2} and Kristin Persson^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

9:30 AM BREAK

10:00 AM DS04.07.07

Accelerated Materials Discovery Using Quantum-Inspired Optimizers Hitarth Choubisa¹, Jehad Abed^{1,1}, Douglas Mendoza^{1,2}, Alan Aspuru-Guzik^{1,1,3} and Edward H. Sargent¹; ¹University of Toronto, Canada; ²Harvard University, United States; ³Vector Institute for Artificial Intelligence, Canada

10:15 AM DS04.07.08

An Automated Adsorption Workflow for Semiconductors Oxana Andriuc^{1,2}, Martin Siron^{2,1,3} and Kristin A. Persson^{2,1}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Lab, United States; ³Toyota Research Institute, United States

10:30 AM DS04.07.09

Analysis of Multi-Component Perovskites as Oxygen Evolution Reaction Catalysts through High-Throughput Simulations and Machine Learning James K. Damewood, Jessica Karaguesian, Daniel Schwalbe-Koda, Jaclyn Lunger, Jiayu Peng, Daniel Zheng, Elton Pan, Vineeth Venugopal, Elsa Olivetti, Yang Shao-Horn and Rafael Gomez-Bombarelli; Massachusetts Institute of Technology, United States

10:45 AM DS04.07.10

Ligation in Data-Driven Synthesis Studies of Nanoparticles—A Case Study of Phosphine-Stabilized Gold Caitlin McCandler^{1,2} and Kristin Persson^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

11:00 AM DS04.07.11

Multivariate Analysis of Peptide-Driven Nucleation and Growth of Au Nanoparticles Kacper J. Lachowski, Kiran Vaddi and Lilo D. Pozzo; University of Washington, United States

SESSION DS04.08: Recent Advances in Data-Driven Discovery of Materials for Energy Conversion and Storage I

Session Chairs: Chibueze Amanchukwu and Jeffrey Lopez

Monday Morning, May 23, 2022

DS04-Virtual

8:00 AM DS04.08.01

Predicting Quasiparticle and Excitonic Properties of Materials Using Machine Learning Tathagata Biswas, Sydney Olson and Arunima K. Singh; Arizona State University, United States

8:15 AM DS04.08.02

High-Throughput Screening of Li-Ion Solid Electrolytes with Experimental Evaluation Joohwi Lee¹, Nobuaki Suzuki¹, Yumi Masuoka¹, Shingo Ohta¹, Tetsuro Kobayashi¹ and Ryoji Asahi^{1,2}; ¹Toyota Central R&D Labs., Inc., Japan; ²Present affiliation : Nagoya Univ., Japan

8:30 AM DS04.08.03

Identification of Electromagnetic Steel Sheets for Motors by Material Structure Characteristics Hiroyuki Suzuki¹, Qiang Dong² and Sayaka Tanimoto¹; ¹Hitachi, Ltd., Japan; ²Hitachi (China), Ltd., China

8:45 AM DS04.08.04

Toward Combinatorial Characterization of LLZO-Based Solid Electrolyte Thin Films Euimin Cheong and Dongwoo Lee; SungKyunKwan University, Korea (the Republic of)

9:00 AM DS04.08.05

Data-Driven Improvement of ZT in SnSe-Based Thermoelectric Systems Jino Im¹, Yea-Lee Lee¹, Hyungseok Lee², Sejin Byun², Seunghun Jang¹, Hyunju Chang¹ and In Chung²; ¹Korea Research Institute of Chemical Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:15 AM DS04.08.06

A Broad Structural Search of Binary Precipitates via Active Learning Angel Diaz Carral, Azade Yazdan Yar, Maria Fyta and Siegfried Schmauder; University of Stuttgart, Germany

9:30 AM *DS04.08.07

Auto-Generating Material and Device Databases on Batteries and Solar Cells for Data-Driven Materials Discovery Jacqueline M. Cole^{1,2}; ¹University of Cambridge, United Kingdom; ²ISIS Pulsed Neutron and Muon Source, United Kingdom

SESSION DS04.09: Recent Advances in Data-Driven Discovery of Materials for Energy Conversion and Storage II

Session Chairs: Chibueze Amanchukwu and Jeffrey Lopez

Monday Morning, May 23, 2022

DS04-Virtual

10:30 AM *DS04.09.01

On the Interplay of High Throughput Experiments and Data Science for Accelerated Materials Discovery John M. Gregoire¹, Joel Haber¹, Dan Guevarra¹, Lan Zhou¹, Di Chen², Shufeng Kong², Lusann Yang³, Francesco Ricci⁴, Jeffrey B. Neaton⁴ and Carla P. Gomes²; ¹California Institute of Technology, United States; ²Cornell University, United States; ³Google Research, United States; ⁴Lawrence Berkeley National Laboratory, United States

11:00 AM *DS04.09.02

Accelerated Materials Discovery for Sustainable Energy Storage Dmitry Zubarev, Maxwell Giammona and Young-Hye Na; IBM Almaden Research Center, United States

11:30 AM DS04.09.03

Molecular Structure–Redox Potential Relationship for Organic Electrode Materials—Density Functional Theory–Machine Learning Approach Omar A. Allam, Robert Kuramshin, Zlatomir Stoichev, Byung Woo Cho, Seung Woo Lee and Seung Soon Jang; Georgia Institute of Technology, United States

11:45 AM DS04.09.04

Physics-Informed XGBoost Model for Electrocaloric Temperature Change Predictions in Ceramics Jie Gong, Sharon Chu, Rohan Mehta and Alan McGaughey; Carnegie Mellon University, United States

12:00 PM DS04.09.05

Design and Discovery of Novel OLED Materials via Active Learning [Hadi Abroshan](#)¹, Anand Chandrasekaran², Paul Winget², Yuling An², H. Shaun Kwak¹, Christopher T. Brown² and Mathew Halls²; ¹Schrödinger Inc, United States; ²Schrödinger, Inc., United States

12:15 PM DS04.09.06

Alcohol-Based Electrolytes—An Alternative Between Aqueous and Nonaqueous for Increased Voltage and High-Rate Lithium-Ion Batteries [Hewei Xu](#); Institute of Condensed Matter and Nanosciences, Molecular Chemistry, Materials and Catalysis, Université catholique de Louvain, Belgium

12:30 PM *DS04.07.06

Natural Language Processing for Energy Technology Scalability [Elsa Olivetti](#); Massachusetts Institute of Technology, United States

##PAGE_BREAK##

SYMPOSIUM EN01

Silicon for Photovoltaics
May 9 - May 23, 2022

Symposium Organizers

Kaining Ding, Forschungszentrum Jülich GmbH
Daniel Hiller, TU Bergakademie Freiberg
Alison Lennon, UNSW Sydney
David Young, National Renewable Energy Laboratory

* Invited Paper

SESSION Tutorial EN01.00: Photovoltaic Solar Cell to Module Modeling
, NaN,

SESSION EN01.01: Passivating Contacts I
Session Chairs: Daniel Hiller and David Young
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 325A

10:30 AM EN01.01.02

Bottom-up Filling of Nanosized Trenches with Silver and Copper to Fabricate Transparent Conducting Electrodes [Yorick Bleijl](#), Mees Dieperink, Stefan Tabernig, Andrea Cordaro, Albert Polman and Esther Alarcon-Llado; AMOLF, Netherlands

SESSION EN01.02: Nanomaterials for Si-PV
Session Chairs: Daniel Hiller and Uwe Rau
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 325A

11:15 AM EN01.02.01

Mediating Triplet Energy Transfer for Photon Upconversion in a Silicon Quantum Dot-Molecular Hybrid System [Kefu Wang](#)¹, Robert P. Cline², Joseph Schwan³, Jacob Strain⁴, MingLee Tang⁵, Lorenzo Mangolini³, Sean Roberts⁴ and Joel D. Eaves²; ¹University of Utah, United States; ²University of Colorado Boulder, United States; ³University of California, Riverside, United States; ⁴The University of Texas at Austin, United States; ⁵The University of Utah, United States

11:30 AM EN01.02.02

Bidirectional Triplet Exciton Transfer Between Silicon Nanocrystals and Perylene [Tingting Huang](#)¹, Timothy T. Koh², Joseph Schwan², Tiffany Tran², Pan Xia², Kefu Wang¹, Lorenzo Mangolini^{2,2}, MingLee Tang¹ and Sean Roberts³; ¹The University of Utah, United States; ²University of California, Riverside, United States; ³The University of Texas at Austin, United States

SESSION EN01.03: Passivating Contacts II
Session Chairs: Cassidy Sainsbury and David Young
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 325A

1:45 PM *EN01.03.01

Al-Doped Zinc Oxide as a Passivating Conductive Contact Layer for PERC, TOPCon and Perovskite Tandem Cells Bart Macco and Erwin Kessels; Eindhoven University of Technology, Netherlands

2:15 PM EN01.03.02

Hafnium Oxide Surface Passivation for Silicon Solar Cells Ailish Wratten, Sophie L. Pain, Nicholas E. Grant, David Walker and John D. Murphy; University of Warwick, United Kingdom

2:30 PM EN01.03.03

Excellent Surface Passivation of n^+ -doped Silicon by $\text{PO}_x/\text{Al}_2\text{O}_3$ Stacks with High Positive Fixed Charge Density Roel J. Theeuwes¹, Jimmy Melskens², Lachlan Black³, Wolfhard Beyer⁴, Willem-Jan Berghuis¹, Bart Macco¹ and Erwin Kessels¹; ¹Eindhoven University of Technology, Netherlands; ²TNO Energy Transition, Netherlands; ³The Australian National University, Australia; ⁴Forschungszentrum Jülich GmbH, Germany

2:45 PM BREAK

SESSION EN01.04: Cells and Modules Optimization I
Session Chairs: Daniel Hiller and Erwin Kessels
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 325A

3:15 PM *EN01.04.01

Improving Cell Production Lines Through Easy Data Cassidy L. Sainsbury, Harrison Wilterdink, Karoline Dapprich, Wes Dobson and Ron Sinton; Sinton Instruments, United States

3:45 PM EN01.04.02

Incorporation of Stokes Shifting Dyes into a Si-Based Photovoltaic-Thermal System Lindsey Gray, Paul Allaire and David Carroll; Wake Forest University, United States

4:00 PM EN01.04.04

Formation of a Porous Monolithic Silver Layer for Deep Metal-Assisted Chemical Etching—For the Commercialization of the Neutral-Colored Transparent Silicon Photovoltaics HyeonOh Shin and Tae-Hyuk Kwon; Ulsan National Institute of Science and Technology, Korea (the Republic of)

4:15 PM EN01.04.05

Feasibility Analysis of Integrating Silicon Luminescent Solar Concentrators into Greenhouses Yaling Liu and Uwe Kortshagen; University of Minnesota, United States

SESSION EN01.05: Silicon, Defects and Degradation
Session Chairs: Kaining Ding and Daniel Hiller
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 325A

9:00 AM *EN01.05.01

Gallium Doped Silicon for PERC Solar Cells—Carrier Lifetime Potential and Instability John D. Murphy¹, Tim Niewelt¹, Eduard C. Hopkins¹, Pietro P. Altermatt² and Nicholas E. Grant¹; ¹University of Warwick, United Kingdom; ²Trina Solar Limited, China

9:30 AM EN01.05.02

Atomistic Insight into the Defect Structure and Mechanism of Light- and Elevated-Temperature-Induced Degradation and Regeneration in Ga-Doped Cz Si Abigail R. Meyer^{1,2}, P. Craig Taylor¹, Vincenzo LaSalvia², Xue Wang¹, William Nemeth², Matthew Page², David Young², Sumit Agarwal^{1,2} and Paul Stradins²; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

9:45 AM EN01.05.03

Understanding the Microscopic Mechanisms of Auger Recombination in Crystalline Silicon Kyle Bushick and Emmanouil Kioupakis; University of Michigan, United States

10:00 AM BREAK

10:30 AM EN01.05.04

Hydrogen Movement from Passivating Dielectrics Measured by Mass Spectrometry and Vibrational Spectroscopy Matthew B. Hartenstein^{1,2}, William Nemeth², Vincenzo LaSalvia², Matthew Page², David Young², Paul Stradins² and Sumit Agarwal^{1,2}; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

10:45 AM EN01.05.05

Quantifying the Influence of Free Carriers and Crystal Polytypes on Silicon PV with Theoretical Characterization Xiao Zhang, Guangsha Shi and Emmanouil Kioupakis; The University of Michigan, United States

11:00 AM EN01.05.06

Intermediate Band (IB) Induced by Nitrogen Chemical Complexes in Silicon [Abdennaceur Karoui](#), Fozia Sahtout, Igor Filikhin and Branislav Vlahovic; North Carolina Central University, United States

SESSION EN01.06: Cells and Modules Optimization II

Session Chairs: Kaining Ding and John Murphy

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 325A

1:45 PM *EN01.06.01

Stability of Silicon Photovoltaic Modules in Intermediate Precision Conditions of Measurement [Mauro Pravettoni](#) and Amit S. Rajput; National University of Singapore, Singapore

2:15 PM *EN01.07.01

Three-Terminal Tandem Solar Cells Using IBC-Si and III-V Materials Adele Tamboli¹, John Geisz¹, William E. McMahon¹, Jeronimo Buencuerpo¹, Kaitlyn VanSant¹, Talysa Klein¹, Michael Riennaecker², Robby Peibst² and [Emily Warren](#)¹; ¹National Renewable Energy Laboratory, United States; ²Institute for Solar Energy Research in Hamelin (ISFH), Germany

2:45 PM EN01.06.03

Energy Harvesting with Solar and Thermoelectric Materials—A Hybrid Concept [Sarath Witanachchi](#)¹, Derick C. DeTellem¹ and Murape D. Mnyaradz²; ¹University of South Florida, United States; ²Botswana International University of Science and Technology, Botswana

SESSION EN01.08: Poster Session: Silicon for Photovoltaics

Session Chairs: Daniel Hiller and David Young

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN01.08.03

FRay—A Free from Freiberg Ray Tracer for the PV Community [Matthias Müller](#), Tobias Urban and Johannes Heitmann; institute of Applied Physics, Germany

SESSION EN01.09: Silicon for Photovoltaics I

Session Chairs: Kaining Ding, Daniel Hiller, Alison Lennon and David Young

Monday Morning, May 23, 2022

EN01-Virtual

8:00 AM *EN01.09.01

100% Renewables—Rapid, Deep and Cheap Emissions Reductions [Andrew Blakers](#); Australian National Univ, Australia

8:30 AM *EN01.09.02

Concepts for Mass Manufacturing of Vehicle Integrated PV Components [Bonna Newman](#); TNO, Netherlands

9:00 AM *EN01.09.03

Degradation Rates of High-Efficiency Silicon Modules from the 7GW PV Fleet Performance Data Initiative [Chris Deline](#), Dirk Jordan, Kevin Anderson, Kirsten Perry, Matthew Muller, Robert White and Michael Deceglie; National Renewable Energy Laboratory, United States

9:30 AM *EN01.09.04

Copper Metallization for Heterojunction Solar Cells [Agata Lachowicz](#), Bertrand Paviet-Salomon and Christophe Ballif; CSEM, Switzerland

SESSION EN01.10: Silicon for Photovoltaics II

Session Chairs: Daniel Hiller and David Young

Monday Morning, May 23, 2022

EN01-Virtual

10:30 AM *EN01.10.01

Passivating Contacts for High-Efficiency Silicon Solar Cells Based on Poly-Si/SiO_x Structures [Stefan Glunz](#)^{1,2}; ¹Fraunhofer Institute for Solar Energy Systems (ISE), Germany; ²University of Freiburg, Germany

11:00 AM EN01.10.04

Modeling of the Effects of Porosity and Passivation on Porous Silicon [Panus Sundarapura](#), Sergei Manzhos and Manabu Ihara; Tokyo Institute of Technology, Japan

11:05 AM EN01.10.05

MXenes as Contacts for PERC Solar Cells Loay A. Madbouly^{1,2}, Hisham Nasser², Öykü Çetin¹, Yaqoob Khan¹, Rasit Turan^{2,2} and Husnu Emrah Unalan^{1,2}; ¹Middle East Technical University, Turkey; ²Middle East Technical University (METU), Turkey

11:10 AM EN01.10.06

Interfacial Degradation in Bifacial Glass/Glass Silicon Photovoltaic Modules Under Applied Bias and Humidity Sona Ulicna¹, Laura Spinella², Archana Sinha¹, Michael Owen-Bellini², Dana Kern², Steve Johnston² and Laura T. Schelhas²; ¹SLAC National Accelerator Laboratory, United States; ²National Renewable Energy Laboratory, United States

11:25 AM EN01.06.02

Performance of Silicon Solar Cells and Modules Using High-Resistivity Wafers in Relevant Field Conditions of Illumination, Temperature and Shading Andre Augusto¹, Anh Le Huy Tuan², Apoorva Srinivasa¹, Stuart Bowden¹ and Ziv Hameiri²; ¹Arizona State University, United States; ²University of New South Wales, Australia

##PAGE_BREAK##

SYMPOSIUM EN02

III-V Semiconductors for Energy Conversion Technologies
May 9 - May 24, 2022

Symposium Organizers

Esther Alarcon-Llado, AMOLF

Todd Deutsch, National Renewable Energy Laboratory

Shu Hu, Yale University

Vijay Parameshwaran, U.S. Army Research Laboratory

* Invited Paper

SESSION EN02.01: III-V Epitaxy

Session Chairs: Marina Leite and Xiaowang Zhou

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 321B

10:45 AM EN02.01.01

Coalescence of GaP on V-Groove Si Substrates Theresa E. Saenz^{1,2}, John S. Mangum¹, Olivia Schneble^{1,2}, Anica Neumann^{1,2}, Ryan France¹, William E. McMahon¹, Jeremy Zimmerman² and Emily Warren¹; ¹National Renewable Energy Lab, United States; ²Colorado School of Mines, United States

11:00 AM *EN02.01.02

Recent III-V Materials Development Using Dynamic Hydride Vapor Phase Epitaxy Aaron Ptak, Jacob T. Boyer, Anna K. Braun, Allison Perna, Dennice M. Roberts, Kevin Schulte and John Simon; National Renewable Energy Lab, United States

11:30 AM EN02.01.03

GaAs Overgrowth of a Faceted Surface Using HVPE Towards Planarization of Rough Substrates Anna K. Braun¹, William E. McMahon², Corinne E. Packard^{1,2} and Aaron Ptak²; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

11:45 AM EN02.01.04

Low-Cost Synthesis Methods for Single Crystal Quality III-V Alloys Sonia J. Calero^{1,2}, Abdulaziz F. Alfarhood^{1,2} and Mahendra K. Sunkara^{1,2}; ¹University of Louisville, United States; ²Conn Center for Renewable Energy Research, United States

SESSION EN02.02: Modeling Materials Growth

Session Chairs: Marina Leite and Aaron Ptak

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 321B

1:45 PM *EN02.02.01

Impact of Molecular Dynamics (MD) in Semiconductor Materials Research Xiaowang Zhou¹, Sharmin Abdullah², David Zubia² and Saurav Goel³; ¹Sandia National Laboratories, United States; ²University of Texas at El Paso, United States; ³London South Bank University, United Kingdom

2:15 PM EN02.02.02

Understanding Zn Doping of Vapor-Liquid-Solid Grown GaAs Nanowires [Jonas Johansson](#)¹, Masoomeh Ghasemi², Sudhakar Sivakumar¹, Kilian Mergenthaler¹, Axel R. Persson¹, Wondwosen Metaferia¹ and Martin H. Magnusson¹; ¹Lund University, Sweden; ²Thermo-Calc Software AB, Sweden

2:30 PM EN02.02.03

Kinetic Modeling of Vertical Cation Segregation During $A_xB_{1-x}N$ Epitaxy [Christopher M. Matthews](#), Zachary Engel and W. A. Doolittle; Georgia Institute of Technology, United States

2:45 PM BREAK

SESSION EN02.03: Thermoelectric/Thermophotovoltaic Energy

Session Chairs: Aaron Ptak and Xiaowang Zhou

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 321B

3:15 PM EN02.03.02

Silicon Air-Bridge Thermophotovoltaics [Rebecca Lentz](#), Byungjun Lee, Tobias Burger, Bosun Roy-Layinde, Andrej Lenert and Stephen R. Forrest; University of Michigan, United States

3:30 PM EN02.03.03

Enhanced Thermoelectric ZT in the Tails of the Fermi Distribution via Electron Filtering by Nanoscale Defects — Model Electron Transport in Nanostructured Materials Seyed Aria Hosseini^{1,2}, Devin Coleman¹, [Alex Greaney](#)¹ and Lorenzo Mangolini¹; ¹University of California, Riverside, United States; ²Massachusetts Institute of Technology, United States

3:45 PM EN02.03.04

Effect of Particle-Size Distribution and Pressure-Induced Densification on the Structure and Properties of Thermoelectric Composites and Flexible Devices [Deepa Madan](#)¹, Priyanshu Banerjee¹, Jiyuan Huang¹, Rohan Ambade², Mortaza S. Javash³ and Yanliang Zhang³; ¹University of Maryland, United States; ²Hanyang University, Korea (the Democratic People's Republic of); ³University of Notre Dame, United States

4:00 PM EN02.03.05

Waste Heat Harvesting Using Thermoelectric Generators—Materials Sustainability Assessment [Satish Vitta](#) and Anil K. Bohra; IIT-Bombay, India

SESSION EN02.04: Poster Session: III-V Semiconductors for Energy Conversion Technologies

Session Chairs: Todd Deutsch and Shu Hu

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SESSION EN02.05: Heterogeneous and Device—Enabling Materials Growth/Integration

Session Chairs: Minjoo Larry Lee and Myles Steiner

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 321B

8:45 AM *EN02.05.01

The Prospects and Alternatives of III-Vs for Next Generation PV [Anna Fontcuberta i Morral](#); Ecole Polytechnique Federale de Lausanne, Switzerland

9:15 AM *EN02.05.02

Monolithic Growth of Crystalline III-Vs on Non-Epitaxial and Heteroepitaxial Substrates for Solar Energy Conversion [Rehan R. Kapadia](#); Univ of Southern California, United States

9:45 AM BREAK

10:15 AM EN02.05.03

Defects in Heteroepitaxy of III-Vs on Si by Templated Liquid-Phase Growth [Olivia Schneble](#)^{1,2}, Anica Neumann^{1,2}, John S. Mangum¹, Emily Warren¹ and Jeremy Zimmerman²; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States

10:30 AM EN02.05.04

Development of AlInP-Passivated GaAs Solar Cells Grown by Dynamic-Hydride Vapor Phase Epitaxy [Jacob T. Boyer](#), Kevin Schulte, John Simon and Aaron Ptak; National Renewable Energy Laboratory, United States

10:45 AM EN02.05.05

Large Scale III-V Material Template Growth Directly on Metal for Device Application [Hyun Uk Chae](#) and Rehan Kapadia; University of Southern California, United States

11:00 AM *EN02.06.01

Radically Reimagining III-V Compound Semiconductor Photovoltaics: Epitaxy-Free Approach to Scalable Synthesis of Flexible Low-Cost Thin-Film Solar Cells Harry A. Atwater; California Institute of Technology, United States

SESSION EN02.06: III-V Photovoltaics
Session Chairs: Anna Fontcuberta i Morral and Rehan Kapadia
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 321B

2:45 PM *EN02.06.04

III-V/Si Epitaxial Tandem Solar Cells Minjoo Larry Lee; University of Illinois at Urbana-Champaign, United States

3:15 PM *EN02.06.05

Record Efficiency Multijunction Solar Cells with Strain-Balanced Quantum Well Superlattices Myles Steiner and Ryan France; NREL, United States

3:45 PM EN02.06.06

Optoelectrical Characterization of Epitaxial InGaAs and InAlAs in Multilayer Stacks by Wide Spectral Range Ellipsometry Madan K. Mainali^{1,2}, Indra Subedi^{1,2}, Seth Hubbard³ and Nikolas Podraza^{1,2}; ¹The University of Toledo, United States; ²Wright Center for Photovoltaics Innovation and Commercialization, United States; ³Rochester Institute of Technology, United States

SESSION EN02.07: Wide Bandgap Materials and Devices
Session Chairs: Todd Deutsch and Shu Hu
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 321B

9:30 AM EN02.07.01

Diamond Growth on GaN Membranes Using Microwave Plasma Chemical Vapour Deposition Jerome Cuenca¹, Matthew Smith², Daniel Field², Soumen Mandal¹, Simon M. Fairclough³, Fabien Massabuau⁴, James Pomeroy², David Wallis^{1,3}, Rachel Oliver³, Iain Thayne⁵, Martin Kuball² and Oliver A. Williams¹; ¹Cardiff University, United Kingdom; ²University of Bristol, United Kingdom; ³University of Cambridge, United Kingdom; ⁴University of Strathclyde, United Kingdom; ⁵University of Glasgow, United Kingdom

9:45 AM EN02.07.02

Diamond Growth on Wide Band Gap Semiconductors for Thermal Management in High Power Devices Soumen Mandal¹, Evan Thomas¹, Jerome Cuenca¹, Karsten Arts², Harm Knoops^{2,3}, Georgina M. Klemencic¹, Henry Bland¹, Chao Yuan⁴, Fabien Massabuau⁵, Rachel Oliver⁵, David Wallis^{5,1}, Martin Kuball⁴ and Oliver A. Williams¹; ¹Cardiff University, United Kingdom; ²Technische Universiteit Eindhoven, Netherlands; ³Oxford Instruments Plasma Technology, United Kingdom; ⁴University of Bristol, United Kingdom; ⁵University of Cambridge, United Kingdom

10:00 AM BREAK

SESSION EN02.08: III-V Nitrides
Session Chairs: Todd Deutsch and Mahendra Sunkara
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 321B

10:30 AM EN02.08.01

Structure, Chemistry and Optical Properties of ZnGeN₂ Quantum Wells in GaN Marshall B. Tellekamp¹, Moira Miller², Anthony Rice¹, David Diercks² and Adele Tamboli^{1,2}; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States

10:45 AM EN02.08.02

ZnGeN₂/GaN Heterostructures for Green LEDs—Band Offsets and Device Modelling Moira Miller^{1,2}, Marshall B. Tellekamp², Anthony Rice², Jacob Cordell^{1,2}, Xerxes Steiner^{1,2}, Garritt Tucker¹, Stephan Lany² and Adele Tamboli^{2,1}; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

11:00 AM EN02.08.05

Influence of Environmental Conditions and Surface Treatments on the Photoluminescence Properties of GaN Nanowires and Nanofins Florian Pantle, Max Kraut, Simon Wörle, Elise I. Sirotti, Andreas Zeidler, Felix Eckmann and Martin Stutzmann; Walter Schottky Institute, Germany

SESSION EN02.09: Photoelectrochemical (PEC) Devices and Systems
Session Chairs: Minjoo Larry Lee and Myles Steiner
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 321B

8:30 AM *EN02.09.01

Dilute Anion Alloying of III-V Materials for Photoelectrochemical Water Splitting Mahendra K. Sunkara, Sonia Calero and Madhu Menon; University of Louisville, United States

9:00 AM EN02.09.02

III-V's via Hydride Vapor Phase Epitaxy for Photoelectrochemical Water Splitting Todd G. Deutsch, Keenan Wyatt, James Young, Aaron Ptak, Myles Steiner, John Simon and Kevin Schulte; National Renewable Energy Laboratory, United States

9:15 AM EN02.09.03

Investigating the Impacts of Surface Layers on the Durability of GaInP₂ Photocathodes for Photoelectrochemical Water-Splitting Micha Ben-Naim^{1,2}, Chase Aldridge³, Myles Steiner³, Reuben Britto¹, Adam C. Nieland¹, Laurie King⁴, Todd G. Deutsch³, James Young³ and Thomas Jaramillo¹; ¹Stanford University, United States; ²Lawrence Livermore National Laboratory, United States; ³National Renewable Energy Laboratory, United States; ⁴Manchester Metropolitan University, United Kingdom

9:30 AM EN02.09.04

Discretized Photoanodes Design Tolerates Nanoscale Corrosion Defects for >600 Hours Stable Photoelectrochemical Water Oxidation Xin Shen¹, Nathan S. Lewis² and Shu Hu¹; ¹Yale University, United States; ²California Institute of Technology, United States

9:45 AM BREAK

10:15 AM EN02.09.05

Novel Protective Coatings for Efficient Photoanodes with Tunable Intermediate Bands Induced by Transition-Metal Cations in TiO₂ Haoqing Su, Xin Shen and Shu Hu; Yale University, United States

10:30 AM EN02.09.06

Engineering Defects and Interfaces of ALD TiO_x Protective Coatings for Highly Efficient III-V Photocathodes Oliver Bieneck, Benedikt Fuchs, Matthias Kuhl, Alex Henning and Ian D. Sharp; Technische Universität München, Germany

10:45 AM EN02.09.07

A Quantum Approach to Simulating Photoelectrochemical Cells Lassi Hällström¹, Werner Lipsunen² and Ilkka Tittonen¹; ¹Aalto University, Finland; ²University of Helsinki, Finland

11:00 AM EN02.09.08

Tandem Cascade Photoelectrochemical Devices Calton J. Kong^{1,2}, Emily Warren³, Ann Greenaway³, Rajiv Ramanujam Prabhakar², Adele Tamboli³, Grace Rome³, Joel Ager^{1,2}, Thomas Chan⁴ and Cliff Kubiak¹; ¹UC Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³National Renewable Energy Laboratory, United States; ⁴University of California, San Diego, United States

11:15 AM EN02.09.09

Photocatalytic Upgrading of Abundant Aromatic Feedstocks on Coated III-V Semiconductors Devan Solanki^{1,2} and Shu Hu^{1,2}; ¹Yale University, United States; ²Energy Sciences Institute, United States

11:30 AM EN02.09.10

Bioinspired Photocatalytic CO₂ Reduction Exploiting CO₂ Direct Air Capture (DAC) and III-V Semiconductors Rito Yanagi^{1,1}, Tianshuo Zhao², Matthew Cheng¹, Daniel King³, Zhaohan Li^{1,1} and Shu Hu^{1,1}; ¹Yale University, United States; ²University of Pennsylvania, United States; ³Texas A&M University, United States

SESSION EN02.10: General Session I
Session Chairs: Esther Alarcon-Llado and Sophia Haussener
Monday Morning, May 23, 2022
EN02-Virtual

8:00 AM EN02.10.01

Axial GaAs/AlGaAs Nanowire Solar Cell on Si with Ultra-High Power-per-Weight Ratio Anjan Mukherjee¹, Dingding Ren¹, Per Erik Vullum², Bjørn-Ove Finland¹ and Helge Weman¹; ¹Norwegian Univ of S&T, Norway; ²SINTEF Industry, Norway

8:15 AM *EN02.10.02

Suitability of GaAsBi as a Candidate Junction in a III-V Multi-Junction Solar Cell Nicholas Ekins-Daukes¹ and Tom Wilson²; ¹University of New South Wales Sydney, Australia; ²Imperial College London, United Kingdom

8:45 AM *EN02.10.03

Artificial Photosynthesis on III-Nitride Nanostructures Zetian Mi; University of Michigan, United States

9:15 AM *EN02.10.04

III-V Nanowires for Solar Energy Harvesting—From Growth to Integration in Substrate-Free Devices Hannah J. Joyce, Nian Jiang, Chawit Uswachoke, Thomas Albrow-Owen, Ningning Gao and Jack Alexander-Webber; University of Cambridge, United Kingdom

SESSION EN02.11: General Session II
Session Chairs: Rebecca Anthony and Hannah Joyce
Monday Afternoon, May 23, 2022
EN02-Virtual

1:00 PM EN02.11.01

Rapid Growth of GaInP Graded Buffers and Metamorphic Devices Grown by Hydride Vapor Phase Epitaxy Kevin Schulte¹, David R. Diercks², Harvey L. Guthrey¹, John S. Mangum¹, Corinne E. Packard^{2,1}, John Simon¹ and Aaron Ptak¹; ¹NREL, United States; ²Colorado School of Mines, United States

States

1:15 PM EN02.11.02

(110)-Oriented GaAs Devices and Spalling as a Platform for Low-Cost III-V Photovoltaics [Kevin Schulte](#)¹, Wondwosen Metaferia¹, Jason Chenenko², Corinne E. Packard^{2,1}, Aaron Ptak¹ and Anna K. Braun²; ¹NREL, United States; ²Colorado School of Mines, United States

1:30 PM EN02.11.03

Increasing PV Conversion Efficiency via Nanobonding™ ≤ 220°C In Air Of GaAs/Si and Surface Energy Engineering Combining 3LCAA, High Resolution IBA, XPS, SAWM And TEM Siddarth Jandhyala¹, Pranav V. Penmatcha¹, Aashi Gurijala^{1,2}, Nimith Gurijala¹, Ajay Taduri¹, Amber A. Chow^{1,3}, Shaurya Khanna^{1,4}, Sukesh Ram^{1,5}, Timoteo C. Diaz^{1,6}, Michelle E. Bertram^{1,6}, Christian E. Cornejo^{1,6}, Wesley Peng¹, Thilina Balasooriya¹, Robert J. Culbertson¹, Karen Kavanagh³ and [Nicole Herbots](#)¹; ¹Arizona State University, United States; ²Vanderbilt University, United States; ³Princeton University, United States; ⁴Wharton School of the University of Pennsylvania, United States; ⁵Yale University, United States; ⁶Simon-Fraser University, Canada

1:45 PM EN02.11.04

Designing Electrochemical Junctions with MBE-Grown III-Nitride Semiconductors and Electrocatalysts [Vijay Parameshwaran](#); U.S. Army Research Laboratory, United States

2:00 PM *EN02.03.01

Optical Emitter Materials for Thermophotovoltaics with Efficiency >50% [Marina S. Leite](#); University of California, Davis, United States

SESSION EN02.12: General Session III
Session Chairs: Zetian Mi and Vijay Parameshwaran
Tuesday Morning, May 24, 2022
EN02-Virtual

10:30 AM EN02.06.02

Approaches for High-Efficiency and Low-Cost Multi-Junction Solar Cells [Masafumi Yamaguchi](#), Kyotaro Nakamura, Ryo Ozaki, Nobuaki Kojima and Yoshio Ohshita; Toyota Technological Inst, Japan

10:45 AM *EN02.12.02

Concentrated Radiation for Low-Temperature and High-Temperature Solar Water and CO₂ Reduction Devices [Sophia Haussener](#); Ecole Polytechnique Federale de Lausanne, Switzerland, Switzerland

11:15 AM *EN02.12.03

Low-temperature plasma synthesis of III-nitride nanocrystals [Rebecca J. Anthony](#), Alexander Ho, Chloe Ho, Sankhadeep Basu and Richard Lunt; Michigan State University, United States

11:45 AM EN02.12.04

Quantitative Nanoscale Electrical and Thermal Transport Studies in Enhanced Thermoelectric Performance Sb₂Te₃/MoS₂ Multilayer Sample [Khushboo Agarwal](#)¹, Sergio Gonzalez-Munoz¹, Mujeeb Ahmad², Jean Spiege³, Bodh R. Mehta² and Oleg V. Kolosov¹; ¹Lancaster University, United Kingdom; ²Indian Institute of Technology Delhi, India; ³Université catholique de Louvain, Belgium

##PAGE_BREAK##

SYMPOSIUM EN03

Emerging Inorganic Semiconductors for Solar Energy and Fuels
May 9 - May 24, 2022

Symposium Organizers

Sage Bauers, National Renewable Energy Laboratory
Kazuhiko Maeda, Tokyo Inst of Technology
Jeffrey Neaton, University of California, Berkeley
Lydia Wong, Nanyang Technological University

* Invited Paper

SESSION EN03.01: Nanostructured Oxides and Chalcogenides
Session Chairs: Sage Bauers and Nicolas Gaillard
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 323B

10:30 AM *EN03.01.01

Nanostructured Ferrite Materials for (Photo)electrochemical Energy Conversion Roland Marschall; University of Bayreuth, Germany

11:00 AM EN03.01.03

Engineering Solution-Processable 2D TMD Nanoflakes for Photoelectrochemical Applications Rebekah Wells, Miao Zhang, Tzu-Heng Chen, Victor Bureau, Marina Caretti and Kevin Sivula; Ecole Polytechnique Federale de Lausanne, Switzerland

11:15 AM EN03.01.04

3D Nanostructured WO₃ Photoanode for Water Splitting Jungmin Kim¹, Hoyoung Lee^{2,3}, Jun-Hyuk Choi², Chan Park¹, Jeongbeom Kang¹, Byeongjun Lee¹, Haran Lee¹, Jongwon Yoon¹, JooYun Jung², Jong Hyeok Park³, Jihye Lee² and Seong J. Cho¹; ¹Chungnam National University, Korea (the Republic of); ²Korea Institute of Machinery & Materials, Korea (the Republic of); ³Yonsei University, Korea (the Republic of)

SESSION EN03.02: Inorganic Perovskite Absorbers for Photocatalysis
Session Chairs: Sage Bauers and Roland Marschall
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 323B

1:30 PM *EN03.02.01

Bismuth-Based Perovskite-Inspired Materials for Energy Harvesting Robert Hoye; Imperial College London, United Kingdom

2:00 PM EN03.02.02

Solar Water-Splitting with Low-Cost Hybrid Halide Perovskites at >13% STH Austin Fehr, Ayush Agrawal, Faiz Mandani, Chris Conrad, Siraj Sidhik, Isaac Metcalf, Chris Botello, Michael Wong and Aditya D. Mohite; Rice University, United States

2:15 PM EN03.02.03

Inorganic Lead Halide Perovskites Based Tandem Photoelectrodes for Unassisted Water-Splitting Zhaoning Song, Chongwen Li and Yanfa Yan; University of Toledo, United States

2:30 PM EN03.02.04

Unraveling the Structure-Property Correlations in Durable Multimetal Oxyhalide Photocatalysts Kaustav Chatterjee¹, Roberto d. Reis², Jette K. Mathiesen³, Nicolas P. Magnard³, Jared Stanley¹, Kirsten M. Jensen³, Vinayak P. Dravid² and Sara Skrabalak¹; ¹Indiana University, United States; ²Northwestern University, United States; ³University of Copenhagen, Denmark

2:45 PM EN03.02.05

Charge Transport Mechanisms in SrTiO₃:Rh Nanoparticle Photocatalysts for Z-Scheme Water Splitting Brian T. Zutter¹, Luisa Barrera², Aliya Lapp¹, Austin Bhandarkar¹, Zejie Chen³, Kenta Watanabe⁴, Akihiko Kudo⁴, Rohini B. Chandran², Shane Ardo^{3,5,5} and A. A. Talin¹; ¹Sandia National Laboratory, United States; ²University of Michigan–Ann Arbor, United States; ³University of California, Irvine, United States; ⁴Tokyo University of Science, Japan; ⁵University of California, Irvine, United States

3:00 PM BREAK

SESSION EN03.03: Chalcopyrite Based Materials and Technologies for PV and PEC
Session Chairs: Robert Hoye and Lydia Wong
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 323B

3:30 PM *EN03.03.01

New Absorbers, Interfaces and Integration Methods for Chalcopyrite-Based Photoelectrochemical Water Splitting Tandems Nicolas Gaillard; University of Hawaii, United States

4:00 PM EN03.03.03

IZO and IOH Window Layers in Ag-Alloyed CuInSe₂ Thin-Film Solar Cells for Tandem Applications Maximilian Krause, David Giger, Huagui Lai, Fan Fu, Shiro Nishiwaki, Ayodhya N. Tiwari and Romain Carron; Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

4:15 PM EN03.03.04

Transparent Back Contact Interface Modification for Bifacial (Ag,Cu)(In,Ga)Se₂ Thin-Film Solar Cells with Efficiencies Beyond 20% Shih-Chi Yang, Mario Ochoa, Huagui Lai, Ayodhya N. Tiwari and Romain Carron; EMPA, Switzerland

4:30 PM EN03.03.05

Atomic Layer Deposited Metal Oxide Buffer Layers to Mitigate Sputter Damage on Co-Evaporated CIGS Solar Cell Absorbers Ramis Hertwig, Shiro Nishiwaki, Ayodhya N. Tiwari and Romain Carron; Empa, Switzerland

SESSION EN03.04: Poster Session I: Inorganic Photoabsorbers for PEC
Session Chairs: Jeffrey Neaton and Lydia Wong
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN03.04.01

A First-Principles Analysis of Hydrogen Evolution Reaction Using an AgTe Catalyst [Heeju Kim](#) and Gunn Kim; Sejong University, Korea (the Republic of)

EN03.04.02

Enhancing the Photocatalytic Activity of TiO₂ Through the Use of Selective Contacts Based on Photovoltaic Solar Cells Joaquim Puigdollers, Miquel Anglada, Eloi Ros, David Rovira, Maykel Jiménez Guerra, Cristobal Voz, Pablo Ortega, [Lluís Soler](#), Edgardo Saucedo and Jordi Llorca; University of Politecnica-Catalunya, Spain

EN03.04.03

Tailoring Metal-Insulator-Semiconductor Junctions for Photoelectrochemical Water and Urea Oxidation [Sol A Lee](#) and Ho Won Jang; Seoul National University, Korea (the Republic of)

EN03.04.04

Effects of 1D/2D Heterostructure Formation on the Charge Carrier Recombination Dynamics of TiO₂ Nanotube Photoanodes for Solar Photoelectrochemical Water Splitting [Lilly A. Schaffer](#) and Oomman K. Varghese; University of Houston, United States

EN03.04.05

High-Quality Ta₃N₅ Photoelectrodes for Photoelectrochemical Energy Conversion Johanna Eichhorn¹, Simon P. Lechner¹, Chang-Ming Jiang¹, Giulia Folchi-Heunecke¹, Frans Munnik², Ian D. Sharp¹ and [Lukas Wolz](#)¹; ¹Technische Universität München, Germany; ²Helmholtz-Zentrum Dresden-Rossendorf, Germany

EN03.04.06

Tandem PEC Device with Perovskite/g-C₃N₄ and Phosphorene/g-C₃N₄ as the Electrodes for Hydrogen Evolution and Ciprofloxacin Photodegradation [Tzu-Heng Wang](#) and Ruey-An Doong; National Tsing Hua University, Taiwan

EN03.04.08

Unbiased Photoelectrochemical Solar Fuel Generation Enabled by Antimony Trisulfide Photoanode Based on Iodide Oxidation Reaction Young Sun Park, Hyungsoo Lee, Juwon Yun and [Jooho Moon](#); Yonsei University, Korea (the Republic of)

EN03.04.09

Band Edge Engineering in Metal Oxide Heterostructures for Efficient Charge Separation for Solar Water Oxidation in Photoelectrochemical Cell [Ornella Laouadi](#), Aadesh Pratap Singh, Tomi Koskinen and Ilkka Tittonen; Aalto University, Finland

EN03.04.13

Preparation of p-p Heterojunction and Its Photocatalytic H₂ Production by CuO-Mn₃O₄ Nanocomposite Karthik Kannan¹, V. Navakoteswara Rao², Mikiyas Mekete Meshesha¹, Jun-Mo Yang², Na Young Kwan¹, Jaewon Lee¹, Heo Jae-Young¹, Myungsik Choi³ and [Bee Lyong Yang](#)¹; ¹Kumoh National Inst of Tech, Korea (the Republic of); ²National NanoFab Center, Korea (the Republic of); ³SJ Tech Co., Ltd, Korea (the Republic of)

EN03.04.14

Boosted Photoelectrochemical Water Splitting by BiVO₄ Nanodots on In₂O₃ Nanorods [Jin Wook Yang](#) and Ho Won Jang; Seoul National University, Korea (the Republic of)

EN03.04.16

Exploring the Roles of Nafion Ionomer in CO₂ Electrolysis [Pan Ding](#)¹, Tianfu Guan², Hongyu An³, Peter Muller-Buschbaum², Ward v. Stam³, Bert Weckhuysen³ and Ian D. Sharp¹; ¹Walter Schottky Institut, TUM, Germany; ²Technical University of Munich, Germany; ³Utrecht University, Netherlands

EN03.04.17

The CO₂ Impact of Materials Science Research [Rachel Woods-Robinson](#); Lawrence Berkeley National Laboratory, United States

EN03.04.19

BiVO₄ Photoanode Surface Modification with Metal Borate Decorated Ti₃C₂T_x MXenes OER Catalyst [Ruben Dell'Oro](#), Eugenio Gibertini and Luca Magagnin; Politecnico di Milano, Italy

EN03.04.20

Solar-Driven Simultaneous Electrochemical CO₂ Reduction and Water Oxidation Using Perovskite Solar Cells [Jaehoon Chung](#)¹, Jun Hong Noh² and Yanfa Yan¹; ¹The University of Toledo, United States; ²Korea University, Korea (the Republic of)

SESSION EN03.05: Inorganic Perovskite Absorbers for Photovoltaics
Session Chairs: Sage Bauers and Jeffrey Neaton
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 323B

8:30 AM EN03.05.01

Chalcogenide Perovskite Thin Films as Next-Generation Solar Absorbers [Mythili Surendran](#)¹, Huandong Chen¹, Boyang Zhao¹, Arashdeep S. Thind²,

Shantanu Singh¹, Thomas Orvis¹, Huan Zhao³, Han Htoon³, Jae-Kyung Han⁴, Megumi Kawasaki⁴, Rohan Mishra² and Jayakanth Ravichandran¹;
¹University of Southern California, United States; ²Washington University in St. Louis, United States; ³Los Alamos National Laboratory, United States;
⁴Oregon State University, United States

8:45 AM EN03.05.02

Synthesis, Properties and Prospects for Photovoltaics of Chalcogenide Perovskite Thin Films Rafael Jaramillo; Massachusetts Institute of Technology, United States

9:00 AM EN03.05.03

NaBiS₂ as an Emerging Lead-Free Perovskite-Inspired Material—Defect Tolerance and PV Application Yi-Teng Huang¹, Seán R. Kavanagh^{2,3}, Marcello Righetto⁴, Igal Levine⁵, Alexander Sneyd¹, Laura Herz⁴, Akshay Rao¹ and Robert Hoye³; ¹University of Cambridge, United Kingdom; ²University College London, United Kingdom; ³Imperial College London, United Kingdom; ⁴University of Oxford, United Kingdom; ⁵Helmholtz-Zentrum Berlin, Germany

9:15 AM EN03.05.04

Highly Absorbing Lead-Free Semiconductors CuAgBiI₅ and Cu₂AgBiI₆ from the Quaternary CuI-AgI-BiI₃ Phase Space for Photovoltaic Applications Harry C. Sansom^{1,2}, Leonardo Buizza¹, Laura Herz¹, Henry Snaith¹ and Matthew Rosseinsky²; ¹University of Oxford, United Kingdom; ²University of Liverpool, United Kingdom

9:30 AM EN03.05.05

From Monolayers to Bilayers and Cs₂AgBiBr₆ (Elpasolite) Nanoplatelets, Investigation of Their Formation and Engineering Their Properties Shaked Dror, Sasha Khalfin and Yehonadav Bekenstein; Technion, Israel

9:45 AM EN03.05.06

Flexible Dye-Sensitized Solar Cells Assisted with Lead-Free Perovskite Halide Xiaojuan Fan; Marshall University, United States

10:00 AM BREAK

SESSION EN03.06: Advanced Characterization of Photoactive Materials

Session Chairs: Sage Bauers and Lydia Wong

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 323B

10:45 AM EN03.06.01

Carrier Recombination and Open-Circuit Voltage Loss in Na-Engineered Cu₂ZnSn(S,Se)₄ Flexible Solar Cells Ha Kyung Park¹, Yunae Cho^{1,1}, Juran Kim¹, Sammi Kim², Kee-Jeong Yang², Dae-Hwan Kim², Jin-Kyu Kang² and William Jo^{1,1}; ¹Ewha Womans University, Korea (the Republic of); ²Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

11:00 AM EN03.06.03

Why Should We Consider Integrated Photoelectrochemical Devices? Tobias Kistler^{1,1,2}, Min Young Um^{1,1}, Jason K. Cooper^{1,1}, Ian D. Sharp² and Peter Agbo^{1,1}; ¹Lawrence Berkeley National Laboratory, United States; ²Technische Universität München, Germany

11:15 AM *EN03.06.04

Surface Photovoltage Spectroscopy Observes Quasi-Fermi Level Splitting in BiVO₄ and Other Solar Fuel Photoelectrodes Sahar Daemi, Anna C. Kundmann, Kathleen Becker and Frank E. Osterloh; University of California, Davis, United States

SESSION EN03.07: Emerging Chalcogenide Photoabsorbers I

Session Chairs: Jeffrey Neaton and Frank Osterloh

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 323B

2:00 PM EN03.07.01

Efficient Ultrathin AgBiS₂ Nanocrystal Solar Cells via Cation Disorder Engineering Seán R. Kavanagh^{1,2}, Yongjie Wang³, Gerasimos Konstantatos³, Aron Walsh² and David O. Scanlon¹; ¹University College London, United Kingdom; ²Imperial College London, United Kingdom; ³ICFO—The Institute of Photonic Sciences, Spain

2:15 PM EN03.07.02

High-Specific-Power Flexible Transition Metal Dichalcogenide Solar Cells Koosha Nassiri Nazif¹, Alwin Daus¹, Jiho Hong¹, Nayeun Lee¹, Sam Vaziri¹, Aravindh Kumar¹, Frederick Nitta¹, Michelle Chen¹, Siavash Kananian¹, Raisul Islam¹, Kwan-Ho Kim^{2,3}, Jin-hong Park², Ada Poon¹, Eric Pop¹, Mark L. Brongersma¹ and Krishna Saraswat¹; ¹Stanford University, United States; ²Sungkyunkwan University, Korea (the Republic of); ³University of Pennsylvania, United States

2:30 PM EN03.07.03

Combinatorial Investigations of ZnTe_xSe_{1-x} Alloys for Applications as CO₂ Reduction Photocathodes Theodore Culman, Dana Kern, Craig Perkins, Andriy Zakutayev and Sage Bauers; National Renewable Energy Laboratory, United States

2:45 PM EN03.07.04

Graded Cd_{1-x}Zn_xTe Films for Use in Wide Bandgap Photovoltaics Adam Phillips, Ebin Bastola, Manoj K. Jamarkattel, Zulkifl Hussain, Abasi Abudulimu, Jared Friedl, Austin Snyder, Kevin Schaffer, Ian M. Glass, Randy Ellingson and Michael J. Heben; University of Toledo, United States

3:00 PM BREAK

SESSION EN03.08: Complex Oxides I
Session Chairs: Sage Bauers and Rachel Woods-Robinson
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 323B

3:45 PM EN03.08.01

Growth, Intermixing and Composition Control of Atomic Layer Deposited Zinc Tin Oxide Poorani Gnanasambandan^{1,2} and Renaud Leturcq¹;
¹Luxembourg Institute of Science and Technology, Luxembourg; ²University of Luxembourg, Luxembourg

4:00 PM EN03.08.02

Direct Z-Scheme Photocatalytic Water Splitting over an α -Fe₂O₃-Cu₂O Heterojunction with Ultrafast Interfacial Charge Transfer Jake Heinlein^{1,1}, Rito Yanagi^{1,1}, Yulian He², Shu Hu^{1,1} and Lisa Pfefferle¹; ¹Yale University, United States; ²Shanghai Jiao Tong University, China

4:15 PM EN03.08.03

Designing Catalytically Active and Stable Multifunctional CoO_x Layers by Plasma-Enhanced Atomic Layer Deposition for Efficient Electrochemical Energy Conversion Matthias Kuhl¹, Alex Henning¹, Verena Streibel¹, Lukas Haller¹, Laura I. Wagner¹, Chang-Ming Jiang², Ian D. Sharp¹ and Johanna Eichhorn¹; ¹Technische Universität München, Germany; ²National Taiwan University, Taiwan

SESSION EN03.09: Poster Session II: Inorganic Photoabsorbers for PV
Session Chairs: Sage Bauers and Kazuhiko Maeda
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN03.09.01

Efficient and Stable CsPbI_{3-x}Br_x Perovskite Solar Cells and Submodules by Orthogonal Processable Spray Coating Jin Hyuck Heo¹, Jin Kyoung Park¹, David Sunghwan Lee¹, Bong Woo Kim¹, Woo-Sik Kim², Kai Zhu³ and Sang Hyuk Im¹; ¹Korea University, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of); ³National Renewable Energy Laboratory, United States

EN03.09.02

Lead-Free Halide Perovskite Inspired Solar Cells—Organic-Inorganic A-Site Engineering in Bismuth Halide Absorbers Feray Ünlü¹, Ashish Kulkarni², Khan Lê¹, Christoph Bohr¹, Andrea Bliesener¹, Seren Öz¹, Ajay Jena², Yoichi Ando¹, Tsutomu Miyasaka², Thomas Kirchartz³, Sanjay Mathur¹ and Michael Wilhelm⁴; ¹Universität zu Köln, Germany; ²TOIN University of Yokohama, Japan; ³Forschungszentrum Jülich GmbH, Germany; ⁴University of Cologne, Germany

EN03.09.04

High-Performance Perovskite-Kesterite Monolithic Tandem Solar Cells Enabled by the Roughness Control Sun Kyung Hwang¹, Ik Jae Park², Jae-Hyun Park³, So Jeong Park¹, You Jin Ahn¹ and Jin Young Kim^{1,3}; ¹Seoul National University, Korea (the Republic of); ²Sookmyung Women's University, Korea (the Republic of); ³Research Institute of Advanced Materials, Korea (the Republic of)

EN03.09.05

Subcell Characterization of Monolithic Perovskite/Silicon Tandem Solar Cells Jae-Hyun Park^{1,2}, Su Geun Ji¹, Sun Kyung Hwang¹, You Jin Ahn¹ and Jin Young Kim^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Research Institute of Advanced Materials, Korea (the Republic of)

EN03.09.06

Cadmium Selenide (CdSe) as an Active Absorber Layer for Photovoltaic Device with Voc Exceeding 750 mV Ebin Bastola, Adam Phillips, Abdilium Abasi, Tamanna Mariam, Griffin Barros-King, Manoj K. Jamarkattel, Jared Friedl, Zulkifl Hussain, Dipendra Pokhrel, Abdul Quader, Chongwen Li, Ian M. Glass, Zhaoning Song, Yanfa Yan, Randy Ellingson and Michael J. Heben; University of Toledo, United States

EN03.09.07

Problems and Possible Solutions for Antimony Selenide Interfaces Maykel Jiménez Guerra¹, Yudania Sánchez², Lorenzo Calvo^{3,4}, Jose Miguel Asensi⁵, Ivan Cano Prades¹, Pedro Vidal Fuentes², Victor Izquierdo-Roca² and Edgardo Saucedo¹; ¹Universitat Politècnica de Catalunya, Spain; ²Institut de Recerca en Energia de Catalunya, Spain; ³Centres Científics i Tecnològics (CCiTUB), Spain; ⁴IN2UB, Spain; ⁵Universitat de Barcelona, Spain

EN03.09.08

Antimony Sulfide Absorber Developed by Hydrothermal Method for Efficient Solar Cells Dipendra Pokhrel¹, Nini Mathews², Suman Rijal¹, Ebin Bastola¹, Abasi Abudulimu¹, Tamanna Mariam¹, Zhaoning Song¹, Xavier Mathew¹, Adam Phillips¹, Yanfa Yan¹, Michael J. Heben¹ and Randy Ellingson¹; ¹University of Toledo, United States; ²Instituto de Energías Renovables, Mexico

EN03.09.09

Templated Growth and Passivation of Vertically Oriented Antimony Selenide Thin Films for High-Efficiency Solar Cells Suman Rijal¹, Dengbing Li¹, Rasha A. Awni¹, Chuanxiao Xiao², Sandip S. Bista¹, Manoj K. Jamarkattel¹, Michael J. Heben¹, Chun-sheng Jiang², Mowafak Al-Jassim², Zhaoning Song¹ and Yanfa Yan¹; ¹The University of Toledo, United States; ²National Renewable Energy Laboratory, United States

EN03.09.10

Post-Annealing Treatment of Hydrothermally Grown Antimony Selenosulfide Solar Cells Suman Rijal, Dengbing Li, Sandip S. Bista, Rasha A. Awni, Dipendra Pokhrel, Sabin Neupane, Jaehoon Chung, Zhaoning Song and Yanfa Yan; The University of Toledo, United States

EN03.09.14

Substitution of Elements—From Ternary Chalcopyrite-Type CuInS_2 to Quaternary Adamantines CuBCX_4 with B= Al, Ga, C= Ge, Sn, X= S, Se Yvonne Tomm¹ and Susan Schorr^{1,2}; ¹Helmholtz-Zentrum Berlin, Germany; ²Freie Universität Berlin, Germany

EN03.09.15

Vacuum-Deposited $\text{Cu}_2\text{BaGe}_{1-x}\text{Sn}_x\text{Se}_4$ Films and Solar Cells Yongshin Kim¹, Hannes Hempel², Sergiu Levenco², Julie Euvrard¹, Eric Bergmann³, Oki Gunawan⁴, Thomas Unold², Ian Hill³ and David B. Mitzi^{1,1}; ¹Duke University, United States; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ³Dalhousie University, Canada; ⁴IBM T.J. Watson Research Center, United States

EN03.09.16

Evolution of Structural and Optoelectronic Properties in Fluorine–Aluminum co-doped Zinc Oxide (FAZO) Thin Films and Their Application in CZTSSe Thin-Film Solar Cells Suyoung Jang and Jinhyeok Kim; Chonnam National University, Korea (the Republic of)

EN03.09.17

Na Ion Migration in NaF-Doped $\text{Cu}_2\text{ZnSn(S,Se)}_4$ Thin-Film Solar Cells on Flexible Mo Foil Eunae Jo and Jinhyeok Kim; Chonnam National University, Korea (the Republic of)

EN03.09.18

Role of CdTe Deposition Temperature in the Fabrication and Optimization of Sputtered CdTe Solar Cells Mohammed Alaani^{1,2,3}, Prakash Koirala^{1,2}, Nikolas Podraza^{1,2}, Stephen K. O'Leary⁴ and Robert W. Collins^{1,2}; ¹The University of Toledo, United States; ²Wright Center for Photovoltaics Innovation & Commercialization, United States; ³Tikrit University, Iraq; ⁴University of British Columbia, Canada

EN03.09.19

Loss Analysis for Thin-Film Solar Cells via Transfer Matrix and Electrical Finite Element Method Mario Zinßer^{1,2}, Tim Helder¹, Andreas Bauer¹, Theresa Magorian Friedlmeier¹ and Michael Powalla^{1,2}; ¹Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW), Germany; ²Karlsruhe Institute of Technology (KIT), Germany

EN03.09.20

Lightweight and Flexible CdTe Solar Cell via Lift-Off Process Sandip S. Bista, Dengbing Li, Zhaoning Song, Rasha A. Awni, Suman Rijal, Sabin Neupane, Kamala Khanal Subedi, Manoj K. Jamarkattel, Adam Phillips, Randy Ellingson, Michael J. Heben and Yanfa Yan; The University of Toledo, United States

EN03.09.22

Absorber Delamination-Induced Shunt Defects in CIGS Solar Modules Seung Hoon Lee¹, Min Kyu Kim², Soohyun Bae¹, Jiyeon Nam¹, HyunJung Park¹, Sang-Won Lee¹, Yun Jung Jang^{1,2}, Byoung Koun Min², JungYup Yang³, Yoonmook Kang¹, Hae-Seok Lee¹ and Donghwan Kim^{1,1}; ¹Korea University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of); ³Kunsan National University, Korea (the Republic of)

EN03.09.23

Understanding the Role of High Vacuum Annealed Magnesium doped Zinc Oxide as a Buffer Layer Manoj K. Jamarkattel, Adam Phillips, Jared Friedl, Geethika Liyanage, Ebin Bastola, Sandip S. Bista, Dipendra Pokhrel, Abdul Quader, Abasi Abudulimu, Dengbing Li, Xavier Mathew, Yanfa Yan, Randy Ellingson and Michael J. Heben; University of Toledo, United States

EN03.09.24

Solution-Processing of Chalcogenide Perovskites Jonathan Turnley, Apurva Pradhan, Ryan N. Swope, Madeleine Uible, Suzanne C. Bart and Rakesh Agrawal; Purdue University, United States

EN03.09.25

Chemical and Electronic Structure of Cd^{2+} -Treated CuGa_3Ses Solar Absorbers and Their Interfaces with $\text{Mg}_x\text{Zn}_{1-x}\text{O}$ Buffers Mary Blankenship¹, Brooklynne Jacobellis¹, Amandee Hua¹, Dirk Hauschild^{1,2,2}, Lothar Weinhard^{1,2,2}, Imran Khan³, Christopher P. Muzzillo³, Andriy Zakutayev³, Nicolas Gaillard⁴ and Clemens Heske^{1,2,2}; ¹University of Nevada, Las Vegas, United States; ²Karlsruhe Institute of Technology, Germany; ³National Renewable Energy Laboratory, United States; ⁴University of Hawai'i at Mānoa, United States

SESSION EN03.10: Novel Materials for Tandem Solar Cells

Session Chairs: Xiaojing Hao and Jeffrey Neaton

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 323B

8:30 AM *EN03.10.01

Monolithic Photoelectrochemical Tandem Devices Consisting of Tunnel Oxide Passivated Contact Silicon and BiVO_4 Enabling Unassisted Water Splitting Choongman Moon¹, Gihun Jung¹, Filipe Martinho², Stela Canulescu² and Byungha Shin¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Technical University of Denmark, Denmark

9:00 AM EN03.10.02

Tandem Semiconductor Microwire Slurries for Solar Hydrogen Generation Joshua M. Spurgeon, Saumya Gulati, Matthew Mulvehill and Tyler Thompson; University of Louisville, United States

9:15 AM EN03.10.03

Novel Monolithic Three-Terminal Tandem Solar Cells Based on Antimony Chalcogenide Absorbers Zacharie Jehl Li-Kao¹, Ivan Cano Prades¹, Marcel Placidi¹, Ignacio Minguez Bacho², Julien Bachmann², Sergio Giraldo¹ and Edgardo Saucedo¹; ¹Polytechnic University of Catalonia, Spain; ²Friedrich-Alexander-Universität, Germany

9:30 AM EN03.10.04

Elemental Selenium as a Wide Bandgap Photoabsorber Appropriate for Tandem Integration with Silicon or CIGS [Rasmus Nielsen](#)¹, Tomas H. Youngman¹, Andrea Crovetto², Ole Hansen¹, Ib Chorkendorff¹ and Peter C. Vesborg¹; ¹Technical University of Denmark, Denmark; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

9:45 AM EN03.10.05

Tapered-Nanoflakes-Array of Cupric Oxide for Bias-Free Tandem Solar Water-Splitting [Hyun Soo Han](#)¹, Sung Won Hwang², Dong Un Lee¹, Settasit Chaikasetsin¹, Yoo Jae Jeong², Minje Kang², Fritz Prinz¹ and In Sun Cho²; ¹Stanford University, United States; ²Ajou University, Korea (the Republic of)

10:00 AM BREAK

SESSION EN03.11: Complex Oxides II
Session Chairs: Sage Bauers and Jon Major
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 323B

10:30 AM *EN03.11.01

Synthesizability and Properties of Carbon Nitride Semiconductors for Solar Energy Conversion Shaun O'Donnell, Eric Gabilondo and [Paul Maggard](#); North Carolina State University, United States

11:00 AM EN03.11.04

Co-doping Strategy of Hematite for Efficient Water Splitting [Ji-Hyun Jang](#); UNIST, Korea (the Republic of)

11:15 AM EN03.15.02

Computationally Accelerated Discovery of Gd-based Perovskite Oxides for Solar Thermochemical Applications Zachary Bare, [Ryan J. Morelock](#) and Charles Musgrave; University of Colorado Boulder, United States

SESSION EN03.13: Emerging Chalcogenide Photoabsorbers II
Session Chairs: Paul Maggard and Lydia Wong
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 323B

4:00 PM *EN03.13.01

Interface Control in Antimony Selenide Solar Cells [Jon Major](#); University of Liverpool, United Kingdom

4:30 PM EN03.13.03

In₂O₃:Mo as an Alternative Partner Layer for Sb₂Se₃ Thin-Film Solar Cells [Nicole Fleck](#)¹, Jon Major², Devendra Tiwari¹, Oliver Hutter¹, Thomas Shalvey² and Frank Jaecckel²; ¹Northumbria University, United Kingdom; ²University of Liverpool, United Kingdom

4:45 PM EN03.13.04

Unravelling Light-Driven CO₂ Reduction Mechanisms on Semiconductors—A Case Study of Sb₂Se₃ and Si [RajivRamanujam Prabhakar](#) and Joel Ager; Lawrence Berkeley National Laboratory, United States

SESSION EN03.14: Catalysts and Electrolytes
Session Chairs: Stephan Lany and David Mitzi
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 323B

8:45 AM *EN03.14.04

Water Splitting Under Modal Strong and Ultra Strong Coupling Conditions [Hiroaki Misawa](#)^{1,2}, Tomoya Oshikiri¹, Xu Shi¹ and Yoshiki Suganami¹; ¹Hokkaido University, Japan; ²National Yang Ming Chiao Tung University, Taiwan

10:00 AM BREAK

SESSION EN03.15: Materials Design and Theory
Session Chairs: Jeffrey Neaton and Rachel Woods-Robinson
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 323B

10:30 AM EN03.15.01

Redox Defect Thermochemistry of FeAl₂O₄ Hercynite in Water-Splitting from First Principles Methods Samantha L. Millican¹, Jacob M. Clary¹, Charles Musgrave¹ and [Stephan Lany](#)²; ¹University of Colorado Boulder, United States; ²National Renewable Energy Laboratory, United States

10:45 AM DISCUSSION TIME

11:00 AM EN03.15.03

Enhancement of Photoelectrolysis of MoS₂ and PdSe₂ Using Heterostructuring [Edward A. Baker](#), Joe Pitfield, Conor J. Price and Steven P. Hepplestone; University of Exeter, United Kingdom

11:15 AM EN03.15.05

Identifying New Inorganic Solar Absorbers with Long Carrier Lifetime Using High-Throughput Computational Screening Diana F. Dahliah¹, Guillaume Brunin¹, Janine George¹, Viet-Anh Ha², Gian-Marco Rignanese¹ and [Geoffroy Hautier](#)¹; ¹Universite catholique de Louvain, Belgium; ²Dartmouth College, United States

SESSION EN03.16: Pnictide Photoabsorbers for PV and PEC

Session Chairs: Sage Bauers and Maarja Grossberg

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 323B

1:45 PM *EN03.16.01

Leveraging Surface Transformations in the Design of New Photoabsorbers for CO₂ Reduction Adele Tamboli, Ann Greenaway, John S. Mangum, Sage Bauers, Dennice M. Roberts, Kevin Talley, Elisa Miller and [Andriy Zakutayev](#); National Renewable Energy Laboratory, United States

2:15 PM EN03.16.02

ZrTa₂N₃—A New Visible Light Absorbing Ternary Nitride Semiconductor Photoanode [Laura I. Wagner](#), Elise I. Sirotti, Johanna Eichhorn, Chang-Ming Jiang, David A. Egger and Ian D. Sharp; TU Munich, Germany

2:30 PM EN03.16.03

ZnGeN₂—A Disorder Tunable Material [Susan Schorr](#)^{1,2}, Joachim Breternitz¹, Zhenyu Wang^{1,2} and Stanislav Savvin³; ¹Helmholtz-Zentrum Berlin for Materials and Energy, Germany; ²Freie Universität Berlin, Germany; ³Institute Laue Langevin, France

2:45 PM EN03.16.04

Towards High-Performing and Sustainable Zinc Phosphide Solar Cell Absorbers [Mirjana Dimitrievska](#)¹, Elias Stutz¹, Simon Escobar Steinvall¹, Mahdi Zamani¹, Djamshid A. Damry², Rajrupa Paul¹, Jean-Baptiste Leran¹, Jessica L. Boland², Alexander P. Litvinchuk³ and Anna Fontcuberta i Morral¹; ¹École Polytechnique Fédérale de Lausanne, Switzerland; ²The University of Manchester, United Kingdom; ³University of Houston, United States

3:00 PM BREAK

SESSION EN03.17: Progress in Kesterite Photoabsorbers I

Session Chairs: [Geoffroy Hautier](#), Lydia Wong and [Andriy Zakutayev](#)

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 323B

3:30 PM *EN03.17.01

Perspectives of the Kesterite Cu₂ZnSnS₄ Based Photovoltaics [Maarja Grossberg](#), Kristi Timmo, Jüri Krustok, Katri Muska, Idil Mengü, Maris Pilvet, Valdek Mikli, Mati Danilson and Marit Kauk-Kuusik; Tallinn University of Technology, Estonia

4:00 PM *EN03.17.02

Structure and Property Control in I₂-II-IV-X₄ Multinary Chalcogenide Solar Absorbers [David B. Mitzi](#); Duke University, United States

4:30 PM EN03.17.03

Small Atoms Doping—A Strategy to Reduce Sn_{zn} Recombination Center Concentration in CZTSe [Alex Jimenez Arguijo](#)¹, Alejandro Navarro Güell², Yudania Sánchez¹, Joaquim Puigdollers², Zacharie Jehl Li-Kao², Edgardo Saucedo² and Sergio Giraldo¹; ¹Institut de Recerca Energètica de Catalunya (IREC), Spain; ²Universitat Politècnica de Catalunya (UPC), Spain

4:45 PM EN03.17.04

Crystallographic Structure and Point Defects vs Efficiency and Stability in Cu₂ZnSn(S,Se)₄ Monograin Solar Cells [Galina Gurieva](#)¹, Kaia Ernits², Nikita Siminel³, Alicia Manjon Sanz⁴, Denis Sheptyakov⁵, Melanie Kirkham⁴, Dieter Meissner^{2,6} and Susan Schorr^{1,7}; ¹Helmholtz Zentrum Berlin, Germany; ²crystalsol OÜ, Estonia; ³Institute of Applied Physics, Academy of Sciences of Moldova, Moldova (the Republic of); ⁴Neutron Scattering Division, Oak Ridge National Laboratory, United States; ⁵Paul Scherrer Institute, Switzerland; ⁶Tallinn University of Technology, Estonia; ⁷Freie Universität Berlin, Institute of Geological Sciences, Germany

SESSION EN03.18: Materials Science and Engineering of Emerging Oxide and Chalcogenide Photoabsorbers I

Session Chair: Roel Van de Krol

Monday Morning, May 23, 2022

EN03-Virtual

8:00 AM *EN03.18.01

Structure and Chemistry of Delafossite CuRhO₂ [Tachun Lee](#) and Annabella Selloni; Princeton University, United States

8:30 AM EN03.18.02

Manipulating the Fate of Charge Carrier with Tungsten Concentration—Enhancing Photoelectrochemical Water Oxidation of Bi₂WO₆ Hoi Ying Chung and Yun Hau Ng; City University of Hong Kong, Hong Kong

8:45 AM EN03.18.05

Lowering Manufacturing Costs of Multi-Junction Solar Cells, While Increasing Photo-Voltaic Efficiency by Using Nano-Bonding™ of Semiconductor Absorbers in Air Using Surface Energy Engineering (SEE) at Low Temperature (T ≤ 220°C) Pranav V. Penmatcha¹, Siddarth Jandhyala¹, Aashi Gurijala¹, Nimith Gurijala¹, Ajay Taduri¹, Amber A. Chow¹, Shaurya Khanna¹, Sukesh Ram², Timoteo C. Diaz¹, Michelle E. Bertram¹, Shreyas Prakash¹, Thilina Balasooriya¹, Wesley Peng¹, Robert J. Culbertson¹, Karen Kavanagh³ and Nicole Herbots¹; ¹Arizona State University, United States; ²Yale University, United States; ³Simon Fraser University, Canada

8:50 AM *EN03.18.07

N-Type SnS and Its Application to Homo Junction PV Issei Suzuki¹, Sakiko Kawanishi¹, Sage Bauers², Andriy Zakutayev², Binxiang Huang³, Zexin Lin¹, Hiroyuki Shibata¹, Andreas Klein³, Hiroshi Yanagi⁴ and Takahisa Omata¹; ¹Tohoku University, Japan; ²National Renewable Energy Laboratory, United States; ³Technische Universität Darmstadt, Germany; ⁴University of Yamanashi, Japan

SESSION EN03.19: Accelerated Discovery and Testing of Advanced Photoabsorber Systems

Session Chairs: Jeffrey Neaton and Julia Wiktor

Monday Morning, May 23, 2022

EN03-Virtual

10:30 AM *EN03.19.01

Rapid Screening Method for the Viability of Emerging Photoelectrode Materials and Compositions Yannick Gaudy and Sophia Haussener; Ecole Polytechnique Federale de Lausanne, Switzerland, Switzerland

11:00 AM EN03.19.02

Designing Nanostructures and Multilayers with Numerical Simulation for Efficient Solar Energy Conversion David Waligo, Lilly A. Schaffer, Maggie Paulose and Oomman K. Varghese; University of Houston, United States

11:15 AM EN03.19.03

High Throughput Evaluation of Multi-Element, Multi-Functional Coatings for Improved Photocathodes Joel Haber¹, Zemin Zhang², Guosong Zeng³, Guiji Liu³, Lan Zhou¹, Kevin Kan¹, John M. Gregoire¹, Francesca Maria Toma³ and Jason K. Cooper³; ¹California Institute of Technology, United States; ²Lanzhou University, China; ³Lawrence Berkeley National Laboratory, United States

11:30 AM EN03.19.04

Designing New Semiconductor Materials with Multinary Cu-Chalcogenide Nanocrystals Soubantika Palchoudhury, Madison Jones, Zeyad Al Abri and Nicholas Saunders; University of Dayton, United States

SESSION EN03.20: Materials Science and Engineering of Emerging Oxide and Chalcogenide Photoabsorbers II

Session Chairs: Sage Bauers and Jeffrey Neaton

Tuesday Morning, May 24, 2022

EN03-Virtual

8:00 AM *EN03.20.01

Understanding Oxide Interfaces in Photoelectrochemistry with XPS Roel Van de Kroel^{1,2}; ¹Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ²Technische Universität Berlin, Germany

8:30 AM EN03.20.02

Earth-Abundant Electrocatalysts for the Oxygen-Evolution Reaction (OER) Supported on Zirconium Phosphate Layered Nanomaterials Jorge L. Colón¹, Mario V. Ramos-Garcés², Kálery La Luz-Rivera¹, Andrea R. Cortés-Ortiz¹, Victoria M. Figueroa¹, Brenda L. Vargas-Pérez¹, Yannelly A. Serrano-Rosario¹, Joel Sanchez³, Isabel Barraza-Alvarez⁴, Yanyu Wu⁵, Dino Villagrán⁶, Thomas Jaramillo³, Louise M. Debeve⁷, Christopher Pollock⁷, Jeesoo Seok⁷, Rui Zeng⁷ and Hector Abruna⁷; ¹University of Puerto Rico, United States; ²The Pennsylvania State University, United States; ³Stanford University, United States; ⁴University of California, Santa Barbara, United States; ⁵Chemical Incorporated, United States; ⁶The University of Texas at El Paso, United States; ⁷Cornell University, United States

8:45 AM EN03.20.05

Hierarchical Porous Nickel Phosphide Electrode for Solar-Driven Green Hydrogen Production Xinnan Lu, Shubra Lalwani, Lin Yuan, Mohamed A. Abdelsalam, Faisal AlMarzooqi and TieJun Zhang; Khalifa University of Science and Technology, United Arab Emirates

9:00 AM EN03.20.07

Photoelectrochemical Water Oxidation Using Halide Double Perovskites Poonam Sikarwar; Indian Institute of Technology Madras, India

9:05 AM EN03.12.02

Bulk and Surface Properties of Cu₂ZnGe(S_xSe_{1-x})₄ Thin-Film Solar Cell Absorbers Yufeng Zhang^{1,2}, Guy Brammertz^{3,4,5}, Bart Vermang^{3,4,5}, Marc Meuris^{3,4,5}, Thomas Schnabel⁶, Erik Ahlswede⁶, Leo Choubrac^{1,7}, Sylvie Harel⁷, Christophe Cardinaud⁷, Ludovic Arzel⁷, Nicolas Barreau⁷, Jakob Bombsch¹, Andreas Siebert¹, Evelyn Handick¹, Xeniya Kozina¹, Claudia Hartmann¹, Roberto Felix¹, Regan Wilks¹ and Marcus Baer^{1,8,9}; ¹Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany; ²Xiamen University, China; ³IMEC, Belgium; ⁴Hasselt University, Belgium; ⁵EnergyVille, Belgium; ⁶ZSW, Germany; ⁷Universite de Nantes, France; ⁸Helmholtz Institute Erlangen-Nürnberg for Renewable Energies, Germany; ⁹Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

9:20 AM *EN03.13.02

Binary Selenide (Sb₂Se₃ and CdSe) Thin-Film Solar Cells [Jiang Tang](#) and Chao Chen; Huazhong University of Science and Technology, China

9:50 AM EN03.09.12

A Novel V₂O₅/ZnTiO₃ Nanocomposite as a Highly Effective Adsorbent for Congo Red Adsorption Applications [Yogendra Yadawa](#); Rajiv Gandhi Institute of Petroleum Technology, Jais, Amethi, UP, Pin code: 229304, India

SESSION EN03.21: Materials Science and Engineering of Emerging Oxide and Chalcogenide Photoabsorbers IV

Session Chairs: Sage Bauers and Jeffrey Neaton

Tuesday Morning, May 24, 2022

EN03-Virtual

10:30 AM *EN03.21.01

Towards Realistic *Ab Initio* Modeling of Complex Photoabsorbers [Julia Wiktor](#); Chalmers University of Technology, Sweden

11:00 AM EN03.21.02

Metal Chalcogenide Heterostructure Based Photoanode for Highly Efficient Water Splitting [Muthuraja Velpandian](#) and Praveen Meduri; Indian Institute of Technology Hyderabad, India

11:15 AM EN03.21.03

Highly Efficient AgBiS₂ Nanocrystal Solar Cells Enabled by Cation Disorder Engineering [Yongjie Wang](#)¹, Seán R. Kavanagh^{2,3}, Ignasi Burgués-Ceballos¹, Aron Walsh^{3,4}, David O. Scanlon^{2,5} and Gerasimos Konstantatos^{1,6}; ¹ICFO-Institut de Ciències Fotoniques, The Barcelona Institute of Science and Technology, Spain; ²Thomas Young Centre and Department of Chemistry, University College London, United Kingdom; ³Thomas Young Centre and Department of Materials, Imperial College London, United Kingdom; ⁴Department of Materials Science and Engineering, Yonsei University, Korea (the Republic of); ⁵Diamond Light Source Ltd., Diamond House, Harwell Science and Innovation Campus, Didcot, United Kingdom; ⁶ICREA-Institució Catalana de Recerca i Estúdia Avançats, Lluís Companys 23, Spain

11:30 AM EN03.21.04

Contrasting the Performance of BiFeO₃ Thin Films as Photocathodes and in All-Oxide Photovoltaic Devices [David J. Fermin](#)¹ and Devendra Tiwari²; ¹University of Bristol, United Kingdom; ²University of Northumbria, United Kingdom

11:45 AM EN03.21.05

Covalent S-O bonding enables enhanced photoelectrochemical performance of Cu₂S/Fe₂O₃ heterojunction for water splitting Yan Zhang^{1,1}, Yuan Huang^{1,1}, Shi-Shi Zhu^{1,1}, Jianjun Wang^{1,1}, [Artur Braun](#)² and Xing Zhang³; ¹Shandong University of Science and Technology, China; ²Empa, Switzerland; ³Beijing National Laboratory for Molecular Sciences, China

12:00 PM EN03.21.06

BaHfS₃ Thin Film Growth by Sputtering [Haolei Hui](#)¹, Zhonghai Yu², Sen Yang² and Hao Zeng¹; ¹University at Buffalo, The State University of New York, United States; ²Xi'an Jiaotong University, China

12:05 PM *EN03.21.07

Photoanode Discovery in the Ni-Sb Oxide System for Durable Oxygen Evolution [John M. Gregoire](#)¹, Karun Rao², Lan Zhou¹, Matthias Richter¹, Elizabeth Peterson³, Sijia Ke³, Jeffrey B. Neaton³, Xiang Li³, Junko Yano³, Sage Bauers⁴, Andriy Zakutayev⁴, Joel Haber¹ and Michal Bajdich²; ¹California Institute of Technology, United States; ²SLAC National Accelerator Laboratory, United States; ³Lawrence Berkeley National Laboratory, United States; ⁴National Renewable Energy Laboratory, United States

SESSION EN03.22: Materials Science and Engineering of Emerging Oxide and Chalcogenide Photoabsorbers III

Session Chairs: Kazuhiko Maeda and Lydia Wong

Tuesday Afternoon, May 24, 2022

EN03-Virtual

9:00 PM *EN03.22.01

More Se Vacancies in Sb₂Se₃ Under Se-Rich Conditions—An Abnormal Behavior Induced by Defect-Correlation in Compensated Compound Semiconductors Menglin Huang¹, Shanshan Wang¹, Xin-Gao Gong¹, Su-Huai Wei² and [Shiyong Chen](#)¹; ¹Fudan University, China; ²Beijing Computational Science Research Center, China

9:30 PM EN03.22.02

Quantum Confinement and Carrier Transport in π -SnS Colloidal Quantum Dot Solids Retno Miranti^{1,2}, Ricky Dwi Septianto^{1,2}, Tomoka Kikitsu¹, Daisuke Hashizume¹, Nobuhiro Matsushita², Yoshihiro Iwasa^{1,3} and [Satria Z. Bisri](#)^{1,2}; ¹RIKEN Center for Emergent Matter Science, Japan; ²Tokyo Institute of Technology, Japan; ³The University of Tokyo, Japan

9:45 PM EN03.22.03

A New Strategy of Vanadium Doping in Centimeter-Scaled MoS₂ Thin Film for CO₂ Reduction Ying-Ti Hung^{1,2}, Pin-pin Huang¹, Mao-Feng Tseng¹, Li-Chyong Chen³, Kuei-Hsien Chen¹ and [Yu-Ting Peng](#)¹; ¹Academia Sinica, Taiwan; ²National Taiwan University, Taiwan; ³National Taiwan University, Taiwan

10:00 PM *EN03.22.04

Design of Efficient Photocatalysts for Solar Fuel Generation by Water Splitting and CO₂ Reduction [Rong Xu](#)^{1,2}; ¹Nanyang Technological University, Singapore; ²Cambridge Centre for Advanced Research and Education in Singapore (CARES), Singapore

10:30 PM *EN03.12.01

Efficient Green Kesterite for Solar Photovoltaic and Solar Fuel Devices [Xiaoqing Hao](#); Univ of New South Wales, Australia

##PAGE_BREAK##

SYMPOSIUM EN04

Next-Generation Organic Photovoltaics—Fundamentals and Applications for Flexible, Stretchable and Wearable Devices
May 8 - May 25, 2022

Symposium Organizers

Derya Baran, King Abdullah University of Science and Technology
Jung-Yong Lee, Korea Advanced Institute of Science and Technology
Gregory Welch, University of Calgary
Han Young Woo, Korea University

* Invited Paper

SESSION Tutorial EN04.00: Fundamentals and Applications of Next-Generation Organic Photovoltaics
Session Chairs: Derya Baran, Jung-Yong Lee, Gregory Welch and Han Young Woo
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SESSION EN04.01: Materials—OPV Synthesis and Characterization
Session Chairs: Safa Shoaee and Han Young Woo
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 321A

1:30 PM *EN04.01.01

Development of Conjugated Polymers and Devices for High Performance Large-Area Organic Photovoltaics [Hae Jung Son](#); KIST, Korea (the Republic of)

2:00 PM EN04.01.02

Phase Behavior and Charge Transfer Network in High Performing Non-Fullerene Acceptor Organic Solar Cells [Christina Cheng](#)¹, Stephen Wong², Garrett LeCroy¹, Sebastian Schneider¹, Enrique Gomez², Michael Toney³ and Alberto Salleo¹; ¹Stanford University, United States; ²The Pennsylvania State University, United States; ³University of Colorado Boulder, United States

2:15 PM EN04.01.03

Conjugated Polymer Blends—X-Ray and Neutron Scattering Analysis of Structure and Relationships to Electronic Properties [Sage Scheiwiller](#)¹, Lilo D. Pozzo¹, Caitlyn Wolf², Lorenzo Guio¹ and Christine Luscombe¹; ¹University of Washington, United States; ²National Institute of Standards and Technology, United States

2:30 PM EN04.01.04

Impact of Charge Separation on Solar Cell Performance in PBDB-T-SF and PBDB-T-2Cl:NFA Photoactive Blends [Jafar I. Khan](#)¹, Neha Chaturvedi¹, George Harrison¹, Dalaver Anjum^{1,2}, Yuliar Firdaus¹, Thomas D. Anthopoulos¹, Stefaan Dewolf¹ and Frédéric Laquai¹; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²Khalifa University of Science and Technology, United Arab Emirates

2:45 PM BREAK

SESSION EN04.02: Fundamentals—OPV Photophysics and Device Physics III
Session Chairs: Safa Shoaee and Han Young Woo
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 321A

3:00 PM *EN04.02.01

Reducing Energetic Disorder and Nonradiative Recombination of Charge Transfer State for Better Organic Solar Cells [Safa Shoaee](#); University of

Potsdam, United States

3:30 PM *EN04.02.02

Organic Photovoltaics with Small Driving Force—Spectroscopic Perspectives [Natalie Banerji](#); University of Bern, Switzerland

4:00 PM EN04.02.03

Origin of Charge Generation in Neat Non-Fullerene Acceptor Domains [Kaila M. Yallum](#), Marco Finger and Natalie Banerji; Universität Bern, Switzerland

4:15 PM EN04.02.04

Revealing the Impact of Interfacial Structure on Charge Generation and Recombination in Organic Photovoltaics [Brian A. Collins](#), Awwad Alotaibi, Obaid Alqahtani, Thomas Ferron and Victor Murcia; Washington State University, United States

4:30 PM EN04.02.05

Unraveling Photoelectric Processes in Semitransparent Organic Solar Cells Nora Schopp¹, [Viktor Brus](#)² and Thuc-Quyen Nguyen¹; ¹University of California, Santa Barbara, United States; ²Nazarbayev University, Kazakhstan

4:45 PM EN04.02.06

A Simple Approach for Unraveling Optoelectronic Processes in Organic Solar Cells Under Short-Circuit Conditions [Nora Schopp](#)¹, Viktor Brus², Jaewon Lee³, Guillermo Bazan¹ and Thuc-Quyen Nguyen¹; ¹University of California, Santa Barbara, United States; ²Nazarbayev University, Kazakhstan; ³Chungnam National University, Korea (the Democratic People's Republic of)

SESSION EN04.03: Materials—OPV Processing and Reliability I

Session Chairs: Jung-Yong Lee and Erin Ratcliff

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 321A

10:30 AM *EN04.03.01

Molecular Orientation of Polymer Semiconductors and Non-Fullerene Acceptors in Organic Photovoltaics [Keisuke Tajima](#); RIKEN, Japan

11:00 AM EN04.03.02

Crystallization Driven Boost in Fill Factor and Stability in Additive-Free Organic Solar Cells [David Garcia Romero](#), Lorenzo Di Mario, Giuseppe Portale and Maria Antonietta Loi; RUG, Netherlands

11:15 AM EN04.03.04

The Effects of Chromophore Halogenation on Reliability of UV-Absorbing Organic Transparent Photovoltaics [Tianran Liu](#), Quinn C. Burlingame, Jeni Sorli and Lynn Loo; Princeton University, United States

SESSION EN04.04: Materials—OPV Processing and Reliability II

Session Chairs: Natalie Banerji and Gregory Welch

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 321A

1:30 PM *EN04.04.01

A Multi-Length Scale Look at Interfaces in Organic Photovoltaics—Structure-Property Relationships, Functionalities and Stability to Power the Internet of Things [Erin L. Ratcliff](#); University of Arizona, United States

2:00 PM *EN04.04.02

Trace Impurity Tolerance of Polymer Solar Cells Gilles Roche¹, Tanguy Jousselein², Lionel Hirsch¹, Sebastien Taillemite², Pierre Antoine Bonnardel² and [Guillaume Wantz](#)¹; ¹Univ of Bordeaux, France; ²SEQENS, France

2:30 PM EN04.04.03

Non-Fullerene Acceptor Organic Photovoltaics with Intrinsic Operational Lifetimes over 30 Years [Yongxi Li](#)¹, Xiaheng Huang¹, Kan Ding², Hafiz K. Sheriff², Long Ye^{3,4}, Haoran Liu⁵, Changzhi Li⁵, Harald Ade³ and Stephen R. Forrest^{1,2}; ¹University of Michigan, United States; ²University of Michigan–Ann Arbor, United States; ³North Carolina State University, United States; ⁴Tianjin University, China; ⁵Zhejiang University, China

2:45 PM EN04.04.04

Narrow Bandgap Approach for All-Day Operation Solar Cell with Functional Interlayer [Yongju Lee](#), Swarup Biswas, Hyo-won Jang and Hyeok Kim; University of Seoul, Korea (the Republic of)

3:00 PM EN04.04.05

Scalable Alcohol-Amine-Capped Tin Oxide Interlayers for Organic Solar Cells [David Garcia Romero](#), Lorenzo Di Mario, Erik P. den Ouden and Maria Antonietta Loi; RUG, Netherlands

3:15 PM BREAK

SESSION EN04.05: Mechanical Stability of Organic Photovoltaics

Session Chairs: Guillaume Wantz and Gregory Welch

Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 321A

3:45 PM *EN04.05.01

Fundamental Relationships Between Morphological and Mechanical Stability of Organic Solar Cells Brendan T. O'Connor; North Carolina State University, United States

4:15 PM EN04.05.02

Dynamic Mechanical Analysis of Bulk-Heterojunction Active Layers Using a Kirigami-Inspired Substrate Support to Gain Insights into the Mechanical Stability of Organic Solar Cells Salma Siddika, Nrup Balar, Ronald Booth, Zhengxing Peng, Harald Ade and Brendan T. O'Connor; NC State University, United States

4:30 PM *EN04.05.03

Metal Nanowire Network Transparent Electrodes Towards High-Performance Flexible Optoelectronic Devices Shengyun Huang, Ting Yu and Dongling Ma; Institut national de la recherche scientifique, Canada

5:00 PM EN04.05.04

Amphiphilic Polymer Conetworks—Wearable and High Energy Transfer Rate Luminescent Solar Concentrators for Fiber Dye-Sensitized Solar Cells Chieh-Szu Huang^{1,2}, Luciano Boesel¹, Maksym Kovalenko^{2,1}, Rene Rossi¹, Xinyue Kang³ and Xuemei Sun³; ¹Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ²ETH Zürich, Switzerland; ³Fudan University, China

SESSION EN04.06: Poster Session: Next-Generation Organic Photovoltaics—Fundamentals and Applications for Flexible, Stretchable and Wearable Devices

Session Chairs: Jung-Yong Lee and Han Young Woo

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN04.06.01

Exploring Charge Generation and Recombination in Dilute-Donor Organic Solar Cell Blends Using Ultrafast Transient Absorption Spectroscopy Gareth J. Moore¹, Martina Causa¹, Josue Martinez Hardigree², Safakath Karuthedath³, Ivan Ramirez², Anna Jungbluth², Frédéric Laquai³, Moritz Riede² and Natalie Banerji¹; ¹University of Bern, Switzerland; ²University of Oxford, United Kingdom; ³King Abdullah University of Science and Technology, Saudi Arabia

EN04.06.02

Machine Learning-Assisted Optimization of Organic Photovoltaics via High-Throughput *In Situ* Formulation Na Gyeong An^{1,2}, Doojin Vak² and Jin Young Kim¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Commonwealth Scientific and Industrial Research Organisation, Australia

EN04.06.04

Development of Efficient Organic Photovoltaics using Green Solvent-Based Processing Jueun Kim, Minkyung Kim and Taeshik Earmme; Hongik University, Korea (the Republic of)

EN04.06.05

Encapsulated Polymers for Organic Photovoltaics Darcy Unson, Alex J. Gillett, Anastasia Leventis, Teodora Moiseanu, Neil Greenham and Hugo Bronstein; University of Cambridge, United Kingdom

EN04.06.06

Design of Non-Fullerene Acceptors for Organic Photovoltaics—From Theory to Application Mathieu Mainville, Tristan Marcoux St-Pierre, Paul A. Johnson and Mario LeClerc; Université Laval, Canada

EN04.06.07

A Simple Structured Exciplex Device with a Multi-Color Sensing Capability Geonwoo Jeong, Changmin Lee, Dong Hyun Kim, Dong Hyun Choi, Tae Wook Kim, Hyung Ju Chae, Sye Hamad Ullah Shah, Hyun Woo Jo, Min Jae Park, Amjad Islam, Sung Tae Shin and Seung Yoon Ryu; Korea University, Korea (the Republic of)

EN04.06.08

Excellent Thermal Stability of 1D/2A Terpolymer-Based Polymer Solar Cells Processed with Nonhalogenated Solvent Hyeonwoo Jung and Youngu Lee; DGIST, Korea (the Republic of)

EN04.06.09

Importance of Terminal Group Pairing of Polymer Donor and Small-Molecule Acceptor in Optimizing Blend Morphology and Voltage Loss of High-Performance Solar Cells Geon-U Kim¹, Cheng Sun², Jin Su Park¹, Hyun Gyeong Lee¹, Dongchan Lee³, Jin-Woo Lee¹, Hyeong Jun Kim¹, Shinuk Cho³, Yun-Hi Kim², Soon-Ki Kwon² and Bumjoon Kim¹; ¹KAIST, Korea (the Republic of); ²Gyeongsang National University, Korea (the Republic of); ³University of Ulsan, Korea (the Republic of)

EN04.06.11

Impact of Amino Acids on the Structure, Conductivity and Work Function of PEDOT:PSS Aman Anand^{1,2}, Jose Prince Madalaimuthu^{1,2}, Oluwaseun Adebayo^{1,2}, Maximilian Schaal³, Felix Otto³, Marco Gruenewald³, Torsten Fritz³, Ulrich S. Schubert^{1,2} and Harald Hoppe^{1,2}; ¹Laboratory of Organic and Macromolecular Chemistry (IOMC), Friedrich Schiller University Jena, Humboldtstraße 10, Germany; ²Center for Energy and Environmental Chemistry Jena (CEEC Jena), Friedrich Schiller University Jena, Philosophenweg 7a, Germany; ³Institute of Solid State Physics, Friedrich Schiller University Jena,

Helmholtzweg 5, Germany

EN04.06.15

Inverted Organic Solar Cells with Oxidized Carbon Materials as Effective Hole Transport Layer [Nara Han](#), Yina Moon, Dongseong Yang, Yeonsu Choi and Dong-Yu Kim; Gwangju Institute of Science and Technology, Korea (the Republic of)

EN04.06.16

Physical and Chemical Interface Modification to Improve Device Characteristics of AgNW-Based Optoelectronic Devices [Dongwook Ko](#), Sanghwan Kim, Jinwook Jung and Jongbok Kim; Kumoh National Institute of Technology, Korea (the Republic of)

EN04.06.18

Super Flexible Transparent Conducting Oxide-Free Organic-Inorganic Perovskite Solar Cells [Jin Hyuck Heo](#)¹, Jin Kyoung Park¹, David Sunghwan Lee¹, Bong Woo Kim¹, Woo-Sik Kim², Kai Zhu³ and Sang Hyuk Im¹; ¹Korea University, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of); ³National Renewable Energy Laboratory, United States

EN04.06.20

Analysis of deterioration of CIGS Photovoltaic Module Based on Electrical and Thermal Equivalent Circuit Modeling, [Yongki Kim](#)¹, Myunghun Shin¹, Mmyeong-Jin Lee¹ and Yoonmook Kang²; ¹Korea Aerospace University, Korea (the Republic of); ²Korea University, Korea (the Republic of)

EN04.06.21

Combined Engineering of Backbone Building Block and Regioregularity in Polymerized Small-Molecule Acceptors for Efficient All-Polymer Solar Cells with High Electron Mobility [Soodeok Seo](#)¹, Cheng Sun², Jin-Woo Lee¹, Seungjin Lee¹, Dongchan Lee³, Cheng Wang⁴, Tan Ngoc-Lan Phan¹, Geon-U Kim¹, Shinuk Cho³, Soon-Ki Kwon², Yun-Hi Kim² and Bumjoon J. Kim¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Gyeongsang National University, Korea (the Republic of); ³University of Ulsan, Korea (the Republic of); ⁴Lawrence Berkeley National Laboratory, United States

EN04.06.22

Optimization of Crystallinity and Hole Mobility of BDT-Based Polymer Donor Enables Simultaneous Enhancements of Voc, Jsc, and FF in Efficient Nonfullerene Organic Solar Cells [Jin Su Park](#)¹, Geon-U Kim¹, Dongchan Lee², Seungjin Lee¹, Shinuk Cho² and Bumjoon Kim¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²University of Ulsan, Korea (the Republic of)

EN04.06.23

Organic Photovoltaics for ‘Extreme’ Worlds—Exploring the Frontiers of the Temperature Window of Operation [Jeroen Hustings](#)¹, Asfaw Negash², Dieter Schreurs¹, Zewdeh Genene³, Dasalegn Yilma³, Michiel Mathijs¹, Jori Liesenborgs¹, Frank Van Reeth¹, Koen Vandewal¹, Wendimagegn Mammo³, Shimelis Admassie³, Wouter Maes¹ and Jean V. Manca¹; ¹University of Hasselt, Belgium; ²Debre Berhan University, Ethiopia; ³Addis Ababa University, Ethiopia

EN04.06.24

A GIWAXS Investigation of the Small Molecule Donor X2 [Andrew J. Levin](#)¹, Stefan Oosterhout², Junxiang Zhang¹, Michael Toney¹ and Seth R. Marder¹; ¹University of Colorado Boulder, United States; ²TNO, Netherlands

EN04.06.26

First principles Exploration of Hybrid Perovskite Superlattice and Solid Solutions for Efficient and Structurally Stable Stand-Alone Hybrid Solar PV Material Tsz Hin Edmund Chan and [Steven P. Hepplestone](#); University of Exeter, United Kingdom

EN04.06.28

Luminescent Solar Concentrators as Detectors in Free-Space Optical Communication Systems and Their Bandwidth Limits [Ioannis Papakonstantinou](#) and Mark Portnoi; University College London, United Kingdom

EN04.06.29

Identifying Optimal Photovoltaic Materials for Underwater Applications [Jason A. Röhr](#)¹, Benjamin E. Sartor¹, Joel Duenow², Juan Meng¹, Jason Lipton¹, Steven A. Maclean¹, Udo Römer³, Michael P. Nielsen³, Jaemin Kong^{4,5}, Matthew Reese², Myles Steiner², Nicholas Ekins-Daukes³ and André D. Taylor¹; ¹New York University, United States; ²National Renewable Energy Laboratory, United States; ³University of New South Wales, Australia; ⁴Gyeongsang National University, Korea (the Republic of); ⁵Gwangju Institute of Science and Technology, Korea (the Republic of)

EN04.06.30

A Universal Cathode Lamination Protocol for Intrinsically Stretchable Light-Emitting Diods [HuanYu Zhou](#), Shin Jung Han and Tae-Woo Lee; Seoul National University, Korea (the Republic of)

SESSION EN04.07: Organic Photovoltaic Device Engineering

Session Chairs: Jung-Yong Lee and Han Young Woo

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 321A

8:30 AM *EN04.07.01

Aesthetic and Colorful—Dichroic Polymer Solar Cells Using High-Performance Fabry-Pérot Etalon Electrodes Hye Rim Yeom¹, Seyeong Song¹, Song Yi Park¹, Han Young Woo² and [Jin Young Kim](#)¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Korea University, Korea (the Republic of)

9:00 AM *EN04.07.00

How Organic Semiconductors Can Contribute to a More Sustainable Electronics Industry [Jean-Rémi Pouliot](#); Brilliant Matters Organic Electronics, Canada

9:30 AM EN04.07.03

Roll-to-Roll Printing—A High-Throughput Digital Research Platform for Organic Photovoltaics Doojin Vak¹, Leonard W. Ng^{2,1}, Seok Woo Lee³, Dong Wook Chang³, Mei Gao¹ and Na Gyeong An¹; ¹CSIRO Manufacturing, Australia; ²Nanyang Technological University, Singapore; ³Pukyong National University, Korea (the Republic of)

9:45 AM BREAK

SESSION EN04.08: Fundamentals—OPV Photophysics and Device Physics

Session Chairs: Jung-Yong Lee and Keisuke Tajima

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 321A

10:15 AM *EN04.08.01

Organic Solar Cells Processed from Green Solvents Thuc-Quyen Nguyen; University of California, Santa Barbara, United States

10:45 AM EN04.08.02

Kinetically Driven Near-Unity Charge Generation Yield in Organic Solar Cells Oskar Sandberg, Paul Meredith and Ardalan Armin; Swansea University, United Kingdom

11:00 AM EN04.08.03

Accounting for Excitation Losses in UV-Absorbing Organic Heterojunctions with Bright Charge-Transfer State Emission Quinn C. Burlingame, Xiao Liu, Melissa L. Ball, Barry P. Rand and Lynn Loo; Princeton University, United States

11:15 AM EN04.08.04

Electron Transport Layers Based on Oligo(Ethylene Glycol)-Incorporated Conjugated Polymers Enabling Reproducible Fabrication of High-Performance Organic Solar Cells Seungjin Lee, Youngwoong Kim, Donguk Kim, Dahyun Jeong, Geon-U Kim, Jinseck Kim and Bumjoon Kim; KAIST, Korea (the Republic of)

11:30 AM EN04.08.05

Green Solvent Processed Perylene Diimides for Slot-Die Coated Photovoltaics Gregory C. Welch; University of Calgary, Canada

11:45 AM EN04.08.06

Organic Double Heterojunction Solar Cells Loren G. Kaake; Simon Fraser University, Canada

SESSION EN04.09: General Session I

Session Chairs: Jung-Yong Lee and Han Young Woo

Tuesday Afternoon, May 24, 2022

EN04-Virtual

9:00 PM *EN04.09.01

Polymer Solar Cells Made with Two-Component or Single-Component Active Layer Dong Hoon Choi; Korea Univ, Korea (the Republic of)

9:30 PM *EN04.09.02

Flexible and Stretchable Conductors for Soft Electronics Pooi See Lee; Nanyang Technological University, Singapore, Singapore

10:00 PM EN04.09.04

Non-Halogenated Solvent Processed Polymer Solar Cells Derived from a Conjugated Donor-Acceptor Block Copolymer Su Hong Park, Na Yeon Kwon, Seung Uk Cho, Dong Won Lee, Hyeon Doo Je, Sung Hoon Jung, Min Ju Cho and Dong Hoon Choi; Korea University, Korea (the Republic of)

10:05 PM EN04.09.05

Patterned Sandwich-Type Silver Nanowire-Based Flexible Electrode Through Simple Solution-Process Photolithography for Organic Photovoltaics Na Yeon Kwon¹, Su Hong Park¹, Young Un Kim¹, Yoonjoo Lee¹, Mai Ha Hoang², Han Young Woo¹, Min Ju Cho¹ and Dong Hoon Choi¹; ¹Korea University, Korea (the Republic of); ²Vietnam Academy of Science and Technology, Viet Nam

10:10 PM EN04.09.06

Tuning Mechanical Properties of High-Performance Organic Solar Cells with the Addition of a Thermoplastic Elastomer Abdullah Al Shafe, Ronald Booth, Salma Siddika and Brendan T. O'Connor; NC State University, United States

SESSION EN04.10: General Session II

Session Chairs: Jung-Yong Lee and Han Young Woo

Wednesday Morning, May 25, 2022

EN04-Virtual

10:30 AM *EN04.10.01

Imide/Cyano-Functionalized n-Type Polymers for Applications in All-Polymer Solar Cells Xugang Guo; Southern University of Science and Technology, China

11:00 AM EN04.10.04

Linker Modulated Peroxide Electrosynthesis Using Metal-Organic Nanosheets [Kirankumar Kuruvnashetti](#) and Nikolay Kornienko; University of Montreal, Canada

11:15 AM EN04.10.05

Understanding the Thermal Stability of Cl-Rich Non-Fullerene Acceptor-Based Organic Photovoltaics [Kan Ding](#)¹, Yongxi Li² and Stephen R. Forrest²; ¹North Carolina State University, United States; ²University of Michigan, United States

11:30 AM *EN04.10.06

Green Chemistry for Green Energy [Mario LeClerc](#); Laval University, Canada

12:00 PM EN04.10.07

Flexible and Stretchable Piezoelectric Nanogenerators (S-PENG) for Wearable energy harvesting [Gurneet Kaur](#), Jagan Singh Meena, Ashwini K. Agrwal and Manjeet Jassal; Indian Institute of Technology Delhi, India

SESSION EN04.11: General Session III
Session Chairs: Gregory Welch and Han Young Woo
Wednesday Afternoon, May 25, 2022
EN04-Virtual

9:00 PM *EN04.07.02

Recent Advances in Organic Photovoltaics—Morphology, Interface and Device Yang Yang¹ and [Gang Li](#)²; ¹University of California, Los Angeles, United States; ²The Hong Kong Polytechnic University, Hong Kong

9:30 PM *EN04.09.03

Active Material Design for Mechanically-Robust, Stretchable Polymer Solar Cells [Bumjoon Kim](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

10:00 PM EN04.10.02

Thermoplastic Elastomer Tunes Phase Structure and Promotes Stretchability of High-Efficiency Organic Solar Cells [Zhongxiang Peng](#)^{1,2}, Yanhou Geng^{1,3} and Long Ye^{1,2}; ¹Tianjin University, China; ²State Key Laboratory of Applied Optics, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, China; ³Joint School of National University of Singapore and Tianjin University, International Campus of Tianjin University, China

##PAGE_BREAK##

SYMPOSIUM EN05

Emerging Materials for Electrochemical Energy Storage Devices—Degradation and Failure Characterization—From Composition, Structure and Interfaces to Deployed Systems
May 9 - May 24, 2022

Symposium Organizers

Thomas Barrera, LIB-X Consulting
Matthieu Dubarry, University of Hawaii at Manoa
Andreas Pfrang, European Commission Joint Research Centre
Loraine Torres-Castro, Sandia National Laboratories

* Invited Paper

SESSION Tutorial EN05.00: Introduction to Data Science for Battery Degradation
, NaN,

SESSION EN05.01: Thermal Characterization of Energy Storage Materials and Devices I
Session Chairs: Partha Mukherjee and Loraine Torres-Castro
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

11:00 AM *EN05.01.01

Thermal Stability in Solid-State Batteries [Partha P. Mukherjee](#), Bairav Sabarish Vishnugopi and Hanwei Zhou; Purdue University, United States

11:30 AM EN05.01.04

Isothermal Calorimetry as a Valuable Tool for Developing Smart & Safe Charging Protocols [Gordon Waller](#), Abhishek Raj, Rachel E. Carter and Corey T. Love; Naval Research Laboratory, United States

SESSION EN05.02: Thermal Characterization of Energy Storage Materials and Devices II
Session Chairs: Qian Huang and Loraine Torres-Castro
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

1:30 PM *EN05.02.01

Insight into the Degradation Mechanism of Li-Ion Batteries by Heat Measurement [Qian Huang](#), Daiwon Choi, Alasdair Crawford, Bruce McNamara, Nimat Shamim, Vish Viswanathan, David Reed and Vincent Sprenkle; Pacific Northwest National Laboratory, United States

2:00 PM EN05.02.02

Thermal Stability of Solid-State Battery Components with Liquid Electrolyte [Alex Bates](#), Jill Langendorf, Joshua Lamb, Yuliya Preger and Loraine Torres-Castro; Sandia National Laboratories, United States

2:15 PM EN05.02.03

An Optical Thermoreflectance Technique for Accurately Measuring Thermal Energy Storage of Nanoscale Materials [Milena Milich](#), John Tomko and Patrick E. Hopkins; University of Virginia, United States

2:30 PM BREAK

SESSION EN05.03: Novel Materials for Li-Ion Technologies
Session Chairs: Valerio De Angelis and Dibyendu Mukherjee
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

3:00 PM EN05.03.01

Synthesis and Characterization of Phosphorus-Doped Silicon for Electrochemical Applications [Isabelle Gordon](#)¹, Wei Xu¹, Richard Jow² and Nicholas Stadie¹; ¹Montana State University, United States; ²U.S. Army Research Laboratory, United States

3:15 PM EN05.03.03

Investigating Low-Temperature Behavior of Alloy Anodes for Lithium-Ion Batteries [Kelsey A. Cavallaro](#), Stephanie E. Sandoval, Akila Thenuwara and Matthew T. McDowell; Georgia Institute of Technology, United States

3:30 PM EN05.03.04

3D Electrode Architectures and Advanced Materials for Next-Generation Lithium-Ion Battery [Wilhelm Pflöging](#), Peter Smyrek and Yijing Zheng; Karlsruhe Institute of Technology, Germany

3:45 PM EN05.03.05

Improved Stability of LiCoO₂ Positive Electrode with Kosmotropic Anion in Aqueous Lithium-Ion Batteries [Hyunjeong Oh](#)¹, Seung-Jae Shin¹, Hirona Yamagishi², Toshiaki Ohta², Naoaki Yabuuchi³, Hyungjun Kim¹ and Hye Ryung Byon¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Ritsumeikan University, Japan; ³Yokohama University, Japan

4:00 PM EN05.03.06

Multiscale Evidence of LiH Formation in Lithium Batteries [Rafael A. Vila](#)¹, Jennifer A. Dionne¹ and Yi Cui^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

4:15 PM EN05.03.07

Tailoring Surface of Ni-Rich LiNi_{1-x}Co_{x/2}Mn_{x/2}O₂ by Using Lithium-Ion Conducting Solid-Electrolytes [Xinwei Jiao](#), Chan-Yeop Yu and Jung-Hyun Kim; The Ohio State University, United States

4:30 PM EN05.03.08

3D Printing of Batteries—Comparison Between Fabrication Processes [Sergio Pinilla](#), Sean Ryan, Lorcan McKeon, Meiyang Lian, Ahin Roy and Valeria Nicolosi; Trinity College Dublin, Ireland

SESSION EN05.04: Poster Session I: Novel Materials for Li-Ion Technologies
Session Chairs: Thomas Barrera, Matthieu Dubarry and Loraine Torres-Castro

Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.04.01

A New TiO with *In Situ* Transformed Rutile TiO₂ Nanorods as a Next-Generation Anode Material for Lithium-Ion Battery Tong-Hyun Kang, Jong Hun Sung, Jeong-Hoon Yu and Jong-Sung Yu; Daegu Gyeongbuk Institute of Science and Technology (DGIST), Korea (the Republic of)

EN05.04.02

Mesoparticle-Nanoparticle Size Relation for Improved Silicon-Carbon Composite Cycling Stability in Lithium-Ion Batteries Joseph Schwan, Kimberly C. Hizon, Pankaj Ghildiyal, Michael Zachariah and Lorenzo Mangolini; University of California, Riverside, United States

EN05.04.03

Further Improving Coulombic Efficiency and Discharge Capacity in LiNiO₂ Material by Activating Sluggish ~3.5V Discharge Reaction Changgeun Bae and Byoungwoo Kang; Pohang University of Science and Technology (POSTECH), Pohang 37673, Korea (the Republic of)

EN05.04.04

Superior Cyclic Reversibility of Amorphous Lithium-Iron Fluorosulphate Based on Both Insertion and Conversion Reaction for High Energy Density Lithium-Ion Battery Cathode Material Jaehoon Heo and Kisuk Kang; Seoul National University, Korea (the Republic of)

EN05.04.05

High-Energy Spinel-Type Li-Ion Cathodes by Continuously Tuning the Level of Cation Disorder Zijian Cai^{1,2}, Huiwen Ji^{2,3}, Yang Ha², Jue Liu⁴, Deok-Hwang Kwon¹, Zhengyan Lun¹, Tzu-Yang Huang¹, Bryan McCloskey¹, Raphaële Clément², Wanli Yang² and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³The University of Utah, United States; ⁴Oak Ridge National Laboratory, United States; ⁵University of California, Santa Barbara, United States

EN05.04.06

Towards Higher Electric Conductivity and Wider Phase Stability Range via Nanostructured Glass-Ceramics Processing Tomasz K. Pietrzak, Marek Wasiciuonek and Jerzy Garbacz; Warsaw Univ. of Technology, Poland

EN05.04.07

Atomic Layer Deposition of Sulfide Films for Improved Electrochemical performance of LiNi_{0.8}Mn_{0.1}Co_{0.1}O₂ Cathodes Xin Wang and Xiangbo Meng; University of Arkansas, United States

EN05.04.08

Understanding the Improvement Mechanism of Triethyl Borate as an Electrolyte Additive for 5 V Spinel/Graphite Lithium-Ion Batteries Tianyang Wang and Jung-Hyun Kim; The Ohio State University, United States

EN05.04.09

Epitaxial Oxide Films and Nanoparticle Network for Lithium-Ion Battery and Oxygen Electrocatalyst Applications Hongmei Luo and Meng Zhou; New Mexico State University, United States

EN05.04.10

Two New Low-Expansion Li-Ion Cathode Materials with Promising Multi-Property Performance Brandi Ransom¹, Nathan Zhao¹, Austin Sendek², Ekin D. Cubuk³, William C. Chueh¹ and Evan Reed¹; ¹Stanford University, United States; ²AIONICS, United States; ³Google, United States

EN05.04.11

Yolk-Shell Structured SiO₂@N,P Co-Doped Carbon Sphere as Highly Stable Anode Materials for Lithium-Ion Batteries Kyeongseok Min, Yeeun Lee, Rin Na, Kyutae Kim and Sung-Hyeon Baeck; Inha University, Korea (the Republic of)

EN05.04.12

Structure Design and Improved Performance of the Carbon Coated Silicon/Graphite Composite Anodes for Lithium-Ion Batteries Seungwoo Lee, Jeongheon Kim, Jaek Kim, Joonhyeok Park, Insung Hwang, Yongmin Jung and Taeseup Song; Hanyang University, Korea (the Republic of)

EN05.04.14

Incorporation of Aniline Tetramer into Alginate-Grafted-Polyacrylamide as Polymeric Binder for High-Capacity Silicon/Graphite Anodes Bolormaa Gendensuren and Eun-Suok Oh; University of Ulsan, Korea (the Republic of)

EN05.04.16

Development of NMC622/Graphite Hybrid Polymer Lithium Battery Jérémie Salomon¹, Helene Rouault¹, Benjamin Amestoy¹, Léo Merchat¹, Gaëlle Besnard¹, Côme Leys¹, Elise Gutel¹, Djamel Mourzagh¹, Julio Abuslem², Dominique Bascour³, Daniel Gloesener³, Thierry Baert³, Marc-David Braidat⁴ and Ludovic Odoni³; ¹Univ. Grenoble Alpes, CEA Liten, France; ²Solvay Specialty Polymers, Italy; ³R&I Centre Brussels-Solvay Campus, Belgium; ⁴Solvay R&I, France

EN05.04.17

Development of Bipolar Cells in the SOLGAIN® Technology for Lithium-Ion Batteries Djamel Mourzagh¹, Daniel Tomasi¹, Helene Rouault¹, Gaëlle Besnard¹, Elise Gutel¹, Julio Abuslem², Daniel Gloesener² and Marc-David Braidat²; ¹CEA - LITEN, France; ²SOLVAY, Italy

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.05.01

Development of Lithium/Sodium-Ion Battery Electrodes Based on Solvent Engineered Tin(II) Oxide Nanomaterials [Sean Ryan](#)¹, Joao Coelho^{1,2}, Sonia Jaskaniec¹ and Valeria Nicolosi¹; ¹Trinity College Dublin, Ireland; ²Universidade Nova de Lisboa, Portugal

EN05.05.02

Insights into the Storage Mechanism of Lithium and Sodium in Phosphorus-Doped Graphite [Cassius Clark](#), Christopher A. O'Keefe, Dominic S. Wright and Clare P. Grey; University of Cambridge, United Kingdom

EN05.05.03

Unlocking New Redox Activity in Alluaudite Cathodes Through Compositional Design [Vincent Wu](#)¹, Raynald Giovine¹, Emily E. Foley¹, Jordan Finzel¹, Mahalingam Balasubramanian², Elias Sebt¹, Eve Mozur¹, Andrew Kwon¹ and Raphaële Clément¹; ¹University of California, Santa Barbara, United States; ²Oak Ridge National Laboratory, United States

EN05.05.04

3D-Microarchitected, Free-Standing Carbon Lattices for Sodium-Ion Batteries with Ultra-High Areal Capacity and Study on Na-Ion Storage Mechanism in Hard Carbon [Yuto Katsuyama](#)¹, Akira Kudo², Hiroaki Kobayashi², Jihui Han², Mingwei Chen^{3,2}, Itaru Honma² and Richard B. Kaner¹; ¹University of California, Los Angeles, United States; ²Tohoku University, Japan; ³Johns Hopkins University, United States

EN05.05.05

Optimization of Prussian Blue Analogues for Na-Ion Desalination Batteries Nihat Sahin, [Jacob Morton](#) and Matthieu Dubarry; University of Hawaii at Manoa, United States

EN05.05.06

Experimental and Modeling Studies of Metal Halide Catholyte and Cathode Materials to Enable Low-temperature Molten Sodium Batteries [Adam M. Maraschky](#), Rose Y. Lee, Stephen Percival, Martha Gross, Amanda Peretti, Erik D. Spoeke and Leo J. Small; Sandia National Laboratories, United States

EN05.05.07

Hierarchical Nanocellulose-Based Gel Polymer Electrolytes for Stable Na Electrodeposition in Sodium-Ion Batteries [Neeru Mittal](#)¹, Sean Tien¹, Erlantz Lizundia² and Markus Niederberger¹; ¹ETH Zurich, Switzerland; ²University of the Basque Country, Spain

SESSION EN05.06: Poster Session III: Emerging Energy Storage Materials—Lithium-Metal Batteries

Session Chairs: Thomas Barrera, Matthieu Dubarry and Loraine Torres-Castro

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.06.01

Double-Layer Protection for Lithium-Metal Anode [Ju-Myung Kim](#), Ji-Guang Zhang and Wu Xu; Pacific Northwest National Laboratory, United States

EN05.06.02

Functional Composite Separator for High Energy Density Lithium-Metal Batteries [Hao Jia](#), Hyung-Seok Lim, Ji-Guang Zhang and Wu Xu; Pacific Northwest National Laboratory, United States

EN05.06.05

Structurally Tailored Hierarchical Cu Current Collector for Suppressing Dendrite Failure in Lithium Metal Batteries [Inyeong Yang](#)¹, Ji-Hun Jeong¹, Jae Young Seok² and Sanha Kim¹; ¹Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); ²Korea Institute of Machinery and Materials (KIMM), Korea (the Republic of)

EN05.06.06

Copper Nitride Nanowires Coated Li-Metal with Improved Performances for Li-Metal Batteries [Jaek Kim](#), Jeongheon Kim, Seungwoo Lee, Joonhyeok Park, Jiwoon Kim and Taeseup Song; Hanyang University, Korea (the Republic of)

EN05.06.08

Super-Lithiophilic Porous Copper Host for Enhancing Performance of Lithium Metal Anode [Seungeun Paik](#), Jungtaek Kim, Hee-Dong Kwak, Changhyun Lim, Doyoon Park, Ho-Young Kim and Yunseog Lee; Seoul National University, Korea (the Republic of)

EN05.06.10

Characterization of Alkali Metal Anodes with Xe Focused Ion Beam [Hyeong-Jun Koh](#), Eric Detsi and Eric A. Stach; University of Pennsylvania, United States

SESSION EN05.07: Emerging Energy Storage Materials—Sodium Based Batteries

Session Chairs: Matthieu Dubarry and Erik Spoeke

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, Emalani Theater 320

8:00 AM EN05.07.02

Understanding the Effect of Redox-Inactive Dopants on $\text{Na}_2\text{Mn}_3\text{O}_7$ Cathodes Using Density Functional Theory Calculations Yong-Seok Choi^{1,2,3}, Begoña Silván^{4,2}, Nuria T. Ruiz^{4,2} and David O. Scanlon^{1,2,3}; ¹University College London, United Kingdom; ²The Faraday Institution, United Kingdom; ³Thomas Young Centre, United Kingdom; ⁴Lancaster University, United Kingdom

8:15 AM EN05.07.03

Unlocking Record Capacity and Rate Capability of HxCrS_2 by Proton-Exchange Pretreatment Joseph Stiles¹, Anna Soltys¹, Saul Lapidus², Xiaoyu Song¹, Craig Arnold¹ and Leslie Schoop¹; ¹Princeton University, United States; ²Argonne National Laboratory, United States

8:30 AM EN05.07.04

Reversible Phase Transition of Layered Materials by Electrochemical Insertion/Deinsertion of Li^+ and Na^+ Suwon Lee, Seongkoo Kang, Youngju Choi and Yong-Mook Kang; Korea University, Korea (the Republic of)

8:45 AM EN05.07.05

Molten Salt-Based Batteries for Safe, Reliable Long-Duration Energy Storage Erik D. Spoecker, Melissa Meyerson, Adam Maraschky, Stephen Percival, Martha Gross, Joshua Lamb and Leo J. Small; Sandia National Laboratories, United States

9:00 AM EN05.07.07

Microstructural Investigation into Na-Ion Storage Behaviors of Cellulose-Based Hard Carbons for Na-Ion Batteries Jae-Bum Kim and Yong-Mook Kang; Korea University, Korea (the Republic of)

9:45 AM BREAK

SESSION EN05.08: Emerging Energy Storage Materials—Lithium-Metal Batteries

Session Chairs: Alex Bates and Stephen Harris

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, Emalani Theater 320

10:15 AM *EN05.08.01

Advanced Characterization of Electrochemical Materials and Interfaces for Better Batteries Y. Shirley Meng; University of California, San Diego, United States

10:45 AM EN05.08.02

Superior Polymeric Lithicones for Extremely Long-Life Lithium Metal Anodes Xiangbo Meng¹ and Kah Chun Lau²; ¹University of Arkansas, United States; ²California State University Northridge, United States

11:00 AM EN05.08.03

Strategy to Design Functionalized Battery Separator for Highly Stable Lithium Metal Batteries Patrick J. Kim¹, Junghyun Choi², Junghwan Kim², Sungho Park^{2,1} and Seul Lee^{2,1}; ¹Kyungpook National University, Korea (the Republic of); ²Korea Institute of Ceramic Engineering & Technology, Korea (the Republic of)

11:15 AM EN05.08.04

Data-Driven Automated Robotic Experiments Accelerate Discovery of Multi-Components Electrolyte for Rechargeable Lithium-Metal Batteries Shoichi Matsuda; National Institute for Materials Science, Japan

11:30 AM EN05.08.05

Dynamic Electrochemical Responses of "Dead Li" During Battery Operations Fang Liu and Yi Cui; Stanford University, United States

11:45 AM EN05.08.06

Pressure-Tailored Lithium Deposition and Dissolution in Lithium Metal Batteries Chengcheng Fang¹ and Y. Shirley Meng²; ¹Michigan State University, United States; ²University of California, San Diego, United States

12:00 PM EN05.08.07

New Insights on Reaction Pathways for FeS_2 Cathodes Grace Whang¹, David Ashby², Aliya Lapp², Igor Kolesnichenko², Timothy Lambert², A. A. Talin² and Bruce S. Dunn¹; ¹University of California, Los Angeles, United States; ²Sandia National Laboratories, United States

SESSION EN05.09: Emerging Energy Storage Materials—New Technologies

Session Chairs: John Hewson and Nicholas Stadie

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, Emalani Theater 320

1:30 PM *EN05.09.01

Highlighting the Versatility of Ionogel Solid Electrolytes David Ashby¹, Ryan DeBlock² and Bruce S. Dunn³; ¹Sandia National Laboratories, United States; ²U.S. Naval Research Laboratory, United States; ³University of California, Los Angeles, United States

2:00 PM EN05.09.03

3D Printing of Aqueous Zinc-Ion Batteries with High Cycling Stability Stefano Tagliaferri, Nagaraju Goli, Mauro Och, Maria Sokolikova, Apostolos Panagiotopoulos and Cecilia Mattevi; Imperial College London, United Kingdom

2:15 PM EN05.09.04

Investigating Ionic Pathways to Map Motion within Multivalent Battery Cathodes [Megan Murphy](#)¹, Matthew G. Tucker² and Jordi Cabana¹;
¹University of Illinois at Chicago, United States; ²Oak Ridge National Laboratory, United States

2:30 PM EN05.09.05

Probing Local Electrochemical Activity in MgV₂O₄ Using Atomic-Resolution Electron Microscopy [Francisco J. Lagunas Vargas](#)^{1,2}, Grant C. Alexander^{1,2}, Christian Moscica^{1,2}, Jordi Cabana^{1,2} and Robert F. Klie^{1,2}; ¹Joint Center for Energy Storage Research, United States; ²University of Illinois at Chicago, United States

3:00 PM BREAK

3:05 PM *EN05.09.06

High-stiffness Electrodes and Separators for Structural Batteries and Capacitors [Jodie Lutkenhaus](#), Dimitris Lagoudas, James Boyd and Micah Green; Texas A&M University, United States

3:20 PM MONDAY AND TUESDAY POSTER AWARDS ANNOUNCEMENT

3:45 PM EN05.09.09

Electroless Pb Monolayer Deposition on Carbide and Nitrides for Energy Conversion Reactions [Joescene Soto-Perez](#)^{1,2}, Carlos R. Cabrera Martínez³ and Kotaro Sasaki²; ¹University of Puerto Rico, Río Piedras, United States; ²Brookhaven National Laboratory, United States; ³The University of Texas at El Paso, United States

4:00 PM EN05.09.11

Structural, Morphological and Interfacial Changes in H₂V₃O₈ Upon Mg²⁺ Intercalation—A Post-Mortem Investigation [Yuri Surace](#), Martina Romio, Damian Cupid and Marcus Jahn; AIT Austrian Institute of Technology GmbH, Austria

SESSION EN05.10: Poster Session IV: Emerging Energy Storage Materials—New Technologies
Session Chairs: Thomas Barrera, Matthieu Dubarry and Loraine Torres-Castro
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.10.01

Ferroelectric P(VDF-TrFE)/BaTiO₃ Layer Coated Zinc-Ion Batteries Toward Dendrite-Free Zinc Anodes [WooJun Seol](#), Hyeonhun Park, Hyeon-Jin Kim and Ji Young Jo; Gwangju Institute of Science and Technology, Korea (the Republic of)

EN05.10.02

Conducting Polymer-Intercalated Vanadate System for High-Performance Aqueous Zinc-Ion Batteries Changyong Park, Jichang Kim, Se Hun Lee and [Heejoon Ahn](#); Hanyang University, Korea (the Republic of)

EN05.10.03

Effect of Mn Content in Co_{1-x}Mn_xFe[CN]₆ as Cathode Material for Rechargeable Aqueous Zinc-Ion Batteries [Federico Lissandrello](#), Prisca Viviani, Eugenio Gibertini and Luca Magagnin; Politecnico di Milano, Italy

EN05.10.04

Stabilizing Zn Anode with Porous Functional Polymer Coating for Zn Metal Batteries [Rong Kou](#), Tianhang Chen and Chris Rahn; Pennsylvania State University, United States

EN05.10.05

Oxygen Vacancies Rich CoFe-CoFe₂O_{4-x} Embedded in N-Doped Hollow Carbon Sphere as a Highly Efficient Electrocatalyst for Zinc-Air Battery [Yohan Go](#), Kyeongseok Min, Rin Na, Hyelin An and Sung-Hyeon Baek; Inha University, Korea (the Republic of)

EN05.10.06

CoFe Alloy Nanoparticles Embedded in N-doped Carbon Supported on Highly Defective Ketjenblack for Rechargeable Zn Air Battery [Kyutae Kim](#), Yohan Go, Rin Na, Yeeun Lee and Sung-Hyeon Baek; Inha University, Korea (the Republic of)

EN05.10.10

Temperature Tolerant, Anti-Drying Supercapacitor Based on Organohydrogel Electrolyte [Gyusung Jung](#) and Jeong Sook Ha; Korea University, Korea (the Republic of)

EN05.10.16

Design of Conducting Polymer-Based Supercapacitors Towards Ultralong Lifespan [Xueying Chang](#)^{1,2}, Maher F. El-Kady^{1,2}, Helen Huang^{1,2}, Cheng-Wei Lin^{1,2}, Mackenzie Anderson^{1,2}, Stephanie Aguilar¹, Jason Z. Zhu¹ and Richard B. Kaner^{1,2,1}; ¹University of California, Los Angeles, United States; ²California NanoSystems Institute, United States

EN05.10.17

Facile Fabrication of Multivalent VO₂/Graphene Nanocomposite Electrodes for High-Energy-Density Symmetric Supercapacitors [Helen Huang](#), Xueying Chang, Maher F. El-Kady, Mackenzie Anderson, Cheng-Wei Lin, Chris Turner and Richard B. Kaner; California State University, Los Angeles, United States

EN05.10.18

Ultra-Fast, High-Energy Supercapacitor for Wireless Electronics [Lulu Yao](#) and Tse N. Ng; University of California, San Diego, United States

EN05.10.19

Densification and Co-Doping of Laser-Induced Graphene for Boosting Electrochemical Performance of Flexible Supercapacitors [Jung Bin In](#), Mahima Khandelwal and Chau Van Tran; Chung-Ang University, Korea (the Republic of)

EN05.10.21

Solvent and Anion Controlled Ionic Clustering in Halide Containing Electrolytes for use in Rechargeable Magnesium Batteries Vallabh Vasudevan, Mingchao Wang and [Nikhil Medhekar](#); Monash University, Australia

EN05.10.22

Electrochemically Produced High Rate, High Capacity Iron Electrodes for Use in Iron-Air Batteries [Yigit Aziz Durmus](#), Ammar Tatlisu and Julian Tornow; Hochschule Ruhr West (Ruhr West University of Applied Sciences), Germany

EN05.10.23

Structural Topologies to Enable Exploitation of Grotthuss Diffusion for Fast Proton Ion Batteries Weiyi Zhang¹, Yanke Fu¹, Xiulei (David) Ji² and [Alex Greaney](#)¹; ¹University of California, Riverside, United States; ²Oregon State University, United States

EN05.10.25

Electrochemistry of Vacancy-Decorated α -MnO₂: Improved Ion Diffusion and Capacity Retention via Li₂O Incorporation [Yong-Jie Hu](#), Chris Tandoc, Bryan Byles and Ekaterina Pomerantseva; Drexel University, United States

EN05.10.26

Nickel/Vulcan XC-72R Nanocatalysts via the Rotating Disk Slurry Electrodeposition (RoDSE) Method as Electrocatalyst for the Oxygen Evolution Reaction (OER) in Alkaline Medium [Pedro Trinidad-Perez](#)¹, Joesene Soto-Perez¹ and Carlos R. Cabrera Martínez^{2,1}; ¹University of Puerto Rico, Rio Piedras Campus, United States; ²The University of Texas at El Paso, United States

EN05.10.27

Functionalized 2D Silicate-Based Films for Energy Applications [Suvash Ghimire](#), Varchaswal Kashyap and Kausik Mukhopadhyay; University of Central Florida, United States

EN05.10.28

Core-Shell Structured NiCo@NiCoP Nanorod on Ni Foam as an Efficient Bifunctional Electrocatalyst for Overall Water Splitting [Yeeun Lee](#), Hyelin An, Kyeongseok Min, Dongwook Lim and Sung-Hyeon Baeck; Inha university, Korea (the Republic of)

EN05.10.29

“Water-in-Polyelectrolyte Salt” for Scalable High Power Sustainable Lignin Batteries [Divyaratan Kumar](#), Ziyauddin Khan, Ujwala Ail, Jaywant Phopase, Jakob Nilsson, Olle Inganäs, Magnus Berggren and Xavier Crispin; Linköping University, Sweden

EN05.10.33

Ultra-Small, Pyramidal Platinum Nanoparticles for High Stability Fuel Cell Oxygen Reduction [Emanuele Magliocca](#), Thomas S. Miller and Dan Brett; University College London, United Kingdom

EN05.10.34

Fe-, N-, and S-Tridoped Carbon Hollow Spheres as Highly Active Electrocatalysts for Oxygen Reduction Reaction [Hyelin An](#), Rin Na, Dongwook Lim, Yohan Go and Sung-Hyeon Baeck; Inha university, Korea (the Republic of)

EN05.10.35

Bottom-up Fabrication of Oxygen Reduction Electrodes with Atomic Layer Deposition for High-Power-Density PEMFCs [Samuel Dull](#), Shicheng Xu and Fritz Dull; Stanford University, United States

EN05.10.40

“Turbocharging” the Potassium-Oxygen Battery—The Influence of Oxygen Pressure on Discharge Performance [Jannis N. Küpper](#), Simon Jakobi and Ulrich Simon; RWTH Aachen University, Germany

EN05.10.41

COMSOL Modeling of Ion Transport Within Pattern-Imprinted Electrodes for Lithium-Ion Batteries [Anand Vinubhai Patel](#), Rokia Tamraz and Dunbar P. Birnie; Rutgers, The State University of New Jersey, United States

SESSION EN05.11: Characterizing Battery Degradation and Failure Modes

Session Chairs: Randy Shurtz and Loraine Torres-Castro

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, Emalani Theater 320

8:00 AM EN05.11.01

Path Dependence of Li-Ion Battery Degradation During Cycling to 80% Capacity [Reed Wittman](#)¹, Matthieu Dubarry², Sergei Ivanov³, Jessica Kustas¹, Jill Langendorf¹, Richard Grant¹, Gretchen Taggart¹, Babu Chalamala¹ and Yuliya Preger¹; ¹Sandia National Laboratories, United States; ²University of Hawaii at Manoa, United States; ³Los Alamos National Laboratory, United States

8:15 AM EN05.11.02

Evaluation of Degradation Processes in Lithium-Based Thick Film Electrodes by Laser-Induced Breakdown Spectroscopy [Peter Smyrek](#), Hans Jürgen Seifert and Wilhelm Pflöging; Karlsruhe Institute of Technology, Germany

8:30 AM EN05.11.03

Imaging Lithium-Ion Battery Aging Induced by Manufacturing Defects with Open-Hardware Scanning Acoustic Microscopy David Wasylowski, Niklas Kisseler, Morian Sonnet, Heinrich Dittler and Dirk U. Sauer; RWTH Aachen University, Germany

8:45 AM EN05.11.04

Calibration-Free Quantitative Analysis of Lithium-Ion Battery (LiB) Electrode Materials Using Laser-Induced Breakdown Spectroscopy (LIBS) Dibyendu Mukherjee¹, Ravi Pamu^{1,1}, Seyyed Ali Davari², Devendrasinh Darbar^{3,4}, Ethan C. Self⁴ and Jagjit Nanda⁴; ¹The University of Tennessee, Knoxville, United States; ²California Air Resources Board, United States; ³Tennessee Tech University, Cookeville, United States; ⁴Oak Ridge National Laboratory, United States

9:00 AM EN05.11.05

Resolving Chemical and Spatial Heterogeneities at Complex Electrochemical Interfaces in Li-Ion Batteries Julia C. Hestenes¹, Richard May¹, Jerzy Sadowski², Naiara Munich³ and Lauren Marbella¹; ¹Columbia University, United States; ²Brookhaven National Laboratory, United States; ³Barnard College, Columbia University, United States

9:45 AM EN05.11.08

How Dynamic Thermal Evaluation of Battery Electrodes and Materials Better Replicate In-Service Operating Conditions Rachel E. Carter¹, Todd Kingston², Matthieu Dubarry³, Connor Fear⁴, Partha P. Mukherjee⁴ and Corey T. Love¹; ¹U.S. Naval Research Laboratory, United States; ²Iowa State University, United States; ³University of Hawaii-Manoa, United States; ⁴Purdue University, United States

9:30 AM BREAK

10:00 AM EN05.11.09

In Situ Infrared Spectroscopy for High-Nickel Lithium-Ion Battery Cathodes: Elucidating the Relationships Between Vibrational Signatures and Cathode-Electrolyte Interphase Phenomena Sang-Don Han¹, Bertrand J. Tremolet de Villers¹, Junghoon Yang¹ and Jihyeon Gim²; ¹National Renewable Energy Laboratory, United States; ²Argonne National Laboratory, United States

10:15 AM EN05.11.10

Study of Electrolyte Decomposition and Its Contribution Towards Stable SEI Formation for High-Performance Li-Metal Anode Guoxing Li and Donghai Wang; The Pennsylvania State University, United States

10:30 AM EN05.11.11

Using Resistance as a Surrogate to Lithium Consumed During Formation for Cell Life Prediction Andrew Weng¹, Peyman Mohtat¹, Peter M. Attia², Valentin Sulzer¹, Suhak Lee¹, Greg Less³ and Anna Stefanopoulou¹; ¹University of Michigan–Ann Arbor, United States; ²Stanford University, United States; ³University of Michigan, United States

10:45 AM EN05.11.12

Combining In Situ X-Ray Tomography with Quantitative Algorithms for Ni-Rich Particle Defects Sustained During High Voltage Operation Aaron Wade^{1,2}, Alice Llewellyn^{1,2}, Tom Heenan^{1,2}, Dan Brett^{1,2} and Paul Shearing^{1,2}; ¹UCL, United Kingdom; ²Faraday Institution, United Kingdom

11:00 AM EN05.11.13

In Situ Electrochemical Dilatometry Study of Lithiation-Induced Giant Buckling Deformations in Monolithic Nanoporous Metal Films Used as Lithium-Ion Battery Electrodes Lin Wang and Eric Detsi; University of Pennsylvania, United States

11:15 AM EN05.11.14

Understanding and Mitigating Mechanical Degradation in Lithium–Sulfur Batteries—Additive Manufacturing of Li₂S Composites and Nanomechanical Particle Compressions Max Saccone and Julia R. Greer; California Institute of Technology, United States

SESSION EN05.12: Fast Charging I

Session Chairs: Daniel Abraham and Donal Finegan

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, Emalani Theater 320

1:30 PM *EN05.12.01

Enabling Fast Charging of Lithium-Ion Batteries with 3-D Anode Architectures Neil P. Dasgupta; University of Michigan, United States

2:00 PM *EN05.12.02

Modeling and Testing Considerations for Electrolytes that Enable Extreme Fast Charging of Lithium-ion Cells Sangwook Kim¹, Ningshengjie Gao¹, Parameswara Chinnam¹, Tanvir Tanim¹, Eric J. Dufek¹, Andrew Colclasure², Andrew Jansen³, Seoung-Bum Son³, Ira Bloom³, Alison Dunlop³, Stephen Trask³ and Kevin Gering¹; ¹Idaho National Laboratory, United States; ²National Renewable Energy Laboratory, United States; ³Argonne National Laboratory, United States

2:30 PM BREAK

2:50 PM WEDNESDAY POSTER AWARDS ANNOUNCEMENT

3:00 PM *EN05.12.03

Fast Charging of Lithium-Ion Cells—Polarization, Gradients, Plating and More Daniel Abraham; Argonne National Laboratory, United States

3:30 PM EN05.12.04

Operando Video Microscopy of Li Plating and Re-Intercalation on Graphite Anodes During Fast Charging Yuxin Chen¹, Kuan-Hung Chen¹, Adrian Sanchez¹, Eric Kazzyak¹, Vishwas Goel¹, Yelena Gorlin², Jake Christensen², Katsuyo Thorton¹ and Neil P. Dasgupta¹; ¹University of Michigan, United States; ²Robert Bosch LLC, United States

3:45 PM EN05.12.05

Correlating Wavelength Dependence in LiMn_2O_4 Cathode Photo-Accelerated Fast Charging with Deformations in Local Structure Jason Lipton^{1,2}, Yuan Yuan Ma¹, Jason A. Röhr¹, John Zhu¹, Christopher Johnson² and André D. Taylor¹; ¹New York University, United States; ²Argonne National Laboratory, United States

4:00 PM EN05.12.06

Enabling 4C Fast Charging of Lithium-Ion Batteries by Coating Graphite with a Solid-State Electrolyte Eric Kazzyak, Kuan-Hung Chen, Yuxin Chen, Tae Cho and Neil P. Dasgupta; University of Michigan–Ann Arbor, United States

4:15 PM EN05.12.07

Effects of Stack Pressure on Capacity Fade in Extreme Fast Charging Lithium-Ion Batteries Elizabeth K. Allan-Cole¹, Chuntian Cao², Roberts Lacey¹, Julian Mars¹ and Michael Toney^{1,1}; ¹University of Colorado Boulder, United States; ²Brookhaven National Laboratory, United States

SESSION EN05.13: Poster Session V: Interphase/Interfaces
Session Chairs: Thomas Barrera, Matthieu Dubarry and Loraine Torres-Castro
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.13.02

Stable Artificial Solid Electrolyte Interphase with Lithium Chloride and Lithium Selenide for Dendrite-Free Lithium Metal Batteries Yongmin Jung, Insung Hwang, Dongsoo Lee, Keemin Park, Seungwoo Lee, Taeseup Song and Ungyu Paik; Hanyang University, Korea (the Republic of)

SESSION EN05.14: Poster Session VI: Characterizing Battery Degradation and Failure Modes
Session Chairs: Thomas Barrera, Matthieu Dubarry and Loraine Torres-Castro
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN05.14.02

Characterizing Dynamic Structures in Battery Electrodes by Time-Resolved Cryo-TEM Nikita S. Dutta, Katherine Jungjohann and Mowafak Al-Jassim; National Renewable Energy Laboratory, United States

EN05.14.03

Understanding the Effect of Disorder on the Electrochemical Properties of LiMn_2O_4 Spinel Tina Chen^{1,2} and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

EN05.14.04

A Novel Approach of Micro-Si Anode Characterization and Optimization Using *In Situ* Atomic Force Microscopy (AFM) Jian Liu¹, Suyeon Lee², Jung-Hyun Kim¹ and Hanna Cho¹; ¹Ohio State University, United States; ²LG Energy Solution, Korea (the Republic of)

EN05.14.05

Potassium Fluoride and Carbonate Lead to Cell Failure in Potassium-Ion Batteries Andrew Ells, Richard May and Lauren Marbella; Columbia University, Afghanistan

EN05.14.06

Understanding of Capacity Decay of High Voltage KVPO_4F Cathode Haegycom Kim; Lawrence Berkeley National Laboratory, United States

EN05.14.07

Quantifying Loss Mechanisms in Zinc Metal Anodes with *Operando* XRD Lacey Roberts, Julian Mars, Elizabeth K. Allan-Cole and Michael Toney; University of Colorado Boulder, United States

EN05.14.08

TEM Observation Revealing Oxygen Ion Accumulation and Pore Evolution Mechanism in LSM/YSZ/LSM Cells Under SOEC Operation Haneul Choi^{1,2}, Mi-Young Park¹, Kyung Joong Yoon¹, Jin-Woo Park² and Hyejung Chang^{1,3}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Yousei University, Korea (the Republic of); ³Korea University of Science and Technology, Korea (the Republic of)

EN05.14.09

Redox on Anions as a Potential Pathway to Minimizing Chemical Expansion in Fuel Cell Electrodes Adrian Xiao Bin Yong, Lawrence O. Anderson, Nicola H. Perry and Elif Ertekin; University of Illinois at Urbana-Champaign, United States

EN05.14.11

Effects of Mesoporosity on Catalyst Layer Degradation Mechanisms in PEM Fuel Cells Timothy Goh, Marwa Atwa, Samuel Dull, Thomas Jaramillo and Fritz Prinz; Stanford University, United States

EN05.14.12

Quantifying the Dependence of Battery Rate Performance on Common Physical Parameters Dominik V. Horvath¹, Joao Coelho², Ruiyuan Tian¹, Valeria Nicolosi² and Jonathan N. Coleman¹; ¹Trinity College Dublin, Ireland; ²Trinity College Dublin, The University of Dublin, Ireland

EN05.14.13

Investigation, Definition and Review of the State of Energy for Range Prediction [Katharina L. Quade](#)^{1,2}, Dominik Jöst^{1,2} and Dirk U. Sauer^{1,3,2}; ¹RWTH Aachen University, Germany; ²JARA-Energy, Germany; ³Forschungszentrum Jülich GmbH, Germany

EN05.14.14

Combined Effects of the Cyclable Lithium Loss and Electrolyte Depletion on the Performance Degradation of a Lithium-Ion Battery [Dongcheul Lee](#), Byungmook Kim, Seohee Kang and Chee-Burm Shin; Ajou University, Korea (the Republic of)

SESSION EN05.15: Interphase and Interfaces
Session Chairs: Scott McClary and Loraine Torres-Castro
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

8:15 AM *EN05.15.01

Design and Understanding of Cathode-Solid Electrolyte Interfaces for High Voltage Stability in All-Solid-State Batteries [Linda F. Nazar](#); University of Waterloo, Canada

8:45 AM EN05.15.03

Probing Interfacial Reactivity in Li Batteries with *Operando* Nuclear Magnetic Resonance Techniques [Lauren Marbella](#); Columbia University, United States

9:00 AM EN05.15.04

Investigating the Effects of Alloy Interfacial Layers on the Electrochemical Behavior of Lithium Metal Anodes with *Operando* Optical Microscopy [Stephanie E. Sandoval](#)¹, Francisco J. Quintero Cortes², Emily J. Klein¹, John Lewis¹, Pralav Shetty¹, David Yeh¹ and Matthew T. McDowell^{1,1}; ¹Georgia Institute of Technology, United States; ²Capacitor Foundry, United States

9:15 AM EN05.15.05

Selective NMR Observation of the SEI-Metal Interface by Dynamic Nuclear Polarisation from Lithium Metal [Michael A. Hope](#)^{1,2}, Bernadine L. Rinkel², Anna B. Gunnarsdottir², Katharina Märker², Svetlana Menkin² and Clare P. Grey²; ¹EPFL, Switzerland; ²University of Cambridge, United Kingdom

9:30 AM EN05.15.06

***In Situ* Investigation of Interfacial Degradation Mechanisms in Next-Generation Batteries** [Manuel Weiß](#) and Jürgen Janek; Justus Liebig University Giessen, Germany

9:45 AM OPEN DISCUSSION

10:00 AM BREAK

10:30 AM EN05.15.08

LiF Rich-Polymer Composite Layer Formation on Lithium-Metal by Simple Roll-Press Processing for Lithium-Metal Batteries [Seungcheol Myeong](#), Keemin Park, Myeungwoo Ryu, Taeseup Song and Ungyu Paik; Hanyang University, Korea (the Republic of)

10:45 AM EN05.15.09

WITHDRAWN (NO SHOW) EN05.15.09 Decoupling Bulk and Interfacial Contributions to Performance in Localized High Concentration Electrolytes for Li Metal Batteries [Richard May](#)¹, Julia Hestenes¹, Naiara Munich² and Lauren Marbella¹; ¹Columbia University, United States; ²Barnard College, Columbia University, United States

11:00 AM EN05.15.11

Designing High-Voltage Cathode and Electrolyte Interphase (CEI) with *In Situ* Formation, Passivation and Self-Healing Mechanisms [Jung-Hyun Kim](#)¹, Lalith Rao¹, Tianyang Wang¹, Xinwei Jiao¹, Neil Kidner², Cody Lockhart² and Meghan Stout²; ¹The Ohio State University, United States; ²Nexceris LLC, United States

11:15 AM EN05.13.03

Solid-Electrolyte Interphase Engineering for Multivalent-Ion Batteries [Scott A. McClary](#), Daniel M. Long, Alan Landers, Paul Kotula and Kevin Zavadil; Sandia National Laboratories, United States

11:30 AM EN05.15.13

Metallic 1T Phase MoS₂ as Sulfur Cathode Host for Lithium-sulfur Batteries [Zhuangnan Li](#) and Manish Chowalla; University of Cambridge, United Kingdom

11:45 AM EN05.13.04

A Consistent and Interactive Protocol for Generating an Atomistically Resolved Solid Electrolyte Interphase (SEI) Passivating Layer in Li-Ion Batteries [Paolo De Angelis](#)¹, Roberta Cappabianca¹, Matteo Fasano¹, Pietro Asinari^{2,1} and Eliodoro Chiavazzo¹; ¹Politecnico di Torino, Italy; ²Istituto Nazionale di Ricerca Metrologica (INRIM), Italy

SESSION EN05.16: Diagnostics and Prognostics
Session Chairs: David Beck and Matthieu Dubarry
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

1:30 PM EN05.16.01

Diagnostics for Thermal Runaway Detection Loraine Torres-Castro; Sandia National Laboratories, United States

1:45 PM EN05.16.02

Big Data for Li-Ion Diagnosis and Prognosis David Beck and Matthieu Dubarry; University of Hawaii at Manoa, United States

2:00 PM EN05.16.03

Developing an *Ab Initio*-Kinetic Model for the Prediction of Corrosion Behavior Rachel Gorelik, Peter A. Crozier and Arunima K. Singh; Arizona State University, United States

2:15 PM EN05.16.04

Correlative Electrochemical Acoustic Time-of-Flight Spectroscopy and X-Ray Imaging to Monitor the Performance of Single-Crystal and Polycrystalline NMC811/Gr Lithium-Ion Batteries Harry Michael^{1,2}, Rhodri Owen^{1,2}, James Robinson^{1,2}, Tom Heenan^{1,2}, Rhodri Jervis^{1,2}, Dan Brett^{1,2} and Paul Shearing^{1,2}; ¹University College London, United Kingdom; ²The Faraday Institution, United Kingdom

2:30 PM BREAK

SESSION EN05.17: Safety and Reliability I
Session Chairs: Alex Bates and Andrew Kurzwski
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, Emalani Theater 320

3:15 PM EN05.17.02

Intra-Particle Diffusion-Limited Thermal Runaway Predictions in Lithium-Ion Systems Andrew Kurzwski, Randy Shurtz, Loraine Torres-Castro and John Hewson; Sandia National Laboratories, United States

3:30 PM EN05.17.03

Investigation of Fiber Optic Temperature Measurements in Lithium-Ion Cells Florian Krause^{1,2} and Dirk U. Sauer^{1,3,4}; ¹RWTH Aachen, Germany; ²JARA-Energy, Germany; ³E.ON ERC, Germany; ⁴Forschungszentrum Jülich GmbH, Germany

3:45 PM EN05.17.05

Development of Safe Electrolytes for Lithium Ion Batteries Hao Jia, Lirong Zhong and Wu Xu; Pacific Northwest National Laboratory, United States

4:00 PM EN05.17.06

Safety and Stability of High Energy NMC811 Cathode Containing Lithium-Ion Traction Batteries Katja Froehlich¹, Bernd Eschelmueller¹, Werner Pessenhofer², Heino Besser³, Wilhelm Pfleging³ and Marcus Jahn¹; ¹AIT Austrian Institute of Technology GmbH, Austria; ²Miba eMobility GmbH, Austria; ³Karlsruhe Institute of Technology–Institute for Applied Materials, Germany

4:15 PM EN05.17.07

Lithium Titanate Battery Durability and Reliability Under Electric Utility Grid Operations Matthieu Dubarry; University of Hawaii at Manoa, United States

4:30 PM EN05.17.08

Competitive Reactions and Heat Transfer Effects Applicable to Thermal Runaway Onset in Lithium-Ion Batteries Randy Shurtz, Andrew Kurzwski and John Hewson; Sandia National Laboratories, United States

SESSION EN05.18: Thermal Characterization of Energy Storage Materials and Devices III
Session Chairs: Thomas Barrera and Andreas Pfrang
Monday Morning, May 23, 2022
EN05-Virtual

8:00 AM *EN05.18.01

How Calorimetry Can Help in Battery Research Carlos Ziebert, Nils Uhlmann, Nils Löffelholz, Sebastian Ohneseit, Ijaz U. Mohsin and Hans Jürgen Seifert; KIT, Germany

8:30 AM *EN05.18.02

On-Line Gas Detection During the Thermal Runaway of Li-Ion Cells by ARC-MS Thomas Waldmann, Abdelaziz A. Abd-El-Latif, Peter Sichler and Margret Wohlfahrt-Mehrens; Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW), Germany

9:00 AM *EN05.18.03

Use of Thermal Analysis to Elucidate Irreversibility and Degradation in Lithium Based Batteries Esther S. Takeuchi^{1,2}, Kenneth Takeuchi^{1,2} and Amy Marschilok^{1,2}; ¹Stony Brook University, United States; ²Brookhaven National Laboratory, United States

9:30 AM EN05.18.04

Investigation of Thermal Properties of Lithium-Ion Batteries Kunal Dixit, Jiwei Wang, Qinglu Fan, Morteza Bagheri, Piyush Kulkarni, Hao Liu and Scott N. Schiffres; Binghamton University, United States

9:45 AM EN05.15.12

3D Nanoscale Morphology and Local Physical Properties of Li/Na-Ion-Battery Solid-Electrolyte-Interphase via Scanning Probe 3D *Operando* Nanorheology [Yue Chen](#)^{1,2}, Samuel Jarvis¹, Sara R. Costa^{3,2}, Nuria T. Ruiz^{2,3} and Oleg V. Kolosov^{1,2}; ¹Lancaster University, United Kingdom; ²Faraday Institution, United Kingdom; ³Department of Chemistry, Lancaster University, United Kingdom

SESSION EN05.19: Emerging Energy Storage Materials I
Session Chairs: Thomas Barrera and Matthieu Dubarry
Monday Morning, May 23, 2022
EN05-Virtual

10:30 AM *EN05.19.01

Concentrated Mixed Cation “Water-in-Salt” Solutions as Low Cost High Voltage Electrolytes for Aqueous Batteries [Maria Lukatskaya](#); ETH Zürich, Switzerland

11:00 AM EN05.19.02

Magnetron Sputtering of Metal Oxide Thin Films on Sulfur Cathodes for Suppressing the Shuttle Effect in Li-S Batteries [Ruoxu Shang](#), Yi Ma, Mihrimah Ozkan and Cengiz S. Ozkan; University of California Riverside, United States

11:15 AM EN05.19.03

Electrochemical Stability of Bis(trifluoromethanesulfonyl)imide Anions at Oxide Based Cathode in Multivalent Batteries [Dan Thien Nguyen](#)^{1,2}, Venkateshkumar Prabhakaran^{1,2}, Vaithiyalingam Shutthanandan¹, Jian Z. Hu^{1,2}, Karl Mueller^{1,2} and Vijayakumar Murugesan^{1,2}; ¹Pacific Northwest National Laboratory, United States; ²Joint Center for Energy Storage Research, United States

11:30 AM EN05.19.04

Multimodal Spectroscopic Investigation of AlCl₃ Additive on Initial SEI Layer Evolution in Mg Metal Batteries Luke Soule^{1,2}, Venkateshkumar Prabhakaran^{1,2}, [Dan Thien Nguyen](#)^{1,2}, Grant E. Johnson^{1,2}, Jaegwon Ryu^{1,2}, Vaithiyalingam Shutthanandan¹, Karl Mueller^{1,2} and Vijayakumar Murugesan^{1,2}; ¹Pacific Northwest National Laboratory, United States; ²Joint Center for Energy Storage Research, United States

11:45 AM EN05.19.05

Sulfur Cathode Design Strategies Enabled by Stereolithography Technique and Oxidative Chemical Vapor Deposition [Yuxuan Zhang](#)¹, Han Wook Song² and Sunghwan Lee¹; ¹Purdue University, United States; ²Korea Research Institute of Standard and Science, Korea (the Republic of)

12:00 PM EN05.19.07

Enhanced Performance of Ultra-Microporous Hard Carbon Spheres as Anode in Half /Full Cells for Sodium-Ion Batteries Through Optimized Carbonate Ester Electrolytes [Nagmani](#), Ananya Kumar and Sreeraj Puravankara; Indian Institute of Technology Kharagpur, India

12:05 PM EN05.19.08

Water Chestnut Husks-Derived Nanoporous Carbons as Electrode Materials for Microbial Fuel Cells [Lin Yi-Chu](#), Hsu Chia-Chieh and Ni Chung-Sheng; National Tsing Hua University, Taiwan

12:10 PM EN05.19.09

Jute-Based Porous Hard Carbon Anode for Cheaper, Sustainable Non-Aqueous Sodium-Ion Batteries [Nagmani](#) and Sreeraj Puravankara; Indian Institute of Technology Kharagpur, India

12:15 PM EN05.19.10

Chromium Tetrphosphide (CrP₄) as a Promising Anode Material for Lithium-Ion and Sodium-Ion Batteries [Jongwon Lee](#) and Seong-Hyeon Hong; Seoul National University, Korea (the Republic of)

12:20 PM EN05.10.15

Supercapattery Electrode Materials by Design: Plasma-Induced Defect Engineering of Bimetallic Oxyphosphides for Energy Storage Nageh K. Allam and [Amina Saleh](#); American University in Cairo, Egypt

SESSION EN05.20: Fast Charging II
Session Chairs: Andreas Pfrang and Loraine Torres-Castro
Tuesday Morning, May 24, 2022
EN05-Virtual

8:00 AM *EN05.20.01

Enhancing Safety and Performance of Li-Ion Batteries Under Fast Charge Conditions [Said Al-Hallaj](#)^{1,2}; ¹University of Illinois at Chicago, United States; ²AllCell Technologies, LLC, United States

8:30 AM *EN05.20.02

A New Lithium-Ion Battery Management Method and System [Rachid Yazami](#); KVI Pte Ltd, Singapore

SESSION EN05.21: Safety and Reliability II
Session Chairs: Andreas Pfrang and Loraine Torres-Castro
Tuesday Morning, May 24, 2022
EN05-Virtual

10:30 AM *EN05.21.01

Data-Driven Battery Health Diagnosis in Real-World Applications [David Howey](#) and Antti Aitio; University of Oxford, United Kingdom

11:00 AM *EN05.21.03

Characterization of Fire and Smoke for Li-Ion Cells of Different Chemistries, Capacities and SOC [Judith Jeevarajan](#)¹, Daniel Juarez-Robles¹, Alex Klieger² and Pravinray Gandhi²; ¹Underwriters Laboratories, United States; ²UL, United States

11:30 AM EN05.21.04

Uncertainty-Aware and Explainable Machine Learning for Early Prediction of Battery Cell Degradation [Laura H. Rieger](#)¹, Eibar Flores¹, Poul Norby¹, Elixabete Ayerbe², Ole Winther¹, Tejs Vegge¹ and Arghya Bhowmik¹; ¹Technical University of Denmark, Denmark; ²CIDETEC, Spain

11:45 AM EN05.17.01

Degradation Characterization and Thermal Management of Li-Ion Batteries for Low-Temperature Applications [Amani Alhammadi](#) and Daniel Choi; Khalifa University, United Arab Emirates

SESSION EN05.22: Characterizing Degradation and Failure Modes

Session Chairs: Thomas Barrera and Loraine Torres-Castro

Tuesday Afternoon, May 24, 2022

EN05-Virtual

1:00 PM *EN05.22.01

In-situ and Operando Approaches for Distinguishing Productive and Parasitic Processes in Electrochemical Energy Storage Materials and Systems [Amy Marschilok](#)^{1,2}; ¹Stony Brook University, United States; ²Brookhaven National Laboratory, United States

1:30 PM EN05.22.02

Identifying Limitations of the Lithium Metal Anode through Laser Plasma Focused Ion Beam Cross-Sectional Imaging [Laura C. Merrill](#)¹, Renae N. Gannon², Katherine Jungjohann¹, Steven J. Randolph³, Subrahmanyam Goriparti¹, Kevin Zavadil¹, David C. Johnson² and Katharine Harrison¹; ¹Sandia National Laboratories, United States; ²University of Oregon, United States; ³Thermo Fisher Scientific, United States

1:45 PM EN05.22.03

Coupled Impact of Nickel Content and Charge Rate on Lithiation Mechanisms for Various Layered Materials of Li-Ion Batteries [Thibaut Jousseume](#), Samuel Tardif, Marion Chandesris, Jean-François Colin and Sandrine Lyonard; CEA, France

2:00 PM EN05.22.04

Insights in Solid Electrolyte Interphase Evolution on Alkali Metals with Liquid and Solid Electrolytes [Jelena Popovic](#), Kyungmi Lim and Joachim Maier; Max Planck Institute for Solid State Research, Germany

2:15 PM EN05.22.05

Suppressing Volume Change in the Li Metal Anode via Three-Dimensional Current Collector Construction for Anode-Free Batteries [Yazhou Zhou](#), Lauren Chew and Jae Chul Kim; Stevens Institute of Technology, United States

2:30 PM EN05.22.06

In Depth Investigation of Methyl Viologen Dichloride Fade Rate. Advancing the *In Situ* Compositionally Symmetric Unbalanced Flow Cell Cycling Technique with SOC Monitoring and Complementing the Technique with *Ex Situ* Amperometric SOH Measurement. [Ivan A. Volodin](#), Christian Stolze, Oliver Nolte, Philip Rohland, Martin D. Hager and Ulrich S. Schubert; FSU Jena, Germany

2:35 PM EN05.22.07

Precursor-Derived C-Rich SiOC as Self-Supporting Electrodes [Shakir Bin Mujib](#)¹, Christel Gervais² and Gurpreet Singh¹; ¹Kansas State University, United States; ²Sorbonne Université, France

2:40 PM EN05.22.08

Energy Storage Applications of Sucrose-Nitrate Foamed Graphite [William C. Coley](#), Amirali S. Akhavi, Ruoxu Shang, Yi Ma, Mihrimah Ozkan and Cengiz S. Ozkan; University of California Riverside, United States

2:45 PM EN05.22.09

Titania in Amorphous Silicon Oxycarbide Phase as a Competent Anode Material [S S Lokesh Vendra](#)^{1,2}, Gurpreet Singh² and Ravikumar NV^{1,3}; ¹Indian Institute of Technology Madras, India; ²Kansas State University, United States; ³Indian Institute of technology Madras, India

2:50 PM EN05.22.10

Insights into Electrochemical Cycling and Ageing of Bimetallic Oxyphosphides Nanowires Using Multivariate Statistical Analyses for Stable and High Energy Density Supercapacitors [Amina Saleh](#) and Nageh K. Allam; The American University in Cairo, Egypt

2:55 PM EN05.22.12

Reaction Mechanism of Na-Ion Intercalation in Transition Metal Silicates Jiwei Wang, Grayson Hotelling and [Hao Liu](#); Binghamton University, The State University of New York, United States

SESSION EN05.23: Emerging Energy Storage Materials II

Session Chairs: Andreas Pfrang and Loraine Torres-Castro

Tuesday Afternoon, May 24, 2022
EN05-Virtual

9:00 PM EN05.23.01

Enhanced Electrochemical Properties and Reaction Mechanism of NiTi₂S₄ Ternary Metal Sulfide as an Anode for Lithium-Ion Battery [Hyung-Ho Kim](#), Kyeong-Ho Kim, Jongwon Lee and Seong-Hyeon Hong; Seoul National University, Korea (the Republic of)

9:15 PM EN05.23.02

Exploring the Pore Distribution Changes in Hard Carbon Anodes Using *Ex Situ* Small-Angle X-Ray Scattering [Luis Kitsu Iglesias](#), Emma Antonio and Michael Toney; University of Colorado Boulder, United States

9:30 PM EN05.23.03

Augmenting the Rate Capability and Efficiency of Battery Anodes by Fabrication of MoSe₂/SiOC Self-Supported Structure [Sonjoy Dey](#) and Gurpreet Singh; Kansas State University, United States

9:35 PM EN05.23.04

First Intuition of Rate Capability Performance of Multiphase SiOC/C/NbC/Nb₂O₅ Anode Material for Battery Applications [S S Lokesh Vendra](#)^{1,2}, Gurpreet Singh² and Ravikumar NV^{1,1}; ¹Indian Institute of Technology Madras, India; ²Kansas State University, United States

9:40 PM EN05.10.24

Sulfur and Carbon Nano Tube Composite Cathode Coupled with Highly Polarized Doped BiFeO₃ for the High-Rate Performance of Li-S Batteries [Rajesh K. Katiyar](#)¹, Balram Tripathi², Gerardo Morell¹, Brad R. Weiner¹ and Ram S. Katiyar¹; ¹University of Puerto Rico-San Juan, United States; ²S S Jain Subodh P.G. (Autonomous) College, India

##PAGE_BREAK##

SYMPOSIUM EN06

Solid-State Batteries—From Electro-Chemo Mechanics to Devices
May 9 - May 25, 2022

Symposium Organizers

Neil Dasgupta, University of Michigan
Xin Li, Harvard University
Matthew McDowell, Georgia Institute of Technology
Hong Zhu, Shanghai Jiao Tong University

* Invited Paper

SESSION EN06.01: General Session I
Session Chairs: Neil Dasgupta and Xin Li
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 323A

10:30 AM *EN06.01.01

The Pros and Cons of Solid vs Liquid Electrolytes in Lithium Batteries [M. Stanley Whittingham](#); Binghamton University, United States

11:00 AM *EN06.01.02

Enabling High Energy Density All-Solid Batteries [Timothy S. Arthur](#); Toyota Research Inst, United States

SESSION EN06.02: Superionic Conductors
Session Chairs: Xin Li and Matthew McDowell
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 323A

1:30 PM *EN06.02.01

What are the Structural Features That Lead to High Li-Ion Conductivity? Gerbrand Ceder; University of California, Berkeley/Lawrence Berkeley National Laboratory, United States

2:00 PM *EN06.02.02

Design of Alkali Superionic Conductors with Machine Learning Shyue Ping Ong, Ji Qi, Chi Chen, Erik Wu, Swastika Banerjee and Shirley Meng; University of California, San Diego, United States

2:30 PM EN06.02.03

Characterizing Sub-Diffusive Transport in Fast-Ion Conducting Solid Electrolytes Andrey Poletayev^{1,2}, James Dawson^{3,3}, M. Saiful Islam⁴ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³The University of Newcastle, United Kingdom; ⁴University of Bath, United Kingdom

2:45 PM BREAK

SESSION EN06.03: Interface Stability
Session Chairs: Neil Dasgupta and Xin Li
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 323A

3:00 PM *EN06.03.01

The Stability and Kinetics of the Li/Solid Electrolyte Interface Jeff Sakamoto^{1,2,3}; ¹University of Michigan - Ann Arbor, United States; ²Zakuro, Inc., United States; ³University of Michigan-Ann Arbor, United States

3:30 PM *EN06.03.02

Mechanistic Underpinnings of Interfaces and Crosstalk in Solid-State Batteries Partha P. Mukherjee and Bairav Sabarish Vishnugopi; Purdue University, United States

4:00 PM EN06.03.03

Design Dynamic Stability for Lithium Metal Solid-State Batteries Luhan Ye and Xin Li; Harvard University, United States

4:15 PM EN06.03.04

Mesoscale Analysis of Interface Stability in Solid-State Batteries Bairav Sabarish Vishnugopi and Partha P. Mukherjee; Purdue University, United States

4:30 PM EN06.03.05

Phase Stability of Garnet Solid-Electrolyte Interfacing with Various Cathodes in All-Solid-State Batteries Jung-Hyun Kim¹, Chan-Yeop Yu¹, Junbin Choi¹, Jinhyp Han² and Eungje Lee²; ¹The Ohio State University, United States; ²Argonne National Laboratory, United States

SESSION EN06.04: Poster Session I: Solid-State Batteries—From Electro-Chemo Mechanics to Devices I
Session Chairs: Xin Li and Luhan Ye
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN06.04.01

Predicting Transport Limitations in Lithium Metal Anodes Jeong Seop Yoon¹, Hafeez Sulaimon¹ and Donald Siegel²; ¹University of Michigan, United States; ²The University of Texas at Austin, United States

EN06.04.02

High Ionic Conductivity PEO-Based Solid Polymer Electrolyte for All-Solid-State Li-Metal Batteries Through a Fast and Scalable Process Luca Bertoli, Giacomo Gabriele, Alessandra Accogli, Eugenio Gibertini and Luca Magagnin; Politecnico di Milano, Italy

EN06.04.03

In Situ Spatially-Resolved Thermal Conductivity Mapping of Battery Cell Degradation Milena Milich, Ziyang Nie, John Tomko, Gary Koenig and Patrick E. Hopkins; University of Virginia, United States

EN06.04.04

Attempt Frequencies for Solid-State Ionic Conductivity from Statistical Analyses of Steady-State and Biased Molecular Dynamics Simulations Andrey Poletayev^{1,2}, James Dawson^{3,3}, M. Saiful Islam⁴ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³The University of Newcastle, United Kingdom; ⁴University of Bath, United Kingdom

EN06.04.05

Flexible and Safe Additives-Based Zinc-Binder-Free-Hierarchical MnO₂-Solid Alkaline Polymer Battery for Potential Use in Wearable Applications Deepa Madan¹, Aswani Poosapati¹ and Rohan Ambade²; ¹University of Maryland, United States; ²Hanyang University, Korea (the Democratic People's Republic of)

EN06.04.08

Solution Synthesis of Ternary Solid-State Electrolytes for Sodium-Ion Batteries Saeed Ahmadi Vasselabadi, William Smith and Colin A. Wolden; Colorado School of Mines, United States

EN06.04.09

3D Printed Carbon Nanostructures Based Electrodes in Capacitive Deionization Devices for Seawater Desalination Hui Ying Yang; Singapore University of Technology and Design, Singapore

SESSION EN06.05: Li Metal Anode in Solid-State Batteries

Session Chairs: Xin Li and Matthew McDowell

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 323A

8:30 AM *EN06.05.01

Phase-Field Method of Li-Metal Plating and Stripping in Solid-State Li-Ion Batteries Long-Qing Chen¹, Yanzhou Ji¹ and Yue Qi²; ¹The Pennsylvania State University, United States; ²Brown University, United States

9:00 AM EN06.05.02

The Stripping Behavior of Thin Li on Li₇La₃Zr₂O₁₂ as a Function of Current Density and Thickness Kiwoong Lee, Eric Kazyak, Michael Wang, Neil P. Dasgupta and Jeff Sakamoto; University of Michigan–Ann Arbor, United States

9:15 AM EN06.05.03

The Effect of Aspect Ratio on Creep Behavior of Lithium Metal in Relevant Solid-State Battery Configuration Catherine Haslam¹, Jeff Wolfenstine² and Jeff Sakamoto¹; ¹University of Michigan, United States; ²Solid Ionic Consulting, United States

9:30 AM BREAK

10:00 AM *EN06.05.04

A Proposed General Solution to the Dendrite Penetration Problem Stephen J. Harris¹, Harsh Jagad², Chunmei Ban³, Brian Sheldon² and Yue Qi²; ¹Lawrence Berkeley National Laboratory, United States; ²Brown University, United States; ³University of Colorado Boulder, United States

10:30 AM *EN06.05.05

Ion Conduction and Dendrite Formation in Solid-State Batteries Yan-Yan Hu^{1,2}; ¹Florida State University, United States; ²The National High Magnetic Field Laboratory, United States

11:00 AM EN06.05.06

Phase-Field Simulation of Mechanical Inhibition of Li Dendrite Growth in Li-Metal Batteries Yao Ren¹, Yue Zhou² and Ye Cao¹; ¹The University of Texas at Arlington, United States; ²South Dakota State University, United States

SESSION EN06.06: Interface in Solid-State Batteries

Session Chairs: Neil Dasgupta, Partha Mukherjee and Shyue Ping Ong

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 323A

2:00 PM *EN06.06.01

Understanding Interfacial Phenomena in All-Solid-State Batteries Y. Shirley Meng; University of California, San Diego, United States

2:30 PM EN06.06.02

Stabilizing the Interface Between Polymer Electrolyte and Lithium by Concentration Polarization-Induced Phase Transformation Yuan Yang; Columbia University, United States

2:45 PM BREAK

3:15 PM *EN06.06.03

Understanding Solid Electrolyte-Lithium Interfaces via *Operando* Multiscale Characterizations Lihong Zhao, Chaoshan Wu, Yanliang Liang, Zheng Fan and Yan Yao; University of Houston, United States

3:45 PM EN06.06.04

Probing Interfaces in Solid-State Batteries Using *Operando* X-Ray Tomography John Lewis and Matthew T. McDowell; Georgia Institute of Technology, United States

4:00 PM EN06.06.05

Electro-Chemo-Mechanical Evolution of Sulfide Solid Electrolyte-LiMg Alloy Interfaces—Effect of Current, Temperature and Stacking Pressure Lihong Zhao¹, Qing Ai², Chaoshan Wu¹, Liqun Guo¹, Mathew Anderson¹, Yanliang Liang¹, Jun Lou² and Yan Yao¹; ¹University of Houston, United States; ²Rice University, United States

4:15 PM EN06.06.07

Nanoscale Interface Characterization in Battery Materials with Vibrational Spectroscopy in a Scanning Transmission Electron Microscope Kartik Venkatraman and Miaofang Chi; Oak Ridge National Laboratory, United States

SESSION EN06.07: Poster Session II: Solid-State Batteries—From Electro-Chemo Mechanics to Devices II

Session Chairs: Ye Cao and Neil Dasgupta

Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN06.07.01

Revealing the Structure of Solid Electrolyte Thin Films to Enable Lithium Metal Batteries Pooja Vadhva; University College London, United Kingdom

EN06.07.02

Free Energy Sampling to Explore Ion Solvation Environments and Understand Transport and Glass Transition in Solid-State Electrolytes for Battery Materials Siddharth Sundararaman and David Prendergast; Lawrence Berkeley National Laboratory, United States

EN06.07.04

Synergistic Optimization of $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ Thin Films Deposited by RF Reactive Sputtering at Various Ar/O₂ Flow Ratios for High Performance All-Solid-State Thin-Film Battery Jong Heon Kim and Hyun-Suk Kim; Chungnam National University, Korea (the Republic of)

EN06.07.05

Design Principles for Grain Boundaries in Solid-State Lithium-Ion Conductors James A. Quirk and James Dawson; Newcastle University, United Kingdom

EN06.07.06

Calculation and Validation Measurement of Salt Loading in MOFs Chisang Park^{1,2}, Sorout Shalini¹, Alauddin Ahmed¹, Thomas Vaid¹, Adam Matzger¹ and Donald Siegel²; ¹University of Michigan–Ann Arbor, United States; ²The University of Texas at Austin, United States

EN06.07.07

Can We Utilise Phonons to Enhance Li-Ion Diffusion? Benjamin A. Williamson and Sverre M. Selbach; Norwegian University of Science and Technology, Norway

EN06.07.08

Dimensionality Control of Li⁺ Transport by MOFs-Based Quasi-Solid to Solid-State Electrolytes (Q-SSEs) Manuel Salado¹, Roberto Fernandez de Luis¹ and Senentxu Lanceros-Méndez^{1,2}; ¹BC Materials, Spain; ²Ikerbasque Foundation, Spain

EN06.07.09

CO₂ Reactive Laser Sintering of Garnet-Type Li-Ion Conductors Erika Ramos, Jianchao Ye and Allison Eileen Marie Browar; Lawrence Livermore National Laboratory, United States

EN06.07.10

Interactions Between Laser and Solid-State Lithium Battery Materials Jianchao Ye, Allison Eileen Marie Browar, Erika Ramos Guzman, Marissa Wood, John Roehling, Jae-Hyuck Yoo, Aiden Martin and Jean-Baptiste Forien; Lawrence Livermore National Lab, United States

EN06.07.12

Generating Solid-State Polymeric Electrolytes via *i*CVD for Macroscale 3D All Solid-State Ag–Zn Batteries Megan B. Sassin¹, Brian L. Chaloux¹, Jeffrey Long¹, Joel B. Miller¹, Youngchan Kim¹, Xiao Liu¹, Battogtokh Juggersuren², Ryan DeBlock¹, Michelle D. Johannes¹ and Debra Rolison¹; ¹U.S. Naval Research Laboratory, United States; ²Jacobs Engineering Group Contractor, United States

SESSION EN06.08: Sulfide Electrolyte
Session Chairs: Xin Li, Matthew McDowell and Yan Yao
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 323A

9:00 AM EN06.08.01

Amphipathic Binder Integrating Ultrathin and Highly Ion-Conductive Sulfide Membrane for Cell-Level High Energy Density All-Solid-State Batteries Hongli Zhu; Northeastern University, United States

9:15 AM EN06.08.02

High Performance All-Solid-State Li-S Battery Enabled by Interfacial Modification Minjeong Shin^{1,2} and Andrew Gewirth²; ¹Sungshin Women's University, Korea (the Republic of); ²University of Illinois at Urbana-Champaign, United States

9:30 AM BREAK

10:00 AM EN06.08.03

Understanding Ion Transport and Interfacial Stability in Fluorine Containing Lithium Argyrodite Electrolytes for Solid-State Lithium-Sulfur Batteries Badri Narayanan, Varun Shreyas, Saransh Gupta, William Arnold and Hui Wang; University of Louisville, United States

10:15 AM EN06.08.04

Sulfide Solid-State Electrolytes with Li₂S Synthesized via Room Temperature Metathesis William Smith, Saeed Ahmadi Vaselabadi and Colin A. Wolden; Colorado School of Mines, United States

10:30 AM EN06.08.05

Low-Cost Scalable Synthesis of Sulfide Solid Electrolytes by Wet Chemical Cascade Reaction Mukarram Ali^{1,2}, Su Cheol Han¹ and Yoon-Cheol Ha¹; ¹Korea Electrotech Res Inst, Korea (the Republic of); ²University of Science and Technology, Korea (the Republic of)

10:45 AM EN06.14.03

Composite Cathode Architectures for High Performance All-Solid-State Lithium Sulfur Batteries Yi Lin¹, Brandon A. Walker¹, Vesselin I. Yamakov², Donald A. Dornbusch³, Ji Su¹, James J. Wu³, Rocco P. Viggiano³ and John W. Connell¹; ¹NASA Langley Research Center, United States; ²National Institute of Aerospace, United States; ³NASA Glenn Research Center, United States

SESSION EN06.09: Oxide Related Electrolyte
Session Chairs: Minjeong Shin, Yuan Yang and Hongli Zhu
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 323A

2:00 PM EN06.09.01

Design Principles for Fast Oxide Lithium-Ion Conductors KyuJung Jun¹, Yihan Xiao¹, Yan Wang² and Gerbrand Ceder¹; ¹UC Berkeley, United States; ²Samsung Research America, United States

2:15 PM EN06.09.02

First-Principles Evaluation of Dopant Impact on Structural Deformability of LLZO Solid-State Electrolyte—Towards Realization of Co-Sintering with High-Energy Cathodes Liwen Wan, Aniruddha M. Dive, Kwangnam Kim, ShinYoung Kang and Brandon Wood; Lawrence Livermore National Laboratory, United States

2:30 PM BREAK

3:00 PM EN06.09.04

Electro-Chemo-Mechanical Evaluation of Garnet Surface Treatments Edward Barks, Sunny Wang, Geoff McConohy, Xin Xu, Emma Kaeli, Po-Ting Lin and William C. Chueh; Stanford University, United States

3:15 PM EN06.09.05

Working Thin-Film Solid-State Batteries Designed in a Multilayered Stack to Enhance Energy Density Victoria Castagna Ferrari, Gary Rubloff and David M. Stewart; University of Maryland, United States

3:30 PM EN06.09.06

Co-Sintered Solid Electrolyte/Cathode Interfaces in Solid-State Batteries Marissa Wood, Liwen Wan, Aniruddha M. Dive and Jianchao Ye; Lawrence Livermore National Lab, United States

3:45 PM EN06.09.07

Plasma Enhanced Atomic Layer Deposition of Sodium Phosphorous Oxynitride Daniela Fontecha, R B. Nuwayhid, Alexander C. Kozen, David M. Stewart, Gary Rubloff and Keith E. Gregorczyk; University of Maryland at College Park, United States

SESSION EN06.10: Poster Session III: Solid-State Batteries—From Electro-Chemo Mechanics to Devices III

Session Chairs: Matthew McDowell and Luhan Ye

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN06.10.01

Mathematical Design of Energy Materials Ananya Renuka Balakrishna and Delin Zhang; University of Southern California, United States

EN06.10.03

Nanostructured Li₂Se as a Protective Layer for All-Solid-State Lithium Metal Batteries Joonhyeok Park, Jeongheon Kim, Seungwoo Lee, Jaecik Kim, Ungyu Paik and Taeseup Song; Hanyang University, Korea (the Republic of)

EN06.10.04

Effect of Asymmetric Loading and Fracture on Polymorphism and Transport Properties in La₃Li₇Zr₂O₁₂ (LLZO) Scott Q. Monismith¹, Jianmin Qu^{2,1} and Remi Dingreville³; ¹Tufts University, United States; ²Stevens Institute of Technology, United States; ³Sandia National Laboratories, United States

EN06.10.05

Photo-Assisted Li-Se Solid-State Batteries Moritz H. Futscher, Mathieu Rohner, Jordi Sastre-Pellicer and Yaroslav Romanyuk; Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland

EN06.10.07

Methodology for Mechanical Pillar Array Indentation of Alkali Metals Thomas S. Marchese¹, Stephen Harris², Brad L. Boyce³, Katharine Harrison³, Katherine Jungjohann⁴ and Matthew T. McDowell^{1,1}; ¹Georgia Institute of Technology, United States; ²Lawrence Berkeley National Laboratory, United States; ³Sandia National Laboratories, United States; ⁴National Renewable Energy Laboratory, United States

SESSION EN06.11: Advanced Characterization

Session Chairs: Xin Li and Yingzhi Sun

Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 323A

9:15 AM EN06.11.01

Lattice Dynamics in the NASICON $\text{NaZr}_2(\text{PO}_4)_3$ Electrolyte Revealed from Temperature-Dependent Neutron, NMR and *Ab Initio* Computational Studies [Emily E. Morgan](#)^{1,1}, Hayden A. Evans², Kartik Pilar^{1,1}, Craig Brown², Raphaële Clément^{1,1}, Ryo Maezono³, Ram Seshadri^{1,1,1}, Bartomeu Monserrat^{4,4} and Anthony Cheetham¹; ¹University of California, Santa Barbara, United States; ²National Institute of Standards and Technology, United States; ³Japan Advanced Institute of Science and Technology, Japan; ⁴University of Cambridge, United Kingdom

9:30 AM EN06.11.02

Understanding Ion Transport in Block Copolymer Electrolytes Using X-Ray Photon Correlation Spectroscopy [Emma Antonio](#)¹, Lorena Grundy², Michael Galluzzo², Nitash Balsara^{2,3}, Chris Takacs⁴, Hans-Georg Steinrueck⁵ and Michael Toney¹; ¹CU Boulder, United States; ²University of California, Berkeley, United States; ³Lawrence Berkeley National Laboratory, United States; ⁴SLAC National Accelerator Laboratory, United States; ⁵Universität Paderborn, Germany

9:45 AM BREAK

10:15 AM EN06.11.03

Understanding Coupled Electro-Chemo-Mechanics During *In Situ* Li Metal Anode Formation in Anode-Free Solid-State Batteries [Eric Kazyak](#), Michael Wang, Srinivas Yadavalli, Kiwoong Lee, Adrian Sanchez, M.D. Thouless, Jeff Sakamoto and Neil P. Dasgupta; University of Michigan–Ann Arbor, United States

10:30 AM EN06.11.04

Characterization of NaSICON Solid Electrolytes Exposed to Thermal and Electrochemical Cycling in Molten Sodium Environment [Ryan C. Hill](#)¹, Amanda Peretti², Martha Gross², Leo J. Small², Erik D. Spoecker² and Yang-Tse Cheng¹; ¹University of Kentucky, United States; ²Sandia National Laboratories, United States

10:45 AM EN06.11.05

The Effect of Aluminum Concentration on the Structure, Microstructure and Electrochemical Properties of $\text{Li}_{7-3x}\text{Al}_x\text{La}_3\text{Zr}_2\text{O}_{12}$ [Alexandra C. Moy](#) and Jeff Sakamoto; University of Michigan, United States

11:00 AM EN06.11.06

***In Situ* Strain Distributions in 3D Solid-State Battery Electrodes** [Haotian Wang](#), Gary Rubloff and David M. Stewart; University of Maryland, United States

11:15 AM EN06.11.07

A Lithium Dendrite Inhibiting Strategy by Metallic Coatings in Solid Electrolytes via *Operando* Study [Xin Xu](#), Geoff McConohy, Edward Barks, Sunny Wang, Emma Kaeli and William C. Chueh; Stanford University, United States

SESSION EN06.12: Cathode in Solid-State Batteries
Session Chairs: Eric Kazyak and Xin Li
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 323A

1:30 PM *EN06.12.01

Cathode Design for All-Solid-State Lithium Batteries [Jagjit Nanda](#); Oak Ridge National Laboratory, United States

2:00 PM EN06.12.02

Constructing Favorable Microstructures in Solid-State Organic Cathodes via Mechanical Property Manipulation [Zhaoyang Chen](#)¹, Qing Ai², Hua Guo², Viktor G. Hadjiev¹, Jun Lou², Yanliang Liang¹ and Yan Yao¹; ¹University of Houston, United States; ²Rice University, United States

2:15 PM EN06.12.03

Unlocking Stable Multi-Electron Cycling in NMC811 Thin Films Between 1.5 – 4.7 V [Abdessalem Aribia](#)¹, Jordi Sastre-Pellicer¹, Moritz H. Futscher¹, Xubin Chen¹, Matthias Rumpel², Agnieszka Priebe³, Max Doebeli⁴, Ayodhya N. Tiwari¹ and Yaroslav Romanyuk¹; ¹Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ²Fraunhofer R&D Center for Electromobility, Germany; ³Laboratory for Mechanics of Materials and Nanostructures, Switzerland; ⁴ETH Zürich - Swiss Federal Institute of Technology, Switzerland

2:30 PM BREAK

SESSION EN06.13: New Solid Electrolytes
Session Chairs: Eric Kazyak and Xin Li
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 323A

3:00 PM EN06.13.01

Hybrid Halide Solid Electrolytes and Bottom-Up Cell Assembly Enable High Voltage Solid-State Lithium Batteries [Benjamin Zahiri](#)¹, Chadd Kiggins², Dijo Damien¹, Michael Caple¹, Arghya Patra¹, Carlos Juarez Yescasz¹, John B. Cook² and Paul Braun¹; ¹University of Illinois at Urbana-Champaign, United States; ²Xerion Advanced Battery Corp., United States

3:15 PM EN06.13.02

Interplay of Synthesis and Ionic Conduction in Halide-Based Solid Electrolytes [Elias Sebt](#)^{1,1}, Hayden A. Evans², Hengning Chen³, Peter M. Richardson^{1,1}, Kelly M. White¹, Erik Wu⁴, Swastika Banerjee⁴, Phillip Ridley⁴, Raynald Giovine^{1,1}, Elioardo Gonzalez-Correa^{1,1}, Craig Brown², Anthony Cheetham^{3,1,1}, Shyue Ping Ong⁴, Shirley Meng^{4,4}, Pieremanuele Canepa^{3,3} and Raphaële Clément^{1,1}; ¹University of California, Santa Barbara, United States; ²National Institute of Standards and Technology, United States; ³National University of Singapore, Singapore; ⁴University of California, San Diego, United States

3:30 PM EN06.13.03

Investigation of Li⁺ Migration in Monoclinic Li_{2-x}Zr_{1-x}M_xCl₆ (M = Sc, In) [Hiram Kwak](#)¹, Jong Seok Kim¹, Jun Pyo Son¹, Juhyou Park¹, Yeji Choi¹, Daseul Han², Hyungsub Kim³, Kyung-Wan Nam² and Yoon Seok Jung¹; ¹Yonsei University, Korea (the Republic of); ²Dongguk University, Korea (the Republic of); ³Korea Atomic Energy Research Institute, Korea (the Republic of)

3:45 PM EN06.13.04

Novel Superionic Conductors with Pseudo-Halogen Substitution [Yingzhi Sun](#), Bin Ouyang and Gerbrand Ceder; UC Berkeley, United States

4:00 PM EN06.13.05

Solid-State Calcium-Ion Diffusion in Ca_{1.5}Ba_{0.5}Si₅O₃N₆ [Yu Chen](#)^{1,2}, Christopher Bartel^{1,2}, Maxim Avdeev³, Ya-Qian Zhang^{1,2}, Huiwen Ji⁴ and Gerbrand Ceder^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Australian Nuclear Science and Technology Organisation, Australia; ⁴The University of Utah, United States

4:15 PM EN06.13.06

Highly-Conducting Alluaudite-Type Nanocrystallized Glass-Ceramics for Sodium-Ion Batteries Maciej Nowagiel, Mateusz J. Samsel, Aldona Zalewska and [Tomasz K. Pietrzak](#); Warsaw Univ. of Technology, Poland

SESSION EN06.15: Simulation for Solid-State Batteries

Session Chairs: Xin Li and Qingsong Tu

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 323A

10:00 AM EN06.15.02

High-Throughput Discovery of Solid-State Fluoride-Ion Conductors and Generalized Heuristics for Ion Transport [Jack D. Sundberg](#), Daniel Druffel, Mathew Lanetti, Lauren McRae, Jacob Pawlik and Scott Warren; University of North Carolina, United States

10:15 AM EN06.15.03

Construction of Solid-State Electrolyte Optimization Pareto Fronts with Machine Learning-Based Models [Austin Sendek](#)¹, Gowoon Cheon², Mauro Pasta³ and Evan Reed⁴; ¹Aionics, United States; ²Google Research, United States; ³University of Oxford, United Kingdom; ⁴Stanford University, United States

10:30 AM EN06.15.05

Electronic Properties and Ionic Conductivity of Doped Garnet Type Solid Electrolyte Ipshita Sahoo, Dahyun Oh and [Santosh KC](#); San Jose State University, United States

10:45 AM EN06.15.06

Fast Na Diffusion and Anharmonic Phonon Dynamics in Superionic Na₃PS₄ Mayanak Gupta^{1,2}, Jingxuan Ding¹, Naresh Osti³, Douglas L. Abernathy³, Hui Wang⁴, Zachary D. Hood³ and [Olivier Delaire](#)¹; ¹Duke University, United States; ²Babbha Atomic Research Center, India; ³Oak Ridge National Laboratory, United States; ⁴Univ. Louisville, United States; ⁵Argonne National Laboratory, United States

11:00 AM EN06.15.07

Predicting the Nucleation and Formation of Secondary Phases in All Solid-State Lithium Batteries [Liwen Wan](#), Aniruddha M. Dive and Kwangnam Kim; Lawrence Livermore National Laboratory, United States

SESSION EN06.16: Fabrication and Process of Solid-State Batteries

Session Chairs: Eric Kazyak, Qingsong Tu and Luhan Ye

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 323A

1:45 PM EN06.16.01

The Buffer Layer for Anode-Free Architecture in Solid-State Batteries [Qingsong Tu](#); Rochester Institute of Technology, United States

2:00 PM EN06.16.02

Development of a Fabrication Process for Antiperovskite Li₃OCl Thin Films [Stephen J. Turrell](#), Hyeon Jeong Lee, Junliang Liu, Sudarshan Narayanan, Chris Grovenor, Mauro Pasta, Susannah C. Speller and Marco Siniscalchi; University of Oxford, United Kingdom

2:15 PM EN06.16.04

Sputtered Amorphous Carbon Interlayers for Homogeneous Lithium Plating and Stripping [Moritz H. Futscher](#), Thomas Amelal, Jordi Sastre-Pellicer, Jyotish Patidar, André Müller, Abdesslem Aribia, Sebastian Siol and Yaroslav Romanyuk; Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

2:30 PM BREAK

3:00 PM EN06.16.05

Forthcoming High Performance All-Solid-State Pouch Cell [Fatima N. Ajjan](#), Marco Amores, Ningxin Zhang and Marcus Jahn; AIT Austrian Institute of Technology GmbH, Austria

3:15 PM EN06.16.07

Layer-by-Layer Assembly with Lithiophilic and Electrophobic Interlayer for Dendrite-Free Lithium-Metal Solid-state Batteries [Sunyoung Lee](#), Kyungho Yoon, Sangwook Han, Joo Hyeon Noh and Kisuk Kang; Seoul National University, Korea (the Republic of)

3:30 PM EN06.16.08

Tuning the Diffusion and Mechanical Properties of the Lithium Metal Anode by Mixing with Carbon-Nanotubes for Use in Solid-State Batteries [Till Fuchs](#)¹, Catherine Haslam², Alexandra C. Moy², Jeff Sakamoto², Felix Richter¹ and Jürgen Janek¹; ¹Institute of Physical Chemistry / Justus-Liebig-University Giessen, Germany; ²University of Michigan–Ann Arbor, United States

3:45 PM EN06.16.09

In Situ Impedance Study on All-Solid-State Lithium-Ion Batteries Fabricated by Screen-Printing [Masayuki Itagaki](#), Arisa Kamei, Hikari Watanabe and Isao Shitanda; Tokyo University of Science, Japan

SESSION EN06.17: General Session II
Session Chairs: Neil Dasgupta and Xin Li
Tuesday Afternoon, May 24, 2022
EN06-Virtual

1:00 PM EN06.17.02

In the Search for the Best Solid Electrolyte-Layered Oxide Pairing for Assembling Practical All-Solid-State Batteries [Tuncay Koc](#)^{1,2,3}, Florencia Marchini^{1,3}, Gwenaëlle Rouse^{1,2,3}, Romain Dugas^{1,3} and Jean Marie Tarascon^{1,2,3}; ¹College de France, France; ²Sorbonne Université, France; ³Reseau sur le Stockage Electrochimique de l'Energie (RS2E), France

1:15 PM *EN06.17.03

High-Performance Solid-State Electrolytes—Ultra-Fast High Temperature Sintering (UHS) Oxides and Expanded Cellulose [Liangbing Hu](#); University of Maryland College Park, United States

SESSION EN06.18: General Session III
Session Chairs: Xin Li and Matthew McDowell
Wednesday Morning, May 25, 2022
EN06-Virtual

8:00 AM *EN06.18.01

The Influence of Temperature on Li Plating/Stripping at Metal/Oxide Solid Electrolyte Interfaces [Munekazu Motoyama](#) and Yasutoshi Iriyama; Nagoya University, Japan

8:30 AM *EN06.18.02

Factors Influencing the Critical Current in Lithium Anode Ceramic Electrolyte Solid-State Batteries [Peter Bruce](#), Ziyang Ning, Dominic S. Jolly, Jiti Kasemchainan and T. James Marrow; University of Oxford, United Kingdom

9:00 AM EN06.18.04

Developing New Polymer Nanocomposite (PNCs)-Based Electrolytes with Higher Ionic Conductivity Using Non-Linear Poly(ethylene oxide) Topologies [Recep Bakar](#), Saed Darvishi and Erkan Senses; Koc University, Turkey

9:15 AM *EN06.18.05

Lithium Hydroxide Halide Antiperovskites—An Ideal Model System to Understand Solid-State Batteries [Mauro Pasta](#), Hyeon Jeong Lee and Sudarshan Narayanan; University of Oxford, United Kingdom

SESSION EN06.19: General Session IV
Session Chairs: Xin Li and Hong Zhu
Wednesday Morning, May 25, 2022
EN06-Virtual

10:30 AM EN06.19.01

Unification of Bulk Storage and Supercapacitive Storage [Chuanlian Xiao](#), Chia-Chin Chen, Robert Usiskin and Joachim Maier; Max Planck Institute for Solid State Research, Germany

10:45 AM EN06.19.02

Thermal and Electrochemical Interface Compatibility Between Hydroborate Solid Electrolytes and High-Voltage Cathodes for All-Solid-State Batteries [Ryo Asakura](#)¹, Léo Duchêne¹, Seyedhosein Payandeh¹, Daniel Rentsch¹, Hans R. Hagemann², Corsin Battaglia¹ and Arndt Remhof¹; ¹Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ²University of Geneva, Switzerland

11:00 AM EN06.19.03

Building a Better Li-Garnet Solid Electrolyte/Metallic Li Interface with Antimony Kostiantyn Kravchuk^{1,2}, Romain Dubey^{1,2} and Maksym Kovalenko^{1,2}; ¹ETH Zurich, Switzerland; ²Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

11:15 AM EN06.19.04

Operando Monitoring of Internal Li-Driven Stress in Solid-State and Liquid Battery Electrodes Enabled by Optical Sensing Laura Albero Blanquer^{1,2}, Florencia Marchini¹, Jan R. Seitz¹, Nour Daher¹, Fanny Bétermier¹, Jiaqiang Huang¹, Charlotte Gervillie¹ and Jean Marie Tarascon^{1,2}; ¹Collège de France, France; ²Sorbonne Université, France

11:30 AM EN06.10.11

Lithium Metal Diffusion in a Li-Mg Alloy by SIMS Marco Siniscalchi, Junliang Liu, Susannah C. Speller and Chris Grovenor; University of Oxford, United Kingdom

SESSION EN06.20: General Session V
Session Chairs: Xin Li and Matthew McDowell
Wednesday Afternoon, May 25, 2022
EN06-Virtual

1:00 PM *EN06.20.01

Design and Manufacture of Solid State Batteries towards Low Cost Jennifer L. Rupp; Technical University of Munich, Germany

1:30 PM EN06.20.02

Sodium-Ion Conduction and Interfacial Stability in Multivalent Cation Doped Sulfide Electrolytes Varun Shreyas, Sabina Chertmanova, Hui Wang and Badri Narayanan; University of Louisville, United States

1:45 PM EN06.20.03

Universal Cathode Design Strategies to Engineer Cathode Electrolyte Interfaces for High Performance All-Solid-State Batteries Yuxuan Zhang¹, Han Wook Song² and Sunghwan Lee¹; ¹Purdue University, United States; ²Korea Research Institute of Standard and Science, Korea (the Republic of)

2:00 PM EN06.20.04

Local Structural Characterization of Metal Oxides Nanocomposites for Electro-Chemo-Mechanical (ECM) Devices Junying Li¹, Yuanyuan Li¹, Evgeniy Makagon², Igor Lubomirsky² and Anatoly I. Frenkel¹; ¹Stony Brook University, The State University of New York, United States; ²Weizmann Institute of Science, Israel

2:05 PM EN06.20.05

Ferroelectric and Multiferroics Materials being Incorporated into Lithium-Sulfur Batteries to Promote Efficient High-Performance Claudia C. Zuluaga Gomez¹, Christian Plaza², Ram S. Katiyar¹ and Gerardo Morell¹; ¹University of Puerto Rico, Rio Piedras Campus, Puerto Rico; ²University of Puerto Rico at Mayagüez, Puerto Rico

SESSION EN06.21: General Session VI
Session Chairs: Neil Dasgupta and Xin Li
Wednesday Afternoon, May 25, 2022
EN06-Virtual

4:00 PM *EN06.21.01

Differentiate the Intrinsic and Extrinsic Interface Resistance in All-Solid-State Li-Ion Batteries Yue Qi; Brown University, United States

4:30 PM EN06.21.02

Mixed-Domain Charge Transport in S-Se Alloys as a Li-S Battery Cathode Material Junsoo Park, Zhigang Wu and John Lawson; NASA Ames Research Center, United States

SESSION EN06.22: General Session VII
Session Chairs: Neil Dasgupta and Xin Li
Wednesday Afternoon, May 25, 2022
EN06-Virtual

6:30 PM *EN06.22.01

Detection of Chemo-Mechanical Transformations in Solid-State Batteries from Nano-to-Meso Scale Kelsey B. Hatzell; Princeton University, United States

7:00 PM EN06.22.02

Tailoring Electrolyte to Enable High-Safety High-Performance Flexible Rechargeable Batteries Ying Wang; Louisiana State University, United States

7:15 PM *EN06.22.03

Probing Degradation Mechanisms and Structural Analysis of Solid Electrolytes by Diverse Analyses Including Cryogenic Electron Microscopy Hyun-Wook Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of)

7:45 PM *EN06.22.04

Challenges of ASSB for Future Electric Vehicle Application Toshikazu Kotaka, Koichiro Aotani and Yuichiro Tabuchi; Nissan Motor Co Ltd, Japan

8:15 PM EN06.22.05

Millisecond Ion-Transport Simulations of Mixed Polyanion Solid Electrolytes Zeyu Deng¹, Tara P. Mishra^{1,2}, Jean-Noël Chotard^{3,4,5}, Vincent Seznec^{3,4,5}, Anthony Cheetham^{1,6}, Christian Masquelier^{3,4,5}, Sai Gautam Gopalakrishnan⁷ and Pieremanuele Canepa^{1,2,1}; ¹National University of Singapore, Singapore; ²Singapore-MIT Alliance for Research and Technology, Singapore; ³CNRS UMR 7314, Université de Picardie Jules Verne, France; ⁴FR CNRS 3459, France; ⁵FR CNRS 3104, France; ⁶University of California, Santa Barbara, United States; ⁷Indian Institute of Science, India

SESSION EN06.23: General Session VIII

Session Chairs: Xin Li and Hong Zhu

Wednesday Afternoon, May 25, 2022

EN06-Virtual

9:00 PM *EN06.23.01

Component Regulation and Performance Optimization of PVDF-Based Polymer Electrolytes Liangliang Li, Shundong Guan, Ying Liang, Sijie Liu, Yang Shen and Ce-Wen Nan; Tsinghua University, China

9:30 PM EN06.23.02

Fabrication and Evaluation of Pouch-Type All-Solid-State Lithium-Ion Batteries Yong Bae Song, Seunggoo Jun and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

9:45 PM EN06.23.03

Wet-Slurry Fabrication Using PVdF-HFP Binder with Sulfide Electrolytes for All-Solid-State Batteries Kyu Tae Kim, Tae Young Kwon and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

10:00 PM EN06.23.04

Versatile Wet-Chemical Synthesis of Sulfide Solid Electrolytes Using Cosolvents for All-Solid-State Batteries Jehoon Woo, Yong Bae Song and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

10:05 PM EN06.23.05

Tailoring the Performance of an Mg²⁺-Conducting NASICON-type Solid Electrolyte: Anisotropic Thermal Expansion and Ionic Conductivity Cem E. Özbilgin^{1,2}, Kiyoshi Kobayashi², Shinji Tamura³, Nobuhito Imanaka³ and Tohru Suzuki^{2,1}; ¹Waseda University, Japan; ²National Institute for Materials Science, Japan; ³Osaka University, Japan

10:10 PM *EN06.23.06

Design Factors for New Halide Superionic Conductors for All-Solid-State Batteries Hiram Kwak and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM EN07

Sustainable Polymeric Materials by Green Chemistry—Degradability and Resilience
May 9 - May 24, 2022

Symposium Organizers

Anna Finne Wistrand, KTH Royal Institute of Technology

Rainhard Machatschek, Helmholtz Zentrum Hereon

Keiji Numata, RIKEN Inst

Ying Yang, University of Nevada, Reno

* Invited Paper

SESSION EN07.01: Polymers from Sustainable, Natural Building Blocks

Session Chairs: Rainhard Machatschek and Ying Yang

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 323C

10:45 AM *EN07.01.01

Harnessing the Diversity of Biomass in the Design of Performance-Advantaged, Polymeric Materials [LaShanda Korley](#); University of Delaware, United States

11:15 AM EN07.01.02

Sustainable Sanitary Products from Cellulose/Protein Composites—Challenges and Approaches [Antonio J. Capezza](#) and Richard T. Olsson; KTH, Sweden

11:30 AM EN07.01.04

Valorization of Vegetable Biomass as Moldable Biocomposites [Giovanni Perotto](#)¹, Roberto Simonutti², Michela Gallo³, Danila Merino¹, Ilker Bayer¹, Adriana Del Borghi³ and Athanassia Athanassiou¹; ¹Italian Inst of Technology, Italy; ²Università degli Studi di Milano-Bicocca, Italy; ³Università di Genova, Italy

SESSION EN07.02: Sustainability by Molecular Design
Session Chairs: LaShanda Korley and Rainhard Machatschek
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 323C

1:45 PM *EN07.02.01

Sustainable Polymer Network Designs Using Robust Dynamic Covalent Bonds [Zhibin Guan](#); University of California, Irvine, United States

2:15 PM *EN07.02.02

Molecular Engineering in Four Dimensions—A Mechanistic Approach to Reprocessable Elastomers [Julia Kalow](#); Northwestern University, United States

2:45 PM EN07.02.03

Long Term Evolution of Morphology, Melting and Crystal-Crystal Transitions Facilitated by Dynamic Bond Exchange in Ethylene Dynamic Networks [Bhaskar Soman](#) and Christopher Evans; University of Illinois Urbana Champaign, United States

3:00 PM BREAK

3:30 PM *EN07.02.04

Self-Healable Copolymers Based on Dipolar and Coulombic Interactions siyang Wang, Qianhui Liu and [Marek W. Urban](#); Clemson University, United States

4:00 PM EN07.02.05

Manufacturing of Materials with Regenerative Capabilities [Julian Cooper](#), Justine E. Paul, Nabil Ramlawi, Randy Ewoldt, Nancy R. Sottos and Jeffrey Moore; UIUC, United States

4:15 PM EN07.02.06

Tuning the Degradation Lifetimes of Degradable Imine-Based Polymer Semiconductors by Molecular Design [Jerika A. Chiong](#), Yu Zheng and Zhenan Bao; Stanford University, United States

4:30 PM EN07.02.07

Polybutadiene Elastomers with Degradation Profiles Programmed by Microencapsulation and Controlled Release of Metathesis Catalysts [Brad H. Jones](#), Samuel C. Leguizamón, Hannah Narcross, James P. Lassa, Koushik Ghosh and George D. Bachand; Sandia National Labs, United States

SESSION EN07.03: New Routes for De- and Repolymerization
Session Chairs: Hang (Jerry) Qi and Natalia Tarazona
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 323C

8:30 AM EN07.03.01

Potential of Singlet-Oxygen-Driven Polymer Photodegradation in Remediation of Disposed Plastics [Kaan Kalkan](#) and Linqi Zhang; Oklahoma State University, United States

8:45 AM EN07.03.02

Recyclable Epoxies Through Depolymerization Using Photothermal Nanoparticles [Youngmin Lee](#), Samantha Lindholm, Brandon McReynolds, Kavon Mojtabai, Sanchari Chowdhury and John McCoy; New Mexico Tech, United States

9:00 AM EN07.03.03

Fabrication of PHB-Based Biodegradable Bioplastic Films Comparable to Current Plastic for Packaging Applications Jihyeon Kim, Nevin S. Gupta and [Kwan-Soo Lee](#); Los Alamos National Laboratory, United States

9:15 AM EN07.03.04

Assessing Polymer Sustainability at End-of-Life—Linking Quality to Polymeric Waste Treatment Processes [Basuhi Ravi](#), Karan Bhuwarka, Richard Roth and Elsa Olivetti; Massachusetts Institute of Technology, United States

9:30 AM EN07.03.05

Homogenous Gold Catalysis—A Versatile Platform for the Upcycling of Commodity Aromatic Polymers Eric R. King, [Samuel B. Hunt](#), Levi J. Hamernik, Lauren E. Gonce, Jeffrey S. Wiggins and Jason D. Azoulay; University of Southern Mississippi, United States

9:45 AM EN07.03.06

Evaluation of Post-Consumer Recycled (PCR) Plastics in Consumer Electronics System [Rashed A. Islam](#), Jacki Laiz, Dolaphine Kwok and Swanand Vaidya; Google LLC., United States

10:00 AM BREAK

10:30 AM *EN07.03.07

Synthesis of Sustainable Polymeric Materials from Biobased Building-Blocks and Their Recycling or Reprocessing [Karin Odelius](#); KTH Royal Institute of Technology, Sweden

11:00 AM EN07.03.08

Nanofiber-Based Biodegradable Textiles for Decreased Microfiber Pollution [James Dolgin](#), Hristo Ivanov, Michael Pallotta, Colin Harmer, Alairé Jameson and Stephen Farias; Materic Group, United States

11:15 AM EN07.03.09

A Comparative Framework for Plastic-to-Plastic Recycling Technologies [Taylor Uekert](#); National Renewable Energy Laboratory, United States

11:30 AM EN07.03.10

Enzymes Immobilized Nanocarriers for the Selective Degradation of Synthetic Polymers Eva Krakor¹, Isabel Gessner^{2,1}, [Michael Wilhelm](#)¹, Veronika Brune¹ and Sanjay Mathur¹; ¹University of Cologne, Germany; ²Harvard Medical School-Massachusetts General Hospital, United States

SESSION EN07.04: Synthesis and Processing of Green and Sustainable Polymers

Session Chairs: Anna Finne Wistrand and Brent Sumerlin

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 323C

3:00 PM EN07.04.03

3D-Printability of PPG-Poly(hydroxyurethane) Elastomers Using Thermal or UV Curing Processes [Anna Pierrard](#), Abdelhafid Aqil, Christophe Detrembleur and Christine Jerome; University of Liège, Belgium

3:15 PM EN07.04.04

Improvement of Photocatalytic Power and Dimensional Stability via *In Situ* Synthesis of Carbon Dot on Cellulose Nanofiber [Jungbin Ahn](#) and Hyungsup Kim; Konkuk Univ., Korea (the Republic of)

3:30 PM EN07.04.05

Tunable Naphthalene-Based Microporous Polyimide Networks for CO₂ Capture and Conversion [Basiram Narzary](#)¹, Ben Baker¹, Jie Chen² and Prof. Charl F. Faul¹; ¹University of Bristol, United Kingdom; ²Fuzhou University, China

3:45 PM EN07.04.06

Poster Spotlight: Mechanochemical Modification of High-Melt-Viscosity Polymers via Solid-State Shear Pulverization—Appropriate Levels of Degradation and Enhanced Properties in Specialty Polyethylenes Riggs Johnson, Spencer Zack and [Katsuyuki Wakabayashi](#); Bucknell Univ, United States

3:50 PM EN07.04.07

Poster Spotlight: Characterization of a Conductive Wax-Based Ink for 3D Printed Microbial Activity Sensors [John-Baptist Kauzya](#), Eloise Bihar, Madhur Atreya and Gregory L. Whiting; University of Colorado Boulder, United States

SESSION EN07.05: Poster Session: Sustainable Polymeric Materials by Green Chemistry—Degradability and Resilience

Session Chairs: Anna Finne Wistrand, Rainhard Machatschek and Ying Yang

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EN07.05.02

Poster Spotlight: Characterization of a Conductive Wax-Based Ink for 3D Printed Microbial Activity Sensors [John-Baptist Kauzya](#), Eloise Bihar, Madhur Atreya and Gregory L. Whiting; University of Colorado Boulder, United States

EN07.05.03

Poster Spotlight: Mechanochemical Modification of High-Melt-Viscosity Polymers via Solid-State Shear Pulverization—Appropriate Levels of Degradation and Enhanced Properties in Specialty Polyethylenes Riggs Johnson, Spencer Zack and [Katsuyuki Wakabayashi](#); Bucknell Univ, United States

EN07.05.05

Elastic Properties of Bio Based Polyamide (PA) Materials [Rashed A. Islam](#), Jacki Laiz, Dolaphine Kwok and Swanand Vaidya; Google LLC., United States

EN07.05.06

Chemical Modification of Cellulose Fibres Using Fluorine Promoted Esterification (FPE) Chemistry via Carbonyldiimidazole (CDI) Faridah Namata, Michael Malkoch and Lars Wagberg; KTH Royal Institute of Technology, Sweden

EN07.05.10

Revealing the Foaming Process of Gluten-Based Materials by Extrusion—Towards the Production of Sustainable Porous Plastics Mercedes Bettelli¹, Antonio J. Capezza¹, Eva Johansson², Richard T. Olsson¹ and Mikael Hedenqvist¹; ¹KTH Royal Institute of Technology, Sweden; ²Swedish University of Agricultural Sciences (SLU), Sweden

EN07.05.12

The Surface Modification of Cellulose Fibers for Design of Bio-Based Flame Retardant Composites Jun Hyuk Lee¹ and Bong Sup Shim^{1,2}; ¹Inha university, Korea (the Republic of); ²Inha University, Korea (the Republic of)

EN07.05.13

Enhanced Thermal Stability of Tunicate Cellulose Nanofibers by Inorganic Nanocomposites Hong YeongBeom and Bong Sup Shim; Inha University, Korea (the Republic of)

EN07.05.15

Chemical Modification of Glycolipids with Polymerizable Acrylate Groups and Their Incorporation into Hydrogels Vidula Lokugama, Susan D. Perez, Alicia D. Power, Sano R. Twaje, David E. Hogan, Raina M. Maier and Douglas A. Loy; The University of Arizona, United States

EN07.05.16

Biodegradable Pressure Sensitive Hot Melt Adhesive Amelia Heiner and Jeffrey S. Bates; University of Utah, United States

EN07.05.17

Hydrolytic Degradation of Cannabinoid-Derived Materials with Tunable Service Temperatures John M. Toribio, Robert Daniels and Gregory A. Sotzing; University of Connecticut, United States

EN07.05.18

Biomolecule-Functionalized Polymeric Ultrafiltration Membranes for the Removal and Degradation of Contaminants and Toxins Misael A. Romero-Reyes^{1,2} and Jennifer Heemstra²; ¹Hanover College, United States; ²Emory University, United States

EN07.05.19

Synthesis and Characterization of Materials Properties of a Biological Superabsorbent Polymer for Single-Use Consumer Product Applications Kaylon Draney and Jeffrey S. Bates; The University of Utah, United States

SESSION EN07.07: Fundamental Properties of Resilient and Functional Polymers

Session Chairs: Karin Odelius and Ying Yang

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 323C

1:30 PM EN07.07.01

Electrohydrodynamic 3D Printing of Aqueous Solutions Ander Reizabal^{1,2}, Senentxu Lanceros-Méndez² and Paul Dalton¹; ¹Phil and Penny Knight Campus for Accelerating Scientific Impact, University of Oregon, United States Minor Outlying Islands; ²BCMaterials - Basque Center for Materials, Applications and Nanostructures, Spain

1:45 PM *EN07.07.02

Good Solvent Assisted Recycling of Thermosetting Polymers with Dynamic Bonds Hang (Jerry) Qi; Georgia Inst of Technology, United States

2:15 PM EN07.07.03

Redox-Active Polymers Designed for the Circular Economy of Energy Storage Devices Alexander Giovannitti, Siew Ting Melissa Tan, Tyler Quill, Garrett LeCroy and Alberto Salleo; Stanford University, United States

2:30 PM BREAK

3:00 PM *EN07.07.04

Seven Simple Dynamic Covalent Chemistries to Transform Crosslinked Thermosets into Thermoplastics: Sustainable Chemical Recycling of Traditionally Non-Recyclable Materials John M. Torkelson; Northwestern University, United States

3:30 PM EN07.07.05

Sorption and Permeation of H₂S, CO₂, CH₄, and N₂ in Amine-Functionalized Microporous Polymers Katherine Mizrahi Rodriguez, Pablo Dean, Sheng Guo, Naksha Roy, Zachary Smith and Timothy Swager; Massachusetts Institute of Technology, United States

3:45 PM EN07.07.06

Tunability and Mixing Rules in PDMS Vitrimers Laura Porath and Christopher Evans; University of Illinois, United States

4:00 PM EN07.07.07

Decreasing the Glass Transition Temperature (T_g) of Poly(Ethylene Terephthalate) Films at the Air-Water Interface by Reducing Sample Dimensions Natalia Tarazona¹, Rainhard Machatschek^{1,2} and Andreas Lendlein^{1,2}; ¹Helmholtz-Zentrum Hereon, Germany; ²University of Potsdam, Germany

4:15 PM EN07.07.08

Refractory Plasmonic Nanoparticles for Visible Light Mediated Recycling of Epoxy [Kavon Mojtabai](#), Samantha Lindholm, Brandon McReynolds, John McCoy, Youngmin Lee and Sanchari Chowdhury; New Mexico Institute of Mining and Technology, United States

SESSION EN07.08: Functional, Bio-Based Polymers
Session Chairs: Anna Finne Wistrand and Rainhard Machatschek
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 323C

8:45 AM EN07.08.01

Keratin Extraction, Iso-Electric Precipitation and Micro-Pattern Preparation for Cellular Contact Guidance [Dagmara J. Trojanowska](#)^{1,2}, Giulia Suarato^{1,1}, Fabrizio Fiorentini¹, Athanassia Athanassiou¹ and Giovanni Perotto¹; ¹Italian Institute of Technology, Italy; ²University of Milano-Bicocca, Italy

9:00 AM EN07.08.02

Poly(Cannabinoid)s, Natural Polymers Fit for Green Chemistry [Gregory A. Sotzing](#)^{1,1}, John M. Toribio¹, Robert Daniels¹, Omer Yassin¹, Jiahua Mao², Zeynep Mutlu², Mayank Jain², Joseph Valenti¹ and Mukerrem Cakmak²; ¹University of Connecticut, United States; ²Purdue University, United States

9:15 AM EN07.08.05

Naturally-Derived Sustainable Hydrogel Materials Based on Slide-Ring and Triblock Copolymer Topologies [Ching Pang](#); Texas A&M University, United States

SESSION EN07.09: Polymer Degradation and Recycling I
Session Chairs: Rainhard Machatschek and Ying Yang
Monday Afternoon, May 23, 2022
EN07-Virtual

6:30 PM *EN07.09.01

Novel Design for Degradable Vinyl Polymers by Radical Copolymerization [Kotaro Satoh](#); Tokyo Institute of Technology, Japan

7:00 PM *EN07.09.03

Mesosopic Coarse-Grained Modeling for the Effect of Polymer Degradation on Rheological Properties [Takashi Uneyama](#); Nagoya University, Japan

7:30 PM EN07.09.04

Photodegradation Studies of Pristine and Microencapsulated Thermochromic Coatings for Energy Savings in Outdoor Applications [Sushant Madhukar Nagare](#)¹, Sessa S. Srinivasan², Abdullatif Hakami³, Prasanta Kumar Biswas¹ and Elias K. Stefanakos¹; ¹University of South Florida, United States; ²Florida Polytechnic University, United States; ³Jazan Saudi Arabia, Saudi Arabia

7:35 PM *EN07.09.05

Lifetime Prediction of Polyhydroxyalkanoates in the Natural Environment [Bronwyn Laycock](#), Steven Pratt and Paul Lant; The University of Queensland, Austria

8:05 PM EN07.09.06

Modified Physical Properties of Thermoplastic Polyurethane Composites with Chemically Modified Microcrystalline Cellulose [Seoku Lee](#), Woongbi Cho, Saebom Jhang, Ah Ran Yu and Jeong Jae Wie; Inha university, Korea (the Republic of)

SESSION EN07.10: Polymer Degradation and Recycling II
Session Chairs: Rainhard Machatschek and Ying Yang
Monday Afternoon, May 23, 2022
EN07-Virtual

9:00 PM *EN07.10.01

Green Polymeric Materials: Photodegradable Polymers to Lignin Based Polymers [Kei Saito](#); Kyoto University, Japan

9:30 PM EN07.10.02

A Novel and Green Method of Polymerizing Plant-Based Fatty Acids [David A. Stone](#); Iron Shell Materials LLC, United States

9:45 PM *EN07.10.03

Tri-Branched Gels—Rubbery Materials with the Lowest Branching Factor Approach the Ideal Elastic Limit [Takamasa Sakai](#); The University of Tokyo, Japan

10:15 PM EN07.10.04

Studies on the Chemical Synthesis and the Solution Structures of Proline-Containing Cyclic Peptides [Taichi Kurita](#)¹, Joan Gimenez-Dejoz², Seiya Fujita¹, Hiroataka Uji¹ and Keiji Numata^{1,2}; ¹Kyoto University, Japan; ²RIKEN, Japan

SESSION EN07.11: Polymer Degradation and Recycling III
Session Chair: Rainhard Machatschek

Tuesday Morning, May 24, 2022
EN07-Virtual

10:30 AM *EN07.11.01

Non-Isocyanate Polyurethanes (NIPUs)—From Synthesis Towards Biomaterials [Christine Jerome](#); Univ de Liege, Belgium

11:00 AM EN07.09.02

Upcycling of Used Face Masks Sustainably [Joyce Cavalcante](#), Rifan Hardian and Gyorgy Szekely; KAUST, Saudi Arabia

##PAGE_BREAK##

SYMPOSIUM EQ01

Ultra-Wide Bandgap Materials and Devices
May 9 - May 23, 2022

Symposium Organizers

Srabanti Chowdhury, Stanford University
Robert Kaplar, Sandia National Laboratories
Yoshinao Kumagai, Tokyo University of Agriculture and Technology
Julien Pernot, University of Grenoble Alpes

* Invited Paper

SESSION EQ01.01: Computational Approaches to UWBGs
Session Chair: Sukwon Choi
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 318B

10:30 AM *EQ01.01.01

GW-BSE Workflows for High-Throughput Study of Ultra-Wide Band Gap Materials [Arunima K. Singh](#); Arizona State University, United States

11:00 AM EQ01.01.02

Computational Discovery of Ultra-Wide Band Gap Semiconductors for Radio Frequency Applications [Emily McDonald](#)^{1,2}, Prashun Gorai^{1,2}, Andriy Zakutayev^{2,1} and Vladan Stevanovic^{1,2}; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

11:15 AM EQ01.01.03

Discovering the Extreme Limits to Semiconductor Band Gaps [Sieun Chae](#)¹, Kelsey Mengle¹, Kyle Bushick¹, Nocona Sanders¹, Nguyen Vu¹, Jihang Lee¹, Hanjong Paik², John Heron¹ and Emmanouil Kioupakis¹; ¹University of Michigan, United States; ²Cornell University, United States

11:30 AM EQ01.01.04

Computational Fermi Level Engineering and Doping-Type Conversion of Ga₂O₃ via Three-Step Processing Anuj Goyal¹, Andriy Zakutayev¹, Vladan Stevanovic² and [Stephan Lany](#)¹; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States

SESSION EQ01.02: Thermal Aspects of UWBGs
Session Chair: Robert Kaplar
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 318B

1:30 PM *EQ01.02.01

Deep-Ultraviolet Thermoreflectance Imaging of Ultra-Wide Bandgap Semiconductor Devices [Sukwon Choi](#); The Pennsylvania State University, United States

2:00 PM EQ01.02.02

Material Properties for High Thermal Interface Conductance [Samreen Khan](#)¹, Frank Angeles¹, Wanyue Peng¹, John Wright², Saurabh Vishwakarma³, Debdeep Jena², Huili Xing², David Smith³ and Richard Wilson¹; ¹University of California, Riverside, United States; ²Cornell University, United States;

³Arizona State University, United States

2:15 PM EQ01.02.03

Anisotropic Thermal Conductivity in Boron Doped Diamond [Frank Angeles](#)¹, Erick Guzman¹, Fariborz Kargar¹, Alexander A. Balandin¹, Richard B. Wilson¹ and Timothy A. Grotjohn²; ¹University of California, Riverside, United States; ²Michigan State University, United States

SESSION EQ01.03: Poster Session: Ultra-Wide Bandgap Materials and Devices

Session Chair: Robert Kaplar
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ01.03.01

Magneto-Optical Spectroscopy of Cr³⁺ and Red Emission in β -Ga₂O₃ J. E. Stehr¹, M. Jansson¹, D. M Hofmann², Stephen Pearton³, Weimin M. Chen¹ and [Irina A. Buyanova](#)¹; ¹Linköping University, Sweden; ²Justus-Liebig-University Giessen, Germany; ³University of Florida, United States

EQ01.03.04

Effects of Electrical Characteristics on Undoped and Li-Doped NiO Interlayers Embedded Ni/ β -Ga₂O₃ Schottky Barrier Diodes [Jiyoung Min](#) and Youseung Rim; Sejong University, Korea (the Republic of)

EQ01.03.05

Cubic Boron Nitride's High-Field Electron Transport Poppy Siddiqua¹, Michael Shur² and [Stephen K. O'Leary](#)¹; ¹University of British Columbia, Canada; ²Rensselaer Polytechnic Institute, United States

EQ01.03.06

High Performance β -Ga₂O₃ Schottky Barrier Transistors with Large Work Function TMD Gate of NbS₂ and TaS₂ [Ki-Tae Kim](#) and Seongil Im; Yonsei University, Korea (the Republic of)

EQ01.03.07

An Ultrawide Bandgap Transparent Conductor for Deep Ultraviolet—A-Doped Sn_{1-x}Ge_xO₂ Thin Films [Yo Nagashima](#)¹, Yasushi Hirose¹, Masato Tsuchii¹, Michitaka Fukumoto¹, Yuki Sugisawa², Daiichiro Sekiba² and Tetsuya Hasegawa¹; ¹The University of Tokyo, Japan; ²University of Tsukuba, Japan

EQ01.03.09

Phase Engineering of Ga₂O₃ Hetero- and Homo- Epitaxial Growth by Mist Chemical Vapor Deposition [Joonhui Park](#) and Youseung Rim; Sejong university, Korea (the Republic of)

EQ01.03.12

Comparative Study in the Synthesis of Carbon Doped 2D Hexagonal Boron Nitride Films [Eoin O'Sullivan](#)¹, Chelsea Xia¹, Dipankar Chugh², Dillon McGurty¹, Nicole Grobert¹, Michael Johnston¹ and Chennupati Jagadish²; ¹University of Oxford, United Kingdom; ²The Australian National University, Australia

SESSION EQ01.04: Diamond I

Session Chairs: Timothy Grotjohn and Julien Pernot
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 318B

8:30 AM *EQ01.04.01

Diamond and Ultra-Wide Bandgap Semiconductors for Power Electronics [Robert J. Nemanich](#); Arizona State University, United States

9:00 AM *EQ01.04.02

Vertical Diamond p-FETs with Normally-Off Operation for Complementary High Power and High Speed Inverters [Hiroshi Kawarada](#); Waseda University, Japan

9:30 AM EQ01.04.03

Methane Influence on Diamond Schottky Barrier Diode Performance Rozita Rouzbahani^{1,2}, Juliette Letellier³, Paulius Pobedinskas^{1,2}, David Eon³, Julien Pernot³ and [Ken Haenen](#)^{1,2}; ¹Hasselt University, Belgium; ²IMEC vzw, Belgium; ³Université Grenoble Alpes, CNRS, France

9:45 AM EQ01.04.04

Photo-Induced Phase Transition of Diamond—A Nonadiabatic Quantum Molecular Dynamics Study [Shogo Fukushima](#)^{1,2}, Rajiv Kalia¹, Thomas M. Linker¹, Ken-ichi Nomura¹, Aiichiro Nakano¹, Kohei Shimamura², Fuyuki Shimojo² and Priya Vashishta¹; ¹University of South Carolina, United States; ²Kumamoto University, Japan

10:00 AM BREAK

10:30 AM EQ01.04.06

Diamond FET Technology for Power Electronics [Etienne Gheeraert](#)^{1,2}; ¹University Grenoble Alpes, France; ²Centre National de la Recherche Scientifique, France

10:45 AM EQ01.04.07

Polycrystalline Diamond Micro/Nano-Electro-Mechanical Systems Evan Thomas¹, Soumen Mandal¹, Jaspa Stritt¹, William Leigh¹, Matthias Imboden² and Oliver A. Williams¹; ¹Cardiff University, United Kingdom; ²4K-MEMS Sàrl, Switzerland

SESSION EQ01.05: Diamond II
Session Chairs: Hiroshi Kawarada and Robert Nemanich
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 318B

1:30 PM *EQ01.05.01

Diamond Growth by Microwave Plasma CVD for Electronic Devices Timothy A. Grotjohn¹, Ramon Diaz², Cristian Herrera-Rodriguez¹, Shengyuan Bai¹, Paul Quayle², Aaron Hardy³, Matthias Muehle³, Alec Fischer⁴, Fernando A. Ponce⁴ and Elias Garratt¹; ¹Michigan State University, United States; ²Great Lakes Crystal Technologies, United States; ³Fraunhofer USA Center Midwest, United States; ⁴Arizona State University, United States

2:00 PM *EQ01.05.02

Space Charge Region Visualization Under Diamond Schottky Diode by Electron Beam Induced Current and Correlation with Defects Observed by Cathodoluminescence David Eon^{1,2}; ¹Institut Neel, France; ²University Grenoble Alpes, France

2:30 PM *EQ01.05.03

Optimization of NV/N, Ratio of CVD Single Crystal Diamond for Quantum Applications Jocelyn Achar¹, Alexandre Tallaire^{2,1}, Ovidiu Brinza¹, Midrel Ngandeu¹, Audrey Valentin¹ and Fabien Benedic¹; ¹LSPM-CNRS, France; ²Institut de Recherche de Chimie Paris, Chimie ParisTech, PSL Research University, France

SESSION EQ01.06: Nitrides I
Session Chair: Alan Doolittle
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 318B

8:30 AM EQ01.06.01

Substantial P-Type, N-Type and Homo Junction Diode Functionality Using the Highest Bandgap Semiconductor Ever Demonstrated Alan Doolittle, Habib Ahmad, Zachary Engel, Christopher M. Matthews, Keisuke Motoki and Sangho Lee; Georgia Institute of Technology, United States

8:45 AM EQ01.06.02

Molecular Beam Homoepitaxy of N-Polar AlN on Bulk AlN Substrates Jashan Singhal¹, Jimmy J. Encomendero Risco¹, Yongjin Cho¹, Len v. Deurzen¹, Zexuan Zhang¹, Kazuki Nomoto¹, Masato Toita², Huili Xing¹ and Debdeep Jena¹; ¹Cornell University, United States; ²Asahi Kasei Corporation, Japan

9:00 AM EQ01.06.03

Design of Transverse Quasi-Phase-Matched Non-Polar/AlN Waveguides for 230-nm Far-UV Second Harmonic Generation Hiroto Honda¹, Soshi Umeda¹, Kanako Shojiki^{2,1}, Hideto Miyake², Maki Kushimoto³, Yasufumi Fujiwara¹, Masahiro Uemukai¹, Tomoyuki Tanikawa¹ and Ryuji Katayama¹; ¹Osaka University, Japan; ²Mie University, Japan; ³Nagoya University, Japan

9:15 AM EQ01.06.04

Molecular Beam Homoepitaxy of N-Polar AlN—The Enabling Role of Aluminum-Assisted Surface Cleaning Zexuan Zhang¹, Yusuke Hayashi², Vladimir Protasenko¹, Jashan Singhal¹, Hideto Miyake³, Huili Xing¹, Debdeep Jena¹ and Yongjin Cho¹; ¹Cornell University, United States; ²Osaka University, Japan; ³Mie University, Japan

9:30 AM EQ01.06.05

Thermal and Electrical Properties of Wide Bandgap Nitride Thin Films Deposited at Low Temperatures for Heterogeneous Integration Michelle Chen¹, Christopher Perez¹, Scott Ueda², Aaron Meleod², Victoria Chen¹, Zachary Sobell³, Cagil Koroglu¹, Asir Intisar Khan¹, Steven George³, Andrew Kummel², Kenneth E. Goodson¹ and Eric Pop^{1,1}; ¹Stanford University, United States; ²University of California, San Diego, United States; ³University of Colorado Boulder, United States

9:45 AM BREAK

10:15 AM EQ01.06.07

TaC Virtual Substrates for AlGaIn Epitaxy Dennice M. Roberts¹, Andrew Norman¹, Vladan Stevanovic² and Marshall B. Tellekamp¹; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States

10:30 AM EQ01.06.08

Controllable N-Type Doping in Ultra-Wide Bandgap AlN By Chemical Potential Control Pegah Bagheri¹, Cristyan Quinones-Garcia¹, Pramod Reddy², Seiji Mita², Ramon Collazo¹ and Zlatko Sitar^{1,2}; ¹North Carolina State University, United States; ²Adroit Materials, United States

10:45 AM EQ01.06.09

Increasing the Power-Electronics Figure of Merit of AlGaIn with Atomically Thin Superlattices Nick Pant, Woncheol Lee, Nocona Sanders and Emmanouil Kioupakis; University of Michigan, United States

SESSION EQ01.07: Nitrides II
Session Chairs: Srabanti Chowdhury and Robert Kaplar

Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 318B

1:30 PM *EQ01.07.01

Selective Area Regrowth of p-type GaN and AlGa_N for Power Diodes A. A. Allerman, M. H. Crawford, A. T. Binder, Andrew Armstrong, G. W. Pickrell, V. M. Abate, J. Steinfeldt and Robert J. Kaplar; Sandia National Laboratories, United States

2:00 PM EQ01.07.02

Growth and Characterization of N-Polar AlGa_N/AlGa_N HEMTs with Varying Al Mole Fractions Maliha Noshin, Xinyi Wen, Rohith Soman, Xiaoping Xu and Srabanti Chowdhury; Stanford University, United States

2:15 PM EQ01.07.03

Electrical Characteristics of Ag-Pd-Cu Alloy Schottky Contacts on n-Type Al_{0.6}Ga_{0.4}N Keebaek Sim, Su-Kyung Kim and Tae-Yeon Seong; Korea University, Korea (the Republic of)

2:30 PM EQ01.07.04

MOCVD Development of Thick GaN for Vertical High Power Devices Yuxuan Zhang, Vijay Gopal Thirupakuzi Vangipuram, Vishank Talesara, Kaitian Zhang, Wu Lu and Hongping Zhao; The Ohio State University, United States

2:45 PM BREAK

3:15 PM EQ01.07.06

High Dielectric Constant (111)-Oriented Sr_{1-x}Ca_xTiO₃ Epitaxial Layers Integrated on AlGa_N/Ga_N Heterostructures Eric N. Jin, Brian Downey, Vikrant Gokhale, Jason Roussos, Matthew Hardy, Tyler A. Growden, Neeraj Nepal, D. S. Katzer, Jeffrey P. Calame and David J. Meyer; U.S. Naval Research Laboratory, United States

3:30 PM EQ01.07.07

Vertical GaN P-N Power Diodes with over 5 kV Breakdown Voltage Vishank Talesara, Yuxuan Zhang, Vijay Gopal Thirupakuzi Vangipuram, Hongping Zhao and Wu Lu; The Ohio State University, United States

3:45 PM EQ01.07.08

Determination of Mn Charge State in Bulk GaN:Mn Through Magnetization Steps Katarzyna Gas¹, Piotr Wisniewski², Dariusz Sztenkiel¹, Aneta Grochot¹, Rafal Jakiela¹, Malgorzata Iwinska³, Tomasz Sochacki³, Hanka Przybylinska¹, Michal Bockowski³ and Maciej Sawicki¹; ¹Institute of Physics Polish Academy of Sciences, Poland; ²Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Poland; ³Institute of High Pressure Physics, Polish Academy of Sciences Warsaw, Poland

4:00 PM EQ01.06.10

Growth and Characterization of High-Temperature, High-Quality, Nitrogen-Polar InAlN Films Using Plasma Assisted Molecular Beam Epitaxy Majid Aalizadeh, Kamruzzaman Khan and Elaheh Ahmadi; University of Michigan--Ann Arbor, United States

SESSION EQ01.08: Oxides I
Session Chair: Hongping Zhao
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 318B

8:30 AM *EQ01.08.01

Progress in Ga₂O₃ Growth and Devices for High Voltage Switching Applications Marko Tadjer¹, Michael Mastro¹, Alan Jacobs¹, Joseph Spencer^{1,2}, Mona Ebrish³, James Gallagher¹, Jeffrey Woodward¹, Jennifer Hite¹, Karl Hobart¹ and Travis Anderson¹; ¹Naval Research Laboratory, United States; ²Virginia Tech, United States; ³National Research Council, United States

9:00 AM EQ01.08.02

An 8-nm-Thick Sn-Doped β-Ga₂O₃ MOSFET with a Normally-Off Operation Youngbin Yoon, Yongki Kim, Wansik Hwang and Myunghun Shin; Korea Aerospace University, Korea (the Republic of)

9:15 AM EQ01.08.03

β-Ga₂O₃ Heterojunction Field-Effect Transistors Prepared via UV Laser-Assisted p-Doping of WSe₂ Sanghyun Moon¹, Jinho Bae², Dongryul Lee² and Jihyun Kim¹; ¹Seoul National University, Korea (the Republic of); ²Korea University, Korea (the Republic of)

9:30 AM EQ01.08.04

Realization of Highly Rectifying Schottky Barrier Diodes and pn-Heterojunctions on κ-Ga₂O₃ Max Kneiß, Daniel Splith, Peter Schlupp, Anna Hassa, Holger von Wenckstern, Michael Lorenz and Marius Grundmann; Universität Leipzig, Germany

9:45 AM BREAK

10:15 AM EQ01.08.05

Design Study of Enhancement-Mode β-(Al_xGa_{1-x})₂O₃/Ga₂O₃ HEMT for Multi-kV Power Electronic Applications Alexander Senckowski and Man Hoi Wong; University of Massachusetts Lowell, United States

10:30 AM EQ01.08.06

NiO/β-Ga₂O₃ p-n Heterojunction for Improved High Temperature Performance Shahadat H. Sohel, Marshall B. Tellekamp, Ramchandra Kotecha,

Imran Khan, Karen Heinselman and Andriy Zakutayev; National Renewable Energy Lab, United States

SESSION EQ01.09: Oxides II
Session Chairs: Robert Kaplar and Julien Pernot
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 318B

1:30 PM *EQ01.09.01

Status of MOCVD Development of UWBG Ga₂O₃, AlGaO and Heterostructures Hongping Zhao, A F M Anhar Uddin Bhuiyan, Lingyu Meng and Zixuan Feng; The Ohio State University, United States

2:00 PM EQ01.09.02

Strategy for Achieving Optimal Electronic Performance in Group-IV Doped Ga₂O₃ Joe Willis^{1,2} and David O. Scanlon¹; ¹University College London, United Kingdom; ²Diamond Light Source, United Kingdom

2:15 PM EQ01.09.03

Thermal Stability of HVPE-Grown α -Ga₂O₃ on Sapphire Substrate in Different Environments Zhuoqun Wen¹, Kamruzzaman Khan¹, Elaheh Ahmadi¹ and Yuichi Oshima²; ¹University of Michigan, United States; ²SAMURAI, Japan

2:30 PM EQ01.09.04

Optimized Annealing for Activation of Implanted Si in β -Ga₂O₃ Katie R. Gann, Jonathan McCandless and Michael O. Thompson; Cornell University, United States

2:45 PM BREAK

3:15 PM EQ01.09.05

Comparison of Group-IV Donor Elements for Tailoring of Electrical Properties of α -Ga₂O₃ Grown by Pulsed Laser Deposition Sofie Vogt¹, Max Kneiß¹, Clemens Petersen¹, Thorsten Schultz², Holger von Wenckstern¹, Norbert Koch² and Marius Grundmann¹; ¹Universität Leipzig, Germany; ²Humboldt-Universität zu Berlin, Germany

3:30 PM EQ01.09.06

Improved Phase Stability of Orthorhombic κ -Ga₂O₃ Grown by Mist CVD Ha Young Kang, Gyeong Ryul Lee, Young-woo Heo and Roy B. Chung; Kyungpook National University, Korea (the Republic of)

SESSION EQ01.10: Oxides III
Session Chair: Srabanti Chowdhury
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 318B

8:30 AM *EQ01.10.01

Optically Detected Defect Levels in Ga₂O₃ Mary Ellen Zvanut and Suman Bhandari; University of Alabama-Birmingham, United States

9:00 AM EQ01.10.03

Atomic Scale Investigation of Point and Extended Defects in Ion Implanted β -Ga₂O₃ Hsien-Lien Huang¹, Christopher Chae¹, Alexander Senckowski², Man Hoi Wong² and Jinwoo Hwang¹; ¹The Ohio State University, United States; ²University of Massachusetts Lowell, United States

9:15 AM BREAK

9:45 AM EQ01.10.04

In Situ MOCVD Growth of Dielectric Al₂O₃ on β -(Al_xGa_{1-x})₂O₃: Interfaces and Band Offsets A F M Anhar Uddin Bhuiyan, Lingyu Meng, Zixuan Feng, Hsien-Lien Huang, Jinwoo Hwang and Hongping Zhao; The Ohio State University, United States

10:00 AM EQ01.10.05

High RT Mobility 2DEGs in a Modulation-Doped BaSnO₃/SrSnO₃ Heterostructure Hanjong Paik^{1,2}, Amit Verma³, Debdeep Jena^{1,1} and Darrell Schlom^{1,4,5}; ¹Cornell University, United States; ²Platform for the Accelerated Realization, Analysis, and Discovery of Interface Materials (PARADIM), United States; ³IIT Kanpur, India; ⁴Kavli Institute at Cornell for Nanoscale Science, United States; ⁵Leibniz-Institut für Kristallzüchtung, Germany

10:15 AM EQ01.10.06

MOCVD Growth of High-Quality β -(Al_xGa_{1-x})₂O₃ / β -Ga₂O₃ Heterostructures and Superlattices Doped in a Wide Range of Electron Concentrations Fikadu Alema¹, Takeki Itoh², Akhil Mauze², James S. Speck², Shubhra S. Pasayat³, Chirag Gupta³ and Andrei Osinsky¹; ¹Agnitron Technology Incorporated, United States; ²University of California, Santa Barbara, United States; ³University of Wisconsin-Madison, United States

10:30 AM EQ01.10.07

Characterization of κ -(Al_xIn_{1-x})₂O₃ Interfaces and Quantum Wells via X-Ray Photoelectron Spectroscopy and a Potential Application for Quantum-Well Infrared Photodetectors Thorsten Schultz^{1,2}, Max Kneiß³, Philipp Storm³, Daniel Splith³, Holger von Wenckstern³, Marius Grundmann³ and Norbert Koch^{1,2}; ¹Humboldt-Universität zu Berlin, Germany; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ³Universität Leipzig, Germany

10:45 AM EQ01.10.08

Strain States and Relaxation for α -(Al_xGa_{1-x})₂O₃ Thin Films on Prismatic Planes of α -Al₂O₃ in the Full Composition Range Max Kneiß¹, Daniel

Splith¹, Holger von Wenckstern¹, Michael Lorenz¹, Thorsten Schultz^{2,3}, Norbert Koch^{2,3} and Marius Grundmann¹; ¹Universität Leipzig, Germany; ²Humboldt-Universität zu Berlin, Germany; ³Helmholtz-Zentrum für Energie und Materialien GmbH, Germany

SESSION EQ01.11: Oxides IV
Session Chairs: Jack Flicker and Robert Kaplar
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, 318B

1:30 PM EQ01.11.01

Long-Lived Metastable AlScO₃ Perovskite—A Ultrawide Bandgap Hole Conductor with Low Ionization Energy of Small Hole Polarons Cheng-Wei Lee^{1,2}, Prashun Gorai^{1,2}, Emily McDonald^{1,2}, Andriy Zakutayev^{2,1} and Vladan Stevanovic^{1,2}; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

1:45 PM EQ01.11.02

Bragg Reflector Micro- and Nanowire Optical Cavities Based on Gallium Oxide—Exploring Light Confinement by Atomic Layer Deposition as an Alternative to Focused Ion Beam Patterning Manuel Alonso-Orts^{1,2}, Ruben Neelissen¹, Marco Schowalter¹, Daniel Carrasco², Emilio Nogales², Bianchi Méndez², Andreas Rosenauer¹ and Martin Eickhoff¹; ¹University of Bremen, Germany; ²Universidad Complutense de Madrid, Spain

2:00 PM EQ01.11.03

3D Imaging of β -Ga₂O₃ Crystal Using Multiphoton-Excitation Photoluminescence Tomoka Nishikawa¹, Mayuko Tsukakoshi¹, Ken Goto², Hisashi Murakami², Yoshinao Kumagai², Tomoyuki Tanikawa¹, Masahiro Uemukai¹ and Ryuji Katayama¹; ¹Osaka University, Japan; ²Tokyo University of Agriculture and Technology, Japan

2:15 PM BREAK

2:45 PM EQ01.11.05

High Aspect Ratio β -Ga₂O₃ FinFETs with Near-Zero Hysteresis and Low On-Resistance by Metal-Assisted Chemical Etching Hsien-Chih Huang¹, Zhongjie Ren², A F M Anhar Uddin Bhuiyan³, Zixuan Feng³, Andrew Green⁴, Keson Chabak⁴, Hongping Zhao³ and Xiuling Li^{2,1}; ¹University of Illinois Urbana-Champaign, United States; ²The University of Texas at Austin, United States; ³The Ohio State University, United States; ⁴AirForce Research Laboratory, United States

3:00 PM EQ01.11.06

Atomic Layer Deposition of Aluminium Doped Zn_{1-x}Mg_xO as Highly Transparent Conducting Films Poorani Gnanasambandan, Noureddine Adjeroud and Renaud Leturcq; Luxembourg Institute of Science and Technology, Luxembourg

SESSION EQ01.12: Diamond III
Session Chair: Julien Pernot
Monday Morning, May 23, 2022
EQ01-Virtual

8:00 AM *EQ01.12.01

Diffusion-Related Lifetime of Photoexcited Carriers in Ultrapure Diamond Nobuko Naka¹, Kazuki Konishi¹, Ikuko Akimoto², Hideto Matsuoka³, Viktor Djurberg⁴, Saman Majidi⁴ and Jan Isberg⁴; ¹Kyoto University, Japan; ²Wakayama University, Japan; ³Osaka City University, Japan; ⁴Uppsala University, Sweden

8:30 AM *EQ01.12.02

High-Mobility P-Channel Wide Bandgap Transistors Based on Hydrogen-Terminated Diamond and Hexagonal Boron Nitride Yamaguchi Takahide; NIMS, Japan

9:00 AM *EQ01.12.03

Optimal Design of Diamond Field Effect Transistors Towards a Key Milestone for Diamond Power Electronics Nicolas Rouger; CNRS, Laplace, Univ. Toulouse, France

9:30 AM EQ01.12.04

Design of a Source Field-Plated Deep-Depletion Diamond MOSFETs Marine Couret¹, Nicolas Rouger¹, Khaled Driche², Juliette Letellier², Anne Castelan¹ and Julien Pernot³; ¹Université Toulouse, Laplace, France; ²DiamFab, France; ³Institut Néel, France

9:45 AM EQ01.12.05

A Comparative Study of Structural and Electronic Properties of Group-IV Terminated Diamond (100) and (111) Surfaces Mahesh R. Neupane^{1,2}, Hector Gomez², Jenille Cruz³, Michael Groves³, Ruzmetov Dmitry¹, A G. Birdwell¹, James Weil¹, Pankaj Shah¹, Sergey Rudin¹ and Tony Ivanov¹; ¹U.S. Army Research Laboratory, United States; ²University of California, Riverside, United States; ³California State University, Fullerton, United States

SESSION EQ01.13: Nitrides/Oxides
Session Chair: Mahesh Neupane
Monday Morning, May 23, 2022
EQ01-Virtual

10:30 AM *EQ01.13.01

Surface Chemistry of Diamond for Quantum Applications Anke Krueger^{1,2}; ¹Julius-Maximilians-Universität Würzburg, Germany; ²Universität Stuttgart, Germany

11:00 AM *EQ01.13.02

Nanoscale and Quantum Engineering of III-Nitride Heterostructures for High Efficiency UV-C and Far UV-C Optoelectronics Ayush Pandey, Xianhe Liu, Yuanpeng Wu and Zetian Mi; University of Michigan, United States

11:30 AM EQ01.13.03

Shallow Donor and DX State in Si Doped AlN Nanowires Remy Vermeersch^{1,2}, Eric Robin², Ana Cros³, Gwénoél Jacopin¹, Bruno Daudin² and Julien Pernot¹; ¹Centre National de la Recherche Scientifique, France; ²CEA, France; ³Universitat de València, Spain

11:45 AM EQ01.13.04

Comparative Spectroscopic Study of Aluminum Nitride Grown by MOCVD in Hydrogen and Nitrogen Reaction Environment Samiul Hasan¹, Mohi Uddin Jewel¹, Stavros Karakalos¹, Mikhail Gaevski² and Iftikhar Ahmad¹; ¹University of South Carolina, United States; ²CVD Equipment Corporation, United States

12:00 PM EQ01.13.05

Tackling Disorder in γ -Ga₂O₃ Laura Ratcliff; Imperial College London, United Kingdom

12:15 PM EQ01.13.06

Investigation of Low-Frequency Noise Characteristics of GaN Vertical PIN Diodes at Elevated Temperatures Subhajit Ghosh¹, Kai Fu², Fariborz Kargar¹, Sergey Rumyantsev³, Yuji Zhao² and Alexander A. Balandin¹; ¹University of California, Riverside, United States; ²Rice University, United States; ³Institute of High-Pressure Physics, Polish Academy of Sciences, Poland

SESSION EQ01.14: Ultra-Wide Bandgap Materials and Devices I

Session Chair: Yoshinao Kumagai

Monday Afternoon, May 23, 2022

EQ01-Virtual

1:00 PM *EQ01.14.01

AlGa_N Channel HEMTs for High Voltage Applications Jash Mehta¹, Idriss Abid¹, Yvon Cordier², Fabrice Semond² and Farid Medjdoub¹; ¹IEMN-CNRS, France; ²CRHEA, France

1:30 PM EQ01.14.02

Defect Mediated and Diode Degradation in Wide Band-Gap AlGa_N Electronics Nicholas Baldonado¹, Julia Deitz² and Boris Kiefer¹; ¹New Mexico State University, United States; ²Sandia National Laboratories, United States

1:45 PM EQ01.14.03

Ultrawide Bandgap β -Ga₂O₃/p-GaN Heterojunction Barrier Schottky Rectifiers for Efficient Power Electronic Applications Dinusha Herath Mudiyanselage, Dawei Wang and Houqiang Fu; Iowa State University, United States

2:00 PM EQ01.14.04

Comprehensive Design and Simulation of E-Mode β -Ga₂O₃ Current-Aperture Vertical Electron Transistors Dawei Wang, Dinusha Herath Mudiyanselage and Houqiang Fu; Iowa State University, United States

2:15 PM EQ01.14.06

Post-synthesis Control of Oxygen Vacancy Concentrations in Metal Oxides via Exposure to Liquid Water Heonjae Jeong, Elif Ertekin and Edmund G. Seebauer; University of Illinois at Urbana-Champaign, United States

2:30 PM EQ01.03.02

Large Band Gap of Insulator Clay Nanosheets Barbara Pacakova¹, Per Erik Vullum² and Jon O. Fossum¹; ¹Norwegian University of Science and Technology, Norway; ²SINTEF Industry, NO-7034 Trondheim, Norway, Norway

2:35 PM *EQ01.04.05

Progress in Inversion Channel Diamond MOSFET Technologies Norio Tokuda¹, Kazuki Kobayashi¹, Xufang Zhang¹, Tsubasa Matsumoto¹, Takao Inokuma¹, Satoshi Yamasaki¹, Hiromitsu Kato², Masahiko Ogura², Toshiharu Makino², Daisuke Takeuchi² and Christoph E. Nebel^{1,3}; ¹Kanazawa Univ, Japan; ²National Institute of Advanced Industrial Science and Technology, Japan; ³Diamond and Carbon Applications, Germany

SESSION EQ01.15: Ultra-Wide Bandgap Materials and Devices II

Session Chair: Yoshinao Kumagai

Monday Afternoon, May 23, 2022

EQ01-Virtual

6:30 PM *EQ01.15.01

Development of Surface-Activated Bonding Technologies to Compensate for Shortcomings of Ga₂O₃ Devices Masataka Higashiwaki¹, Zhenwei Wang¹, Takahiro Kitada¹, Naoki Hatta², Kuniaki Yagi², Jianbo Liang³ and Naoteru Shigekawa³; ¹National Institute of Information & Comm Tech, Japan; ²SICOXS Corporation, Japan; ³Osaka City University, Japan

7:00 PM EQ01.15.02

Effects of Dislocation on Carrier Transport in α -Ga₂O₃ on M-Plane Sapphire Substrate [Hitoshi Takane](#)¹, Hirokazu Izumi² and Kentaro Kaneko¹;
¹Kyoto University, Japan; ²Hyogo Prefectural Institute of Technology, Japan

7:15 PM EQ01.15.03

MOVPE-Grown β -Ga₂O₃ Lateral Power Transistors with V_{BR} Exceeding 4 kV [Arkka Bhattacharyya](#)¹, Shivam Sharma², Fikadu Alema³, Praneeth Ranga¹, Saurav Roy⁴, Carl Peterson⁴, George Seryogin³, Andrei Osinsky³, Uttam Singiseti² and Sriram Krishnamoorthy⁴; ¹The University of Utah, United States; ²University at Buffalo, The State University of New York, United States; ³Agnitron technologies Incorporated, United States; ⁴University of California, Santa Barbara, United States

7:30 PM EQ01.15.04

Influence of HCl Support on the α -Ga₂O₃ Thin Film Properties Growth by Mist Chemical Vapor Deposition [Tatsuya Yasuoka](#), Yoshiro Kawanishi, Li Liu, Giang T. Dang and Toshiyuki Kawaharamura; Kochi University of Technology, Japan

7:45 PM *EQ01.15.05

Reduction of Threshold Current Density in UV-C LDs Fabricated on AlN Substrates [Maki Kushimoto](#)¹, Ziyi Zhang^{1,2}, Yoshio Honda¹, Leo J. Schowalter¹, Chiaki Sasaoka¹ and Hiroshi Amano¹; ¹Nagoya University, Japan; ²Asahi Kasei corporation, Japan

SESSION EQ01.16: Ultra-Wide Bandgap Materials and Devices III

Session Chair: Yoshinao Kumagai

Monday Afternoon, May 23, 2022

EQ01-Virtual

9:00 PM *EQ01.16.01

Crystal Growth of β -Ga₂O₃ for Application in Power Electronic Devices [Kohei Sasaki](#) and Akito Kuramata; Novel Crystal Technology, Inc., Japan

9:30 PM EQ01.16.02

Fabrication of Highly-Oriented Wide-Bandgap Oxide Thin Films on the Surface-Modified Polymer Substrates by Room-Temperature UV Laser/Light Processes [Tomoaki Oga](#)¹, Ryoya Kai¹, Naho Kaneko¹, Kenta Kaneko¹, Satoru Kaneko^{2,1}, Hisashi Miyazaki³, Akifumi Matsuda¹ and Mamoru Yoshimoto¹; ¹Tokyo Institute of Technology, Japan; ²Kanagawa Institute of Industrial Science and Technology, Japan; ³National Defense Academy, Japan

9:45 PM EQ01.16.03

Effect of Off-Axis Angle of C-Plane Sapphire Substrate for Cubic In₂O₃(111) Single-Crystal Layer Growth by Halide Vapor Phase Epitaxy [Ken Goto](#)¹, Akane Mori¹, Rie Togashi² and Yoshinao Kumagai¹; ¹Tokyo University of Agriculture and Technology, Japan; ²Sophia University, Japan

10:00 PM *EQ01.16.04

Fabrication of High-Quality Templates by Face-to-Face Annealing of Sputtered AlN for Deep UV LEDs [Hideto Miyake](#), Kenjiro Uesugi, Kanako Shojiki, Shiyu Xiao and Shigeyuki Kuboya; Mie University, Japan

10:30 PM EQ01.16.06

Growth Mechanism of 2-Inch High-Quality Heteroepitaxial Diamond Free-Standing Wafers on Sapphire for High-Power Diamond FETs [Makoto Kasu](#)¹, Seong-Woo Kim², Ryota Takaya¹ and Niloy S. Chandra¹; ¹Saga University, Japan; ²Adamant Namiki Precision Jewel, Japan

##PAGE_BREAK##

SYMPOSIUM EQ02

Harnessing Functional Defects in Energy and Electronic Materials

May 9 - May 23, 2022

Symposium Organizers

Carmela Aruta, National Research Council

Panchapakesan Ganesh, Oak Ridge National Laboratory

Hua Zhou, Argonne National Laboratory

Yuanyuan Zhou, Hong Kong Baptist University

* Invited Paper

SESSION EQ02.01: Harvesting Functional Defects in Light Harvesting I
Session Chairs: Junwoo Son and Hua Zhou
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 319A

10:30 AM *EQ02.01.01

Defect Engineering and Doping Control in Halide Perovskite Materials David B. Mitzi; Duke University, United States

11:00 AM *EQ02.01.02

Ionic Defects in Halide Perovskite Solar Cells Carsten Deibel¹, Sandhya Tammireddy¹, Sebastian Reichert¹, Qingzhi An², Alexander D. Taylor², Ran Ji² and Yana Vaynzof²; ¹Institut für Physik, Chemnitz University of Technology, Germany; ²Technical University of Dresden, Germany

11:30 AM EQ02.01.03

Electrochemical Doping of Halide Perovskites by Interstitial Au⁺ and Ag⁺ Sourced from Metal Contacts Ross Kerner¹, Ayala Cohen², Zhaojian Xu³, Leeor Kronik² and Barry P. Rand³; ¹National Renewable Energy Laboratory, United States; ²Weizmann Institute of Science, Israel; ³Princeton University, United States

11:45 AM EQ02.01.04

Defects Evolution in the Degradation of Metal Halide Perovskite Solar Cells Under Reverse-Bias and Illumination Zhenyi Ni¹, Haoyang Jiao¹, Chengbin Fei¹, Haogyu Gu¹, Yanfa Yan² and Jinsong Huang¹; ¹University of North Carolina at Chapel Hill, United States; ²University of Toledo, United States

SESSION EQ02.02: Functional Defects in Metal Oxide Thin Films and Nanostructures I
Session Chairs: Carmela Aruta and In Chung
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 319A

1:30 PM *EQ02.02.01

Emerging Functionalities by Reversibly Controllable Defects Across Oxide Interfaces Junwoo Son; Pohang University of Science and Technology, Korea (the Republic of)

2:00 PM EQ02.02.02

Reversible Control of In-Gap States from Surface Oxygen Vacancies in Perovskite Stannates with Ultraviolet Light Yujeong Lee, Daseob Yoon, Hyeji Sim, Si-Young Choi and Junwoo Son; Pohang University of Science and Technology, Korea (the Republic of)

2:15 PM EQ02.02.03

Control of Surface Cation Enrichment in Perovskite-Type Oxides for Energy Conversion Devices Bonjae Koo; Sungshin Women's University, Korea (the Republic of)

2:30 PM EQ02.02.04

Polyamorphism in Photodeposited Amorphous Metal Oxy(hydroxides) Electrocatalysts and Semiconductors Simon Trudel, Nicholas Randell, Martin Schon and Renaud Miclette Lamarche; University of Calgary, Canada

2:45 PM EQ02.02.05

Perfect is Not Always Better—Oxygen Vacancy-Rich Metal-Oxides and Their Use for the Additive Manufacturing of Sunlight-Activated Photocatalytic Cells and Other Complex Device Architectures Jaime-Alberto Benavides-Guerrero, Paul Fourmont, Arjun Wadhwa, Luis-Felipe Gerlein, Yin Bai, Debika Banerjee and Sylvain G. Cloutier; Ecole de Technologie Supérieure, Canada

SESSION EQ02.03: Harvesting Functional Defects in Light Harvesting II
Session Chairs: Hua Zhou and Yuanyuan Zhou
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 319A

8:30 AM *EQ02.03.01

Detecting Defects Evolution in Operational Perovskite Solar Cells Jinsong Huang and Zhenyi Ni; University of North Carolina-Chapel Hill, United States

9:00 AM *EQ02.03.02

Controlling Surface and Interface Defects in Halide Perovskite Semiconductors David S. Ginger; University of Washington, United States

9:30 AM EQ02.03.04

Impact of Metastable Defect Structures on Carrier Recombination in Solar Cells Seán R. Kavanagh^{1,2}, Aron Walsh², David O. Scanlon¹ and Christoph Freysoldt³; ¹University College London, United Kingdom; ²Imperial College London, United Kingdom; ³Max-Planck-Institut für Eisenforschung GmbH, Germany

9:45 AM BREAK

SESSION EQ02.04: Functional Defects in Metal Oxide Thin Films and Nanostructures II

Session Chair: Rajeev Ahuja
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 319A

10:30 AM *EQ02.04.01

Optimizing Nanoscale Defects for Enhanced Vortex-Pinning in High-Temperature Superconducting Wires Amit Goyal; SUNY-Buffalo, United States

11:00 AM *EQ02.04.02

Oxygen Vacancies at CeO₂ Surfaces and Catalysis for Environmental Applications Maria Veronica Ganduglia-Pirovano; Institute of Catalysis and Petrochemistry-CSIC, Spain

11:30 AM EQ02.04.03

Comparison of Positron Lifetimes Across Oxide Chemistry, Structure and Charge Alejandro Lopez-Bezanilla¹, Farida Selim² and Blas P. Uberuaga¹; ¹Los Alamos National Laboratory, United States; ²Bowling Green University, United States

SESSION EQ02.05: Functional Defects for Energy and Environmental Sustainability I

Session Chairs: Maria Veronica Ganduglia-Pirovano and Amit Goyal
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 319A

1:30 PM *EQ02.05.01

Materials Informatics as the Fourth Paradigm—An Industrial Perspective Chen Ling; Toyota Research Institute of North America, United States

2:00 PM EQ02.05.02

Locating Anion and Cation Point Defects in Doped Ceria Materials Mai Tan, Rachel Gorelik and Peter A. Crozier; Arizona State University, United States

2:15 PM EQ02.05.03

The Effect of Geometric Crowding by Defects on Fast Ionic Conductivity Andrey Poletayev^{1,2}, James Dawson^{3,3}, M. Saiful Islam⁴ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³The University of Newcastle, United Kingdom; ⁴University of Bath, United Kingdom

2:30 PM EQ02.05.04

Site-Selective Doping Mechanisms for the Enhanced Photocatalytic Activity of Tin Oxide Nanoparticles Woo-Sung Jang¹, Yeongrok Jin², Sang-Hyeok Yang¹, Seon Je Kim¹, Jung A. Hong¹, Young-Hoon Kim¹, Jaeyoon Baik³, Jaekwang Lee², Hangil Lee⁴ and Young-Min Kim¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Pohang Accelerator Laboratory, Korea (the Republic of); ⁴Sookmyung Women's University, Korea (the Republic of)

2:45 PM EQ02.05.05

Dynamic Z-Scheme-Driven Heterojunction Photocatalyst Design for Hydrogen Production from Water Splitting Valeriia Poliukhova^{1,2}, Jong-Ku Park¹, Sovann Khan^{3,4}, Wenwei Lei^{5,3}, Doyeon Kim^{1,2}, Seungchul Kim^{1,2}, Ken-Ichi Katsumata³ and So-Hye Cho^{1,2}; ¹Korea Institute of Science & Technology, Korea (the Republic of); ²Korea University of Science and Technology, Korea (the Republic of); ³Tokyo University of Science, Japan; ⁴Kyushu University, Japan; ⁵Yanshan University, China

3:00 PM BREAK

3:30 PM EQ02.05.07

Stabilization of Ir-Based Catalysts During the Oxygen Evolution Reaction by Oxygen-Rich Metal Oxide Supports Gyu Rac Lee¹, Jin Young Kim² and Yeon Sik Jung¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

3:45 PM EQ02.05.08

Improved Durability of Pt/C for Oxygen Reduction via Trapping at Graphene Defect Sites Kyu-Young Park¹, Matthew Sweers¹, Ulrich Berner², Erhard Hirth², Julia R. Downing¹, Janan Hui¹, Jonathan Mailoa³, Christina Johnston³, Soo Kim³, Linsey Seitz¹ and Mark C. Hersam^{1,1,1}; ¹Northwestern University, United States; ²Robert Bosch GmbH, Germany; ³Robert Bosch LLC, United States

SESSION EQ02.06: Poster Session I: Functional Defects I

Session Chairs: Hua Zhou and Yuanyuan Zhou
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ02.06.01

Comparative Study of Carbon Doping in 2D Hexagonal Boron Nitride Films Eoin O'Sullivan¹, Chelsea Xia¹, Dipankar Chugh², Dillon McGurty¹, Nicole Grobert¹, Michael Johnston¹ and Chennupati Jagadish²; ¹University of Oxford, United Kingdom; ²The Australian National University, Australia

EQ02.06.02

Signature of Many-Body Localization of Phonons in Strongly Disordered Superlattices [Thanh Nguyen](#)¹, Nina Andrejevic¹, Hoi Chun Po^{1,2}, Qichen Song¹, Yoichiro Tsurimaki^{1,3}, Nathan C. Drucker⁴, Ahmet Alatas⁵, Esen E. Alp⁵, Bogdan M. Leu^{5,6}, Alessandro Cunsolo⁷, Yong Q. Cai⁸, Lijun Wu⁸, Joseph A. Garlow⁸, Yimei Zhu⁸, Hong Lu⁹, Arthur C. Gossard¹⁰, Alexander A. Puretsky¹¹, David B. Geohegan¹¹, Shengxi Huang¹² and Mingda Li¹; ¹Massachusetts Institute of Technology, United States; ²The Hong Kong University of Science and Technology, Hong Kong; ³Stanford University, United States; ⁴Harvard University, United States; ⁵Argonne National Laboratory, United States; ⁶Miami University, United States; ⁷University of Wisconsin–Madison, United States; ⁸Brookhaven National Laboratory, United States; ⁹Nanjing University, China; ¹⁰University of California, Santa Barbara, United States; ¹¹Oak Ridge National Laboratory, United States; ¹²The Pennsylvania State University, United States

EQ02.06.03

Enhancement Performance and Reliability Using Defect Control for PEMFC [Ji Hyeok Choi](#)¹, Haeun Kang¹, Hyeongwoo Min¹, Dong-Joo Kim² and Young Soo Yoon¹; ¹Gachon University, Korea (the Republic of); ²Auburn University, United States

EQ02.06.04

Design of Single-Layer Graphene over Cobalt Nanoparticles and Insight into Active Sites for Efficient Oxygen Evolution Gisang Park, Cheol-Hwan Shin, Ha-Young Lee and [Jong-Sung Yu](#); Daegu Gyeongbuk Institute of Science and Technology (DGIST), Korea (the Republic of)

EQ02.06.05

Synthesis of Single-Atom and Dual-Atom Catalyst Using N-Defective C₃N₄ [Sang yong Shin](#) and Hyunjoon Lee; KAIST (Korea Advanced Institute of Science and Technology), Korea (the Republic of)

EQ02.06.06

Ultra-Fast Visible Light Photodection with α -Fe₂O₃ Grown on p-Silicon Punya Mainali, Nishan Khatri, Alex Bias, Kaan Kalkan and [David McIlroy](#); Oklahoma State University, United States

SESSION EQ02.07: Functional Defects for Electronic and Optoelectronic Materials I

Session Chairs: Carmela Aruta and Weimin Chen

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 319A

8:30 AM *EQ02.07.01

Spatial Defects and Metal Contacts Nanoengineering for Bipolar Conductivity in 2D Materials [Elisa Riedo](#), Carmela Aruta, Annalisa Calo, Davood Shahrjerdi, Xiaorui Zheng and Tengfei Cao; New York University, United States

9:00 AM EQ02.07.02

Graph Neural Network and Tight Binding Approaches for Fast and Accurate Predictions of Defect Energetics [Kamal Choudhary](#); National Institute of Standards and Technology, United States

9:15 AM EQ02.07.03

Functional Adsorption Mechanisms in Hybrid 2-D TiMxene-WSe₂ Materials [Lia Stanciu](#) and Winston Y. Chen; Purdue University, United States

9:30 AM EQ02.07.04

Impact of Site Disorder on Electronic Properties in ZnGeN₂ [Jacob Cordell](#)^{1,2}, Moira Miller^{1,2}, Marshall B. Tellekamp², Garritt Tucker¹, Adele Tamboli² and Stephan Lany²; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

9:45 AM BREAK

SESSION EQ02.08: Functional Defects for Energy and Environmental Sustainability II

Session Chairs: Carmela Aruta and Weimin Chen

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 319A

10:15 AM *EQ02.08.01

Defect Engineering in the Crystal Lattice for Higher Thermoelectric Performance [In Chung](#)^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Institute for Basic Science, Korea (the Republic of)

10:45 AM EQ02.08.02

Ordered-Vacancy Chalcogenides—New N-Type Dopable Diamond-Like Semiconductors with High Thermoelectric Performance [Jiaxing Qu](#) and Elif Ertekin; University of Illinois at Urbana Champaign, United States

11:00 AM EQ02.08.03

Determination of the Cr Charge State in Thermoelectric PbTe:Cr Through Direct Magnetometry Katarzyna Gas, Aleksandra Króllicka, Sławomir Kret, Krzysztof Dybko, Tomasz Story and [Maciej Sawicki](#); Institute of Physics Polish Academy of Sciences, Poland

SESSION EQ02.09: Functional Defects for Electronic and Optoelectronic Materials II

Session Chairs: Elisa Riedo and Junwoo Son

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 319A

1:30 PM *EQ02.09.01

Spin Functional Defects Enable Room-Temperature Electron Spin Polarization Exceeding 90% in an Opto-Spintronic Semiconductor Nanostructure

Y.Q. Huang¹, V. Polojärvi², S. Hiura³, P. Hojer¹, A. Aho², R. Isoaho², T. Hakkarainen², M. Guina², S. Sato³, J. Takayama³, A. Murayama³, Irina A. Buyanova¹ and Weimin M. Chen¹; ¹Linköping University, Sweden; ²Tampere University, Finland; ³Hokkaido University, Japan

2:00 PM EQ02.09.02

Charge-Generating Mid-Gap Trap States Limiting Organic Electronic Devices Oskar Sandberg, Paul Meredith and Ardalan Armin; Swansea University, United Kingdom

2:15 PM EQ02.09.03

Oxygen Defects Alter the Optical and Electronic Properties of Epitaxially Grown Zinc Nitride Layers Elise I. Sirotti, Stefan Böhm, Franziska S. Hegner, Verena Streibel, Johanna Eichhorn, Chang-Ming Jiang, Laura I. Wagner, Matthias Kuhl and Ian D. Sharp; Technische Universität München, Germany

2:30 PM BREAK

3:00 PM *EQ02.09.04

Machine Learning Defect Properties of Semiconductors Arun Kumar Mannodi Kanakkithodi¹, Jiaqi Yang¹, Xiaofeng Xiang², Laura Jacoby² and Maria K. Chan³; ¹Purdue University, United States; ²University of Washington, United States; ³Argonne National Laboratory, United States

3:30 PM EQ02.09.05

Defect-Enhanced Recovery Processes for Heterogeneous Integration of Ge on Si Eveline Postelnicu¹, Ruitao Wen², Danhao Ma¹, Baoming Wang¹, Kazumi Wada¹, Jurgen Michel¹ and Lionel C. Kimerling¹; ¹Massachusetts Institute of Technology, United States; ²Southern University of Science and Technology, China

3:45 PM EQ02.09.06

Small Defects, Big Deal—Using Point Defects to Control Giant Opto-Mechanical Effects and to Engineer New Resistive Switches Rafael Jaramillo; Massachusetts Institute of Technology, United States

4:00 PM EQ02.09.07

Covalent Defects in Carbon Nanotubes—Dependence of Exciton Energy on Defect-Defect Couplings and Configurations Svetlana V. Kilina, Braden Weight and August Amb; North Dakota State University, United States

SESSION EQ02.10: Poster Session II: Functional Defects II

Session Chairs: Hua Zhou and Yuanyuan Zhou

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ02.10.01

Enhancing N-Type Thermoelectric Performance in Bi₂Te₃-Based System Through Structural Modulation by Incorporating Excess Alkali Metal and Chalcogen Atoms Hyungseok Lee^{1,2} and In Chung^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Institute for Basic Science, Korea (the Republic of)

EQ02.10.02

Ultra-Low Pt Catalyst Supported on Block Copolymer-Based Carbon with Connected Channels for High-Performance PEMFCs Hee-Eun Kim, Young Jun Lee and Hyunjoon Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ02.10.04

Surface Characterization of the Structural Defects in MoS₂ Atomic Layers Formed by Lithium Intercalation Haydee Pacheco, Jessica Johnson, Adrian B. Mann and Deirdre O'Carroll; Rutgers, The State University of New Jersey, United States

EQ02.10.05

Controlling Formation and Energetics of Chemically Reactive Schottky Defects in Multinary Oxides Eli Nygren¹, Robert Bell², Sarah Shulda², Dan Plattenberger², Eric Coker³, Nicholas Strange^{2,4}, Karen Heinselman², Philip Parilla², Anthony McDaniel³, Michael Toney⁴, Sai Gautam Gopalakrishnan⁵, Emily A. Carter⁶, Ellen Stechel⁷, Sue Carter¹ and David Ginley²; ¹University of California, Santa Cruz, United States; ²National Renewable Energy Laboratory, United States; ³Sandia National Laboratories, United States; ⁴SLAC National Accelerator Laboratory, United States; ⁵Indian Institute of Science, India; ⁶Princeton University, United States; ⁷Arizona State University, United States

SESSION EQ02.11: Functional Defects in Halide Perovskites

Session Chairs: Panchapakesan Ganesh and Hua Zhou

Monday Morning, May 23, 2022

EQ02-Virtual

10:30 AM *EQ02.11.01

Defects and Halide Perovskites—Tautology, Oxymoron, or ... How Do They Get Along? David Cahen; Weizmann Institute and Bar-Ilan University, Israel

11:00 AM *EQ02.11.02

Octahedral Tilt Prevents Formation of Nanoscale Trap Clusters in Halide Perovskite Semiconductors that Otherwise Limit Performance and Cause Instabilities Samuel D. Stranks; University of Cambridge, United Kingdom

11:30 AM *EQ02.11.03

How Scientific Machine Learning and High-Throughput Experimentation Can Help Elucidate Defect Dynamics Richa Naik, Armi Tiihonen, Janak Thapa, Clio Batali, James Serdy, Alexander E. Siemenn, Zhe Liu, Shijing Sun and Tonio Buonassisi; Massachusetts Institute of Technology, United States

12:00 PM *EQ02.11.04

Perovskite Interface Microstructures—On and Beyond Grain Boundaries Yuanyuan Zhou; Hong Kong Baptist University, China

12:30 PM EQ02.11.05

Tuning Thermoelectric Transport in Ag Modified Sb₂Te₃ Through Band-Structure Modifications and Carrier Filtering Abhishek Ghosh and Bodh Raj Mehta; IIT Delhi, India

SESSION EQ02.12: Functional Defects in Energy and Electronic Materials

Session Chairs: Carmela Aruta and Yuanyuan Zhou

Monday Afternoon, May 23, 2022

EQ02-Virtual

1:00 PM *EQ02.12.01

Highly Defective Oxides—The Next Generation of Electromechanical Materials Nini Pryds; Technical University of Denmark, Denmark

1:30 PM *EQ02.12.02

Synthesis and Advanced Characterization of Quantum Materials by Synchrotron Techniques—An All-*In Situ* Open-Access Platform Pasquale Orgiani; CNR-IOM Tasc laboratory, Italy

2:00 PM *EQ02.12.03

Engineering Defect Formation in Functional Oxide Thin Films and Heterostructures Regina Dittmann; Forschungszentrum Jülich GmbH, Germany

2:30 PM EQ02.12.04

High-Throughput Search for Potential Plasmonic Spinel Oxides Steven T. Hartman, Ekaterina Dolgoplova, Jennifer Hollingsworth and Ghanshyam Pilania; Los Alamos National Laboratory, United States

2:45 PM EQ02.12.05

Function and Electronic Structure of Defects in the SnO₂ Buffer Layer Between the α -Fe₂O₃ Water Oxidation Photoelectrode and the Transparent Conducting Oxide Current Collector Yelin Hu^{1,2}, Florent Boudoire^{1,3}, Matthew Mayer², Songhak Yoon¹, Michael Grätzel² and Artur Braun¹; ¹Empa, Switzerland; ²EPFL, Switzerland; ³Universität Basel, Switzerland

SESSION EQ02.13: Harnessing Functional Defects in Energy and Electronic Materials

Session Chairs: Panchapakesan Ganesh, Hua Zhou and Yuanyuan Zhou

Monday Afternoon, May 23, 2022

EQ02-Virtual

4:00 PM *EQ02.13.01

Defect Chemistry, Structure and Property Evolution During Amorphous-to-Crystalline Transformation of Mixed Conducting Oxides Nicola H. Perry; University of Illinois at Urbana-Champaign, United States

4:30 PM *EQ02.13.02

Understanding and Controlling Materials Atom-by-Atom Bobby G. Sumpter, David Lingerfelt, Jacek Jakowski and Panchapakesan Ganesh; Oak Ridge National Laboratory, United States

5:00 PM EQ02.13.03

Investigations of Interactions Between Thin Metal Catalyst Films and a-TiO₂ Photoelectrode Protection Layers Through Synchrotron Wen-Hui Cheng^{1,2}, Matthias Richter², Ethan Crumlin³, Walter S. Drisdell³, Harry A. Atwater², Dieter Schmeißer⁴, Nathan S. Lewis² and Bruce S. Brunschwig²; ¹National Cheng Kung University, Taiwan; ²California Institute of Technology, United States; ³Lawrence Berkeley National Laboratory, United States; ⁴BTU Cottbus, Germany

5:15 PM EQ02.13.04

Ferroelectrics Meet Ionics in the Land of van der Waals Petro Maksymovych¹, Andrew O'Hara², Mengwei Si³, Peide Ye³, Michael McGuire¹, Michael A. Susner⁴, Sokrates Pantelides² and Nina Balke⁵; ¹Oak Ridge National Laboratory, United States; ²Vanderbilt University, United States; ³Purdue University, United States; ⁴Air Force Research Laboratory, United States; ⁵North Carolina State University, United States

5:30 PM EQ02.13.05

Harvesting Oxygen Vacancies in Cobaltites for Low Power Neuromorphic Devices Shenli Zhang¹, I-Ting Chiu², Minhan Lee³, Brandon Gunn³, Hien Vo¹, Mingzhen Feng², Tae Joon Park⁴, Padraic Shafer⁵, Alpha T. N'Diaye⁵, Fanny M. Rodolakis⁶, Shriram Ramanathan⁴, Alex Frano³, Ivan K. Schuller³, Yayoi Takamura² and Giulia Galli^{1,6}; ¹University of Chicago, United States; ²University of California, Davis, United States; ³University of California, San Diego, United States; ⁴Purdue University, United States; ⁵Lawrence Berkeley National Laboratory, United States; ⁶Argonne National Laboratory, United States

5:45 PM EQ02.13.06

Characterization of Defect Populations and Evolution in Complex Oxides Using Atom Probe Tomography and Isotopic Tracers [Kayla H. Yano](#)¹, Sandra Taylor¹, Sten V. Lambeets¹, Elizabeth Kautz¹, Sydney C. Neuman^{1,2}, Bethany Matthews¹, Le Wang¹, Yingge Du¹ and Steven R. Spurgeon¹; ¹Pacific Northwest National Laboratory, United States; ²Rensselaer Polytechnic Institute, United States

##PAGE_BREAK##

SYMPOSIUM EQ03

Next Generation Organic Semiconductors—Materials, Fundamentals and Applications
May 9 - May 25, 2022

Symposium Organizers

Oana Jurchescu, Wake Forest University
Emanuele Orgiu, Université du Québec/Institut National de la Recherche Scientifique
Natalie Stingelin, Georgia Institute of Technology
Yutaka Wakayama, NIMS

* Invited Paper

SESSION EQ03.01: Devices I
Session Chair: Beatrice Fraboni
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 316B

10:30 AM *EQ03.01.01

High-Performance Organic Electronics [Karl Leo](#); IAPP, Germany

11:00 AM *EQ03.01.02

Using Ions to Control Conduction in Semiconducting Polymers [Michael L. Chabinyc](#); University of California, Santa Barbara, United States

11:30 AM *EQ03.01.03

Conjugated Polyelectrolytes for Organic Electrochemical Transistors [Thuc-Quyen Nguyen](#); University of California, Santa Barbara, United States

SESSION EQ03.02: Organic Field-Effect Transistors
Session Chair: Eleni Stavrinidou
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 316B

1:30 PM EQ03.02.01

Reconfigurable Organic Logic Circuits Based on a Dual-Gate Antiambipolar Transistor [Ryoma Hayakawa](#)¹, Kosuke Honma^{1,2}, Shu Nakaharai¹, Kaname Kanai² and Yutaka Wakayama^{1,2}; ¹National Institute for Materials Science, Japan; ²Tokyo University of Science, Japan

1:45 PM EQ03.02.02

Photopatternable Control of Threshold Voltage in Organic Transistors for Ultraflexible Complementary Circuits [Koki Taguchi](#)^{1,2,3}, Takafumi Uemura^{1,3}, Andreas Petritz⁴, Naoko Namba^{1,3}, Teppei Araki^{1,2,3}, Masahiro Sugiyama^{1,2,3}, Barbara Stadlober⁴ and Tsuyoshi Sekitani^{1,2,3}; ¹Osaka University, Japan; ²Osaka University, Japan; ³National Institute of Advanced Industrial Science and Technology, Japan; ⁴Joanneum Research Forschungsgesellschaft mbh, Austria

2:00 PM EQ03.02.03

Charge Transport Investigation in Solution Processed Organic Field-Effect Transistors Based on sp-Hybridized Cumulenic Carbon Wires [Stefano Pecoraro](#)^{1,2}, Daniele Fazzi³, Alberto Davide Scaccabarozzi¹, Edgar Gutiérrez-Fernández⁴, Pietro Marabotti², Carlo Spartaco Casari², Rik Tykwinski⁵ and Mario Caironi¹; ¹Istituto Italiano di Tecnologia, Italy; ²Politecnico di Milano, Italy; ³Università di Bologna, Italy; ⁴Polymat, Spain; ⁵University of Alberta, Canada

2:15 PM EQ03.02.04

A Pathway to Enable Efficient Performance in Organic Field-Effect Transistors with Low-Cost, Scalable Contacts [Matthew Waldrip](#)¹, Yue Yu¹,

Derek Dremann¹, Iain McCulloch² and Oana D. Jurchescu¹; ¹Wake Forest University, United States; ²University of Oxford, United Kingdom

2:30 PM *EQ03.02.05

High-Performance and Reliable Lead-Free Layered-Perovskite Transistors Yong-Young Noh; Pohang University of Science and Technology, Korea (the Republic of)

3:00 PM BREAK

SESSION EQ03.03: Material Design and Synthesis

Session Chair: Jason Azoulay

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 316B

3:30 PM EQ03.03.02

Reimagining Synthetic Approaches and Architectures for Semiconducting Polymers Barry C. Thompson; University of Southern California, United States

3:45 PM EQ03.03.03

Photoactivation Properties of Self-N-Doped Organic Semiconductors—Concentration-Dependent Radical and Biradical Formation Daniel R. Powell and Luisa L. Whittaker-Brooks; University of Utah, United States

4:00 PM EQ03.20.04

Attaining Infrared Detection in Devices with Narrow Bandgap Conjugated Polymers Jasmine Lim¹, Naresh Eedugurala¹, Vikash Kaphle¹, Tse N. Ng² and Jason D. Azoulay¹; ¹The University of Southern Mississippi, United States; ²University of California, San Diego, United States

4:15 PM EQ03.20.03

Synthetic Nuances to Maximize N-Type Organic Electrochemical Transistor and Thermoelectric Performance in Fused Lactam Polymers Adam Marks^{1,2}, Xingxing Chen³, Ruiheng Wu⁴, Reem B. Rashid⁴, Wenlong Jin⁵, Bryan Paulsen⁴, Maximilian Moser¹, Xudong Ji⁴, Sophie Griggs¹, Dilara Meli⁴, Helen Bristow¹, Nicola Gasparini⁶, Simone Fabiano⁵, Jonathan Rivnay⁴ and Iain McCulloch¹; ¹University of Oxford, United Kingdom; ²Stanford University, United States; ³King Abdullah University of Science and Technology, Saudi Arabia; ⁴Northwestern University, United States; ⁵Linköping University, Sweden; ⁶Imperial College London, United Kingdom

4:30 PM EQ03.20.06

Bridging Molecules and Polymer Semiconductor Device Performance Chad R. Snyder; National Institute of Standards and Technology, United States

SESSION EQ03.04: Poster Session I: Next Generation Organic Semiconductors—Materials, Fundamentals and Applications I

Session Chair: Maryam Alsufyani

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ03.04.01

The Signatures of Polarons and Bipolarons in the Raman Spectrum of Molecularly P-Doped poly(3-hexylthiophene-2,5-diyl) Ahmed E. Mansour^{1,2}, Ana M. Valencia^{2,3}, Dominique Lungwitz², Berthold Wegner^{1,2}, Naoki Tanaka⁴, Yoshiaki Shoji⁵, Takanori Fukushima⁵, Andreas Opitz², Caterina Cocchi^{2,3} and Norbert Koch^{1,2}; ¹Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ²Humboldt-Universität zu Berlin, Germany; ³Carl von Ossietzky Universität Oldenburg, Germany; ⁴Kyushu University, Japan; ⁵Tokyo Institute of Technology, Japan

EQ03.04.02

Improvement of Efficiency in Inverted Green and Blue Phosphorescent Organic Light-Emitting Diodes Using Red Dye-Doped Hole Transport Layers Hyunkoo Lee; Sookmyung Women's University, Korea (the Republic of)

EQ03.04.03

High-Efficiency Organic Light-Emitting Devices Involving Au(I) Complexes as Singlet Exciton Sensitizers Seunga Heo¹, Kyungmin Kim², Yongsik Jung³, Joonghyuk Kim³, Hye Jin Bae³, Hyeonho Choi³, Jaeheung Cho² and Youngmin You¹; ¹Ewha Womans University, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of); ³Samsung Advanced Institute of Technology, Korea (the Republic of)

EQ03.04.04

Efficient Coupling of Heavy Atom Effects and Orbital Angular Momentum Towards Fast and Efficient Metal-Free Organic Phosphors Wenhao Shao¹, Hanjie Jiang¹, Byeongseop Song¹, Jie Hao², Dongryun Lee³, Jun Yeob Lee³, Paul Zimmerman¹ and Jinsang Kim¹; ¹University of Michigan, United States; ²Nankai University, China; ³Sungkyunkwan University, Korea (the Republic of)

EQ03.04.05

Naphthalene Diimide-Based Conjugated Polymers as Promising Organocatalysts for Photocatalytic CO₂ Reaction Lee Yih Wang, Shih-Hao Wang, Pin-Zhen Chen and Cheng-Wei Cai; National Taiwan University, Taiwan

EQ03.04.06

Design and Synthesis of Molecular Semiconductors Tailored to Couple with Vacuum Field Rahul Meena and Yves Geerts; Universite Libre Du Bruxelles, Belgium

EQ03.04.07

Tuning Thermoelectric Properties in an Organic Electrochemical Transistor Through Side Chains Engineering of Conducting Polymers Soonyong Lee¹, Woojin Choi², Ayushi Tripathi¹, Soohyun Kim², Yoonjoo Lee¹, Changhwa Jung², Hyunjung Lee² and Han Young Woo¹; ¹Korea University, Korea (the Republic of); ²Kookmin University, Korea (the Republic of)

EQ03.04.08

Study of the Bulk Polymorphism of Best Performing Molecular Semiconductors Priya Pandey^{1,2}, Yves Geerts^{3,3}, Enrico Modena¹ and Lucia Maini²; ¹PolyCrystalLine SPA, Italy; ²University of Bologna, Italy; ³Université Libre de Bruxelles (ULB), Belgium

EQ03.04.09

Solution-Processed N-Type Perylene Diimide Based Molecular Semiconductors for Air-Stable OFET Operations Eunkyung Park¹, Samantha Brixi², Mark Martell¹, Michael Ocheje³, Richard Pettipas¹, Dylan Harris¹, Benjamin Gelfand¹, Simon Rondeau-Gagné³, Benoit Lessard² and Gregory C. Welch¹; ¹University of Calgary, Canada; ²University of Ottawa, Canada; ³University of Windsor, Canada

EQ03.04.10

Study of Bulk and Thin-Film Polymorphism of NDI Derivatives—Annealing and Deposition Procedures to Access Elusive Polymorphs Inês de Oliveira Martins^{1,2}, Enrico Modena¹ and Lucia Maini²; ¹Polycrystalline SPA, Italy; ²Università di Bologna, Italy

EQ03.04.11

Electron- and Ion-Transporting Fluorinated Conjugated Polymers for High-Transconductance Organic Electrochemical Transistors Seongmin Heo¹, Jimin Kwon¹, Haksoon Jung¹, Insang You¹, Changduk Yang² and Yong-Young Noh¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of)

EQ03.04.12

Highly Efficient and Stable Hyperfluorescence Device Using Organo Boron Materials Hyuna Lee and Jang Hyuk Kwon; Kyung Hee University, Korea (the Republic of)

EQ03.04.15

Study on Thermoelectric Properties and Charge Transport Behaviors of Side-chain Engineered Conjugated Polymers via Electrochemical Doping Woojin Choi¹, Soohyun Kim¹, Soonyong Lee², Changhwa Jung¹, Han Young Woo² and Hyunjung Lee¹; ¹Kookmin University, Korea (the Republic of); ²Korea University, Korea (the Republic of)

EQ03.04.17

Toward Water-Processable and Self-Doped Conducting Polymers via Direct (Hetero)arylation Polymerization Catherine Beaumont and Mario LeClerc; Laval University, Canada

EQ03.04.18

Synthesis of a Si-Containing Gradient Block Copolymer and Its Application to EUV Lithography by Aspect Ratio Enhancement Yemin Park, Seung Won Song and Yeon Sik Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ03.04.20

Molecular Doping of Solution-Mixed Conjugated Polymers for Improving Thermoelectric Properties Jaeyoung Jang; Hanyang University, Korea (the Republic of)

EQ03.04.21

Exciton-Harvested Electroluminescence Using Organic Hosts Capable of Exergonic Triplet Exciton Conversion SeonJu Kim¹, Dayoon Song^{1,1}, Ju Hyun Kim², Inkoo Kim², Joonghyuk Kim², Yongsik Jung², Hyeonho Choi² and Youngmin You^{1,1}; ¹Ewha Womans University, Korea (the Republic of); ²Samsung Electronics Co. Ltd, Korea (the Republic of); ³Samsung Electronics Co. Ltd., Korea (the Republic of)

EQ03.04.22

Electronic Physically Unclonable Functions Based on Organic Thin-Film Transistors with Organic Semiconductor Microstructures Fingerprint for Highly Strong Encryption Technology Jung Ah Lim¹, Dongyoung Kim^{1,2}, Seong-il Im^{1,3} and Hyunsu Ju¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea University of Science and Technology, Korea (the Republic of); ³Yonsei University, Korea (the Republic of)

EQ03.04.23

Impact of Dynamic Disorder on Thermoelectric Transport in Organic Semiconductors Shantonio W. Birch and Kevin P. Pipe; University of Michigan, United States

EQ03.04.25

Organic Antiambipolar Transistors for High Performance and Optically Tuneable Ternary Logic Circuits Debdatta Panigrahi, Ryoma Hayakawa and Yutaka Wakayama; National Institute for Materials Science, Japan

EQ03.04.26

Mono- and bis(triazolo)triazine Emitters for Blue Thermally Activated Delayed Fluorescence Organic Light-Emitting Diodes Celine Leonhardt¹, Stefan Bräse¹ and Eli Zysman-Colman²; ¹KIT, Germany; ²University of St Andrews, United Kingdom

EQ03.04.27

Unprecedented Rearrangement: Investigation and OLED Application of a Novel Class of Carbazolophanes Jasmin T. Seibert¹, Eduard Spuling¹, Stefan Bräse^{1,1} and Eli Zysman-Colman²; ¹Karlsruhe Institute of Technology (KIT), Germany; ²University of St Andrews, United Kingdom

EQ03.04.28

Design and Synthesis of Novel Dinuclear Cu(I)-TADF-Complexes as Emitting Materials for Application in OLEDs Clara Adam and Stefan Bräse; Karlsruhe Institute of Technology, Germany

EQ03.04.29

Semiconducting Polymers for Functionally Graded Organic Thermoelectrics Tengzhou Ma and Shrayesh Patel; Univ of Chicago, United States

EQ03.04.30

Strategic Doping by Solid-State Diffusion for Enhancing Charge Injection Properties and Doping Stability in Organic Field-Effect Transistors Keehoon Kang¹, Youngrok Kim¹, Katharina Broch², Henning Sirringhaus³ and Takhee Lee¹; ¹Seoul National University, Korea (the Republic of); ²University of Tübingen, Korea (the Republic of); ³University of Cambridge, United Kingdom

EQ03.04.31

Emerging Hole-Selective Monolayers for Optoelectronic Applications Artiom Magomedov¹, Ernestas Kasparavicius¹, Amran Al-Ashouri², Eike Köhnen², Yuanbao Lin³, Yuliar Firdaus³, Bor Li², Thomas D. Anthopoulos³, Tadas Malinauskas¹, Steve Albrecht² and Vytautas Getautis¹; ¹Kaunas University of Technology, Lithuania; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ³King Abdullah University of Science and Technology, Saudi Arabia

EQ03.04.33

Polyaniline and Aniline Oligomers—Materials and Chemistry Cheng-Wei Lin and Richard B. Kaner; University of California, Los Angeles, United States

EQ03.04.34

Minimization of Contact Resistance in Organic Field-Effect Transistor by Introducing Buried Electrode Structure Giheon Choi^{1,2}, Seungtaek Oh^{1,2}, Jungyoon Seo^{1,2} and Hwasung Lee^{1,2}; ¹Hanyang University, Korea (the Republic of); ²BK21 FOUR ERICA-ACE Center, Hanyang University, Korea (the Republic of)

EQ03.04.35

High Thermoelectric Performance from Optimization of Doping Methods for Donor-Donor Polymers Changhwa Jung¹, Ayushi Tripathi², Soohyun Kim¹, Woojin Choi¹, Han Young Woo² and Hyunjung Lee¹; ¹Kookmin university, Korea (the Republic of); ²Korea University, Korea (the Republic of)

EQ03.04.36

Engineering Morphology of One-Dimensional Organic Semiconductor for Uniaxially Aligned Molecules Toward Efficient Charge Transport Keon Joo Park, Chae Won Kim, Yerin Choi, YoungTea Chun, Hyung Soo Ahn and Sam Nyung Yi; Korea Maritime and Ocean University, Korea (the Republic of)

EQ03.04.37

Improving Charge Carrier Injection in Nanoscale Organic and Polymer Thin-Film Transistors Calla M. McCulley, Xin Xu, Xiao Wang, Liang Wang and Ananth Dodabalapur; The University of Texas at Austin, United States

EQ03.04.38

Metal-Organic Complexes for Multistate Memory Yonatan Hamo, Julia Narevicius, Elad Gaver, Mark Iron, Michal Lahav and Milko van der Boom; Weizmann Institute of Science, Israel

SESSION EQ03.05: Molecular Crystals
Session Chair: Adam Moule
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 316B

8:30 AM EQ03.05.01

Specific Phonon-Phonon Coupling in Organic Semiconductors—A Raman Spectroscopy Study Maor Asher¹, Remy Jouclas², Marco Bardini³, Yael Diskin-Posner¹, Nitzan Kahn¹, Roman Korobko¹, Alan R. Kennedy⁴, Lygia Silva De Moraes², Guillaume Schweicher², Jie Liu², David Beljonne³, Yves Geerts² and Omer Yaffe¹; ¹Weizmann Institute of Science, Israel; ²Université libre de Bruxelles, Belgium; ³University of Mons, Belgium; ⁴University of Strathclyde, United Kingdom

8:45 AM EQ03.05.02

Variation of Crystalline Polymorphs of Dinaphthothienothiophene—From Monolayer to Bulk Nobutaka Shioya, Takafumi Shimoaka and Takeshi Hasegawa; Kyoto University, Japan

9:00 AM EQ03.05.03

Single-Crystalline Polymorphs of Charge-Transfer Complexes Give Insight into Donor-Acceptor Interactions in Organic Semiconductors Katelyn P. Goetz¹, Hamna F. Iqbal², Christina A. Hacker¹, Oana D. Jurchescu², Emily G. Bittle¹ and Sujitra Pookpanratana¹; ¹National Institute of Standards and Technology, United States; ²Wake Forest University, United States

9:15 AM *EQ03.05.04

Crystal Engineering of Acene-Based Semiconductors and the Delicate 'Brickwork' [I]-Stack John Anthony; University of Kentucky, United States

9:45 AM EQ03.18.01

Molecular Triplet Exciton Control via Spin-Exchange Coupling with Lanthanides Lars van Turnhout, Sanyang Han and Akshay Rao; University of Cambridge, United Kingdom

10:00 AM BREAK

SESSION EQ03.06: Devices II
Session Chair: Pietro Rossi
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 316B

10:30 AM *EQ03.06.01

14 GHz Schottky Diodes Using Organic Semiconductors Thomas D. Anthopoulos; King Abdullah University of Science and Technology, Saudi Arabia

11:00 AM EQ03.06.02

Improving Operational Stability in Organic Semiconductors—OFF-State Bias Focus Malgorzata Nguyen¹, Ulrike Kraft², Katharina Broch³, Wen Liang Tan⁴, Ian Jacobs¹, Illia Dobryden⁵, Weimin Zhang⁶, Deepak Venkateshvaran¹, Iain McCulloch^{7,6}, Chris McNeill⁴ and Henning Sirringhaus¹; ¹Cambridge University, United Kingdom; ²Max Planck Institute for Polymer Research, Germany; ³University of Tübingen, Germany; ⁴Monash University, Australia; ⁵Research Institutes of Sweden, Sweden; ⁶King Abdullah University of Science and Technology, Saudi Arabia; ⁷University of Oxford, United Kingdom

11:15 AM EQ03.06.03

Thermodynamics of Organic Electrochemical Transistors Matteo Cucchi, Hans Kleemann and Karl Leo; TU Dresden, Germany

11:30 AM EQ03.06.04

Effect of Additives on the Performance of a P-Type Organic Semiconductor Tania C. Hidalgo Castillo¹, Maximilian Moser², Camila Cendra³, Prem Nayak¹, Alberto Salleo³, Iain McCulloch² and Sahika Inal¹; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²University of Oxford, United Kingdom; ³Stanford University, United States

SESSION EQ03.07: Doping

Session Chair: Alexandra Paterson

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 316B

1:30 PM EQ03.20.09

Temperature-Dependent Transient Charge Delocalization in High-Mobility Organic Molecular Semiconductors Marco Bardini¹, Lucia Di Virgilio², Samuele Giannini^{1,3}, Hai Wang², Mischa Bonn², Jochen Blumberger³ and David Beljonne¹; ¹Université de Mons, Belgium; ²Max Planck Institute for Polymer Research, Germany; ³University College London, United Kingdom

1:45 PM EQ03.20.01

Label-Free, Sub-Picomolar Detection of Neurofilament Light Chain with Electrolyte-Gated Organic Field-Effect Transistor-Based Biosensors Kateryna Solodka¹, Marcello Berto¹, Diana Ferraro¹, Marco Borsari¹, Fabio Biscarini^{1,2}, Carlo Augusto Bortolotti¹ and Marcello Pinti¹; ¹University of Modena and Reggio Emilia, Italy; ²Italian Institute of Technology, Italy

2:00 PM EQ03.07.02

The Splitting of Singly-Occupied Molecular Orbitals Holds the Key to Double Doping of Organic Semiconductors Ross Warren¹, Hong Li², Eunkyung Cho², Jean-Luc Bredas² and Norbert Koch¹; ¹Humboldt-Universität zu Berlin, Germany; ²The University of Arizona, United States

2:15 PM EQ03.07.03

N-Type Polymer Thermoelectrics Realized Though Heavy P-Doping of π -Conjugated Polymers Zhiming Liang¹, Hyun Ho Choi², Xuyi Luo³, Tuo Liu¹, Ashkan Abtahi¹, Uma Shantini Ramasamy¹, J. Andrew Hitron¹, Kyle Baustert¹, Jacob Hempel¹, Alex Boehm¹, Armin Ansary¹, Douglas Strachan¹, Jianguo Mei³, Chad Risko¹, Vitaly Podzorov⁴ and Kenneth R. Graham¹; ¹University of Kentucky, United States; ²Gyeongsang National University, Korea (the Republic of); ³Purdue University, United States; ⁴Rutgers, The State University of New Jersey, United States

2:30 PM BREAK

SESSION EQ03.08: Organic Mixed Ionic-Electronic Conductors

Session Chair: Alexander Giovannitti

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 316B

3:00 PM *EQ03.18.05

Improving the Performance of Light-Emitting Devices with Polaritonics Konstantinos Daskalakis; Turku University, Finland

3:30 PM *EQ03.08.01

Doping at the Extremes Enables Large Gap p-i-n Homojunction Diode Hannah L. Smith¹, Jordan Dull¹, Swagat K. Mohapatra², Khaled Al Kurdi³, Stephen Barlow⁴, Seth R. Marder⁴, Barry P. Rand¹ and Antoine Kahn¹; ¹Princeton University, United States; ²Institute of Chemical Technology, India; ³Georgia Institute of Technology, United States; ⁴University of Colorado Boulder, United States

4:00 PM EQ03.08.02

Chemical Doping of Organic Mixed Ionic Electronic Conductors for Tunable Threshold Voltage in Organic Electrochemical Transistors Siew Ting Melissa Tan and Alberto Salleo; Stanford University, United States

4:15 PM EQ03.08.03

General Observation of an Insulator-Metal Transition in Polymer Electrochemical Transistors Dionisius Hardjo Lukito Tjhe, Xinglong Ren, Yuxuan Huang, Ian Jacobs and Henning Sirringhaus; University of Cambridge, United Kingdom

4:30 PM EQ03.19.03

Structural and Dynamic Disorder, Not Ionic Trapping, Controls Charge Transport in Highly Doped Conducting Polymers Ian Jacobs¹, Gabriele

D'Avino², Vincent Lemaire³, Yue Lin¹, Yuxuan Huang¹, Chen Chen¹, Thomas Harrelson⁴, William Wood¹, Leszek Spalek¹, Tarig Mustafa¹, Christopher A. O'Keefe¹, Xinglong Ren¹, Dimitrios Simatos¹, Dionisius Hardjo Lukito Tjhe¹, Martin Statz¹, Joseph Strzalka⁵, Jin-Kyun Lee⁶, Iain McCulloch⁷, Simone Fratini², David Beljonne³ and Henning Sirringhaus¹; ¹University of Cambridge, United Kingdom; ²Institut Néel, France; ³University of Mons, Belgium; ⁴Lawrence Berkeley National Laboratory, United States; ⁵Argonne National Laboratory, United States; ⁶Inha University, Korea (the Republic of); ⁷University of Oxford, United Kingdom

SESSION EQ03.09: Composition and Microstructure

Session Chair: Katelyn Goetz

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 316B

8:30 AM EQ03.09.01

Self-Assembly in Solid-State Intra-Molecular Singlet Fission Materials David J. Jones; University of Melbourne, Australia

8:45 AM EQ03.09.02

Does Structure Really Matter? Influence of Structural 'Perfectness' of Conjugated Polymers on Their Optoelectronic Properties and Device Performance Jochen Vanderspikken^{1,2,3}, Omar Beckers^{1,2,3}, Sam Gielen^{1,2,3}, Quan Liu^{1,2,3}, Alberto Salleo⁴, Koen Vandewal^{1,2,3} and Wouter Maes^{1,2,3}; ¹Hasselt University, Belgium; ²imec, Belgium; ³Energyville, Belgium; ⁴Stanford University, United States

9:00 AM EQ03.09.03

Quantifying Exciton Annihilation Effects in Thermally Activated Delayed Fluorescence Materials Kalyani Thakur, Theun Sebastiaan v. van der Zee, Gert-Jan Wetzelaer, Charusheela Ramanan and Paul W. Blom; Max Planck Institute for Polymer Research, Germany

9:15 AM EQ03.09.04

Morphological Understanding of the Effect of the Elastomer's Molecular Weight in Conjugated Polymer/ Elastomer Blends Amnahir Pena-Alcantara, Shayla Nikzad, Huaxin Gong, Yu Zheng, Yuto Ochiai, Jiancheng Lai, David Koshy and Zhenan Bao; Stanford University, United States

9:30 AM BREAK

SESSION EQ03.10: Material Synthesis and Processing

Session Chair: Kenneth Graham

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 316B

10:30 AM EQ03.10.01

Narrow Bandgap Conjugated Polymers with Strong Correlations and Open-Shell Electronic Structures—Towards New Phenomena and Emergent Technologies Jason D. Azoulay, Naresh Eedugurala, Kevin Mayer, Michael Steelman and Daniel Adams; University of Southern Mississippi, United States

10:45 AM EQ03.10.02

Systematic Control of Nanostructure via External Processing Parameters in Organic Functional Thin Films Fabian Eller¹, Remco W.A. Havenith^{2,3} and Eva M Herzig¹; ¹Dynamics and Structure Formation - Herzig Group, Physikalisches Institut, Universität Bayreuth, Germany; ²Stratingh Institute for Chemistry and Zernike Institute for Advanced Materials, Rijksuniversiteit Groningen, Netherlands; ³Ghent Quantum Chemistry Group, Department of Chemistry, Ghent University, Belgium

11:00 AM EQ03.10.03

Solution N-Doping with Benzimidazole Compounds—A New Derivative for Improved Thermoelectric Performances Pietro Rossi^{1,2}, Francesca Pallini³, Giulia Coco^{1,2}, Marco Cassinelli¹, Chris McNeill⁴, Guglielmo Lanzani^{1,2}, Luca Beverina³ and Mario Caironi¹; ¹Istituto Italiano di Tecnologia, Italy; ²Politecnico di Milano, Italy; ³Università degli Studi di Milano-Bicocca, Italy; ⁴Monash University, Australia

11:15 AM *EQ03.10.04

Star-Shaped Organic Semiconductors with HBC and Other Fused Cores Towards Higher Levels of Bulk Charge Transport Peter Skabara; University of Glasgow, United Kingdom

SESSION EQ03.11: Organic Electrochemical Transistors

Session Chair: Konstantinos Daskalakis

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 316B

1:30 PM *EQ03.11.01

Microstructure and Properties of Conjugated Polymers—Linking XRD, TEM and Spectroscopy to Gain Fundamental Insights into Charge Transport Mechanisms Alberto Salleo; Stanford University, United States

2:00 PM EQ03.11.02

pH Dependent Stability of Organic Electrochemical Transistors Made from Carboxylic Acid Functionalized Polythiophenes Lucas Flagg, Owen M. Sotak and Lee Richter; NIST, United States

2:15 PM EQ03.11.03

Mixed Electron- and Ion- Conduction in Radical Polymer-Based Blends Siddhartha Akkiraju and Bryan W. Boudouris; Purdue University, United States

2:30 PM BREAK

SESSION EQ03.12: Optoelectronic Devices

Session Chair: Aman Anand

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 316B

3:30 PM *EQ03.12.01

Controlling Charge Recombination in Organic Photovoltaics and Photodetectors for Near-Infrared Light Conversion Nicola Gasparini; Imperial College London, United Kingdom

4:00 PM EQ03.12.02

High Detectivity Near-Infrared Organic Photodetectors with the Cross-Linked Electron Blocking Layer Using a Novel Photoinitiator Hyocheol Jung¹, Tai Nguyen¹, Jihoon Lee² and Do Young Kim¹; ¹Oklahoma State University, United States; ²Korea National University of Transportation, Korea (the Republic of)

4:15 PM EQ03.12.03

On the Origin of the Intrinsic Detectivity Limits of Near-Infrared Organic Photodetectors Sam Gielen^{1,2}, Christina Kaiser³, Jochen Vanderspikken^{1,2}, Omar Beckers^{1,2}, Ardalan Armin³, Paul Meredith³, Koen Vandewal^{1,2} and Wouter Maes^{1,2}; ¹Hasselt University, Belgium; ²Imec, Belgium; ³Swansea University, United Kingdom

4:30 PM EQ03.18.02

Optical Outcoupling in Efficient Single-Layer TADF Organic Light-Emitting Diodes Yungui Li, Naresh B. Kotadiya, Theun Sebastiaan v. van der Zee, Paul W. Blom and Gert-Jan Wetzelaer; Max Planck Institute for Polymer Research, Germany

SESSION EQ03.13: Poster Session II: Next Generation Organic Semiconductors—Materials, Fundamentals and Applications II

Session Chair: Giorgio Ernesto Bonacchini

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ03.13.01

Design and Synthesis of Novel Hole Transport Materials for Emerging Active Layers Steffen Otterbach, Henrik Tappert and Stefan Bräse; Karlsruhe Institute of Technology, Germany

EQ03.13.03

Short-range Conductivity Increase with Dielectric Constant—THz Spectroscopy on Doped Polythiophenes Eva Röck¹, Dimitra Tsokkou¹, Emmy Järsvall², Christian Muller² and Natalie Banerji¹; ¹University of Bern, Switzerland; ²Cahlmers University of Technology, Sweden

EQ03.13.06

A Novel Isomer-Free and Low-Lying Energy Level Quinoidal Conjugated Polymer Employing Planar Thiophene Derivative Core Yeonsu Choi, Yunseul Kim, Dongseong Yang, Nara Han, Yina Moon and Dong-Yu Kim; Gwangju Institute of Science and Technology, Korea (the Republic of)

EQ03.13.07

Exploring the Recombination Zone of Blue Organic Light-Emitting Diodes from Various Thickness of Emitting Layer Without Sensing Layer Tae Wook Kim, Changmin Lee, Dong Hyun Kim, Geonwoo Jeong, Dong Hyun Choi, Hyung Ju Chae, Sye Hamad Ullah Shah, Hyun Woo Jo, Min Jae Park, Amjad Islam and Seung Yoon Ryu; Korea University, Korea (the Republic of)

EQ03.13.10

Organic Salts—A Route to Improve Performance and Stability of N-Type Conjugated Polymers at the Electrolyte Interface David Ohayon and Sahika Inal; King Abdullah University of Science and Technology, Saudi Arabia

EQ03.13.13

Singlet-Triplet Inversion in Organic Photoactive Molecules Piotr de Silva; Technical University of Denmark, Denmark

EQ03.13.14

Time-Temperature Integrating Sensors Based on Gradient Mixtures of Binary Colloidal Crystals Marius Schoettle and Markus Retsch; University of Bayreuth, Germany

EQ03.13.16

Organic Electrochemical Transistors—Vogel-Tamman-Fulcher and the Three Step Model Loren G. Kaake; Simon Fraser University, Canada

*EQ03.13.17

Synthesis of Amphiphilic Block Copolymers for OSCs David J. Jones and Gagandeep Ahluwalia; University of Melbourne, Australia

EQ03.13.18

Structure-Property-Processing Relationships for Electrospun poly(3-hexylthiophene) Fibers Humayun Ahmad, Mahesh Gangishetty and Santanu Kundu; Mississippi State University, United States

EQ03.13.19

Chemical Doping of Well-Dispersed P3HT Nanowire Networks Song Guo; Univ of Southern Mississippi, United States

EQ03.13.21

Mixed Conduction in an N-Type Organic Semiconductor in the Absence of Hydrophilic Side-Chains Jokubas Surgailis¹, Achilleas Savva¹, Tania C. Hidalgo Castillo¹, Bryan Paulsen², Iain McCulloch³, Jonathan Rivnay² and Sahika Inal¹; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²Northwestern University, United States; ³University of Oxford, United Kingdom

EQ03.13.22

Emulating Organic Ion Reservoirs for Synaptic Applications Dongshin Kim, Ik-Jyae Kim and Jang-Sik Lee; Pohang University of Science and Technology, Korea (the Republic of)

EQ03.13.23

Tailored Enhanced Halide Perovskite Memory Performance by Oxide Grain Passivation in Resistive Switching Memory SangMyeong Lee and Hyun Suk Jung; Sungkyunkwan University, Korea (the Republic of)

EQ03.13.26

Understanding How P3HT Crystallinity Controls Anion Exchange and Chemical Doping Charlene Z. Salamat, Zerina Mehmedović, Benjamin J. Schwartz and Sarah Tolbert; University of California, Los Angeles, United States

EQ03.13.28

Oxidant Effects on the Morphology and Properties of Oxidatively-Polymerized Polythiophenes Jenna L. Sartucci¹, Brian L. Chaloux¹ and Battogtokh Jugdersuren²; ¹U.S. Naval Research Laboratory, United States; ²Jacobs Engineering Group, United States

EQ03.13.30

Organic Field-Effect Transistors Based on Solution Sheared Thin films of DNTT and BTBT Derivatives Lamiaa Fijahi¹, Adrián Tamayo¹, Jinghai Li¹, Roland Resel², Yves Geerts³ and Marta Mas-Torrent¹; ¹Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; ²Institute of Solid State Physics, Graz University of Technology, Austria; ³Laboratoire de Chimie des Polymères, Faculté des Sciences et Laboratoire de Chimie des Polymères, Faculté des Sciences, International Solvay Institutes of Physics and Chemistry, Université Libre de Bruxelles, Belgium

EQ03.13.31

Dopant Dependency of Homojunction Field-Effect Transistors with Selectively Doped Conductive Polymer Electrode Yoonjoo Lee¹, Min Je Kim², Jeong Ho Cho² and Han Young Woo¹; ¹Korea University, Korea (the Republic of); ²Yonsei University, Korea (the Republic of)

EQ03.13.32

An N-Annulated Perylene Butyl Tetra Ester for Use in Organic Field-Effect Transistors as the Active Material Layer Kathryn M. Wolfe and Gregory C. Welch; University of Calgary, Canada

EQ03.13.33

Perylene Diimide Based Polymer with Oligo Ethylene Glycol Side Chain and Their Applications in Organic Thermoelectric Devices Sang Young Jeong¹, Woojin Choi², Hyunjung Lee² and Han Young Woo¹; ¹Korea University, Korea (the Republic of); ²kookmin university, Korea (the Republic of)

EQ03.13.34

Design and Synthesis of Chiral Molecular Semiconductors for Spintronic Applications Martina Volpi and Yves Geerts; Université Libre de Bruxelles, Belgium

EQ03.13.36

Dramatic Effects of Electrode Metal on Tunnel Junction Based Molecular Spintronic Devices Pawan Tyagi¹, Eva Mutunga¹ and Vincent Lamberti²; ¹University of District of Columbia, United States; ²Y12, United States

EQ03.13.37

Tuning Optoelectronic Properties of Nanomaterials via Surface Engineering Using Luminescent Organic Molecules Arya Karappilly Rajan, Ryan Brisbin, Md. Imran Khan, Sayantani Ghosh and Ryan Baxter; University of California, Merced, United States

EQ03.13.38

Study of Polymorph Tuning at the Surfaces in an Organic Semiconductor Ann M. James¹, Nicola Demitri², Lara Gigli², Yves Geerts³ and Roland Resel¹; ¹Graz University of Technology, Austria; ²Elettra Synchrotron Trieste, Italy; ³Université Libre de Bruxelles, Belgium

SESSION EQ03.14: Emerging Devices I
Session Chair: Emanuele Orgiu
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 316B

8:30 AM EQ03.14.01

Enhancing the Backbone Coplanarity of N-Type Copolymers for Organic Electrochemical Transistors Sophie Griggs¹, Iuliana P. Maria¹, Reem B. Rashid^{2,2}, Bryan Paulsen², Jonathan Rivnay^{2,2} and Iain McCulloch^{1,3}; ¹University of Oxford, United Kingdom; ²Northwestern University, United States; ³King Abdullah University of Science and Technology, Saudi Arabia

8:45 AM EQ03.14.02

Direct Detection of 5-MeV Protons by Flexible Thin-Film Devices Based on Organic Semiconductors Laura Basiricò^{1,2}, Ilaria Fratelli^{1,2}, Enrico Zanazzi³, Massimo Chiari⁴, Andrea Ciavatti^{1,2}, Alberto Quaranta³, John Anthony⁵ and Beatrice Fraboni^{1,2}; ¹Department of Physics and Astronomy, University of Bologna, Italy; ²National Institute for Nuclear Physics, Italy; ³University of Trento, Italy; ⁴INFN, Italy; ⁵University of Kentucky, United States

9:00 AM EQ03.14.03

Semiconducting Polymer X-Ray Detectors with Non-Fullerene Acceptors for Enhanced Stability—Towards Printable Flexible, and Tissue Equivalent Devices Jessie Posar^{1,2}, Matthew Large², Attila J. Mozer², Martin Carolan^{2,3,2}, Paul J. Sellin⁴, Justin Davies⁵, Anatoly Rosenfeld², Marco Petasecca² and Matthew J. Griffith¹; ¹University of Sydney, Australia; ²University of Wollongong, Australia; ³Wollongong Hospital, Australia; ⁴University of Surrey, United Kingdom; ⁵Australian Nuclear Science and Technology Organisation (ANSTO), Australia

9:15 AM EQ03.14.04

Introducing New Highly Soluble High Electron Affinity Molecular Dopants Adam J. Moule¹, Tucker Murrey¹, Goktug Gonen¹, Zaira I. Bedolla Valdez¹, Alice Ferguson¹, Mark Mascal¹, Raja Ghosh², Francis Spano², Michael Berteau-Rainville³, Ingo Salzmann³ and Alberto Salleo⁴; ¹University of California, Davis, United States; ²Temple University, United States; ³Concordia University, Canada; ⁴Stanford University, United States

9:30 AM *EQ03.14.05

Beyond Copper(I) Thiocyanate—Development of Semiconductors and Devices Pichaya Pattanasattayavong; Vidyasirimedhi Institute of Science and Technology, Thailand

10:00 AM BREAK

SESSION EQ03.15: Bioelectronics
Session Chair: Pichaya Pattanasattayavong
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 316B

10:30 AM EQ03.15.01

Next-Generation Polymeric Organic Semiconductors for Electrochemical Application in Aqueous Electrolytes Alexander Giovannitti, Garrett LeCroy, Camila Cendra and Alberto Salleo; Stanford University, United States

10:45 AM EQ03.15.02

Potentiometric Adsorption Isotherm Analysis of Protein Sensing Comparing Two EGOT Architectures Pamela A. Manco Urbina¹, Marcello Berto¹, Pierpaolo Greco¹, Matteo Sensi¹, Simone Borghi¹, Marco Borsari¹, Carlo Augusto Bortolotti¹ and Fabio Biscarini^{1,2}; ¹University of Modena and Reggio Emilia, Italy; ²Center for Translation Neurophysiology - Italian Institute of Technology, Italy

11:00 AM EQ03.15.03

Organic Bioelectronics for Real Time Monitoring and Dynamic Regulation of Plant Physiology Eleni Stavrinidou; Linköping University, Sweden

11:15 AM EQ03.15.04

New Opportunities for Organic Mixed Ion-Electron Conductors in Microwave Applications Giorgio Ernesto Bonacchini^{1,2}, Siew Ting Melissa Tan¹, Alexander Giovannitti¹, Tyler Quill¹ and Alberto Salleo¹; ¹Stanford University, United States; ²Istituto Italiano di Tecnologia, Italy

SESSION EQ03.16: Organic and Hybrid Photovoltaics
Session Chair: Keiki Fukumoto
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 316B

1:30 PM *EQ03.16.01

Understanding Structure, Composition and Performance Relationships in Perovskite Solar Cells Martyn A. McLachlan; Imperial College London, United Kingdom

2:00 PM EQ03.16.03

Highly Efficient Modulation Doping Towards Superior Organic Thermoelectric Devices Shu-Jen Wang¹, Michel Panhans², Hans Kleemann¹, Frank Ortmann² and Karl Leo¹; ¹TU Dresden, Germany; ²TU Munich, Germany

2:15 PM EQ03.16.04

The Interfacial Energetic Landscape in Non-Fullerene Acceptor Organic Solar Cells and Its Impact on Charge Generation and Recombination Frédéric Laquai and Julien F. Gorenflot; King Abdullah University of Science and Technology, Saudi Arabia

2:30 PM EQ03.18.04

An Intermediate Model For Fitting Triplet-Triplet Annihilation In Phosphorescent Organic Light Emitting Diode Materials Paul Niyonkuru, Andrew Proudian, Matthew Jaskot and Jeremy Zimmerman; Colorado School of Mines, United States

3:00 PM BREAK

SESSION EQ03.17/EQ04.14: Joint Keynote Session
Session Chair: Oana Jurchescu

Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 316B

3:30 PM *EQ03.17/EQ04.14.01

Device Design for Organic Mixed Ionic-Electronic Conductor Performance [Alexandra F. Paterson](#); The University of Kentucky, United States

SESSION EQ03.18: Light-Emitting Devices
Session Chair: Yutaka Wakayama
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 316B

8:30 AM EQ03.18.03

Device Operation of Organic Light-Emitting Diodes Based on Thermally Activated Delayed Fluorescence [Theun Sebastiaan v. van der Zee](#), Yungui Li, Gert-Jan Wetzelaer and Paul W. Blom; Max Planck Institute for Polymer Research, Germany

8:45 AM EQ03.20.02

Uncovering the Mechanism by Which Wheland-Type Complexes Act as P-Dopants to Improve the Performance of Organic Semiconducting Polymers [Connor Ganley](#), Tushita Mukhopadhyaya, Taecin Lee, Howard Katz and Paulette Clancy; Johns Hopkins University, United States

9:00 AM EQ03.20.05

Multi-State Heterojunction Transistors Based on Field-Effect Tunneling-Transport Transitions [Dong Un Lim](#)¹, Sae Byeok Jo¹, Seongchan Kim², Dong Hae Ho¹, Youngjin Choi¹, Jooheon Kang² and Jeong Ho Cho¹; ¹Yonsei University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

9:15 AM EQ03.20.07

High Mobility Solution Processed Organic Semiconducting Blends for Ultra-High Frequency Operation [Tommaso Losi](#) and Mario Caironi; Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia, via Pascoli 70/3, 20133 Milano, Italy, Italy

9:30 AM EQ03.20.08

Direct Observation of Rapid Triplet Harvesting by Radical Emitters [Sebastian Gorgon](#)¹, Qinying Gu¹, Alexander S. Romanov², Feng Li³, Richard Friend¹ and Emrys Evans⁴; ¹University of Cambridge, United Kingdom; ²The University of Manchester, United Kingdom; ³Jilin University, China; ⁴Swansea University, United Kingdom

9:45 AM BREAK

SESSION EQ03.19: Charge Transport in Organic Devices
Session Chair: Ingo Salzmann
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 316B

10:30 AM EQ03.19.01

A Study for Charge Transport and Spin-Magnetic Properties of Open-Shell and Closed-Shell Quinoidal Conjugated Polymers [Yunseul Kim](#)¹, Minji Kang², Yeon-Ju Kim¹, Dongseong Yang¹, Eunhwan Jung³ and Dong-Yu Kim^{1,4}; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²Korea Research Institute of Chemical Technology, Korea (the Republic of); ³University of Cologne, Germany; ⁴Heeger Center of Advanced Materials (HCAM), Korea (the Republic of)

10:45 AM EQ03.19.02

Recent Advancements in Organic Photovoltaics Jean-Rémi Pouliot and [Arthur D. Hendsbee](#); Brilliant Matters Organic Electronics, Canada

11:00 AM *EQ03.19.04

Imaging Electron Motion in Organic Semiconductors Using Femtosecond Photoemission Electron Microscopy [Keiki Fukumoto](#)¹, Ryoma Hayakawa², Soichiro Takeiri^{2,3}, Yusuke Fukami³, Masato Iwasawa³, Yoichi Yamada³ and Yutaka Wakayama²; ¹High Energy Accelerator Research Organization (KEK), Japan; ²National Institute for Materials Science, Japan; ³University of Tsukuba, Japan

SESSION EQ03.21: Next Generation Organic Semiconductors—Materials, Fundamentals and Applications I
Session Chair: Oana Jurchescu
Tuesday Morning, May 24, 2022
EQ03-Virtual

8:00 AM *EQ03.21.01

Vertical Stratification in Sequentially Deposited Organic Solar Cells [Yana Vaynzof](#); Technical University Dresden, Germany

8:30 AM EQ03.21.02

A Flexible Piezoelectric PVDF-TiO₂ Nanofibrous Membrane for Intelligent Photocatalytic Performance [Jiayi Yin](#), Martina Roso and Michele Modesti; University of Padova, Italy

8:45 AM EQ03.21.03

Homoconjugated Poly(Phenylene Methylene)s—A Case Study of Light Emission Enabled by Through-Space Conjugation Aleksandr Perevedentsev^{1,2}, Adrian Francisco-Lopez², Xingyuan Shi³, Andreas Braendle⁴, Walter R. Caseri⁴, Alejandro R. Goni^{2,5} and Mariano Campoy-Quiles²; ¹Karlsruhe Institute of Technology, Germany; ²Institute of Materials Science of Barcelona (ICMAB-CSIC), Spain; ³Imperial College London, United Kingdom; ⁴ETH Zürich, Switzerland; ⁵ICREA, Spain

9:00 AM EQ03.21.05

Effects of Dopant Counterion Size on Polaron Characteristics in Chemically Doped Conjugated Polymers Joel H. Bobile and Chad Risko; UNIVERSITY OF KENTUCKY, United States

9:15 AM EQ03.21.06

The Influence of Ionic and Electronic Interaction in Single- and Dual-Gate Organic Electrochemical Transistors and Circuits Hsin Tseng, Anton Weissbach, Karl Leo and Hans Kleemann; Technische Universität Dresden, Germany

9:20 AM *EQ03.21.07

Influence of Side Chain Composition and Polarity of the Environment on the Electrochemical Doping Mechanism in Poly(3-hexylthiophene) and Dioxathiophene Derivatives Iaria Bargigia; Wake Forest University, United States

SESSION EQ03.22: Next-Generation Organic Semiconductors—Materials, Fundamentals and Applications II

Session Chair: Luisa Whittaker-Brooks

Tuesday Afternoon, May 24, 2022

EQ03-Virtual

9:00 PM *EQ03.22.01

Recent Developments in Organic-Based Stretchable Electronics for Health Monitoring Jong Won Chung, Yeongjun Lee, Gae Hwang Lee, Hyunbum Kang, Joo-Young Kim and Youngjun Yun; Samsung Advanced Institute of Technology, Korea (the Republic of)

9:30 PM EQ03.22.02

Effect of Dopants on Optical and Electrical Characteristics of PEDOT:PSS for Hybrid Solar Cell Devices Aditya Saha¹, Daisuke Ohori¹, Takahiko Sasaki², Keisuke Itoh³ and Seiji Samukawa^{1,4}; ¹IFS, Tohoku University, Japan; ²IMR, Tohoku University, Japan; ³IITM, Japan; ⁴AIMR, Tohoku University, Japan

9:45 PM EQ03.22.03

Carrier Transport in Junctions Between Molecules and 2D Materials Bhartendu Papnai^{1,2}, Hsin-Yi Tiffany Chen² and Mario Hofmann³; ¹Academia Sinica, Taiwan; ²National Tsing Hua University, Taiwan; ³National Taiwan University, Taiwan

10:00 PM *EQ03.22.04

Crystallization Kinetics and the Influences on Organic Semiconducting Devices Liyang Yu; Sichuan University, China

10:30 PM *EQ03.22.05

Unraveling the Mechanisms of Electron Injection into Organic Semiconductors by Fabricating Ultralow-Work-function Electrodes Hirohiko Fukagawa; NHK S&T Res Labs, Japan

SESSION EQ03.23: Next-Generation Organic Semiconductors—Materials, Fundamentals and Applications III

Session Chair: Emanuele Orgiu

Wednesday Morning, May 25, 2022

EQ03-Virtual

8:00 AM *EQ03.23.01

Interface Energetics and Chemical Modification of Graphitic Carbon Nitride Film Akaike Kouki; National Institute of Advanced Industrial Science and Technology, Japan

8:30 AM EQ03.23.02

Organic Photodiodes with Ultralow Dark Current Reveal the Sub-Bandgap Trap States in Organic Semiconductors Xiao Ma, René A. Janssen and Gerwin Gelinck; Technische Universiteit Eindhoven, Netherlands

8:45 AM EQ03.23.03

A Newly Developed Atropine Imprinted Copolymer and Its Functionalized Organic Transistor-Based Sensor Qi Zhou and Tsuyoshi Minami; The University of Tokyo, Japan

8:50 AM EQ03.23.04

Control of Luminescence Mechanism of Ultra-Deep Blue Emitter via Donor Engineering in Solution-Processed OLEDs Jinhyo Hwang, Su Hong Park, Na Yeon Kwon, Seung Uk Cho, Dong Won Lee, Min Ju Cho and Dong Hoon Choi; Korea University, Korea (the Republic of)

8:55 AM EQ03.23.05

Energy State Adjustment of Multi-Carbazole TADF Emitter by Ortho-Biphenyl Substitution Jingwan Kim¹, Yeon-Hee Ha¹, Yun-Hi Kim¹ and Jang-Joo Kim²; ¹Gyeong-sang National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:00 AM EQ03.23.06

Synthesis and Characterization of Boron Based Efficient and Pure Blue TADF Materials for Organic Light Emitting Diodes Hyung Jin Cheon¹,

Hyungcheol Lim², Seung-Je Woo², Soon-Ki Kwon¹, Jang-Joo Kim² and Yun-Hi Kim¹; ¹Gyeongsang National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:05 AM EQ03.23.07

A Thienothiophene Based Reliable and Low Driving Near-Infrared Organic Light-Emitting Diodes(OLEDs) Gyeong Seok Lee¹, Yongjin Park², Hye-Ryung Choi³, Kyoung-Chan Park³, Kyung-Cheol Choi² and Yun-Hi Kim¹; ¹Gyeongsang National University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); ³Seoul National University Bundang Hospital (SNUBH), Korea (the Republic of)

9:10 AM EQ03.23.08

Visualization of Nanoscale Multi-Orientalional Ordering in Thin Films of Polymer/Non-Fullerene Acceptor Blend Urvashi Bothra^{1,2}, Dinesh Kabra¹, Chris McNeill² and Amelia C.Y. Liu²; ¹Indian Institute of Technology Bombay, India; ²Monash University, Australia

##PAGE_BREAK##

SYMPOSIUM EQ04

Advanced Soft Materials and Processing Approaches for Flexible and Printed Optoelectronic Devices
May 9 - May 24, 2022

Symposium Organizers

Gerardo Hernandez-Sosa, Karlsruhe Institute of Technology
Do Hwan Kim, Soongsil University
Tse Nga Ng, University of California, San Diego
Yong-Young Noh, Pohang University of Science and Technology

* Invited Paper

SESSION EQ04.01: Materials Design and Electronic Properties I

Session Chair: Yong-Young Noh
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 315

10:30 AM *EQ04.01.01

Maintaining High Mobility Charge Transport in Organic Semiconductors at High Charge Carrier Concentrations Henning Sirringhaus; Cambridge University, United Kingdom

11:00 AM EQ04.01.02

Comparative Study of Charge-Transport Behaviour of Edge-on- and Face-on-Oriented Diketopyrrolopyrrole-Based Conjugated Copolymers Bearing Chalcogenophene Units Jiyoul Lee¹, Minho Yoon¹ and Do-Hoon Hwang²; ¹Pukyong National University, Korea (the Republic of); ²Pusan National University, Korea (the Democratic People's Republic of)

11:15 AM EQ04.01.03

Optimized Charge Transport in Molecular Semiconductors by Control of Fluid Dynamics and Crystallization in Meniscus-Guided Coating Tomasz Marszalek^{1,2}, Jasper Michels², Wojciech Pisula^{1,2} and Paul W. Blom²; ¹Lodz University of Technology, Poland; ²Max Planck Institute for Polymer Research, Germany

SESSION EQ04.02: Materials Design and Electronics Properties II

Session Chair: Barbara Stadlober
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 315

1:30 PM *EQ04.02.01

Reduction of Charge-Carrier Trapping by Molecular Design Paul W. Blom, Oskar Sachnik, Xiao Tan, Constantin Haese, Naomi Kinaret, Kun-Han Lin, Denis Andrienko, Robert Graf, Gert-Jan Wetzelaer and Jasper Michels; Max-Planck-Institute for Polymer Research, Germany

2:00 PM EQ04.02.02

Donor Polymer Conformation Determines Processing Resilience of Printed Organic Solar Cells [Azzaya Khasbaatar](#)¹, Andrew Cheng¹, Justin Kwok¹, Austin L. Jones², John R. Reynolds² and Ying Diao¹; ¹University of Illinois at Urbana-Champaign, United States; ²Georgia Institute of Technology, United States

2:15 PM EQ04.02.03

The Role of Transient Heat and Mass Transfer in Controlling the Photovoltaic Properties of Solution-Processed Cu(In,Ga)Se₂ [Kyle Weideman](#), Shreyash Hadke and Rakesh Agrawal; Purdue University, United States

SESSION EQ04.03: Materials Processing

Session Chair: Do Hwan Kim

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 315

8:15 AM EQ04.03.01

High Speed-Laser Speckle Imaging to Unravel Pico-Liter Droplets to Substrate Interactions [Riccardo Antonelli](#) and Thomas Kodger; Wageningen University & Research, Netherlands

8:30 AM EQ04.03.02

Sub-Micrometer Photothermal Patterning of Polymer Semiconductors Using Cleanroom Lithography Equipment [Adam J. Moule](#), Tucker Murrey, Meghna Jha, Sarah Dolan, Justin Mulvey and Alice Ferguson; University of California, Davis, United States

8:45 AM EQ04.03.03

Super-Resolution Photothermal Patterning in Conductive Polymers Enabled by Thermally Activated Solubility [Ian Jacobs](#)^{1,2}, Zaira Bedolla², Brandon Rotondo², David Bilsky², Ryan Lewis², Alejandra Ayala², Goktug Gonen², John Armitage¹ and Adam J. Moule²; ¹University of Cambridge, United Kingdom; ²University of California, Davis, United States

SESSION EQ04.04: Printed Flexible Sensors and Systems I

Session Chair: Sungjune Jung

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 315

9:45 AM *EQ04.04.01

Making Printed Organic Electronics Thin, Fast and Edible [Mario Caironi](#); Istituto Italiano di Tecnologia, Italy

10:15 AM *EQ04.04.02

Bias-Stress Free Organic Transistors for Radiation Dosimeters Used in Cancer Treatment [Oana D. Jurchescu](#); Wake Forest University, United States

10:45 AM EQ04.04.03

Selectively Oxidized Tungsten Oxide Photocatalytic Layer on Indium-Gallium-Zinc-Oxide-Based Phototransistors for Visible Light Detection [Jong Bin An](#), Byung Ha Kang, Sujin Jung, Kunho Moon, Jong Hyuk Ahn and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

SESSION EQ04.06: Printed Flexible Sensors and Systems II

Session Chairs: Paul Blom and Mario Caironi

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 315

1:30 PM *EQ04.06.01

Flexible and Printed 3D Organic Integrated Circuits and Active-Matrix Sensor Arrays [Sungjune Jung](#); Pohang University of Science and Technology, Korea (the Republic of)

2:00 PM EQ04.06.02

Customizable Soft Vertical Interconnect Access Utilizing Micro-Perforated Elastomer Membrane for Stretchable Multi-Layered Circuits [Jiseok Seo](#)^{1,2}, Geonhee Kim^{1,2}, Jinsu Yoon^{1,2}, Hyeon Cho^{1,2}, Dongju Jang^{1,2}, Hanul Kim^{1,2} and Yongtaek Hong^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Inter-university Semiconductor Research Center, Korea (the Republic of)

2:15 PM EQ04.06.03

Integration of High Performance, Fully Printed Organic Photodiodes onto Flexible Arrays of Solution Processed Organic Thin-Film Transistors [Luis A. Ruiz-Preciado](#)^{1,2}, Sanghoon Baek^{1,2,3}, Noah Strobel^{1,2}, Youngmin Jo³, Jimin Kwon³, Mervin Seiberlich^{1,2}, Karl-Philipp Strunk², Sebastian Raths⁴, Sebastian Stehlin², Stefan Schliske², Peter Erk⁴, Uli Lemmer^{1,2,1}, Kai Exner³, Christian Melzer², Sungjune Jung³ and Gerardo Hernandez-Sosa^{1,2,1}; ¹Karlsruhe Institute of Technology, Germany; ²InnovationLab, Germany; ³Pohang University of Science and Technology, Korea (the Republic of); ⁴BASF SE, Germany; ⁵BASF New Business GmbH, Germany

2:30 PM EQ04.06.04

Printable, Flexible and Tissue Equivalent Wearable X-Ray Detectors—A New Biomedical Frontier for Solution Processable Organic Semiconductors [Matthew J. Griffith](#)¹, Jessie Posar^{1,2}, Sophie Cottam¹, Atila J. Mozer², Paul J. Sellin³, Beatrice Fraboni⁴, Anatoly Rosenfeld² and Marco Petasecca²; ¹The University of Sydney, Australia; ²University of Wollongong, Australia; ³University of Surrey, United Kingdom; ⁴University of Bologna, Italy

2:45 PM BREAK

3:15 PM *EQ04.06.05

New Architecture of Fiber-Shaped Organic Electronic Devices for Advanced Flexible and Wearable Applications Jung Ah Lim; Korea Institute of Science and Technology, Korea (the Republic of)

3:45 PM EQ04.06.06

Environmental Monitoring with Additively Manufactured Tattoo-Based Bioelectronics Elliot Strand¹, Eloise Bihar¹, Sean Gleason², George G. Malliaras³ and Gregory L. Whiting¹; ¹University of Colorado, United States; ²United States Department of Agriculture, United States; ³University of Cambridge, United Kingdom

4:00 PM EQ04.06.07

Wearable Active-Matrix Pressure Sensor Arrays for Spatiotemporal Measurement of Human Vital Signs Sanghoon Baek^{1,2,3}, Youngoh Lee⁴, JinHyeok Baek³, Jimin Kwon^{5,3}, Seungjae Lee⁴, Karl-Philipp Strunk², Sebastian Stehlin², Christian Melzer², Sung-Min Park³, Hyunhyub Ko⁴ and Sungjune Jung³; ¹Karlsruhe Institute of Technology, Germany; ²Innovationlab GmbH, Germany; ³Pohang University of Science and Technology, Korea (the Republic of); ⁴Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁵Stanford University, United States

4:15 PM EQ04.06.08

Aerosol Jet Printing Process Considerations for Radio Frequency Packaging Applications Georg Gramlich and Thomas Zwick; Karlsruhe Institute of Technology, Germany

4:30 PM *EQ04.06.09

Skin-Inspired Deformable Devices for Artificial Skins and Health Care Unyong Jeong; Pohang University of Science and Technology, Korea (the Republic of)

SESSION EQ04.07: Poster Session I: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors I

Session Chairs: Gerardo Hernandez-Sosa and Tse Nga Ng

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ04.07.01

Device Characteristics of Semiconducting/ Insulating Polymer Blended Organic Field Effect Transistors with Variable Insulating Polymer's Molecular Weight Amnahir Pena-Alcantara, Shayla Nikzad, Huaxin Gong, Yu Zheng, Yuto Ochiai, Jiancheng Lai, David Koshy and Zhenan Bao; Stanford University, United States

EQ04.07.02

Seamlessly Integrated Flexible Supercapacitor for Minimizing the Interfacial Resistance Using Quick Gelation of Agarose Hydrogels Jong Sik Kim and Tae Soup Shim; Ajou University, Korea (the Republic of)

EQ04.07.04

Photolithography-Compatible Organic Light-Emitting Semiconductors for High-Resolution RGB OLEDs Hyukmin Kweon¹, Keun-Yeong Choi², Han Wool Park¹, Ryungyu Lee², Sangjun Park¹, Ukjin Jeong¹, Hojin Lee² and Do Hwan Kim¹; ¹Hanyang University, Korea (the Republic of); ²Soongsil University, Korea (the Republic of)

EQ04.07.05

Selective Thiol-Based Polymerizations for Two-Stage Holographic Materials John Rynk, Maciej Podgórski and Christopher Bowman; University of Colorado Boulder, United States

EQ04.07.06

Ultra-Thin AR Sticker via Optimization of Materials, Structure and Fabrication Method to Effectively Enhance Efficiency of Perovskite Solar Devices Jiseong Choi¹, Yeoun-Woo Jang², Unsoo Kim², Mansoo Choi² and Seongmin Kang¹; ¹Chungnam National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

EQ04.07.07

Inkjet Printed Cellulose Nanofiber/Carbon Nanotube-Based Thin-Film Transistor for Deformation Sensor Joonyoung Kim, Boik Park, Dong Keon Lee, Hayun Kim and Yongtaek Hong; Seoul National University, Korea (the Republic of)

EQ04.07.09

Inkjet-Printing-Based Density and Purity Modulated Single-Walled Carbon Nanotube Thin-Film Transistors for Conformable High-On/Off-Performance and Its Display Applications Hyunuk Oh¹, Hayun Kim¹, Hyunjun Yoo¹, Geonhee Kim¹, Byeongmoon Lee² and Yongtaek Hong¹; ¹Seoul National University, Korea (the Republic of); ²Korea Institute of Science, Korea (the Republic of)

EQ04.07.10

High Performance N-Type Doped Semiconducting Carbon Nanotube Field Effect Transistors (CNT-FETs) on Flexible Substrate Dongseong Yang¹, Seung-Hoon Lee², Nara Han¹, Yeonsu Choi¹, Yina Moon¹ and Dong-Yu Kim¹; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²Korea Research Institute of Chemical Technology, Korea (the Republic of)

EQ04.07.11

Extremely Stretchable Fiber Transistors Based on the Programmable Inflow and Outflow of Semiconducting Fiber to an Ionic Liquid Phase Juhyun Kim and Hoichang Yang; Inha University, Korea (the Republic of)

EQ04.07.12

Strain-Response Sensors Based on In-Drop Spooling of Conducting Micro Fibers into a Liquid Phase Juhyun Kim¹, Kang-Don Lee², Yoo Seong Ahn¹ and Hoichang Yang¹; ¹Inha University, Korea (the Republic of); ²Novatech Int, Korea (the Republic of)

EQ04.07.14

Patterning 1D Polymer Nanostructures with High Region Selectivity for Integrated Logic Circuits Chae Won Kim, Keon Joo Park, Yerin Choi, Sam Nyung Yi, Hyung Soo Ahn and YoungTea Chun; Korea Maritime and Ocean University, Korea (the Republic of)

EQ04.07.15

The Analysis of Ink Jetting and Uniform Thin Film Through Ink Formulation for Inkjet-Printed Optoelectronic Devices Woo Jin Jeong, Hee Jung Kwak, Ri Gyeong Kwon and Jun Young Kim; Gyeongsang National University, Korea (the Republic of)

EQ04.07.17

Chemically Tunable, Flexible and Functionalizable Organic Dielectric Layer on Various TFT Devices Based on Poly(para xylylene) Derivatives Kyung Jin Lee; Chungnam National University, Korea (the Republic of)

EQ04.07.19

Comparison of Ternary Additive Loading when Processing Large Area Organic Photovoltaics by Spin- versus Blade-Coating Methods Chithiravel Sundaresan^{1,2}, Salima Alem², Chase L. Radford³, Trevor M. Grant¹, Timothy L. Kelly³, Jianping Lu², Ye Tao² and Benoit Lessard^{1,1}; ¹University of Ottawa, Canada; ²National Research Council of Canada, Canada; ³University of Saskatchewan, Canada

EQ04.07.21

Liquid Metal Based Stretchable/Self-Healing Electrode for Soft Machine Dong Jin Han and Byung Yang Lee; Korea University, Korea (the Republic of)

SESSION EQ04.08: Printed Flexible Sensors and Applications I

Session Chairs: Unyong Jeong and Tse Nga Ng

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 315

8:30 AM EQ04.08.01

Sensor Design and Circuit Implementation Using Organic Process Design Kit Palak Gupta^{1,2}, Christian Willig³, Justas Lukosiunas⁴, Sebastian Rath⁵, Gabriel Cadilha Marques¹, Stefan Schlisske³, Luis A. Ruiz-Preciado¹, Kosmas Ziogas⁴, Sebastian Stehlin³, Johannes Zimmermann³, Josef Mittermaier⁴, Karl-Philipp Strunk³, Xiaowei Feng¹, Noah Strobel¹, Kai Exner⁵, Peter Erk⁵, Anton Klotz⁴, Louis Thiam⁴, Gerardo Hernandez-Sosa¹, Jasmin Aghassi-Hagmann¹, Wolfgang Kowalsky³ and Christian Melzer³; ¹Karlsruhe Institute of Technology, Germany; ²University of Heidelberg, Germany; ³InnovationLab GmbH, Germany; ⁴Cadence design systems gmbh, Germany; ⁵BASF Corporation, Germany

8:45 AM EQ04.08.02

Printing and Mechanism Modelling of Nanocomposites Strain Sensors James Garcia¹, Daniel O'Driscoll¹, Seán McMahon¹, Domhnall O'Suilleabhain¹, Cian Gabbett¹, Adam Kelly¹, Harneet Kaur¹, Sebastian Barwick¹, Matthias Moebius¹, Conor Boland² and Jonathan N. Coleman¹; ¹Trinity College Dublin, Ireland; ²University of Sussex, United Kingdom

9:00 AM BREAK

9:30 AM EQ04.08.04

Quantifying the Piezoresistive Mechanism in High Performance Flexible Printed Graphene Strain Sensors Eoin Caffrey, James Garcia, Domhnall O'Suilleabhain, Cian Gabbett, Tian Carey and Jonathan N. Coleman; Trinity College Dublin, Ireland

9:45 AM EQ04.08.05

Inkjet-Printed Transparent Temperature Sensors based on Organic Thermoelectrics for High Temporal Resolution Temperature Sensing in Optical Neural Stimulation Junhee Lee¹, Seongkwon Hwang², Jee-woong Lee³, Seungjun Chung² and Hongki Kang¹; ¹Daegu Gyeongbuk Institute of Science and Technology (DGIST), Korea (the Republic of); ²Korea Institute of Science and Technology (KIST), Korea (the Republic of); ³Uppsala University, Sweden

SESSION EQ04.09: Printed Flexible Sensors and Applications II

Session Chair: Paddy K. L. Chan

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 315

1:30 PM EQ04.09.01

Fully Printed High-Density Temperature Sensor Array Robert Huber and Uli Lemmer; Karlsruhe Institute of Technology, Germany

1:45 PM EQ04.09.02

Development of Easily Integrable, Cheap, Flexible, 4x4 and 8x12 Arrays of Organic Water-Gated Transistors for Biosensing Applications Francesco Modena^{1,2}, Fabrizio A. Viola¹ and Mario Caironi¹; ¹Istituto Italiano di Tecnologia (IIT), Italy; ²Politecnico di Milano, Italy

2:00 PM EQ04.09.03

Manufacturing Hierarchical Multifunctional Architectures Regina Ragan; University of California, Irvine, United States

SESSION EQ04.10: Poster Session II: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors II
Session Chairs: Do Hwan Kim and Yong-Young Noh
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ04.10.02

The Ultra-High External Quantum Efficiency of Photomultiplication-Type Organic Photodiodes Induced by Interfacial Electrostatic Interactions Juhee Kim, Mingyun Kang and Dae Sung Chung; Pohang University of Science and Technology (POSTECH), Korea (the Republic of)

EQ04.10.03

Photomultiplication in Organic Photodiodes Realized by Tuning Charge Blocking Layers Chanho Shin, Ning Li and Tse N. Ng; University of California, San Diego, United States

EQ04.10.04

Fabrication of Tattoo Paper-Based SERS Devices and Pesticides Sensing on Fruit Surfaces Daejong Yang and Sangjun Jeon; Kongju National University, Korea (the Republic of)

EQ04.10.05

Biocompatible Ionic Conductor-Based Neural Interface for Implantable Bioelectronics Joo Sung Kim¹, Junho Kim², Junjae Park¹, Dong Jun Kim¹, Sung-Min Park² and Do Hwan Kim¹; ¹Hanyang University, Korea (the Republic of); ²Pohang University of Science and Technology, Korea (the Republic of)

EQ04.10.06

Molecular-Switch-Embedded Organic Photodiode with Autonomous Transition of Operation Mode Mingyun Kang¹, Syed Zahid Hassan¹, Seong-Min Ko², Changwon Choi³, Juhee Kim¹, Jaesub Song¹, Yun Hee Jang³, Jinhwan Yoon⁴, Dong-Woo Jee² and Dae Sung Chung¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Ajou University, Korea (the Republic of); ³Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of); ⁴Pusan National University, Korea (the Republic of)

EQ04.10.07

Highly Deformable, Underwater Self-Healable Tactile Sensor for Breathing Monitoring Zhengyang Kong¹, Joo Sung Kim¹, Hanbin Choi¹, Dong Jun Kim¹, Wu Bin Ying^{2,1} and Do Hwan Kim¹; ¹Hanyang University, Korea (the Republic of); ²Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, China

EQ04.10.08

Visco-Poroelastic Electrochemiluminescence Skin Devices with Piezo-Ionic Effect Hanbin Choi¹, Jong Ik Lee², Joo Sung Kim¹, Zhengyang Kong¹, Moon Sung Kang² and Do Hwan Kim¹; ¹Hanyang University, Korea (the Republic of); ²Sogang University, Korea (the Republic of)

EQ04.10.09

Development of PDMS-Based Ink for 3D Printing Applications Kwan-Soo Lee¹ and Chi Hoon Park^{1,2}; ¹Los Alamos National Laboratory, United States; ²Gyeongsang National University, Korea (the Republic of)

EQ04.10.10

Thermally Stable Vertical μ LED Patch for Facilitating Hair Growth Jaehye Lee and Keon Jae Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ04.10.11

Electrohydrodynamic Printing of Quantum Dot/Polymer Composite for Color-Conversion Micro-Structure on Flexible Platform Geonhee Kim^{1,2}, Hyungsoo Yoon^{1,2}, Donghyo Hahm³, Jinsu Yoon^{1,2}, Seunghwan Lee^{1,2}, Wan Ki Bae³ and Yongtaek Hong^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Inter-university Semiconductor Research Center, Korea (the Republic of); ³Sungkyunkwan University Advanced Institute of NanoTechnology, Korea (the Republic of)

EQ04.10.12

Stretchable Polymer Light-Emitting Diodes with Mercaptosilane-Assisted Mechanically Reliable Ag Electrodes Sujin Jeong^{1,2}, Hyungsoo Yoon^{1,2}, Geonhee Kim^{1,2}, Dahyun Kim^{1,2}, Hwaeeun Park^{1,2} and Yongtaek Hong^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Inter-university Semiconductor Research Center, Korea (the Republic of)

EQ04.10.13

Molecular Design and Development of Materials with Second-Harmonic Generation (SHG) Through Self-Assembly of Supramolecular Systems Hannes F. Kuehner and Stefan Bräse; Karlsruhe Institute of Technology (KIT), Germany

EQ04.10.15

Inkjet-Printed Tin Oxide as Hole Blocking Layer for Organic Photodiodes Peter Krebsbach^{1,2}, Stefan Schliske^{1,2}, Noah Strobel^{1,2}, Mervin Seiberlich^{1,2}, Luis A. Ruiz-Preciado^{1,2}, Christian Rainer^{1,2}, Xiaokun Huang^{3,4,2}, Ulrich Lemmer¹ and Gerardo Hernandez-Sosa^{1,2}; ¹Karlsruhe Institute of Technology, Germany; ²InnovationLab, Germany; ³Technische Universität Braunschweig, Germany; ⁴Universität Heidelberg, Germany

EQ04.10.16

Biocompatible Nanotransfer Printing for Smart Textile and Smart Contact Lens Jiwoo Ko^{1,2}, Junseong Ahn^{1,2}, Yongrok Jeong², Ji-Hwan Ha^{1,2}, Inkyu Park¹ and Jun-Ho Jeong²; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Korea Institute of Machinery & Materials, Korea (the Republic of)

EQ04.10.18

Mechanical Auxetic-Structured Substrates with Negative Poisson's Ratio Beomgil Ha and Byung Yang Lee; Korea University, Korea (the Republic of)

EQ04.10.19

Modulating Non-Iridescent Structural Colors by Controlling Shell Thickness of Inverse Opal Photonic Glasses with Atomic Layer Deposition Inspired by Avian Feathers Jihun Kang^{1,2}, Deok-Jin Jeon^{1,2}, Seunghwan Moon^{1,2}, Seungmuk Ji² and Jong-Souk Yeo^{1,2}; ¹Yonsei University, Korea (the Republic of); ²Yonsei University, Korea (the Republic of)

EQ04.10.22

Design of Cellular Architecture and Development of Cu₂Se-Based 3D Printing Inks for High Durability and Efficient Power Generation Seungjun Choo¹, Hyejin Ju¹, Han Gi Chae¹, Beomjin Kwon² and Jae Sung Son¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Arizona State University, United States

EQ04.10.23

Aerosol-Jet Printed Donor Blocking Layer and Spray-Coated Stretchable Platforms for Organic Photodiode Applications Mervin Seiberlich^{1,2}, Noah Strobel^{1,2}, Luis A. Ruiz-Preciado^{1,2}, Stefan Schlisske^{1,2}, Aleksandr Perevedentsev^{1,2}, Marta Ruscello², Uli Lemmer^{1,1} and Gerardo Hernandez-Sosa^{1,1,2}; ¹Karlsruhe Institute of Technology, Germany; ²InnovationLab, Germany

SESSION EQ04.11: Printed Photonic Devices and Systems I

Session Chair: Gerardo Hernandez-Sosa

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 315

8:30 AM *EQ04.11.01

Architecting Energy Storage Materials with Additive Manufacturing Corie L. Cobb; University of Washington, United States

9:00 AM *EQ04.11.02

Ultra-Flexible Organic Light Emitting Diode for Optical Stimulation Tomoyuki Yokota and Takao Someya; The University of Tokyo, Japan

9:30 AM EQ04.11.03

Flexible Vertical GaN MicroLEDs for Transparent Biomedical Stimulator Sang Hyun Park¹, Han Eol Lee² and Keon Jae Lee¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Jeonbuk National University, Korea (the Republic of)

9:45 AM EQ04.11.04

Highly Stretchable Phosphorescence Organic Light Emitting Diodes Je-Heon Oh and Jin-Woo Park; Yonsei University, Korea (the Republic of)

10:00 AM BREAK

10:30 AM EQ04.11.05

Roll-to-Roll Optical Manufacture of Mechano-Responsive Photonic Sheets Benjamin Miller and Mathias Kolle; Massachusetts Institute of Technology, United States

10:45 AM EQ04.11.06

Electrothermally Driven Paintable Photonic Devices for Large-Area Flexible Optoelectronic Applications Arne Froyen and Albert Schenning; Eindhoven University of Technology, Netherlands

SESSION EQ04.12: Printed Photonic Devices and Systems II

Session Chair: Sanghoon Baek

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 315

1:30 PM EQ04.12.01

Flexible, Colored Spectrally Segmented Covert Infrared Display Based on Hybrid Planar-Plasmonic Structure Joo Hwan Ko¹, Young Jin Yoo¹, Joong Hoon Lee², Yeong Jae Kim³ and Young Min Song¹; ¹Gwangju Institute of Science and Engineering, Korea (the Republic of); ²LG Innotek, Korea (the Republic of); ³Korea Institute of Ceramic Engineering and Technology Ceramics Test-Bed Center, Korea (the Republic of)

1:45 PM EQ04.12.02

Optical Rotation-Based Color Tuning with Engineered Cholesteric Liquid Crystal for Tunable Color Filter Yun-Seok Choi, Hyewon Park, Wongi Park and Dong Ki Yoon; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

2:00 PM EQ04.12.03

Design of Interactive Meta-Holographic Sensor Using Liquid Crystallinity Won-Sik Kim, Jin-Kang Choi, Yena Choi, Hyein Kim, Jun Hyung Im and Youngki Kim; Pohang University of Science and Technology, Korea (the Republic of)

2:15 PM EQ04.12.04

Tailoring of Selective Responsiveness Liquid Crystals for Chemical Targets via Organic Ionics Jin-Kang Choi¹, Won-Sik Kim¹, Yena Choi¹, Chang Yun Son¹, Minjae Lee² and Youngki Kim¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Kunsan National University, Korea (the Republic of)

2:30 PM BREAK

SESSION EQ04.13: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors I
Session Chair: Gerardo Hernandez-Sosa
Monday Morning, May 23, 2022
EQ04-Virtual

8:00 AM *EQ04.13.01

High-Resolution Gravure Printing of Electronics—Materials, Processes and Devices Vivek Subramanian^{1,2}; ¹Ecole polytechnique Federale de Lausanne, Switzerland; ²University of California, Berkeley, United States

8:30 AM EQ04.13.02

Inkjet-Printed Functional Surface Enhanced Raman Scattering (SERS) Sensors for Aerosol Detection Li-lin Tay; National Res Council Canada, Canada

8:45 AM EQ04.13.03

Highly Sensitive Screen-Printed Thermocouples Based on Novel Graphene Ink Christian Willig¹, Irene Brunetti¹, Pariya Nazari², Rainer Bäuerle², Johannes Zimmermann¹, Jean-Nicolas Tisserant¹, Sina Abdolhosseinzadeh³, René Schneider³, Jakob Heier³, Christian Melzer¹ and Wolfgang Kowalsky⁴; ¹InnovationLab GmbH, Germany; ²Universität Heidelberg, Germany; ³Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ⁴Technische Universität Braunschweig, Germany

9:00 AM EQ04.13.04

A Computation-Assisted Approach to Defining the Optimal Processing Window for Meniscus-Guided Coating of Organic Semiconductors Okan Yildiz, Zuyuan Wang, Ke Zhang, Wojciech Pisula, Tomasz Marszalek, Paul W. Blom and Jasper Michels; Max Planck Institute, Germany

9:15 AM EQ04.13.05

Highly Sensitive, Fully Screen-Printed Sensor Matrix Based on a PTC Material for Sensing Thermal Energy Flow Rainer Bäuerle¹, Christian Willig², Pariya Nazari¹, Jean-Nicolas Tisserant², Johannes Zimmermann², Christian Melzer², Wolfgang Kowalsky^{3,2} and Uwe Bunz¹; ¹Ruprecht-Karls-Universität Heidelberg, Germany; ²InnovationLab GmbH, Germany; ³Technische Universität Braunschweig, Germany

9:30 AM *EQ04.13.06

Photonic Nanostructures by Inkjet Printing Qiaoshuang Zhang, Yidenkachew J. Donie, Gerardo Hernandez-Sosa and Ulrich Lemmer; Karlsruhe Inst of Technology, Germany

SESSION EQ04.14: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors II
Session Chair: Tse Nga Ng
Monday Morning, May 23, 2022
EQ04-Virtual

10:30 AM *EQ04.14.01

Functionalized Semiconducting Carbon Nanotube Networks for Sensing Jana Zaumseil; University of Heidelberg, Germany

11:00 AM EQ04.14.02

R2R Manufacturing of Stretchable Soft Electronics for Biosensing Jukka Hast; VTT Technical Research Centre of Finland Ltd., Finland

11:15 AM EQ04.14.03

Ethylene-Vinyl Acetate—A Promising Alternative to Polydimethylsiloxane for Stretchable Electronics Pariya Nazari¹, Palak Gupta¹, Rainer Bäuerle¹, Christian Willig², Johannes Zimmermann², Christian Melzer², Wolfgang Kowalsky³, Jasmin Aghassi-Hagmann⁴, Uwe Bunz¹ and Ulrich Lemmer⁴; ¹Ruprecht-Karl Universität Heidelberg, Germany; ²InnovationLab GmbH, Germany; ³Technische Universität Braunschweig, Germany; ⁴Karlsruhe Institute of Technology, Germany

11:30 AM EQ04.14.05

Ultrasensitive Flexible Broadband Photodetectors Based on Three-Dimensional Graphene Shirin Movaghgharneshad¹, Minsu Kim², Seung Min Lee¹, Heeyoung Jeong³, Byoung Gak Kim³ and Pilgyu Kang¹; ¹George Mason University, United States; ²Georgia Institute of Technology, United States; ³Korea Research Institute of Chemical Technology, Korea (the Republic of)

11:35 AM EQ04.14.06

Fully Printed Ionic Polymer-Metal Composite Soft Microactuator Ji Zhang; University of Cambridge, United Kingdom

11:50 AM EQ04.14.07

Polarized Photodetectors Based on Oriented Organic Semiconductors—Fabrication, Dark-Current Suppression and Applications Aleksandr Perevedentsev^{1,2}, Hadhemi Mejri^{1,2}, Luis A. Ruiz-Preciado^{1,2}, Tomasz Marszalek³, Paul W. Blom³, Uli Lemmer^{1,1} and Gerardo Hernandez-Sosa^{1,2,1}; ¹Karlsruhe Institute of Technology, Germany; ²InnovationLab, Germany; ³Max Planck Institute for Polymer Research, Germany

SESSION EQ04.15: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors III
Session Chair: Yong-Young Noh
Monday Afternoon, May 23, 2022
EQ04-Virtual

6:30 PM *EQ04.15.01

Making Printed 2D Crystal-Based Gas Sensors Smarter—From Materials Synthesis to Computational Algorithms Tawfique Hasan; Cambridge

University, United Kingdom

7:00 PM EQ04.15.02

Facile Fabrication of Extremely Wet Surface Harnessing 5nm-thick Gallium Oxide on Liquid Metal [Kazi Zihan Hossain](#) and M. Rashed Khan; University of Nevada, Reno, United States

7:15 PM EQ04.15.03

Diffuse Solar Micro-Concentrators Using Dielectric Total Internal Reflection with Tunable Side and Top Profiles [Lulin Li](#), Yida Lin, Keyi Kang Yao, Alex Ozbolt, Eric Guo and Susanna Thon; Johns Hopkins University, United States

7:20 PM EQ04.15.04

Stability and Temporal Decay of Nanopatterned Tribocharge on Nanotextured Soft Polymeric Surfaces [Myunggi Ji](#), Qiang Li, Rana Biswas and Jaeyoun Kim; Iowa State University, United States

SESSION EQ04.16: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors IV

Session Chair: Do Hwan Kim
Monday Afternoon, May 23, 2022
EQ04-Virtual

9:00 PM *EQ04.16.01

Silk-Nanocarbon Hybrid Materials for Soft Electronics [Yingying Zhang](#); Tsinghua University, China

9:30 PM *EQ04.16.02

Printable Flexible Electroactive Composite Materials and Devices [Pooi See Lee](#); Nanyang Technical University, Singapore

10:00 PM EQ04.16.03

A Wirelessly Pressure Monitoring 3D Integrated Insole [Taeil Kim](#) and Woo Soo Kim; Simon Fraser University, Canada

10:15 PM *EQ04.16.04

Self-Healing and Stretchable Optoelectronic Devices [Benjamin C. Tee](#); National University of Singapore, Singapore

SESSION EQ04.17: Advanced Soft Materials and Processing Concepts for Flexible Printed Optoelectronic Devices and Sensors V

Session Chair: Gerardo Hernandez-Sosa
Tuesday Morning, May 24, 2022
EQ04-Virtual

8:00 AM *EQ04.17.01

Flexible Printed Organic Sensors and Their Applications [Shizuo Tokito](#); Yamagata University, Japan

8:30 AM *EQ04.17.02

Molecular Structural and Environmental Origins of Charge Trapping and Their Effects on Operational Stability of Organic Field-Effect Transistors [Kilwon Cho](#); Pohang University of Science and Technology, Korea (the Republic of)

9:00 AM EQ04.17.03

Enhanced Piezocapacitive Response in Zinc Oxide tetrapod-poly(dimethylsiloxane) Composite Dielectric Layer for Flexible and Ultrasensitive Pressure Sensor [Gen-Wen Hsieh](#), Shih-Rong Ling, Fan-Ting Hung, Pei-Hsiu Kao and Jian-Bin Liu; National Yang Ming Chiao Tung University, Taiwan

9:15 AM EQ04.17.04

Influence of Corona Poling to PVDF-Based Dielectric Layers on Charge Transport of Organic Field-Effect Transistor with Dielectric Bilayer [Yina Moon](#), Yeon-Ju Kim, Nara Han, Yeonsu Choi, Dongseong Yang and Dong-Yu Kim; Gwangju Institute of Science and Technology, Korea (the Republic of)

9:30 AM *EQ04.17.05

Monolayer Organic Transistors—From Fabrications to Applications [Paddy K. L. Chan](#); University of Hong Kong, Hong Kong

##PAGE_BREAK##

SYMPOSIUM EQ05

Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices
May 9 - May 25, 2022

[Symposium Organizers](#)

Do Young Kim, Oklahoma State University
Jovana Milic, University of Fribourg
Aditya Mohite, Rice University
Stephen Sai-Wing Tsang,

* Invited Paper

SESSION EQ05.01: Thin-Film Processing, Characterization, Properties I
Session Chairs: Do Young Kim and Barry Rand
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 316A

10:30 AM EQ05.01.02

Monitoring the Transition from Molecular Surface Passivation to 2D Layer Formation on 3D Perovskite Films Tim Kodalle¹, Raphael Moral², Lucas Scalon², Rodrigo Szostak², Maged Abdelsamie³, Ana Nogueira² and Carolin M. Sutter-Fella¹; ¹Lawrence Berkeley National Laboratory (LBNL, LBL), United States; ²University of Campinas, Brazil; ³Lawrence Berkeley National Laboratory, United States

10:45 AM EQ05.01.03

Increasing the Reverse Bias Breakdown Potential of Perovskite Solar Cells with a Conformal SnOx Barrier Layer Isaac Gould^{1,2}, Samuel Johnson^{1,2}, Jay Patel^{1,2}, Axel Palmstrom² and Michael McGehee^{1,2}; ¹CU Boulder, United States; ²National Renewable Energy Laboratory, United States

11:00 AM EQ05.01.04

Relationship Between Annealing Temperature and the Presence of PbI₂ Platelets at the Surfaces of Triple-Halide Perovskite Films Dan R. Wargulski, Ke Xu, Hannes Hempel, Marion Flatken, Steve Albrecht and Daniel Abou-Ras; Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

11:15 AM *EQ05.01.05

Two-Dimensional Organic-Perovskite Hybrid Materials and Heterostructures Letian Dou; Purdue University, United States

SESSION EQ05.02: Thin-Film Processing, Characterization, Properties II
Session Chairs: Biwu Ma and Aditya Mohite
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 316A

1:30 PM EQ05.02.01

Enhanced Visible Light Absorption in Layered Cs₃Bi₂Br₉ Through Mixed-Valence Sn(II) / Sn(IV) Doping Seán R. Kavanagh^{1,2,3}, Chantalle Krajewska⁴, Lina Zhang¹, Dominik Kubicki⁵, Krishanu Dey⁵, Krzysztof Galkowski⁵, Clare P. Grey⁵, Samuel D. Stranks⁵, Robert Palgrave¹, Aron Walsh² and David O. Scanlon¹; ¹University College London, United Kingdom; ²Imperial College London, United Kingdom; ³CDT-ACM, United Kingdom; ⁴Massachusetts Institute of Technology, United States; ⁵University of Cambridge, United Kingdom

1:45 PM EQ05.02.03

Fully Roll-to-Roll Fabricated Perovskite PV Modules with Printed Carbon Electrodes Doojin Vak and Luke Sutherland; CSIRO Manufacturing, Australia

2:00 PM *EQ05.02.04

Metal Halide Perovskite Interfaces—Role in Doping and Degradation Barry P. Rand; Princeton University, United States

2:30 PM BREAK

3:00 PM EQ05.02.05

Universal Current Losses in Perovskite Solar Cells Due to Mobile Ions Jarla Thiesbrummel¹, Vincent Le Corre¹, Francisco Peña-Camargo¹, Lorena Perdígón-Toro¹, Felix Lang¹, Fengjiu Yang², Max Grischek^{2,1}, Emilio Gutierrez-Partida¹, Jonathan Warby¹, Steve Albrecht², Dieter Neher¹ and Martin Stoltterfoht¹; ¹University of Potsdam, Germany; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

3:15 PM EQ05.02.06

Light-Activated Interlayer Contraction in 2D Perovskites for High-Efficiency Solar Cells Wenbin Li^{1,1}, Siraj Sidhik¹, Boubacar Traore², Reza Asadpour³, Jin Hou¹, Hao Zhang¹, Austin Fehr¹, Joseph Essman¹, Yafei Wang¹, Justin Hoffman⁴, Ioannis Spanopoulos⁴, Jared Crochet⁵, Esther Tsai⁶, Joseph Strzalka⁷, Claudine Katan², Muhammad Alam³, Mercouri Kanatzidis⁴, Jacky Even², Jean-Christophe Blancon¹ and Aditya D. Mohite^{1,1}; ¹Rice University, United States; ²Univ Rennes, INSA Rennes, France; ³Purdue University, United States; ⁴Northwestern University, United States; ⁵Los Alamos National Laboratory, United States; ⁶Brookhaven National Laboratory, United States; ⁷Argonne National Laboratory, United States

3:30 PM EQ05.02.07

Toward Scalable Fabrication of High-Quality Metal Halide Perovskite Films Through Confined-Volume Printing Adam Printz, Matthew Dailey, Yanan Li and Patrick Lohr; The University of Arizona, United States

3:45 PM EQ05.02.08

Post 10-Month MISSE 13 Space Flight Testing of Encapsulated MAPI Thin Film William G. Delmas¹, Samuel Erickson¹, Calista Lum¹, Jorge Arteaga¹, Kyle Crowley², Jennifer Williams³, Lyndsey McMillon-Brown², Timothy Peshek² and Sayantani Ghosh¹; ¹University of California, Merced, United States; ²John H. Glenn Research Center, The National Aeronautics and Space Administration, United States; ³Wilberforce University, United States

4:00 PM EQ05.02.09

Doping Organic Interlayers in Perovskite Solar Cells with Carbon Dioxide Jason A. Röhr, Jaemin Kong, Hang Wang, Juan Meng and André D. Taylor; New York University, United States

SESSION EQ05.03: Poster Session I: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices I

Session Chairs: Do Young Kim and Aditya Mohite

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ05.03.01

Gas Sensing Properties at Room Temperature of Halide Perovskite Cs₂SnI₆ Thin Film Grown by Chemical Vapor Deposition Method Phung D. Hoat, Hyojun Lim, Sunwoo Jin, Sunghoon Bae, Vo V. Khoe, Intaek Lee, Joochan Kim, Joon-Hyung Lee, Sangwook Lee, Roy B. Chung, Ji Hoon Lee, Tae Hoon Lee and Young-woo Heo; School of Materials Science and Engineering, Kyungpook National University, Korea (the Republic of)

EQ05.03.02

Strategy for Highly Efficient Perovskite Solar Cell —The Ratio of Precursor with GBL:DMF:DMSO Mixing Solution Changmin Lee, Sye Hamad Ullah Shah, Dong Hyun Kim, Geonwoo Jeong, Dong Hyun Choi, Tae Wook Kim, Hyung Ju Chae, Hyun Woo Jo, Min Jae Park, Anjad Islam and Seung Yoon Ryu; Korea University, Korea (the Republic of)

EQ05.03.03

Compositional Engineering Triple-Cation Tin-Lead Iodides for Narrow-Band-Gap Perovskite Solar Cells Sung Woong Yang¹, Yeonghun Yun¹, Devthade Vidyasagar¹, Rajendra Kumar Gunasekaran¹, Jina Jung¹, Won Chang Choi¹, Ji Hoon Lee¹, Chang-Lyoul Lee² and Sangwook Lee¹; ¹Kyungpook National University, Korea (the Republic of); ²Gwangju Institute of Science and Technology, Korea (the Republic of)

EQ05.03.06

Visualizing Current Flow In Solar Cell Electrodes Greyson Christoforo and Henry Snaith; University of Oxford, United Kingdom

EQ05.03.07

Direct Observation of Photoinduced, Non-Equilibrium Phase Transition in CH₃NH₃PbI₃ via Time-Resolved X-Ray Diffraction Shobhana Panuganti, Mercuri Kanatzidis and Richard Schaller; Northwestern University, United States

EQ05.03.08

Energetics of π – Conjugated Surface Ligands on Metal Halide Perovskites and Their Influence on Interfacial Charge Transfer and Photovoltaic Performance Harindi R. Atapattu¹, Ke Ma², Sailajah Gukathasan¹, Samuel Awuah¹, Letian Dou² and Kenneth R. Graham¹; ¹University of Kentucky, United States; ²Perdue University, United States

EQ05.03.09

Ultra-Stable and Robust Response to X-Rays in 2D Layered Perovskite Micro-Crystalline Films Directly Deposited on Flexible Substrate Matteo Verdi^{1,2}, Ferdinand Lédée¹, Andrea Ciavatti^{1,2}, Laura Basiricò^{1,2} and Beatrice Fraboni^{1,2}; ¹University of Bologna, Italy; ²National Institute for Nuclear Physics-INFN, Italy

EQ05.03.11

Photoinduced Changes in Crystallinity in Two-Dimensional Layered Perovskites Shelby Cuthriell, Mercuri Kanatzidis and Richard Schaller; Northwestern University, United States

EQ05.03.12

Optimizing Substrate Chemistry and Perovskite Composition for Reproducible Manufacturing of Efficient and Stable Perovskite Solar Cells Annikki L. Santala, Rohit Prasanna, Max Hoerantner and Hyunjong Lee; Swift Solar Inc., United States

EQ05.03.13

Interfacial Strategies for Efficient and Stable Spray-Coated Perovskite Solar Cells in Open Air Mathilde Fievez, Austin Flick, Nicholas Rolston and Reinhold H. Dauskardt; Stanford University, United States

EQ05.03.14

Machine Learning for Automatic, Accelerated Semiconductor Characterization from Time-Resolved Photoluminescence (TPRL) via Iterated Bayesian Inferencing—Case of CH₃NH₃PbI₃-xCl_x Calvin Fai, Anthony Ladd and Charles J. Hages; University of Florida, United States

SESSION EQ05.04: Thin-Film Processing, Characterization, Properties III

Session Chairs: Kenneth Graham and Adam Printz

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 316A

8:30 AM EQ05.04.01

Ultra-Thin Transition Metal Dichalcogenide Photovoltaics for Space Applications [Peter Bermel](#); Purdue University, United States

8:45 AM EQ05.04.02

Pressure-Dependent Structural and Optical Properties of Dion-Jacobson and Ruddlesden-Popper Layered Hybrid Perovskites Loreta A. Muscarella¹, [Algirdas Ducinkas](#)^{2,3}, Mathias Dankl², Michal Andrzejewski⁴, Nicola P. Casati⁴, Ursula Roethlisberger², Joachim Maier³, Michael Grätzel², Bruno Ehrler¹ and Jovana V. Milic^{5,2}; ¹AMOLF, Netherlands; ²École Polytechnique Fédérale de Lausanne, Switzerland; ³Max Planck Institute for Solid State Research, Switzerland; ⁴Paul Scherrer Institute, Switzerland; ⁵Adolph Merkle Institute, Switzerland

9:00 AM EQ05.04.03

Diverging Expressions of Anharmonicity in Halide Perovskites [Adi Cohen](#)¹, Thomas Brenner¹, Johan Klarbring², Rituraj Sharma¹, Douglas Fabini³, Roman Korobko¹, Pabitra K. Nayak⁴, Olle Hellman² and Omer Yaffe¹; ¹Weizmann Institute of Science, Israel; ²Linköping University, Sweden; ³Max Planck Institute for Solid State Research, Germany; ⁴Tata Institute of Fundamental Research, India

9:15 AM EQ05.04.04

From 2D to 3D—A Green Solvent System for Templated Sequential Deposition of Efficient and Stable Perovskite Solar Cells [Benjamin Gallant](#), Philippe Holzhey, Karim Elmostekawy, Laura Herz and Henry Snaith; University of Oxford, United Kingdom

9:30 AM BREAK

10:00 AM EQ05.04.05

2D Surface Engineering for Efficient and Stable Perovskite Solar Cells [Kai Zhu](#); National Renewable Energy Laboratory, United States

10:15 AM EQ05.04.06

Is Synthesis Complexity Responsible for Defect Formation in Wide Bandgap Halide Perovskites? Tianyi Huang¹, Shaun Tan¹, Finn Babbe² and [Carolyn M. Sutter-Fella](#)²; ¹University of California, Los Angeles, United States; ²Lawrence Berkeley National Laboratory, United States

10:30 AM *EQ05.04.07

Integrated Halide Perovskite Photoelectrodes for High-Efficiency and Durable Solar Water-Splitting Michael Wong and [Aditya D. Mohite](#); Rice University, United States

SESSION EQ05.05: Synthesis and Structural Characterization

Session Chairs: Aditya Mohite and Bayram Saparov

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 316A

1:30 PM EQ05.05.01

Vertically Aligned Two-Dimensional Halide Perovskite as Artificial Synapses Toward Neuromorphic Computing [Seung Ju Kim](#) and Ho Won Jang; Seoul National University, Korea (the Republic of)

1:45 PM EQ05.05.02

A Selenophene-Containing Conjugated Organic Ligand for Two-Dimensional Halide Perovskite [Zitang Wei](#), Kang Wang and Letian Dou; Purdue University, United States

2:00 PM EQ05.05.03

Induced Chirality in Halide Perovskite Clusters Through Surface Chemistry [Aaron Forde](#)^{1,1}, Dibyajyoti Ghosh², Dmitri Kilin³, Amanda Evans¹, Sergei Tretiak¹ and Amanda Neukirch¹; ¹Los Alamos National Laboratory, United States; ²Indian Institute of Technology Delhi, India; ³North Dakota State University, United States

2:15 PM EQ05.05.04

Intermediate-Phase Engineering via Dimethylammonium as Excess Cation for Stable Perovskite Solar Cells [Philippe J. Holzhey](#)^{1,2}; ¹University of Oxford, United Kingdom; ²Adolphe-Merkel Institute, Switzerland

2:30 PM *EQ05.05.05

Molecular Dopants—Tools to Control the Electronic Structure of Metal Halide Perovskite Interfaces Fengyu Zhang, Hannah L. Smith and [Antoine Kahn](#); Princeton University, United States

3:00 PM BREAK

3:30 PM *EQ05.05.07

Alloying Metals in Halide Perovskites Kurt Lindquist¹, Michael Boles¹, Bridget Connor¹, Stephanie Mack^{2,3}, Jeffrey B. Neaton^{2,3} and [Hemamala Karunadasa](#)^{1,4}; ¹Stanford University, United States; ²Lawrence Berkeley National Laboratory, United States; ³University of California, Berkeley, United States; ⁴SLAC National Accelerator Laboratory, United States

4:00 PM EQ05.05.09

Defects Activity in Wide Bandgap Metal Halide Perovskite Semiconductors [Annamaria Petrozza](#); Istituto Italiano di Tecnologia, Italy

SESSION EQ05.06: Poster Session II: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices II

Session Chairs: Do Young Kim and Aditya Mohite

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ05.06.01

Intact 2D/3D Halide Junction Perovskite Solar Cells via Solid-Phase In-Plane Growth (SIG) [Yecoun-Woo Jang](#)^{1,1}, Seungmin Lee², Jun Hong Noh^{2,2} and Mansoo Choi^{1,1}; ¹Seoul National University, Korea (the Republic of); ²Korea University, Korea (the Republic of)

EQ05.06.02

Probing the Stability and Degradation of 2D Perovskites Using *In Situ* Infrared Spectroscopy [Robert Balow](#), Blake S. Simpkins and Daniel Ratchford; U.S. Naval Research Laboratory, United States

EQ05.06.03

Preparation of (CH₃NH₃)₃Bi₂I₉ Thick Film via Mist Deposition Method for X-Ray Detection [Mioko Kawakami](#), Yuki Haruta, Shinji Wada, Takumi Ikenoue, Masao Miyake and Tetsuji Hirato; Kyoto University, Japan

EQ05.06.04

Halide Segregation in Ruddlesden-Popper Perovskites [Alessandro Caiazzo](#), Kunal Datta, Zehua Chen, Junyu Li, Geert Brocks, Shuxia Tao, Peter Bobbert, Martijn M. Wienk and René A. Janssen; TU Eindhoven, Netherlands

EQ05.06.05

Demonstrating Metal Halide Perovskite Reversible Glass Transition via *In Situ* X-Ray Scattering [Damara G. Dayton](#)¹, Julian Mars¹, Michael Toney¹, Akash Singh² and David B. Mitzi²; ¹University of Colorado Boulder, United States; ²Duke University, United States

EQ05.06.06

Universal Charge Transfer p-Doping Approach for Developing Intrinsic Properties of Perovskite Films [Youjin Reo](#), Huihui Zhu, Ao Liu and Yong-Young Noh; Pohang University of Science and Technology, Korea (the Republic of)

EQ05.06.07

Illuminating Structure-Property Relationships of Methylammonium-Free Lead Halide Perovskites Through Advanced Characterization Studies of Halide- and Phase- Segregation [Diana K. LaFollette](#)¹, An Yu^{2,1} and Juan Pablo Correa Baena¹; ¹Georgia Institute of Technology, United States; ²Tianjin University, China

EQ05.06.08

Doped Lead Halide Perovskites for Ionizing Radiation Detection [Ashley Conley](#), Katelyn Dagnall, Ephraim Sarabamoun, Lucy U. Yoon, Matthew Alpert, Eric Holmgren, Seung-Hun Lee and Joshua J. Choi; University of Virginia, United States

EQ05.06.11

A Facile Surface Passivation for Thermally Stable Planar Perovskite Solar Cells by Using a Novel IDTT-Based Small Molecule Additive [Hyuntae Choi](#) and Taiho Park; Pohang University of Science and Technology, Korea (the Republic of)

EQ05.06.13

Highly Efficient Solar Cells Using Monodisperse Perovskite Quantum Dots [Seyeong Lim](#) and Taiho Park; Pohang University of Science and Technology, Korea (the Republic of)

EQ05.06.15

Strongly Anharmonic Octahedral Tilting in 2D Hybrid Halide Perovskites [Matan Menahem](#)¹, Zhenbang Dai², Sigalit Aharon¹, Rituraj Sharma¹, Maor Asher¹, Yael Diskin-Posner¹, Roman Korobko¹, Andrew M. Rappe² and Omer Yaffe¹; ¹Weizmann Institute of Science, Israel; ²University of Pennsylvania, United States

EQ05.06.17

CsPbBr₃ Thin Film Grown by Dual-Source Evaporation for PeLED [Sung hoon Bac](#), Sunwoo Jin, Vo V. Khoe, Intaek Lee, Hyojun Lim, Joohan Kim, Sangwook Lee, Joon-Hyung Lee, Roy B. Chung, Tae Hoon Lee and Young-woo Heo; Kyungpook National University, Korea (the Republic of)

SESSION EQ05.07: Photo-Physics, Spin, Photonics I

Session Chairs: Deep Jariwala and Kai Zhu

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 316A

8:30 AM EQ05.07.01

Study of Synthesis Parameters on the Formation and Physical Properties of 2D/3D Hybrid Halide Perovskite Heterostructures for Solar Cells [Thomas Campos](#)^{1,2}, Pia Dally^{2,3}, Muriel Boutemy³, Gaele Trippe-Allard¹, Aurelien Duchatelet^{4,2}, Jean Rousset^{4,2}, Damien Garrot^{5,1} and Emmanuelle Deleporte¹; ¹Light, Material and Interfaces Laboratory (LuMI), France; ²Institut Photovoltaïque d'Ile-de-France (IPVF), France; ³Institut Lavoisier de Versailles (ILV), France; ⁴EDF R&D, France; ⁵Groupe d'Etudes de la Matière Condensée (GEMaC), France

8:45 AM EQ05.07.02

Phase Segregation in Mixed-Halide Perovskites Impacts Charge-Carrier Dynamics While Preserving Mobility [Silvia G. Motti](#), Jay Patel, Robert Oliver, Henry Snaith, Michael Johnston and Laura Herz; University of Oxford, United Kingdom

9:00 AM EQ05.07.04

Understanding and Suppressing Non-Radiative Losses in Methylammonium-Free Wide Bandgap Perovskite Solar Cells [Robert Oliver](#) and Henry Snaith; University of Oxford, United Kingdom

9:15 AM *EQ05.07.05

Intrinsic Nanostructure and Halide Segregation in Metal Halide Perovskites [Laura Herz](#); University of Oxford, United Kingdom

10:15 AM EQ05.07.06

Understanding the Photophysics of Layered Lead Halide Perovskites [Elco K. Tekelenburg](#)¹, Simon Kahmann^{1,2}, Herman Duim¹, Machteld Kamminga^{1,3}, Graeme Blake¹ and Maria Antonietta Loi¹; ¹University of Groningen, Netherlands; ²University of Cambridge, United Kingdom; ³University of Copenhagen, Denmark

10:15 AM BREAK

10:30 AM EQ05.07.07

Strain Modified Carrier Dynamics in 2D Perovskites [Daniel Ratchford](#)¹, Vanessa M. Breslin¹, Tara J. Michael², Junghoon Yeom¹, Robert Balow¹, Blake S. Simpkins¹, Jeff Owrutsky¹ and Adam Dunkelberger¹; ¹Naval Research Laboratory, United States; ²NRC Postdoc Fellow, United States

10:45 AM *EQ05.07.08

Scalable, Template Driven Formation of Highly Crystalline Lead-Tin Halide Perovskite Films [Maria Antonietta Loi](#); University of Groningen, Netherlands

SESSION EQ05.08: Photo-Physics, Spin, Photonics II

Session Chairs: Letian Dou and Laura Herz

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 316A

1:30 PM EQ05.08.01

Effect of Sub-Bandgap States in 2D Halide Perovskite Photodetector [Eunyoung Choi](#)¹, Yuroo Zhang², Arman M. Soufiani¹, Richard F. Webster¹, Peter J. Reece¹, Jan Seidel¹, Jung-Ho Yun² and Jae Sung Yun^{1,3}; ¹University of New South Wales, Australia; ²University of Queensland, Australia; ³University of Surrey, United Kingdom

1:45 PM EQ05.08.02

Energy Cascade in Ruddlesden-Popper Lead Halide Perovskites—Exciton Delocalization and the Role of Organic Spacer [Sankaran Ramesh](#)^{1,2}, David Giovanni¹, Marcello Righetto¹, Jia Wei Melvin Lim^{1,2}, Qiannan Zhang¹, Yue Wang¹, Senyun Ye¹, Qiang Xu¹, Jian Qing^{3,4}, Xiao-Ke Liu⁴, Heyong Wang⁴, Zhongcheng Yuan⁴, Zhan Chen^{4,3}, Lintao Hou³, Feng Gao⁴, Nripan Mathews^{2,1} and Tze Chien Sum¹; ¹Nanyang Technological University, Singapore; ²Energy Research Institute@NTU, Singapore; ³Jinan University, China; ⁴Linköping University, Sweden

2:00 PM *EQ05.08.03

Atomic Imaging of Octahedral Tilting in Two-dimensional Ruddlesden-Popper Perovskites [Kian Ping Loh](#); National University of Singapore, Singapore

2:30 PM BREAK

3:00 PM EQ05.08.04

Perovskite Solar Cells with Enhanced Mechanical Reliability [Min Chen](#)^{1,2}, Nitin Padture² and Joseph Luther¹; ¹National Renewable Energy Laboratory, United States; ²Brown University, United States

3:15 PM EQ05.08.05

First-Principles Characterization of Surface Phonons of Halide Perovskite CsPbI₃ and Their Role in Stabilization [Ruoxi Yang](#) and Liang Z. Tan; Lawrence Berkeley National Laboratory, United States

3:30 PM EQ05.08.06

Investigating Excited State Coherence and Coupling in Engineered Spin-Cast Superlattices of 2D Halide Perovskites [Bogdan Dryzhakov](#) and Bin Hu; University of Tennessee Knoxville, United States

3:45 PM EQ05.08.07

Energy Transfer in Stability-Optimized Perovskite Nanocrystals [Andreas Singldinger](#), Michèle Greiner, Moritz Gramlich, Carola Lampe, Nina A. Henke and Alexander S. Urban; Ludwig-Maximilians-Universität München, Germany

4:00 PM EQ05.08.08

Chiral Induced Spin Selectivity in Halide Perovskites Enables Room Temperature Spin Light-Emitting Diodes [Young-Hoon Kim](#)^{1,2}; ¹Hanyang University, Korea (the Republic of); ²National Renewable Energy Laboratory, United States

4:15 PM EQ05.08.09

In Operando, Photovoltaic, Microscopic Evaluation of Recombination Centers in Halide Perovskite-Based Solar Cells [Arava Zohar](#)^{1,2}, Michael Kulbak², Silver Hamill Turren-Cruz³, Pabitra K. Nayak⁴, Adi Kama⁵, Anders Hagfeldt⁶, Henry Snaith⁷, Gary Hodes² and David Cahen²; ¹University of California, Santa Barbara, United States; ²Weizmann Inst, Israel; ³Jaume I University, Spain; ⁴Tata Institute of Fundamental Research, India; ⁵Bar-Ilan University, Israel; ⁶École Polytechnique Fédérale de Lausanne, Switzerland; ⁷University of Oxford, United Kingdom

SESSION EQ05.09: Poster Session III: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices III

Session Chairs: Do Young Kim and Aditya Mohite

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ05.09.01

Enhancing Moisture Stability of Alumina Passivated Inverted (p-i-n) Structure Perovskite Solar Cells Using SiO₂ Encapsulation Tamanna Mariam, Ramez H. Ahangharnajhad, Zhaoning Song, Prabodika N. Kaluarachchi, Manoj K. Jamarkattel, Shannon Costello, Manoj Rajakaruna, Suman Rijal, Zahrah Almutawah, Abdul Quader, Adam Phillips, Yanfa Yan, Randy Ellingson and Michael J. Heben; University of Toledo, United States

EQ05.09.02

Ultralow Dark Current in Near-Infrared Perovskite Photodiodes by Reducing Charge Injection and Interfacial Charge Generation Riccardo Ollearo¹, Junke Wang¹, Matthew J. Dyson¹, Christ H. Weijtens¹, Marco Fattori¹, Bas T. van Gorkom¹, Albert van Breemen¹, Stefan C. Meskers¹, Gerwin Gelinck^{2,1} and René A. Janssen^{1,3}; ¹Eindhoven University of Technology, Netherlands; ²TNO at Holst Centre, Netherlands; ³Dutch Institute for Fundamental Energy Research, Netherlands

EQ05.09.03

The A-Site Cation Effect on the Structural Dynamics of Lead-Bromide Perovskites Guy Reuveni, Yael Diskin-Posner and Omer Yaffe; Weizmann Institute of Science, Israel

EQ05.09.04

Molecular Engineering of Interfacial Materials to Afford Perovskite Solar Cells and Modules with Improved Efficiency and Stability Kasparas Rakstys; Kaunas University of Technology, Lithuania

EQ05.09.05

Time to Go Bifacial—A Commercialization Pathway for Perovskite Photovoltaics Zhaoning Song and Yanfa Yan; University of Toledo, United States

EQ05.09.06

Large-Scale Room Temperature One-Pot Synthesis of Perovskite Nanoplatelets for Blue Light-Emitting Diodes Ju-Hyun Yoo¹, Tae-Woo Lee² and Jin-Woo Park¹; ¹Yonsei University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

EQ05.09.07

Room Temperature Superfluorescence Melike Biliroglu¹, Gamze Findik¹, Juliana Mendes¹, Dovletgeldi Seyitliyev¹, Lei Lei¹, Qi Dong¹, Yash Mehta¹, Vasily Temnov², Franky So¹ and Kenan Gundogdu¹; ¹North Carolina State University, United States; ²French National Centre for Scientific Research and Ecole Polytechnique, France

EQ05.09.09

Solution-Processed Li Doped NiO_x as a Hole Transport Layer for Pb-Sn Mixed Low Bandgap Perovskite Solar Cells You Jin Ahn¹, So Jeong Park¹, Sun Kyung Hwang¹, Ik Jae Park² and Jin Young Kim¹; ¹Seoul National University, Korea (the Republic of); ²Sookmyung Women's University, Korea (the Republic of)

EQ05.09.12

Space-Charge-Limited Electron and Hole Transport in Methyl Ammonium Lead Iodide Perovskites Mohammad Sajedi Alvar, Paul W. Blom and Gert-Jan Wetzelaer; Max Planck Institute for Polymer Research, Germany

EQ05.09.15

Investigation of the Interactions Between Photo-Generated Charge Carriers and Defects in Perovskite Solar Cells by Photoluminescence Spectroscopy Zhihua Xu; University of Minnesota-Duluth, United States

EQ05.09.16

Room-Temperature NO₂ Gas Sensor Based on Cs₂TeI₆ Thin Film Under Blue-Light Illumination Phung D. Hoat, Hyojun Lim, Sunwoo Jin, Sunghoon Bae, Vo V. Khoe, Intaek Lee, Joochan Kim, Joon-Hyung Lee, Sangwook Lee, Roy B. Chung, Ji Hoon Lee, Tae Hoon Lee and Young-woo Heo; School of Materials Science and Engineering, Kyungpook National University, Korea (the Republic of)

SESSION EQ05.10: Photo-Physics, Spin, Photonics III

Session Chairs: Gerd Bacher and Maria Antonietta Loi

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 316A

8:00 AM *EQ05.10.01

Room Temperature Macroscopic Quantum Phenomena in Hybrid Perovskites Kenan Gundogdu and Franky So; North Carolina State University, United States

8:30 AM EQ05.10.02

X-Ray Induced Modification of the Photophysical Properties of MAPbBr₃ Single Crystals Giovanni Armaroli¹, Laura Ferlauto^{1,2}, Ferdinand Lédée^{1,2}, Matilde Lini¹, Andrea Ciavatti¹, Alessandro Kovtun³, Francesco Borgatti⁴, Gabriele Calabrese⁵, Silvia Milita⁵, Beatrice Fraboni¹ and Daniela Cavalcoli¹; ¹Department of Physics and Astronomy, University of Bologna, Italy; ²Interdepartmental Center for Industrial Research of the University of Bologna, Italy; ³Institute of Organic Synthesis and Photoreactivity - (CNR-ISOF), Italy; ⁴Institute for Nanostructured Material Study (CNR – ISMN), Italy; ⁵Institute for Microelectronics and Microsystems (CNR – IMM), Italy

8:45 AM EQ05.10.03

Quantification of Efficiency Losses Due to Mobile Ions in Perovskite Solar Cells via Fast-Hysteresis Measurements Martin Stollerfoht, Vincent Le Corre, Jarla Thiesbrummel and Dieter Neher; University of Potsdam, Germany

9:00 AM EQ05.10.04

Optoelectronic Properties of Tin-Based Narrow-Bandgap Halide Perovskites [Isabella Poli](#)¹, Francesco Ambrosio^{1,2}, Antonella Treglia^{1,3}, Samuele Martani^{1,3}, Giulia Folpini¹, Filippo De Angelis^{2,4} and Annamaria Petrozza¹; ¹Istituto Italiano di Tecnologia, Italy; ²CNR di Scienze e Tecnologie Chimiche “Giulio Natta” (CNR- SCITEC), Italy; ³Politecnico di Milano, Italy; ⁴University of Perugia, Italy

9:15 AM *EQ05.10.05

Preparation of High-Efficiency Light Emitters Based on Copper and Silver Halides [Bayram Saparov](#)¹, Tielyr Creason¹ and Mao-Hua Du²; ¹University of Oklahoma, United States; ²Oak Ridge National Laboratory, United States

9:45 AM BREAK

10:15 AM EQ05.10.06

The Halogen Exchange Equilibrium in Halide Perovskites—Halide Diffusion, Spontaneous Electronic Doping, and Implications Towards Stability [Julian A. Vigil](#), Nathan Wolf, Adam Slavney, Abraham Saldivar Valdes and Hemamala Karunadasa; Stanford University, United States

10:30 AM EQ05.10.07

Lattice Configuration and Crystal Orientation of Single CsPbBr₃ Nanoplatelets Probed by Optical Spectroscopy [Gerd Bacher](#)¹, Alexander Schmitz¹, L. Leander Schaberg¹, Frederico Montanarella² and Maksym Kovalenko²; ¹Univ Duisburg-Essen, Germany; ²ETH Zürich, Switzerland

SESSION EQ05.11: Devices, Stability Sustainability I

Session Chairs: Peter Bermel and Franziska Muckel

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 316A

1:30 PM *EQ05.11.01

Strong Light-Matter Coupling in Two-Dimensional Halide Perovskites [Deep Jariwala](#); University of Pennsylvania, United States

2:00 PM EQ05.11.03

2D Perovskites for Wavelength-Selective Photodetectors Tamara Czerny and [Franziska E. Muckel](#); University Duisburg-Essen, Germany

2:15 PM *EQ05.11.04

Understanding the Influence of Defects, Light and Ion Conduction in Metal Halide Perovskites for Stability [Jinsong Huang](#); University of North Carolina-Chapel Hill, United States

2:45 PM BREAK

3:15 PM EQ05.11.05

Open-Circuit and Short-Circuit Loss Management in Inverted Wide-Gap Perovskite *pin* Solar Cells [Pietro Caprioglio](#), Joel Smith, Robert Oliver, Akash Dasgupta and Henry Snaith; University of Oxford, United Kingdom

3:30 PM EQ05.11.06

Thermoelectric Performance of Two-Dimensional Halide Perovskites Featuring Conjugated Ligands [Sheng-Ning P. Hsu](#), Bryan W. Boudouris and Letian Dou; Purdue University, United States

3:45 PM EQ05.11.07

Dynamic Structural Fluctuations and Strongly Anharmonic Phonons in Inorganic Halide Perovskites Xing He¹, Tyson Lanigan-Atkins¹, Matthew Krogstad², Chengjie Mao¹, Mayanak Gupta^{1,3}, Daniel Pajeroski⁴, Guangyong Xu⁵, Tao Hong⁴, Feng Ye⁴, Duck Young Chung², Mercuri Kanatzidis^{6,2}, Jinsong Huang⁷, Stephan Rosenkranz², Raymond Osborn² and [Olivier Delaire](#)¹; ¹Duke University, United States; ²Argonne National Laboratory, United States; ³Bhabha Atomic Research Center, India; ⁴Oak Ridge National Laboratory, United States; ⁵National Institute of Standards and Technology, United States; ⁶Northwestern University, United States; ⁷University of North Carolina at Chapel Hill, United States

4:00 PM EQ05.11.08

Long-Range Carrier Transport and Recombination in All-Back-Contact Perovskite Solar Cells [Kevin J. Prince](#)^{1,2}, Darius Kuciauskas¹, Mirzo Mirzokarimov¹, Matthew Sibila³, Marco Nardone³, Colin A. Wolden^{2,1} and Lance M. Wheeler¹; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States; ³Bowling Green State University, United States

SESSION EQ05.12: Devices, Stability, Sustainability II

Session Chairs: Kenan Gundogdu and Jinsong Huang

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 316A

8:30 AM EQ05.12.03

Understanding Charge Transport in Lead-Tin Perovskite Field Effect Transistors with Superior Performance [Krishanu Dey](#) and Samuel D. Stranks; University of Cambridge, United Kingdom

8:45 AM *EQ05.12.04

Towards Spectrally Stable Blue Perovskite Light Emitting Diodes [Biwu Ma](#); Florida State University, United States

9:15 AM EQ05.12.05

Controlled Ion Transport in Metal Halide Perovskites for Field-Effect Transistors Working at Room-Temperature [Beomjin Jeong](#); Pusan National University, Korea (the Republic of)

9:30 AM BREAK

10:00 AM EQ05.12.06

Exploiting Perovskites Multidimensionality for High Performance Photodiodes [Alessandro Caiazzo](#)¹, Riccardo Ollearo¹, Junyu Li¹, Albert van Breemen², Martijn M. Wienk¹, Gerwin Gelinck^{1,2} and René A. Janssen¹; ¹TU Eindhoven, Netherlands; ²TNO Holst Centre, Netherlands

10:15 AM EQ05.12.08

3D/2D Hybrid Perovskite Heterostructures for Thin-Film Field-Effect Transistors [Amita Ummadisingu](#) and Henning Sirringhaus; University of Cambridge, United Kingdom

10:30 AM EQ05.12.09

Highly Efficient Perovskite-CIS Monolithic Tandem Solar Cells [Marco A. Ruiz Preciado](#)^{1,1}, Ihtez M. Hossain^{1,1}, Thomas Feeney^{1,1}, Ahmed Farag^{1,1}, Hang Hu^{1,1}, Saba Gharibzadeh^{1,1}, Fabrizio Gota^{1,1}, Roja Singh^{1,1}, Marcel Simor², Pieter J. Bolt² and Ulrich W. Paetzold^{1,1}; ¹Karlsruhe Institute of Technology, Germany; ²TNO, Netherlands

SESSION EQ05.13: Devices, Stability, Sustainability III

Session Chairs: Charles Hages and In Soo Kim

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 316A

1:30 PM *EQ05.13.01

Suppression of Defects and Ion-Migration for Efficient Perovskite Emitters and Light-Emitting Diodes [Tae-Woo Lee](#); Seoul National University, Korea (the Republic of)

2:00 PM EQ05.13.02

Self-Healing Polymer-Based Encapsulation for Lead-Sealed, Submersible, Stretchable and Scalable Modular Perovskite-Based Optoelectronics Jinhyun Kim¹, Duhwan Seong², Donghee Son² and [In Soo Kim](#)¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

2:15 PM EQ05.13.03

High Sensitivity Flexible X-Ray Detectors Based on Printed Perovskite Inks Andrea Ciavatti^{1,2}, Roberto Sorrentino³, Laura Basiricò^{1,2}, Bianca Passarella³, Mario Caironi³, Annamaria Petrozza³, Beatrice Fraboni^{1,2} and [Matteo Verdi](#)⁴; ¹DIFA - University of Bologna, Italy; ²National Institute for Nuclear Physics, Italy; ³Istituto Italiano di Tecnologia, Italy; ⁴University of Bologna, Italy

2:30 PM EQ05.13.04

The Influence of Intrinsic Semiconductor Properties and Device Architecture on the Temperature Coefficients of Single Junction and Multi-Junction Perovskite Photovoltaics [Jay Patel](#)^{1,2}, Daniel A. Morales², Samuel Johnson², Artiom Magomedov², Joseph Luther¹ and Michael McGehee^{2,1}; ¹National Renewable Energy Laboratory, United States; ²University of Colorado, United States

2:45 PM BREAK

3:15 PM EQ05.13.05

Mighty Morphin' Power of Perovskites [Lance M. Wheeler](#)¹, Bryan Rosales¹, Kevin J. Prince^{1,2}, Colin A. Wolden^{2,1}, Laura Mundt³ and Laura T. Schelhas¹; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States; ³SLAC National Accelerator Laboratory, United States

3:30 PM EQ05.13.07

Highly Transparent, Scalable and Stable Perovskite Photovoltaics without Compromising Aesthetics [Tianran Liu](#), Xiaoming Zhao, Ping Wang, Quinn C. Burlingame, Minjie Chen and Lynn Loo; Princeton University, United States

3:45 PM EQ05.13.08

Rapid Spray Plasma Processing for High-Throughput, Multi-Modal Curing of Perovskite Solar Modules [Austin Flick](#), Nicholas Rolston, Mathilde Fievez and Reinhold H. Dauskardt; Stanford University, United States

SESSION EQ05.14: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices I

Session Chair: Jovana Milic

Wednesday Morning, May 25, 2022

EQ05-Virtual

8:00 AM *EQ05.12.02

Strategies for Efficient Inverted Architecture Devices [Yana Vaynzof](#); Technical University Dresden, Germany

8:30 AM EQ05.14.03

Are Space Charges at Interfaces Between Halide Perovskites and Charge Carrier Transporting Layers Ionically or Electronically Induced? [Mina Jung](#), Gee Yeong Kim, Alessandro Senocrate, Davide Moia and Joachim Maier; Max Planck Institute for Solid State Research, Germany

8:45 AM EQ05.14.04

Photo De-Mixing in Two-Dimensional Dion-Jacobson Mixed Halide Perovskites [Ya-Ru Wang](#)¹, Alessandro Senocrate¹, Marko Mladenović², Algirdas Ducinkas³, Gee Yeong Kim¹, Ursula Roethlisberger², Jovana V. Milic³, Davide Moia¹, Michael Grätzel³ and Joachim Maier¹; ¹Max Planck Institute for

Solid State Research, Germany; ²École Polytechnique Fédérale de Lausanne, Switzerland; ³Ecole polytechnique Fédérale de Lausanne, Switzerland

9:00 AM EQ05.14.05

A-Site Cation Influence on the Conduction Band of Lead Bromide Perovskites and Its Connection to Slow Hot Carrier Cooling [Gabriel J. Man](#)¹, Chinnathambi Kamal², Aleksandr Kalinko³, Dibya Phuyal⁴, Joydev Acharya⁵, Soham Mukherjee¹, Pabitra K. Nayak⁵, Håkan Rensmo¹, Michael Odellius² and Sergei M. Botorin¹; ¹Uppsala University, Sweden; ²Stockholm University, Sweden; ³Photon Science DESY, Germany; ⁴KTH Royal Institute of Technology, Sweden; ⁵Tata Institute of Fundamental Research, India

9:15 AM EQ05.14.06

Luminescence Imaging of Perovskite Solar Cells [Akash Dasgupta](#)¹, Suhas Mahesh² and Henry Snaith¹; ¹University of Oxford, United Kingdom; ²University of Toronto, Canada

9:30 AM EQ05.14.07

Quasi-2D Hybrid Organic-Inorganic Perovskites: DFT Modeling Approach [Omar A. Allam](#)^{1,1}, Yoonseo Nah², Ilgeum Lee², Dong Ha Kim² and Seung Soon Jang¹; ¹Georgia Institute of Technology, United States; ²Ewha Womans University, Korea (the Republic of)

9:35 AM EQ05.14.08

Accessing Radiation-Matter Interactions in Perovskite Photovoltaics for Space Applications—*Readying the Launch* [Ahmad R. Kirmani](#)¹, Bibhudutta Rout², Ian R. Sellers³ and Joseph Luther¹; ¹National Renewable Energy Laboratory, United States; ²University of North Texas System, United States; ³The University of Oklahoma, United States

SESSION EQ05.15: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices II

Session Chair: Jovana Milic
Wednesday Morning, May 25, 2022
EQ05-Virtual

10:30 AM EQ05.15.01

Enhanced Self-Assembled Monolayer Surface Coverage by ALD NiO in p-i-n Perovskite Solar Cells [Nga Phung](#)¹, Marcel Verheijen¹, Anna Todinova¹, Kunal Datta¹, Michael Verhage¹, Amran Al-Ashouri², Hans Köbler², Antonio Abate², Steve Albrecht² and Mariadriana Creatore¹; ¹TU Eindhoven, Netherlands; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

10:45 AM EQ05.15.02

On the Equilibrium Electrostatic Potential and Light-Induced Charge Redistribution in Halide Perovskite Structures [Davide Regalado](#)^{1,2,3}, Aleksandra Bojar^{1,2,3}, Sean Dunfield^{4,5}, Pilar Lopez-Varo¹, Mathieu Frégnaux^{1,6}, Vincent Dufoulon^{1,7}, Shan-Ting Zhang¹, José Alvarez^{1,2,3}, Joseph J. Berry⁴, Jean-Baptiste Puel^{1,8}, Philip Schulz^{1,7} and Jean-Paul Kleider^{1,2,3}; ¹Institut Photovoltaïque d'Ile-de-France, France; ²Université Paris-Saclay, CentraleSupélec, CNRS, Laboratoire de Génie Electrique et Electronique de Paris, France; ³Sorbonne Université, CNRS, Laboratoire de Génie Electrique et Electronique de Paris, France; ⁴National Renewable Energy Laboratory, United States; ⁵University of Colorado Boulder, United States; ⁶Institut Lavoisier de Versailles, Université de Versailles Saint-Quentin-en-Yvelines, Université Paris-Saclay, CNRS, UMR 8180, France; ⁷CNRS, École Polytechnique, IPVF, UMR 9006, France; ⁸EDF R&D, France

11:00 AM EQ05.15.03

Tailoring Interfacial Energetics to Minimize Voltage Losses in FASnI₃ [Vesta Zhelyaskova](#), Jay Patel, Michael McGehee and Sean E. Shaheen; University of Colorado Boulder, United States

11:05 AM EQ05.15.04

An Accurate Description of Excitonic Absorption in GaAs and Tri-Halide Perovskites (MAPbX₃) by Combining the Sommerfeld Enhancement Factor and Bands Fluctuations [Kevin Lizarraga](#) and Andres Guerra; Pontificia Universidad Católica del Perú, Peru

11:10 AM EQ05.15.05

Anomalous Charge Transport in Lead Halide Perovskite Field-Effect Transistors [Youcheng Zhang](#)^{1,2}, Amita Ummadisingu¹ and Henning Sirringhaus¹; ¹Cavendish Laboratory, Department of Physics, University of Cambridge, United Kingdom; ²University of Cambridge, United Kingdom

11:25 AM EQ05.15.06

Monolithic All-Perovskite Tandem Solar Cells with Minimal Optical and Energetic Losses [Junke Wang](#)¹, Kunal Datta¹, Dong Zhang^{2,1}, Valerio Zardetto², Willemijn H. Remmerswaal¹, Christ H. Weijtens¹, Martijn M. Wienk¹ and René A. Janssen^{1,3}; ¹Eindhoven University of Technology, Netherlands; ²TNO, Netherlands; ³Dutch Institute for Fundamental Energy Research, Netherlands

11:40 AM EQ05.15.07

Study of Energetic Distribution of Traps in Perovskite Solar Cell With Iron Pyrite as a Hole Transport Layer [Punit Sharma](#); Indian Institute of Technology Delhi, India

11:45 AM EQ05.15.08

Quantitatively Assessing Hybrid Perovskite Degradation Using Spectroscopic Ellipsometry [Alvaro Tejada Esteves](#)^{1,2}, Sven Peters³, Amran Al-Ashouri¹, Silver Hamill Turren-Cruz¹, Steve Albrecht¹, Florian Ruske¹, Bernd Rech¹, Andres Guerra² and Lars Korte¹; ¹Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany; ²Pontificia Universidad Católica del Perú, Peru; ³SENTECH Instruments GmbH, Germany

11:50 AM EQ05.14.02

Exploring Carrier-Driven Exciton Formation in Upconverting Perovskite/Rubrene Bilayers Using Drift-Diffusion Simulations Calvin Fai¹, Karunanantharajah Prashanthan², Frederik Eistrup², Klaus Lips², Thomas Unold², Charles J. Hages¹ and [Rowan MacQueen](#)²; ¹University of Florida, United States; ²Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

SESSION EQ05.16: Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices III
Session Chair: Stephen Sai-Wing Tsang
Wednesday Afternoon, May 25, 2022
EQ05-Virtual

9:00 PM *EQ05.16.01

Strategic Approaches for Achieving High-Power Perovskite Solar Cells Under Indoor Light Conditions—Defect Control by Interface Engineering
Jong Hyun Kim; Ajou University, Korea (the Republic of)

9:30 PM *EQ05.16.02

Ligand-Engineered Bandgap Stability in Mixed-Halide Perovskite LEDs Bo Ram R. Lee¹, Yasser Hassan², Jong Hyun Park³, Michael Crawford⁴, Aditya Sadhanala², Jeongjae Lee⁵, James Sadighian⁴, Edoardo Mosconi⁶, Ravichandran Shivanna⁷, Eros Radicchi⁶, Mingyu Jeong³, Changduk Yang³, Hyosung Choi⁸, Sung Heum Park¹, Myoung Hoon Song³, Filippo Angelis⁹, Cathy Wong⁴, Richard Friend⁷ and Henry Snaith²; ¹Pukyong National University, Korea (the Republic of); ²University of Oxford, United Kingdom; ³Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁴Oregon State University, United States; ⁵Seoul National University, Korea (the Republic of); ⁶Istituto CNR di Scienze e Tecnologie Chimiche ‘Giulio Natta’ (CNR-SCITEC), Italy; ⁷University of Cambridge, United Kingdom; ⁸Hanyang University, Korea (the Republic of); ⁹University of Perugia, Italy

10:00 PM EQ05.16.03

Hole Selective Monolayers Directing to the Efficiency More Than 23% in Tin-Lead Mixed Perovskite Solar Cells Gaurav Kapil^{1,2}, Takeru Bessho², Qing Shen¹, Hiroshi Segawa² and Shuzi Hayase¹; ¹The University of Electro-communications, Japan; ²The University of Tokyo, Japan

10:15 PM EQ05.16.04

High Efficiency Tin-Lead Mixed Halides Perovskite Solar Cells via Additive Engineering with Enhanced Electronic Properties and Stability
Shahrir Razey Sahamir, Muhammad Akmal Kamarudin, Qing Shen and Shuzi Hayase; The University of Electro-Communications, Japan

10:30 PM EQ05.16.05

Visualizing Defects in Charge Transport Layers of Halide Perovskite-Based Solar Cells by Fluorescence Quenching Microscopy Hannah Kwon¹, Jinhyun Kim¹, Hyejun Kim¹, Hyun Chul Kim¹, Seok Joon Kwon² and In Soo Kim¹; ¹Korea Institute of Science and Technology (KIST), Korea (the Republic of); ²Sungkyunkwan University (SKKU), Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM EQ06

Surfaces and Interfaces in Electronics and Photonics
May 8 - May 24, 2022

Symposium Organizers

Silvia Armini, IMEC
Santanu Bag, Air Force Research Laboratory
Mandakini Kanungo, Corning Incorporated
Hong Zhao, Virginia Commonwealth University

* Invited Paper

SESSION EQ06.01: Area Selective Deposition I
Session Chairs: Silvia Armini and Santanu Bag
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 314

8:30 AM *EQ06.01.01

Nanoscale Chemically Self-Aligned Thin Films Using Simultaneous Adjacent Deposition and Etching Gregory N. Parsons, SK Song, Jung-Sik Kim and Hannah R. Margavio; North Carolina State Univ, United States

9:00 AM EQ06.01.02

Area-Selective Deposition of Titanium Oxide and Titanium Nitride for Nanoscale Patterning Solutions Based on Self-Aligned Tone Reversal Scheme Silvia Armini; IMEC, Belgium

9:15 AM EQ06.01.03

Plasma-assisted Atomic Layer Deposition of Monolayer AlO_x on GaN for Surface Functionalization and Low-Resistance Contacts [Alex Henning](#), Johannes D. Bartl, Maximilian Christis, Andreas Zeidler, Simon Qian, Oliver Bienek, Chang-Ming Jiang, Claudia Paulus, Bernhard Rieger, Martin Stutzmann and Ian D. Sharp; Technical University of Munich, Germany

9:30 AM BREAK

10:00 AM EQ06.01.04

ALD- and CVD-Based Nanolayers for Germanium Surface Passivation [Willem-Jan Berghuis](#), Max Helmes, Roel J. Theeuwes, Bart Macco and Erwin Kessels; Eindhoven University of Technology, Netherlands

10:15 AM EQ06.01.05

The Importance of the Metal-Adjacent Atom in Hybrid Metal/Organic Vapor Deposition [Jacqueline Lewis](#), Jingwei Shi, Steven I-Cheng Hsu and Stacey F. Bent; Stanford University, United States

10:30 AM EQ06.01.07

Integrating ALD with Anion Exchange Chemistry to Tune p-type CuO_xS_y Semiconductors with Atomic Precision [Julia D. Leneff](#), Jaesung Jo, Andrew J. Gayle, Orlando Trejo, Rebecca L. Peterson and Neil P. Dasgupta; University of Michigan–Ann Arbor, United States

10:45 AM *EQ06.01.08

Control of Interfacial Grain Structure for Deposition of III-V Nitrides with RF Bias Atomic Layer Annealing Aaron Mcleod¹, Scott Ueda¹, Jeff Spiegelman² and [Andrew Kummel](#)¹; ¹University of California, San Diego, United States; ²Rasire, United States

SESSION EQ06.02: Interface Engineering
Session Chairs: Silvia Armini and Jane Chang
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 314

1:30 PM EQ06.02.02

Extremely Scaled Hetero-Junction Channel TFT for Advanced Electronics [Sonu Devi](#) and Aaron V. Thean; National University of Singapore, Singapore

1:45 PM *EQ06.02.04

Atomic Layer Processing for Engineering Interfaces in Functionally Enhanced Complex Materials [Jane P. Chang](#); University of California, Los Angeles, United States

2:15 PM EQ06.02.05

Electron Scattering at Rh and Ir Surfaces and Grain Boundaries [Atharv Jog](#) and Daniel Gall; Rensselaer Polytechnic Institute, United States

2:30 PM EQ06.02.06

Enhanced Light Emission by Engineering Random Strain Fields at the Interface Between Crystalline-Si and Rare-Earth Doped Silica [Sufian Abedrabbo](#)¹, Ali Abdulla¹, El Mostafa Benchafia¹, Ahmad Al Qawasmeh¹ and Anthony T. Fiory²; ¹Khalifa University of Science and Technology, United Arab Emirates; ²Integron Solutions LLC, United States

2:45 PM BREAK

3:15 PM EQ06.02.07

Customising Material Properties Through Interfacial Patterning [Shane G. Davies](#), Conor J. Price and Steven P. Hepplestone; University of Exeter, United Kingdom

3:30 PM EQ06.02.09

Enhanced Efficiency of Inverted Triple Cation Perovskite Solar Cells Assisted by Antisolvent Crystallization with PEDOT:PSS as the Hole Transport Layer [Banashree Gogoi](#) and Aditya Yerramilli; Arizona State University, United States

SESSION EQ06.03: Interfaces in Wearable Electronics
Session Chairs: Santanu Bag, Mandakini Kanungo and Rebecca Kramer-Bottiglio
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 314

10:30 AM *EQ06.03.01

Are Liquid Metals Bulk Conductors? [Rebecca Kramer-Bottiglio](#); Yale University, United States

11:00 AM EQ06.03.02

VTH Shift in n-MoS₂ and p-MoTe₂ FET Induced by Surface Charge Transfer from Organic Thin Film [Yongjae Cho](#); Yonsei University, Korea (the Republic of)

11:15 AM EQ06.03.03

Photoresponse on Cu-Cu₂O-Cu Flexible Photodetectors Fabricated Using Laser-Induced Digital Oxidation [Junil Kim](#)¹, Kyungmin Ko², Hyeokjin Kwon^{1,1}, Joonki Suh^{2,2}, Hyuk-Jun Kwon^{1,1} and Jae-Hyuck Yoo³; ¹DGIST, Korea (the Republic of); ²UNIST, Korea (the Republic of); ³Lawrence Livermore National Laboratory, United States

11:30 AM EQ06.03.04

Tuning the Surface Properties of Liquid Metal Particles via Non-Native Shells for Stimuli-Responsive Electronics [Wilson Kong](#)^{1,2}, Megan Creighton^{3,1}, Zachary Farrell^{4,1} and Christopher E. Tabor¹; ¹Air Force Research Laboratory, United States; ²National Research Council, United States; ³Drexel University, United States; ⁴UES, Inc., United States

11:45 AM EQ06.03.05

Pushing Electrochemical Transformations and Enhancing Carrier Doping in Functional Oxides by Electrolyte Gating [Hua Zhou](#), Wei Chen, Diillon Fong and Hui Cao; Argonne National Laboratory, United States

SESSION EQ06.04: Interfaces in Energy Harvesting and Thin-film Devices

Session Chairs: Santanu Bag, Mandakini Kanungo and Tse Nga Ng

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 314

1:30 PM *EQ06.04.01

Development of Energy Harvesting and Storage Structures through Printing Customizations [Tse Nga Ng](#); University of California, San Diego, United States

2:00 PM EQ06.04.02

Improved Temperature Stability of Source-Gated IGZO Thin-Film Transistors via Insulating Contact Layers Eva Bestelink¹, Kham M. Niang², Salman Alfarisy¹, Patryk Golec¹, Andrew J. Flewitt², Ravi Silva¹ and [Radu A. Sporea](#)¹; ¹University of Surrey, United Kingdom; ²University of Cambridge, United Kingdom

2:15 PM EQ06.04.03

Offset and Noise Reduction with Bridge Resistance Compensation in a Self-Balanced PHMR Sensor [Changyeop Jeon](#)¹, Jaehoon Lee¹, Taehyeong Jeon¹, Proloy T. Das¹, Yongho Lee², Byeonghwa Lim¹ and CheolGi Kim^{1,1}; ¹DGIST, Korea (the Republic of); ²KRISS, Korea (the Republic of)

2:30 PM EQ06.04.04

Role of Interfacial Layers in the Performance of EGO FETs and EGO FET-Biosensors [Larissa Huetter](#)¹, Adrica Kyndiah² and Gabriel Gomila^{1,3}; ¹Institute for Bioengineering of Catalonia, Spain; ²Istituto Italiano di Tecnologia, Italy; ³Universitat de Barcelona, Spain

2:45 PM EQ06.04.05

Interface Engineering of Potential Ruthenium Interconnect for Reduced Electrical Resistivity [Yu-Lin Chen](#), Yi-Ying Fang and Shou-Yi Chang; National Tsing Hua University, Taiwan

3:00 PM BREAK

3:30 PM EQ06.04.06

Inorganic Nanoparticle Fillers for Electricity from Solar Energy Parks in Africa to European Cities Mattias E. Karlsson and [Richard T. Olsson](#); KTH Royal Institute of Technology, Sweden

3:45 PM EQ06.04.07

Heterostructural Interface Atomic-Structure Predictions for SnO₂/CdTe with CdCl₂ Treatment in Photovoltaics Abhishek Sharan, Darius Kuciauskas and [Stephan Lany](#); National Renewable Energy Laboratory, United States

4:00 PM *EQ06.04.08

Carrier-Resolved Photo Hall Effect and the Parallel Dipole Line Hall System [Oki Gunawan](#); IBM Research, United States

SESSION EQ06.05: Poster Session I: Surfaces and Interfaces I

Session Chairs: Silvia Armini, Santanu Bag and Mandakini Kanungo

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ06.05.03

Long Term Anti-Corrosion Effect of Nitrogen-Doped Amorphous Carbon Film on Transparent and Deformable Ultrathin Copper Film [Chae-Eun Shim](#) and Unyong Jeong; Pohang University of Science and Technology, Korea (the Republic of)

EQ06.05.04

High-Definition Optophysical Image Construction Having Pixelated Wrinkles [Kitae Kim](#)¹, Se-Um Kim², Moon-Young Choi¹ and Jun-Hee Na¹; ¹Chungnam National University, Korea (the Republic of); ²Samsung Advanced Institute of Technology, Korea (the Republic of)

EQ06.05.06

Advanced Organic Transistor-Based Sensor utilizing Solvatochromic Medium with Twisted Intramolecular Charge-Transfer Behavior and Its Application to Ammonia Gas Detection [Seungtaek Oh](#), Giheon Choi, Jungyoon Seo and Hwasung Lee; Hanyang University, Korea (the Republic of)

EQ06.05.07

Manipulation of Mid-Infrared Emission via Metal Dielectric Metal Approaches [Qimeng Song](#)¹, Kishin Matsumori¹, Tobias Lauster¹, Nelson W. Pech-May¹ and Markus Retsch^{1,2}; ¹Bayreuth University, Germany; ²Bavarian Polymer Institute, Germany

EQ06.05.09

First-Principles Analysis of Electronic Characteristics of Bilayer Dicalcium Nitride (Ca₂N) with Point Defect Jinwoong Chae and Gunn Kim; Sejong University, Korea (the Republic of)

EQ06.05.11

Area-Selective Chemical Vapor Polymerization—Multistage Growth and Temperature-Pressure Control of Deposition Xiaoyang Zhong; University of Michigan–Ann Arbor, United States

EQ06.05.12

Strain-Controlled Atomic Scale Distortions and Anti-Ferromagnetism at LaFeO₃/SrTiO₃ Interface Menglin Zhu, Jose G. Flores, Joseph Lanier, Sevim Polat Genlik, Maryam Ghazisaeidi, Fengyuan Yang and Jinwoo Hwang; Ohio State University, United States

EQ06.05.13

Surface Chemical Composition and Thermal Stability of Ge/Ge_{1-x}Sn_x Co-Axial Heterostructures Michael Braun¹, John Lentz¹, Isha Bishnoi¹, Andrew C. Meng² and Paul McIntyre¹; ¹Stanford University, United States; ²University of Pennsylvania, United States

EQ06.05.14

Strain-Free Perovskite Hetero-Chalco-Epitaxy with Giant Lattice Constant Mismatch Enabled by Self-Assembled Surface Passivation Using Gas-Source MBE Rafael Jaramillo; Massachusetts Institute of Technology, United States

EQ06.05.17

High Tunneling-Electroresistance and Non-Linearity via Tunneling-Barrier Modulation in Ferroelectric Tunnel Junction Hojin Lee¹, Joonbong Lee¹, Jinho Byun², Jaekwang Lee², Sungkyun Park², Yoon-Uk Heo³ and Taekjib Choi¹; ¹Sejong University, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Pohang University, Korea (the Republic of)

EQ06.05.18

Surface Engineering with Monolayer Precision Using Atomic Layer Etching—Application to Superconducting Microwave Resonators Haozhe Wang, David S. Catherall, Azmain Hossain, Peter Day and Austin J. Minnich; California Institute of Technology, United States

EQ06.05.19

Atomic Layer Deposition for Surface Modification of Various High Aspect Ratio 1D Nanomaterials Raul Zazpe^{1,2}, Hanna Sopha^{1,2}, Martina Rihova^{2,1}, Sitaramanjanya Mouli Thalluri^{1,2}, Jhonatan Rodriguez-Pereira^{1,2} and Jan M. Macak^{1,2}; ¹Univ of Pardubice, Czechia; ²Brno University of Technology, Czechia

EQ06.05.20

Hierarchically Designed Nanoparticles for High-Transparency, Self-Cleaning Surfaces Jin-Woo Cho¹, Seungtae Oh², Sun-Kyung Kim¹ and Youngsuk Nam³; ¹Kyung Hee University, Korea (the Republic of); ²Korea Institute of Industrial Technology, Korea (the Republic of); ³Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ06.05.22

Surface Modification of TCOs(Transparent Conductive Oxides) for Colloidal-Ink Based Photoelectronic Devices Yoolim Cha^{1,2}, Dong-Joo Kim¹ and Young Soo Yoon²; ¹Auburn University, United States; ²Gachon University, Korea (the Republic of)

EQ06.05.23

First-Principles Investigation of Crossover Between ALD and CVD in the Thin Film Deposition of Gold Casey N. Brock, David J. Giesen, Alexandr Fonari and Simon Elliott; Schrödinger Inc, United States

EQ06.05.24

Understanding Intercalation Kinetics and Structural Changes of Chevrel Phase Sulfides as a Function of Stoichiometric Control of Cu Intercalation in Aqueous Environment via Electrochemical Methods Kabian Ritter¹, Forrest Hyler¹, Joseph Perryman^{2,1} and Jesus Velazquez¹; ¹University of California, Davis, United States; ²Stanford University, United States

SESSION EQ06.06: Area Selective Deposition II

Session Chairs: Silvia Armini, Santanu Bag, Mandakini Kanungo and Adrie Mackus

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 314

8:30 AM *EQ06.06.01

Surface Functionalization Using Small Molecule Inhibitors for Area-Selective Atomic Layer Deposition Adrie Mackus; Eindhoven University of Technology, Netherlands

9:00 AM EQ06.06.02

Influence of Thickness and Surface Composition on the Stability of Ferroelectric Polarization in Ultrathin HfO₂ Adrian Acosta¹, John Mark P. Martinez¹, Norleakvisoth Lim¹, Jane P. Chang¹ and Emily A. Carter^{1,2}; ¹University of California, Los Angeles, United States; ²Princeton University, United States

9:15 AM EQ06.06.03

Developing Hafnium Oxide Thin Films on Silicon with Robust Wet Chemical Etch Resistance Ailish Wratten, Nicholas E. Grant, David Walker and John D. Murphy; University of Warwick, United Kingdom

9:30 AM BREAK

10:00 AM *EQ06.06.04

Guiding Area Selective Deposition by a Mechanistic Understanding of Surface Chemistry Stacey F. Bent; Stanford University, United States

10:30 AM EQ06.06.05

Surface States Spectroscopic Characterization in GaN—From Bare Wafers to GaN HEMT Yury Turkulets¹, Nitzan Shauloff², Raz Jelinek² and Ilan Shalish¹; ¹Ben Gurion University of the Negev, Israel; ²Ben-Gurion University of the Negev, Israel

10:45 AM EQ06.06.06

Surface Passivation by ALD and CVD Nanolayers for Electronics and Photonics Erwin Kessels, Willem-Jan Berghuis, Roel J. Theeuwes, Marcel Verheijen and Bart Macco; Eindhoven Univ of Technology, Netherlands

11:00 AM EQ06.06.07

In Situ Characterization of Cleaning and Passivation of Cu Surface for Applications to Area Selective Atomic Layer Deposition Su Min Hwang¹, Dan N. Le¹, Jin-Hyun Kim¹, Yong Chan Jung¹, Jean- F. Veyan¹, Daniel Alvarez², Jeff Spiegelman² and Jiyoung Kim¹; ¹The University of Texas at Dallas, United States; ²Rasirc Inc, United States

SESSION EQ06.07: Interface Characterization
Session Chairs: Silvia Armini, John Conley and Mandakini Kanungo
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 314

1:30 PM EQ06.07.01

Exposing Dynamical Phase Transitions and Electro-Thermal Transport in TiTe₂ Thin Films Christopher Perez^{1,2}, Asir Intisar Khan¹, Kathryn Neilson¹, Xiangjin Wu¹, H.-S. Phillip Wong¹, Mehdi R. Asheghi¹, Eric Pop¹ and Kenneth E. Goodson¹; ¹Stanford University, United States; ²Sandia National Laboratories, United States

1:45 PM EQ06.07.02

Resistivity Size Effect in Thin Metal Films Computed with a Realistic Tight-Binding Model Patrick K. Schelling, Eduardo Mucciolo and William Richardson; Univ of Central Florida, United States

2:00 PM *EQ06.07.03

Internal Photoemission (IPE) Spectroscopy Measurement of Energy Barriers at Interfaces in Metal/Insulator/Metal (MIM) Devices John F. Conley; Oregon State University, United States

2:30 PM BREAK

3:00 PM *EQ06.07.05

In Operando XPS Study of Dry Etching of Metals Zijian Wang, Omar Melton and Robert Opila; University of Delaware, United States

SESSION EQ06.08: Poster Session II: Surfaces and Interfaces II
Session Chairs: Silvia Armini, Santanu Bag and Mandakini Kanungo
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ06.08.01

Cu₂O Thin-Film Transistor with Enhanced Switching Characteristics by Controlling Deposition Condition and Annealing in N₂ Atmosphere Jae Hak Lee and Youn Sang Kim; Seoul National University, Korea (the Republic of)

EQ06.08.03

Galvanic Corrosion Inhibition of Copper Film for Ruthenium Barrier Film Chemical Mechanical Planarization Slurry Gangyu Lee, Sungmin Kim, Hojin Jeong, Taeseup Song and Ungyu Paik; Hanyang University, Korea (the Republic of)

EQ06.08.04

High-Throughput Fabrication of Flexible LSPR Sensor Platforms Based on Roll-to-Roll Nanoimprinting and Controlled Angled Metal Deposition Dong Kyo Oh¹, Kwangjun Kim², Minwook Kim², Hyein Kim², Wonjun Lee² and Jong G. Ok²; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Seoul National University of Science and Technology, Korea (the Republic of)

EQ06.08.05

Continuous and High-Precision Period-Programmable Micro- and Nanopatterning by the Mold-Free Piezo-Actuated One-Axis-Vibrational Patterning (POP) Principle Minwook Kim, Kwangjun Kim, Geonhui Jo, Hyein Kim, Hyungi Son and Jong G. Ok; Seoul national university of science and technology, Korea (the Republic of)

EQ06.08.07

Experimental Evaluation of Water Side Permeation in Thin-Film Encapsulation Kangling Wu¹, Massimo Mariello², Marion von Allmen³, Matthias Van Gompel³, Yves Leterrier² and Stephanie P. Lacour¹; ¹Bertarelli Foundation Chair in Neuroprosthetic Technology, Laboratory for Soft Bioelectronic Interfaces, Institute of Microengineering, Institute of Bioengineering, Centre for Neuroprosthetics, École Polytechnique Fédérale de Lausanne, Switzerland; ²Laboratory for Processing of Advanced Composites, Institute of Materials, School of Engineering, École Polytechnique Fédérale de Lausanne, Switzerland; ³Comelec SA, Switzerland

EQ06.08.08

Perovskite Adhesion on Rigid Substrates Coated with Metallic Thin Films [Xavier T. Vorhies](#)¹, Jessica M. Andriolo¹, David F. Bahr² and Jack L. Skinner¹; ¹Montana Technological University, United States; ²Purdue University, United States

EQ06.08.09

Hygroscopic Aqueous Film Assisted Detection of Hydrolysable Toxic Compounds Based on Carbon Nanotube Sensor [SeongWoo Lee](#) and Chang Young Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of)

EQ06.08.11

Plasma Etching Behavior of PVT and CVD SiC in Harsh Environments Je Hoon Oh, [Jongbeom Kim](#), Je Jun Jeong and Kyu Hwan Oh; Seoul National University, Korea (the Republic of)

EQ06.08.13

Thiol-ene Click Chemistry for Ligand-Crosslinking in Nanocrystal Solids Kyungwan Kang, Seungki Shin, [Inyoung Jeong](#) and Nuri Oh; Hanyang University, Korea (the Republic of)

EQ06.08.16

Multi-Peak One-Dimensional Photonic Crystals via Hybrid Strategies [Samuel Wallaert](#) and Alamgir Karim; Karim Laboratory, United States

EQ06.08.18

Interlayer Exciton-Driven Efficient Photocatalysis on Z-Scheme C₃N₃/C₃N₄ van der Waals Heterostructure [Nikhilesh Maity](#); Indian Institute of Science, India

EQ06.08.19

ARTEMIS—A Tool for Interface Structural Prediction Aiding in the Exploration of Electronic and Optical Properties Ned T. Taylor, Joe Pitfield, Conor J. Price and [Steven P. Hepplestone](#); University of Exeter, United Kingdom

EQ06.08.20

Epitaxial and Clean Molybdenum Disulfide/Gallium Nitride Junctions—Low-Knee-Voltage Schottky-Diode Behavior at Optimized Interfaces [Ludwig Bartels](#), Hae-In Yang, Michelle Wurch, Prachi Yadav and Kortney Almeida; University of California, Riverside, United States

SESSION EQ06.09: Surfaces and Interfaces in Electronics and Photonics I
Session Chairs: Mandakini Kanungo, Ephraim Suhir and Gilad Zorn
Monday Afternoon, May 23, 2022
EQ06-Virtual

8:55 PM EQ06.09.01

Single-Crystal-Like Ge(110) Layers for High-Performance Flexible Thin-Film Transistors [Takamitsu Ishiyama](#)¹, Toshifumi Imajo¹, Kenta Moto², Keisuke Yamamoto², Takashi Suemasu¹ and Kaoru Toko¹; ¹University of Tsukuba, Japan; ²Kyushu University, Japan

9:10 PM EQ06.09.03

Electrical Properties and Interfacial Characterization of NiSi₂ Nanostructures In Nanowires [Chia-Yi Wu](#), Chuan-Chen Yang, Yuan-Wei Chang and Yi-Chia Chou; National Yang Ming Chiao Tung University, Taiwan

9:25 PM EQ06.09.04

Surface Characterization of Cr/Ni and Ni/Cr Ohmic Contacts on n-Type 3C-SiC [Patrick W. Leech](#)¹, Martyn H. Kibel² and Paul J. Pigram²; ¹RMIT University, Australia; ²LaTrobe University, Australia

9:30 PM EQ06.09.05

Modulation of Electric Field in Metal Insulator Transition(MIT) of VO₂ Thin Film by Manipulating the Interface [Sooraj Kumar](#)¹, Ujjwal Chitnis¹, Syed A. Bukhari^{2,3}, Thomas Thundat^{2,4} and Ankur Goswami¹; ¹Indian Institute of Technology Delhi, India; ²University of Alberta, Canada; ³National Research Council of Canada, Canada; ⁴State University of New York, United States

9:35 PM EQ06.09.06

Tuning YSZ- and SiN_x-Based Granular Metal Conductivity by Controlling Island Morphology and Interface Interactions [Simeon Gilbert](#)¹, Samantha Rosenberg¹, Paul Kotula¹, Thomas Kmiecik², Melissa Meyerson¹, Michael Siegal¹ and Laura Biedermann¹; ¹Sandia National Laboratories, United States; ²University of Illinois at Urbana-Champaign, United States

9:40 PM EQ06.09.07

Ni/(0001)InSe 2D Nanosystem on Cleaved Surface of InSe Layered Semiconductor Crystal Intercalated by Nickel Pavlo Galiy¹, Taras Nenchuk¹, Antoni Ciszewski², Piotr Mazur², [Volodymyr Dziuba](#)¹ and Taras Makar¹; ¹Ivan Franko Lviv National University, Ukraine; ²University of Wroclaw, Poland

9:45 PM EQ06.09.08

Root Cause Detection of Excursion—An Empirical Study for Semiconductor Manufacturing [Youjin Lee](#)^{1,2}, Sangin Kim², Chung-Sam Jun² and Yong-han Roh¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Samsung Electronics Co., Korea (the Republic of)

9:50 PM EQ06.09.09

Crystal Orientation Dependent Conductivity Improvement of Pure NiO Epitaxial Thin-Film Surface by Irradiation of Excimer Vacuum-ultraviolet Light [Kenta Kaneko](#)¹, Tomoaki Oga¹, Yuki Goto¹, Hiroki Shoji¹, Satoru Kaneko^{2,1}, Mamoru Yoshimoto¹ and Akifumi Matsuda¹; ¹Tokyo Institute of Technology, Japan; ²KISTEC, Japan

9:55 PM EQ06.09.10

An Economical Paper-Based SERS Approach Established by Chemically Synthesized Aluminum Nanoparticles [Chiao-Jung Su](#), Yu-Ling Chang and Dehui Wan; National Tsing Hua University, Taiwan

10:10 PM EQ06.09.12

Palladium Selectivity for CMP of Packaging and Barrier Level Integration [John Langhout](#)^{1,2}, Debashish Sur^{1,3} and G. Bahar Basim⁴; ¹NSF Center for Particle and Surfactant Systems, United States; ²University of Florida, United States; ³University of Virginia, United States; ⁴NSF Center for Particle and Surfactant Systems, United States

10:25 PM EQ06.08.12

Hydrophobic and Water-Repellent Modification of Polymeric Surfaces with Co-Curing of Silica Aerogel Hyeonhee Roh^{1,2}, [Hyunsun Song](#)¹ and Maeseon Im¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea University, Korea (the Republic of)

SESSION EQ06.10: Surfaces and Interfaces in Electronics and Photonics II

Session Chairs: Silvia Armini, Santanu Bag, Mandakini Kanungo, Chang-Yong Nam and Gilad Zorn

Tuesday Morning, May 24, 2022

EQ06-Virtual

10:30 AM EQ06.10.01

Ge-Doped Sb₂Se₃ Thin-Film Solar Cells—Optical and Morphological Properties [Sanghyun Lee](#)¹ and Kent Price²; ¹Indiana State University, United States; ²Morehead State University, United States

10:45 AM EQ06.10.02

Probing Buried Interfaces and Localised Defects Using Hard X-Ray Photoelectron Spectroscopy [Anna Regoutz](#); University College London, United Kingdom

11:00 AM *EQ06.10.03

Approaches to Design, Grow and Assess Hermetic Hybrid Barrier Coatings for Flexible and Stretchable Electronics Kyungjin Kim, Kangling Wu, Massimo Mariello, Yves Leterrier and [Stephanie P. Lacour](#); Ecole Polytechnique Federale de Lausanne, Switzerland

11:30 AM EQ06.10.04

High Spatial Photoluminescence Investigation of Nanostructures with Single-Molecule Sensitivity [Christian Oelsner](#), Volker Buschmann, Felix Koberling, Matthias Patting and Rainer Erdmann; PicoQuant GmbH, Germany

11:35 AM EQ06.10.05

Structural and Electronic Properties of In Double Layers on Si(111) $\sqrt{3}\times\sqrt{3}$ -B [Insung Seo](#), Kan Nakatsuji, Hiroyuki Hirayama and Yoshihiro Gohda; Tokyo Institute of Technology, Japan

11:40 AM *EQ06.10.06

Vapor-Phase Infiltration (VPI)—An Emerging Hybrid Synthesis and Nanopatterning Method Derived from Atomic Layer Deposition (ALD) for Microelectronics Applications [Chang-Yong Nam](#); Brookhaven National Laboratory, United States

12:10 PM EQ06.10.07

Variable-Energy XPS Characterisation of TiW/Cu Heterostructures in Power Semiconductor Devices [Curran Kalha](#)¹, Sebastian Bichelmaier², Pardeep Kumar-thakur³, Tien-Lin Lee³, Nathalie Fernando¹, Julio Gutierrez⁴, Stephan Mohr⁴, Laura Ratcliff⁵ and Anna Regoutz¹; ¹University College London, United Kingdom; ²Technische Universität Wien, Austria; ³Diamond Light Source, United Kingdom; ⁴Barcelona Supercomputing Center, Spain; ⁵Imperial College London, United Kingdom

12:25 PM EQ06.10.08

Spin Pumping Study in Ion-Beam Sputtered β -W/Co₂FeAl Heterostructures and Effects of Different Interlayers (Al, Mg, Ta, Mo) [Soumyarup Hait](#)¹, Sajid Husain², Vineet Barwal¹, Lalit Pandey¹ and Sujeet Chaudhary¹; ¹Indian Institute of Technology Delhi, India; ²University of Paris-Saclay, Palaiseau, France, France

##PAGE_BREAK##

SYMPOSIUM EQ07

Emerging Opto-Magnetic Materials—Advances, Trends and Challenges at the Interface Between Optics and Magnetism
May 11 - May 25, 2022

Symposium Organizers

Luis Carlos, University of Aveiro
Ana de Bettencourt-Dias, University of Nevada
Eva Hemmer, University of Ottawa
Fernando Sigoli, UNICAMP

* Invited Paper

SESSION EQ07.01: Optical Materials
Session Chairs: Eva Hemmer and Ute Resch-Genger
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 314

10:30 AM *EQ07.01.01

Tapping into Molecular Cluster-Aggregate's Size to Fine-Tune the Magnetic and Luminescent Properties [Muralee Murugesu](#); University of Ottawa, Canada

11:00 AM *EQ07.01.02

Luminescence Thermometry of Eu-Tb Mixed Metal-Organic Frameworks—Some Ways to Tune the Thermometric Performances [Helene Serier-Brault](#); Institut of Materials Jean Rouxel, University of Nantes, France

11:30 AM EQ07.01.03

Design Your Own Nanothermometer—From Core-Shell Nanoparticles to Nanorattles, Nanoplatforms and Nanocomposites [Anna M. Kaczmarek](#); Ghent University, Belgium

SESSION EQ07.02: Poster Session: Emerging Opto-Magnetic Materials and Molecules
Session Chair: Eva Hemmer
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ07.02.02

Proximity-Mediated Spin Transport Through Transition Metal Dichalcogenide Interfaces [Derick C. DeTellem](#), Chang-Ming Hung, Amit Chanda, Nivarthana W. Mudiyansele, Yen Thi Hai Pham, Sarath Witanachchi, Harihran Srikanth and Manh-Huong Phan; University of South Florida, United States

EQ07.02.03

Controlling the Nature of Exchange Interaction in Lanthanide-Based Single-Molecule Magnets [Juho Toivola](#)¹, Akseli Mansikkamäki² and Jani O. Moilanen¹; ¹University of Jyväskylä, Finland; ²University of Oulu, Finland

EQ07.02.04

Yb (III) Single Molecule Magnet as a Liquid Quantum Cell for Magnetic Sensing [Ashley J. Shin](#)¹, Changling Zhao², Yi Shen¹, Barry Y. Li¹, Claire Dickerson¹, Anastassia N. Alexandrova¹, Wesley C. Campbell² and Justin Caram¹; ¹University of California Los Angeles, United States; ²University of California, Los Angeles, United States

EQ07.02.05

Relating the Intricacies of Lanthanide Core-Loss EELS Features to 4f-Electron Behavior [Ellis Kennedy](#)¹, Trent Kyrk², Kulathepan Thanabalasingam², Moises Bravo², Julia Chan² and Mary Scott^{1,3}; ¹University of California, Berkeley, United States; ²Baylor University, United States; ³Lawrence Berkeley National Laboratory, United States

SESSION EQ07.03: Single-Molecule Magnets
Session Chairs: Eva Hemmer and Muralee Murugesu
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 314

8:30 AM *EQ07.03.01

Predicting Magnetic Properties of Lanthanide-Based Single-Ion Magnets from *Ab Initio* Electronic Structure Calculations [Sergey A. Varganov](#), Daria Nakritskaia and Vsevolod Dergachev; University of Nevada, Reno, United States

9:00 AM *EQ07.03.02

Radical Approach to Lanthanide-Based Single-Molecule Magnets [Jani O. Moilanen](#)^{1,1}, Juho Toivola^{1,1}, Maykon Lemes², Niki Mavragani³, Paul Richardson³, Jaclyn L. Brusso³ and Muralee Murugesu³; ¹University of Jyväskylä, Finland; ²Universidade Federal de Goiás, Brazil; ³University of Ottawa, Canada

9:30 AM BREAK

SESSION EQ07.04: Opto-Magnetic Materials and Hybrids I
Session Chair: Eva Hemmer
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 314

10:30 AM *EQ07.04.01

Magnetic Nanomaterials—From Unexpected Luminescence to Unexpected Magnetism Simon Trudel; University of Calgary, Canada

SESSION EQ07.05: Opto-Magnetic Materials and Hybrids II
Session Chair: Eva Hemmer
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 314

1:30 PM *EQ07.05.01

Chemical and Biological Sensing Strategies Based on Upconversion, Metallic and Magnetic Nanoparticles and Their Assemblies Andrea S. De Camargo^{1,2}, Marylyn S. Arai¹ and Raquel R. Vilela^{1,2}; ¹University of São Paulo, Brazil; ²Westfälische Wilhelms-Universität Münster, Germany

2:00 PM EQ07.05.02

Giant Induced Magnetization by Inverse Faraday Effect in α -W Thin Films Victor H. Ortiz, Shashi B. Mishra, Luat Vuong, Sinisa Coh and Richard Wilson; University of California, Riverside, United States

2:15 PM EQ07.05.03

Spark Ablation—A Novel Technique for Generation and Self-Assembly of Multifunctional Magnetic Nanoparticles Maria E. Messing; Lund University, Sweden

SESSION EQ07.06: Emerging Opto-Magnetic Materials—Advances, Trends and Challenges at the Interface Between Optics and Magnetism I
Session Chairs: Luis Carlos and Eva Hemmer
Monday Morning, May 23, 2022
EQ07-Virtual

10:30 AM *EQ07.06.01

Cooperative Luminescence Upconversion in Yb/Tb Polynuclear Clusters in Solution Loic J. Charbonniere^{1,2}, Richard Knighton^{1,2}, Lohona Soro^{1,2} and Niko Hildebrandt³; ¹CNRS, France; ²Universite de Strasbourg, France; ³University of Rouen, France

11:00 AM EQ07.06.02

Opto-Magnetic Nanomaterials—From Synthesis Design to Biomedical Applications Nan Liu; University of Ottawa, Canada

11:15 AM *EQ07.06.04

Multifunctional Single-Molecule Magnets with Slow Relaxation of Magnetization, Luminescence and Ferroelectricity—The Quest for Cross-Coupling Between Properties Jérôme Long^{1,2}; ¹University of Montpellier, France; ²Institut Universitaire de France, France

11:45 AM *EQ07.06.05

Organometallic Lanthanide Single-Molecule Magnets Selvan Demir; Michigan State University, United States

SESSION EQ07.07: Emerging Opto-Magnetic Materials—Advances, Trends and Challenges at the Interface Between Optics and Magnetism II
Session Chairs: Luis Carlos and Eva Hemmer
Wednesday Morning, May 25, 2022
EQ07-Virtual

8:00 AM *EQ07.07.01

Lanthanide-Doped Luminescent Colloidal Nanocrystals and Their Applications V Mahalingam; IISER-Kolkata, India

8:30 AM *EQ07.07.02

The Principles of Luminescence Thermometry—From Applications to Fundamental Questions Markus Suta; Heinrich Heine University Düsseldorf, Germany

SESSION EQ07.08: Emerging Opto-Magnetic Materials—Advances, Trends and Challenges at the Interface Between Optics and Magnetism III
Session Chair: Eva Hemmer
Wednesday Morning, May 25, 2022
EQ07-Virtual

10:30 AM *EQ07.08.01

FERSC Based Spin-Computing Devices for Edge Artificial Intelligence Riccardo Bertacco; Politecnico di Milano, Italy

11:00 AM BREAK

11:30 AM *EQ07.08.03

Luminescent Smart Labels for the New Generation of Optical Sensing and Internet of Things [Maria Rute Ferreira Andre](#); University of Aveiro, Portugal

##PAGE_BREAK##

SYMPOSIUM EQ08

Quantum Dot Optoelectronics and Low-Dimensional Semiconductor Electronics
May 9 - May 25, 2022

Symposium Organizers

Robert Hoye, Imperial College London
Shinae Jun, Samsung Advanced Institute of Technology
Laura Schelhas, National Renewable Energy Laboratory
Byungha Shin, Korea Advanced Institute of Science and Technology

* Invited Paper

SESSION Tutorial EQ08.00: Basics of 2D Transition Metal Dichalcogenides
, NaN,

SESSION EQ08.01: Quantum Dots: Fundamental Properties I
Session Chairs: Robert Hoye and Byungha Shin
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 317A

10:30 AM *

WITHDRAWN (NO REG) 6/14/22 EQ08.01.01 Advancing the Synthesis of Metal-Chalcogenide Quantum Dots to Achieve Upconversion Photochemistry via Nanocrystal-Sensitized Triplet Fusion [Mark W. Wilson](#); University of Toronto, Canada

11:00 AM *EQ08.01.02

Charged Colloidal Quantum Dots by Self-Doping [Kwang Seob Jeong](#)^{1,2}; ¹Korea University, Korea (the Republic of); ²Institute for Basic Science, Korea (the Republic of)

11:30 AM EQ08.01.03

Highly Efficient Spin-Exchange Carrier Multiplication in Mn-Doped Colloidal Quantum Dots [Ho Jin](#)^{1,2} and Victor I. Klimov¹; ¹Los Alamos National Laboratory, United States; ²The University of New Mexico, United States

SESSION EQ08.02: Quantum Dots: Fundamental Properties II
Session Chairs: Laura Schelhas and Mark Wilson
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 317A

1:30 PM *EQ08.02.01

Novel Surface Passivation Strategies for Colloidal Quantum Dot Solar Cells [Shujuan Huang](#)¹, Long Hu¹, Zhi Li Teh², Lin Yuan¹ and Robert Patterson²; ¹Macquarie University, Australia; ²UNSW Sydney, Australia

2:00 PM EQ08.02.03

Solving Discrepancies in the Synthesis of Ligand-Capped BiI₃ Nanoparticles Maia Momburu¹, Carolina Grosso², Isabel Galain¹ and [Ivana Aguiar](#)¹; ¹Universidad de la República, Uruguay; ²Universidad de la Republica, Uruguay

2:15 PM EQ08.02.04

Mapping and Directing Strain Relaxation in Connected Quantum Dot Superlattices via *In Situ* Heating in the STEM Michelle A. Smeaton¹, Tyler A. Dunbar¹, Ismail El Baggari², Daniel Balazs³, Tobias Hanrath¹ and Lena Kourkoutis¹; ¹Cornell University, United States; ²Rowland Institute at Harvard, United States; ³Institute of Science and Technology Austria, Austria

SESSION EQ08.03: Quantum Dots: Device Applications

Session Chairs: Byungha Shin and Mark Wilson

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 317A

3:15 PM *EQ08.03.01

Heavy Metal Free Blue Quantum Dots for Electroluminescence Displays Joon-Hyung Kim¹, Changyeol Han¹, Yunhyuk Ko¹, Heesun Yang² and Changhee Lee¹; ¹Samsung Display, Korea (the Republic of); ²Hongik University, Korea (the Republic of)

3:45 PM EQ08.03.02

Highly Bright Top-Emitting Quantum Dot Light-Emitting Diodes Fabricated on Si Substrate Taesoo Lee¹, Byong Jae Kim², Hyunkoo Lee³, Donghyo Hahm², Wan Ki Bae², Jaehoon Lim² and Jeonghun Kwak¹; ¹Seoul National University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of); ³Sookmyung Women's University, Korea (the Republic of)

4:00 PM EQ08.03.03

Brightening InP Core and Effective Shelling Process by Combinational Precursor Chemistry Seungki Shin, Hyunwoo Jang, Namyong Gwak and Nuri Oh; Hanyang University, Korea (the Republic of)

4:15 PM EQ08.03.04

VIS/NIR CdSe/HgS/CdS Quantum Dots with an Atomically Defined Emitting Interlayer Zachary L. Robinson, Vladimir Sayevich, Younghee Kim, Heeyoung Jung and Victor I. Klimov; Los Alamos National Laboratory, United States

SESSION EQ08.04: Poster Session I: Quantum Dot Optoelectronics and Low-Dimensional Semiconductor Electronics

Session Chairs: Robert Hoye and Laura Schelhas

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ08.04.01

Colloidal Suprastructures Self-Organized from Oppositely Charged All-Inorganic Nanoparticles Da Hwi Gu and Jae Sung Son; Ulsan National Institute of Science and Technology, Korea (the Republic of)

EQ08.04.03

Thermodynamics Reveal Potential Ligand-Induced Surface Atom Rearrangement During the Exchange of Oleate for Dodecylphosphonic Acid on CdSe Quantum Dots Sierra Hathaway and Joseph D. Keene; Mercer University, United States

EQ08.04.05

Affordable Determination of the Elemental Composition of Colloidal Quantum Dots with Portable X-Ray Fluorescence Spectroscopy Joseph C. Land and Joseph D. Keene; Mercer Univ, United States

EQ08.04.06

Near-Atomistic Meso-Scale Tomographic Imaging of PbSe Quantum-Dot Super-Lattice Assemblies Adam J. Moule¹, Xiaolei Chu¹, Ethan Field¹, Oleg Igouchkine¹, Alex Abelson², Caroline Yu Qian², Kwan Liu Ma¹ and Matt Law²; ¹University of California, Davis, United States; ²University of California, Irvine, United States

EQ08.04.07

The Transformation from Intraband Transition to Localized Surface Plasmon Resonance with Crystal Phase Change in Self-Doped Ag₂Se Nanocrystals Haemin Song¹, Juhee Son², Dongsun Choi¹ and Kwang Seob Jeong¹; ¹Korea University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

EQ08.04.08

The Effect of Cd Incorporation on the Electronic Transport in HgTe Nanocrystal Films Jungchul Noh¹, Rich Pimpinella² and Brian A. Korgel¹; ¹University of Texas at Austin, United States; ²Episensors, Sivananthan Laboratories, United States

EQ08.04.09

Development of a High-Throughput Workflow for the Synthesis of CdSe Nanocrystals Using a Sonochemical Materials Acceleration Platform Maria Politi, Edwin Antonio, Fabio Baum, Joshua Vasquez, Brittany Bishop, Vincent C. Holmberg, Nadya Peek and Lilo D. Pozzo; University of Washington, United States

EQ08.04.12

Investigation of Germanium Quantum Dots in Photovoltaics and near-IR Detectors Roy Sfadia; University of California, Santa Cruz, United States

EQ08.04.14

Synthesis of Direct Bandgap ZnS/GaP Colloidal Quantum Well Hongjoo Shin and Yeon Sik Jung; KAIST, Korea (the Republic of)

EQ08.04.15

Growth-Controlled Single-Crystalline InP Tetrapods Youngsik Kim, Eunhye Cho, Taewan Kim, Jibin Shin, Sohee Jeong and Seongmin Park; Sungkyunkwan University, Korea (the Republic of)

SESSION EQ08.05: Poster Session II: Transition Metal Dichalcogenide: Synthesis, Characterization and Devices

Session Chairs: Robert Hoye and Laura Schelhas

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ08.05.01

Substantially Improved NO₂ Sensing Properties in Two-Dimensional SnS₂ Nanoflowers Enabled by Visible Light Illumination Tae Hoon Eom¹ and Ho Won Jang^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Advanced Institute of Convergence Technology, Korea (the Republic of)

SESSION EQ08.07: Low Dimensional Structures: Synthesis, Characterization and Devices

Session Chairs: Robert Hoye and David Munoz-Rojas

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 317A

1:30 PM EQ08.07.01

Vacancy-Related Defect Characterization in Optoelectronic Ge/Ge-Sn Core/Shell Nanowires via Correlated Extended X-Ray Absorption Fine Structure Spectroscopy (EXAFS) and Single Wire Electrical Measurements John Lentz¹, Aein Babadi¹, Apurva Mehta², Ryan Davis² and Paul McIntyre^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

1:45 PM EQ08.07.03

Stimulated Emission via Multi-Exciton Complexes in Colloidal 2D Materials Pieter Geiregat¹, Kai Chen^{2,3}, Justinas M. Hodgkiss^{3,2} and Zeger Hens¹; ¹Ghent University, Belgium; ²Victoria University of Wellington, New Zealand; ³MacDiarmid Institute of Nanotechnology, New Zealand

2:00 PM BREAK

2:30 PM *EQ08.07.04

Fast Open-Air Deposition of Nanomeric Components for (Opto)Electronic Devices Through Spatial Atomic Layer Deposition David Munoz-Rojas; LMGP Grenoble INP/CNRS, France

3:00 PM EQ08.07.06

Laser-Driven Growth, Alignment, and Assembly of Semiconductor Nanowires in Solution Elena P. Pandres, Matthew J. Crane, E. James Davis, Peter Pauzaskie and Vincent C. Holmberg; University of Washington, United States

3:15 PM EQ08.07.07

Interrogating Local Order in Quantum-Dot-in-Perovskite Solids Dylan Ladd, Nicholas J. Weadock and Michael Toney; University of Colorado Boulder, United States

SESSION EQ08.08: Low Dimensional Halide Perovskite

Session Chairs: Robert Hoye and Yun-Seong Lee

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 317A

8:30 AM *EQ08.08.01

Science and Materials for a Sustainable World—Perspective from Editor at Nature Materials Steven Lukman; Nature Materials, United Kingdom

9:00 AM *EQ08.08.02

Halide Perovskite Nanoscale Heterojunctions for Next-Generation Optoelectronic Devices Joseph Luther^{1,2}; ¹National Renewable Energy Laboratory, United States; ²RASEI, United States

9:30 AM EQ08.08.03

Inverse Temperature Crystallization for Inch-Scale, Phase-Pure Ruddlesden-Popper Perovskite Single Crystals Young Chu¹, Kijoon Bang¹, Joonyun Kim², Doyoon Lee³, Sanghee Nah⁴, Kitae Park¹, Sunggun Yoon¹, Sanghoon Bae⁵, Jeehwan Kim³, Byungha Shin² and Yunseog Lee¹; ¹Seoul National University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of); ³Massachusetts Institute of Technology, United States; ⁴Korea Basic Science Institute, Korea (the Republic of); ⁵Washington University in St. Louis, United States

9:45 AM EQ08.08.04

Pure-Blue Light Emitting Diodes Based on Layer-Transferred Two-Dimensional, Single-Crystalline Ruddlesden-Popper Halide Perovskite Joonyun Kim¹, Young Chu², Yunseog Lee² and Byungha Shin¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

10:00 AM BREAK

10:30 AM *EQ08.08.05

Self-Assembly of Halide Perovskite Heterostructures Michael Aubrey¹, Abraham Saldivar Valdes¹, Marina Filip^{2,3}, Bridget Connor¹, Kurt Lindquist¹, Jeffrey B. Neaton^{3,4} and Hemamala Karunadasa^{1,5}; ¹Stanford University, United States; ²University of Oxford, United Kingdom; ³Lawrence Berkeley National Laboratory, United States; ⁴University of California, Berkeley, United States; ⁵SLAC National Accelerator Laboratory, United States

11:00 AM EQ08.08.06

Direct Photopatterning of Perovskite Nanocrystals with Multi-Functional Zwitterionic Ligand Sung Hoon Noh, Han Sol Yang, Jaemin Jung and Jong Gyu Oh; Hanyang University, Korea (the Republic of)

11:15 AM EQ08.08.07

Efficient Pure-Blue Light Emitting Diodes with Phosphonate-Passivated CsPbBr₃ Nanoplatelets Jinu Park, Joonyun Kim and Byungha Shin; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:30 AM EQ08.08.08

Lead-Free Heterometallic Halide Layered Double Perovskite Nanocrystals Tong Cai, Wenwu Shi and Ou Chen; Brown University, United States

SESSION EQ08.09: Low Dimensional Structures: Theory

Session Chairs: Joseph Luther and Laura Schelhas

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 317A

1:30 PM *EQ08.09.01

Ligand-Surface Atomic Structure of Colloidal Quantum Dots Yong-Hyun Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

2:00 PM EQ08.09.02

Engineering Exciton-Phonon Coupling in CdS/Se/Te Nanocrystals via Composition and Thickness—A First-Principles Study Ruoxi Yang and Kristin A. Persson; Lawrence Berkeley National Laboratory, United States

2:15 PM EQ08.09.03

The Underlying Mechanisms of Ultrahigh Carrier Mobility in Bi₂O₃/Se Using Self-Consistent GW Methods Benjamin A. Williamson¹ and David O. Scanlon²; ¹Norwegian University of Science and Technology, Norway; ²University College London, United Kingdom

SESSION EQ08.10: Poster Session III: Optoelectronics Based on Quantum Dots

Session Chairs: Yun-Seong Lee and Byungha Shin

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ08.10.01

Modification of Zinc Oxide Electron Transport Layer for Highly Efficient and Stable Quantum-Dots Light Emitting Devices Dong Seob Chung and Hany Aziz; University of Waterloo, Canada

EQ08.10.02

Synthesis of Green Efficient InP/ZnSeS/ZnS Quantum Dots Using P(DEA)₃ as P Precursor Suhyeon Kim and Jiwan Kim; Kyonggi University, Korea (the Republic of)

EQ08.10.03

Synthesis of Blue InGaP Multishell Quantum Dots by Controlling the Length of Capping Ligands Seungchul Shin and Jiwan Kim; Kyonggi University, Korea (the Republic of)

EQ08.10.04

Chemically and Electronically Active Metal Ions on InAs Quantum Dots for Infrared Detectors Seongchan Kim and Sooyeon Yeon; Hanyang University, Korea (the Republic of)

EQ08.10.05

Non-Stoichiometric and Non-Toxic Silver Telluride Colloidal Nanocrystals in the Extended Near Infrared Region Gahyeon Kim¹, Dongsun Choi¹, So Young Eom¹, Haemin Song¹ and Kwang Seob Jeong^{1,2}; ¹Korea University, Korea (the Republic of); ²Institute for Basic Science, Korea (the Republic of)

EQ08.10.06

Enhanced Efficiency of InP-Based Quantum Dot Light-Emitting Diodes Using P-Type Inorganic Nanoparticles Kwangkeun Lee, Yeseul Park, Kyunghwan Kim and Jeonghun Kwak; Seoul National University, Korea (the Republic of)

EQ08.10.07

Synthesis and Characteristics of Nickel Oxide Nanoparticles by Solution Process for the Hole Transport Layer of QLED Hyojun Lim, Sunwoo Jin, Sunghoon Bae, Vo V. Khoe, Intaek Lee, Joohan Kim, Joon-Hyung Lee, Sangwook Lee, Roy B. Chung, Ji Hoon Lee, Tae Hoon Lee and Young-woo Heo; School of Materials Science and Engineering, Kyungpook National University, Korea (the Republic of)

EQ08.10.08

Improving the Performance of InAs Colloidal Quantum Dot Photodetectors Through Zinc Doping Daekwon Shin¹, Eunji Jang¹, Taewan Kim¹, Youngsang Park², Chaeyon Lim¹, Jugyoung Kim¹ and Sohee Jeong¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ08.10.09

Comparison of Two Types of Quantum Dots Having Heterostructures to Understand the Charge Balance of Charge Carriers Namyong Gwak, Minwoo Lee, Inyoung Jeong and Nuri Oh; Hanyang University, Korea (the Republic of)

EQ08.10.10

Facile Large-Scale Synthesis of CsPbI₃ Perovskite Quantum Dots for Solar Cells—Elucidation of Degradation Mechanism Han Sol Yang, Eui Hyun Suh, Sung Hoon Noh, Jaemin Jung, Jong Gyu Oh, Kyeong Ho Lee, Dongwoon Lee and Jaeyoung Jang; Hanyang University, Korea (the Republic of)

SESSION EQ08.11: Poster Session IV: Low Dimensional Structures: Synthesis and Characterization

Session Chairs: Yun-Seong Lee and Byungha Shin

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ08.11.01

Assembly of 2D Nanomaterials in Cholesteric Liquid Crystals Urice Tohgha^{1,2} and Nicholas Godman²; ¹Azimuth Corporation, United States; ²Air Force Research Laboratory, United States

EQ08.11.02

Formation of Bismuth Chalcogenide Nanorods Through a Self-Sacrificing Route and Study of Its Optical Properties for Application in Solar Cells Maia Momburu¹, Carolina Grosso¹, Alvaro Olivera², Heinkel Bentos Pereira², Daniel Gau³, Laura Rosa Fornaro Bordolli² and Ivana Aguiar¹; ¹Facultad de Química, Universidad de la República, Uruguay; ²Centro Universitario Regional del Este, Uruguay; ³Facultad de Ingeniería, Universidad de la República, Uruguay

EQ08.11.03

Seeded Growth of Mesoscale Quantum Confined Semiconductor Nanoplatelets Stephanie Tenney, Lauren Tan, Mikayla Sonleitner, Anthony Sica, Ashley J. Shin, Timothy L. Atallah and Justin Caram; University of California, Los Angeles, United States

SESSION EQ08.12: Transition Metal Dichalcogenide: Synthesis, Characterization and Devices

Session Chairs: Jiwoong Park and Laura Schelhas

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 317A

8:30 AM *EQ08.12.01

Emergent Devices Enabled by van der Waals Contacts on 2D Transition Metal Dichalcogenides Manish Chhowalla; University of Cambridge, United Kingdom

9:00 AM *

WITHDRAWN (NO SHOW) 6/14/22 EQ08.12.02 Large Scale Atomically Thin Semiconductor Films for Electronics and Optoelectronics Jiwoong Park; University of Chicago, United States

9:30 AM *EQ08.12.03

Femtosecond Laser Synthesis and Functionalization of 2D Nanoparticles for Sustainability Applications Kevin Musselman; University of Waterloo, Canada

10:00 AM EQ08.12.04

Solution-Processed 2D-WSe₂ as a Hole Transport Material in PbS Quantum Dot Solar Cells Arlene Chiu, Eric Rong, Dhanvini Gudi and Susanna Thon; Johns Hopkins University, United States

10:15 AM EQ08.12.05

Unique Synthetic Approach to Low-Dimensional Semiconducting Metal-Sulfide Materials for (Photo)Electrochemical Energy Conversion by Molecular Building Blocks Veronika Brune, Michael Wilhelm, Khan Lê and Sanjay Mathur; University of Cologne, Germany

SESSION EQ08.13: Quantum Dot Optoelectronics and Low-Dimensional Semiconductor Electronics I

Session Chairs: Jianbo Gao and Shinae Jun

Wednesday Morning, May 25, 2022

EQ08-Virtual

8:00 AM *EQ08.13.01

InP-Based Quantum Dots Toward Efficient Color Conversion Pixels Tae-Gon Kim, Nayoun Won, Taekhoon Kim, Garam Park and Shinae Jun; Samsung Advanced Institute of Technology, Korea (the Republic of)

8:30 AM EQ08.13.02

Size-Dependent Assembly and Electronic Transport in Epitaxially-Connected Superlattices of Lead Sulfide Quantum Dots Ricky Dwi Septianto^{1,2}, Retno Miranti¹, Nobuhiro Matsushita², Takaaki Hikima³, Yoshihiro Iwasa^{1,4} and Satria Z. Bisri^{1,2}; ¹RIKEN Center for Emergent Matter Science, Japan; ²Tokyo Institute of Technology, Japan; ³RIKEN SPring-8 Center, Japan; ⁴The University of Tokyo, Japan

8:45 AM EQ08.13.03

Intraband Optical Gain in Colloidal Nanoplates Benjamin T. Diroll; Argonne National Laboratory, United States

9:00 AM *EQ08.13.04

Chiral Induced Spin Selectivity During Triplet Transfer Between Nanocrystals and Molecules Tingting Huang and MingLee Tang; The University of Utah, United States

9:30 AM EQ08.13.05

Exclusive Electron Transport in Core@Shell PbTe@PbS Colloidal Semiconductor Nanocrystal Assemblies Retno Miranti^{1,2}, Ricky Dwi Septianto^{1,2}, Maria Ibanez³, Maksym Kovalenko^{4,5}, Nobuhiro Matsushita², Yoshihiro Iwasa^{1,6} and Satria Z. Bisri^{1,2}; ¹RIKEN Center for Emergent Matter Science, Japan; ²Tokyo Institute of Technology, Japan; ³Institute of Science and Technology Austria, Austria; ⁴ETH Zürich, Switzerland; ⁵Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ⁶The University of Tokyo, Japan

9:45 AM EQ08.07.05

Compact Quantum-Dot Lasing Microbeads for Multiplexed Bio-Imaging Kwon-Hyeon Kim^{1,2}, Paul Dannenberg¹, Hao Yan^{1,2} and Andy Seok-Hyun Yun^{1,2}; ¹Harvard Medical School, United States; ²Massachusetts General Hospital, United States

SESSION EQ08.14: Devices Based on 2D Semiconductors

Session Chairs: Tae-Gon Kim and MingLee Tang

Wednesday Morning, May 25, 2022

EQ08-Virtual

10:30 AM *EQ08.14.01

Recent Progress on 2D Transition-Metal Chalcogenide Semiconductor Zheng Liu; Nanyang Technological University, Singapore

11:00 AM EQ08.14.03

Molecular Engineering of 2D Sn-Based Halide Perovskites for High-Performance Field-Effect Transistors Yao Gao^{1,2} and Letian Dou¹; ¹Purdue University, United States; ²Huazhong University of Science & Technology, China

11:15 AM *EQ08.14.04

In Situ Ultrafast Carrier Dynamics in Quantum Materials Devices Jianbo Gao^{1,2}; ¹Clemson University, United States; ²Berkeley Photonics LLC, United States

SESSION EQ08.15: Quantum Dot Optoelectronics and Low-Dimensional Semiconductor Electronics II

Session Chairs: Robert Hoye and Shinae Jun

Monday Morning, May 23, 2022

EQ08-Virtual

8:00 AM *EQ08.15.01

Ink Formulations of 2D Materials for 3D Printed Energy Conversion Devices Cecilia Mattevi; Imperial College London, United Kingdom

8:30 AM EQ08.15.02

High Efficiency and Long Lifetime Inverted Red InP-Based Quantum Dot Light-Emitting Diodes by Enhancing the Charge Balance Nagarjuna Naik Mude, Su Jeong Kim, Thuy Truong Thi and Jang Hyuk Kwon; Kyung Hee University, Korea (the Republic of)

8:45 AM EQ08.15.04

Optical Property of Self-Doped PbSe Colloidal Quantum Dots Sungmin Hong and Kwang Seob Jeong; Korea University, Korea (the Republic of)

8:50 AM EQ08.15.05

Quantum Confinement in Elliptical Graphene Quantum Dots Shane Brown and Zubaer M. Hossain; University of Delaware, United States

8:55 AM EQ08.15.06

Photodegradation in the Presence of Zinc Selenide Nanoparticles Angelie M. Núñez Colón; University of Puerto Rico at Ponce, Puerto Rico

9:00 AM EQ08.15.07

Identifying Defect-Induced Trion in Monolayer WS₂ Riya Sebat^{1,2}, Chandan Biswas², Bumsob Song^{1,2}, Changwon Seo^{1,2} and Young Hee Lee^{1,2}; ¹Center for Integrated Nanostructure Physics (CINAP), Institute for Basic Science (IBS), Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

9:05 AM *EQ09.04/EQ08.06.03

Expanding Chemical Versatility of Colloidal Quantum Dots Dmitri V. Talapin; University of Chicago, United States

##PAGE_BREAK##

SYMPOSIUM EQ09

Emerging Light Emitters for Photonics and Optoelectronics—Hybrid Perovskites and Other Low-Dimensional Emitters
May 9 - May 25, 2022

Symposium Organizers

Hanwei Gao, Florida State University
Maksym Kovalenko, ETH Zurich
Tae-Woo Lee, Seoul National University
Jiangeng Xue, University of Florida

* Invited Paper

SESSION EQ09.01: Low-Dimensional Perovskite Light-Emitting Materials and Optoelectronics I
Session Chairs: Maksym Kovalenko and Tae-Woo Lee
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 317B

10:30 AM *EQ09.01.01

Luminescent Organic Metal Halide Hybrids Beyond Perovskites Biwu Ma; Florida State University, United States

11:00 AM *EQ09.01.02

Heterostructures of 3D/2D Perovskites with Sharp Interfaces for High-Performance Photovoltaics and Light Emitting Diodes Aditya D. Mohite; Rice University, United States

11:30 AM EQ09.01.03

Suppressing Phase Disproportionation in Quasi-Two-Dimensional Perovskite Light-Emitting Diodes Kang Wang and Letian Dou; Purdue University, United States

11:45 AM EQ09.01.04

Orientation Controllable 2D Colloidal CsPbI₃ Perovskite Nanoplatelets Towards Spectra Stable Pure Red Light-Emitting Diodes with Polarized Light Emission Junzhi Ye¹, Aobo Ren², Tomi K. Baikie¹, Manuel Scheel³, Renjun Guo³, Linjie Dai¹, Ziming Chen¹, Javad Shamsi¹, Huang He⁵, Peter Muller-Buschbaum³, Samuel D. Stranks¹, Artem Bakulin⁴, Lakshminarayana Polavarapu⁶, Wei Zhang², Akshay Rao¹ and Robert Hoyer⁴; ¹University of Cambridge, United Kingdom; ²University of Surrey, United Kingdom; ³Technische Universitat Munchen, Germany; ⁴Imperial College London, United Kingdom; ⁵Nano-Institute Munich Department of Physics, Germany; ⁶Universidade de Vigo, United Kingdom

SESSION EQ09.02: Low-Dimensional Perovskite Light-Emitting Materials and Optoelectronics II
Session Chairs: Maksym Kovalenko and Biwu Ma
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 317B

1:30 PM *EQ09.02.01

Fundamental Studies and Applications of 2D Halide Perovskite Heterostructures Song Jin; University of Wisconsin--Madison, United States

2:00 PM EQ09.02.02

Low-Energy Photoluminescence in Layered Tin Halide Perovskites—Unravelling the Impact of Diammonium Cations on the Structure and Its Photophysics Eelco K. Tekelenburg, Nawal Aledlbi, Graeme Blake and Maria Antonietta Loi; University of Groningen, Netherlands

2:15 PM EQ09.02.03

Enhancement of the Photoluminescence of Cs₂AgBiBr₆ Double Perovskite Film via Grain Size Regulation Eojin Yoon, Seong-Eui Chang and Tae-Woo Lee; Seoul National University, Korea (the Republic of)

2:30 PM EQ09.02.04

Exploring Trends Between 4,4'-methylenedianiline Lead-Halide Hybrid Materials Megan Cassingham¹, Eric T. McClure¹, Yang Goh¹, Christopher Savory², Weiguo Zhang³, Peter I. Djurovich¹, David O. Scanlon², P. Shiv Halasyamani³, Mark E. Thompson¹ and Brent C. Melot¹; ¹University of Southern California, United States; ²University College London, United Kingdom; ³University of Houston, United States

2:45 PM BREAK

SESSION EQ09.03: Photophysics of Low-Dimensional Perovskite Materials
Session Chairs: Song Jin and Biwu Ma
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 317B

3:30 PM *EQ09.03.01

Origin of Broad Luminescence in Low-Dimensional Metal Halide Perovskites Maria Antonietta Loi; University of Groningen, Netherlands

4:00 PM EQ09.03.02

Rashba Exciton in a 2D Perovskite Quantum Dot Michael W. Swift¹, John Lyons¹, Alexander Efros¹ and Peter Sercel²; ¹U.S. Naval Research Laboratory, United States; ²California Institute of Technology, United States

4:15 PM EQ09.03.03

Exciton Fine-Structure in Halide Perovskite Nanoplatelets Alexander S. Urban¹, Moritz Gramlich¹, Michael W. Swift², Carola Lampe¹, Jan Drenniok¹, John Lyons², Markus Döblinger¹, Alexander Efros² and Peter Sercel³; ¹Ludwig-Maximilians-Universität München, Germany; ²U.S. Naval Research Laboratory, United States; ³California Institute of Technology, United States

SESSION EQ09.04/EQ08.06: Joint Keynote Session
Session Chairs: Tae-Woo Lee and Byungha Shin
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 317B

8:30 AM *EQ09.04/EQ08.06.01

Keynote: Spin-Orbit Coupled Exciton-Polariton Condensates in Lead Halide Perovskites Xiaoyang Zhu; Columbia University, United States

9:00 AM *EQ09.04/EQ08.06.02

InAs Nanoclusters, Quantum Dots and Optoelectronic Applications Sohee Jeong; Sungkyunkwan University, Korea (the Republic of)

9:30 AM BREAK

10:00 AM *EQ09.04/EQ08.06.04

Recent Progress Towards Colloidal Quantum Dot Laser Diodes Victor I. Klimov; Los Alamos National Laboratory, United States

10:30 AM *EQ09.04/EQ08.06.05

Ligand- and Cation-Exchanged Colloidal Quantum Dot Thin Films and Devices Cherie R. Kagan; University of Pennsylvania, United States

SESSION EQ09.05: Quantum Dot Emitting Materials and Lasers
Session Chairs: Maksym Kovalenko and Maria Antonietta Loi
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 317B

1:30 PM EQ09.05.01

Disruptive Optical Gain Metrics in the Green and Near-Infrared Spectrum Using Weakly Confined CdX (X=S,Se,Te) Quantum Dots Ivo Tanghe¹, Servet Ataberk Cayan¹, Margarita Samoli¹, Kai Chen^{2,3}, Ali Khan⁴, Zeger Hens¹, Iwan Moreels¹, Dries Van Thourhout¹ and Pieter Geiregat¹; ¹Ghent University, Belgium; ²MadDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand; ³Victoria University of Wellington, New Zealand; ⁴Institute of Nano Science and Technology, India

1:45 PM EQ09.05.02

On-Demand, Room Temperature Single-Photon Generation with an Electrically-Pumped Colloidal Quantum Dot Zachary L. Robinson, Heeyoung Jung, Younghee Kim, Jun Du, Clement Livache, Igor Fedin, Istvan Robel and Victor I. Klimov; Los Alamos National Laboratory, United States

2:00 PM EQ09.05.03

Two-Band Optically Pumped Amplified Spontaneous Emission in an Ultrahigh-Current-Density Colloidal Quantum Dot LED Namyoung Ahn, Young-Shin Park, Clement Livache, Jun Du and Victor I. Klimov; Los Alamos National Laboratory, United States

2:15 PM EQ09.05.05

Bilayer Luminescent Solar Concentrator with Enhanced Absorption and Efficiency for Agrivoltaic Applications John W. Keil, Yaling Liu, Uwe Kortshagen and Vivian Ferry; University of Minnesota, United States

2:30 PM BREAK

SESSION EQ09.06: Perovskite Lasers
Session Chairs: Letian Dou and Myoung Hoon Song
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 317B

3:30 PM *EQ09.06.01

Toward Metal Halide Perovskite Laser Diodes [Barry P. Rand](#); Princeton University, United States

4:00 PM EQ09.06.03

Amplified Spontaneous Emission in Single-Layered 2D Tin Perovskites [Daniele Cortecchia](#)¹, Ada L. Alvarado-Leaños¹, Giulia Folpini¹, Christian N. Saggau², Libo Ma² and Annamaria Petrozza¹; ¹Istituto Italiano di Tecnologia, Italy; ²Leibniz Institute for Solid State and Materials Research (IFW), Germany

SESSION EQ09.07: Poster Session I: Emerging Light Emitters for Photonics and Optoelectronics—Hybrid Perovskites and Other Low-Dimensional Emitters

Session Chairs: Maksym Kovalenko and Tae-Woo Lee

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ09.07.01

Improving Efficiency and Foldability of Perovskite Light-Emitting Diodes via Microlens Array Embedded Substrates [Junho Kim](#)¹, Eungjun Kim¹, Hanul Moon² and Seunghyup Yoo¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Dong-A University, Korea (the Republic of)

EQ09.07.03

Modulation of Copper-Based Perovskite Nanocrystals Using Different Chain-Length Ligands [Minjin Kim](#) and Hyeonseok Yoon; Chonnam National University, Korea (the Republic of)

EQ09.07.04

Efficient Blue Perovskite Light-Emitting Diode Based on Dually Passivated Nanocrystals Using Thiocyanate and Neodymium Ions [Sung-Doo Back](#), Dahl-Young Khang and Jae-Min Myoung; Yonsei University, Korea (the Republic of)

EQ09.07.05

Optimizing Charge Balance of Quantum-Dot Light Emitting Diodes via Controlling Hole/Electron Injection [Yiseul Kim](#), Hyungsoo Yoon, Geonhee Kim, Sujin Jeong, Jinsu Yoon, Dahyun Kim and Yongtaek Hong; Seoul National University, Korea (the Republic of)

EQ09.07.06

Additive Assisted Optimization in Morphology and Optoelectronic Properties of Inorganic Mixed Sn-Pb Halide Perovskite [Rubaiya Murshed](#) and Shubhra Bansal; University of Nevada Las Vegas, United States

EQ09.07.08

Synthesis and Characterization of Tetrapod-Shaped InP/ZnSe/ZnS Core/Shell/Shell Quantum Dots [Seongmin Park](#), Youngsik Kim, Hyoin Kim, Mahnmin Choi and Sohee Jeong; Sungkyunkwan University, Korea (the Republic of)

EQ09.07.09

Comparison of Traditional Near-IR Dye Sensitisers for Lanthanide Doped Nanoparticles with Picolinic Based Bidentate Counterparts [Alasdair Tew](#), Hugo Bronstein and Akshay Rao; University of Cambridge, United Kingdom

EQ09.07.10

Stretchable Wrinkled WSe₂ for Tunable Single Photon Emitters [Mary G. Pelzer](#)^{1,2,3}, Henry Feldhaus^{1,2,3}, Jin Myung Kim¹, Yeageun Lee¹ and SungWoo Nam^{1,4}; ¹University of Illinois at Urbana-Champaign, United States; ²These authors contributed equally, United States; ³Co-presenters, United States; ⁴University of California, Irvine, United States

EQ09.07.11

Hole Injection Mechanism of Quantum Dot Light-Emitting Diodes Through Adjustment of Various Hole Transport Layer [Hee Jung Kwak](#), Woo Jin Jeong and Jun Young Kim; Gyeongsang National University, Korea (the Republic of)

EQ09.07.12

Ligand-Free In Situ Synthesis of Stable Perovskite-Inorganic Polymer Composites [Jinwoo Park](#)¹, Song Hee Lee¹, So-Hye Cho² and Tae-Woo Lee¹; ¹Seoul National University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

EQ09.07.13

Low-Pressure Annealing of Hexagonal NaYF₄ to Achieve Highly Efficient Upconversion Luminescence [Byeong-Seok Moon](#) and Dong-Hwan Kim; Sungkyunkwan University, Korea (the Republic of)

SESSION EQ09.08: Surface Passivation and Molecular Additives in Perovskite Light-Emitting Devices I

Session Chairs: Matthew Beard, Bin Hu, Maria Antonietta Loi and Barry Rand

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 317B

8:30 AM *EQ09.08.01

Tailored Surface Defect Passivating Materials for Efficient and Metal Halide Perovskite Light-Emitting Diodes [Myoung Hoon Song](#)¹, ChungHyoon Jang¹, Jong Hyun Park¹ and Han Young Woo²; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Korea University, Korea (the Republic of)

9:00 AM EQ09.08.02

Designer Zwitterionic Phospholipid Capping Ligands for Metal Halide Colloidal Nanomaterials Viktorija Morad, Mariia Svyrydenko and Maksym Kovalenko; ETH Zurich, Switzerland

9:15 AM EQ09.08.03

Highly Efficient Thermally-Evaporated Perovskite Light-Emitting Diodes with an Electrically Conductive Poly-Ethylene Oxide Passivation Layer Nakyung Kim, Mingue Shin, Seongmoon Jun, Bongjun Choi, Joonyun Kim, Jinu Park, Hyungseung Kim, Woochul Jung, Jung-Yong Lee, Yong-Hoon Cho and Byungha Shin; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:30 AM BREAK

10:00 AM *EQ09.08.04

Organic Semiconductor-Incorporated Perovskite (OSiP) Lighting-Emitting Devices Letian Dou; Purdue University, United States

10:30 AM EQ09.08.05

Synthesis of Cu₂S/PbS Core/Shell and Cu,Pb₂S Alloy Nanocrystals for Optoelectronics Patrick Yee¹, Sarah Brittan¹, Paul D. Cunningham¹, Nadeemullah Mahadik¹, Joseph Tischler², Rhonda M. Stroud¹, Alexander Efros¹, Peter Sercel³ and Janice Boecker¹; ¹U.S. Naval Research Laboratory, United States; ²The University of Oklahoma, United States; ³Peter Sercel Research, LLC, United States

10:45 AM EQ09.08.06

Enhancing Light Emission from Lead Halide Perovskite Nanocrystals Tassilo Naujoks¹, Roshini Jayabalan¹, Qi Xue², Carola Lampe², Theresa Hettiger³, Christopher Kirsch³, Alexander S. Urban², Marcus Scheele³ and Wolfgang Brütting¹; ¹University of Augsburg, Germany; ²Ludwig-Maximilians-Universität München, Germany; ³Eberhard-Karls Universität Tübingen, Germany

11:00 AM EQ09.08.08

Composition-Dependent Phase Transitions and Superlattice Ordering in Lead-Iodide Perovskite Nanocrystals Julian A. Vigi^{1,2}, Joseph Luther³ and Michael Toney⁴; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³National Renewable Energy Laboratory, United States; ⁴University of Colorado Boulder, United States

SESSION EQ09.09: Surface Passivation and Molecular Additives in Perovskite Light-Emitting Devices II

Session Chairs: Bin Hu and Yanfa Yan

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 317B

1:30 PM EQ09.09.01

Mixed Donor and Acceptor Organic Molecules in Hybrid Lead-Halide Films Yang Goh, Eric T. McClure, Megan Cassingham, Peter I. Djurovich, Mark E. Thompson and Brent C. Melot; University of Southern California, United States

1:45 PM EQ09.09.02

Highly Luminescent Cs–Pb–Br Composite Perovskites Designed via Tracking the Phase Competition During Mechanochemical Synthesis Keehoon Kang¹, Kyeong-Yoon Baek¹, Woocheol Lee¹, Hyeon-Dong Lee¹, Richard Friend², Aron Walsh³, Tae-Woo Lee¹, Jeongjae Lee¹ and Takhee Lee¹; ¹Seoul National University, Korea (the Republic of); ²University of Cambridge, Korea (the Republic of); ³Imperial College London, United Kingdom

2:00 PM BREAK

SESSION EQ09.10: Perovskite Photovoltaics and Other Applications

Session Chair: Matthew Beard

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 317B

3:30 PM EQ09.10.01

Flash Evaporation of Perovskite Powders—Angstrom-Precision Growth for Single-Source Solar Cell Fabrication Nathan Rodkey, Bas Huisman and Henk Bolink; Universitat de València, Spain

3:45 PM EQ09.10.02

Strong Linear Photoluminescence Modulation by an External Electric Field in Epitaxial Halide Perovskite Nanowires Yahel Soffer and Ella Sanders; Weizmann Institute of Science, Israel

4:00 PM EQ09.10.03

Electrospun Electroluminescent CsPbBr₃ Fibers—Flexible Perovskite Networks for Light-Emitting Application Khan Lê¹, Florian von Toperczer¹, Feray Ünlü¹, Klas Lindfors¹, Sanjay Mathur¹ and Veronika Brune²; ¹Universität zu Köln, Germany; ²University of Cologne, Germany

4:15 PM EQ09.10.04

Highly Luminescent Platinum(II) Complex-Based Multifunctional Photon Downshifting Materials for Perovskite Solar Cells Eunhye Hwang and Tae-Hyuk Kwon; Ulsan National Institute of Science and Technology, Korea (the Republic of)

4:30 PM EQ09.10.05

Tandem Cell Charge Transfer—Quantum Dots on Perovskite Thin Films Jorge Arceaga¹, Melissa Guarino-Hotz², Jin Zhang² and Sayantani Ghosh¹; ¹University of California, Merced, United States; ²University of California, Santa Cruz, United States

4:45 PM EQ09.10.06

Mixed-Cation Perovskite Nanoparticles for Photovoltaic Application [Seung Hyeon Jo](#)¹ and Tae-Woo Lee^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Research Institute of Advanced Materials, Seoul National University, Korea (the Republic of)

SESSION EQ09.11: Physics of Perovskite Materials

Session Chairs: Feng Gao, Tae-Woo Lee and Myoung Hoon Song

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 317B

8:30 AM *EQ09.11.01

Effects of Phonons on the Structural Stability and Light Emission Properties of Halide Perovskites Canglang Yao, Xiaoming Wang and [Yanfa Yan](#); University of Toledo, United States

9:00 AM EQ09.11.03

A Dielectric Hybrid-Metasurface Supporting Lead-Halide Perovskite Exciton-Polaritons [Hendrik Utzat](#)¹, Jung Hwang Song¹, Jack Hu¹, Jefferson Dixon¹, Yan Joe Lee¹, Hordii Andrusiv², Qitong Li¹, Maksym Kovalenko^{2,3}, Mark L. Brongersma¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²EMPA, Switzerland; ³ETH Zürich, Switzerland

9:15 AM BREAK

9:45 AM *EQ09.11.04

Controlling Charge, Spin and Light in Lead-Halide Inspired Hybrid Semiconductors [Matthew C. Beard](#); National Renewable Energy Lab, United States

10:15 AM *EQ09.11.05

Orbit-Orbit Interaction Effects on Light-Emitting Properties Through Intrinsic Excitons and Artificially Engineered Charge-Transfer Excitons in Hybrid Perovskites [Bin Hu](#); University of Tennessee, United States

10:45 AM EQ09.11.06

High Efficiency and Tunable Photoemission in Ternary Group 11 Halides [Tielyr Creason](#)¹, Mao-Hua Du² and Bayram Saparov¹; ¹University of Oklahoma, United States; ²Oak Ridge National Laboratory, United States

11:00 AM EQ09.11.07

Enhanced Emission from the Bright Exciton and Locating the Dark Exciton in Strained CdSe/Cd_{1-x}Zn_xSe QDs [Igor Fedin](#)¹, Mateusz Goryca², Dan Liu³, Sergei Tretiak³, Victor I. Klimov³ and Scott Crooker³; ¹The University of Alabama, United States; ²The University of Warsaw, Poland; ³Los Alamos National Laboratory, United States

11:15 AM EQ09.11.08

Machine Learning and Ligand Modification Enhances the Optical Performance of Perovskite Nanoplatelets [Nina A. Henke](#)¹, Carola Lampe¹, Stefan Martin¹, Ioannis Kouroudis², Milan Harth², Alessio Gagliardi² and Alexander S. Urban¹; ¹Ludwig Maximilian University of Munich, Germany; ²Technical University of Munich, Germany

11:30 AM EQ09.11.09

Strong Spin-Dependent Interactions of Photoexcited Charge Carriers with Magnetic Transition Metal Dopants in MAPbBr₃ [Jonathan Zerhoch](#)¹, Stanislav Bodnar¹, Timo Neumann², Barbara Sergl¹, Lissa Eyre¹ and Felix Deschler¹; ¹Technische Universität München, Germany; ²University of Cambridge, United Kingdom

SESSION EQ09.12: Quantum Dots and Emerging Emitting Materials and Devices I

Session Chairs: Letian Dou, Myoung Hoon Song and Yanfa Yan

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 317B

1:30 PM EQ09.12.01

Absence of Intraband Phonon Bottleneck in Thick-Shell N-Type HgSe/CdS Core/Shell Quantum Dots [Ananth Kamath](#), Christopher Melnychuk and Philippe Guyot-Sionnest; University of Chicago, United States

1:45 PM EQ09.12.03

Size-Tunable Synthesis of Metal-Organic Chalcogenolate Assemblies [Alexander C. Hernandez Oendra](#), Maximilian A. Aspect, Julia L. Jaeggi, Carin R. Lightner, Andrew B. Pun and David J. Norris; ETH Zurich, Switzerland

2:00 PM EQ09.12.04

Deeply Subwavelength NIR Imaging with Photon Avalanching Nanoparticles [Bruce E. Cohen](#); Lawrence Berkeley National Laboratory, United States

2:15 PM BREAK

2:45 PM EQ09.12.07

Highly Luminescent Hetero-Ligand MOF Nanocrystals with Engineered Stokes Shift for Photonic Applications [Angelo Monguzzi](#); Univeristà degli Studi Milano Bicocca, Italy

3:00 PM EQ09.12.08

Achieving Bright, Low Voltage Emission Across the Spectrum with a Generic Electroluminescent Device [Vivian Wang](#) and Ali Javey; University of California, Berkeley, United States

3:15 PM EQ09.12.09

Role of Fluorescent By-Products, Structure and Optical Properties of White Emitting Carbon Dots [Nasir Javed](#), Zhongkai Cheng and Deirdre O'Carroll; Rutgers, The State University of New Jersey, United States

3:30 PM EQ09.12.10

Structural and Optical Interplay in Ultrafast-Decay Alkaline-Earth Rare-Earth Fluoride Nanoparticles for Novel Gamma Ray Scintillators [Parivash Moradifar](#), Garry Chinn, Qingyuan Fan, Chris Siefe, Aaron Lindenberg, Craig Levin and Jennifer A. Dionne; Stanford University, United States

SESSION EQ09.13: Quantum Dots and Emerging Emitting Materials and Devices II

Session Chairs: Maksym Kovalenko and Tae-Woo Lee

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 317B

8:30 AM EQ09.13.01

Towards Natural White Luminescence: Synthesis Control of the Oxidation States of Europium in Glassy Matrices and Its Effect on Photoluminescence Spectra [Agata Jaroeka](#), Pawel Debowski, Bartosz Fetlinski, Tomasz K. Pietrzak and Marek Wasuconek; Warsaw University of Technology, Poland

8:45 AM EQ09.13.02

Untying the Cesium “Not:” Cesium-Iodoplumbate Complexation in Solution Has Implications for Perovskite Crystallization [Yannick Eatmon](#)¹, Oluwaseun Romiluyi², Ruihao Ni², István Pelczér¹, Paulette Clancy², Barry P. Rand¹ and Jeffrey Schwartz¹; ¹Princeton University, United States; ²Johns Hopkins University, United States

9:00 AM EQ09.13.03

Tunable Luminescent Carbon Quantum Dots via Non-Thermal Plasma Synthesis [Sankhadeep Basu](#), Cameron Papson, Tanvi Nikhar, Sergey Baryshev and Rebecca J. Anthony; Michigan State University, United States

SESSION EQ09.14: Perovskite Light-Emitting Diodes and Lasing

Session Chairs: Maksym Kovalenko and Tae-Woo Lee

Monday Afternoon, May 23, 2022

EQ09-Virtual

9:00 PM *EQ09.14.01

Highly Efficient LEDs Featuring Solution-Processed Perovskite Nanocrystals [Zhengguo Xiao](#); University of Science and Technology of China, China

9:30 PM *EQ09.14.02

Energy-Band Engineering for Efficient Blue Perovskite Light-Emitting Diodes [Jingbi You](#); Chinese Academy of Sciences, China

10:00 PM *EQ09.14.04

Near-Infrared-II Light-Emitting Diodes Based on Heavy-Metal-Free Quantum Dots [Zhi Kuang Tan](#); National University of Singapore, Singapore

SESSION EQ09.15: Low-Dimensional Perovskite Light-Emitting Materials and Devices

Session Chairs: Maksym Kovalenko and William Tisdale

Tuesday Morning, May 24, 2022

EQ09-Virtual

8:00 AM *EQ09.15.01

Progress in Reduced-Dimensional Perovskite Light-Emitting Materials and Devices [Edward H. Sargent](#); University of Toronto, Canada

8:30 AM *EQ09.15.02

Excitons in Perovskite Nanostructures [Alexander L. Efros](#); Naval Research Laboratory, United States

9:00 AM *EQ09.15.03

Highly Luminescent Lead Halide Perovskite Nanocrystals—From Synthesis Advancements to Multicomponent Superlattices [Maryna Bodnarchuk](#)^{1,2}, Ihor Cherniukh^{1,2}, Gabriele Raino^{2,1}, Thilo Stoeferle³, Alex Travesset⁴, Rolf Erni¹ and Maksym Kovalenko^{2,1}; ¹Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ²ETH Zürich, Switzerland; ³IBM Research-Zurich, Switzerland; ⁴Iowa State University and Ames Lab, United States

9:30 AM *EQ09.15.04

Nanoscale Interface @ Bulk Hybrid Perovskite [Angshuman Nag](#); Indian Institute of Science Education and Research Pune, India

10:00 AM *EQ09.17.06

Molecular Additives in Perovskite LEDs—From Defect Passivation to Crystallization Manipulation [Feng Gao](#); Linköping Univ, Sweden

SESSION EQ09.16: Perovskite and Low-Dimensional Light-Emitting Materials and Devices I
Session Chairs: Tae-Woo Lee and Angshuman Nag
Wednesday Morning, May 25, 2022
EQ09-Virtual

8:00 AM *EQ09.16.01

Extraordinary Exciton Transport Phenomena in CsPbBr₃ Nanocrystal Solids [William Tisdale](#); Massachusetts Institute of Technology, United States

8:30 AM *EQ09.16.02

Towards White Light Halide Perovskite Emitters [Samuel D. Stranks](#); University of Cambridge, United Kingdom

9:00 AM EQ09.16.04

Light Emission in 2D Silver Phenylchalcogenides [Woo Seok Lee](#)¹, Watcharaphol Paritmongkol¹, Wenbi Scherbakov-Wu¹, Seung Kyun Ha¹, Tomoaki Sakurada¹, Eric R. Powers¹, Soong Ju Oh² and William Tisdale¹; ¹Massachusetts Institute of Technology, United States; ²Korea University, Korea (the Republic of)

9:15 AM EQ09.16.05

Synthetic and Structure-Property Tailoring of 2D Lead Iodide Perovskites with Trap-State Emission [Eugenia S. Vasileiadou](#)¹, Mikaël Kepenekian², Jacky Even², Xinyi Jiang¹, Michael De Siena¹, Vladislav Klepov¹, Ioannis Spanopoulos¹, Daniel Friedrich¹, Imra Tajuddin¹, Emily Weiss¹ and Mercouri Kanatzidis¹; ¹Northwestern University, United States; ²Univ Rennes, France

9:30 AM EQ09.12.05

Increased Optical Responsivity in MoS₂/Si Photodiode Using Chemically Exfoliated Nanoparticles [Wafa Alnaqbi](#), [Ayman Rezk](#), [Aisha Alhammadi](#) and [Ammar Nayfeh](#); Khalifa University of Science and Technology, United Arab Emirates

9:45 AM *EQ09.14.03

Exciton Polariton Lasing and Condensates in All-Inorganic Perovskite Microcavities [Qihua Xiong](#); Tsinghua University, China

SESSION EQ09.17: Perovskite and Low-Dimensional Light-Emitting Materials and Devices II
Session Chairs: Tae-Woo Lee and Jingbi You
Wednesday Afternoon, May 25, 2022
EQ09-Virtual

9:00 PM *EQ09.17.01

Photophysics of Low-Dimensional Halide Perovskites [Tze Chien Sum](#); Nanyang Technological University, Singapore

9:30 PM EQ09.17.02

High-performance Perovskite-Nanocrystal Based Red Light Emitting Diodes with Long Operational Lifetime of 317 hours [Wallace C. Choy](#); University of Hong Kong, China

9:45 PM EQ09.17.03

Blue-Emitting Colloidal Quantum Wells for Light-Emitting Diodes with Low Turn-on Voltage [Merve Izmir](#)^{1,1}, Ashma Sharma¹, Sushant Shendre¹, Emek G. Emek Goksu Durmusoglu¹, Vijay K. Sharma¹, Farzan Shabani², Hamed D. Baruj², Savas Delikanli², Manoj Sharma¹ and Hilmi V. Demir^{1,1,2}; ¹Nanyang Technological University, Singapore; ²Bilkent University, Turkey

10:00 PM EQ09.17.04

High-Optical Quality InGaN/GaN Nano-Porous Membrane Structures Fabricated by Combination Process of Hydrogen Environment Anisotropic Thermal Etching and AlInN Selective Wet Etching [Umuto Kurabe](#)¹, Koji Yoneta¹ and Akihiko Kikuchi^{1,2,3}; ¹Sophia University, Japan; ²Sophia Photonics Research Center, Japan; ³Sophia Semiconductor Research Institute, Japan

10:15 PM EQ09.17.05

Shape-, Size- and Composition-Controlled Lead Free Organic-Inorganic Halide Perovskites with Tunable Optical Properties [Puneet Siwach](#) and Poonam Sikarwar; Indian Institute of Technology Madras, India

##PAGE_BREAK##

SYMPOSIUM EQ10

Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects

May 8 - May 24, 2022

Symposium Organizers

Viktoriia Babicheva, University of New Mexico
Arseniy Kuznetsov, Data Storage Institute
Ho Wai (Howard) Lee, University of California, Irvine
Junsuk Rho, Pohang University of Science and Technology

* Invited Paper

SESSION Tutorial EQ10.00: Optical Metasurfaces—Materials, Designs and Advanced Applications
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SESSION EQ10.01: Plasmonic Sensing
Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 316C

8:30 AM EQ10.01.01

Optical Characteristics of Plasmonic Nanoparticles and Its Application to Colorimetric Imaging of Histone in Senescence Cell Yun Kim¹, Hyun Ji An², Soojeong Chang², Hyunsung Park², Inhee Choi² and Jihwan Song¹; ¹Hanbat National University, Korea (the Republic of); ²University of Seoul, Korea (the Republic of)

8:45 AM EQ10.01.02

An Achromatic and Polarization-Insensitive Metafiber at the Entire Telecommunication Wavelengths Jaehyuck Jang¹, Junsuk Rho¹, Haoran Ren², Stefan Maier³ and Chenhao Li³; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Macquarie University, Australia; ³Ludwig-Maximilians-Universität München, Germany

9:00 AM EQ10.01.03

Experimental Demonstration of Arbitrary Wave-Shaping with High Q Metasurfaces—A Route to Ultra-Efficient, High-Resolution Spatial-Light-Modulators Mark Lawrence¹, Lin Lin¹, Jack Hu², Sahil Dagli² and Jennifer A. Dionne²; ¹Washington University in St. Louis, United States; ²Stanford University, United States

9:15 AM EQ10.01.04

Three-Dimensional Tomographic Mapping of Surface Plasmons of a Chiral Gold Nanoparticle Using STEM-EELS Jaeyeon Jo, Jinseok Ryu, Hyeohn Kim, Ki Tae Nam and Miyoung Kim; Seoul National University, Korea (the Republic of)

9:30 AM EQ10.01.05

Asymmetric Seed Passivation for the Synthesis of Bowl-Like Plasmonic Nanostructures Zachary J. Woessner¹, Sandra Bueno¹, George Lewis², Emilie Ringe² and Sara Skrabalak¹; ¹Indiana University, United States; ²University of Cambridge, United Kingdom

9:45 AM BREAK

SESSION EQ10.02: Plasmonics/Metasurfaces
Session Chairs: Arseniy Kuznetsov and Ho Wai (Howard) Lee
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 316C

10:30 AM *EQ10.02.01

Estimating Spontaneous Photon Pair Generation Rates in Au Nanoantennas Using Stimulated Emission Tomography Paul Dichtl¹, Jefferson Florez-Gutierrez¹, John Yang¹, Stefan A. Maier^{1,2}, Chris Phillips¹, Alex Clark¹ and Rupert F. Oulton¹; ¹Imperial College London, United Kingdom; ²Ludwig Maximilians University, Germany

11:00 AM EQ10.02.02

Conducting Polymers for Tuneable Structural Colours Stefano Rossi, Magnus P. Jonsson and Shangzhi Chen; Linköping University, Sweden

11:15 AM EQ10.02.03

High Quality Factor Metasurfaces for Real-Time Ocean Observation Halleh Balch¹, Jack Hu¹, Fareeha Safir¹, Kai Chang¹, Greg Doucette², Chris Scholin³ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²National Oceanic and Atmospheric Administration, United States; ³Monterey Bay Aquarium Research Institute, United States

11:30 AM EQ10.02.04

Lattice Resonances in Arrays of Finite Size and Lossy Nanoscatterers Vahid Karimi and Viktorija Babicheva; University of New Mexico, United States

11:45 AM EQ10.02.05

Manipulation of Er³⁺-Ion Fluorescence by Controlled Modal Coupling on the Nanoscale Nicholas A. Gusken^{1,2}, Ming Fu², Maximilian Zapf³, Michael P. Nielsen⁴, Jung Hwang Song¹, Paul Dichtl², Stefan Maier⁵, Carsten Ronning³, Mark L. Brongersma¹ and Rupert F. Oulton²; ¹Stanford University, United States; ²Imperial College London, United Kingdom; ³Friedrich-Schiller-Universität Jena, Germany; ⁴University of New South Wales, Australia; ⁵Ludwig-Maximilians-Universität München, Germany

SESSION EQ10.03: Metasurfaces and Metamaterials I
Session Chairs: Viktorija Babicheva and Ho Wai (Howard) Lee
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 316C

1:30 PM *EQ10.03.01

Nonlocal Metasurfaces Andrea Alu; City University of New York, United States

2:00 PM EQ10.03.02

Chiral Metasurface Synthesis by Circularly Polarized Light Ji-Young Kim, Connor McGlothlin, Minjeong Cha, Wonjin Choi, Emine S. Turali-Emre and Nicholas A. Kotov; University of Michigan, United States

2:15 PM EQ10.03.03

Dynamic Color Tuning with Electrochemically Actuated TiO₂ Metasurfaces Janna Eaves-Rathert¹, Elena Kovalik¹, Cary L. Pint^{2,1} and Jason Valentine¹; ¹Vanderbilt University, United States; ²Iowa State University of Science and Technology, United States

2:30 PM EQ10.03.04

Dynamic Plasmonic Optics in Dense Nanorod Phases Nicholas J. Greybush¹, Christopher D. Musi², Jawad Naciri¹, Charles A. Rohde¹ and Jake Fontana¹; ¹U.S. Naval Research Laboratory, United States; ²Contractor, U.S. Naval Research Laboratory, United States

3:00 PM BREAK

SESSION EQ10.04: Plasmonic Applications I
Session Chairs: Andrea Alu and Ho Wai (Howard) Lee
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 316C

3:30 PM EQ10.04.01

Computational Discovery and Experimental Demonstration of Boron Phosphide for All-Dielectric Nanophotonics Mark Kamper Svendsen¹, Hiroshi Sugimoto², Artyom Assadillayev¹, Daisuke Shima², Minoru Fujii², Kristian Thygesen¹ and Søren Raza¹; ¹Technical University of Denmark, Denmark; ²Kobe University, Japan

3:45 PM EQ10.04.02

Characterizing Transient Dynamics of Hot Carriers via Terahertz Spectroscopies Mohammad Taghinejad¹, Chenyi Xia¹, Andrew S. Kim², Kyutae Lee², Jun Xiao¹, Wenshan Cai², Aaron Lindenberg¹ and Mark L. Brongersma¹; ¹Stanford University, United States; ²Georgia Institute of Technology, United States

4:00 PM EQ10.04.03

Tunable Surface Gap Plasmon Devices with a Liquid Crystal Elastomer Gap Anqi Ji¹, Irina Zubritskaya¹, Arul Clement², Mohsen Talbrizi², Ravi Shankar² and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Pittsburgh, United States

SESSION EQ10.05: Plasmonic Applications II
Session Chairs: Viktorija Babicheva and Ho Wai (Howard) Lee
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 316C

10:30 AM *EQ10.05.01

Surface Engineering and Applications of Plasmonic Nanoparticle Lattices Teri W. Odom; Northwestern University, United States

11:00 AM EQ10.05.02

High Quality Factor Silicon-on-Lithium Niobate Metasurfaces for Electro-Optic Modulation and Reconfigurable Beamsteering Sahil Dagli¹, Elissa Klopfer¹, Baba Ogunlade¹, Harsha Reddy¹, David R. Barton², Mark Lawrence³ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²Harvard University, United States; ³Washington University in St. Louis, United States

11:15 AM EQ10.05.03

Engineering Hyperbolic Resonances in CdO Superlattices Angela Cleri¹, Joshua Nolen^{2,3}, Kyle Kelley⁴, Evan Runnerstrom⁵, Thomas G. Folland⁶, Jon-Paul Maria¹ and Joshua D. Caldwell³; ¹The Pennsylvania State University, United States; ²The City University of New York, United States; ³Vanderbilt

University, United States; ⁴Oak Ridge National Laboratory, United States; ⁵U.S. Army Research Office—Materials Science Division, United States; ⁶The University of Iowa, United States

11:30 AM EQ10.05.04

Maximum Electro-Momentum Coupling in Piezoelectric Metamaterials Jeong-Ho Lee, Zhizhou Zhang and Grace Gu; University of California, Berkeley, United States

11:45 AM EQ10.05.05

Plasmonic Nanocavities for Tailored Emission Spectrum of Vertical WS₂ LEDs Viktoria Shautsova^{1,2}, Linlin Hou¹, Qianyang Zhang¹, Yang Lu¹ and Jamie Warner^{1,3}; ¹University of Oxford, United Kingdom; ²Stanford University, United States; ³The University of Texas at Austin, United States

SESSION EQ10.06: Advances in Metasurfaces, Metamaterials and Plasmonics

Session Chairs: Andrei Faraon and Arseniy Kuznetsov

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 316C

1:30 PM EQ10.06.02

A Generic Framework for Neural Networks Based Modeling and Design of Free-Form Manufacturable Metasurfaces Ibrahim Tanriover, Doksoo Lee, Wei Chen and Koray Aydin; Northwestern University, United States

1:45 PM *EQ10.06.03

Light Sailing with Metamaterials Artur Davoyan; University of California, Los Angeles, United States

2:15 PM EQ10.06.04

Sensitive and Multiplexed Genetic Analysis with High Quality Factor Metasurfaces Jack Hu¹, Fareeha Safir¹, Halleh Balch¹, Kai Chang¹, John Abendroth², Benjamin A. Pinsky¹, Stefanie Jeffrey¹, Mark Lawrence³ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²ETH Zürich, Switzerland; ³Washington University in St. Louis, United States

2:30 PM EQ10.06.05

Resonant Ultraviolet Plasmonic Chirality Sensing of Biomolecular Films Tiago Ramos Leite da Silva¹, Orhan Kizilkaya^{1,2} and Kevin McPeak¹; ¹Louisiana State University, United States; ²Center for Advanced Microstructures and Devices, United States

2:45 PM BREAK

SESSION EQ10.07: Plasmonic Applications III

Session Chairs: Arseniy Kuznetsov and Ho Wai (Howard) Lee

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 316C

3:30 PM *EQ10.07.01

Volumetric Meta-Optics for Sorting Light By Color, Polarization and Angle of Incidence Andrei Faraon, Gregory Roberts, Ian Foo and Conner Ballew; California Institute of Technology, United States

4:00 PM EQ10.07.02

Harmonic Beam Switching Using Space-Time Modulated Metasurfaces Prachi Thureja, Jared Sisler, Meir y. Grajower, Ruzan Sokhoyan and Harry A. Atwater; California Institute of Technology, United States

4:15 PM EQ10.07.03

Nanoparticle-Based 3D Optical Nanostructure for Resonance Manipulation Geon Yeong Kim, Shinho Kim, Min Seok Jang and Yeon Sik Jung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

4:30 PM EQ10.07.04

Light Driven Alternative Plasmonic Catalysis for the Reduction of Heavy Metals in Solution Chris Rudnicki, Carla Berrospe Rodríguez and Lorenzo Mangolini; University of California, Riverside, United States

SESSION EQ10.08: Poster Session I: Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects I

Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ10.08.02

Optical and Electro-Optical Characterization of Hybrid Metal-Semiconductor Hybrid Metamaterials Nathan Dice, Aaron Austin and David McIlroy; Oklahoma State University, United States

EQ10.08.03

Gradient Colloidal Crystals via Infusion-Withdrawal Coating of Fluorescent Latex Particles [Marius Schoettle](#) and Markus Retsch; Universität Bayreuth, Germany

EQ10.08.04

Scalable Fabrication of Heat Tolerant Titanium Nitride Nanoring Structures with Multiple-Patterning Colloidal Lithography for Broadband Absorbers in the Visible to Near-Infrared [Myeongcheol Go](#), Dasol Lee, Junsuk Rho and Jinkon Kim; POSTECH, Korea (the Republic of)

EQ10.08.05

Optic Phonon Confinement for Modifying the Infrared Dielectric Function [Joseph R. Matson](#)¹, Md Nazmul Alam², George Varnavides³, Ayman Said⁴, Thomas Beechem⁵, Prineha Narang³, Stephanie Law² and Joshua D. Caldwell¹; ¹Vanderbilt University, United States; ²University of Delaware, United States; ³Harvard University, United States; ⁴Argonne National Laboratory, United States; ⁵Purdue University, United States

EQ10.08.07

Experimental Investigations into Unprecedented Electro-momentum Coupling [Kahraman G. Demir](#), Elizabeth Pegg, Shao-Yi Yu and Grace Gu; University of California, Berkeley, United States

EQ10.08.08

Switchable Waveguides for Novel Laser Displays and Scanners [Andreas Henkel](#), Maik Meudt, Maximilian Buchmueller, Christopher Knoth and Patrick Goerm; University of Wuppertal, Germany

SESSION EQ10.09: Metasurfaces and Metamaterials II
Session Chairs: Arseniy Kuznetsov and Ho Wai (Howard) Lee
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 316C

8:00 AM *EQ10.09.01

Electrically Controlled Reconfigurable Metasurfaces for High-Power Applications [Ruzan Sokhoyan](#), Meir y. Grajower, Jared Sisler, Prachi Thureja, Komron Shayegan and Harry A. Atwater; California Institute of Technology, United States

8:30 AM EQ10.09.02

Plasmonic Current for Monitoring Excited-State Kinetics [Lahari Saha](#)^{1,2} and Chris D. Geddes^{1,2}; ¹Institute of Fluorescence, United States; ²University of Maryland, Baltimore County, United States

8:45 AM EQ10.09.03

Passively Stabilized Dynamics of Flexible Metagrating-Based Laser-Propelled Lightsails [Ramon Gao](#), Michael Kelzenberg and Harry A. Atwater; California Institute of Technology, United States

9:00 AM EQ10.09.04

Dynamic Metasurfaces Based on a Tunable Material Resonance in High-Quality, Large-Area 2D Semiconductors [Fenghao Xu](#), Amalya Johnson, Yan Joe Lee, Qitong Li, Jung-Hwan Song, Joao Paulo Berenguer, Fang Liu and Mark L. Brongersma; Stanford University, United States

9:15 AM BREAK

9:45 AM *EQ10.09.05

Metasurface Electrodes for Solar Cells and Display Technologies [Mark L. Brongersma](#); Stanford University, United States

10:15 AM EQ10.09.06

Dual-Mode Anti-Counterfeiting System via Hydrogel-Based Reconfigurable Metasurfaces [Byoungsu Ko](#), Trevon Badloe, Younghwan Yang and Junsuk Rho; Pohang University of Science and Technology, Korea (the Republic of)

10:30 AM EQ10.09.07

New Mode of Energy Propagation in Double Metallic Networks Wenhui Wang, [Cédric Schumacher](#), Ullrich Steiner and Matthias Saba; Adolphe Merkle Institute, Switzerland

10:45 AM EQ10.09.09

Deep Learning-Based Programmable Design of Plasmonic Born-Kuhn Metasurface for Sensing Application [Jeong Hyun Han](#), Yae-Chan Lim and Ki Tae Nam; Seoul National University, Korea (the Republic of)

11:00 AM EQ10.09.10

Hybrid Photonic-Plasmonic Bound States in Continuum Patrick Goerm, Andreas Henkel, [Maximilian Buchmueller](#) and Maik Meudt; University of Wuppertal, Germany

11:15 AM EQ10.09.11

Control of Electrochemical Reactions and Film Deposition with the Plasmonic Environment and Light Illumination [Paula Fortuno](#), Ashleigh Wilson, Mohammad Shahabuddin and Natalia Neginova; Norfolk state university, United States

SESSION EQ10.10: Zero-Index Photonics
Session Chairs: Mark Brongersma and Ho Wai (Howard) Lee
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 316C

1:30 PM EQ10.10.02

Observation of Higher-Order Kerr Effect in Thin Epsilon-Near-Zero Films Sudip Gurung^{1,2,3}, Subhjit Bej^{2,3,4}, Francesco Tonelli⁵, Aleksei Anopchenko^{1,3}, Zhenhuan Yi², Alessandro Ciattoni⁶, Andrea Marini⁶ and Ho Wai (Howard) Lee^{1,2,3}; ¹University of California, United States; ²Texas A&M University, United States; ³Baylor University, United States; ⁴Tampere University, Finland; ⁵CNR-SPIN, Italy; ⁶University of L'Aquila, Italy

1:45 PM EQ10.10.03

Nonlinear Properties of ITO-Based ENZ Materials and Metasurfaces Throughout the Short-Wave Infrared Evan M. Smith¹, Christopher E. Stevens¹, Joshua R. Hendrickson², Stefan Nikodemski¹, Carl Liebig² and Shiva Vangala²; ¹KBR, Inc., United States; ²Air Force Research Laboratory, United States

2:00 PM EQ10.10.04

Ultrafast Characterization of Indium Tin Oxide Grating Michele Guizzardi¹, Silvio Bonfadini², Liliana Moscardi^{1,2}, Ilka Kriegel², Francesco Scotognella¹ and Luigino Criante²; ¹Politecnico di Milano, Italy; ²Istituto Italiano di Tecnologia, Italy

2:15 PM EQ10.10.05

Ultrafast Nonreciprocal Beam Steering and Frequency Conversion in Epsilon-Near-Zero Materials Qingyuan Fan^{1,2}, Amr Shaltout¹, Jorik Van de Groep^{1,3}, Jung-Hwan Song¹, Mark L. Brongersma¹ and Aaron Lindenberg^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³University of Amsterdam, Netherlands

2:30 PM BREAK

SESSION EQ10.11: Plasmonic/Nanophotonic Applications

Session Chairs: Viktoriia Babicheva and Ruzan Sokhoyan

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 316C

3:30 PM EQ10.11.01

Broadband Light-Trapping Antireflection Coatings for Ultrathin Solar Cells Based on Dense Arrays of Mie Resonators Nayeun Lee¹, Muyu Xue¹, Jiho Hong¹, Jorik Van de Groep² and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Amsterdam, Netherlands

3:45 PM EQ10.11.02

Work-Function Studies of Constituents of Fabri-Perot Cavities and MIM Waveguides Kanij Mehtanin Khabir, Mohammad Shahabuddin, Jalyn-Rose L. Clark, Natalia Noginova and Mikhail A. Noginov; Norfolk State University, United States

4:00 PM EQ10.11.03

Effect of Metal-Dielectric Environments on Photopolymerization of the [2,2'-bi-1H-indene]-1,1'-dione-3,3'-diylidheptanoatecarboxylate monomer Leila Hesami, Chi Yang, Elias Anwar and Mikhail A. Noginov; Norfolk State University, United States

4:15 PM EQ10.08.06

Dynamic Mechanical Control of Gap Plasmons Skyler P. Selvin¹, Majid Esfandyarpour^{1,2}, Anqi Ji¹ and Mark L. Brongersma¹; ¹Stanford University, United States; ²Apple Inc., United States

SESSION EQ10.12: Poster Session II: Advances in Metasurfaces, Metamaterials and Plasmonics—Materials, Design, Manufacturing, Applications and Industrial Aspects II

Session Chairs: Arseniy Kuznetsov and Ho Wai (Howard) Lee

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ10.12.01

Distance Independence in Excitonic Transport Between Chromophores Facilitated by Plasmonic Nanorods Albert B. Lamonda¹, David Coker¹ and Wendu Ding²; ¹Boston University, United States; ²Wake Forest University, United States

EQ10.12.02

Hierarchical PDMS-Based Metamaterial for Simultaneous Control of Visible, NIR and LWIR Wavebands Injoong Chang¹, Boram Yoon², Namkyu Lee³, Wei-Ting Hsu¹, Joon-Soo Lim¹, Juyeong Nam¹, Maroosol Yun¹ and Hyung Hee Cho¹; ¹Yonsei University, Korea (the Republic of); ²Hyundai Mobis, Korea (the Republic of); ³Forschungszentrum, Germany

EQ10.12.03

Effect of Microsphere Size on Infrared Selective Emission of Hole-Structured Metamaterial Juyeong Nam, Joon-Soo Lim, Injoong Chang, Maroosol Yun and Hyung Hee Cho; Yonsei University, Korea (the Republic of)

EQ10.12.04

High-Index Nanowire Metasurfaces for Polarization-sensitive Light Detection Jiho Hong¹, Jorik Van de Groep^{1,2}, Nayeun Lee¹, Philippe Lalanne³, Pieter Kik^{1,4} and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Amsterdam, Netherlands; ³Centre National de la Recherche Scientifique, France; ⁴University of Central Florida, United States

EQ10.12.05

Dipeptide-Directed Chiral Gold Nanoparticle and Its Evolution Pathway Analysis [Hyeon Kim](#), Sang Won Im, Nam Heon Cho, Ryeong Myeong Kim and Ki Tae Nam; Seoul National University, Korea (the Republic of)

EQ10.12.06

Influence of the Crystallographic Orientation of ITO on the Electrodeposition of Ag Nanoparticles [Yorick Bleiji](#), Mees Dieperink and Esther Alarcon-Llado; AMOLF, Netherlands

EQ10.12.08

Collective Phonon-Polaritonic Modes in SiC Subarrays [Guanyu Lu](#)¹, Christopher R. Gubbin², Joshua Nolen¹, Thomas G. Folland^{1,3}, Katja Diaz-Granados¹, Ivan I. Kravchenko⁴, Joseph Spencer⁵, Marko Tadjer⁵, Orest J. Glembocki¹, Simone De Liberato² and Joshua D. Caldwell¹; ¹Vanderbilt University, United States; ²University of Southampton, United Kingdom; ³The University of Iowa, United States; ⁴Oak Ridge National Laboratory, United States; ⁵US Naval Research Laboratory, United States

SESSION EQ10.13: Metasurfaces and Metamaterials III

Session Chairs: Viktoriia Babicheva and Ruzan Sokhoyan

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 316C

8:30 AM EQ10.13.02

Sensitive, Quantitative, Real-Time Detection of Protein-Based Biomarkers for Human-Health Diagnosis and Monitoring Using High Quality Factor Metasurfaces [Fareeha Safir](#)¹, Jack Hu¹, Halleh Balch¹, Kai Chang¹, John Abendroth², Mark Lawrence³, Stefanie Jeffrey¹, Scott Boyd¹, Butrus (Pierre) Khuri-Yakub¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²ETH Zürich, Switzerland; ³Washington University in St. Louis, United States

8:45 AM EQ10.13.03

High-Quality-Factor Metasurfaces for Rapid Identification and Classification of Mycobacterium Tuberculosis Using Surface-Enhanced Raman spectroscopy [Baba Ogunlade](#)¹, Loza Tadesse², Jack Hu¹, Fareeha Safir¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²University of California, Berkeley, United States

9:00 AM EQ10.13.04

Gires-Tournois Immunoassay Platform for Label-Free Colorimetric Detection of SARS-CoV-2 [Young Jin Yoo](#)¹, Joo Hwan Ko¹, Gil Ju Lee², Jiwon Kang¹, Min Seok Kim¹, Stefan G. Stanciu³, Hyeon-Ho Jeong¹ and Young Min Song¹; ¹GIST, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Politehnica University Bucharest, Romania

9:45 AM EQ10.13.05

Ultrasensitive THz All-Dielectric Metasurface Biosensor Based on Bound States in the Continuum [Marie L. Georgiades](#), James Seddon and Cyril Renaud; University College London, United Kingdom

9:30 AM BREAK

10:00 AM EQ10.13.06

Architecturally Tailorable Order-Disorder Transition in Ag/Si Layered Hyperbolic Metamaterials [Jose Luis Ocana Pujol](#), Lea Forster, Henning Galinski and Ralph Spolenak; ETH Zurich, Switzerland

10:15 AM EQ10.13.07

A Scalable Manufacturing Approach for All-Inorganic Diffractive Optics, Lightguide Gratings and Metalenses Using Nanoimprint Lithography and High Refractive Index Nanoparticle Inks Vincent J. Einck, Mahsa Toref, Andrew McClung, Dae Eon Jung, Mahdad Mansouree, Amir Arbabi and [James J. Watkins](#); University of Massachusetts, United States

10:30 AM EQ10.13.08

Radiation Pressure Propulsion of Structurally Stable Lightsails with Embedded Payloads [Michael Kelzenberg](#), Ramon Gao and Harry A. Atwater; California Institute of Technology, United States

10:45 AM *EQ10.13.09

Decoding Spectral Signatures of Bacterial Metabolism [Regina Ragan](#); University of California, Irvine, United States

SESSION EQ10.14: Plasmonic Applications IV

Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 316C

1:30 PM *EQ10.14.01

High-Quality-Factor Phase Gradient Metasurfaces for Multiplexed Molecular Sensing and Modulation [Jennifer A. Dionne](#), Mark Lawrence, Jack Hu, Fareeha Safir, Elissa Klopfer, Sahil Dagli, David R. Barton, Jefferson Dixon and Harsha Reddy; Stanford University, United States

2:00 PM EQ10.14.02

A-SHARC: Adaptive Solar Heating and Radiative Cooling by Electrochemically Reversible Plasmonic Selective Absorber [Po-Chun Hsu](#); Duke University, United States

2:15 PM EQ10.14.03

Design of Chiral Kink Atoms on Single Gold Nanoparticle for the Efficient Electrocatalysis of Glucose [Seungwoo Choi](#) and Ki Tae Nam; Seoul National University, Korea (the Republic of)

2:30 PM BREAK

SESSION EQ10.15: Metasurfaces and Metamaterials IV
Session Chairs: Jennifer Dionne and Ho Wai (Howard) Lee
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 316C

3:45 PM EQ10.15.01

Nonlocal, High- Q Metasurfaces for Precise Control of Light Waves in Energy-Momentum Space [Jung-Hwan Song](#)¹, Qitong Li¹, Fenghao Xu¹, Jorik Van de Groep², Fang Liu¹, Alwin Daus¹, Eric Pop¹ and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Amsterdam, Netherlands

4:00 PM EQ10.15.02

Rapid Acoustic Bioprinting for Label-Free, SERS Detection of Bloodstream Pathogens [Fareeha Safir](#)¹, Loza Tadesse², Stefanie Jeffrey¹, Kamyar Frouzi¹, Amr A. Saleh³, Butrus (Pierre) Khuri-Yakub¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²University of California, Berkeley, United States; ³Cairo University, Egypt

4:15 PM EQ10.15.03

Circularly-Polarized Stimulated Raman Scattering in a Doubly-Resonant Silicon Metasurface for Subwavelength Nonreciprocity [Jefferson Dixon](#), Harsha Reddy, Sahil Dagli and Jennifer A. Dionne; Stanford University, United States

SESSION EQ10.16: Poster Session III: Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects III

Session Chairs: Viktoriia Babicheva and Arseniy Kuznetsov
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ10.16.01

Bulk Synthesis of Hyperbolic Metamaterials with Chemical Tunability Jong-Young Kim¹, [Eunsil Lee](#)^{1,2}, Myeongjeong Lee³, Sunae So⁴, Wooyoung Shim², Junsuk Rho⁴ and In Chung³; ¹KICET, Korea (the Republic of); ²Yonsei University, Korea (the Republic of); ³Seoul National University, Korea (the Republic of); ⁴Pohang University of Science and Technology, Korea (the Republic of)

EQ10.16.02

Liquid-Metal-Based Nanophotonic Surface-Enhanced Infrared Absorption Sensors [Xianglong Miao](#) and [Peter Qiang Liu](#); State University of New York at Buffalo, United States

EQ10.16.03

Enantioselective Sensing by Collective Circular Dichroism of 2D Helicoid Crystals [Ryeong Myeong Kim](#) and Ki Tae Nam; Seoul National University, Korea (the Republic of)

EQ10.16.04

Long-Lived Hyperbolic Phonon Polaritons in Monoisotopic (¹⁰B) Hexagonal Boron Nitride [Georges Pavlidis](#)^{1,2}, Jeffrey Schwartz^{1,3}, Joseph R. Matson⁴, Thomas G. Folland^{4,5}, Song Liu^{6,7}, James H. Edgar⁶, Joshua D. Caldwell⁴ and Andrea Centrone¹; ¹National Institute of Standards and Technology, United States; ²University of Connecticut, United States; ³University of Maryland, United States; ⁴Vanderbilt University, United States; ⁵The University of Iowa, United States; ⁶Kansas State University, United States; ⁷Columbia University, United States

EQ10.16.05

ThermoMechanical Imaging and Discerning of Single Bacteria Cells by Optomechanical Spectroscopy [Daniel Ramos](#); CSIC, Spain

EQ10.16.06

The High Optical Performance of a Polymeric Sulfur-Based Mid-Wavelength Infrared Linear Polarizer [Woongbi Cho](#)¹, Jehwan Hwang², Sang Yeon Lee¹, Jaeseo Park³, Nara Han¹, Jun Oh Kim³, Augustine Urbas⁴, Zahyun Ku⁴ and Jeong Jae Wie^{1,1}; ¹Inha University, Korea (the Republic of); ²Purdue University, United States; ³Korea Research Institute of Standards and Science, Korea (the Republic of); ⁴Air Force Research Laboratory, United States

EQ10.16.07

Optical Properties of a Monolayer of Metallic Nanoparticles in a Thin-Film Stack [Marie-Caroline Solignac](#)^{1,2}, Matteo Balestrieri¹, Iryna Gozhyk¹, Hervé Montigaud¹, Kevin Vynck³ and Philippe Lalanne²; ¹Surface du Verre et Interfaces, UMR 125 CNRS/Saint-Gobain, France; ²LP2N, CNRS, Institut d'Optique Graduate School, Univ. Bordeaux, France; ³ILM, CNRS, Université Claude Bernard Lyon 1, France

SESSION EQ10.17: Nanophotonic/Plasmonic Applications
Session Chairs: Debashis Chanda and Arseniy Kuznetsov
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 316C

8:00 AM EQ10.17.01

Ultrathin Photothermal Percolating Metasurface to Combat Fogging Iwan Haeckler, Gabriel Schnoering, Nicole Ferru, Efstratios Mitridis, Thomas Schutzius and Dimos Poulikakos; ETH Zürich, Switzerland

8:15 AM EQ10.17.02

Machine Learning Analysis of Spectral Data using Bacterial Metabolic Networks for Signal Amplification Hong Wei, Yixin Huang, Peter Santiago, Allon Hochbaum and Regina Ragan; University of California, Irvine, United States

8:30 AM EQ10.17.03

Hybrid Visible Imaging and Near-Infrared Optical Spectroscopy Using Bioinspired Nanostructures with Smartphone Image Sensors Radwanul H. Siddique, Daniel Assumpcao, Hyochul Kim, Young-Geun Roh, Michelle Wang and Hyuck Choo; Samsung Semiconductor, Inc., United States

8:45 AM EQ10.17.04

Co-Design of Free-Space Metasurface Optical Neuromorphic Classifiers for High Performance Francois Leonard, Elliot Fuller, Corinne Teeter and Craig Vineyard; Sandia National Laboratories, United States

9:30 AM *EQ10.17.06

Tunable and Multifunctional Optoelectronic Devices Debashis Chanda; University of Central Florida, United States

9:15 AM BREAK

10:00 AM EQ10.17.07

Nondestructive Characterization of the Structural and Mechanical Properties of Nanostructured Metalattices Using Coherent Extreme UV Scatterometry Joshua Knobloch¹, Brendan McBennett¹, Begoña Abad Mayor¹, Emma Nelson¹, Charles Bevis¹, Sadeq Yazdi², Amitava Adak¹, Travis Frazer¹, Jorge Hernández-Charpak¹, Hui Yan Cheng³, Alex J. Grede³, Pratibha Mahale³, Nabila Nova³, Tom Mallouk³, Noel Giebink³, John Badding³, Henry Kapteyn¹ and Margaret Murnane¹; ¹STROBE, JILA, University of Colorado Boulder, United States; ²University of Colorado Boulder, United States; ³The Pennsylvania State University, United States

10:15 AM EQ10.17.08

Neural Network Design of Broadband Epsilon-Near-Zero Perfect Absorbers David Dang, Aleksei Anopchenko and Ho Wai (Howard) Lee; University of California, Irvine, United States

10:30 AM EQ10.17.09

Directional Raman Scattering Coupled into Plasmonic Waveguide with Near-Unity Couple Efficiency Rupert F. Oulton¹, Ming Fu¹, Monica P. Mota¹, Andrea Jacassi¹, Xiaofei Xiao¹ and Stefan A. Maier^{1,2}; ¹Imperial College London, United Kingdom; ²Ludwig Maximilians University, Germany

10:45 AM EQ10.17.10

Graphene-Based Modulation and Enhancement of Near-Field Radiative Heat Transfer Rectification Simon Landrieux, Philippe Ben-Abdallah and Riccardo Messina; Laboratoire Charles Fabry, France

SESSION EQ10.18: Lasing and Radiation Engineering
Session Chairs: Viktoriia Babicheva and Wenshan Cai
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 316C

1:30 PM *EQ10.18.01

Complete 2π Tunable Phase Modulation Using Avoided Crossing of Resonances Min Seok Jang; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

2:00 PM EQ10.18.02

Elucidating and Controlling the Coupling Between Plasmonic Nanostructures and 2D Semiconductors Yan Joe Lee, Fenghao Xu, Qitong Li, Colin Yule, Jiho Hong, Jung-Hwan Song, Fang Liu and Mark L. Brongersma; Stanford University, United States

2:15 PM EQ10.18.03

Tunable Nanophotonics Enabled by Defect-Engineering of VO₂ Using a Focused Ion Beam Chenghao Wan¹, Martin Hafermann², Tae Joon Park³, Shiram Ramanathan³, Carsten Ronning² and Mikhail Kats¹; ¹University of Wisconsin--Madison, United States; ²Friedrich-Schiller-Universität Jena, Germany; ³Purdue University, United States

2:30 PM EQ10.18.05

A Monolayer Semiconductor Free-Space Optical Modulator Qitong Li¹, Jung-Hwan Song¹, Fenghao Xu¹, Jorik Van de Groep^{1,2}, Alwin Daus¹, Jiho Hong¹, Yan Joe Lee¹, Eric Pop¹, Fang Liu¹ and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Amsterdam, Netherlands

2:45 PM BREAK

SESSION EQ10.19: Dimensional Photonics/Metamaterials
Session Chairs: Min Seok Jang and Arseniy Kuznetsov
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 316C

3:30 PM *EQ10.19.01

Inverse Meta-Design—Constructing Metasurfaces and Metasystems via Machine Learning Wenshan Cai; Georgia Institute of Technology, United States

4:00 PM EQ10.19.02

Two-Dimensional ITO for Gate-Tunable Optical Absorption Christopher Gonzalez¹, Alexander Galkin¹, Susanna Weber^{1,2}, Aleksei Anopchenko¹ and Ho Wai (Howard) Lee¹; ¹University of California Irvine, United States; ²University of California, Berkeley, United States

4:15 PM EQ10.19.03

Atomic Layer Deposition as a Novel Technique for the Fabrication of Magnetoplasmonic Metasurfaces—Manufacturing and Characterization of Ferromagnetic Nickel Nanoarrays Gabriele Botta^{1,2}, Mato Knez^{1,3} and Paolo Vavassori^{1,3}; ¹CIC nanoGUNE BRTA, Spain; ²FPI fellow (MINECO), Spain; ³IKERBASQUE, Basque Foundation for Science, Spain

SESSION EQ10.20: Nanophotonics/Plasmonics
Session Chairs: Artur Davoyan and Arseniy Kuznetsov
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 316C

8:00 AM EQ10.20.02

Zero-Index Material Enabled Hollow Core Optical Fiber Leon Zhang, Jingyi Yang and Ho Wai (Howard) Lee; University of California, Irvine, United States

8:15 AM EQ10.20.03

Real-Time Quantum Dynamics of Long-Range Electronic Excitation Transfer in Plasmonic Nanoantennas Bryan M. Wong; University of California, Riverside, United States

8:30 AM EQ10.20.04

Diamond Spin Microscopy on a Plasmonic Quantum Metasurface Laura Kim¹, Hyeonrak Choi^{1,1}, Matthew Trusheim^{1,2} and Dirk Englund^{1,1}; ¹Massachusetts Institute of Technology, United States; ²U.S. Army Research Laboratory, United States

8:45 AM EQ10.20.05

Electrically Tunable Bifocal Metalenses Mediated by Liquid Crystals Trevon Badloe, Sunae So, Joohoon Kim and Junsuk Rho; Pohang University of Science and Technology, Korea (the Republic of)

9:00 AM EQ10.20.06

Interdependent Hot-Carrier Transient Dynamics and Active Linear/Non-Linear Optical Response in a 1D Plasmonic Crystal Andrew S. Kim¹, Mohammad Taghinejad², Kyutae Lee¹ and Wenshan Cai¹; ¹Georgia Institute of Technology, United States; ²Stanford University, United States

9:15 AM BREAK

9:45 AM *EQ10.20.07

Assembly of Large-Area Aligned Gold Trimers with Sub-5 nm Air-Filled Vertical Nanogaps Svetlana Neretina, Zachary Lawson, Arin Preston, Walker Tuff and Robert Hughes; University of Notre Dame, United States

10:15 AM EQ10.20.08

Efficient Nonlinear Modulation for Dynamic Wavefront Shaping with High Quality Factor Phase Gradient Metasurfaces Elissa Klopfer¹, Sahil Dagli¹, David R. Barton², Mark Lawrence³ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²Harvard University, United States; ³Washington University in St. Louis, United States

10:30 AM EQ10.20.09

Plasmon-Enhanced Photoemitters as Bright Ultrashort Electron Pulse Generators Daniel B. Durham^{1,2}, Christopher M. Pierce^{3,2}, Fabrizio Riminucci², Silvia Rotta Loria⁴, Kostas Kanellopoulos⁵, Ivan Bazarov³, Jared M. Maxson³, Stefano Cabrini², Andrew M. Minor^{1,2} and Daniele Filippetto²; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Cornell University, United States; ⁴Politecnico di Milano, Italy; ⁵Technical University of Vienna, Austria

10:45 AM EQ10.20.10

Cavity Enhanced Tellurium Photodetectors Alexander D. White¹, Geun Ho Ahn¹, Hyungjin Kim², Ali Javey² and Jelena Vuckovic¹; ¹Stanford, United States; ²University of California, Berkeley, United States

11:00 AM EQ10.20.11

Atomically Thin Electro-Optic Polarization Modulator Souvik Biswas¹, Meir y. Grajower¹, Kenji Watanabe², Takashi Taniguchi² and Harry A. Atwater¹; ¹California Institute of Technology, United States; ²National Institute for Materials Science, Japan

11:15 AM EQ10.20.12

Deterministic Inverse Design of Lithography-Free, Tamm Plasmon Thermal Emitters with Multi-Resonant Control Mingze He¹, Joshua Nolen¹, Josh Nordlander², Angela Cleri², Nathaniel McLlwayne², Yucheng Tang¹, Guanyu Lu¹, Thomas G. Folland³, Bennett Landman¹, Jon-Paul Maria² and Joshua D. Caldwell¹; ¹Vanderbilt University, United States; ²The Pennsylvania State University, United States; ³The University of Iowa, United States

SESSION EQ10.21: Lasing and Radiation Engineering
Session Chairs: Junghyun Park and Maxim Shcherbakov
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, 316C

1:30 PM *EQ10.21.01

Tunable Photonic Metasurfaces: Fundamentals and Applications Maxim Shcherbakov; University of California, Irvine, United States

2:00 PM EQ10.21.02

Exciton-Polariton Lasing from Topologically Protected States Fabrizio Riminucci¹, Vincenzo Ardizzone², Daniele Sanvitto³ and Stefano Cabrini¹;
¹Lawrence Berkeley National Laboratory, United States; ²CNR Nanotec, Italy

2:15 PM EQ10.21.04

Metaphotonics for Advanced Imaging Techniques—Electrically Tunable Varifocal Metalens and 3D Flash LiDAR Inki Kim¹ and Junsuk Rho^{2,2};
¹Sungkyunkwan University, Korea (the Republic of); ²Pohang University of Science and Technology, Korea (the Republic of)

2:30 PM EQ10.21.05

Manufacturing a Plasmonic Nanotemplate to Modify the Optical Response and Reinforce the Plasmon-Phonon Coupling in Silicon Dioxide Maria C. Garcia Toro¹, Joseph Graham¹, Miguel L. Crespillo², Jose Olivares² and Ovidio Peña²; ¹Missouri University of Science and Technology, United States; ²Universidad Autonoma de Madrid, Spain

2:45 PM BREAK

3:15 PM *EQ10.21.06

Next Step of Tunable Metasurface—Time to Consider Efficiency and Purity Junghyun Park, Byung Gil Jeong, Sun Il Kim, Minkyung Lee, Kyoungho Ha and Hyuck Choo; Samsung Advanced Institute of Technology, Korea (the Republic of)

3:45 PM EQ10.21.07

Reconfigurable Complex Photonic Systems for Secure Cryptographic Primitives Sara Nocentini^{1,2}, Diederik S. Wiersma^{1,2,3} and Francesco Riboli^{2,4};
¹National Institute for Metrological Research, Italy; ²European Laboratory for Nonlinear Spectroscopy, Italy; ³Università degli Studi di Firenze, Italy; ⁴CNR-INO, Italy

4:00 PM EQ10.21.08

Engineering of Large-Scale Plasmonic Networks for Collective Emission René Iseli¹, Matthias Saba¹, Ilja Gunkel¹, Bodo Wilts^{2,1}, Ullrich Steiner¹, Jean-Jacques Greffet³, Cedric Kilchoer¹, Cédric Schumacher¹ and Doha Abdelrahman¹; ¹Adolphe Merkle Institut, Switzerland; ²University of Salzburg, Austria; ³Université Paris-Saclay, Institut d'Optique, France

4:15 PM EQ10.21.09

Sensing Spatially Structured Non-Paraxial Light Fields Eileen Otte^{1,2,2}, Bart Jan Ravoo², Cornelia Denz² and Mark L. Brongersma¹; ¹Stanford University, United States; ²University of Muenster, Germany

SESSION EQ10.22: Advances in Metasurfaces, Metamaterials and Plasmonics
Session Chairs: Arseniy Kuznetsov and Junsuk Rho
Monday Morning, May 23, 2022
EQ10-Virtual

8:00 AM *EQ10.22.01

Salient Features of Space-Time Metastructures Nader Engheta; University of Pennsylvania, United States

8:30 AM *EQ10.22.02

Non-Hermitian Topological Metasurfaces Based on Photonic-Plasmonic Hybrid Resonators Frank Yang^{1,2}, Ciril Samuel Prasad¹, Weijian Li¹, Rosemary Lach¹ and Guru V. Naik¹; ¹Rice University, United States; ²California Institute of Technology, United States

9:00 AM EQ10.22.03

Promoting Excitation of Triplet State of Molecule by Enhanced Magnetic Field of Dielectric Metasurfaces Hiroshi Sugimoto¹, Hiroaki Hasebe¹, Taniyuki Furuyama² and Minoru Fujii¹; ¹Kobe University, Japan; ²Kanazawa University, Japan

9:15 AM EQ10.22.04

Broadband Electromagnetic Absorber Based on 3D Conical Helix Metamaterials Eri Igarashi¹, Nobuhiko Umezumi¹ and Takuo Tanaka^{2,3}; ¹Sony Group Corporation, Japan; ²Tokushima University, Japan; ³RIKEN, Japan

9:30 AM EQ10.22.05

Fundamental Thickness Bounds for Wide-Field-of-View Metalenses Shiyu Li and Chia Wei Hsu; University of Southern California, United States

9:45 AM EQ10.22.06

Electron Transfer Kinetics Using GHz Scanning Tunnelling Electrochemical Microscope Mohamed Awadein¹, Simon Grall², Ferry Kienberger¹, Nicolas Clement² and Georg Gramse³; ¹Keysight Technologies, Austria; ²Institute of Industrial Science University of Tokyo, Japan; ³Johannes Kepler Universität Linz, Austria

SESSION EQ10.23: Active Control
Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee
Monday Morning, May 23, 2022
EQ10-Virtual

10:30 AM *EQ10.23.02

Light-Absorption in Nano-Antennas—From Self-Heating to Reconfigurable Metasurfaces [Giulia Tagliabue](#); École Polytechnique Fédérale de Lausanne, Switzerland

11:00 AM EQ10.23.03

Tunable Metasurfaces Based on Charge Density Waves in 1T-TaS₂ [Weijian Li](#) and [Guru V. Naik](#); Rice University, United States

SESSION EQ10.24: Zero-Index Material
Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee
Monday Afternoon, May 23, 2022
EQ10-Virtual

1:00 PM *EQ10.24.01

Anomalous Electromagnetic Tunneling with Bianisotropic Zero Index Media [Shuang Zhang](#); The University of Hong Kong, Hong Kong

1:30 PM EQ10.24.02

Phase Gradient Gap Surface Plasmon Metasurface for Anomalous Beam Steering and Surface Plasmon Polariton Coupling for Visible to the Infrared Spectrum with the Anisotropic Nanoantenna [Hosna A. Sultana](#); University of Alabama, United States

1:45 PM EQ10.24.03

Magic-Angle Flat Bands and Light Localization in Bilayer Honeycomb Photonic Crystals with A Small Twist [Kaichen Dong](#)^{1,2}, [Tiancheng Zhang](#)^{1,3}, [Jiachen Li](#)^{1,2}, [Qingjun Wang](#)¹, [Fuyi Yang](#)¹, [Yoonsoo Rho](#)¹, [Danqing Wang](#)^{1,2}, [Costas Grigoropoulos](#)¹, [Junqiao Wu](#)^{1,2} and [Jie Yao](#)^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Peking University, China

2:00 PM EQ10.24.04

Self-Assembly of Colloidal Nanoparticles into Encapsulated Hollow Superstructures [Chaolumen Wu](#), [Zhiwei Li](#) and [Yadong Yin](#); University of California, Riverside, United States

2:15 PM *EQ10.24.05

Metaoptics for Active Photonics [Federico Capasso](#); Harvard University, United States

SESSION EQ10.25: Fundamental of Plasmonics and Metaphotonics
Session Chairs: Viktoriia Babicheva and Ho Wai (Howard) Lee
Monday Afternoon, May 23, 2022
EQ10-Virtual

4:00 PM *EQ10.25.01

Peptide Induced Chirality in Single Gold Nanoparticle [Ki Tae Nam](#); Seoul National University, Korea (the Republic of)

4:30 PM EQ10.25.03

Plasmonic Nanostructures for Photothermal Conversion [Yadong Yin](#); University of California, Riverside, United States

4:45 PM EQ10.25.04

Template-Assisted Capillary-Assembly of Crystalline Silicon Nanoparticles for All-Dielectric Nanoantenna [Hidemasa Negoro](#)¹, [Hiroshi Sugimoto](#)^{1,2} and [Minoru Fujii](#)¹; ¹Kobe university, Japan; ²JST-PRESTRO, Japan

5:00 PM EQ10.25.05

Fluorophore Induced Plasmonic Current (FIPC) Detection with Mixed Metal Nanoparticle Films [Dan Pierce](#)^{1,2}; ¹University of Maryland, United States; ²Institute of Fluorescence, United States

5:15 PM EQ10.25.06

Active Plasmonic Color Tuning of Self-Assembled Ag Nanocube Monolayer [Ayana Mizuno](#)^{1,2} and [Atsushi Ono](#)¹; ¹Shizuoka University, Japan; ²JSPS Research Fellow, Japan

5:30 PM EQ10.25.07

Plasmon-Induced Hot Carriers for Photocatalytic CO₂ Reduction with Au/p-GaN Heterostructures [Wen-Hui Cheng](#)^{1,2}, [Rengui Li](#)^{3,2}, [Matthias Richter](#)², [Joseph S. DuChene](#)^{4,2}, [Wenming Tian](#)³, [Can Li](#)³ and [Harry A. Atwater](#)²; ¹National Cheng Kung University, Taiwan; ²California Institute of Technology, United States; ³Dalian Institute of Chemical Physics, China; ⁴University of Massachusetts Amherst, United States

5:45 PM *EQ10.20.01

Rapid Prototyping of Optical Fourier Surfaces and Volumes [Seungwoo Lee](#); Korea University, Korea (the Republic of)

SESSION EQ10.26: Metasurfaces and Metamaterials V
Session Chairs: Arseniy Kuznetsov, Yu-Jung Lu and Junsuk Rho
Monday Afternoon, May 23, 2022
EQ10-Virtual

9:00 PM *EQ10.26.01

Ultrafast Pulse Compression and High-Purity Vortex Beam Generation with Dielectric Metasurfaces Yao-Wei Huang^{1,2}, Marcus Ossiander², Hend Sroor³, Andrew Forbes³ and Federico Capasso²; ¹National Yang Ming Chiao Tung University, Taiwan; ²Harvard University, United States; ³University of the Witwatersrand, South Africa

9:30 PM EQ10.26.02

Use of Si as Low-Loss Thermo-Optical Material for Spectrally Demanding Narrowband IR Devices David Hernandez Pinilla¹, Ngo Duc Thien^{1,2}, Ørjan S. Handegård^{1,2}, Toan P. Tran^{1,2}, Naoki Furuhashi¹ and Tadaaki Nagao^{1,2}; ¹National Institute for Materials Science, Japan; ²Hokkaido University, Japan

9:45 PM EQ10.26.03

Sodium Surface Lattice Plasmons Ankun Yang; Oakland University, United States

10:00 PM EQ10.26.04

Monosaccharide-Mediated Rational Synthesis of a Universal Plasmonic Platform with Broad Spectral Fluorescence Enhancement for High-Sensitivity Cancer Biomarker Analysis Mengyao Liu, Yonghong Li, Wei Xing and Jiang Yang; Sun Yat-sen University Cancer Center, China

10:15 PM *EQ10.26.06

Optimal Polarization Conversion Using a Toroidal-Fano-Resonant Metasurface Amir Hassanirozi, Po-Sheng Huang, Shih-Hsiu Huang, Yu-Tsung Lin and Pin Chieh Wu; National Cheng Kung University, Taiwan

SESSION EQ10.27: Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects I
Session Chairs: Min Seok Jang and Ho Wai (Howard) Lee
Tuesday Morning, May 24, 2022
EQ10-Virtual

8:00 AM *EQ10.27.01

Complex-Amplitude Metasurfaces for Orbital Angular Momentum Holography and Broadband Focusing Stefan A. Maier^{1,2}; ¹LMU Munich, Germany; ²Imperial College London, United Kingdom

8:30 AM *EQ10.27.02

Plasmon-Enhanced Solar-Driven Hydrogen Evolution Using Transition Metal Nitride Metasurface Broadband Absorbers Yu-Jung Lu^{1,2}; ¹Academia Sinica, Taiwan; ²National Taiwan University, Taiwan

9:00 AM *EQ10.27.03

Autonomous Sensing by Intelligent Meta-Lens Array Din-Ping Tsai, Mu Ku Chen, Xiaoyuan Liu, Yubin Fan, Jin Yao, Jincheng Zhang and Linshan Sun; City University of Hong Kong, Hong Kong

9:30 AM EQ10.27.04

Plasmon-Enhanced Photoresponse of Monolayer MoS₂ Phototransistor Integrated with Refractory Metasurfaces Wei-Ren Syong¹, Yu-Chia Chen¹, Chen-Yang Lin¹, Yu-Cheng Chu¹, Li-Chien Chang¹, Chi-Te Liang² and Yu-Jung Lu^{1,2}; ¹Academia Sinica, Taiwan; ²National Taiwan University, Taiwan

9:45 AM EQ10.27.05

Cellulose Janus Structure with Self-Adaptive Optical Heating and Drying Subham Dastidar, Md Meheeb Alam, Xavier Crispin, Dan Zhao and Magnus P. Jonsson; Linköping University, Sweden

SESSION EQ10.28: Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects II
Session Chair: Ho Wai (Howard) Lee
Tuesday Morning, May 24, 2022
EQ10-Virtual

10:30 AM *EQ10.28.01

Metasurface-Embedded Ultracompact On-Chip Spectrometer for Mobile Applications Young-Geun Roh, Hyochul Kim, Unjeong Kim, Jaesoong Lee, Sooyeon Lee and Hyuck Choo; SAIT, Samsung Electronics, Korea (the Republic of)

11:00 AM EQ10.28.02

Development of Gap-Plasmon-Enhanced NbN Superconducting Photodetectors and Its Applications Jingwei Yang¹, Tzu-Yu Peng^{1,2}, Li-Chien Chang^{1,2}, Yu-Cheng Chu^{1,2}, Jia-Wern Chen¹, Wei-Ren Syong¹ and Yu-Jung Lu^{1,2}; ¹Academia Sinica, Taiwan; ²National Taiwan University, Taiwan

11:15 AM EQ10.25.02

Spectrally-Selective Long Infrared Dielectric Meta-Absorber for Thermal Camouflage Buket Akin^{1,2} and Arash Ahmadvand^{3,4}; ¹Istanbul Technical University, Turkey; ²Turkish Aerospace, Turkey; ³Metamaterial Technologies Inc. (META), United States; ⁴Rice University, United States

11:30 AM *EQ10.14.04

Software Defined Meta-Optics Arka Majumdar; University of Washington, Seattle, United States

12:00 PM *EQ10.10.01

Applications of Epsilon-Near-Zero (ENZ) Materials to Quantum Devices Jeremy N. Munday; University of California, Davis, United States

##PAGE_BREAK##

SYMPOSIUM EQ11

Neuromorphic Computing and Biohybrid Systems—Materials and Devices for Brain-Inspired Computing, Adaptive
Biointerfacing and Smart Sensing
May 9 - May 24, 2022

Symposium Organizers

Yiyang Li, University of Michigan
Francesca Santoro, Istituto Italiano di Tecnologia
Ilia Valov, Research Center Juelich
Yoeri van de Burgt, Technische Universiteit Eindhoven

* Invited Paper

SESSION EQ11.01: Novel Materials I
Session Chairs: Yiyang Li and Yoeri van de Burgt
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 318A

10:30 AM *EQ11.01.01

Volatile and Nonvolatile Resistive Switching Devices for Spike-Based Sensing and Learning [Daniele Ielmini](#); Politecnico di Milano, Italy

11:00 AM EQ11.01.03

Towards Metal Oxide Networks as Synaptic Materials [Alexandra Berg](#) and Beatriz Noheda; University of Groningen, Netherlands

SESSION EQ11.02: Novel Materials II
Session Chairs: Seyoung Kim, Yiyang Li and Ilia Valov
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 318A

1:30 PM *EQ11.02.01

Recent Progress in Resistive Memory Device Technologies for AI Computations [Seyoung Kim](#); Pohang University of Science and Technology, Korea (the Republic of)

2:00 PM EQ11.02.02

Reconfigurable MoS₂ Memtransistors for Continuous Learning in Spiking Neural Networks [Stephanie Liu](#)¹, Jiangtan Yuan¹, Ahish Shylendra², Vinod K. Sangwan¹, Amit R. Trivedi² and Mark C. Hersam¹; ¹Northwestern University, United States; ²University of Illinois at Chicago, United States

2:15 PM EQ11.02.03

Two-Dimensional Hetero-Memristors Based Stochastic Neurons for Temperature-Dependent Boltzmann Machine [Jiahui Ma](#)¹, Xiaodong Yan¹, Tong Wu², Aoyang Zhang¹, Jiangbin Wu¹, Matthew Chin³, Zhihan Zhang⁴, Madan Dubey³, Wei Wu¹, Mike Shuo-Wei Chen¹, Jing Guo² and Han Wang^{1,1}; ¹University of Southern California, United States; ²University of Florida, United States; ³U.S. Army Research Laboratory, United States; ⁴Georgia Institute of Technology, United States

2:30 PM EQ11.02.04

Stencil-Printed, Flexible Cyrene-Graphene Electrocardiography (ECoG) Arrays [Jia Hu](#)¹, Ridwan F. Hossain¹, Zahra Navabi¹, Alana Tillery², Michael Laroque¹, Preston D. Donaldson¹, Sarah L. Swisher¹ and Suhasa Kodandaramaiah^{1,1,1}; ¹University of Minnesota Twin Cities, United States; ²Johns Hopkins University, United States

2:45 PM EQ11.02.05

Energy Efficient Bio-Compatible Graphene Artificial Synaptic Transistors for Accurate Neuromorphic Computing [Samuel Liu](#)¹, Dmitry Kireev¹, Harrison Jin¹, Tianyao P. Xiao², Christopher Bennett², Deji Akinwande¹ and Jean Anne Incorvia¹; ¹The University of Texas at Austin, United States; ²Sandia National Laboratories, United States

3:00 PM BREAK

3:30 PM *EQ11.02.07

Ion Tunable Electronic Materials Systems for Neuromorphic Computing [A. A. Talin](#); Sandia National Laboratories, United States

4:00 PM EQ11.02.09

Memristively Programmable Transistors Stefan Tappertzhofen and [Raphael D. Ahlmann](#); TU Dortmund University, Germany

SESSION EQ11.03: Resistive Switching I
Session Chairs: Catherine Graves and Ilia Valov
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 318A

8:30 AM *EQ11.03.01

Characterization of Memory Devices for Energy Efficient Analog In-Memory Neural Computing at the Edge [Matthew Marinella](#)^{1,2}, Tianyao P. Xiao¹, Christopher Bennett¹, William Wahby¹, Robin Jacobs-Gedrim¹, David Hughart¹, Elliot Fuller¹, A. A. Talin¹ and Sapan Agarwal¹; ¹Sandia National Laboratories, United States; ²Arizona State University, United States

9:00 AM EQ11.03.02

Highly Improved Resistance Controllability in the Cu-Cone Structure Inserted Conductive Bridge Random Access Memory for Synaptic Device Application [Haejin Kim](#) and Cheol Seong Hwang; Department of Materials Science and Engineering and Inter-University Semiconductor Research Center, Seoul National University, Korea (the Republic of)

9:15 AM EQ11.03.03

Controlling the Oxygen Ion Motion Using a Diffusion Barrier Layer in HfO_x-Based Analog Memory [Fabia Farlin Athena](#), Matthew P. West, Qi Jiang, Wolfgang Buchmaier, Jinho Hah, Robert Montgomery, Riley Hanus, Samuel Graham and Eric M. Vogel; Georgia Institute of Technology, United States

9:30 AM EQ11.03.04

Monolithic Fabrication of 1S-1R Crossbar Array Using Single Ge₂Te_{1-x} Material by Controlling Composition Between Memory and Threshold Switching for Neuromorphic Application [Sang-Heon Park](#), Jihye Lee, Deok-Jin Jeon and Jong-Souk Yeo; Yonsei University, Korea (the Republic of)

9:45 AM BREAK

10:15 AM *EQ11.03.05

La₂NiO_{4+δ}—A New Mixed Conducting Oxide for Analogue Memristive Devices [Mónica Burriel](#)¹, Khanh Khuu^{1,2}, Klaasjan Maas¹, Gauthier Lefevre², Carlos Moncasi¹, Fabrice Wilhelm³, Serge Blonkowski⁴, Eric Jalaguier⁴, Ahmad Bsiesy² and Carmen Jiménez¹; ¹Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, France; ²Univ. Grenoble Alpes, CNRS, CEA/LETI Minatec, LTM, France; ³European Synchrotron Radiation Facility (ESRF), France; ⁴Univ. Grenoble Alpes, CEA, LETI, France

10:45 AM EQ11.03.06

Enhanced Resistive Switching in Complex Oxide Interfacial Memristors by Device Downscaling [Anouk S. Goossens](#), Majid Ahmadi, Divyanshu Gupta, Ishitro Bhaduri, Bart J. Kooi and Tamalika Banerjee; University of Groningen, Netherlands

11:00 AM EQ11.03.07

Vertically Stacked Memristor Configuration with Individual Half-Cell Tunability [Vasileios Manouras](#), Spyros Stathopoulos and Themis Prodromakis; University of Southampton, United Kingdom

SESSION EQ11.04: Resistive Switching II
Session Chairs: Mónica Burriel and Yiyang Li
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 318A

1:30 PM *EQ11.04.01

In-Memory Computing with Memristor Circuit Primitives [Catherine E. Graves](#); Hewlett Packard Laboratories, United States

2:00 PM *EQ11.04.02

High-Performance Neuromorphic Optimization with Analog Nonvolatile Memory Circuits [Dmitri Strukov](#); University of California, Santa Barbara, United States

2:30 PM EQ11.04.03

Visualizing Thermally Activated Memristive Switching in Percolating Networks of Solution-Processed 2D Semiconductors [Vinod K. Sangwan](#), Sonal Rangnekar, Jooheon Kang, Jie Gu, Haihua Wang and Mark C. Hersam; Northwestern University, United States

2:45 PM BREAK

3:00 PM EQ11.04.04

Physical Modeling of Conductive Filament Growth and Resistive Switching Dynamics in Metal Oxide-Based RRAM Kena Zhang¹, Panchapakesan Ganesh² and [Ye Cao](#)¹; ¹The University of Texas at Arlington, United States; ²Oak Ridge National Laboratory, United States

3:15 PM EQ11.04.05

Fully-Printed Ag/TiO₂/Ag Electronic Synapses for Brain-Inspired Computing [Varvara Salonikidou](#)^{1,2}, Adnan Mehonic³, Yasunori Takeda⁴, Jonathan England¹, Judith MacManus-Driscoll², Shizuo Tokito³ and Radu A. Sporea¹; ¹University of Surrey, United Kingdom; ²University of Cambridge, United Kingdom; ³University College London, United Kingdom; ⁴Yamagata University, Japan

3:30 PM EQ11.04.06

Reset Condition Effects on the Analog Pulsing of HfO_x-Based Neuromorphic Devices [Matthew P. West](#)¹, Georges Pavlidis², Fabia Farlin Athena¹, Andrea Centrone² and Eric M. Vogel¹; ¹Georgia Institute of Technology, United States; ²National Institute of Standards and Technology, United States

SESSION EQ11.05: Poster Session I: Neuromorphic Computing, Biointerfacing, and Smart Sensing I

Session Chairs: Yiyang Li and Ilia Valov

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ11.05.01

Memristive Neuron Based on Silicon Oxide Nanorod Structure for Probabilistic Computing Applications [Sanghyeon Choi](#)¹, Gwangsu Kim^{1,2}, Jehyeon Yang¹, Haein Cho¹, Chong Yun Kang^{1,2} and Gunuk Wang¹; ¹Korea University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

EQ11.05.03

Assessment of Charge Trap Memory for Synaptic Transistor Through Trap Time Control [Eunseo Jo](#) and Youseung Rim; Sejong University, Korea (the Republic of)

EQ11.05.06

Investigation on Effect of Defective Interface Using Solution Process for IGZO Optical Synaptic Transistor [Jusung Chung](#), Kyungho Park, Jong Bin An, Dong Hyun Choi and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

EQ11.05.09

Multi-Scale Modeling of Charge Dynamics in a Neuromorphic Device Based on PEDOT:PSS [Zhongquan Chen](#) ^{1,2}; ¹Eindhoven University of Technology, Netherlands; ²Technische Universiteit Eindhoven, Netherlands

EQ11.05.10

Understanding Behavior of Oxygen Vacancies in Perovskite-Based Memristor Hyoung Gyun Kim¹, [Sanghyo Lee](#)¹, Ventaka R. Nallagatla², Chang Uk Jung², Deok-Hwang Kwon³ and Miyoung Kim¹; ¹Seoul National University, Korea (the Republic of); ²Hankuk University of Foreign Studies, Korea (the Republic of); ³Korea Institute of Science and Technology, Korea (the Republic of)

EQ11.05.11

Realization of Long-Term Plasticity in Ion-Gel Gated Monolayer Graphene Synaptic Transistor [Gyeong-Tak Go](#), Wanhee Lee and Tae-Woo Lee; Seoul National University, Korea (the Republic of)

EQ11.05.12

Liquid-Type Artificial Synaptic Devices with Low Power Consumption [Dongshin Kim](#), Ik-Jyae Kim and Jang-Sik Lee; Pohang University of Science and Technology, Korea (the Republic of)

SESSION EQ11.06: Organic Materials and Biohybrid Approaches I

Session Chairs: Francesca Santoro and Yoeri van de Burgt

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 318A

8:30 AM *EQ11.06.01

Recent Developments in Organic-Based Artificial Synapses—From Protons and Electrons to Robots [Alberto Salleo](#); Stanford University, United States

9:00 AM *EQ11.06.02

Organic Neuromorphic Electronics [Paschalis Gkoupidenis](#); Max Planck Institute for Polymer Research, Germany

9:30 AM EQ11.06.03

Evolvable Transistors for Machine Learning [Jennifer Gerasimov](#), Robert Forchheimer, Vivek Hitaishi, Deyu Tu and Simone Fabiano; Linköping University, Sweden

9:45 AM EQ11.06.04

Towards Biomimetic Biohybrid Synapses—Investigating the Role of Artificial Biomembranes Fluidity on Neuromorphic Short-Term Plasticity [Claudia Lubrano](#)^{1,2}, Ugo Bruno^{1,2}, Chiara Ausilio¹ and Francesca Santoro¹; ¹Istituto Italiano di Tecnologia, Italy; ²University of Naples Federico II, Italy

10:00 AM BREAK

10:15 AM *EQ11.06.05

Simulation and Implementation of Multi-Gate OECT Reservoir Computing Circuits [Sean E. Shaheen](#), Jake C. Perez, Vidyacharan G. Venkata, Nicholas W. Landry, Robert B. MacCurdy and Juan G. Restrepo; University of Colorado-Boulder, United States

10:45 AM EQ11.06.06

Additive Manufacturing Organic Neuromorphic Devices and Neural Networks [Tanyaradzwa Mangoma](#)^{1,2}, George G. Malliaras² and Ronan Daly¹;
¹Institute for Manufacturing, University of Cambridge, United Kingdom; ²University of Cambridge, United Kingdom

11:00 AM EQ11.06.08

Pristine Leaf-Based Electrochemical Resistive Switching Device [Ramesh Adhikari](#), Nicole E. Harmon and K. Paige Williams; Colgate University, United States

SESSION EQ11.07: Organic Materials and Biohybrid Approaches II

Session Chair: Paschalis Gkoupidenis

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 318A

1:30 PM *EQ11.07.01

Organic Electrochemical Neurons and Synapses for Neuromorphic Applications [Simone Fabiano](#); Linköping University, Sweden

2:00 PM EQ11.07.02

Bio-Implantable Mussel Protein-Based Flexible Neuromorphic Memristor [Sung Min Rho](#), Kunho Moon, Dong Hyun Choi, Sujin Jung and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

2:15 PM EQ11.07.03

Droplet Based Microfluidic Crossbar Array for Biomolecular Memristors [Nicholas X. Armendarez](#)¹, Razuan Hossain², Sakib Hasan² and Joseph Najem¹; ¹The Pennsylvania State University, United States; ²The University of Mississippi, United States

2:30 PM BREAK

3:00 PM *EQ11.07.04

Employing the Non-Linear Properties of Organic Electrochemical Transistors to Build Brain-Inspired Artificial Intelligence [Hans Kleemann](#); Technische Universität Dresden, Germany

3:30 PM EQ11.07.05

Functional Biomembranes in Organical Electrochemical Transistor—Analysis, Modelling and Working Regimes [Ugo Bruno](#)^{1,2}, Claudia Lubrano^{1,2}, Chiara Ausilio¹ and Francesca Santoro¹; ¹Italian Institute of Technology, Italy; ²Università degli Studi di Napoli Federico II, Italy

SESSION EQ11.08: Poster Session II: Neuromorphic Computing, Biointerfacing, and Smart Sensing II

Session Chairs: Francesca Santoro and Yoeri van de Burgt

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

EQ11.08.01

Deep Learning-Based Flexible Piezoelectric Acoustic Sensors with Noise-Robust Voice Coverage for Speech Processing [Young Hoon Jung](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

EQ11.08.02

Logic Application in Biological Crossbar Neuron Network Using STDP learning Yonghee Bae, KyoSeok Lee, Sun-Mi Lee and [Kyung-Hwa Yoo](#); Yonsei University, Korea (the Republic of)

EQ11.08.03

A Biohybrid Neural Interface—Human-Derived Supported Lipid Bilayers as a Biological Intermediary [Malak Kawan](#), Yi-Lin Yu, Alejandro Carnicer Lombarte, Sam Hilton, Sagnik Mridha, George G. Malliaras and Damiano G. Barone; University of Cambridge, United Kingdom

EQ11.08.04

Neuromorphic Devices Based on Biocompatible and Biodegradable Silibinin from Milk Thistle Extracts for Implantable Bioelectronics [Dong Hyun Choi](#), Hyung Tae Kim, Kyungho Park, Min Seong Kim and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

EQ11.08.05

Artificial Broadband Light Perception by Optical Neuromorphic Transistor Based on Indium–Gallium–Zinc Oxide Using Bi₂Se₃ [Hyung Tae Kim](#), Dong Hyun Choi, Min Seong Kim, Hyukjoon Yoo and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

EQ11.08.07

Navigating Through the Phase Diagram of a Mott Insulator by Substrate-Induced Strain [Eti Barazani](#)¹, Javier del Valle², Pavel Salev³, Ivan K. Schuller³ and Yoav Kalcheim¹; ¹Technion, Israel; ²University of Geneva, Switzerland; ³University of California, San Diego, United States

EQ11.08.08

Patterning and Encapsulation of Organic Optoelectronic Devices for Interfacing Neurons [Sofia Drakopoulou](#)¹, Camille Cumin¹, John de Mello² and Shahab Rezaei-Mazinani¹; ¹EMSE, France; ²Norwegian University of Science and Technology, Norway

EQ11.08.09

Concurrent Optimization of Electrical and Thermal Performances of Ovonic Threshold Switching Si-Ge-Te-N Selector Device for Neuromorphic Applications Chaebin Park, Sang-Heon Park, Deok-Jin Jeon and Jong-Souk Yeo; Yonsei University, Korea (the Republic of)

SESSION EQ11.09: Phase-Change Memory
Session Chairs: Ilia Valov and Yoeri van de Burgt
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 318A

8:30 AM *EQ11.09.01

Developing analog hardware for cloud and edge computing Stefano Ambrogio; IBM Almaden Research Ctr, United States

9:00 AM EQ11.09.02

Novel Nanocomposite and Superlattice Materials Enabling Energy-Efficient Neuro-Inspired Phase Change Memory Asir Intisar Khan¹, Heshan Yu², Heungdong Kwon¹, Alwin Daus¹, Christopher Perez¹, Mehdi R. Asheghi¹, H.-S. Phillip Wong¹, Kenneth E. Goodson¹, Ichiro Takeuchi² and Eric Pop^{1,1}; ¹Stanford University, United States; ²University of Maryland, United States

9:15 AM EQ11.09.03

Suppressed Electronic Contribution in Thermal Conductivity of Ge₂Sb₂Se₄Te Kiumars Aryana¹, Yifei Zhang², John Tomko¹, Md Shafkat Bin Hoque¹, Eric R. Hoglund¹, David Olson¹, Joyeeta Nag³, John C. Read³, Carlos Rios⁴, Juejun Hu² and Patrick E. Hopkins¹; ¹University of Virginia, United States; ²Massachusetts Institute of Technology, United States; ³Western Digital Corporation, United States; ⁴University of Maryland, United States

9:30 AM EQ11.09.04

Effect of Ge-Incorporation on the Thermal Stability of Ge,Sb,Te_x Phase Change Alloys for Neuromorphic Devices with Automotive Applications Adriano Diaz Fattorini, Francesco De Nicola, Marco Bertelli, Sara De Simone, Valentina Mussi, Raffaella Calarco and Massimo Longo; CNR-IMM, Italy

9:45 AM BREAK

SESSION EQ11.10: Novel Approaches
Session Chairs: Ilia Valov and Yoeri van de Burgt
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 318A

10:15 AM *EQ11.10.01

Material Learning with Dopant Network Processing Units Wilfred G. van der Wiel^{1,2}; ¹University of Twente, Netherlands; ²University of Münster, Germany

10:45 AM EQ11.10.02

On-Site Trainable Biosensor and Locally Adaptive Sensing Based on Organic Neuromorphic Circuits Eveline van Doremale and Yoeri van de Burgt; Technische Universiteit Eindhoven, Netherlands

11:00 AM EQ11.10.03

Integration of Spiking Neurons with Electrochemical Transistors Using a Photopatternable Solid Electrolyte Anton Weissbach¹, Hsin Tseng¹, Laurie Calvet², Hans Kleemann¹ and Karl Leo¹; ¹Technische Universität Dresden, Germany; ²Université Paris-Saclay, France

11:15 AM EQ11.10.04

Conformable, Internal Ion-Gated Organic Electrochemical Transistor (IGT) - Based Multiplexer with Megahertz Operation Claudia Cea, Zifang Zhao, Jennifer Gelinias and Dion Khodagholy; Columbia University, United States

SESSION EQ11.11: Metal Insulator Transitions
Session Chairs: Yiyang Li and Yoeri van de Burgt
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 318A

1:30 PM *EQ11.11.01

Nanoelectronic Activation Neurons for Full Hardware Implementation of Neural Networks Sangheon Oh, Shi Yuhan, Ivan K. Schuller and Duygu Kuzum; University of California, San Diego, United States

2:00 PM EQ11.11.02

Electronic Phase Transitions Induced Neuromorphic Functionalities in a Quasi-ID Chalcogenide BaTiS₃ Huandong Chen¹, Batyr Ilyas², Boyang Zhao¹, Emre Ergecen², Guodong Ren³, Bryan Chakoumakos⁴, Simon Teat⁵, Rohan Mishra³, Nuh Gedik² and Jayakanth Ravichandran¹; ¹University of Southern California, United States; ²Massachusetts Institute of Technology, United States; ³Washington University in St. Louis, United States; ⁴Oak Ridge National Laboratory, United States; ⁵Lawrence Berkeley National Laboratory, United States

2:15 PM EQ11.11.03

Investigation of Nb_xTi_{1-x}O₂ via EXAFS and Functional Correlation to Electrical Nanoscale Devices Karsten Beckmann^{1,2}, Mark Raymond¹, Martin Rodgers¹ and Nathaniel Cady²; ¹NY CREATES, United States; ²SUNY Polytechnic Institute, United States

2:30 PM EQ11.11.04

Dynamics of the Voltage-Triggered Insulator-to-Metal Transition Javier del Valle¹, Rodolfo Rocco², Nicolas Vargas³, Claribel Dominguez¹, Pavel Salev³, Yoav Kalcheim⁴, Coline Adda³, Jennifer Fowlic¹, Minhan Lee³, Lorenzo Fratino², Stefano Gariglio¹, Marcelo Rozenberg², Ivan K. Schuller³ and Jean-Marc Triscone¹; ¹University of Geneva, Switzerland; ²Université Paris-Sud, France; ³University of California, San Diego, United States; ⁴Technion-Israel Institute of Technology, Israel

2:45 PM EQ11.11.05

Temperature Perturbations Causing Temporally Stable Current Density Localization in VO₂ Adelaide Bradicich and Patrick Shamberger; Texas A&M University, United States

3:00 PM BREAK

3:30 PM EQ11.11.06

Modification of the MIT via Anisotropic Transport in Epitaxial Irradiated VO₂ Rebeca M. Gurrrola¹, Adelaide Bradicich¹, Patrick Shamberger¹ and Tzu-Ming Lu²; ¹Texas A&M University, United States; ²Sandia National Laboratories, United States

3:45 PM EQ11.11.07

WITHDRAWN (NO SHOW) EQ.11.11.07 Design and Modeling of Rare-Earth Nickelate Spiking Neurons for Neuromorphic Computing Olivia Schneble^{1,2}, Xing Sun¹, Marshall B. Tellekamp¹ and Jeremy Zimmerman²; ¹National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States

4:00 PM EQ11.11.08

Epitaxial Stabilization (< 500°C) and Degradation Mechanism (> 500°C) of VO_x Films Grown on Y-Stabilised ZrO Songhee Choi¹, Jaeseok Son^{2,3}, Junhyeob Oh⁴, Ji-Hyun Lee⁴, Jae Hyuck Jang¹ and Shinbuhm Lee¹; ¹Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of); ²Center for Correlated Electron Systems, Korea (the Republic of); ³Seoul National University, Korea (the Republic of); ⁴Korea Basic Science Institute, Korea (the Republic of)

SESSION EQ11.12: Ferroelectrics

Session Chair: Stefano Ambrogio

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 318A

8:30 AM EQ11.12.01

HZO FTJ analog NVM with Synaptic Plasticity for In-Memory Computing Nikitas Siannas^{1,2}, Christina Zacharaki^{1,2}, Polychronis Tsipas¹ and Athanasios Dimoulas¹; ¹National Centre of Scientific Research Demokritos, Greece; ²National and Kapodistrian University of Athens, Greece

8:45 AM EQ11.12.02

Resistive Switching in Epitaxial AlN and AlScN Thin Films on Si(111) Xiaoman Zhang¹, Nicholas J. Anderson¹, Andrew C. Meng² and Wen Jin Meng¹; ¹Louisiana State University, United States; ²University of Pennsylvania, United States

9:00 AM EQ11.12.03

Ferroelectric Analog Synaptic Transistors for Neuromorphic Applications Ik-Jyae Kim, Min-Kyu Kim, Dongshin Kim and Jang-Sik Lee; Pohang University of Science and Technology, Korea (the Republic of)

9:15 AM BREAK

SESSION EQ11.13: Sensors

Session Chair: Stefano Ambrogio

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 318A

10:30 AM EQ11.13.01

Fabrication of Gas-Sensitive Memristive Devices Raphael D. Ahlmann and Stefan Tappertzhofen; TU Dortmund, Germany

10:45 AM EQ11.13.02

Non von Neumann Multi-Input Spike Signal Processing Enabled by an Artificial Synaptic Multiplexer Dong Hae Ho¹, Dong Gue Roe¹, Yoon Young Choi², Seongchan Kim³, Youngjin Choi¹, Do Hwan Kim⁴, Sae Byeok Jo¹ and Jeong Ho Cho¹; ¹Yonsei University, Korea (the Republic of); ²University of Illinois at Urbana-Champaign, United States; ³SKKU, Korea (the Republic of); ⁴Hanyang University, Korea (the Republic of)

11:00 AM EQ11.13.03

Machine Vision with Programmable Floating-Gate Phototransistor for Color-Mixed Image Recognition Jun Tao and Rehan R. Kapadia; University of Southern California, United States

11:15 AM EQ11.13.04

Heterostructure Optoelectronic Neuromorphic Devices with Multi-Spectral Light Modulated Synaptic Behaviors Sung Soo Cho, Sung Min Kwon, Chanho Jo, Jongmin Lee, Jee Young Kwak and Sung Kyu Park; Chung-Ang University, Korea (the Republic of)

11:30 AM EQ11.13.05

Memory Formation and Mechanosensing in Neuromorphic Mechanical Metamaterials Katherine S. Riley¹, Juan C. Osorio¹, Harith Morgan¹, Stephen

A. Sarles², [Andres F. Arrieta](#)¹ and Subhadeep Koner²; ¹Purdue University, United States; ²The University of Tennessee, Knoxville, United States

SESSION EQ11.14: Neuromorphic Computing I
Session Chairs: Fabien Alibart and Yiyang Li
Monday Morning, May 23, 2022
EQ11-Virtual

8:00 AM *EQ11.14.01

Computing-in-Memory with Memristor—From Material Exploration to Device-System Co-Design [Huaqiang Wu](#) and [Jianshi Tang](#); Tsinghua University, China

8:30 AM *EQ11.14.02

Dynamic Memristors for Neuromorphic Computing [Yuchao Yang](#); Peking University, China

9:00 AM EQ11.14.03

Reduction of the Operating Current Range of Analog Resistive Switching in Pt/TaO_x/Ta₂O₅/Pt Cells by Controlling the Supply of Oxygen Vacancies [Toshiki Miyatani](#)¹, Tsunenobu Kimoto¹ and Yusuke Nishi^{1,2}; ¹Kyoto University, Japan; ²NIT Maizuru College, Japan

9:15 AM EQ11.14.04

Gradual Formation of Conductive Filaments in Resistive Switching Cells [Yusuke Nishi](#) and Takuya Yamanaka; National Institute of Technology, Japan

9:30 AM EQ11.14.05

Observation of (N-1)!/(ln2)^N Stable Coexisting Oscillations in Neuromorphic Central Pattern Generators [Alain Nogaret](#); Univ of Bath, United Kingdom

9:45 AM EQ11.05.07

Relaxed Synaptic Device Specifications for Neural Network Training with Tiki-Taka Algorithm [Kyungmi Noh](#)¹, Wonjae Ji¹, Chaeun Lee², Tayfun Gokmen³ and Seyoung Kim¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²NAVER Clova, Korea (the Republic of); ³IBM T.J. Watson Research Center, United States

SESSION EQ11.15: Neuromorphic Computing II
Session Chair: Yiyang Li
Monday Morning, May 23, 2022
EQ11-Virtual

10:30 AM *EQ11.15.01

“Lithionics” – On the Design of Lithium Oxides for Novel Neuromorphic Computing Functions [Jennifer L. Rupp](#); Technical University of Munich, Germany

11:00 AM *EQ11.15.02

From Bio-Sensing to Neuromorphic Engineering with Electropolymerized PEDOT:PSS Iono-Electronic Materials Mahdi Ghazal¹, Kamila Janzakova¹, Ankush Kumar¹, Corentin Scholaert¹, Yannick Coffinier¹, Sebastien Pecqueur¹ and [Fabien Alibart](#)^{2,1}; ¹IEMN-CNRS, France; ²LN2-3IT, Canada

11:30 AM EQ11.15.03

Electrothermal Simulations of Synchronization Dynamics of Coupled Beyond-CMOS Vanadium Dioxide Oscillators for Neuromorphic Computing Applications [Stefania Carapezzi](#), Corentin Delacour and Aida Todri-Sanial; LIRMM, University of Montpellier, CNRS, France

11:45 AM EQ11.15.04

van der Waals Epitaxy of Ge-Sb-Te Alloys—A Powerful Way to Design 2D Heterostructures for Neuromorphic Applications [Fabrizio Arciprete](#)^{1,2}, Jos Boschker^{2,3}, Stefano Cecchi², Eugenio Zallo^{2,4}, Valeria Bragaglia^{2,5} and Raffaella Calarco^{2,6}; ¹Univ of Rome-Tor Vergata, Italy; ²Paul-Drude-Institut für Festkörperelektronik, Germany; ³Ferdinand-Braun-Institut, Germany; ⁴Technische Universität München, Germany; ⁵IBM Research-Zurich, Switzerland; ⁶Istituto per la Microelettronica e Microsistemi (IMM), Consiglio Nazionale delle Ricerche (CNR), Italy

12:00 PM EQ11.15.05

Scalability and Functionality of 2- and 3-Terminals Back-End-of-Line Compatible Ferroelectric Synaptic Weights [Laura Bégon-Lours](#)¹, Mattia Halter^{1,2}, Donato Falcone¹, Youri Popoff^{1,2} and Bert Offrein¹; ¹IBM Research-Zurich, Switzerland; ²ETH Zürich, Switzerland

12:05 PM EQ11.15.06

A Phase Change Sb₂Te₃/Ge₂Sb₂Te₅/Ge Heterostructure for Neuromorphic Applications Raffaella Calarco¹, Adriano Diaz Fattorini¹, Francesco De Nicola¹, [Marco Bertelli](#)¹, Sara De Simone¹, Valentina Mussi¹, Massimo Longo¹, Giuseppe D'Arrigo¹, Inaki Lopez Garcia¹, Giuseppe Maida¹, Stefania Privitera¹, Massimo Borghi², Andrea Redaelli² and Marie-Claire Cyrille³; ¹Consiglio Nazionale delle Ricerche, Italy; ²STMicroelectronics, Italy; ³Commissariat à l'énergie atomique et aux énergies alternatives, France

SESSION EQ11.16: Neuromorphic Computing III
Session Chairs: Yiyang Li and Yoeri van de Burgt

Monday Afternoon, May 23, 2022
EQ11-Virtual

1:00 PM *EQ11.16.01

Towards Energy Efficient and Robust Neuromorphic Computing—Algorithm and Hardware Perspective Priyadarshini Panda; Yale University, United States

1:30 PM EQ11.16.02

Interface Formation During the Growth of Phase Change Materials Heterostructures Based on Ge-Rich Ge-Sb-Te Alloys Flavia Righi Riva¹, Caroline Chèze¹, Ernesto Placidi², Giulia Di Bella¹, Simone Prili¹, Adriano Diaz Fattorini³, Stefano Cecchi⁴, Massimo Longo³, Raffaella Calarco³, Marco Bernasconi⁵, Omar Abou El Kheir⁵ and Fabrizio Arciprete¹; ¹University of Rome Tor Vergata, Italy; ²Sapienza University of Rome, Italy; ³CNR Institute for Microelectronics and Microsystems-IMM, Consiglio Nazionale delle Ricerche, Italy; ⁴Paul-Drude-Institut für Festkörperelektronik, Germany; ⁵Department of Materials Science, University of Milano-Bicocca, Italy

1:45 PM EQ11.16.03

Transparent InGaZnO-Based Resistive Random Access Memory Fei Qin and Sunghwan Lee; Purdue University, United States

2:00 PM EQ11.16.04

Electric Field and Temperature Dependent Charge Transport in Stable Amorphous Ge₂Sb₂Te₅ Md Tashfiq Bin Kashem, Raihan Sayeed Khan, ABM Hasan Talukder, Faruk Dirisaglik, Ali Gokirmak and Helena Silva; University of Connecticut, United States

2:15 PM EQ11.16.05

Combinatorial Exploration of New Phase-Change Memory Materials with Enhanced Properties Heshan Yu¹, Changming Wu², Huairuo Zhang³, Asir Intisar Khan⁴, Albert Davydov³, Apurva Mehta⁵, Eric Pop⁴, Mo Li² and Ichiro Takeuchi¹; ¹University of Maryland, United States; ²University of Washington, United States; ³National Institute of Standards and Technology, United States; ⁴Stanford University, United States; ⁵Stanford Synchrotron Radiation Lightsource, United States

2:30 PM EQ11.16.06

Stopping Resistance Drift in Phase Change Memory Cells with Application of High Electric Field Stress at Cryogenic Temperatures Raihan Sayeed Khan, Md Tashfiq Bin Kashem, ABM Hasan Talukder, Faruk Dirisaglik, Helena Silva and Ali Gokirmak; University of Connecticut, United States

2:45 PM EQ11.16.07

Scalable Conductive Metal-Oxide/ fO₂-Based Bilayer ReRAMs for Analog In-Memory Computing Tommaso Stecconi, Youri Popoff, Donato Falcone, Roberto Guido, Antonio La Porta, Folkert Horst, Laura Bégon-Lours, Daniel Jubin, Bert Offrein and Valeria Bragaglia; IBM Research Europe Zurich, Switzerland

SESSION EQ11.17: Neuromorphic Computing IV
Session Chairs: Yiyang Li and Benjamin Tee
Tuesday Morning, May 24, 2022
EQ11-Virtual

8:00 AM *EQ11.17.01

Nanoionics Devices Enabling Various Performance, Such as Neuromorphic Functions Kazuya Terabe, Takashi Tsuchiya and Tohru Tsuruoka; NIMS, Japan

8:30 AM EQ11.17.03

A SiO_x Resistive Memory with Low Operating Voltages, Gradual Set/Reset Operation and High On-State Non-Linearity Sourodeep Roy, Shubham R. Pande, Bhaswar Chakrabarti and Enakshi Bhattacharya; Indian Institute of Technology Madras, India

8:45 AM EQ11.17.04

Optoelectronic Synapses for Neuromorphic Computing Using ITO/Nb-doped SrTiO₃ Memristor Yutaro Yamazaki, Yuta Hashimoto, Hiromasa Aoki and Kentaro Kinoshita; Tokyo University of Science, Japan

8:50 AM *EQ11.02.06

Energy-Efficient Electrochemical Synapses Based on Proton and Oxygen Motion Bilge Yildiz; Massachusetts Institute of Technology, United States

9:20 AM *EQ11.17.02

Scaling Electronic skins with Neuromorphic Engineering Benjamin C. Tee; National University of Singapore, Singapore

SESSION EQ11.18: Neuromorphic Computing V
Session Chairs: Yiyang Li and Ilia Valov
Tuesday Morning, May 24, 2022
EQ11-Virtual

10:30 AM *EQ11.18.01

Perspectives on Metal-Insulator Transitions in V₂O₃ Compounds and Their Potential Use in Resistive Switching and Neuromorphic Devices Mariela Menghini^{1,2}, Pia Homm², Andrea Ronchi^{3,2}, Paolo Franceschini^{3,2}, Jin Won Seo², Michele Fabrizio⁴, Claudio Giannetti³ and Jean Pierre Locquet²; ¹IMDEA Nanociencia, Spain; ²KU Leuven, Belgium; ³Università Cattolica del Sacro Cuore, Italy; ⁴Scuola Internazionale Superiore di Studi Avanzati, Italy

11:00 AM *EQ11.18.02

Prospects and Challenges of Area-Dependent Memristive Devices for Neuromorphic Computing [Regina Dittmann](#); Forschungszentrum Jülich GmbH, Germany

11:30 AM *EQ11.18.03

Soft Spiking Synaptic Circuits for Neural Interfaces Mohammad Javad Mirshojaeian Hosseini¹, Yi Yang¹, Aidan J. Prendergast¹, Elisa Donati^{2,3,4}, Giacomo Indiveri^{2,3,4}, Miad Faezipour¹ and [Robert A. Nawrocki](#)¹; ¹Purdue University, United States; ²Institute of Neuroinformatics, Switzerland; ³University of Zurich, Switzerland; ⁴ETH Zurich, Switzerland

12:00 PM *EQ11.18.04

Timing Selector—Using Transient Switching Dynamics to Solve the Sneak Path Issue of Crossbar Arrays [J. Joshua Yang](#); University of Southern California, United States

##PAGE_BREAK##

SYMPOSIUM MF01

Cutting-Edge Plasma Processes Contributing to Sustainable Development Goals
May 8 - May 24, 2022

Symposium Organizers

Jane Chang, University of California, Los Angeles
Masaharu Shiratani, Kyushu University
David Staack, Texas A&M University
Fumiyoshi Tochikubo, Tokyo Metropolitan University

* Invited Paper

SESSION Tutorial MF01.00: Introduction to Atmospheric-Pressure Plasma Processes for Energy, Environmental and Medical Applications
, NaN,

SESSION MF01.02: Plasmas for Sustainable Energy and Pollution Control II
Session Chairs: Nozomi Takeuchi and Fumiyoshi Tochikubo
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 319B

SESSION MF01.01: Plasmas for Sustainable Energy and Pollution Control I
Session Chairs: Fumiyoshi Tochikubo and Takayuki Watanabe
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 319B

1:45 PM MF01.01.01

Detailed Characterization of a Low-Temperature Plasma-Driven Ammonia Synthesis Process [Minseok Kim](#), Sohag Biswas, Giorgia Nava, Bryan M. Wong and Lorenzo Mangolini; University of California, Riverside, United States

2:00 PM MF01.01.02

Comparison of Efficiency for Decomposition of Perfluorooctane Sulfonic Acid (PFOS) by Various Types of Plasma in Contact with Liquid [Nozomi Takeuchi](#)¹, Shanshan Qing¹, Kiyotaka Okada², Takao Namihira² and Douyan Wang²; ¹Tokyo Institute of Technology, Japan; ²Kumamoto University, Japan

2:15 PM MF01.01.03

Removal of Metal Ions from Water Using Active Species in Oxygen Plasma [Sayma Khanom](#) and Nobuya Hayashi; Kyushu University, Japan

2:30 PM MF01.01.04

Investigation of Plasma Sulfonation Mechanism with Dilute Sulfuric Acid Siqi Deng¹, Nozomi Takeuchi¹, Junko Hieda², Katsuyuki Takahashi³, Kosuke Tachibana⁴ and Oi Lun H. Li⁵; ¹Tokyo institute of technology, Japan; ²Nagoya University, Japan; ³Iwate University, Japan; ⁴Oita University, Japan; ⁵Pusan National University, Korea (the Republic of)

SESSION MF01.03: Plasmas for Semiconductor Processes
Session Chairs: Jane Chang and Nathan Marchack
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 319B

1:30 PM *MF01.03.01

Towards Enhanced Sustainability in Future Plasma Processes Nathan Marchack, Hiroyuki Miyazoe, Luxherta Buzi, John Papalia, Hongwen Yan, Sebastian Engelmann and Robert Bruce; IBM T.J. Watson Research Center, United States

2:00 PM MF01.03.02

Transient Behaviors of Gaseous and Surface Reactions in a Cycle of Passivation and Etch Steps Using Ar-Based C₄F₈ and SF₆ Plasma Kenji Ishikawa, Taito Yoshie, Takayoshi Tsutsumi, Hiroki Kondo, Makoto Sekine and Masaru Hori; Nagoya University, Japan

2:15 PM *MF01.03.03

Achieving Angstrom-Level Control in Etch Processes to Enable Future Advanced Logic and Memory Technologies Catherine Labelle; Intel Corporation, United States

2:45 PM MF01.03.04

Bioinspired Multifunctional Nanopatterns Through Regenerative Secondary Mask Lithography Martyna Michalska, Sophia K. Laney, Tao Li, Mark Portnoi, Nicola Mordan, Elaine Allan, Manish K Tiwari, Ivan P. Parkin and Ioannis Papakonstantinou; University College London, United Kingdom

3:00 PM BREAK

3:30 PM *MF01.03.05

Plasma-Based (spatial) ALD for High-Volume, Low-Temperature Applications Erwin Kessels; Eindhoven Univ of Technology, Netherlands

4:00 PM MF01.03.06

High Capacitance MIM Capacitors with Crystallized TiO₂ Films by Plasma-Assisted Atomic Layer Annealing Seunghyeon Lee¹, Dohyun Go¹, Jeong Woo Shin¹, Keunhoi Kim^{2,1}, ChungMo Yang² and Jihwan An¹; ¹Seoul National University of Science and Technology, Korea (the Republic of); ²National NanoFab Center, Korea (the Republic of)

4:15 PM MF01.03.07

Nanofabrication of an On-Chip Direct Write Evaporator for Scanning Near-Field 3D Deposition Xella Doi^{1,2}, Pavani Vamsi K. Nittala^{1,2}, Suryakant Mishra^{1,2}, Linus Woodard^{1,2}, Sanjoy Sarkar^{1,2}, Kyaw Zin Latt², Ralu Divan² and Supratik Guha^{1,2}; ¹The University of Chicago, United States; ²Argonne National Laboratory, United States

SESSION MF01.04: Plasmas for Materials Processing I
Session Chairs: Mark Kushner and David Staack
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 319B

8:30 AM MF01.04.01

Stress Relaxation of Hydrogenated Amorphous Carbon Films by Incorporating Carbon Nanoparticles Using Plasma Chemical Vapor Deposition Kazunori Koga^{1,2}, Sunghwa Hwang¹, Shinjiro Ono¹, Daichi Yoshikawa¹, Takamasa Okumura¹, Naoto Yamashita¹, Kunihiro Kamataki¹, Naho Itagaki¹, Masaharu Shiratani¹, Jun-Seok Oh³, Susumu Takabayashi⁴ and Tatsuyuki Nakatani⁵; ¹Kyushu Univ., Japan; ²National Institutes of Natural Sciences, Japan; ³Osaka City University, Japan; ⁴National Institute of Technology, Ariake College, Japan; ⁵Okayama University of Science, Japan

8:45 AM MF01.04.02

Time-Resolved Ion and Electron Energy Distributions in a HiPIMS Discharge with Cathode Voltage Reversal David N. Ruzic¹, Zachary Jeckell¹, Wolfgang Huber², Thomas Houlahan², David Barlaz¹, Ian Haehnlein² and Brian Jurczyk²; ¹University of Illinois at Urbana Champaign, United States; ²Starfire Industries, LLC, United States

9:00 AM MF01.04.03

Amplitude Modulation Frequency Dependence of Ion Energy Distribution in Capacitively Coupled Discharge Plasma Studied by Particle-in-Cell/Monte Carlo Collision Method Iori Nagao¹, Akihiro Yamamoto¹, Kunihiro Kamataki¹, Daisuke Yamashita¹, Naoto Yamashita¹, Takamasa Okumura¹, Naho Itagaki¹, Kazunori Koga^{1,2} and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²National Institutes of Natural Sciences, Japan

9:15 AM MF01.04.04

2D Materials for the Investigation of Plasma-Surface Interaction Lorenzo Mangolini, Joseph Schwan, Fariborz Kargar, Alexander A. Balandin and Carla Berrospé Rodríguez; University of California, Riverside, United States

9:30 AM MF01.04.05

Time Resolved Optical Emission Spectroscopy in Ar and Ar/Ne Capacitively Coupled Radio Frequency Plasma Michihiro Otaka¹, Daiki Nagamatsu¹, Toshiaki Arima¹, Kunihiro Kamataki¹, Daisuke Yamashita¹, Naoto Yamashita¹, Takamasa Okumura¹, Naho Itagaki¹, Kazunori Koga^{1,2} and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²National Institutes of Natural Sciences, Japan

9:45 AM BREAK

10:15 AM MF01.04.06

Position Fluctuation of a Fine Particle Trapped with Laser Tweezers in Ar Plasma Toma Sato¹, Sakyo Okunaga¹, Kunihiro Kamataki¹, Kentaro Tomita², Pan Yiming¹, Daisuke Yamashita¹, Takamasa Okumura¹, Naho Itagaki¹, Kazunori Koga^{1,3} and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²Hokkaido University, Japan; ³NINS, Japan

10:30 AM MF01.04.08

Study on Plasma-Induced Liquid-Phase Reactions in a Droplet as Reaction Field Fumiyoshi Tochikubo, Go Yokota and Yusuke Nakagawa; Tokyo Metropolitan University, Japan

10:45 AM MF01.04.09

Size Control of Silver Nanoparticles Driven by Low Pressure Plasma-Solution Interactions Chi Xu, Himashi Andaraarachchi and Uwe Kortshagen; University of Minnesota, United States

SESSION MF01.05: Plasmas for Materials Processing II
Session Chairs: Kazunori Koga and Fumiyoshi Tochikubo
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 319B

1:30 PM MF01.05.01

In-Flight Coating of Magnesium Nanoparticles via Non-Thermal Plasma for Energetics Brandon A. Wagner, Pankaj Ghildiyal, Michael Zachariah and Lorenzo Mangolini; University of California, Riverside, United States

1:45 PM MF01.05.02

Atomically Precise Deposition of Multi-Element Metal Oxide Layered Crystals Alternating Digitally Processed DC Sputtering and Surface Oxidation Hideo Isshiki¹, Ghent Nakamura¹, Grece Fabiola¹, Koki Takamura¹, Mehdi Ali¹, Yanbin Zhang¹, Yasuhito Tanaka^{1,2} and Shinichiro Saisho^{1,2}; ¹University of Electro-Communications, Japan; ²Shincron Co.Ltd., Japan

2:00 PM MF01.05.03

Growth of High-In Content InGaN Layer by Molecular Beam Epitaxy Under High-Density Nitrogen Radical Irradiation Hiroki Kondo¹, Kiyoshi Kuwahara², Arun K. Dhasiyan¹, Osamu Oda¹, Koji Yamakawa², Shoji Den², Yoshihiro Nakai³ and Masaru Hori¹; ¹Nagoya University, Japan; ²Katagiri Engineering Co., Ltd., Japan; ³NU-Rei Co., Ltd., Japan

2:15 PM MF01.05.04

Structural Control of Hydrogenated Amorphous Carbon Films by Substrate Position and Gas Pressure in Plasma Chemical Vapor Deposition Shinjiro Ono¹, Sunghwa Hwang¹, Daichi Yoshikawa¹, Takamasa Okumura¹, Kunihiro Kamataki¹, Naoto Yamashita¹, Naho Itagaki¹, Kazunori Koga^{1,2}, Masaharu Shiratani¹, Jun-Seok Oh³, Susumu Takabayashi⁴ and Tatsuyuki Nakatani⁵; ¹Kyushu Univ., Japan; ²National Institutes of Natural Sciences, Japan; ³Osaka City University, Japan; ⁴National Institute of Technology, Ariake College, Japan; ⁵Okayama University of Science, Japan

2:30 PM MF01.05.05

Transformation of Fungal Mycelium into Novel Ultrananocrystalline Diamond Nanostructures via Microwave Plasma Pyrolysis Ben E. Stein, Orlando Auciello, Maria J. Arellano-Jimenez and Benjamin R. Perez; The University of Texas at Dallas, United States

2:45 PM MF01.05.06

Effects of rf Frequency on Plasma Density in Capacitively Coupled Plasmas at Low Pressure Studied by Particle-in-Cell/Monte Carlo Collision Method Toshiaki Arima, Tao Yang, Kunihiro Kamataki, Daisuke Yamashita, Naoto Yamashita, Takamasa Okumura, Naho Itagaki, Kazunori Koga and Masaharu Shiratani; Kyushu-University, Japan

3:00 PM BREAK

SESSION MF01.06: Plasmas for Medical and Agricultural Applications I
Session Chairs: Masaru Hori and Satoshi Uchida
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 319B

3:30 PM *MF01.06.01

The Role of Plasma Surface Interactions in Achieving Sustainability Goals—Controlling Reactants and Activation Energy Mark J. Kushner; University of Michigan, United States

4:00 PM MF01.06.03

Selective N₂O₅ Synthesis Using Composite Air Plasma Reactors and Its Inactivation Effects on Bacteria and Virus Toshiro Kaneko, Shota Sasaki, Hiroto Iwamoto, Keisuke Takashima and Hideki Takahashi; Tohoku University, Japan

SESSION MF01.07: Poster Session: Cutting-Edge Plasma Processes Contributing to Sustainable Development Goals
Session Chairs: Kenji Ishikawa and Fumiyoshi Tochikubo
Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

MF01.07.01

Fluid Leak Detector for Cyclo-Olefin Polymer Microchannels Using Low-Temperature Bonding by Water Vapor Plasma [Masaaki Tsukamoto](#)^{1,2}, Hirokazu Terai¹, Madoka Tsumaya¹, Shigeru Kurosawa¹, Osamu Tsuji¹, Masashi Satou², Yoshiyuki Inoue², Keiko Kawano^{2,2}, Tomoaki Matsushima² and Toshiyuki Tsuchiya^{2,2}; ¹Samco Inc., Japan; ²Kyoto University, Japan

MF01.07.05

Epitaxial Growth of Single-Crystalline ZnO Films on Sapphire Substrates via Inverted Stranski-Krastanov Mode by Low-Power Magnetron Sputtering [Ryo Mitsuishi](#)¹, Naoto Yamashita¹, Daichi Takahashi¹, Takamasa Okumura¹, Kunihiro Kamataki¹, Kazunori Koga^{1,2}, Masaharu Shiratani¹ and Naho Itagaki¹; ¹Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan; ²National Institutes of Natural Sciences, Japan

MF01.07.06

Nano Aluminum Synthesis with Nonthermal Capacitively Coupled Plasma for Enhanced Yield and Size Control [Thomas J. Cameron](#)¹, Carter Reed¹, Himashi Andaraarachchi¹, Uwe Kortshagen¹ and Chi-Chin Wu²; ¹University of Minnesota, United States; ²U.S. Army Research Laboratory, United States

MF01.07.07

Changes in EL-4 T Cell Properties Due to Oxygen Plasma Irradiation Nobuya Hayashi, Haruka Uematsu and [Reona Muto](#); Kyushu University, Japan

SESSION MF01.08: Plasmas for Medical and Agricultural Applications II

Session Chairs: Peter Bruggeman and Masaharu Shiratani

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 319B

8:45 AM *MF01.08.01

Creation of Plasma Biology by Seamless Radical Control in Gas Phase, Liquid Phase and Biological Systems [Masaru Hori](#); Nagoya University, Japan

9:15 AM MF01.08.02

Gene Expression Analysis of Plasma Activated Ringer's Lactate Solution Treated Cells [Hiromasa Tanaka](#), Masaaki Mizuno, Kenji Ishikawa, Hiroshi Hashizume, Kae Nakamura, Hiroaki Kajiyama, Fumitaka Kikkawa, Yasumasa Okazaki, Shinya Toyokuni and Masaru Hori; Nagoya Univ, Japan

9:30 AM *MF01.08.03

Numerical Investigation of the Permeation Characteristics of Reactive Oxygen and Nitrogen Species into Biological Membrane under Electric Field Using Classical Molecular Dynamics [Satoshi Uchida](#), Ippei Yagi, Yusuke Nakagawa and Fumiyoshi Tochikubo; Tokyo Metropolitan University, Japan

10:00 AM BREAK

10:30 AM MF01.08.04

Electroporation-Like DBD Jet as Rapid FC Delivery Method for Plant Transformation [Min Huang](#), Matthew Burnette, Stephon Warren, Michael Thomson, David Staack and Endang Septiningsih; Texas A&M University, United States

10:45 AM MF01.08.05

Evaluation of Short-Lived Reactive Species Decay Using High-Speed Water Flow in Contact with Atmospheric Pressure Plasma [Kazuki Takeda](#), Shota Sasaki, Keisuke Takashima and Toshiro Kaneko; Tohoku University, Japan

11:00 AM MF01.08.06

Quantitative Evaluation Through LC-QqQ MS/MS for RONS Induced into Dry Seeds by Non-Thermal Plasma Irradiation [Takamasa Okumura](#)¹, Kazunori Koga^{1,2}, Pankaj Attri¹, Kunihiro Kamataki¹, Naoto Yamashita¹, Naho Itagaki¹ and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²National Institutes of Natural Sciences, Japan

11:15 AM MF01.08.07

Calcium-Based Systemic Activation of Plant Defense Response by Exposure to N₂O₅ Gas Synthesized in Atmospheric-Pressure Plasma Technology [Hiroto Iwamoto](#)¹, Shota Sasaki¹, Keisuke Takashima¹, Atsushi Higashitani¹, Masatsugu Toyota² and Toshiro Kaneko¹; ¹Tohoku University, Japan; ²Saitama University, Japan

11:30 AM MF01.08.08

Growth Characteristics of Plant by Irradiation on Seed and Leaf with Active Oxygen Species Shameem Ahmed, Nobuya Hayashi and [Sayma Khanom](#); Kyushu University, Japan

SESSION MF01.09: General Session I

Session Chairs: Masaharu Shiratani and Fumiyoshi Tochikubo

Monday Morning, May 23, 2022

MF01-Virtual

8:00 AM *MF01.09.01

Effects of Low-Pressure Radiofrequency Capacitively Coupled Plasma Treatment of Thai Purple Glutinous Rice Seeds on Phenotypic and

Genotypic Modifications Chananbhorn Thongrote¹, Somboon Anuntalabhochai¹, Artit Chingsungnoen², Wanwisa Butcharee², Liangdeng Yu³ and Kanta Sangwijit¹; ¹University of Phayao, Thailand; ²Maharakham University, Thailand; ³Chiang Mai University, Thailand

8:30 AM MF01.09.02

Pulsed Power Applications for Agriculture and Food Processing Koichi Takaki^{1,2} and Katsuyuki Takahashi^{1,2}; ¹Iwate University, Japan; ²Agri-Innovation Center, Japan

8:45 AM *MF01.09.03

Plasma Mediated Activation of Fungal Enzyme Secretion Gyungsoon Park, Nan-Nan Yu, Wirinthip Ketya, Mayura Veerana and Eun-Ha Choi; Kwangwoon University, Korea (the Republic of)

9:15 AM *MF01.09.05

CO₂ Catalytic Conversion of CO₂—An Emerging Decarbonizing Technology Towards a Sustainable Society Tomohiro Nozaki¹, Dae-Yeong Kim^{1,2}, Xiaozhong Chen¹ and Shinya Furukawa³; ¹Tokyo Institute of Technology, Japan; ²JSPS DC2, Japan; ³Hokkaido University, Japan

9:45 AM MF01.13.02

CO₂ Conversion Performance of Pulse Micro-Gap Dielectric Barrier Discharge Reactor Primas Emeraldi, Tsutomu Imai, Yukio Hayakawa and Shinji Kambara; Gifu University, Japan

10:00 AM MF01.09.06

Epitaxial Growth of Atomically Flat Single-Crystalline (ZnO)_x(InN)_{1-x} Films on O-Polar ZnO Substrates by Magnetron Sputtering Ryota Narishige, Naoto Yamashita, Kunihiro Kamataki, Takamasa Okumura, Kazunori Koga, Masaharu Shiratani and Naho Itagaki; Kyushu University, Japan

SESSION MF01.10: General Session II

Session Chairs: Masaharu Shiratani and Fumiyoshi Tochikubo

Monday Morning, May 23, 2022

MF01-Virtual

10:30 AM *MF01.10.01

Electrical Discharges in a Bubble Column Reactor—A Novel High Throughput Reactor Design for Water Treatment Mikhail Vasilev and Selma Mededovic; Clarkson University, United States

11:00 AM MF01.10.02

Precise Control of the Nanostructure of Ge Films by High-Pressure Plasma Sputtering for Li-Ion Battery with Super-High Capacity Giichiro Uchida; Meijo University, Japan

11:15 AM MF01.10.03

Silicon Surface Passivation with a-Si:H and epi-Si Layer—Effects of Plasma-induced Defects and Interface Structure Shota Nunomura and Isao Sakata; AIST, Japan

11:30 AM MF01.10.04

Atmospheric Plasma Assisted Deposition of Glass Corrosion Coating on Printed Electronics Venkat Kasi and Rahim Rahimi; Purdue University, United States

11:45 AM MF01.10.05

Plasmonic Plasma Process for Reduced Energy Costs of Ultra-Thin Silicon Oxide Films Takeshi Kitajima, Kazuyasu Watanabe and Toshiki Nakano; National Defense Academy, Japan

12:00 PM MF01.10.06

Influence of Gas Species on Electrical Characteristics of High-Power Pulsed Sputtering Taishin Sato¹, Shoki Abe¹, Katsuyuki Takahashi^{1,2}, Seiji Mukaigawa¹ and Koichi Takaki^{1,2}; ¹Iwate university, Japan; ²Agri-innovation Center, Iwate University, Japan

12:05 PM MF01.10.07

Development of Measurement of Two-Dimensional Distribution of Strength of Electrical Field with High Spatial Resolution Using Optical Trapped Particle in Plasma Kunihiro Kamataki¹, Sakyo Okunaga¹, Toma Sato¹, Kentaro Tomita², Pan Yimin¹, Daisuke Yamashita¹, Naoto Yamashita¹, Takamasa Okumura¹, Naho Itagaki¹, Kazunori Koga^{1,3} and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²Hokkaido University, Japan; ³National Institute for Materials Science, Japan

12:20 PM MF01.10.08

Pulsed Electron Beam Deposition of Zinc Oxide Thin Films Magdalena Nistor; NILPRP - National Institute for Laser, Plasma and Radiation Physics, Romania

SESSION MF01.11: General Session III

Session Chairs: Kunihiro Kamataki and Fumiyoshi Tochikubo

Monday Afternoon, May 23, 2022

MF01-Virtual

6:30 PM MF01.11.01

Surface Modification of Graphitic Carbon Nitride by Plasma in Hydroquinone Solution for Enhanced Selectivity and Durability of Visible Light CO₂ Reduction with a Ru(II)-Ru(II) Supramolecular Photocatalyst Noritaka Sakakibara¹, Mitsuhiro Shizuno¹, Tsuyohito Ito², Kazuhiko Maeda¹,

Kazuo Terashima² and Osamu Ishitani¹; ¹Tokyo Institute of Technology, Japan; ²The University of Tokyo, Japan

6:45 PM MF01.11.02

Development of High Frequency-High Power Impulse Magnetron Sputtering Power Supply and Its Diamond-Like Carbon Film Properties Hiroyuki Fukue¹, Tatsuyuki Nakatani¹, Tadayuki Okano², Masahide Kuroiwa², Shinsuke Kunitsugu³, Hiroki Oota⁴ and Ken Yonezawa^{4,1}; ¹Okayama University of Science, Japan; ²Tokyo Electronics Co., Ltd., Japan; ³Industrial Technology Center of Okayama Prefecture, Japan; ⁴Kenix Corporation, Japan

7:00 PM MF01.11.04

Nonthermal Plasma Processes for Sustainable Synthesis of Metallic Titanium Nanoparticles Qiaomiao Tu, David Poerschke and Uwe Kortshagen; University of Minnesota Twin Cities, United States

7:15 PM MF01.11.05

Key Parameters for Single Crystalline ZnO Film Growth by Magnetron Sputtering via Inverted Stranski-Krastanov Mode Naoto Yamashita, Yuta Nakamura, Kunihiro Kamataki, Takamasa Okumura, Kazunori Koga, Masaharu Shiratani and Naho Itagaki; Kyushu University, Japan

7:30 PM MF01.11.06

Functionalization of an Inner-Wall of Diamond-Like Carbon Coated Small-Diameter Long-Sized Tube by Oxygen Plasma Treatment Yuichi Imai^{1,2}, Tatsuyuki Nakatani², Shinsuke Kunitsugu³, Kazuhiro Kanda⁴, Yasuhiro Fujii⁵, Daiki Ousaka⁵, Susumu Oozawa⁵ and Tomio Uchi¹; ¹STRAWB Inc., Japan; ²Okayama University of Science, Japan; ³Industrial Technology Center of Okayama Prefecture, Japan; ⁴University of Hyogo, Japan; ⁵Okayama University, Japan

7:45 PM MF01.11.07

Two-Dimensional Particle-in-Cell Simulation of an Inductively Coupled Source Coupled with a Capacitive Dual-Frequency Bias Heesung Park, Seo I Choi and Hae June Lee; Department of Electrical Engineering, Pusan National University, Korea (the Republic of)

7:50 PM MF01.11.08

Two-Dimensional Particle-in-Cell Simulation for Phase-Resolved Ion Energy and Angle Distributions in Dual-Frequency Capacitively Coupled Ar Plasmas Ji Hyun Shin, Chang Ho Kim, Geon Woo Park, Hwan Ho Kim and Hae June Lee; Pusan National University, Korea (the Republic of)

7:55 PM MF01.11.09

Investigation of the Structure-Asymmetry Effects on Plasma Uniformity in a Capacitively Coupled Etching Reactor Using Two-Dimensional Particle-in-Cell and Fluid Simulations Hwan Ho Kim, Chang Ho Kim, Cheol Woong Kim and Hae June Lee; Pusan National University, Korea (the Republic of)

8:00 PM MF01.11.10

Electron Density Distribution of AC-GTA in Like Mars Atmosphere Kai Aoyama¹, Shinichiro Shobako¹, Tomohiko Yamashita¹, Noboru Terajima¹, Manabu Tanaka² and Hisaya Komen²; ¹National Institute of Technology Kagawa College, Japan; ²Joining and Welding Research Institute, Osaka University, Japan

8:05 PM MF01.11.11

Numerical Investigation of Influencing Factors of Slag Transportation Process During Metal Active Gas Welding Using Particle Method Takamasa Fukazawa¹, Hisaya Komen¹, Masaya Shigeta², Manabu Tanaka¹, Mitsugi Fukahori³, Naoko Saito³ and Tetsuo Yamada³; ¹Joining and Welding Research Institute, Osaka University, Japan; ²Graduate School of Engineering, Tohoku University, Japan; ³Mazda Motor Corporation, Japan

8:10 PM MF01.11.12

Analyses of Oxygen Concentration on Anode Surface in Gas Tungsten Arc Welding Using CO₂ Gas Yuuki Asai¹, Hisaya Komen¹, Manabu Tanaka¹, Masashi Nomoto², Koutaro Watanabe² and Takahiro Kamo²; ¹Joining and Welding Research Institute, Osaka University, Japan; ²NIPPON STEEL CORPORATION, Japan

8:15 PM MF01.11.13

Experimental Study of Dominant Factors for Droplet Ejection from Electrode During AC TIG Welding Kenta Iida¹, Masaya Shigeta², Hisaya Komen¹ and Manabu Tanaka¹; ¹Joining and Welding Research Institute, Osaka University, Japan; ²Graduate School of Engineering, Tohoku University, Japan

SESSION MF01.12: General Session IV
Session Chairs: Takeshi Kitajima and Takayuki Watanabe
Monday Afternoon, May 23, 2022
MF01-Virtual

9:00 PM *MF01.12.01

Machine Learning Approaches Optimizing Semiconductor Manufacturing Processes Tsuyoshi Moriya; Tokyo Electron Limited, Japan

9:30 PM MF01.12.02

Growth of Nanoparticles in TEOS rf Plasma with Amplitude Modulation Akihiro Yamamoto¹, KoHei Abe¹, Iori Nagao¹, Michihiro Otaka¹, Daisuke Yamashita¹, Kunihiro Kamataki¹, Takamasa Okumura¹, Naoto Yamashita¹, Naho Itagaki¹, Kazunori Koga^{1,2} and Masaharu Shiratani¹; ¹Kyushu University, Japan; ²National Institutes of Natural Sciences, Japan

9:45 PM *MF01.12.03

Characterization and Diagnostics of Multiphase AC Arc for Innovative Material Processing Takayuki Watanabe and Manabu Tanaka; Kyushu Univ, Japan

10:15 PM MF01.12.04

Numerical Investigation of Heat Source Characteristics in Arc Spot Welding Using Constricted Nozzle [Hisaya Komen](#)¹, Manabu Tanaka¹, Akihisa Murata² and Tadasuke Murata²; ¹Joining and Welding Research Institute, Osaka University, Japan; ²Murata Welding Laboratory Co., Ltd., Japan

10:30 PM MF01.12.05

Thermal Plasma Generation by Diode-Rectification for Rapid Surface Treatment [Manabu Tanaka](#)¹, Takafumi Okuma¹, Takayuki Watanabe¹, Tsugio Matsuura², Juan P. Trelles³ and Masaya Shigeta⁴; ¹Kyushu University, Japan; ²Taso Arc Corp., Japan; ³University of Massachusetts Lowell, United States; ⁴Tohoku University, Japan

SESSION MF01.13: General Session V
Session Chairs: Nozomi Takeuchi and Fumiyoshi Tochikubo
Tuesday Afternoon, May 24, 2022
MF01-Virtual

9:00 PM MF01.09.04

Rapid Preparation of Low-Molecular-Weight Fucoidan Using a Plasma-Liquid Interface Process [Sayaka Yamamoto](#)¹, Shiori Maezawa², Tatsuru Shirafuji¹, Motoko Takaoka² and Jun-Seok Oh¹; ¹Osaka City University, Japan; ²Kobe College, Japan

9:15 PM MF01.11.03

Charge-up of Metal Plate Treated by Low-Temperature Atmospheric Pressure Helium Plasma Jet [Tetsuji Shimizu](#), Kazuya Kikunaga and Hajime Sakakita; National Institute of Advanced Industrial Science and Technology, Japan

9:30 PM MF01.13.03

Hydrogen Production from Steam Decomposition by Atmospheric Pressure Plasma [Muhd Hadi Iskandar Abd Razak](#), Yukio Hayakawa and Shinji Kambara; Gifu University, Japan

9:45 PM MF01.13.01

Enhancement of Hydrogen Separation in Plasma Membrane Reactors by Zeolite [Yukio Hayakawa](#) and Shinji Kambara; Gifu university, Japan

10:00 PM MF01.12.06

Application of Underwater Discharge Shock Wave to Pretreatment for Enzymic Saccharification of Wood Flour [Wataru Ueda](#), Yusuke Nakagawa and Fumiyoshi Tochikubo; Tokyo Metropolitan University, Japan

##PAGE_BREAK##

SYMPOSIUM MF02

3D Printing of Passive and Active Medical Devices

May 11 - May 25, 2022

Symposium Organizers

Jinah Jang, Pohang University of Science and Technology

Khoon Lim, University of Otago

Roger Narayan, North Carolina State University

Min Wang, University of Hong Kong

* Invited Paper

SESSION MF02.01: 3D Printing of Passive and Active Medical Devices I

Session Chairs: Yong Lin Kong and Rahim Rahimi

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 319B

1:30 PM *MF02.01.01

Additive Manufacturing of Smart Ingestible Devices for Spatial Sampling of Gastrointestinal Microbiome [Rahim Rahimi](#); Purdue University, United States

2:00 PM MF02.01.03

Bioinspired Sutureless Anastomosis Devices by 3D Printing Christopher Shallal¹, Helen Xun¹, David Stonko¹, Runhan Tao¹, Fanzhen Ding¹, Yanwen Liu¹, David Burmeister², Joseph White², Gerald Brandacher¹, Caitlin Hicks¹, Justin Sacks³ and Sung Hoon Kang¹; ¹Johns Hopkins University, United States; ²Uniformed Services University of the Health Sciences, United States; ³Washington University in St. Louis, United States

2:45 PM MF02.01.04

Functionalized 3D-Printed Silkhydroxyapatite Scaffolds for Enhanced Bone Regeneration with Innervation and Vascularization Vincent Fitzpatrick, Anna Deck, Ruben Torres, Chunmei Li and David L. Kaplan; Tufts University, United States

2:30 PM BREAK

3:00 PM MF02.01.05

Dynamically Stretchable Vasculature-on-a-Chip Model by 3D-Printed Porous Molds to Mimic Coronary Arteries During the Cardiac Cycle Terry T. Ching^{1,2}, Jyothsna Vasudevan^{1,2}, Shu-Yung Chang¹, Hsih Yin Tan², Chwee Teck Lim², Javier Fernandez¹, Jun Jie Ng², Yi-Chin Toh³ and Michinao Hashimoto¹; ¹Singapore University of Technology and Design, Singapore; ²National University of Singapore, Singapore; ³Queensland University of Technology, Australia

3:15 PM MF02.01.06

Effect of Temperature Gradient on Crosslinking of GelMA for 4D-Bioprinting Deformable Structures Zeqing Jin, Zhizhou Zhang, Shao-Yi Yu and Grace Gu; University of California, Berkeley, United States

3:30 PM MF02.01.07

Microstructure of Compositionally Graded Ti+Ti15Mo Alloys Prepared by Direct Laser Deposition Milos Janeczek¹, Tomas Krajnak¹, Dalibor Preisler¹, Josef Strasky¹, Michal Brazda², Jaroslav Vavrik² and Jan Dzugan²; ¹Charles University, Faculty of Mathematics and Physics, Czechia; ²Comptes FHT, Czechia

3:45 PM MF02.01.08

Bioactive Self-Limiting Electrospray for Efficient Additive Manufacturing Sarah Park, Robert Green-Warren, Michael J. Grzenda and Jonathan P. Singer; Rutgers University, United States

4:00 PM MF02.01.09

3D-Printing of Mechanically Competent, Low Profile, Radiopaque Bioresorbable Vascular Scaffolds Yonghui Ding¹, Henry Oliver T. Ware², Cheng Sun¹ and Guillermo Ameer¹; ¹Northwestern University, United States; ²North Carolina State University, United States

SESSION MF02.02: Poster Session: 3D Printing of Passive and Active Medical Devices

Session Chairs: Yong Lin Kong and Rahim Rahimi

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

MF02.02.01

Potential of 3D Printing in Fabrication of Patient-Specific Biodegradable Microneedle Platform for Alopecia Treatment Shayan Fakhraei Lahiji, Jaehyun Kim, Juhyeong Hong, Yong-Hee Kim, Seung-Hwan Joo, Ju-Hyun Lee and Seonjeong Chang; Hanyang University, Korea (the Republic of)

MF02.02.03

Correlation Between the Mechanical Strength and Crystallinity of 3D-Printed PEEK Materials Kyung-hyun Kim¹, Hyeon-Sik Ahn², Ae-Sun Oh¹, Dong-Hwan Kim¹, Eunyoung Park¹ and Hyun-Cheol Bae¹; ¹ETRI, Korea (the Republic of); ²Hanbat National University, Korea (the Republic of)

MF02.02.04

Bioinspired 3D Printed Vascularized Polymers for Detection of and Response to Bacteria on Surfaces Brandon Dixon, Anna Briley, Kayla Marquis, Benjamin Chasse and Caitlin Howell; University of Maine, United States

MF02.02.07

Fumed Silica-Modified Polydimethylsiloxane for Embedded 3D Printing of Microfluidic Chips Yifei Jin; University of Nevada Reno, United States

MF02.02.08

3D-Printed Architected Tablets with Tunable Porosity and Drug Release Sang Hoon Lee, Seung Min Oh, Seok Kim and Young Tae Cho; Changwon national University, Korea (the Republic of)

MF02.02.09

3D-Printed Metallic Lattice Scaffolds for Orthopedic Bone Reconstruction J. Sam Meyer¹, Amit Benady², Solomon Dadia^{2,2} and Galit Katarivas Levy¹; ¹Ben-Gurion University of the Negev, Israel; ²Tel-Aviv Medical Center, Israel

SESSION MF02.03: 3D Printing of Passive and Active Medical Devices II

Session Chairs: Spencer Moore and Stephanie Willerth

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 319B

10:00 AM *MF02.03.01

3D Bioprinting Personalized Neural Tissue Models Stephanie M. Willerth; University of Victoria, Canada

10:30 AM MF02.03.02

Materials and Technologies for Implantable Focal Brain Cooling Systems [Spencer R. Moore](#), Thomas Paterson, Arua C. Da Silva, Jason Berwick and Ivan Minev; University of Sheffield, United Kingdom

10:45 AM MF02.03.03

Expanding Geometries Available for Melt Electrowritten Scaffolds Using Microscale Layer Shifting [Ievgenii Liashenko](#)¹, Andrei Hrynevich², Huaizhong Xu³ and Paul Dalton¹; ¹Phil and Penny Knight Campus for Accelerating Scientific Impact, University of Oregon, United States; ²Utrecht University, Netherlands; ³Kyoto Institute of Technology, Japan

11:00 AM MF02.03.04

Development of Shape Memory Alloy Based Micro-Tentacle Actuator Using Two-Photon Polymerization [Hyun-Taek Lee](#)¹, Florent Seichepine² and Guang-Zhong Yang³; ¹Inha University, Korea (the Republic of); ²Imperial College London, United Kingdom; ³Shanghai Jiao Tong University, China

11:15 AM MF02.03.05

Laser Processing of Thermoelectrics for Medical Devices [George S. Nolas](#)¹ and Saniya LeBlanc²; ¹Univ of South Florida, United States; ²The George Washington University, United States

11:30 AM MF02.03.07

Utilising Stereolithography Based 3D Printing for the Direct Fabrication of BioCompatible Hollow Microneedles [Joe Turner](#) and Hannah Leese; University of Bath, United Kingdom

SESSION MF02.04: 3D Printing of Passive and Active Medical Devices III

Session Chairs: [Jayanthi Parthasarathy](#) and [Fiorenzo Vetrone](#)

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 319B

1:45 PM *MF02.04.01

Materials for 3D Printing Patient Specific Blood Specific Vascular Models for Biomechanical Evaluation and Clinical Decision Making [Jayanthi Parthasarathy](#); Nationwide Children's Hospital, United States

2:15 PM *MF02.04.02

Multiscale 3D Printing of Nanomaterials-Based Biomedical Electronics and Ingestible System [Yong Lin Kong](#); University of Utah, United States

2:45 PM MF02.04.03

3D-Printed Epidermal Microfluidic Systems for the Collection and Analysis of Sweat [Chung-Han Wu](#), Howin Ma and Tyler Ray; University of Hawaii, United States

3:00 PM BREAK

3:30 PM *MF02.04.04

Upconversion Nanoparticles [Fiorenzo Vetrone](#); INRS, Université du Québec, Canada

4:00 PM MF02.04.05

Printed Electrode Arrays for Implantable and Wearable Soft Bioelectronic Interfaces [Ivan Minev](#); University of Sheffield, United Kingdom

4:15 PM MF02.04.06

3D Printed Replica Teeth for Understanding Characterization of Cracks Using Quantitative Percussion Diagnostics Jie Shen¹, Haocheng Yang¹, Cheryl Sheets² and [James C. Earthman](#)¹; ¹University of California, Irvine, United States; ²Newport Coast Oral Facial Institute, United States

4:30 PM MF02.04.07

Effect of Printing Parameters on Cross-Linked Polymer Networks—An Investigation into Additive Manufacturing [Kris M. Van de Voorde](#)^{1,2} and Anne Walker¹; ¹US Army, United States; ²Oak Ridge Institute for Science and Education, United States

4:45 PM MF02.04.08

Expresion of Pluripotency Markers in Thermal Injet Bioprinted Adult Human Fibroblasts Patricia Ablanedo Morales¹, Brittany R. Rodriguez¹, Kayla B. Molina¹, Claudia Dell'Amico², Matteo Baggiani², Carmelo De Maria², Marco Onorati² and [Thomas Boland](#)¹; ¹Univ of Texas-El Paso, United States; ²University of Pisa, Italy

SESSION MF02.05: 3D Printing of Passive and Active Medical Devices IV

Session Chairs: [Roger Narayan](#) and [Min Wang](#)

Wednesday Morning, May 25, 2022

MF02-Virtual

8:00 AM *MF02.05.01

Additive Manufacturing of Novel Structures for Tissue Engineering Applications [Min Wang](#); University of Hong Kong, Hong Kong

8:30 AM MF02.05.02

Wetting and Design Guidelines for Bio-Inspired Liquid Diodes [Camilla Sammartino](#); Tel Aviv University, Israel

8:45 AM MF02.05.03

3D Printing of Nano Biphasic Calcium Phosphate Bioceramic for Fabricating Bone Tissue Engineering Scaffolds Yue Wang¹, Jiaming Bai² and Min Wang¹; ¹The University of Hong Kong, Hong Kong; ²Southern University of Science and Technology, China

9:00 AM MF02.05.04

3D Printing Approaches for Transdermal Drug Delivery Roger Narayan; North Carolina State University, United States

9:15 AM MF02.05.05

4D Printing and Characteristics of Shape Morphing GelMA/PDLLA-co-TMC Tissue Engineering Scaffolds Xiaodie Chen, Jiahui Lai and Min Wang; The University of Hong Kong, Hong Kong

9:20 AM MF02.05.06

4D Printed Fiber-Reinforced Highly Stretchable Tissue Engineering Scaffolds for Soft Tissue Applications Jizhuo Chen, Shangsi Chen and Min Wang; The University of Hong Kong, Hong Kong

9:25 AM MF02.05.07

Melt Printing of Polymeric Drug Delivery Microdepots in 2.5D Almog Uziel^{1,2}, David Meiri¹ and Dan Lewitus²; ¹Technion-Israel Institute of Technology, Israel; ²Shenkar- Engineering. Design. Art, Israel

9:40 AM MF02.05.08

3D Microfabrication of Fully-Embedded Transdermal Microneedles for Single-Administration Vaccines Khanh T. Tran and Thanh Nguyen; University of Connecticut, United States

9:55 AM MF02.05.09

Leech-Inspired 3D-Printed Origami Electrodes for Electrophysiology Sensing Tae-Ho Kim, Chao Bao and Woo Soo Kim; Simon Fraser University, Canada

10:10 AM MF02.02.02

Fabrication of Polycaprolactone-Hydroxyapatite Composites Filaments for FDM 3D Printing of Bone Imitation Application Chang Geun Kim¹, Kyung Seok Han¹, Sol Lee¹, Min Cheol Kim¹, Soo Young Kim² and Junghyo Nah¹; ¹Chungnam National University, Korea (the Republic of); ²Yeungnam University, Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM MF03

Materials and Methods for Fabricating Flexible and Large-Area Electronics
May 9 - May 24, 2022

Symposium Organizers

Joseph Andrews, University of Wisconsin
Thomas Anthopoulos, King Abdullah University of Science and Technology
Cinzia Casiraghi, University of Manchester
Aaron Franklin, Duke University

* Invited Paper

SESSION MF03.01: Nanomaterial Electronics for Large-Area or Flexible Applications
Session Chairs: Aaron Franklin and Hideo Hosono
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 328

10:30 AM *MF03.01.01

Two-Dimensional Skintronics Dmitry Kireev, Neelotpala Kumar, Nandu Koripally and Deji Akinwande; The University of Texas at Austin, United States

11:00 AM MF03.01.02

Acoustic-Assisted Wafer-Scale Self-Limiting Assembly of Hard-to-Wet Nanomaterials on Flexible Polymer Substrates in Water Solution Bo Li¹, Liang Zhao¹, Dong Zhou¹, Bchara Sidnawi¹, Jichao Fan², Ruiyang Chen², Thomas Scully¹, Scott Dietrich¹, Weilu Gao² and Qianhong Wu¹; ¹Villanova University, United States; ²The University of Utah, United States

11:15 AM MF03.01.03

All-Solution Processed Silver Nanowire Transparent Electrode with a Conformally Encapsulating Reduced Graphene Oxide Layer Leading to Improved Stability Woo Hyun Chae, Jatin J. Patil and Jeffrey C. Grossman; Massachusetts Institute of Technology, United States

11:30 AM MF03.01.04

Plasmonic ITO Nanoparticles' Ink for IR Thermo-Enabled Applications on Flexible Substrates Arianna Mazzotta^{1,2}, Alessio Gabbani³, Marco Carlotti¹, Marina Ruggieri³, Elvira Fantechi³, Andrea Ottomaniello¹, Francesco Pineider³, Andrea Pucci³ and Virgilio Mattoli¹; ¹Istituto Italiano di Tecnologia, Italy; ²Scuola Superiore Sant'Anna, Italy; ³University of Pisa, Italy

SESSION MF03.02: Flexible/Stretchable Electronics I

Session Chairs: Aaron Franklin and Dmitry Kireev

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 328

1:30 PM MF03.02.02

Gold-Assisted Transfer of Top-Gated Indium Tin Oxide Field-Effect Transistors on Flexible Substrates Sumaiya Wahid, Alwin Daus and Eric Pop; Stanford University, United States

1:45 PM MF03.02.03

Highly Stretchable and Reliable Metal-Oxide Thin-Film-Transistors and Integrated Circuits on a Molecular-Tailored Heterogeneous Acrylate Substrate Seung-Han Kang¹, Seung Beom Shin², Donghyuk Kim¹, Jeong-Wan Jo³, Myung-Gil Kim², Jong-Woong Kim⁴ and Sung Kyu Park¹; ¹Chung-Ang University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of); ³University of Cambridge, United Kingdom; ⁴Jeonbuk National University, Korea (the Republic of)

2:30 PM MF03.02.04

Conductive Self-Healable Rhenium Oxides/Polytetrahydrofuran Composite for the Resilient Flexible Electrodes Seok Min Yoon; Wonkwang University, Korea (the Republic of)

2:30 PM BREAK

2:45 PM MF03.02.05

Highly Flexible Polymer/Metal-Oxide Hybrid Dielectrics Using Plasma Polymerization for Flexible Electronics Gwan In Kim¹, Joohye Jung², Won Kyung Min¹, Min Seong Kim¹, Dong Hyun Choi¹ and Hyun Jae Kim¹; ¹Yonsei University, Korea (the Republic of); ²Samsung Display, Korea (the Republic of)

3:00 PM MF03.02.06

UV Curing Effect on Mechanical Stability of Flexible Dielectric Thin Films Fabricated by Plasma-Enhanced Chemical Vapor Deposition of tetrakis(trimethylsilyloxy)silane Precursor William Wirth, Jacob Comeaux, Rajib Chowdhury and Seonhee Jang; University of Louisiana at Lafayette, United States

SESSION MF03.03: Flexible/Stretchable Electronics II

Session Chairs: Joseph Andrews and Aaron Franklin

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 328

8:30 AM *MF03.03.01

3D Assembly Approaches for Stretchable Optoelectronic Devices Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

9:00 AM MF03.03.02

A Sub-150-Nanometre-Thick and Ultraconformable Solution-Processed All-Organic Transistor Fabrizio A. Viola and Mario Caironi; Italian Institute of Technology, Italy

9:15 AM MF03.03.03

Large-Area Pixelized Stretchable Full-Color Electrochromic Displays with Photo Patternable Acrylate Viologen Derivatives Seong Hwan Yang¹, Gaurav K. Pande², Jae Sang Heo³, Jong S. Park² and Sung Kyu Park¹; ¹ChungAng University, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Samsung Display, Korea (the Republic of)

9:30 AM BREAK

10:00 AM MF03.03.05

Energetic and Kinetic Factors Governing the Direct Fabrication of Laser Induced Graphene Microelectrodes on Flexible Substrates Moataz Abdulhafez, Golnaz Najaf Tomaraei and Mostafa Bedevy; University of Pittsburgh, United States

10:15 AM MF03.03.06

Quantum Dot-Based Flexible Full Color Micro-LED Display for Visible Light Communication Application Luhing Hu and Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

10:30 AM MF03.03.07

A Novel Soft Electronic Platform for Improved Targeted Electro-Culture Catherine Crichton, Elliot Strand, Eloise Bihar and Gregory L. Whiting;

University of Colorado Boulder, United States

SESSION MF03.05: Printed Electronics
Session Chairs: Joseph Andrews and Thomas Anthopoulos
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 328

1:30 PM *MF03.05.01

Solvent-Free, Environment-Friendly Printing for Large-Area Electronics Oana D. Jurchescu; Wake Forest University, United States

2:00 PM MF03.05.02

A Fully Organic, Flexible, Ink-Jet Printed 8-Bit Tag for Radio-Frequency Applications Fabrizio A. Viola and Mario Caironi; Italian Institute of Technology, Italy

2:15 PM MF03.05.03

Roadmap Towards Fabrication of Fully Printed Artificial Neurons on Flexible Substrates for Neuromorphic Computing Applications Surya A. Singaraju¹, Dennis Weller¹, Horst Hahn^{1,2}, Mehdi Tahoori¹ and Jasmin Aghassi-Hagmann¹; ¹Karlsruhe Institute of Technology, Germany; ²Technische Universität Darmstadt, Germany

2:30 PM MF03.05.04

Field-Assisted Aerosol Jet Printing for Fabricating Flexible Electronics Roxanne Kate Balanay, Shaun Jan Mikhel Ildefonso and Tyler Ray; University of Hawaii, United States

2:45 PM MF03.05.05

Fully Printed ZnO Photosensors for Next Generation User Interfaces Georgios Bairaktaris, Fasihullah Khan and Radu A. Sporea; University of Surrey, United Kingdom

3:00 PM BREAK

3:30 PM MF03.05.06

Cyclic Production of Biocompatible Graphene Ink with In-Line Shear-Mixing for Inkjet-Printed Electrodes, Li-Ion Energy Storage and Sensors Tian Carey¹, Abdelnour Alhourani², Ruiyuan Tian¹, Shayan Seyedin³, Adrees Arbab⁴, Jack Maughan¹, Lidija Šiller³, Dominik V. Horvath¹, Jong Min Kim⁴, Hagland Hanne² and Jonathan N. Coleman¹; ¹Trinity College Dublin, Ireland; ²University of Stavanger, Norway; ³Newcastle University, United Kingdom; ⁴University of Cambridge, United Kingdom

3:45 PM MF03.05.07

Scalable Solution Processing of Cu(In,Ga)(S,Se)₂ Solar Cells via Slot Die Coating Jonathan Turnley¹, Ryan Ellis¹, Daniel C. Hayes¹, Doojin Vak², Anthony S. Chesman² and Rakesh Agrawal¹; ¹Purdue University, United States; ²CSIRO Manufacturing, Australia

4:00 PM MF03.05.08

Inkjet-Printed Electrochemical Phosphate Sensors Thiba Nagaraja and Suprem R. Das; Kansas State University, United States

SESSION MF03.06: Poster Session I: Printed and Flexible Electronics
Session Chairs: Joseph Andrews and Aaron Franklin
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

MF03.06.01

High Power Output of Passive Radiative Cooled Thermoelectric Generator Based on Body Heat Salman Khan, Jiyong Kim, Kyeongman Roh, Gimin Park and Woochul Kim; Yonsei University, Korea (the Republic of)

MF03.06.02

Development of Self-Attachable Flexible Transparent Electrodes with Strong Mechanical and Low-Resistant Electrical Contacts Seongjin Park, Minho Seong, Hyejin Jang, Geonjun Choi, Jaeil Kim and Hoon Eui Jeong; Ulsan National Institute of Science and Technology, Korea (the Republic of)

MF03.06.03

Flexible Blade-Coated Devices—Dual Functionality via Simultaneous Deposition Jasmine M. Jan, Juan Zhu, Jonathan Ting and Ana Arias; University of California, Berkeley, United States

MF03.06.05

Lithography Free, Soft, Flexible Vias for 2.5D Fabrication of Ultra-Flexible Circuits Joseph Troughton¹, Séverine C. de Mulatier¹, Thierry Djenizian^{1,2} and Marc Ramuz¹; ¹Ecole des Mines de Sainte Etienne, France; ²Al-Farabi Kazakh National University, Kazakhstan

MF03.06.06

Flexible and Mechanical Damage-Tolerant Metal-Graphene Stretchable Conductors Mitisha Surana¹, Kaihao Zhang², Jad Yaacoub¹ and Sameh Tawfik¹; ¹University of Illinois at Urbana Champaign, United States; ²Massachusetts Institute of Technology, United States

MF03.06.07

Solution-Processable, Ag-Sandwiched Carbon Nanotube-Coated, Durable Architecture Realizing Power-Efficient Anti-Breaking Cyclic Heating

on Glass and Polymer Substrates [Minwook Kim](#), Kwangjun Kim, Hyunchan Noh, Deokyeong Jeong, Hojae Ji and Jong G. Ok; Seoul National University of Science and Technology, Korea (the Republic of)

MF03.06.09

Evaluation of Additively Printed Dielectrics for Fully Printed Carbon Nanotube Thin-Film Transistors [Brittany N. Smith](#), Hope Meikle, Shiheng Lu and Aaron D. Franklin; Duke University, United States

MF03.06.10

Aerosol Jet Printing of Conductive Three-Dimensional Graphene Structures [Peter Ballentine](#), Brittany N. Smith, Nicholas Williams and Aaron D. Franklin; Duke University, United States

MF03.06.12

Methods of 3D Printing Bi₂Te₃-Ink-Based Thermoelectric Modules [Jorge A. Cardenas](#), Claudina X. Cammack, Sean R. Bishop, Adam Cook and Jonathan L. Height; Sandia National Laboratories, United States

MF03.06.13

All-Solution-Processable, Lithography- and Vacuum-Free Nanoarchitecturing [Kwangjun Kim](#), Minwook Kim, Inhui Han, Hyungi Son, Geonhui Jo and Jong G. Ok; Seoul National University of Science and Technology, Korea (the Republic of)

MF03.06.14

High-Resolution Graphene-Based Flexible Electrode Array [Dain Kim](#) and Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

MF03.06.15

Stretchable and Conductive Graphite/PDMS Ink for 3D Printing Multi-Sensor Wearable Devices [Thomas Paterson](#)¹, Nicholas Hagis^{1,2}, Spencer R. Moore¹, Qiheng Wang¹, Arua C. Da Silva¹, Ria L. Mitchell², James J. Alix² and Ivan Minev¹; ¹University of Sheffield, United Kingdom; ²The University of Sheffield, United Kingdom

SESSION MF03.07: Processing for Flexible/Large-Area Electronics I

Session Chairs: Aaron Franklin and Chang Kyu Jeong

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 328

8:30 AM *MF03.07.01

Thin-Film Conformable Electronics Based on Epitaxial Transfer [Stephen R. Forrest](#), Byungjun Lee, Tobias Burger, Dejiu Fan and Andrej Lenert; University of Michigan, United States

9:00 AM MF03.07.02

Integration of Solution Blow Spun Fiber Materials into Flexible 3D Printed Constructs for Scalable Production of Responsive Materials [Anne Walker](#)¹ and Kris M. Van de Voorde²; ¹U.S. Department of the Army, United States; ²Oak Ridge Institute for Science and Education, United States

9:15 AM MF03.07.03

Thermoforming Based Customizable, Conformal and Stretchable 3D Electronics [Jungrak Choi](#), ChanKyu Han and Inkyu Park; KAIST, Korea (the Republic of)

9:30 AM MF03.07.04

A Very Large-Scale Integration of High Performance, Low Leakage Internal Ion-Gated Organic Electrochemical Transistors (IGTs) [Claudia Cea](#), Zifang Zhao, Jennifer Gelinis and Dion Khodagholy; Columbia University, United States

9:45 AM MF03.07.05

Scalable, Flow-Based Processing of 2D Exfoliated Nanosheets via Cross-Flow Filtration [Julia R. Downing](#)¹, Lindsay E. Chaney¹, Jung-Woo T. Seo^{1,2}, Janan Hui¹, Daphne Tsai¹, Deborah R. Cohen³, Michael Dango³, Nicholas X. Williams¹, Justin Qian¹ and Mark C. Hersam^{1,1,1}; ¹Northwestern University, United States; ²Volexion, Inc., United States; ³Cytiva, United States

10:00 AM BREAK

10:30 AM MF03.07.06

Template-Free Alignment of Lamellar Block Copolymers for Large Area Sub-10 nm Patterning and Hybrid Nanostructures [Maninderjeet Singh](#) and Alamgir Karim; University of Houston, United States

10:45 AM MF03.07.07

Influence of The Surface Conductivity of Polymer Films on The Attractive Force of A Bipolar Electrostatic Chuck [Jeremy Gavriel](#), Yuki Taoka and Shigeki Saito; Tokyo Institute of Technology, Japan

SESSION MF03.08: Processing and Packaging Perovskite Electronics

Session Chairs: Thomas Anthopoulos and Stephen Forrest

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 328

1:30 PM MF03.08.01

Efficient Upscaling of Perovskite Photovoltaics Through Temperature-Modulated Inkjet Printing [Helge Eggers](#)^{1,1,2}, Fabian Schackmar^{1,1}, Gerardo

Hernandez-Sosa^{1,1,2}, Uli Lemmer^{1,1,2} and Ulrich W. Paetzold^{1,1}; ¹Karlsruhe Institute of Technology, Germany; ²Innovation Lab, Germany

1:45 PM MF03.08.02

Packaging Flexible Perovskite Solar Cells to Withstand Accelerated Stress Testing [Nancy Trejo Macias](#) and Giles Eperon; Swift Solar, United States

2:00 PM MF03.08.03

Highly Efficient and Fully Roll-to-Roll Processible Perovskite Solar Cells Incorporating Printed Electrodes [Luke Sutherland](#)^{1,2}, Hasitha Weerasinghe¹, George P. Simon², Doojin Vak¹ and Mei Gao¹; ¹CSIRO, Australia; ²Monash University, Australia

SESSION MF03.09: Energy Harvesting and Storage
Session Chairs: Thomas Anthopoulos and Stephen Forrest
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 328

3:30 PM *MF03.09.01

Principles of Energy Harvesting Devices for Self-Powered and Flexible Mechanical Sensors—Case Studies [Chang Kyu Jeong](#); Jeonbuk National University, Korea (the Republic of)

4:00 PM MF03.09.03

Printed Biodegradable Batteries for Soil Sensing Using a Fruit-Waste Based Separator [Anupam Gopalakrishnan](#), Annika Muchlbradt, Yongkun Sui and Gregory L. Whiting; University of Colorado Boulder, United States

4:15 PM MF03.09.04

Innovative Additive Manufacturing of $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$ as Positive Electrode Material for Lithium-Ion Batteries Through the Precursor Approach [Ana C. Martinez Maciel](#), Alexis Maurel, Sreeprasad Sreenivasan and Eric Macdonald; The University of Texas at El Paso, United States

4:30 PM MF03.09.05

Vat Photopolymerization Additive Manufacturing of Shape-Conformable Copper-Based Current Collector for Lithium-Ion Battery [Alexis Maurel](#), Ana C. Martinez Maciel, Sreeprasad Sreenivasan and Eric Macdonald; The University of Texas at El Paso, United States

SESSION MF03.10: Poster Session II: Processing for Printed or Flexible Electronics and Sensors
Session Chairs: Joseph Andrews and Chang Kyu Jeong
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

MF03.10.01

UV Photodoping and Remote Hydrogen Plasma Treatment of ZnO Nanocrystal Films [Chengjian Zhang](#), Lorraine Francis and Uwe Kortshagen; University of Minnesota, United States

MF03.10.02

All-atmospheric Processed Ag-Cu Core-Shell Nanowire Transparent Electrode with Haacke Figure of Merit >600 [Steven DiGregorio](#)¹, Collin Miller¹, Lance M. Wheeler² and Owen Hildreth¹; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

MF03.10.03

Selective Deposition of Conductive Nanofiber Network with Minimized Contact Resistance for Large-Area Soft Electronics [Hyeonsu Woo](#)¹, Suhyeon Kim¹, Seungbin Yoon¹, Geon Hwee Kim² and Geunbae Lim¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Chungbuk National University, Korea (the Republic of)

MF03.10.04

Photovoltaic Photographs [Jeroen Hustings](#)¹, Nico Franssaert¹, Kristof Vrancken^{1,2}, Rob Cornelissen¹, Roland Valcke¹ and Jean V. Manca¹; ¹University of Hasselt, Belgium; ²LUCA School of Arts, Belgium

MF03.10.05

Multi-Functional Thermoelectric Bi_2Te_3 Fabric for Negative Strain and Temperature Sensing [Chaebeen Kwon](#) and Taeyoon Lee; Yonsei University, Korea (the Republic of)

MF03.10.07

High-Gain Common-Source Voltage Amplifier with Intrinsic Temperature Compensation for Biosensing [Georgios Bairaktaris](#)¹, Eva Bestelink¹, Vlad Stolojan¹, Simon King², Luca Maiolo³, Francesco Maita³ and Radu A. Sporea¹; ¹Advanced Technology Institute, United Kingdom; ²Radical Fibres Ltd, United Kingdom; ³Consiglio Nazionale delle Ricerche, Italy

MF03.10.08

Micro-Buckled Shell Structured Fiber Electronics and Its Application in Wearable Devices [Kukro Yoon](#) and Taeyoon Lee; Yonsei University, Korea (the Republic of)

MF03.10.09

Fiber Form GeS₂ OTS Device for Wearable Electronics [DongHun Shim](#) and Taeyoon Lee; YONSEI university, Korea (the Republic of)

MF03.10.10

***In Situ* Monitoring of Marine Environment by Multi-Analyte Microfluidic Platform** [Shuoen Wu](#), Napasorn Phongphaew and Tse Nga Ng; University of California San Diego, United States

MF03.10.11

Thermally Drawn Piezoelectric Fiber Enables Fabric for Acoustic Healthcare Monitoring [Grace H. Noel](#)¹, Wei Yan¹, Elizabeth Meiklejohn², Guanchun Rui³, Lei Zhu³ and Yoel Fink¹; ¹MIT, United States; ²Rhode Island School of Design, United States; ³Case Western Reserve University, United States

MF03.10.12

Dual Regime Spray of Functional Nanomaterials for Electronic Textiles [Taehoo Chang](#), Semih Akin, Laurent Couetil, Martin B. Jun and Chi Hwan Lee; Purdue University, United States

MF03.10.13

High-Performance Top-Gate Transistors by Metal Induced Charge Transport [Ji-Min Park](#) and Hyun-Suk Kim; Chungnam National University, Korea (the Republic of)

MF03.10.15

Single Crystal Thin Films of Silicon on Graphene Enabled by Solid Phase Epitaxy Connor Horn¹, Pavani Vamsi K. Nittala¹, Tarak Patra², Yulin Lin³, Jianguo Wen³, Abhinav Prakash¹, Subramanian Sankaranarayanan³, Supratik Guha^{1,3} and [Xella Doi](#)¹; ¹University of Chicago, United States; ²IIT Madras, India; ³Argonne National Laboratory, United States

SESSION MF03.11: Processing for Flexible/Large-Area Electronics II

Session Chairs: Joseph Andrews and Cinzia Casiraghi

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 328

9:15 AM MF03.11.01

High Performance P-Type Metal Oxide Field-Effect Transistors for Large-Area Monolithic Three-Dimensional Integration [Sooji Nam](#)^{1,2}, Hee-Ok Kim¹, Chihoon Sung^{1,2}, Kyunghee Choi¹, Jaehyun Moon¹, Himchan Oh¹ and Sung Haeng Cho¹; ¹Electronics and Telecommunications Research Institute, Korea (the Republic of); ²University of Science and Technology, Korea (the Republic of)

9:30 AM MF03.11.02

Small Molecule Contact-Controlled Transistors with Reduced Saturation Voltage via Vacuum Deposition [Eva Bestelink](#)¹, Ute Zschieschang², Hagen Klauk² and Radu A. Sporea¹; ¹University of Surrey, United Kingdom; ²Max Planck Institute for Solid State Research, Germany

9:45 AM MF03.11.03

Record CVD Graphene Mobility on Large Area and Scalable CVD Grown Hexagonal Boron Nitride [Ankit S. Rao](#) and Srinivasan Raghavan; Indian Institute of Science, India

10:00 AM BREAK

10:30 AM MF03.11.04

Epitaxial Deposition of Germanium Thin Films on Low-Cost, Large-Area, Flexible, Single-Crystal-Like Substrates [Amit Goyal](#)^{1,2}, Kyunghoon Kim¹, Gokul Radhakrishnan¹ and Ravi Droopad³; ¹TapeSolar Inc., United States; ²SUNY-Buffalo, United States; ³Texas State University, United States

10:45 AM MF03.11.05

Directly Photo-Patternable High-k Polymer Gate Dielectrics for Oxide Thin-Film Transistors [Seongcheol Jang](#) and Hyun-Suk Kim; chungnam national university, Korea (the Republic of)

11:00 AM MF03.11.06

Scalable Open-Air Ultrasonic Spray Deposition of PCBM/BCP Electron Transport Layer and Morphology Control via Rapid Thermal Processing [Justin P. Chen](#), Thomas W. Colburn, Margarita Golding and Reinhold H. Dauskardt; Stanford University, United States

11:15 AM MF03.11.07

Ultrathin Pinhole-Free Hexagonal Boron Nitride Dielectrics by the Repeated Stacking of Liquid-Liquid Assembled Monolayers [Joe Neilson](#); The University of Manchester, United Kingdom

11:30 AM MF03.11.08

Functional Oxides—Challenging the Future of Electronics Elvira Fortunato and [Rodrigo Martins](#); FCT-UNL, Portugal

SESSION MF03.12: Flexible Electronics to Enable Sensors or Wearable Devices

Session Chairs: Joseph Andrews and Cinzia Casiraghi

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 328

1:30 PM *MF03.12.01

From Forest to Electronics—Green Graphene for Biosensor and Applications Elvira Fortunato and [Rodrigo Martins](#); FCT-UNL, Portugal

2:00 PM MF03.12.02

Conformable High Sensitivity Tactile Sensors for Electronic Skin Applications Piero Cosseddu, Andrea Spanu, Antonello Mascia and [Annalisa](#)

Bonfiglio; University of Cagliari, Italy

2:15 PM MF03.12.04

Conformable Microneedle Platform for Sensing Bio-Chemical Analytes Wonryung Lee¹ and Byeong-soo Bae²; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of)

2:30 PM MF03.12.05

Low-Temperature Fabrication of Hole Blocking Layers for Large-Area, Flexible Amorphous Selenium UV and X-Ray Detectors Kaitlin Hellier, Shiloh Sacks and Shiva Abbaszadeh; University of California, Santa Cruz, United States

2:45 PM BREAK

3:15 PM MF03.12.07

Scalable Piezoelectric TFT Arrays on Flexible Substrates for Ultra-High Resolution 3D Force Imaging—From the Mechanism to Applications in Closed-Loop Robotics Hongseok Oh; Soongsil University, Korea (the Republic of)

3:30 PM MF03.12.08

In-Fiber Micro-Devices and Stretchable Interconnects for Textile-Based Electronics Juliette Marion, Nikhil Gupta, Polina Anikeeva and Yoel Fink; Massachusetts Institute of Technology, United States

3:45 PM MF03.12.09

Wearable Thermoelectric Generator for Sustainable Wearable Electronics Jiyong Kim¹, Salman Khan¹, Peng Wu², Sungjin Park¹, Hwanjoo Park¹, Gimin Park¹, Choongho Yu² and Woochul Kim¹; ¹Yonsei University, Korea (the Republic of); ²Texas A&M University, United States

SESSION MF03.13: Flexible and Large-Area Electronics I

Session Chairs: Joseph Andrews and Cinzia Casiraghi

Monday Morning, May 23, 2022

MF03-Virtual

8:00 AM *MF03.13.01

Processing and Doping of Carbon Nanotube Network Transistors on Polymer Substrates Jana Zaumscil; University of Heidelberg, Germany

8:30 AM MF03.13.02

A Universal Approach for Room-Temperature Printing and Coating of Two-Dimensional Materials Sina Abdolhosseinzadeh^{1,2}, Chuanfang (John) Zhang¹, Mahdich Shakoorioskooie^{3,4}, Frank Nüesch^{1,2} and Jakob Heier¹; ¹Swiss Federal Laboratories for Materials Science and Technology (Empa), Switzerland; ²Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland; ³Swiss Federal Institute of Science and Technology (Empa), Switzerland; ⁴Swiss Federal Institute of Technology Zürich (ETHZ), Switzerland

8:45 AM *MF03.13.03

Sensing at the Zeptomolar Concentration Level with Large Area Bioelectronic Interfaces Luisa Torsi and Eleonora Macchia; University of Bari A. Moro, Italy

9:15 AM MF03.13.04

Laser Photophysical Manufacturing of Multi-Functional Three-Dimensional Graphene and Graphene-Based Hybrid Materials with Polymers Pilgyu Kang¹, Byoung Gak Kim², Minsu Kim², Seung Min Lee¹, Shirin Movaghgharnezhad¹, Heeyoung Jeong² and Jun Woo Jeon²; ¹George Mason University, United States; ²Korea Research Institute of Chemical Technology, Korea (the Republic of)

9:30 AM MF03.13.05

Comparative Study of Printed and Laser-scribed Stretchable Conductors on Thin Elastomers for Soft and Wearable Electronics Kirill Keller¹, David Grafinger¹ and Francesco Greco^{1,2}; ¹Graz University of Technology, Austria; ²Scuola Superiore Sant'Anna, Italy

9:35 AM MF03.13.06

Study on the Rheological Properties of Etch Resist Inks for Flexible Printed Circuit Board Bo-Young Kim, Jeongah Kim, Seong Dae Park and Myong Jae Yoo; Korea Electronics Technology Institute, Korea (the Republic of)

9:40 AM MF03.13.07

Molecular Gates: Unlocking the Path to High-Resolution Patterning of Doping, Orientation and Microstructure in Organic Semiconductors Films Aleksandr Perevedentsev^{1,2} and Mariano Campoy-Quiles²; ¹Karlsruhe Institute of Technology, Germany; ²Institute of Materials Science of Barcelona (ICMAB-CSIC), Spain

9:55 AM MF03.13.08

Textiles Coated with Conductive Nanoparticles for Energy Scavenging Wearables and Self-Powered Electronics Bhaskar Dudem, Vivekananthan Venkateswaran and Ravi Silva; University of Surrey, United Kingdom

10:00 AM MF03.13.09

Tunable Wettability and Fog-Basking of Laser-Induced Graphene Through Processing Environment and Parameters Alexander Dallinger¹, Felix Steinwender¹, Matthias Gritzner¹, Manfred Nachtnebel^{2,1}, Martin Sterrer³, Harald Fitzek^{2,1} and Francesco Greco^{1,4}; ¹Graz University of Technology, Austria; ²Graz Centre for Electron Microscopy (ZFE), Austria; ³University of Graz, Austria; ⁴Scuola Superiore Sant'Anna, Italy

SESSION MF03.14: Flexible and Large-Area Electronics II

Session Chairs: Joseph Andrews and Vincenzo Pecunia

Monday Morning, May 23, 2022
MF03-Virtual

10:30 AM *MF03.14.01

Material and Process Considerations for Printing Organic Semiconductor Based Sensors [Ioannis Kymissis](#); Columbia University, United States

11:00 AM MF03.14.03

Rapid and Scalable Open-Air Combustion Synthesis with Plasma Anneal for Transparent Conducting Oxides [Thomas W. Colburn](#), Nicholas Rolston and Reinhold H. Dauskardt; Stanford University, United States

11:15 AM MF03.14.04

Silicon Dioxide Deposition in Polymer Using Sequential Infiltration Synthesis—*In Situ* FTIR Study [Vepa Rozyyev](#)^{1,1,2}, [Amelia Korveziroska](#)³, [Marcos Perez](#)³, [Anil Mane](#)^{1,1}, [Jeffrey W. Elam](#)^{1,1} and [Mahua Biswas](#)^{3,1}; ¹Argonne National Laboratory, United States; ²The University of Chicago, United States; ³Illinois State University, United States

11:30 AM MF03.07.10

Laser-Induced Graphene (LIG) Electrodes for Organic Electrochemical Transistors (OECT) [Mohammad Nazeri](#) and Gerd Grau; York University, Canada

SESSION MF03.15: Flexible and Large-Area Electronics III

Session Chairs: Joseph Andrews and Chang Kyu Jeong

Monday Afternoon, May 23, 2022

MF03-Virtual

9:10 PM MF03.12.03

Printed Radiation Sterilization Monitoring Sensor [Ulisses Heredia Rivera](#), [Sachin Kadian](#), [Sina Nejati](#), [Julia White](#), [Sotoudeh Sedaghat](#), [Zeynep Mutlu](#) and [Rahim Rahimi](#); purdue university, United States

9:25 PM MF03.06.08

Stretchable Lead-Free Perovskite/Polymer Nanofiber Composite for Hybrid Triboelectric and Piezoelectric Energy Harvesting [Feng Jiang](#)^{1,2}, [Yihui Zhang](#)^{2,3} and [Pooi See Lee](#)¹; ¹Nanyang Technological University, Singapore; ²Institute of Flexible Electronics Technology of Tsinghua, Zhejiang, China; ³Tsinghua University, China

9:30 PM MF03.15.01

Grain Boundary Passivation via Balancing Feedback of Hole Barrier Height Modulation in HfO_{2-x} for Flexible Electronics [Yeon Soo Kim](#), [Harry Chung](#), [Suhyoun Kwon](#), [Jihyun Kim](#) and [William Jo](#); Ewha Womans University, Korea (the Republic of)

9:45 PM *MF03.15.02

Solution-Processed Semiconductors for Self-Powered Electronics Toward Sustainable Internet of Things [Vincenzo Pecunia](#); Simon Fraser University, Canada

10:15 PM MF03.15.04

2D- SnS₂ Nanosheets Interspersed 3D-Hierarchical Melamine Foam-Based Ultra-Lightweight Composite for Multifunctional Sensing Applications [Sushmitha Veeralingam](#) and [Sushmee Badhulika](#); Indian Institute of Technology Hyderabad, India

10:30 PM MF03.15.05

Versatile Solution-Processed Organic-Inorganic Hybrid Superlattices for Ultraflexible and Transparent High-Performance Optoelectronic Devices [Minh Nhut Le](#) and [Myung-Gil Kim](#); SungKyunKwan University, Korea (the Republic of)

SESSION MF03.16: Flexible and Large-Area Electronics IV

Session Chairs: Joseph Andrews and Vincenzo Pecunia

Tuesday Morning, May 24, 2022

MF03-Virtual

10:30 AM *MF03.16.01

Textile-Based, Garment-Integrated Sensor Systems Created Using Chemical Vapor Deposition [Trisha L. Andrew](#); University of Massachusetts Amherst, United States

11:00 AM *MF03.16.02

N-Type and P-Type Oxide Electronics Through Area-Selective Atomic Layer Deposition [Rebecca L. Peterson](#), [Christopher R. Allemang](#), [Tae H. Cho](#), [Julia D. Lenef](#), [Nazanin Farjam](#), [Jaesung Jo](#), [Christopher P. Pannier](#), [Eric Kazzyak](#), [Carli Huber](#), [Shantam Ravan](#), [Mattison Rose](#), [Robin E. Rodriguez](#), [Kishwar Mashooq](#), [Orlando Trejo](#), [Kira Barton](#) and [Neil P. Dasgupta](#); University of Michigan, United States

11:30 AM MF03.16.03

Characterization of Flexible RFID Antenna Tags Fabricated by Sintering of Printed Silver Nanoparticulate Patterns [Justin Courville](#), [William Wirth](#), [August Gallo](#) and [Seonhee Jang](#); University of Louisiana at Lafayette, United States

11:45 AM MF03.16.04

NIR-Assisted Flash Soldering of Electrical Components on Printed Circuits [Venkat Kasi](#), [Amin Zareei](#), [Sachin Kadian](#) and [Rahim Rahimi](#); Purdue

University, United States

12:00 PM MF03.16.05

Scalable Manufacturing of Nano and Microelectronics Using Directed Assembly-Based Printing of Nanomaterials on Rigid and Flexible Substrates Ahmed A. Busnaina; Northeastern University, United States

12:15 PM MF03.07.09

Laser-Assisted Scalable Manufacturing of Nanoporous Carbon Electrodes for Rapid and Low-Cost Detection of Opioid and Non-Opioid Drugs in Biofluids Akshay Krishnakumar, Rupesh Kumar Mishra, Amin Zareei and Rahim Rahimi; Purdue University, United States

##PAGE_BREAK##

SYMPOSIUM NM01

Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications
May 8 - May 23, 2022

Symposium Organizers

Zakaria Al Balushi, University of California, Berkeley
Olga Kazakova, National Physical Laboratory
Su Ying Quek, National University of Singapore
Hyeon Jin Shin, Samsung Advanced Institute of Technology

* Invited Paper

SESSION NM01.01: Large-Scale Synthesis of 2D Materials by CVD
Session Chairs: Zakaria Al Balushi and Hanbin Song
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 311

8:30 AM INTRODUCTIONS AND WELCOME

8:45 AM NM01.01.01

Migration-Enhanced MOCVD of Fully-Coalesced WS₂ Monolayers Songyao Tang, Arne Debal, Annika Grundmann, Amir Ghiami, Michael Heuken, Andrei Vescan and Holger Kalisch; RWTH Aachen University, Germany

9:00 AM NM01.01.02

Controlled Rhenium Doping of Few-Layer MoS₂ Films Grown by Metal Organic Chemical Vapor Deposition Riccardo Torsi, Yu-Chuan Lin and Joshua Robinson; The Pennsylvania State University, United States

9:15 AM NM01.01.03

Domain Orientation-Controlled Epitaxial Growth of Tungsten Diselenide Monolayers Thomas McKnight^{1,1}, Krystal York², Haoyue Zhu¹, Tanushree Choudhury¹, Robert Makin², Steven Durbin² and Joan Redwing^{1,1}; ¹The Pennsylvania State University, United States; ²Western Michigan University, United States

9:30 AM NM01.01.04

Conformal Growth of Monolayer MoS₂ and WSe₂ on High Aspect Ratio Trenches Connor Bailey¹, Connor McClellan¹, Stephanie Bohachuk¹, Victoria Chen¹, Sukti Chatterjee² and Eric Pop¹; ¹Stanford University, United States; ²Applied Materials, Inc., United States

9:45 AM BREAK

SESSION NM01.02: Protocols to Large Scale Electronic Grade 2D Materials
Session Chairs: Zakaria Al Balushi and Andrew Mannix
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 311

10:30 AM NM01.02.01

Universal Approach towards 2D van der Waals Metal Chalcogenides from Molecular Building Blocks for Device Application [Veronika Brune](#), Aida Rauf, Michael Wilhelm, Anna K. Schmidt-Verma and Sanjay Mathur; University of Cologne, Germany

10:45 AM NM01.02.04

Clearing the Chemistry in the Synthesis of Transition Metal Dichalcogenides [Jincheng Lei](#), Yu Xie, Alex Kutana, Ksenia V. Bets and Boris I. Yakobson; Rice University, United States

SESSION NM01.03: Novel Growth Methods to Synthetic 2D Materials

Session Chairs: Zakaria Al Balushi and Hanbin Song

Sunday Afternoon, May 8, 2022

Hawai'i Convention Center, Level 3, 311

1:30 PM NM01.03.01

Towards Coveted Borophene on Insulators, Enabled by Step-Edge Epitax [Ksenia V. Bets](#) and Boris I. Yakobson; Rice University, United States

1:45 PM NM01.03.02

Two-Dimensional Gallium Oxide Realized via Confinement Heteroepitaxy [Furkan Turker](#)^{1,1}, Chengye Dong¹, Maxwell Wetherington^{1,1}, Hesham El-Sherif², Stephen Holoviak¹, Zachary J. Trdinich¹, Gopi Krishnan², Caleb Whittier², Susan B. Sinnott^{1,1,1}, Nabil Bassim^{2,3} and Joshua Robinson^{1,1,1}; ¹The Pennsylvania State University, United States; ²McMaster University, Canada; ³Canadian Centre for Electron Microscopy, Canada

2:00 PM NM01.03.03

Stabilizing 2D Phosphorus Allotropes at Confined Heterointerfaces [Jiayun Liang](#)¹, Mark Ma¹, Matthew Sherburne¹, Shaul Aloni², Hans Bechtel² and Zakaria Al Balushi¹; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

2:15 PM NM01.03.04

Accessing Exotic Quantum Materials via Soft-Chemical Synthesis [Xiaoyu Song](#)¹, Guangming Cheng², Jason F. Khoury¹, Nan Yao² and Leslie Schoop¹; ¹Princeton University, United States; ²Princeton Institute for Science and Technology of Materials, United States

2:30 PM NM01.03.05

Lattice Thermal Conductivity of VLS Grown van der Waals Nanowires [Anthony C. Salazar](#)^{1,2}, Hector Calderon³, Edy Cardona^{1,2}, Diana Sánchez Ruiz¹, Niharika Gupta¹, Christian Kisielowski², Junqiao Wu^{1,2} and Oscar Dubon^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Instituto Politécnico Nacional, Mexico

2:45 PM BREAK

SESSION NM01.04: Large Scale Processing and Integration of 2D Materials

Session Chairs: Zakaria Al Balushi and Anthony Salazar

Sunday Afternoon, May 8, 2022

Hawai'i Convention Center, Level 3, 311

3:15 PM NM01.04.02

Scalable Back-End-of-Line Compatible Growth of WS₂ Thin Films via Atomic Layer Deposition [Muhammed Juvaid Mangattuchali](#)¹, Chandan Das², Hippolyte P. Astier¹, John Sudijono² and Silvija Gradečak¹; ¹NUS Singapore, Singapore; ²Applied Materials, Inc., Singapore

3:30 PM NM01.04.03

Large Scale Development of MoS₂ Circuitry for Flexible, Active Matrix X-Ray/Vis Light Detector [Beom Jin Kim](#) and Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

3:45 PM NM01.04.04

Designing and Processing Transition Metal Dichalcogenide Alloys for Photonic Integrated Circuit Applications Rafael Jaramillo and [Yifei Li](#); Massachusetts Institute of Technology, United States

4:00 PM NM01.04.05

High Optical Quality TMD Heterostructures Obtained from MBE Growth and Subsequent Transfer onto SiO₂/Si Wafers [Valentino Jadrisko](#)^{1,2}, Borna Radatović², Borna Pelić², Antonio Supina², Benedetto Ardini¹, Carsten Busse³, Cristian Manzoni¹, Gianluca Valentini¹, Christoph Gadermaier¹, Giulio Cerrullo¹, Marko Kralj² and Nataša Vujičić²; ¹Politecnico di Milano, Italy; ²Institute of Physics, Croatia; ³Universität Siegen, Germany

4:15 PM NM01.04.06

Structure, Morphology and Strain in MoTe₂ Layers Grown on GaAs(111)B Substrates, MnTe and NiTe₂ Buffers by Molecular Beam Epitaxy Slawomir Kret¹, [Wiktoria Zajkowska](#)¹, Bogusława Kurowska¹, Marta Bilka¹, Bartłomiej Serebinski², Zuzanna Ogorzalek², Marta Gryglas-Borysiewicz², Janusz Sadowski^{1,2,3} and Wojciech Pacuski²; ¹Polish Academy of Sciences, Poland; ²University of Warsaw, Poland; ³Linnaeus University, Sweden

SESSION NM01.05: Twisted 2D Materials

Session Chairs: Zakaria Al Balushi and Hyeon Jin Shin

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 311

10:30 AM *NM01.05.01

Topological Domain Anti-Ferroelectricity in Twisted Bilayer Transition Metal Dichalcogenides [Philip Kim](#); Harvard University, United States

11:00 AM NM01.05.02

Quantitatively Mapping Lattice Reconstruction and Strain Fields in Moiré Materials [Madeline Van Winkle](#), Daniel K. Bediako, Nathanael Kazmierczak and Isabel Craig; University of California, Berkeley, United States

11:15 AM *NM01.05.03

Stacking-Dependent Electrochemistry in Twisted-Bilayer Graphene Superlattices Kaidi Zhang and [Daniel K. Bediako](#); UC Berkeley, United States

11:45 AM NM01.02.03

Scalable Synthesis of 2D van der Waals Superlattices [Nicholas Glavin](#); Air Force Research Laboratory, United States

SESSION NM01.06: Defect Engineering in 2D Materials

Session Chairs: Zakaria Al Balushi and Hyeon Jin Shin

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 311

1:30 PM *NM01.06.01

Layered Quantum Materials—Characterization and Applications [Andrea C. Ferrari](#); University of Cambridge, United Kingdom

2:00 PM NM01.06.02

Defect Emission in Two-Dimensional Transition Metal Dichalcogenides Yiru Zhu¹, [Yan Wang](#)¹, Soumya Sarkar¹, Juhwan Lim¹, Jung-In Lee¹, Robert Hoye² and Manish Chhowalla¹; ¹University of Cambridge, United Kingdom; ²Imperial College London, United Kingdom

2:15 PM NM01.06.03

Control of Optical Properties via Ion Irradiation of Two-Dimensional Transition Metal Dichalcogenides [Xuejing Wang](#), Jinkyong Yoo, Michael T. Pettes and Yongqiang Wang; Los Alamos National Laboratory, United States

2:30 PM NM01.06.04

Generation of Monosulfur Vacancies Using Synchrotron Radiation [Theresa Gruenleitner](#)¹, Alex Henning¹, Michele Bissolo¹, Marisa Zengerle¹, Luca Gregoratti², Matteo Amati², Andreas V. Stier¹, Alexander W. Holleitner¹, Jonathan J. Finley¹ and Ian D. Sharp¹; ¹Walter Schottky Institute, TUM, Germany; ²Elettra-Sincrotrone Trieste S.C.p.A., Italy

2:45 PM NM01.06.05

Atomic-Layer-Confined Multiple Quantum Wells Enabled by Monolithic Bandgap Engineering of Transition Metal Dichalcogenides [Yoon Seok Kim](#)¹, Sojung Kang², Jaepil So¹, Jong Chan Kim³, Kangwon Kim⁴, Seunghoon Yang¹, Yeonjoon Jung⁵, Yongjun Shin⁵, Seongwon Lee¹, Donghun Lee¹, Jin-Woo Park², Hyeonsik Cheong⁴, Hu Young Jeong³, Hong-Gyu Park¹, Gwan-Hyong Lee⁵ and Chul-Ho Lee¹; ¹Korea University, Korea (the Republic of); ²Yonsei University, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁴Sogang University, Korea (the Republic of); ⁵Seoul National University, Korea (the Republic of)

3:00 PM BREAK

SESSION NM01.07: New Frontiers in 2D Materials

Session Chairs: Zakaria Al Balushi and Hyeon Jin Shin

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 311

3:30 PM *NM01.07.01

New 2D with Atomically Thin Crystals [Jiwoong Park](#); University of Chicago, United States

4:00 PM *NM01.07.02

Two-Dimensional Spin Bistable Molecules [Xiao-Xiao Zhang](#); University of Florida, United States

4:30 PM *NM01.11.02

Ultrathin Solid Polymer Electrolytes for Electric Double Layer Gating of Two-Dimensional Crystal Field-Effect Transistors [Susan Fullerton](#)^{1,1}, Shubham Awate¹, Brendan Mostek¹, Shalini Kumari², Joshua Robinson^{2,2} and Ke Xu^{3,1}; ¹University of Pittsburgh, United States; ²The Pennsylvania State University, United States; ³Rochester Institute of Technology, United States

SESSION NM01.08: Poster Session I: Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications I

Session Chair: Zakaria Al Balushi

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM01.08.02

Phase Transition of Mechanically Exfoliated Molybdenum Disulfide [Ismail Sami](#), Soumya Sarkar, Yan Wang, Yang Li, Han Yan and Manish

Chhowalla; University of Cambridge, United Kingdom

NM01.08.04

Thermodynamics Perspective on 2D Materials Oxide Formation and Amelioration Yih-Ren Chang, Tomonori Nishimura and Kosuke Nagashio; The University of Tokyo, Japan

NM01.08.05

Morphology Engineering of Multilayer MoSe₂ FETs by Two-Step Functionalization Chang hwan Oh, Yeonjin Je, Do Hyeon Lee and Jun Hong Park; School of Materials Science & Engineering, Department of Materials Engineering and Convergence Technology, Gyeongsang National University, Korea (the Republic of)

NM01.08.06

Platform-Independent Integration of High-Speed Tellurium Photodetectors Gcun Ho Ahn¹, Alexander D. White¹, Hyungjin Kim², Ali Javey² and Jelena Vuckovic¹; ¹Stanford University, United States; ²University of California, Berkeley, United States

NM01.08.07

High Current Density of 2D Electrocatalysts for Hydrogen Evolution Reaction Jicun Yang; Kyung Hee University, Korea (the Republic of)

NM01.08.08

The Impact of Strain on the Growth Mode in CVD Mono- and Few-Layer MoS₂ Jonathan Rommelfangen, Alex Redinger, Phillip J. Dale, Sven Reichardt, Ludger Wirtz and Chu Van Ben; University of Luxembourg, Luxembourg

NM01.08.09

Adoptable High-Performance Actuators and Pumps Based on Ultralightweight 2D Nanomaterial Assemblies Lena M. Saure¹, Florian Rasch¹, Armin Reimers¹, Fabian Schuett¹, Ali S. Nia², Payam Hashemi², Xinliang Feng² and Rainer Adelung¹; ¹Kiel University, Germany; ²Technische Universität Dresden, Germany

NM01.08.10

Depletion Layer Formation-Driven Triboelectric Nanogenerators Based on MoS₂ Myeongjin Kim and Kyung-Hwa Yoo; Yonsei University, Korea (the Republic of)

NM01.08.11

Diverse Near Infrared and Visible-Range Optoelectronic Applications in Heterostructures of 2D Perovskites with Transition Metal Dichalcogenides Abin Varghese^{1,2,3}, Yuefeng Yin^{1,4}, Mingchao Wang¹, Saurabh Lodha³ and Nikhil Medhekar^{1,4}; ¹Monash University, Australia; ²IITB-Monash Research Academy, India; ³Indian Institute of Technology Bombay, India; ⁴ARC Centre of Excellence in Future Low Energy Electronic Technologies, Australia

NM01.08.15

New Molecular Approach Towards TMDCs and TMDC-Like Structures by Single Source Precursors Anja Sutorius, Veronika Brune, Corinna Hegemann and Sanjay Mathur; University of Cologne, Germany

NM01.08.17

Functional WS₂/CoFe₂O₄ Heterostructures Grown by Dual Laser Ablation Derick C. DeTellem, Nivarthana W. Mudiyansele, Sarath Witanachchi, Manh-Huong Phan and Minh Tuan Trinh; University of South Florida, United States

NM01.08.18

Remote Epitaxy on Monolayer MoS₂ to Fabricate Microcavity Yeonhoo Kim¹, John Watt¹, Xuedan Ma², Suhyun Kim³, Kibum Kang³, Ting S. Luk⁴, Young Joon Hong⁵ and Jinkyoungh Yoo¹; ¹Los Alamos National Laboratory, United States; ²Argonne National Laboratory, United States; ³Korea Advanced Institute of Science and Technology, Korea (the Republic of); ⁴Sandia National Laboratories, United States; ⁵Sejong University, Korea (the Republic of)

NM01.08.19

In Situ Mechanical Characterization and Degradation of 2D MOFs Rainhard Machatschek^{1,2}, Hafeesudeen Sahabudeen¹ and Andreas Lendlein^{1,2}; ¹Helmholtz Zentrum Hereon, Germany; ²University of Potsdam, Germany

NM01.08.20

Chemical Vapor Deposition of Monolayer MoS₂ on Chemomechanically Polished N-Polar GaN Rohan Sengupta¹, Shipra Vaidya¹, Dennis Szymanski¹, Pramod Reddy², Kenan Gundogdu¹, Ramon Collazo¹ and Spyridon Pavlidis¹; ¹North Carolina State University, United States; ²Adroit Materials, United States

NM01.08.21

Preparation of Magnesium Diboride Surface Coatings for Gravimetric Adsorption Characterization Thi Kieu Ngan Pham, Edward D. Bruffey, Joseph J. Brown and Godwin Severa; University of Hawaii at Manoa, United States

NM01.08.22

Visualizing Transparent 2D Sheets by Fluorescence Quenching Microscopy Zhizhi Kong^{1,2}, Matthias Daab³, Hitomi Yano⁴, Haiyue Huang², Josef Breu³, Takayoshi Sasaki⁴, SonBinh T. Nguyen² and Jiaying Huang²; ¹University of California, Berkeley, United States; ²Northwestern University, United States; ³University of Bayreuth, Germany; ⁴National Institute for Materials Science, Japan

NM01.08.23

Boosting Thermoelectric Performance of Ultrathin MoS₂ by Substrate-Induced Non-Uniform Strain Hong Kuan Ng^{1,2} and Jing Wu^{1,2}; ¹Institute of Materials Research and Engineering, Singapore; ²National University of Singapore, Singapore

NM01.08.24

Abundant Active Sites on the Basal Plane and Edges of Layered van der Waals Fe₃GeTe₂ for Highly Efficient Hydrogen Evolution Eunsoo Lee, Amir Rezaei, Diana Loung, Johan Yapo and Boniface Fokwa; University of California, Riverside, United States

NM01.08.25

Functional Ultralightweight Foams by Effective Assembly of 1D and 2D Nanomaterials Fabian Schuett¹, Florian Rasch¹, Lena M. Saure¹, Ali S. Nia², Xinliang Feng² and Rainer Adelung¹; ¹Kiel University, Germany; ²Technische Universität Dresden, Germany

NM01.08.28

Ferromagnetism in Co-Doped 2D Graphitic ZnO at Room Temperature Rui Chen^{1,2} and Jie Yao^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

NM01.08.29

Surface and Dynamical Properties of GeI₂ Archit Dhingra¹, Alexey Lipatov¹, Haidong Lu¹, Katerina Chagoya², Joseph Dalton², Alexei Gruverman¹, Alexander Sinitskii¹, Richard G. Blair² and Peter A. Dowben¹; ¹University of Nebraska-Lincoln, United States; ²University of Central Florida, United States

SESSION NM01.09: Advanced Characterization of 2D Materials

Session Chairs: Zakaria Al Balushi and Susan Fullerton

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 311

8:30 AM NM01.09.02

Understanding the Effect of Temperature on Phonon Vibrational Modes of WS₂ Crystals Chisom Okeke, Isaac Juma and Sanjay K. Behura; University of Arkansas at Pine Bluff, United States

8:45 AM NM01.09.03

Investigation of 1D-2D Heterostructures of Te on WSe₂ Using Scanning Nanodiffraction Bengisu N. Sari^{1,2}, Chunsong Zhao¹, Humberto Batiz^{1,2}, Daryl Chrzan^{1,2}, Ali Javey^{3,1,2} and Mary Scott^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³UC Berkeley, United States

9:00 AM NM01.09.04

Asymmetry of the Junction Line Defect Distribution in WS₂-WSe₂ Lateral/Vertical Heterostructures Revealed by TERS Imaging Andrey Kravayev¹, Peng Chen², Xidong Duan³, Zhengwei Zhang³ and Xiangfeng Duan⁴; ¹Horiba Scientific, United States; ²Southern University of Science and Technology, China; ³Hunan University, China; ⁴UCLA, United States

9:15 AM NM01.09.05

Toughening in 2D Materials Yingchao Yang¹, Huajian Gao² and Jun Lou³; ¹The University of Maine, United States; ²Nanyang Technological University, Singapore; ³Rice University, United States

9:45 AM BREAK

SESSION NM01.10: Advanced Microscopy of 2D Materials

Session Chairs: Zakaria Al Balushi and Sanjay Behura

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 311

10:30 AM *NM01.10.01

Picometer-Scale Characterization of Structure, Fields and Defects in 2D Materials Using 4D-STEM David A. Muller and Yu-Tsun Shao; Cornell University, United States

11:00 AM NM01.10.02

Revealing Optoelectronic Processes in Monolayer Transition Metal Dichalcogenides with Nanometre Resolution Cathodoluminescence Hugh Ramsden, James Kerfoot, Andrea Ferrari and Manish Chhowalla; University of Cambridge, United Kingdom

11:15 AM NM01.10.03

Visualizing Transparent 2D Sheets by Fluorescence Quenching Microscopy Zhizhi Kong^{1,2}, Matthias Daab³, Hitomi Yano⁴, Haiyue Huang², Josef Breu³, Takayoshi Sasaki⁴, SonBinh T. Nguyen² and Jiaxing Huang²; ¹University of California, Berkeley, United States; ²Northwestern University, United States; ³University of Bayreuth, Germany; ⁴National Institute for Materials Science, Japan

11:30 AM *NM01.10.04

Electronic Structure, Stacking Arrangement and the Interaction Strength of Tungsten Disulfide at the Gold Contact Taisuke Ohta; Sandia National Laboratories, United States

SESSION NM01.11: Logic Devices Enable by 2D Materials

Session Chairs: Zakaria Al Balushi and Sanjay Behura

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 311

1:30 PM *NM01.11.01

Towards High-Performance Transistors Based on High 2D Transition Metal Dichalcogenide Monolayers Yi Wan¹, Jing-Kai Huang², Sean Li² and Li Lain-Jong¹; ¹University of Hong Kong, Hong Kong; ²University of New South Wales, Australia

2:00 PM NM01.11.02

Multichannel Dual-Gate MoS₂ FETs Enabled by Folding van der Waals Heterostructures Hefei Liu, Jiangbin Wu, Hung-Yu Chen and Han Wang; University of Southern California, United States

2:15 PM NM01.11.03

Mechanical Stress Induced Tunable Resistance in MoS₂ Junctions Pradeep Chaudhary¹, Haidong Lu¹, Michael Loes¹, Alexey Lipatov^{1,2}, Alexander Sinitskii¹ and Alexei Gruverman¹; ¹University of Nebraska-Lincoln, United States; ²South Dakota School of Mines & Technology, United States

2:30 PM BREAK

3:00 PM *NM01.07.03

Advances in Organic 2D Crystals Xinliang Feng; Technische Universität Dresden, Germany

3:30 PM NM01.11.05

Optically Probing Energy Barrier Height Modulation in α -In₂Se₃ Based Ferroelectric Semiconductor Field Effect Transistors for Neuromorphic Applications Ting-Ching Chu, Joon-Seok Kim, Hyeonseon Choi, Zhehao Zhu and Lincoln J. Lauhon; Northwestern University, United States

3:45 PM NM01.11.06

Negative Capacitance in Two-Dimensional Devices—Exploration of Performance Metrics for Energy-Efficient Switching Sadegh Kamaei Bahmaei and Adrian Ionescu; Ecole Polytechnique Federale de Lausanne, Switzerland

4:00 PM NM01.11.07

Charge Trap Engineering and Synaptic Behavior of Transition Metal Dichalcogenides Transistor, via Molecular Dynamics. Yeonjin Je, Chang hwan Oh, Do Hyeon Lee and Jun Hong Park; Department of Materials Engineering and Convergence Technology, School of Materials Science & Engineering, Gyeongsang National University, Korea (the Republic of)

4:15 PM NM01.11.08

Enhanced Normally-off Characteristic of Dual p-n Homojunction WSe₂ FETs Dongryul Lee, Sanghyun Moon and Jihyun Kim; Korea University, Korea (the Republic of)

SESSION NM01.12: Poster Session II: Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications II

Session Chair: Zakaria Al Balushi

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM01.12.01

Multi-Level Generation Mechanism in Basic Floating Gate Memory Structure Oh Hun Gwon¹, Jong Yun Kim², Seok-Ju Kang², Hye Ryung Byun² and Young-Jun Yu^{1,2}; ¹Chungnam National University, Korea (the Republic of); ²Institute of Quantum Systems, Chungnam National University, Korea (the Republic of)

NM01.12.03

Gas Barrier Properties of Chemical Vapor-Deposited Graphene to Oxygen Imparted with Sub-eV Kinetic Energy Shuichi Ogawa¹, Hisato Yamaguchi², Edward F. Holby², Takatoshi Yamada³, Akitaka Yoshigoe⁴ and Yuji Takakuwa¹; ¹Tohoku University, Japan; ²Los Alamos National Laboratory, United States; ³National Institute of Advanced Industrial Science and Technology, Japan; ⁴Japan Atomic Energy Agency, Japan

NM01.12.04

Characterisation and Defect Analysis of 2D Layered Ternary Chalcogenides Tigran Simonian^{1,2}, Ahin Roy^{1,2}, Zdeněk Sofer³ and Valeria Nicolosi^{1,2}; ¹Trinity College Dublin, Ireland; ²Trinity College Dublin, The University of Dublin, Ireland; ³University of Chemistry and Technology, Czechia

NM01.12.05

Photoemission from Alkali Photocathodes Through an Atomically Thin Protection Layer Fangze Liu¹, Lei Guo², Jeffrey DeFazio³, Vitaly Pavlenko⁴, Nolan Regis⁴, Masahiro Yamamoto⁵, Nathan Moody⁴ and Hisato Yamaguchi⁴; ¹Beijing Institute of Technology, China; ²Nagoya University, Japan; ³Photonis Defense Inc., United States; ⁴Los Alamos National Laboratory, United States; ⁵High Energy Accelerator Research Organization (KEK), Japan

NM01.12.07

Biaxial Strain Engineering of MoSe₂/WSe₂ Heterostructures Jennifer Toy¹, Madeline Van Winkle¹, Daniel K. Bediako¹, Sefaattin (. Tongay² and Zakaria Al Balushi¹; ¹University of California, Berkeley, United States; ²Arizona State University, United States

NM01.12.09

NaCl-Assisted Low-Temperature Growth of Few-Layer WSe₂ by Pulsed Laser Deposition Inhyeok Oh and Sanghan Lee; Gwangju Institute of Science and Technology, Korea (the Republic of)

NM01.12.10

Seebeck Domain Formed by Grain Boundaries of 1H-MoS₂ Seungil Back¹, Ho-Ki Lyco², Jun Jung¹, Eui-Cheol Shin¹ and Yong-Hyun Kim¹; ¹KAIST, Korea (the Republic of); ²KRISS, Korea (the Republic of)

NM01.12.11

High-Mobility Junction Field-Effect Transistor via Graphene/MoS₂ Heterointerface [Taesoo Kim](#)^{1,1}, Sidi Fan¹, Sanghyub Lee^{1,1}, Min-Kyu Joo^{2,2} and Young Hee Lee^{1,1}; ¹Sungkyunkwan University, Korea (the Republic of); ²Sookmyung Women's University, Korea (the Republic of)

NM01.12.12

Covalent Functionalization of Carbophene Pores [Chad Junkermeier](#)¹, George Psogogiannakis² and Ricardo Paupitz³; ¹University of Hawaii Maui College, United States; ²University of Ottawa, Canada; ³Universidade Estadual Paulista, Brazil

NM01.12.13

Dynamically Structure-Evolved Ultrathin Layered Double Hydroxide Nanosheets for Highly Efficient 5-(hydroxymethyl)furfural Oxidation Yuwei Yang, Jason Scott, Nicholas Bedford and [Haira G. Hackbarth](#); University of New South Wales, Australia

NM01.12.14

Van der Waals Stacked Synapse Transistor Based on Efficient Charge-(de)trap Flash Memory [Hoyeon Cho](#), Jiyoung Kim, Kyungmin Ko and Joonki Suh; Ulsan National Institute of Science and Technology, United States

NM01.12.15

Ambipolar Charge Transport in Degenerately Doped Transition Metal Dichalcogenides [Kyungmin Ko](#), Mingyu Jang and Joonki Suh; UNIST, Korea (the Republic of)

NM01.12.16

Preparation of WO₃/MoS₂/Carbon Nanomaterials Hybrid Structures for Potential Energy Applications [Marta Mazurkiewicz-Pawlicka](#), Zuzanna Bojarska, Artur Malolepszy and Lukasz Makowski; Warsaw University of Technology, Poland

NM01.12.17

Synthesis of Borophane Polymorphs via Hydrogenation of Borophene [Qiucheng Li](#)¹, Venkata Surya Chaitanya Kolluru², Matthew S. Rahn¹, Pierre Darancet^{2,3}, Maria K. Chan^{2,3} and Mark C. Hersam¹; ¹Northwestern University, United States; ²Argonne National Laboratory, United States; ³Northwestern-Argonne Institute of Science and Engineering, United States

NM01.12.18

Complex Exciton Behavior in Monolayer WS₂ by Laser Irradiation [Hyojung Kim](#)¹ and Hye Min Oh²; ¹Sungkyunkwan University, Korea (the Republic of); ²Kunsan National University, Korea (the Republic of)

NM01.12.19

Unveiling the Nanoscale Mechanism(imaging) of 2D Nanomaterial-Based Memristive Devices [Seokjun Kim](#)¹, Byeongwan Kim¹, Wonseok Chang², Haeyong Kang¹, Sungsik Lee¹ and Songkil Kim¹; ¹Pusan National University, Korea (the Republic of); ²Korea Institute of Machinery and Materials, Korea (the Republic of)

NM01.12.20

Monolithic Interface Contact Engineering in 2D Semiconductor Photovoltaic Heterojunctions [Seunghoon Yang](#)¹, Janghwan Cha², Jong Chan Kim³, Woong Huh¹, Donghun Lee¹, Yoon Seok Kim¹, Seongwon Lee¹, Hong-Gyu Park¹, Hu Young Jeong³, Suklyun Hong², Gwan-Hyoung Lee⁴ and Chul-Ho Lee¹; ¹Korea University, Korea (the Republic of); ²Sejong University, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁴Seoul National University, Korea (the Republic of)

NM01.12.23

Electrically Controllable Neuromodulation Emulated by 2D Weight-Tunable Memristor for Neuromorphic Application [Woong Huh](#)¹, SeongHoon Jang¹, Jaepil So¹, Jong Chan Kim², Donghun Lee¹, Yeon Ho Kim¹, Hong-Gyu Park¹, Hu Young Jeong², Gunuk Wang¹ and Chul-Ho Lee¹; ¹Korea University, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of)

NM01.12.24

Origin of Proton-Beam-Induced Subgap Emission in MoSe₂ Monolayers [Yuan Chen](#)¹, Haidong Liang^{1,1}, Leyi Loh¹, Yi Wei Ho¹, Kenji Watanabe², Takashi Taniguchi², Michel Bosman¹, Andrew A. Bettiol^{1,1} and Goki Eda^{1,1,1}; ¹National University of Singapore, Singapore; ²National Institute for Materials Science, Japan

NM01.12.25

Synthesis of MoS₂/CNMs/TiO₂ Hybrid Nanostructures as Potential HER Catalysts [Zuzanna Bojarska](#), Marta Mazurkiewicz-Pawlicka, Artur Malolepszy and Lukasz Makowski; Warsaw University of Technology, Poland

NM01.12.26

Remote Modulation Doping in van der Waals Heterostructure Transistors Donghun Lee¹, Jea Jung Lee², [Yoon Seok Kim](#)¹, Yeon Ho Kim¹, Jong Chan Kim³, Woong Huh¹, Jaeho Lee¹, Sungmin Park¹, Hu Young Jeong³, Young Duck Kim² and Chul-Ho Lee¹; ¹Korea University, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of)

NM01.12.27

Microwave-Assisted Synthesis of Pt Nanoclusters on ReS₂ for Enhanced Hydrogen Evolution Reaction [Geonwoo Kim](#) and Unyong Jeong; Pohang University of Science and Technology, Korea (the Republic of)

NM01.12.28

Investigating Large-Area 2D Magnetic Materials with Neutron Reflectometry [June Hyuk Lee](#); Korea Atomic Energy Research Institutue, Korea (the Republic of)

NM01.12.29

Layer Control and Electronic State Modulation of MoS₂ Thin Film with Wafer-Scaled Uniformity [Jae-Hwan Jung](#)¹, Ahrum Sohn¹, Changhyun Kim², Hyeon Jin Shin² and Sang-Woo Kim¹; ¹SungKyunKwan University, Korea (the Republic of); ²Samsung Advanced Institute of Technology, Korea (the Republic of)

SESSION NM01.13: Hybrid 2D Materials
Session Chairs: Zakaria Al Balushi and Taisuke Ohta
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 311

8:30 AM NM01.13.01

Defect Engineered 2D Layered Double Hydroxides for Biomass Electrooxidation Reactions Nicholas Bedford; University of New South Wales, Australia

8:45 AM NM01.13.02

Robust Synthesis of 2D ABX₃ Perovskites as Building Blocks for Vertical Junction Shuchen Zhang and Letian Dou; Purdue University, United States

9:00 AM NM01.13.04

Microwaves-Assisted Synthesis of Tunable TMD-COF Heterostructures Lucas K. Beagle^{1,2}, David Moore^{1,2}, Ly D. Tran^{1,2}, Luke A. Baldwin¹ and Nicholas Glavin¹; ¹Air Force Research Laboratory, United States; ²UES, Inc., United States

9:30 AM BREAK

SESSION NM01.14: Magnetism in 2D Materials
Session Chairs: Zakaria Al Balushi and Souvik Biswas
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 311

10:15 AM *NM01.14.01

van der Waals Layered Magnetic Semiconductors Young Hee Lee^{1,2}; ¹Sungkyunkwan University, Korea (the Republic of); ²IBS Center for Integrated Nanostructure Physics, Korea (the Republic of)

10:45 AM NM01.14.02

Room Temperature Ferromagnetism in Metal-Rich, Large-Area Fe_{3-x}GeTe₂ Films Synthesized by van der Waals Epitaxy on Graphene Hua Lv, J. Marcelo J. Lopes, Michael Hanke and Manfred Ramsteiner; Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e. V., Germany

11:00 AM NM01.14.03

Unravelling the Longstanding Problem of the van der Waals Magnetic Material CrI₃—Spins, Structure and Dimensionality Efrén Navarro-Moratalla¹, Jaume Meseguer-Sánchez¹, Catalin Popescu², Pierluigi Gargiani², Manuel Valvidares² and José Luis García-Muñoz³; ¹Instituto de Ciencia Molecular, Spain; ²CELLS-ALBA Synchrotron Light Facility, Spain; ³Institut de Ciència de Materials de Barcelona, Spain

11:15 AM NM01.14.04

Spin Valves with Exfoliated 2D Semiconductors—MoS₂ and Beyond Marta Galbiati^{1,2}, Florian Godel², Aymeric Vecchiola², Victor Zatkan², Hao Wei², Julian Peiro², Sergio Tatay¹, Regina Galceran², Alicia Forment-Aliaga¹, Eugenio Coronado¹, Marie-Blandine Martin², Bruno Dlubak² and Pierre Seneor²; ¹Universidad de Valencia, Spain; ²Unité Mixte de Physique CNRS/Thales, France

11:30 AM *NM01.14.05

Low-Power, Long-Range Spin Transfer in Frustrated Magnets and Other Correlated Systems James G. Analytis and Shannon C. Haley; University of California, Berkeley, United States

SESSION NM01.15: Memory Devices Based on 2D Materials
Session Chairs: Zakaria Al Balushi and SungWoo Nam
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 311

1:30 PM *NM01.15.01

Defectronics—Application of Defects in Memory, Computing and Switching Deji Akinwande; The University of Texas at Austin, United States

2:00 PM NM01.15.02

Two-Dimensional Ferroelectric Heterostructure Field-Effective-Transistor for Wide Memory Window Non-Volatile Memory and Neuromorphic Computing Hyun Ho Yoo, Sungpyo Baek, Prashant Singh, Jingjie Niu and Sungjoo Lee; Sungkyunkwan University, Korea (the Republic of)

2:15 PM NM01.15.03

2D Memristors Based on Gr/Sr2Nb3O10/Gr van der Waals Heterostructure for Neuromorphic Computing Kyungjune Cho¹, Haena Yim¹, Ji-Won Choi¹, Takhee Lee² and Seungjun Chung¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

2:30 PM BREAK

SESSION NM01.16: 2D Mechanics
Session Chairs: Zakaria Al Balushi and Young Hee Lee

Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 311

3:30 PM *NM01.16.01

Fracture of Two-Dimensional Materials Jun Lou; Rice University, United States

4:00 PM *NM01.16.02

Strain Engineering of Two-Dimensional Semiconductors SungWoo Nam; University of California, Irvine, United States

4:30 PM NM01.16.03

Tuning Properties of Molybdenum Disulfide Electrochemical Actuators with Ion Intercalation Ismail Sami, Zhuangnan Li, Wesley M. Dose, Michael De Volder and Manish Chhowalla; University of Cambridge, United Kingdom

4:45 PM NM01.16.04

Converse Flexoelectric Two-Dimensional MoS₂ Actuator Yeageun Lee¹, Hyungjong Bac¹, Farhadul M. Haque¹, Keon-Hee Lim¹, Jin Myung Kim¹ and SungWoo Nam^{1,2}; ¹University of Illinois at Urbana-Champaign, United States; ²University of California, Irvine, United States

SESSION NM01.17: Poster Session III: Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications III

Session Chair: Zakaria Al Balushi
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM01.17.03

Wide Range Continuously Tunable and Fast Thermal Switching Based on Compressible Graphene Composite Foams Zixin Xiong¹ and Tingting Du²; ¹Purdue University, United States; ²Shandong University, China

NM01.17.04

HfZrO₂-Based Negative Capacitance Field-Effect Transistor with Molybdenum Disulfide Transition Metal Dichalcogenides and Al₂O₃ Dielectrics Moonyoung Jung¹ and Dongseok Suh^{1,2}; ¹Sungkyunkwan university, Korea (the Republic of); ²Institute for Basic Science, Korea (the Republic of)

NM01.17.06

Buried Graphene-Based Triple Gates for Steep Slope TFETs Alexander Gumprich, Sarah E. Beck, Stefan Tappertzshofen and Raphael D. Ahlmann; TU Dortmund University, Germany

NM01.17.08

Long-Term Multilevel Memory and Synaptic Function Transistors Using 2D MoSe₂/MoS₂ Heterostack Channel Yeonsu Jeong and Seongil Im; Yonsei University, Korea (the Republic of)

NM01.17.09

Contact Resistance Reduction in 2D MoS₂ FETs Through the Thermal-Evaporated LiF Interlayer Hyunmin Cho and Seongil Im; Department of Physics, Yonsei University, Korea (the Republic of)

NM01.17.11

Change in the Phonon Frequency Spectra of Xenon due to an Isotopic Impurity Vinod K. Tewary and Edward J. Garboczi; National Institute of Standards and Technology, United States

NM01.17.13

Surface Alloy as a New Substrate for Transition Metal Dichalcogenide Growth by Chemical Vapor Deposition Intek Song; Andong National University, Korea (the Republic of)

NM01.17.14

The Synthesis and Characterization of Homogeneous High-Quality Graphene Encapsulated Metallic Powders via Plasma Enhanced Rotating CVD Deniz Cakir¹, Omer R. Caylan^{1,2}, Ogulcan Akgun³, Gunce Dugan³, Halil O. Tugrul³, Benat Kockar³, Erdem Acar¹ and Goknur Cambaz Buke^{1,4}; ¹TOBB University of Economics and Technology, Turkey; ²Bilkent University, Turkey; ³Hacettepe University, Turkey

NM01.17.16

Predicting the Electronic and Thermal Properties of Transitional Metal Dichalcogenide Heterostructure Francis H. Davies, Conor J. Price, Shane G. Davies and Steven P. Hepplestone; University of Exeter, United Kingdom

NM01.17.17

Mesoscale Operando Investigation of Electrochemically Controlled Anion Intercalation in 2D van der Waals Heterostructure Mehdi Rezaee¹, Hana Yoon², Yeong A Lee², Kanghoon Yim², Rizcky Tamarany², Chanwoo Lee², Valerie McGraw³, Takashi Taniguchi⁴, Kenji Watanabe⁴, Philip Kim⁵, Chung Yul Yoo⁶ and Daniel K. Bediako³; ¹Harvard University, United States; ²Korea Institute of Energy Research, Korea (the Democratic People's Republic of); ³University of California Berkeley, United States; ⁴National Institute for Materials Science, Japan; ⁵Harvard University, United States; ⁶Mokpo National University, Korea (the Democratic People's Republic of)

NM01.17.18

Molecular Beam Epitaxial Growth of Indium Telluride on Graphene Sangmin Lee, Gyu-Chul Yi and Miyoung Kim; Seoul National University, Korea (the Republic of)

NM01.17.21

A Low Temperature, Liquid Phase Route to Porous Graphene and Graphene-Magnetic Composites [Vicki L. Colvin](#); Brown University, United States

NM01.17.22

Understanding the Effect of Temperature on Phonon Vibrational Modes of WS₂ Crystals Chisom Okeke, Isaac Juma and [Sanjay K. Behura](#); University of Arkansas at Pine Bluff, United States

NM01.17.23

Kinetic Three Modes of Growth in CVD Grown Hexagonal Boron Nitride (h-BN) [Ankit S. Rao](#) and Srinivasan Raghavan; Indian Institute of Science, India

NM01.17.24

Ion Beam Synthesis of Layer-Tunable and Transfer-Free Graphene on Arbitrary Substrates Towards Versatile Applications [Yongqiang Wang](#); Los Alamos National Laboratory, United States

NM01.17.26

Methods of Obtaining Graphene Structures from Mineral Graphite [Pawel Gluchowski](#)¹, Adrianna Grabowska^{1,2}, Natalia Bartzak^{1,2}, Marta Maciej^{1,2}, Robert Tomala¹, Mariusz Stefanski¹, Anna Wedzynska¹, Jerzy Kowalczyk¹ and Wieslaw Strek¹; ¹Institute of Low Temperature and Structure Research Polish Academy of Sciences, Poland; ²Wroclaw University of Science and Technology, Poland

NM01.17.28

Graphene Flakes from the Mineral Graphite and Its Use in the Composites [Robert Tomala](#)¹, Adrianna Grabowska^{1,2}, Marta Maciej^{1,2}, Natalia Bartzak^{1,2}, Mariusz Stefanski¹, Anna Wedzynska¹, Jerzy Kowalczyk¹, Konrad Szustakiewicz², Wieslaw Strek¹ and Pawel Gluchowski¹; ¹Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Poland; ²Wroclaw University of Science and Technology, Poland

NM01.17.29

Graphitic Carbon Fiber Microelectrode pH Sensors [Alexander G. Zestos](#)¹, Whirang Cho¹ and Arvind Balijepalli²; ¹American University, United States; ²National Institute of Standards and Technology, United States

NM01.17.30

Density Functional Theory Driven Phononic Thermal Conductivity Prediction of Biphenylene—A Comparison with Graphene Harish Veeravenkata and [Ankit Jain](#); Indian Institute of Technology Bombay, India

NM01.17.31

Shear-Assisted Compression Induced Diamane Formation in Hydrogenated Multilayer Graphene [Shiddhartha Paul](#)¹, Kasra Momeni¹ and Jayati Halder Ju²; ¹The University of Alabama, United States; ²University of Pittsburgh, United States

NM01.17.33

Synthesis of Negatively Charged Two-Dimensional Semiconducting 2H-MoS₂ and Its Functionalisation [Aleksandra M. Krajewska](#) and Aidan McDonald; Trinity College Dublin, Ireland

SESSION NM01.18: Optical Properties of 2D Materials

Session Chairs: Zakaria Al Balushi and Kibum Kang

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 311

8:30 AM NM01.18.01

First-Principles Study of Borophene-Boride Hetero-Structures [Luqing Wang](#)^{1,2}, Qunfei Zhou^{1,2}, Qiucheng Li¹, Joshua Paul^{1,2}, Mark C. Hersam^{1,1}, Pierre T. Darancet² and Maria K. Chan²; ¹Northwestern University, United States; ²Argonne National Laboratory, United States

8:45 AM NM01.18.02

Impurity Luminescence from a 2D Semiconductor in the Ultradilute Limit [Levi Loh](#)^{1,1}, Fengyuan Xuan^{1,1}, Yuan Chen¹, Yi Wei Ho¹, Junyong Wang¹, Kenji Watanabe², Takashi Taniguchi², Michel Bosman¹, Su Ying Quek^{1,1,1} and Goki Eda^{1,1,1}; ¹National University of Singapore, Singapore; ²National Institute for Materials Science, Japan

9:00 AM NM01.18.03

Optical Properties of Group-14 Xenos [Carlo Grazianetti](#)¹, Christian Martella¹, Elconora Bonaventura¹, Daya Dhungana¹, Stefano Lupi² and Alessandro Molle¹; ¹CNR-IMM, Italy; ²CNR-IOM, Italy

9:15 AM NM01.18.04

First Principles Study of Multiparticle Excitations in Monolayer MoTe₂ [Supavit Pokawanvit](#)^{1,1}, Aurelie Champagne², Jonah B. Haber^{2,3}, Diana Qiu⁴, Jeffrey B. Neaton^{2,3,5} and Felipe H. da Jornada¹; ¹Stanford University, United States; ²Lawrence Berkeley National Laboratory, United States; ³University of California Berkeley, United States; ⁴Yale University, United States; ⁵Kavli Energy NanoSciences Institute at Berkeley, United States

9:30 AM NM01.18.05

Photoexcitations and Optical Response of Carrier-Doped Monolayer MoTe₂ from First Principles [Aurelie Champagne](#)^{1,2}, Jonah B. Haber², Supavit Pokawanvit³, Souvik Biswas⁴, Diana Qiu⁵, Harry A. Atwater⁴, Felipe H. da Jornada³ and Jeffrey B. Neaton^{2,1,6}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Stanford University, United States; ⁴California Institute of Technology, United States; ⁵Yale University, United States; ⁶Kavli Energy NanoScience Institute, United States

9:45 AM NM01.18.06

Interlayer Excitons Investigated by Nano-PL and Nano-Photocurrent Modalities Thomas P. Darlington, Emanuil Yanev, Xuehao Wu, Abhay Pasupathy and Peter J. Schuck; Columbia University, United States

10:00 AM BREAK

10:30 AM NM01.18.07

Exciton Dynamics at Reconstructed Edges in Monolayer Black Phosphorus Souvik Biswas¹, Joeson Wong¹, Hamidreza Akbari¹, Kenji Watanabe², Takashi Taniguchi² and Harry A. Atwater¹; ¹California Institute of Technology, United States; ²National Institute for Materials Science, Japan

10:45 AM NM01.18.08

Many-Body Exciton and Inter-Valley Correlations in Heavily Electron-Doped WSe₂ Monolayers Scott Crooker¹, Jing Li¹, Mateusz Goryca¹, Junho Choi¹ and Xiaodong Xu²; ¹National High Magnetic Field Lab, United States; ²University of Washington, United States

11:00 AM NM01.18.09

Tuning van der Waals Heterostructures with Near-Field Electrostatics Qunfei Zhou¹, Michele Kotiuga² and Pierre T. Darancet³; ¹Northwestern University, United States; ²EPFL, Switzerland; ³Argonne National Laboratory, United States

11:15 AM *NM01.18.10

Exploring Many-Body Effects on the Dynamics of Optical Excitations in Low-Dimensional Materials Diana Qiu; Yale University, United States

SESSION NM01.19: Advance Manufacturing Methods for 2D Materials

Session Chairs: Zakaria Al Balushi and Diana Qiu

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 311

1:30 PM *NM01.19.01

Robotic Four-Dimensional Pixel Assembly of van der Waals Solids Andrew J. Mannix¹, Andrew Ye², SukHyun Sung³, Ariana Ray⁴, Fauzia S. Mujid², Chibeom Park², Myungjae Lee², Jong-Hoon Kang², Robert Shreiner², Alexander High², David A. Muller⁴, Robert Hovden³ and Jiwoong Park^{2,2}; ¹Stanford University, United States; ²The University of Chicago, United States; ³University of Michigan–Ann Arbor, United States; ⁴Cornell University, United States

2:00 PM NM01.19.02

Inkjet Printed Circuits with 2D Semiconductor Inks for High-Performance Electronics Tian Carey¹, Adrees Arbab², Luca Anzi³, Helen Bristow⁴, Fei Hui², Sivasambu Bohm², Gwenhivir Wyatt-Moon², Andrew Flewitt², Andrew Wadsworth⁴, Nicola Gasparini⁴, Jong Min Kim², Mario Lanza⁶, Iain McCulloch⁴, Roman Sordan³ and Felice Torrisi²; ¹Trinity College Dublin, Ireland; ²University of Cambridge, United Kingdom; ³Politecnico di Milano, Italy; ⁴Imperial College London, United Kingdom; ⁵Technion – Israel Institute of Technology, Israel; ⁶KAUST, Saudi Arabia

2:15 PM NM01.19.04

From Powder to Large-Area Films—A Solution Processable Route for Production of Pristine and Alloyed 2D TMDs for Optoelectronic Applications Rebekah Wells¹, Marc Esteve^{2,1}, Marina Caretti¹, Charles Lhermitte³ and Kevin Sivula¹; ¹Ecole Polytechnique Federale de Lausanne, Switzerland; ²Polytechnic University of Catalonia, Spain; ³Los Alamos National Laboratory, United States

2:30 PM BREAK

3:00 PM *NM01.19.05

Beyond 2D Binary Metal-Chalcogenides—2D Ternary Metal-Chalcogenides and 2D Oxides Kibum Kang; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

3:30 PM NM01.19.06

2D-Material-Integrated Micromachines with Anomalous Propulsion Yun Huang¹, Jianhe Guo¹, Yufan Li² and Donglei (Emma) Fan¹; ¹The University of Texas at Austin, United States; ²The Johns Hopkins University, United States

3:45 PM NM01.19.07

Edge-Contacted Transition Metal Dichalcogenide Transistors—An Experimental Analysis of Fabrication Techniques Hattan Abuzaid¹, Zhihui Cheng^{1,2,3}, Guoqing Li⁴, Linyou Cao⁴ and Aaron D. Franklin^{1,1}; ¹Duke University, United States; ²National Institute of Standards and Technology, United States; ³Purdue University, United States; ⁴North Carolina State University, United States

4:00 PM NM01.19.08

Ultrasensitive Molecular Sensors Based on Real-Time Impedance Spectroscopy in Solution-Processed 2D Materials David Moore^{1,2}, Nicholas Glavin², Lucas K. Beagle^{1,2} and Michael Brothers^{1,2}; ¹UES inc, United States; ²AFRL, United States

4:15 PM NM01.19.09

Hexagonal BN Enabled Fabrication of 2D Transition Metal Dichalcogenides Based Electronic Nanobiosensors Mengqiang Zhao¹, Mo Li¹, Chengyu Wen² and A.T. Charlie Johnson²; ¹New Jersey Institute of Technology, United States; ²University of Pennsylvania, United States

SESSION NM01.20: Physical Properties of 2D Materials

Session Chairs: Zakaria Al Balushi and Kate Reidy

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 311

8:30 AM NM01.20.01

Data-Driven Engineering of Spin Injection in Magnetic Tunnel Junctions Based on van der Waals Materials [Marcelo A. Kuroda](#), Jonathan J. Heath and Adam M. Pfeifle; Auburn Univ, United States

8:45 AM NM01.20.03

Local Electronic Structure and Control of Nanoscale Heterogeneity in Transition Metal Dichalcogenide-Au Interfaces [Alex M. Boehm](#)¹, Jose Fonseca², Jeremy Robinson² and Taisuke Ohta¹; ¹Sandia National Laboratories, United States; ²U.S. Naval Research Laboratory, United States

9:00 AM NM01.20.04

Strain-Induced Semiconducting to Semi-Metallic Phase Transition in MoTe₂ Using a Single-Ion Conductor [Shubham Sukumar Awate](#)¹, Ke Xu², Jierui Liang³, Eric Beckman¹ and Susan Fullerton¹; ¹University of Pittsburgh, United States; ²Rochester Institute of Technology, United States; ³University of Maryland, United States

9:15 AM NM01.20.05

Experimental Demonstration of Gate Dependent Refractive Index and Phase Modulation in Monolayer Molybdenum Diselenide Heterostructures for Active Metasurfaces [Melissa Li](#), Claudio Hail, Souvik Biswas and Harry A. Atwater; California Institute of Technology, United States

9:30 AM BREAK

SESSION NM01.21: Novel Synthesis of 2D Materials and Heterostructures

Session Chairs: Zakaria Al Balushi and Jiayun Liang

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 311

10:30 AM NM01.21.01

Formation and Structure of Oxides of Layered Two-Dimensional Semiconductors [Kate Reidy](#), Seong Soon Jo, Baoming Wang, Yifei Li, Wouter Mortelmans, Rafael Jaramillo and Frances Ross; Massachusetts Institute of Technology, United States

10:45 AM NM01.21.02

Gold-Catalyzed Growth of Vertically Oriented GaS_{1-x}Te_x van der Waals Nanowire Arrays [Daniel R. Paulo-Wach](#)^{1,2}, Edy Cardona^{1,2}, Matthew Horton¹, Shaul Aloni¹ and Oscar Dubon^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

11:00 AM NM01.21.03

Synthesis and Characterization of Monolayer and Few-Layer InSe Electronics [Kathryn Neilson](#), Marc Jaikissoon, Connor Bailey, Krishna Saraswat and Eric Pop; Stanford University, United States

11:15 AM NM01.21.04

Mechanisms of Nanoscroll Formation in 2D Transition Metal Oxides from *Ab Initio* Simulations [Adway Gupta](#) and Arunima K. Singh; Arizona State University, United States

11:30 AM NM01.21.05

High-Throughput Identification of Stable 2D Janus-Bulk Materials Heterostructures [Tara M. Boland](#) and Arunima K. Singh; Arizona State University, United States

11:45 AM NM01.21.06

Energy and Charge Transfer in Hybrid Heterostructures Consisting of MoS₂ Monolayers and Fluorescent Organic Molecules [Soyeong Kwon](#)¹, Jungeun Song¹, Nguyen Thi Anh¹, Dong yeun Jeong¹, Ki Kang Kim², Youngmin You¹, Taeyoung Choi¹ and Dong-Wook Kim¹; ¹Ewha Womans University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

SESSION NM01.22: 2D Materials for Energy

Session Chairs: Zakaria Al Balushi and Jiayun Liang

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 311

1:30 PM NM01.22.01

Metallic Phase 2D MoS₂ Nanosheets as Anodes for Sodium-Ion Batteries [Jung-In Lee](#), Zhuangnan Li, Ismail Sami and Manish Chhowalla; University of Cambridge, United Kingdom

1:45 PM NM01.22.02

Large-Area 2D-MoS₂/black-Si Heterostructure for Next-Generation Energy Storage Swe Z. Oo¹, Jack Tyson¹, Asim Mumtaz², Stuart Boden¹, Tasmia Rahman¹, Ioannis Zeimpekis¹ and [Katrina A. Morgan](#)¹; ¹University of Southampton, United Kingdom; ²University of Liverpool, United Kingdom

2:00 PM NM01.22.03

Synthesis and Electrochemical Performance of Mo₂AlB₂ as Electrode Material for Li-Ion Battery [Ahmad Majed](#)¹, Chaochao Dun², Jeffrey Urban² and Michael Naguib¹; ¹Tulane University, United States; ²Lawrence Berkeley National Laboratory, United States

2:15 PM BREAK

SESSION NM01.23: Transport Properties in 2D Materials
Session Chairs: Zakaria Al Balushi and Jiayun Liang
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, 311

3:00 PM NM01.23.01

P-type Contacts on Two-Dimensional Transition Metal Dichalcogenide Semiconductors [Yan Wang](#)¹, Jong Chan Kim², Yang Li¹, Kyung Yeol Ma², Seokmo Hong², Minsu Kim², Hyeon Suk Shin², Hu Young Jeong² and Manish Chhowalla¹; ¹University of Cambridge, United States; ²UNIST, Korea (the Republic of)

3:15 PM NM01.23.02

Understanding the Role of Contacts for Ferroelectric Control in vdW Heterostructures [Soumya Sarkar](#), Yan Wang, Jung Ho Kim, Jung-In Lee and Manish Chhowalla; University of Cambridge, United Kingdom

3:30 PM NM01.23.03

Van der Waals Vertical *p-n* Junction Using Low Resistance Contacts [Jung Ho Kim](#), Yan Wang and Manish Chhowalla; University of Cambridge, United Kingdom

3:45 PM NM01.23.04

In, Sn and Bi Contacts to Monolayer MoS₂—Alloying for Temperature Tolerance and Silicon CMOS Compatibility [Aravindh Kumar](#), Kirstin E. Schauble, Kathryn Neilson, Alvin Tang, Pranav Ramesh, Eric Pop and Krishna Saraswat; Stanford University, United States

4:00 PM NM01.23.05

Ultrathin Germanium as an Interlayer for Silver Contacts to Monolayer MoS₂ [Kirstin E. Schauble](#), Aravindh Kumar, Stephanie Bohaichuk, Ryan Grady, Krishna Saraswat and Eric Pop; Stanford University, United States

4:15 PM NM01.23.06

Photocurrent in TMDC/Graphene Heterostructure Photodetectors—The Role of Adsorbates Yannick Beckmann¹, Leon Daniel¹, Annika Grundmann², Mohamed Abdelbaky¹, Michael Heuken^{3,2}, Wolfgang Mertin¹, Holger Kalisch², Andrei Vescan², [Tilmar Kuehnmell](#)¹ and Gerd Bacher¹; ¹Universität Duisburg-Essen, Germany; ²RWTH Aachen University, Germany; ³Aixtron SE, Germany

4:30 PM NM01.23.07

Ferroelectric Control of the Band Structure of the Transition Metal Dichalcogenide WSe₂ [Raphael Salazar](#)¹, Sara Varotto², Céline Vergnaud³, Vincent Garcia², Stéphane Fusil², Julien Chaste⁴, Thomas Maroutian⁴, Alain Marty³, Frédéric Bonell³, Abdelkarim Ouerghi³, Matthieu Jamet³, Manuel Bibes² and Julien Rault¹; ¹Synchrotron SOLEIL, France; ²Centre National de la Recherche Scientifique, France; ³Commissariat à l'énergie atomique et aux énergies alternatives, France; ⁴Université Paris-Saclay, France

SESSION NM01.24: Physical Properties of 2D Materials Beyond Graphene I
Session Chairs: Sarah Haigh and Su Ying Quek
Monday Morning, May 23, 2022
NM01-Virtual

8:00 AM *NM01.24.02

Exciton Complexes and Spin/Valley Pumping in Doped Monolayer Semiconductors [Marie Xavier](#)¹, Lei Ren¹, Cedric Robert¹, Min Yang², Dinh Van Tuan², Fabian Cadiz³, Daniel Paget³, Fausto Sirotti³, Takashi Taniguchi⁴, Kenji Watanabe⁴, Bernhard Urbaszek¹, Thierry Amand¹, Hanan Dery² and Laurent Lombez¹; ¹INSA, France; ²University of Rochester, United States; ³Ecole Polytechnique - CNRS, France; ⁴NIMS, Japan

8:30 AM NM01.24.03

Valley-Polarized Hyperbolic-Exciton-Polaritons in 2D Semiconductors [Tomer Eini](#), Tal Asherov, Yarden Mazor and Itai Epstein; Tel Aviv University, Israel

8:45 AM NM01.24.04

Anomalous Raman Spectra Obtained from Zirconium-Based TMDs Nanosheets toward Thermal Properties Extracting [Awsaf A. AlSulami](#)¹, Faisal Alamri¹, Majed Alharbi¹, Abrar Alhazmi¹, Olaiyan Alolaiyan¹, Abdullah Alrasheed¹, Khalid Alhamdan¹, Kin Wong² and Moh R. Amer^{1,2}; ¹King Abdulaziz City for Science and Technology (KACST), Saudi Arabia; ²University of California, Los Angeles, United States

9:00 AM NM01.24.05

Analysis of Avalanche Multiplication in Ambipolar WSe₂ Field-Effect Transistors through Channel Length Modulation [Jaeyoung Kim](#)¹, Jinsu Pak¹, Woocheol Lee¹, Junseok Seo¹, Kyungjune Cho², Jae-Keun Kim¹, Jiwon Shin¹, Juntae Jang¹, Jonghoon Lee¹, Kyeong-Yoon Baek¹, Seungjun Chung², Keehoon Kang³ and Takhee Lee¹; ¹Seoul National University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of); ³Yonsei University, Korea (the Republic of)

9:15 AM NM01.24.06

Incipient Ferroelectric Transition Enables Ultrahigh Electron Mobility in Semiconducting Bi₂O₂Se [Ziye Zhu](#)^{1,2,3}, Xiaoping Yao^{1,2,3}, Shu Zhao^{1,2,3}, Xiao Lin^{1,2} and Wenbin Li^{1,2}; ¹Westlake University, China; ²Westlake Institute for Advanced Study, China; ³Zhejiang University, China

9:30 AM NM01.24.07

Comparative Study Regarding the Synthesis of Carbon Doped 2D Hexagonal Boron Nitride Films [Eoin O'Sullivan](#)¹, Chelsea Xia¹, Dipankar Chugh², Dillon McGurty¹, Nicole Grobert¹, Michael Johnston¹ and Chennupati Jagadish²; ¹University of Oxford, United Kingdom; ²The Australian National University, Australia

SESSION NM01.25: Physical Properties of 2D Materials Beyond Graphene II
Session Chair: Zakaria Al Balushi
Monday Morning, May 23, 2022
NM01-Virtual

10:30 AM *NM01.25.01

Probing and Manipulating Two-Dimensional Semiconductors Amalia Patane; University of Nottingham, United Kingdom

11:00 AM NM01.25.02

Mobility Enhancement in Bilayer 2D Material Field-Effect Transistors by the Giant Stark Effect Haruki Uchiyama¹, Mina Maruyama², Susumu Okada², Tomonori Nishimura¹ and Kosuke Nagashio¹; ¹The University of Tokyo, Japan; ²University of Tsukuba, Japan

11:15 AM NM01.25.03

Origin of Defect-Related Photoluminescence in Boron Nitride Grown by MOVPE Aleksandra K. Dabrowska, Johannes Binder, Mateusz Tokarczyk, Grzegorz Kowalski, Krzysztof Pakula, Andrzej Wyszomolek and Roman Stepniowski; University of Warsaw, Poland

11:30 AM NM01.25.04

Current Injection into Single-Crystalline *h*-BN Towards 2D Power Device Application Supawan Ngamprapawat¹, Tomonori Nishimura¹, Kenji Watanabe², Takashi Taniguchi² and Kosuke Nagashio¹; ¹The University of Tokyo, Japan; ²National Institute for Materials Science (NIMS), Japan

11:45 AM NM01.25.05

Prediction of High Temperature Bose-Einstein Condensation and Valley-Filling Instabilities in Low-Dimensional Quantum Materials Su Ying Quek; National University of Singapore, Singapore

12:00 PM NM01.25.06

Bending Response and Flexoelectricity in Atomic Monolayers from First Principles Shashikant Kumar¹, Phanish Suryanarayana¹, David Codony² and Irene Arias²; ¹Georgia Institute of Technology, United States; ²Universitat Politècnica de Catalunya, Spain

12:15 PM NM01.25.07

Divergent Properties in Structural Isomers of Triphenylamine-Based Covalent Organic Frameworks Ly D. Tran^{1,2}, Luke A. Baldwin² and Nicholas Glavin²; ¹UES, Inc, United States; ²Air Force Research Laboratory, United States

12:30 PM NM01.25.08

Ultrafast Dynamics of Rydberg Excitons in Monolayer WSe₂ Armando Genco¹, Chiara Trovattello¹, James Kerfoot², Tanweer Ahmed², Oscar Balci², Evgeny Alexeev², Andrea Ferrari², Giulio Cerrullo¹ and Stefano Dal Conte¹; ¹Politecnico di Milano, Dipartimento di Fisica, Italy; ²University of Cambridge, United Kingdom

SESSION NM01.26: 2D Materials for Sensors and Poster Session
Session Chairs: Jiayun Liang and Hanbin Song
Monday Afternoon, May 23, 2022
NM01-Virtual

1:00 PM NM01.26.01

MXene Immune Profiling by High-Dimensional Approaches Towards Biomedical Applications Lucia G. Delogu; University of Padua, Italy

1:15 PM NM01.26.02

Graphene and Phthalocyanine Heterostructures for SERS and Gas Sensing Applications Angela Luis Matos¹, Soraya Flores¹, Gustavo Maldonado¹, Brad R. Weiner² and Gerardo Morell¹; ¹University of Puerto Rico-Rio Piedras, United States; ²University of Puerto Rico at Rio Piedras, United States

1:30 PM NM01.26.03

Exploring Supported Metal Nanoclusters on MoS₂ for the Chemical Detection of Biomolecules in Health Monitoring Wearable Devices Gabriele Boschetto, Stefania Carapezzi and Aida Todri-Saniai; LIRMM, University of Montpellier, CNRS, France

1:45 PM NM01.26.05

Defect Dynamics in Two-Dimensional Black Phosphorus under Noble Gas Ions Irradiation Saransh Gupta and Badri Narayanan; University of Louisville, United States

2:00 PM NM01.26.06

Synthesis of One Atom Thick, Two-Dimensional Gold Crystals and Their Novel Properties Sudhir Sharma¹, Renu Pasricha¹, James Weston¹, Thomas Blanton² and Ramesh Jagannathan¹; ¹NYUAD, United Arab Emirates; ²iCDD, United States

2:15 PM NM01.26.08

Wafer-Scale Growth and Transfer of Group III-Nitrides by Nanocrystalline Graphene for Flexible and 3D Stacking Devices Shu-Ju Tsai¹, Yi-Cheng Lin¹, Bang-Kai Wu², Sumayah Shakil Wani², Yu-Lun Chueh² and H. Hoe Tan³; ¹National Applied Research Laboratories Taiwan Instrument Research Institute, Taiwan; ²National Tsing Hua University, Taiwan; ³The Australian National University, Austria

2:20 PM NM01.26.09

Electrochemical Impedance Spectroscopy as an Unorthodox Tool for Discerning Graphite, Graphene and Graphene Oxide Sonjoy Dey, Suprem R. Das and Gurpreet Singh; Kansas State University, United States

2:25 PM NM01.26.10

Synthesis of Wafer-Scale WS₂ Thin Films via Chelant-Assisted Solution-Based Processing [Pedro A. Pena](#)¹, Miguel Isarraraz¹, Han Li², Amirali S. Akhavi¹, Mina Rashednia¹, William C. Coley¹, Sefaattin (. Tongay², Yongtao Cui¹, Mustafa Kurban³, Mihrimah Ozkan¹ and Cengiz S. Ozkan¹; ¹University of California, Riverside, United States; ²Arizona State University, United States; ³Ahi Evran University, Turkey

2:30 PM NM01.26.11

Mechanical and Interface Properties of Carbyne Chains on Metallic Surfaces [Abigail Eaton](#) and Arun K. Nair; University of Arkansas, United States

2:35 PM NM01.26.12

Holey 2D Metal Nitride Nanosheets as Efficient Hybridization Matrices to Maximize the Mass Activity of Metal Nanoclusters [Xiaoyan Jin](#) and Seong-Ju Hwang; Yonsei University, Korea (the Republic of)

2:40 PM NM01.26.13

Electron Charging and Discharging in Double Layer Mechanically Exfoliated MoS₂ Flakes Aisha Alhammedi, Ayman Rezk, Wafa Alnaqbi and [Ammar Nayfeh](#); Khalifa University of Science and Technology, United Arab Emirates

SESSION NM01.27: 2D Materials for Energy Applications

Session Chair: Zakaria Al Balushi

Monday Afternoon, May 23, 2022

NM01-Virtual

4:00 PM NM01.27.01

Interface- and Defect-Engineering Routes to High-Performance 2D Nanosheet-Based Hybrid Electrodes and Catalysts [Seong-Ju Hwang](#); Yonsei University, Korea (the Republic of)

4:15 PM NM01.27.02

Monolayer and Laminar 2D Membranes for Organic Solvent Nanofiltration and Hydrogen Purification [Sui Zhang](#); National University of Singapore, Singapore

4:30 PM NM01.27.04

2D Silicon-Germanium-Layered Materials as Anodes for Li-Ion Batteries [Xi Chen](#)¹, Laura C. Loaiza², Laure Monconduit¹ and Vincent Seznec¹; ¹Laboratoire de Réactivité et Chimie des Solides (LRCS), France; ²Chalmers University of Technology, Sweden

4:45 PM NM01.27.05

Multilayered Conductive Nanosheet as an Emerging Hybridization Matrix to Explore High-Performance Energy-Functional Materials [Nam Hee Kwon](#) and Seong-Ju Hwang; Yonsei University, Korea (the Republic of)

5:00 PM NM01.27.06

Engineering Two-Dimensional Materials and Interfaces for Photocatalytic and Spintronic Applications Using Density Functional Theory [Leah Bendavid](#)¹, Austin Atsango^{1,2}, Reid Smith¹, Serena Inoue¹, Brandon Mai¹, Sandra Yu¹ and Owen Fauth¹; ¹Vassar College, United States; ²Stanford University, United States

5:15 PM NM01.27.07

Understanding the Effects of Phase, Defects, Functional Groups, and D-Orbitals in Transition Metal Dichalcogenides for the Nitrogen Reduction Reaction in Real Media Through *Ab Initio* Studies [Taylor Aubry](#), Nuwan H. Attanayake, Elisa Miller, Derek Vigil-Fowler and Jao Van de Lagemaat; National Renewable Energy Laboratory, United States

5:30 PM NM01.27.08

Integration of 2D Material Characterization and Reliability into Device Manufacturing [Elisabeth Mansfield](#), Jason Holm and David Goggin; National Institute of Standards and Technology, United States

5:45 PM NM01.27.09

Clay Nanosheets at the Air-Water Interface [Paulo H. Michels Brito](#)¹, Antonio Malfatti-Gasperini², Lina Mayr³, Ximena Puentes-Martinez⁴, Romulo Tenorio⁵, Daniel Wagner³, Kenneth Knudsen^{1,6}, Koit Araki⁷, Rafael Oliveira⁸, Josef Breu³, Leide Cavalcanti⁹ and Jon O. Fossum¹; ¹Norwegian University of Science and Technology, Norway; ²Brazilian Synchrotron Light Laboratory - LNLS, Brazil; ³Universität Bayreuth, Germany; ⁴University of Boyaca, Colombia; ⁵Northeast Regional Center of Nuclear Sciences, Brazil; ⁶Institute for Energy Technology, Norway; ⁷Universidade de São Paulo, Brazil; ⁸Universidad Nacional de Córdoba, Argentina; ⁹ISIS Pulsed Neutron and Muon Source, United Kingdom

SESSION NM01.28: Properties of 2D Materials

Session Chairs: Zakaria Al Balushi and Su Ying Quek

Monday Afternoon, May 23, 2022

NM01-Virtual

6:30 PM *NM01.28.01

Fast Ion Exchange, Chemical Synthesis and Atomic Motion in Liquids Studied Using 2D Heterostructures and Scanning Transmission Electron Microscopy [Sarah J. Haigh](#), Yi-Chao Zou, Nick Clark, Marcelo Lozada-Hidalgo and Roman Gorbachev; University of Manchester, United Kingdom

7:00 PM *NM01.28.02

Water-Based and Defect-Free 2D Material Inks for Printed and Wearable Electronics [Cinzia Casiraghi](#); University of Manchester, United Kingdom

7:30 PM NM01.28.03

Synthesis, Surface Modification and Environmental Impact of InSe 2D Nanomaterials [Shreyasi Sengupta](#)¹, Swapnil Ambade¹, Tana O'Keefe², Christy Haynes² and Zeev Rosenzweig¹; ¹University of Maryland Baltimore County, United States; ²University of Minnesota Twin Cities, United States

7:45 PM NM01.28.04

Wafer-Scale Production of TMDs and Alloy Monolayers by Nanocrystal Precursors [Jungwon Park](#); Seoul National University, Korea (the Republic of)

8:00 PM NM01.28.05

Epitaxial Hybrid Covalent-van der Waals Cr₅Te₈/WSe₂ Moiré Superlattices [Mengying Bian](#)^{1,2}, Liang Zhu³, Xiao Wang⁴, Junho Choi⁵, Rajesh V. Chopdekar⁶, Sichen Wei², Fei Yao², Scott Crooker⁵, Xuemei M. Cheng⁴, Renat F. Sabirianov⁷, Junhao Lin³, Yanglong Hou¹ and Hao Zeng²; ¹Peking University, China; ²University at Buffalo, The State University of New York, United States; ³Southern University of Science and Technology, China; ⁴Bryn Mawr College, United States; ⁵Los Alamos National Laboratory, United States; ⁶Lawrence Berkeley National Laboratory, United States; ⁷University of Nebraska-Omaha, United States

8:05 PM NM01.28.06

GaSe–Si Based Vertically Standing Self-Powered van der Waals Heterojunction Photodetector with Ultrahigh Responsivity and Detectivity [Sahin Sorifi](#), Shuchi Kaushik and Rajendra Singh; Indian Institute of Technology Delhi, India

8:10 PM NM01.28.07

Nucleation and Growth of Palladium on WTe₂(001) [Prescott E. Evans](#), Peter Sushko and Zdenek Dohnálek; Pacific Northwest National Laboratory, United States

8:15 PM NM01.28.08

Two-Dimensional Reconfigurable Electronics Enabled by Asymmetric Floating Gate [Tengyu Jin](#); National University of Singapore, Singapore

8:20 PM NM01.28.09

Long-Lived Photogenerated Carriers in 2D MoS₂ Flakes Chemically Exfoliated [Floriana Morabito](#)^{1,2}, Charles J. Sayers¹, Valeria Nicolosi³ and Christoph Gadermaier¹; ¹Politecnico di Milano, Italy; ²Istituto Italiano di Tecnologia, Italy; ³Trinity College Dublin, The University of Dublin, Ireland

8:25 PM NM01.28.10

High-Temperature Robustness Exhibited by h-BN Based Deep Ultraviolet Photodetectors [Shuchi Kaushik](#), Sahin Sorifi and Rajendra Singh; Indian Institute of Technology Delhi, India

8:30 PM NM01.28.11

Flexible Ultraviolet Photodetector Based on 2D MoS₂/Ga₂O₃ Heterojunction [Madan Sharma](#), Aditya Singh, Shuchi Kaushik, Bhera Ram Tak and Rajendra Singh; Indian Institute of Technology Delhi, India

##PAGE_BREAK##

SYMPOSIUM NM02

Reconfiguring the Properties of 2D Materials by Post-Synthesis Design
May 9 - May 24, 2022

Symposium Organizers

Diana Qiu, Yale University

Archana Raja, Lawrence Berkeley National Laboratory

Arend van der Zande, University of Illinois at Urbana Champaign

Stephen Wu, University of Rochester

* Invited Paper

SESSION Tutorial NM02.00: Theory and Experiment of Modifying Properties of 2D Materials
, NaN,

SESSION NM02.01: Quantum Phenomena in Layered Systems I
Session Chairs: Archana Raja and Aditya Sood

Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 303B

10:30 AM *NM02.01.01

Engineering Quantum States in Layered Semiconductors Bernhard Urbaszek; Institut National des Sciences Appliquées de Toulouse, France

11:00 AM *NM02.01.02

Tuning 2D Electronic Properties by Twisting and Stretching Abhay Pasupathy^{1,2} and Madisen Holbrook¹; ¹Columbia University, United States; ²Brookhaven National Laboratory, United States

11:30 AM NM02.01.03

Tuning Interlayer Exciton Absorption by Out-of-Plane Electric Field and Twist-Angle Elyse Barre¹, Ouri Karni¹, Erfu Liu², Henrique B. Ribeiro¹, Adian L. O'Beirne¹, Leo Yu¹, Bumho Kim³, Kenji Watanabe⁴, Takashi Taniguchi⁴, Katayun Barmak³, Chun Hung Lui², Sivan Refaely-Abramson⁵, Felipe H. da Jornada¹ and Tony F Heinz¹; ¹Stanford University, United States; ²University of California, Riverside, United States; ³Columbia University, United States; ⁴National Institute for Materials Science, Japan; ⁵Weizmann Institute of Science, Israel

11:45 AM NM02.01.04

Temperature Dependent Interlayer Exciton Diffusion in a WSe₂/WS₂ Moiré Superlattice Antonio Rossi¹, Jonas Zipfel¹, Emma Regan², Daria Blach^{3,1}, Luca Francaviglia¹, Monica Lorenzon¹, Edward Barnard¹, Eli Rotenberg¹, Feng Wang², Archana Raja¹ and Alexander Weber-Bargioni¹; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States; ³Purdue University, United States

SESSION NM02.02: Quantum Phenomena in Layered Systems II

Session Chairs: Archana Raja and Alexander Weber-Bargioni

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 303B

1:30 PM *NM02.02.02

Interplay Between Structural and Excited-State Properties of Twisted TMDC Moiré Heterostructures Felipe H. da Jornada; Stanford University, United States

2:00 PM NM02.02.03

Spectroscopic Signatures of Moiré-Confined Excitons in Bilayer TMDCs from First Principles Johnathan Georganas and Felipe H. da Jornada; Stanford University, United States

2:15 PM *NM02.02.04

Bidirectional Phonon Emission Across van der Waals Heterojunctions During Ultrafast Charge Transfer Aditya Sood¹, Jonah B. Haber², Johan Carlstroem², Elizabeth Peterson², Elyse Barre¹, Alexander Reid³, Xiaozhe Shen³, Marc Zajac¹, Emma Regan², Jie Yang³, Takashi Taniguchi⁴, Kenji Watanabe⁴, Feng Wang², Xijie Wang³, Jeffrey B. Neaton², Tony F Heinz¹, Aaron Lindenberg¹, Felipe H. da Jornada¹ and Archana Raja²; ¹Stanford University, United States; ²University of California, Berkeley, United States; ³SLAC National Accelerator Laboratory, United States; ⁴NIMS, Japan; ⁵LBNL, United States

2:45 PM BREAK

3:15 PM *NM02.02.05

Tunable Valley Currents in Aligned Bilayer Graphene/BN Rebeca Ribeiro-Palau¹, E. Arrighi¹, D. Mailly¹, Kenji Watanabe² and Takashi Taniguchi²; ¹Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies (C2N), France; ²National Institute for Materials Science, Japan

3:45 PM *NM02.02.06

Interlayer Electronic Transport in Bilayer Graphene Systems Elad Koren; Technion - Israel Institute of Technology, Israel

SESSION NM02.03: Defect Engineering I

Session Chairs: Felipe H. da Jornada and Diana Qiu

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 303B

8:30 AM *NM02.03.02

Optically Active Atomic Defects in 2D Semiconductors Goki Eda; National University of Singapore, Singapore

9:00 AM NM02.03.03

Transition Metal Dichalcogenide Defect Functionalization with Magnetic Impurities—Defect Introduction and Identification John C. Thomas¹, Antonio Rossi^{1,2}, Jun-Ho Lee^{1,3}, Johannes T. Kuehler^{1,4}, Edward Barnard¹, Ed Wong¹, Marcus M. Noack⁵, Archana Raja¹, Eli Rotenberg², Jeffrey B. Neaton^{1,3,6} and Alexander Weber-Bargioni¹; ¹Molecular Foundry, Lawrence Berkeley National Laboratory, United States; ²Advanced Light Source, Lawrence Berkeley National Laboratory, United States; ³Department of Physics, University of California at Berkeley, United States; ⁴Physics Department E20, Technical University of Munich, Germany; ⁵Center for Advanced Mathematics for Energy Research Applications, Lawrence Berkeley National Laboratory, United States; ⁶Kavli Energy Nanosciences Institute at Berkeley, United States

9:45 AM *NM02.03.04

Engineering Quantum Emitters in Two-Dimensional Materials Chitraleema Chakraborty; University of Delaware, United States

9:45 AM BREAK

10:15 AM *NM02.03.05

Photophysics of Quantum Defects in Two-Dimensional Materials from First-Principles Yuan Ping; University of California Santa Cruz, United States

10:45 AM NM02.03.06

Charge Density Modulation in Transition Metal Dichalcogenides via E-Beam Chemistry Ryan Selhorst^{1,2}, Zhouhang Yu³, Michael A. Susner¹, David Moore^{1,2}, Nicholas Glavin¹, Benji Maruyama¹, Mauricio Terrones³ and Rahul Rao¹; ¹Air Force Research Laboratory, United States; ²UES Inc, United States; ³The Pennsylvania State University, United States

11:00 AM NM02.03.07

Tip Enhanced Photoluminescence Based on Gold Pyramid Tip—Towards Inducing and Probing Highly Polarized and Localized Excitonic Emission in Atomically Thin Semiconductors Junze Zhou, Fabrizio Riminucci, Edward Barnard, Sriram Sridhar, Archana Raja, Shaul Aloni, Adam Schwartzberg, Alexander Weber-Bargioni and Stefano Cabrini; Lawrence Berkeley National Laboratory, United States

SESSION NM02.04: Atomic Imaging and Manipulation

Session Chairs: Felipe H. da Jornada and Yuan Ping

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 303B

1:30 PM *NM02.04.01

Probing Atomic Reconstruction at 2D Interfaces via Scanning Transmission Electron Microscopy Pinshane Y. Huang; University of Illinois at Urbana-Champaign, United States

2:00 PM NM02.04.02

Bend-Induced Polarization Switching and Formation of Ferroelectric Domain Walls in α -In₂Se₃ Edmund Han¹, Shahriar Muhammad Nahid¹, Yue Zhang¹, Tawfiqur Rakib¹, Gillian Nolan¹, Andre Schleife¹, Elif Ertekin¹, SungWoo Nam², Arend M. van der Zande¹ and Pinshane Y. Huang¹; ¹University of Illinois at Urbana-Champaign, United States; ²University of California, Irvine, United States

2:15 PM NM02.04.03

Scanning Transmission Electron Microscope (STEM) Characterization of Structures and Defects of Air-Stable Novel 2D van der Waals Magnets Eugene Park¹, Julian Klein¹, John P. Philbin², Frances Ross¹ and Prineha Narang²; ¹Massachusetts Institute of Technology, United States; ²Harvard University, United States

2:30 PM NM02.04.04

Engineering Vacancy Defects in 2D Hexagonal Boron Nitride Using Electron and Ion Beam Methods Dana Byrne^{1,2}, Archana Raja², Aleksandr Noy^{3,4}, Jim Ciston², Alex Smolyanitsky⁵ and Frances I. Allen^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Lawrence Livermore National Laboratory, United States; ⁴University of California, Merced, United States; ⁵National Institute of Standards and Technology, United States

2:45 PM BREAK

3:15 PM NM02.04.05

Ion Beam Modification of Two-Dimensional MoS₂—A Comprehensive Study Kory Burns^{1,2}, Khalid Hattar² and Assel Aitkaliyeva¹; ¹University of Florida, United States; ²Sandia National Laboratories, United States

3:30 PM NM02.04.06

Determining the 3D Atomic Coordinates and Properties of Low-Dimensional Chalcogenides with Picometer Precision Dennis Kim¹, Xuezheng Tian¹, Shize Yang², Christopher Ciccarino³, George Varnavides^{3,4}, Xingxu Yan⁵, Yongji Gong⁶, Yakun Yuan¹, Yongsoo Yang¹, Yao Yang¹, Polina Anikeeva⁴, Ming-Yang Li⁷, Lain-Jong Li⁸, Xiaoqing Pan⁵, Pulickel Ajayan⁶, Juan C. Idrobo², Prineha Narang³ and Jianwei (John) Miao¹; ¹University of California, Los Angeles, United States; ²Oak Ridge National Laboratory, United States; ³Harvard University, United States; ⁴Massachusetts Institute of Technology, United States; ⁵University of California, Irvine, United States; ⁶Rice University, United States; ⁷King Abdullah University of Science and Technology, Saudi Arabia; ⁸The University of Hong Kong, Hong Kong

SESSION NM02.05: Ultrafast Spectroscopy and Control

Session Chairs: Yuan Ping and Diana Qiu

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 303B

4:15 PM NM02.05.01

Control of Ultrafast Many-Body Physics in Monolayer Transition Metal Dichalcogenides by Means of Applied Gate Bias Voltage Irantzu Landa, Charles J. Sayers, Stefano Dal Conte, Chiara Trovatello, Armando Genco, Giulio Cerrulo and Christoph Gadermaier; Politecnico di Milano, Italy

4:30 PM NM02.05.02

Multivalley Dynamics in Monolayer TMDs at High Pressures Revealed by Double-Resonance Raman Luiz G.P. Martins¹, Bruno Carvalho², Connor A. Occhialini¹, Natália P. Neme³, Ji-Hoon Park¹, Qian Song¹, Mário S. Mazzoni⁴, Pedro Venezuela⁵, Matheus J. Matos⁶, Jing Kong¹ and Riccardo Comin¹; ¹MIT, United States; ²Universidade Federal do Rio Grande do Norte, Brazil; ³University of Groningen, Netherlands; ⁴Universidade Federal de Minas Gerais, Brazil; ⁵Universidade Federal Fluminense, Brazil; ⁶Universidade Federal de Ouro Preto, Brazil

SESSION NM02.06: Proximal Coupling and Transport Phenomena
Session Chairs: Chitrleema Chakraborty and Archana Raja
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 303B

8:15 AM *NM02.06.01

Tunable Mobile Excitons in 2D Materials Alexey Chernikov and [Jonas Ziegler](#); Dresden University of Technology, Germany

8:45 AM NM02.06.02

Directing Exciton Propagation in Monolayer TMDCs Through Patterned Dielectric Substrates [Jonas Zipfel](#)¹, Boyce Chang¹, Daria Blach², Kenji Watanabe³, Takashi Taniguchi³, Edward Barnard¹, Ricardo Ruiz¹ and Archana Raja¹; ¹Lawrence Berkeley National Laboratory, United States; ²Purdue University, United States; ³National Institute for Materials Science, Japan

9:00 AM NM02.06.03

Creating a Nanoscale Lateral Heterojunction in a TMD Monolayer by Engineering the Electrostatic Landscape [Madisen Holbrook](#)^{1,2}, Yuxuan Chen², Hyounsue Kim², Lisa Frammonino², Mengke Liu², Chi-Ruei Pan³, Mei-Yin Chou³, Chengdong Zhang⁴ and Chih-Kang Shih²; ¹Columbia University, United States; ²The University of Texas at Austin, United States; ³Academia Sinica, Taiwan; ⁴Wuhan University of Technology, China

9:15 AM *NM02.06.04

Spatial and Temporal Imaging of Exciton Transport in Two-Dimensional Heterostructures [Libai Huang](#); Purdue University, United States

9:45 AM BREAK

10:15 AM NM02.06.05

Dielectric Screening Modulates Semiconductor Nanoplatelet Excitons [Ashley J. Shin](#)¹, Azmain A. Hossain², Stephanie M. Tenney¹, Xuanheng Tan¹, Lauren A. Tan¹, Jonathan J. Foley IV³, Timothy L. Atallah⁴ and Justin Caram¹; ¹University of California Los Angeles, United States; ²California Institute of Technology, United States; ³William Paterson University of New Jersey, United States; ⁴Denison University, United States

10:30 AM *NM02.06.06

Manipulating Excitons in van der Waals Materials with Strain and Dielectric Nanobubbles [Milan Delor](#), Haowen Su, Ding Xu, Shan-Wen Cheng, Inki Lee, Jakhangirkhodja Tulyagankhodjaev, James Baxter and Paul Brown; Columbia University, United States

11:00 AM NM02.06.07

Tailoring Exciton Transport in Strained Two-Dimensional Tungsten Diselenide Toward Straintronics [Jin Myung Kim](#)¹, Kwang-Yong Jeong², Jaepil So², Mike C. Wang^{1,3}, Peter Snapp¹, Hong-Gyu Park² and SungWoo Nam^{1,1,4}; ¹University of Illinois at Urbana-Champaign, United States; ²Korea University, Korea (the Republic of); ³University of South Florida, United States; ⁴University of California, Irvine, United States

11:15 AM NM02.06.08

Direct Spatiotemporal Observation of Coupled Exciton and Heat Transport Reveals Thermoelectric Behavior in Few-Layer MoS₂ [Hannah L. Weaver](#)¹, Cora Went², Joeson Wong², Dipti Jasrasaria¹, Eran Rabani¹, Harry A. Atwater² and Naomi S. Ginsberg¹; ¹University of California, Berkeley, United States; ²California Institute of Technology, United States

SESSION NM02.07: Synthesis and Modification
Session Chairs: Arend van der Zande and Stephen Wu
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 303B

1:30 PM *NM02.07.01

Proximity Effect on Growth, Crystallization and Phase Transition in 2D Materials [Gwan-Hyong Lee](#); Seoul National University, Korea (the Republic of)

2:00 PM NM02.07.02

Surface Energy of Supported Graphene—The Effects of Chemical Functionalization and Adsorption of Volatile Organic Compounds [James Carpenter](#), Hyunchul Kim, Arend M. van der Zande and Nenad Miljkovic; University of Illinois at Urbana-Champaign, United States

SESSION NM02.08: Poster Session: Synthetic Modifications of 2D Materials
Session Chairs: Gwan-Hyong Lee and Arend van der Zande
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM02.08.03

The Role of Si During the Chemical Reaction of XeF₂ with Graphene and h-BN [Subin Shin](#)^{1,2}, Yongjun Shim³, Yang Hui Kim¹, Seokhoon Ahn¹, Sukang Bae¹, Young Min Seo¹, Suklyun Hong⁴, Joonwon Lim², Arend M. van der Zande³, Gwan-Hyong Lee³ and Jangyup Son¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of); ³Seoul National University, Korea (the Republic of); ⁴Sejong University, Korea (the Republic of); ⁵University of Illinois at Urbana-Champaign, United States

NM02.08.04

Nitrogen-Pair Dopant at Graphene Edges with Electrochemically Bifunctional ORR/OER Catalytic Activity for Zn-Air Battery [Joonwon Lim](#)^{1,2}

and Sang Ouk Kim²; ¹Kyung Hee University, Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of)

NM02.08.05

Study on the Dipole Moment of H-C-F Type Janus Single Layer Graphene Dong-hyun Kim¹, Yongjun Shin², Minseong Kim¹, Sangmin An³, Yunjo Jeong³, Kenji Watanabe⁴, Takashi Taniguchi⁴, Arend M. van der Zande⁵, Gwan-Hyong Lee² and Jangyup Son¹; ¹Korea Institute of Science and Technology, United States; ²Seoul National University, Korea (the Republic of); ³Jeonbuk National University, Korea (the Republic of); ⁴National Institute for Materials Science, Japan; ⁵University of Illinois, United States

NM02.08.06

Electronic Transport in Graphene-PZT Ferroelectric Field-Effect Transistors Alexandra Fursina, Alexey Lipatov, Alexei Gruverman and Alexander Sinitskii; University of Nebraska Lincoln, United States

SESSION NM02.09: Strain Engineering I
Session Chairs: Milan Delor and Archana Raja
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 303B

8:30 AM *NM02.09.01

Tuning the Optical Properties of MoS₂ by Strain Engineering and its Applications Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

9:00 AM NM02.09.02

Uniaxial and Biaxial Strain Engineering in 2D Materials with Thin-Film Stressors Ahmad Azizimanesh, Tara Pena, Arfan Sewaket, Wenhui Hou and Stephen M. Wu; University of Rochester, United States

9:15 AM NM02.09.03

Strain Engineering Metal Contacts to Monolayer MoS₂ Transistors Marc Jaikissoon, Jerry A. Yang, Eric Pop and Krishna Saraswat; Stanford University, United States

9:30 AM BREAK

10:00 AM NM02.09.04

Heterostrain Engineering for Twisted and Non-Twisted 2D Systems with Process-Induced Strain Tara Pena, Ahmad Azizimanesh, Jewel Holt, Shoieb Ahmed Chowdhury, Liangyu Qiu, Arunabh Mukherjee, Nick Vamivakas, Hesam Askari and Stephen M. Wu; University of Rochester, United States

10:15 AM NM02.09.05

Dynamic Strain Engineering of 2D Materials with Piezoelectrics Wenhui Hou, Ahmad Azizimanesh, Arfan Sewaket, Shoieb Ahmed Chowdhury, Aditya Dey, Carla Watson, Tara Pena, Hesam Askari and Stephen M. Wu; University of Rochester, United States

10:30 AM NM02.09.07

Buckling and Strain Engineering of Two-Dimensional CsPbBr₃ Perovskite Nanostructures Emma H. Massasa and Yehonadav Bekenstein; Technion, Israel

10:45 AM NM02.09.08

Two-Dimensional Interfaces May Not Be Flat Zhihui Cheng^{1,2}, Huairuo Zhang^{2,3}, Son T. Le^{2,3}, Hattan Abuzaid⁴, Guoqing Li⁵, Yifei Yu⁵, Albert Davydov², Linyou Cao⁵, Aaron D. Franklin⁴ and Curt A. Richter²; ¹Purdue University, United States; ²National Institute of Standards and Technology, United States; ³Theiss Research, United States; ⁴Duke University, United States; ⁵North Carolina State University, United States

11:00 AM *NM02.09.09

Assembled Functional Oxide Membrane Heterostructures Chang-Beom Eom; University of Wisconsin--Madison, United States

SESSION NM02.10: Strain Engineering II
Session Chair: Stephen Wu
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 303B

1:30 PM *NM02.10.01

Stretching, Bending and Breaking Freestanding Oxide Membranes Harold Y. Hwang^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

2:00 PM NM02.10.03

Mechanically Reconfigurable Electrical Polarization in Two Dimensional α -In₂Se₃ Shahriar Muhammad Nahid¹, Edmund Han², Yue Zhang¹, Tawfiqur Rakib¹, Gillian Nolan², Andre Schleife², Elif Ertekin¹, Pinshane Y. Huang², SungWoo Nam³ and Arend M. van der Zande¹; ¹University of Illinois Urbana Champaign, United States; ²University of Illinois at Urbana-Champaign, United States; ³University of California Irvine, United States

2:15 PM NM02.10.04

Wrinkle Dynamics in Graphene Supported on a Polymer Anikeya Aditya¹, Shogo Fukushima², Ankit Mishra¹, Ken-ichi Nomura¹, Fuyuki Shimojo², Aiichiro Nakano¹, Priya Vashishta¹, Rajiv Kalia¹ and Mark J. Stevens³; ¹University of Southern California, United States; ²Kumamoto University, Japan; ³Sandia National Laboratories, United States

2:30 PM BREAK

SESSION NM02.11: Device Applications
Session Chairs: Arend van der Zande and Stephen Wu
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 303B

3:30 PM NM02.11.01

Engineering the Resonant Modes of a Graphene Optomechanical Transducer Chunhui Dai^{1,2,2}, Yoonsoo Rho², Khanh Pham², Brady McCormick², Costas Grigoropoulos² and Alex Zettl^{2,1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

3:45 PM NM02.11.02

Integrating Ultrathin Gate Dielectrics on 2D Materials for High-Performance Transistors Jung-Soo Ko, Kirstin E. Schauble, Krishna Saraswat and Eric Pop; Stanford University, United States

4:00 PM NM02.11.03

Optimization of 2D Materials for Atmospheric Monitoring Michael Brothers^{1,2}, David Moore^{3,2}, Daniel Sim^{1,2}, Eric Frantz¹, Nicholas X. Williams⁴, Shay Wallace⁴, John Hodul¹, Lucas Beagle^{3,2}, Beata Szydłowska⁴, Benji Maruyama², Mark C. Hersam⁴, Nicholas Glavin² and Steve Kim²; ¹UES Inc, United States; ²Air Force Research Laboratory, United States; ³UES, Inc., United States; ⁴Northwestern University, United States

4:15 PM NM02.11.04

Controlled Encapsulation of Monolayer MoS₂ with Ultrathin Aluminum Oxide for Tunnel Contacts Alex Henning, Julian Primbs, Sergej Levashov, Theresa Gruenleitner, Chenjiang Qian, Jonathan J. Finley and Ian D. Sharp; Technical University of Munich, Germany

4:30 PM NM02.11.05

Interlayer Slip and Friction in 2D Material Nanoelectromechanical Systems Paolo F. Ferrari¹, SunPhil Kim¹ and Arend M. van der Zande^{1,2}; ¹University of Illinois at Urbana-Champaign, United States; ²University of Illinois at Urbana-Champaign, United States

SESSION NM02.12: Reconfiguring the Properties of 2D Materials by Post-Synthesis Design
Session Chair: Arend van der Zande
Monday Morning, May 23, 2022
NM02-Virtual

8:00 AM *NM02.12.01

Surface/Interface Engineering of 2D Materials via Chemical Functionalization Jangyup Son; Korea Institute of Science and Technology, Korea (the Republic of)

8:30 AM NM02.12.02

Room Temperature Enhancement of 2D Materials by Superacid Analogue Treatments Sophie L. Pain, Nicholas E. Grant and John D. Murphy; School of Engineering, The University of Warwick, United Kingdom

8:45 AM NM02.12.03

Magnetic Sensing Using Two-Dimensional Transition Metal Dichalcogenides Bivek Pokhrel, Chitrleema Chakraborty, John Q. Xiao, Matthew Whalen, Mark Ku and Eric Herrmann; University of Delaware, United States

SESSION NM02.13: Synthesis and Applications
Session Chairs: Diana Qiu and Stephen Wu
Monday Morning, May 23, 2022
NM02-Virtual

10:30 AM *NM02.13.01

Nanocavities and Polaritons in Twisted and Indirectly Nanostructured 2D Materials Frank Koppens; ICFO-The Institute of Photonics Sciences, Spain

11:00 AM *NM02.13.02

Post-Synthesis Design of 2D Materials—Surface Functionalization and Intercalation Judy Cha; Yale University, United States

11:30 AM *NM02.13.03

Silver Organochalcogenides—An Emerging Family of Hybrid 2D Semiconductors William Tisdale; Massachusetts Institute of Technology, United States

SESSION NM02.14: 2D Materials—Electronic and Optical Properties
Session Chairs: Diana Qiu and Archana Raja
Monday Afternoon, May 23, 2022
NM02-Virtual

9:00 PM *NM02.14.01

Excitons in Two-Dimensional Semiconductors—a Momentum-Resolved Perspective [Keshav M. Dani](#); Okinawa Institute of Science and Technology, Japan

9:30 PM NM02.14.03

Large-Scale Flexible Electronics on Ultrathin Glass Using Low-Temperature Grown MoS₂ [Anh Tuan Hoang](#), Lu Hing Hu, Beomjin Kim, Seunghyeon Ji and Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

9:45 PM *NM02.14.04

Excitonic Effects in Optical-Field-Driven Quasi 2D Materials from Time-Dependent GW Approach [Yang-Hao Chan](#); Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan

10:15 PM NM02.02.01

Atomic Reconstruction and Interfacial Ferroelectricity in Twisted TMD Interfaces [Roman Gorbachev](#)¹, Astrid Weston¹, Eli Castanon², Vladimir Enaldiev¹, Vladimir Falko¹ and Sarah J. Haigh¹; ¹Univ of Manchester, United Kingdom; ²NPL, United Kingdom

SESSION NM02.15: New Materials and Strong Correlations

Session Chairs: Archana Raja and Stephen Wu

Tuesday Morning, May 24, 2022

NM02-Virtual

8:00 AM *NM02.15.01

Correlated Electrons in van der Waals Superlattices: Control and Understanding [Tim Wehling](#); Universität Hamburg, Germany

8:30 AM *NM02.15.02

Strongly Correlated Excitonic Insulator in Atomic Double Layers [Kin Fai Mak](#); Cornell University, United States

9:00 AM *NM02.15.03

Engineering New Magnetic Ground States in Twisted Bilayer CrI₃ [Jie Shan](#); Cornell University, United States

9:30 AM *NM02.15.04

Moiré-Based Quantum Sensing of Correlated Electrons [Ajit Srivastava](#); Emory University, United States

##PAGE_BREAK##

SYMPOSIUM NM03

2D MXenes—Synthesis, Properties and Applications

May 9 - May 25, 2022

Symposium Organizers

Babak Anasori, Indiana University-Purdue University

Christina Birkel, Arizona State University

Chong Min Koo, Korea Institute of Science & Technology

Valeria Nicolosi, Trinity College Dublin

* Invited Paper

SESSION NM03.01: MXenes Synthesis and Structure

Session Chairs: Babak Anasori and Christina Birkel

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 301B

8:30 AM *NM03.01.01

Bottom-Up, Scalable Synthesis of Anatase Nanofilament-Based Two-Dimensional Titanium Carbo-Oxide Flakes Hussein Badr and [Michel Barsoum](#); Drexel University, United States

9:00 AM NM03.01.02

Synthesis of Solid-Solution MXenes with Tunable Electronic, Optical and Electrochemical Properties Christopher E. Shuck^{1,1}, Meikang Han^{1,1}, Kathleen Maleski^{1,1}, Yizhou Yang¹, James Glazar², Alexandre Foucher², Kanit Hantanasirisakul^{1,1}, Asia Sarycheva^{1,1}, Nathan Frey², Steven May¹, Vivek Shenoy², Eric A. Stach² and Yury Gogotsi^{1,1}; ¹Drexel University, United States; ²University of Pennsylvania, United States

9:15 AM NM03.01.03

Ionic Liquid-Based Synthesis of 2D MXenes Nanocarbons Samantha Husmann¹, Wyatt Bellville^{1,2}, Michael Naguib³ and Volker Presser^{1,2,4}; ¹INM-Leibniz Institute for New Materials, Germany; ²Universität des Saarlandes, Germany; ³Tulane University, United States; ⁴Saarland Center for Energy Materials and Sustainability, Germany

9:30 AM NM03.01.04

Delamination of Aqueous Multilayer MXene Dispersions by High Shear Mixing Alex Inman¹, Veronika Sedajova^{2,3}, Kyle Matthews¹, James Gravin¹, Jeffrey Busa¹, Mikhail Shekhirev¹, Christopher E. Shuck¹, Armin VahidMohammadi¹ and Yury Gogotsi¹; ¹Drexel University, United States; ²Olomouc Czech Advanced Technology and Research Institution, Czechia; ³Palacky University, Czechia

9:45 AM NM03.01.05

2D Transition Metal Carbides and Carbonitrides (MXenes) as Surface-Enhanced Raman Scattering (SERS)-Active Substrates Kateryna Shevchuk¹, Asia Sarycheva^{1,2} and Yury Gogotsi¹; ¹A.J. Drexel Nanomaterials Institute, United States; ²Lawrence Berkeley National Laboratory, United States

10:00 AM BREAK

10:30 AM *NM03.01.06

Synthesis of 2D Transition Metal Carbides and Nitrides (MXenes) Yury Gogotsi¹, Kang Rui Garrick Lim², Mikhail Shekhirev¹, Brian Wyatt³, Babak Anasori³ and Zhi Wei Seh⁴; ¹Drexel University, United States; ²Harvard University, United States; ³Indiana University–Purdue University Indianapolis, United States; ⁴Institute of Materials Research and Engineering, Singapore

11:00 AM NM03.01.07

The Synthesis Mechanism of Ultrathin Mo₂C on Liquid Metal Substrates by Chemical Vapor Deposition and the Impact of Substrate Choice Katherine T. Young^{1,2}, Colter Smith², Dale Hitchcock³, Todd Walters², Cooper Voigt² and Eric M. Vogel²; ¹Georgia Tech Research Institute, United States; ²Georgia Institute of Technology, United States; ³Savannah River National Laboratory, United States

11:15 AM NM03.01.08

Properties of the Overlooked Boride-Carbide-Nitride Families of MXenes via High-Throughput DFT Calculations Murali Gopal Muraleedharan and Paul Kent; Oak Ridge National Laboratory, United States

11:30 AM NM03.01.09

High-Entropy 2D Carbide MXenes—TiVNbMoC₃ and TiVCrMoC₃ Kartik Nemani¹, Bowen Zhang², Brian Wyatt¹, Zachary D. Hood³, Sukriti Manna⁴, Rasoul Khaledialidusti⁵, Weichen Hong¹, Michael Sternberg³, Subramanian Sakaranarayanan⁴ and Babak Anasori¹; ¹Indiana University Purdue University, United States; ²Henan Key Laboratory for Photovoltaic materials, China; ³Applied Materials Division, United States; ⁴Center for nanoscale material, United States; ⁵Norwegian University of Science and Technology, Norway

SESSION NM03.02: MXenes Synthesis, Structure, and Bio Applications

Session Chairs: Michael Naguib and Armin VahidMohammadi

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 301B

1:30 PM *NM03.02.01

Safer MXene Synthesis Using Quaternary Ammonium Salts Vrushali Kotasthane, Max Johnson, Emily Pentzer, Jodie Lutkenhaus, Micah Green and Miladin Radovic; Texas A&M Univ, United States

2:00 PM NM03.02.02

Halogen-Free MXene with High Electrical Conductivity and Moisture Resistance Masashi Koyanagi and Takeshi Torita; Murata Manufacturing Co., Ltd., Japan

2:15 PM NM03.02.04

Atomic-Resolution Study of Structure and Bonding in 2D Metal-Organic Hybrid MXenes Using *In Situ* STEM Francisco J. Lagunas Vargas¹, Chenkun Zhou², Dmitri V. Talapin² and Robert F. Klie¹; ¹University of Illinois at Chicago, United States; ²The University of Chicago, United States

2:30 PM BREAK

3:00 PM NM03.02.05

Synthesis and Characterization of 2D Mo₂C Crystals and Graphene Heterostructures Through CVD Omer R. Caylan^{1,2}, Furkan Turker¹, Derya Karadeniz¹, Tarik Can Turkoglu¹, Deniz Cakir¹ and Goknur Cambaz Buke^{1,1}; ¹TOBB University of Economics and Technology, Turkey; ²Bilkent University, Turkey

3:15 PM NM03.03.05

Poster Spotlight: Ion Exchange Coupled with Flocculation Extends Oxidation Stability of V₂CT_x MXene Kyle Matthews, Teng Zhang, Christopher E. Shuck, Armin VahidMohammadi and Yury Gogotsi; Drexel University, United States

3:30 PM SPECIAL TALK

3:21 PM NM03.03.06

Poster Spotlight: Synthesis of an Ordered Double-Transition Metal W_2TiC_2Tx MXene [Wyatt Highland](#), Brian Wyatt, Bowen Zhang, Kartik Nemani and Babak Anasori; Indiana University-Purdue University Indianapolis, United States

3:22 PM NM03.03.09

Poster Spotlight: Weak Anti-Localization (WAL)/Weak Localization (WL) Crossover at Inkjet-Printed Ti_3C_2Tx MXene Thin-Film [DooSeung Um](#)^{1,2}, Mi-Jin Jin^{3,2}, Chang-Il Kim⁴, Jung-Woo Yoo⁵ and Jason Robinson²; ¹Sejong University, Korea (the Republic of); ²University of Cambridge, United Kingdom; ³Institute for Basic Science (IBS), Korea (the Republic of); ⁴Chung-Ang University, Korea (the Republic of); ⁵Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of)

SESSION NM03.03: Poster Session: MXenes Synthesis, Structure, and Stability

Session Chairs: Babak Anasori and Christina Birkel

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM03.03.05

Poster Spotlight: Ion Exchange Coupled with Flocculation Extends Oxidation Stability of V_2CT_x MXene [Kyle Matthews](#), Teng Zhang, Christopher E. Shuck, Armin VahidMohammadi and Yury Gogotsi; Drexel University, United States

NM03.03.06

Poster Spotlight: Synthesis of an Ordered Double-Transition Metal W_2TiC_2Tx MXene [Wyatt Highland](#), Brian Wyatt, Bowen Zhang, Kartik Nemani and Babak Anasori; Indiana University-Purdue University Indianapolis, United States

NM03.03.09

Poster Spotlight: Weak Anti-Localization (WAL)/Weak Localization (WL) Crossover at Inkjet-Printed Ti_3C_2Tx MXene Thin-Film [DooSeung Um](#)^{1,2}, Mi-Jin Jin^{3,2}, Chang-Il Kim⁴, Jung-Woo Yoo⁵ and Jason Robinson²; ¹Sejong University, Korea (the Republic of); ²University of Cambridge, United Kingdom; ³Institute for Basic Science (IBS), Korea (the Republic of); ⁴Chung-Ang University, Korea (the Republic of); ⁵Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of)

SESSION NM03.04: MXenes Stability and Phase Transformation

Session Chair: Majid Beidaghi

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 301B

8:30 AM *NM03.04.01

Chemistry of 2D Transition Metal Carbides and Carbonitrides (MXenes) [Vadym Mochalin](#); Missouri University of Science and Technology, United States

9:00 AM NM03.04.02

Solid-State NMR Characterisation of Surface and Bulk MXene Chemistry [Michael A. Hope](#)^{1,2}, Kent J. Griffith^{2,3}, Alex Forse², Mark Anayee⁴, Yury Gogotsi⁴ and Clare P. Grey²; ¹EPFL, Switzerland; ²University of Cambridge, United Kingdom; ³Northwestern University, United States; ⁴Drexel University, United States

9:15 AM NM03.04.04

Controlled Surface Modification and Oxidation of Ti_3C_2Tx via Ozonation Nitika Parashar¹, Jason Lipton¹, Juan Meng¹, Jason A. Röhr¹, Hang Wang¹, Adam Z. Goad², Yury Gogotsi², André D. Taylor¹ and [Benjamin E. Sartor](#)¹; ¹New York University, United States; ²A.J. Drexel Nanomaterials Institute, United States

9:30 AM *NM03.04.06

In Situ TEM Approaches to Study Dynamic Transformations in MXenes [Raymond R. Unocic](#)¹, Xiahan Sang², Sudhajat Misra¹, Matthew G. Boebinger¹, Stephen Jesse¹, Tyler Mathis³, Adri C. van Duin⁴, Paul Kent¹, Babak Anasori⁵, Michael Naguib⁶ and Yury Gogotsi³; ¹Oak Ridge National Laboratory, United States; ²Wuhan University of Technology, China; ³A.J. Drexel Nanomaterials Institute, United States; ⁴The Pennsylvania State University, United States; ⁵Indiana University Purdue University, United States; ⁶Tulane University, United States

10:30 AM NM03.04.07

Molecular Structure and Oxidation Stability—Interactions Between Antioxidants and Ti_3C_2Tx and Ti_2CT_x MXenes Xiaofei Zhao, Huaixuan Cao, Zeyi Tan, Ian Echols, Emily Pentzer, Jodie Lutkenhaus, Miladin Radovic and [Micah Green](#); Texas A&M University, United States

10:00 AM BREAK

10:45 AM NM03.04.08

High-Temperature Phase Transformation and Stability of Ti_3C_2Tx and Mo_2TiC_2Tx MXenes [Brian Wyatt](#), Wyatt Highland, Kartik Nemani, Bowen Zhang and Babak Anasori; Indiana University - Purdue University of Indianapolis, United States

11:00 AM NM03.04.09

Free Chlorine Induced Phototransformation of Ti_3C_2Tx MXenes in Water [Nasim Ganji](#)¹, Swapnil Ambade², Christian A. Lochbaum¹, Zeev Rosenzweig², D. H. Fairbrother³ and Joel A. Pedersen^{3,1}; ¹University of Wisconsin-Madison, United States; ²University of Maryland-Baltimore County, United States; ³Johns Hopkins University, United States

11:15 AM NM03.04.10

MXene-Derived Oxides as Electrodes for Energy Storage Ekaterina Pomerantseva; Drexel University, United States

SESSION NM03.05: MXenes Electrochemistry
Session Chairs: Babak Anasori and Valeria Nicolosi
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 301B

1:30 PM NM03.05.01

MXenes—Optimism or a Path to the Promised Land? Armin VahidMohammadi and Yury Gogotsi; Drexel University, United States

1:45 PM NM03.05.02

Improved Energy Storage and Rate Capability of MoO₃/Ti₃C₂ MXene Hybrid Electrode in Saturated Water-in-Salt Electrolytes Mohit Saraf, Christopher E. Shuck, Nazgol Norouzi, Kyle Matthews, Ekaterina Pomerantseva and Yury Gogotsi; Drexel University, United States

2:00 PM *NM03.05.03

Nanoengineering MXenes Interlayer Spacing for High Performance Electrochemical Energy Storage Electrodes Kaitlyn E. Prenger¹, Kun Liang¹, Robert Sacchi², Ameer Al-Temimy³, Yanguanli Sun⁴, Ray Matsumoto⁵, Wei Zhao⁵, Bishnu Thapaliya², Tristan Petit³, De-en Jiang⁴, Sheng Dai², Peter Cummings⁵ and Michael Naguib¹; ¹Tulane University, United States; ²Oak Ridge National Laboratory, United States; ³Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; ⁴University of California, Riverside, United States; ⁵Vanderbilt University, United States

2:30 PM BREAK

3:00 PM *NM03.05.04

Assembling MXenes Heterostructures and 3D Printing of MXenes for Energy Storage Majid Beidaghi; Auburn University, United States

3:30 PM NM03.05.05

MXene-Transition Metal Oxide Heterostructures as Electrodes for Neutral Aqueous Supercapacitors Kaitlyn E. Prenger¹, Sudhajt Misra², Murali Gopal Muraleedharan², Chaochao Dun³, Raymond R. Unocic², Paul Kent², Jeffrey Urban³ and Michael Naguib¹; ¹Tulane University, United States; ²Oak Ridge National Laboratory, United States; ³Lawrence Berkeley National Laboratory, United States

3:45 PM NM03.05.06

Ti₃C₂ MXenes Microcapacitors on Textile by Inkjet Printing and Aerosol Printing Eugenio Gibertini¹, Prisca Viviani¹, Tomas Blecha², Jiri Navratil² and Luca Magagnin¹; ¹Politecnico di Milano, Italy; ²University of West Bohemia, Czechia

4:00 PM NM03.05.07

High Performance Ti₃C₂T_x Based Supercapacitors by Controlled Micro- and Nanostructure Helge Krüger¹, Dahnán Spurling², Valeria Nicolosi², Rainer Adelung¹ and Fabian Schuett¹; ¹Kiel University, Germany; ²Trinity College Dublin, The University of Dublin, Ireland

4:15 PM NM03.05.08

3D Printed and Templated Ti₃C₂T_x MXene for Energy Storage Applications Dahnán Spurling¹, Helge Krüger², Matthias Kremer³, Rainer Adelung², Fabian Schuett² and Valeria Nicolosi³; ¹Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN) and Advanced Materials Bio-Engineering Research Centre (AMBER), and School of Chemistry, Trinity College Dublin, Ireland; ²Functional Nanomaterials, Institute for Materials Science, Faculty of Engineering, Kiel University, Germany; ³Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN) and Advanced Materials Bio-Engineering Research Centre (AMBER), I-Form, and School of Chemistry, Trinity College Dublin, Ireland

4:30 PM NM03.06.01

Poster Spotlight: Novel Technique for Developing E-Textiles: Printing MXene Supercapacitors on Fabrics for Wearable Electronics Anastasia Shandra, Ke Li, Dahnán Spurling and Valeria Nicolosi; Trinity College Dublin, The University of Dublin, Ireland

4:31 PM NM03.06.02

Poster Spotlight: Flexible and Stackable Textile Supercapacitors Based on MXene for Wearable Energy Storage Devices Alex Inman¹, Tetiana Hryhorchuk¹, Lingyi Bi¹, Ruocun (John) Wang¹, Ben Greenspan², Taylor Tabb², Eric Gallo², Simge Uzun¹, Armin VahidMohammadi¹, Andreea Danielescu², Genevieve Dion¹ and Yury Gogotsi¹; ¹Drexel University, United States; ²Accenture Labs, United States

4:32 PM NM03.06.05

Poster Spotlight: Design of Effective Hybrid Photocatalysts via Coupling TiO₂ with Delaminated Ti₃C₂T_x Ahmed Al Mayyahi, Swagotom Sarker and Placidus B. Amama; Kansas State University, United States

4:33 PM NM03.06.06

Poster Spotlight: Synthesis of Ordered Double Transition Metal (Mo_{2+a}Nb_{2-a})AlC₃ MAX Phases and Their (Mo_{2+a}Nb_{2-a})C₃T_x MXenes Krista Pulley^{1,2}, Brian Wyatt^{1,1}, Wyatt Highland¹ and Babak Anasori^{1,1}; ¹Indiana University-Purdue University Indianapolis, United States; ²Butler University, United States

4:34 PM NM03.06.07

Poster Spotlight: MXene Embedded Bimetallic Organic Framework Electrocatalyst in Lithium-Oxygen Batteries Sanghee Nam¹, Yury Gogotsi² and Il-Kwon Oh¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Drexel University, United States

4:35 PM NM03.06.08

Poster Spotlight: Electronic and Thermal Properties of Ti₃C₂-MXenes for Sensing Applications Tomasz Straczek, Krzysztof Grabowski, Shreyas Srivatsa, Janusz Przewoznik, Waldemar Tokarz, Agnieszka Radziszewska, Leszek Chlubny, Tadeusz Uhl, Jerzy Lis and Czeslaw Kapusta; AGH

University of Science and Technology, Poland

SESSION NM03.06: Poster Session: Electrochemistry and Electrocatalysis
Session Chairs: Babak Anasori, Christina Birkel, Chong Min Koo and Valeria Nicolosi
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM03.06.01

Poster Spotlight: Novel Technique for Developing E-Textiles: Printing MXene Supercapacitors on Fabrics for Wearable Electronics [Anastasiia Shandra](#), Ke Li, Dahnán Spurling and Valeria Nicolosi; Trinity College Dublin, The University of Dublin, Ireland

NM03.06.02

Poster Spotlight: Flexible and Stackable Textile Supercapacitors Based on MXene for Wearable Energy Storage Devices [Alex Inman](#)¹, Tetiana Hryhorchuk¹, Lingyi Bi¹, Ruocun (John) Wang¹, Ben Greenspan², Taylor Tabb², Eric Gallo², Simge Uzun¹, Armin VahidMohammadi¹, Andreea Danielescu², Genevieve Dion¹ and Yury Gogotsi¹; ¹Drexel University, United States; ²Accenture Labs, United States

NM03.06.05

Poster Spotlight: Design of Effective Hybrid Photocatalysts via Coupling TiO₂ with Delaminated Ti₃C₂T_x Ahmed Al Mayyahi, Swagotom Sarker and Placidus B. Amama; Kansas State University, United States

NM03.06.06

Poster Spotlight: Synthesis of Ordered Double Transition Metal (Mo_{2+a}Nb_{2-a})AlC₃ MAX Phases and Their (Mo_{2+a}Nb_{2-a})C₃T_x MXenes [Krista Pulley](#)^{1,2}, Brian Wyatt^{1,1}, Wyatt Highland¹ and Babak Anasori^{1,1}; ¹Indiana University-Purdue University Indianapolis, United States; ²Butler University, United States

NM03.06.07

Poster Spotlight: MXene Embedded Bimetallic Organic Framework Electrocatalyst in Lithium-Oxygen Batteries [Sanghee Nam](#)¹, Yury Gogotsi² and Il-Kwon Oh¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Drexel University, United States

NM03.06.08

Poster Spotlight: Electronic and Thermal Properties of Ti₃C₂-MXenes for Sensing Applications Tomasz Straczek, [Krzysztof Grabowski](#), Shreyas Srivatsa, Janusz Przewoznik, Waldemar Tokarz, Agnieszka Radziszewska, Leszek Chlubny, Tadeusz Uhl, Jerzy Lis and Czeslaw Kapusta; AGH University of Science and Technology, Poland

SESSION NM03.07: MXenes Electrochemistry, Sensing, and EMI Shielding
Session Chairs: Vadym Mochalin and Raymond Unocic
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 301B

8:00 AM NM03.07.01

Synthesis of New Two-Dimensional Titanium Carbonitride (Ti₂C_{0.5}N_{0.5}) MXene [Anika Tabassum](#)¹, Kun Liang¹, Ahmad Majed¹, Chaochao Dun², Feipeng Yang², Jinghua Guo², Kaitlyn E. Prenger¹, Jeffrey Urban² and Michael Naguib¹; ¹Tulane University, United States; ²Lawrence Berkeley National Laboratory, United States

8:15 AM NM03.07.02

Synthesis and Characterization of MXenes for Flexible Current Collectors Fabricated Through Inkjet Printing [Prisca Viviani](#), Eugenio Gibertini and Luca Magagnin; Politecnico di Milano, Italy

8:30 AM NM03.07.03

Electrochemical Performance of Vanadium Containing MXenes in Aqueous Electrolytes [Teng Zhang](#), Kyle Matthews, Meikang Han, Armin VahidMohammadi and Yury Gogotsi; Drexel University, United States

8:45 AM NM03.07.04

Screening MXenes Based on Polysulfide Adsorption Capability for Li-S Batteries [Geetha Valurouthu](#), Christopher E. Shuck, Marley Downes, Ruocun (John) Wang, Kyle Matthews and Yury Gogotsi; Drexel University, United States

9:00 AM NM03.07.05

Functionalized MXenes for Triboelectric Nanogenerators—A Step Towards Extending Material Choice and Stability of Triboelectric Nanogenerators Aamir Rasheed, Dongseong Lee and [Dae Joon Kang](#); Sungkyunkwan University, Korea (the Republic of)

9:15 AM NM03.07.06

“Smell” Diseases: a Fast, Risk-Free, Novel Sensing System for Disease Intervention and Management [Danling Wang](#) and Qifeng Zhang; North Dakota State University, United States

10:00 AM NM03.07.09

MXene Membranes for Concurrent Functioning as Microwave Components and Sensing Elements Omid Niksan, Kasra Khorsand Kazemi and [Mohammad H Zarifi](#); University of British Columbia, Canada

10:00 AM BREAK

10:15 AM NM03.07.10

Anomalous Absorption of Electromagnetic Waves by 2D Transition Metal Carbonitride Ti_3CNT_x (MXene) Aamir Iqbal^{1,2} and Chong Min Koo¹;
¹Korea Institute of Science and Technology (KIST), Korea (the Republic of); ²Korea University of Science and Technology, Korea (the Republic of)

10:30 AM NM03.07.11

MXene Surface Chemistry and Their Electronic Applications Chong Min Koo^{1,2,3}; ¹Korea Institute of Science & Technology, Korea (the Republic of);
²Korea University, Korea (the Republic of); ³University of Science and Technology, Korea (the Republic of)

10:45 AM NM03.07.13

Electrochemical RAMs for Neuromorphic Computers Based on MXenes Mahiar M. Hamed¹, Armantas Melianas², Mina Kang¹, Yury Gogotsi³,
Alberto Salleo² and Armin VahidMohammadi³; ¹KTH, Sweden; ²Stanford University, United States; ³Drexel University, United States

SESSION NM03.08: MXenes Sensing and Electronics

Session Chairs: Christina Birkel and Brian Wyatt

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 301B

1:30 PM NM03.08.02

Multiscale Bioelectronics Enabled by Ti_3C_2 MXene Flavia Vitale; University of Pennsylvania, United States

1:45 PM NM03.08.04

Clean Water Recycling Through Adsorption via Nanocomposites of $Ti_3C_2T_x$ MXene-AgMOF and Graphene-Oxide-Ag-MOF Mostafa Dadashi
Firouzjaei^{1,2}, Mark Elliott¹ and Babak Anasori²; ¹The University of Alabama, United States; ²Indiana University-Purdue University, United States

2:00 PM *NM03.08.01

Water Treatment and Environmental Remediation Applications of Two-Dimensional Metal Carbides (MXenes)—Opportunities and Challenges
Khaled Mahmoud; Hamad Bin Khalifa University, Qatar

2:30 PM BREAK

3:00 PM NM03.08.03

Carbon Capture by $Ti_3C_2T_x$ MXene—Influence of Amine Intercalation and Particle Size Joshua D. Del Prado, Ona Udoh, Bhoj Gautam and Daniel
E. Autrey; Fayetteville State University, United States

3:15 PM NM03.08.06

Ti_2N Nitride MXene as Electrocatalyst for Nitrogen Reduction Reaction Denis Johnson and Abdoulaye Djire; Texas A&M University, United States

3:30 PM NM03.09.02

Poster Spotlight: Immune Compatibility of MXenes Laura Fusco^{1,2,3}, Arianna Gazzi^{4,1}, Christopher E. Shuck², Darawan Rinchai³, Eiman Ahmed³, Jean-
Charles Grivel³, Davide Bedognetti³, Yury Gogotsi² and Lucia G. Delogu¹; ¹University of Padua, Italy; ²Drexel University, United States; ³Sidra Medicine,
Qatar; ⁴University of Trieste, Italy

3:31 PM NM03.09.03

Poster Spotlight: Neuromorphic Synaptic Device Based on $Ti_3C_2T_x$ MXene Nanosheets Sungpyo Baek, Jae Hyeok Ju, Jingjie Niu, Jin-hong Park and
Sungjoo Lee; Sungkyunkwan University, Korea (the Republic of)

SESSION NM03.09: Poster Session: MXenes Applications

Session Chairs: Babak Anasori, Christina Birkel, Chong Min Koo and Valeria Nicolosi

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM03.09.02

Poster Spotlight: Immune Compatibility of MXenes Laura Fusco^{1,2,3}, Arianna Gazzi^{4,1}, Christopher E. Shuck², Darawan Rinchai³, Eiman Ahmed³, Jean-
Charles Grivel³, Davide Bedognetti³, Yury Gogotsi² and Lucia G. Delogu¹; ¹University of Padua, Italy; ²Drexel University, United States; ³Sidra Medicine,
Qatar; ⁴University of Trieste, Italy

NM03.09.03

Poster Spotlight: Neuromorphic Synaptic Device Based on $Ti_3C_2T_x$ MXene Nanosheets Sungpyo Baek, Jae Hyeok Ju, Jingjie Niu, Jin-hong Park and
Sungjoo Lee; Sungkyunkwan University, Korea (the Republic of)

SESSION NM03.10: MXenes I

Session Chairs: Christina Birkel and Anupma Thakur

Tuesday Morning, May 24, 2022

NM03-Virtual

8:00 AM *NM03.10.01

MXetronics—The Electronic Applications of MXenes [Husam N. Alshareef](#); King Abdullah University of Science and Technology, Saudi Arabia

8:30 AM NM03.10.04

Photocatalytic Properties of the Ti₃C₂T_x MXene [Agnieszka M. Jastrzebska](#), Dominika Bury, Michal Jakubczak and Muhammad A. Purbayanto; Warsaw University of Technology, Poland

8:45 AM *NM03.10.05

Chemically Ordered Laminate Borides and Their Two-Dimensional Derivatives from Chemical Exfoliation [Johanna Rosen](#); Linköping University, Sweden

9:15 AM NM03.10.06

Interactions of Ti₃C₂ MXenes with N-Substituted Zwitterionic Biological Buffers [Swapnil Ambade](#) and Zeev Rosenzweig; University of Maryland Baltimore County, United States

SESSION NM03.11: MXenes II
Session Chairs: Christina Birkel and Valeria Nicolosi
Tuesday Morning, May 24, 2022
NM03-Virtual

10:30 AM NM03.11.02

Self-Assembly of MXene Hydrogels for High-Performance Supercapacitors [Ke Li](#) and Valeria Nicolosi; Trinity College Dublin, Ireland

10:45 AM NM03.11.03

Aerosol-Jet Printing Enables High-Resolution Ti₃C₂ Mxene Printed Electrodes on a PTFE Structure For Neural Stimulation [Javier Gutierrez Gonzalez](#)^{1,2}, Dahnán Spurling¹, Lorcan McKeon¹, Adrian Dervan², Valeria Nicolosi^{1,3,4} and Fergal J O'Brien^{2,3}; ¹Trinity College, Ireland; ²RCSI, Ireland; ³Advanced Materials and Bioengineering Research (AMBER) Centre, Ireland; ⁴CRANN, Ireland

11:00 AM *NM03.11.05

Designing Electrochemical Response of MXenes [Maria Lukatskaya](#); ETH Zürich, Switzerland

11:30 AM NM03.11.06

Multifunctional Electromagnetic-Interference Shielding Materials Based on Ti₃C₂T_x MXene Composites [Ji Liu](#) and Valeria Nicolosi; Trinity College Dublin, The University of Dublin, Ireland

11:45 AM NM03.11.07

Ordered Double Transition Metal MXenes for High Energy Density Asymmetric Supercapacitors [Yaqoob Khan](#)^{1,2} and Husnu Emrah Unalan¹; ¹Middle East Technical University, Turkey; ²National Centre for Physics, Pakistan

SESSION NM03.12: MXenes III
Session Chairs: Babak Anasori and Anupma Thakur
Tuesday Afternoon, May 24, 2022
NM03-Virtual

1:00 PM NM03.12.01

Synthesis of Ultrathin 2D Metal Oxides Films via *In Situ* Oxidation of MXenes on Electrochromic Devices [Xiaoyuan Ma](#); Boston University, United States

1:15 PM NM03.12.02

MXene-Mediated Immune Cell-Cell Interactions Revealed by Enzymatic Lipstic Labelling [Arianna Gazzzi](#)^{1,2}, Laura Fusco^{2,3,4}, Marco Orecchioni⁵, Christopher E. Shuck³, Dafne Alberti², Barbara Zavan^{6,7}, Yury Gogotsi³, Giulia Pasqual² and Lucia G. Delogu²; ¹University of Trieste, Italy; ²University of Padua, Italy; ³Drexel University, United States; ⁴Sidra Medicine, Qatar; ⁵La Jolla Institute for Allergy and Immunology, United States; ⁶University of Ferrara, Italy; ⁷Maria Cecilia Hospital, Italy

1:30 PM NM03.12.04

Nanoscale Heterogeneities in 2D Ti₃C₂T_x MXene Crystals Revealed by TERS Asia Sarycheva¹, [Marudachalam Shanmugasundaram](#)², Andrey Krayev² and Yury Gogotsi¹; ¹A.J. Drexel Nanomaterials Institute, United States; ²HORIBA Instruments Inc, United States

1:45 PM *NM03.12.05

Computational Discovery and Properties of Novel MXenes [Paul Kent](#) and Murali Gopal Muraleedharan; Oak Ridge National Laboratory, United States

2:15 PM NM03.12.06

Superlubricity of Ti₃C₂T_x MXene at the Nanoscale—Effect of Layer Thickness and Aging [James Wait](#)¹, Brian Wyatt², Babak Anasori² and Arzu Colak¹; ¹Clarkson University, United States; ²Indiana University–Purdue University Indianapolis, United States

2:30 PM NM03.12.07

Ti₃C₂T_x MXene-Based Hybrid Aerogels with Tunable Porosity [Farivash Gholamirad](#) and Nader Taheri-Qazvini; University of South Carolina, United States

SESSION NM03.13: MXenes IV
Session Chairs: Babak Anasori, Kartik Nemani and Brian Wyatt
Tuesday Afternoon, May 24, 2022
NM03-Virtual

4:00 PM NM03.13.01

Green Synthesis and Optimization of MXene-Carbon Composites for Capacitor and Battery Applications Amirali S. Akhavi, William C. Coley, Yi Ma, Ruoxu Shang, Mihrimah Ozkan and Cengiz S. Ozkan; University of California, Riverside, United States

4:15 PM NM03.13.02

Graphite-MXene Composites for Capacitor and Battery Applications William C. Coley, Amirali S. Akhavi, Ruoxu Shang, Yi Ma, Mihrimah Ozkan and Cengiz S. Ozkan; University of California Riverside, United States

4:30 PM NM03.13.03

Understanding the Cation and Anion Trapping in the Water Desalination Processes Mediated by 2D Mo_{1.33}C (i-MXene) Jonathan Guerrero Sanchez¹, Dalia M. Muñoz-Pizza^{2,3}, Ma Guadalupe Moreno Armenta¹ and Noboru Takeuchi¹; ¹Universidad Nacional Autonoma de Mexico, Mexico; ²Colegio de la frontera norte, Mexico; ³Universidad Autonoma de Baja California, Mexico

4:45 PM *NM03.13.04

Synthesis of MXenes and Their Integration with other 2D Materials for Electronic Devices Xi Ling; Boston University, United States

5:15 PM NM03.13.05

Enhanced Electrochemical Behaviors of Ti₃C₂ MXenes/Polypyrrole Polymer Composites as Electrode Materials for Electrocatalytic Water Splitting Ashish Sharma¹, Vir S. Rangra¹ and Anupma Thakur²; ¹Himachal Pradesh University SummerHill Shimla, India; ²Indian Institute of Technology Gandhinagar, India

SESSION NM03.14: MXenes V
Session Chair: Chong Min Koo
Tuesday Afternoon, May 24, 2022
NM03-Virtual

7:00 PM *NM03.14.01

Nanoscale Assembly of 2D Materials for Energy & Environmental Applications Sang Ouk Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

7:30 PM *NM03.14.02

Surface Modification of MXene Through Lewis Acidic Molten Salt Etching Route and Investigation on Their Properties Qing Huang; Ningbo Institute of Materials Technology & Engineering, Chinese Academy of Sciences, China

8:00 PM NM03.03.02

Flash Sintering—An Economic and Ultrafast Technique for Synthesis of MAX Phases N Usha Kiran^{1,2}, Bishnu Choudhary^{1,2}, Sriparna Chatterjee^{1,2} and Laxmidhar Besra^{1,2}; ¹CSIR, India; ²CSIR- Institute of Minerals & Materials Technology, India

SESSION NM03.15: MXenes VI
Session Chairs: Seon Joon Kim and Chong Min Koo
Tuesday Afternoon, May 24, 2022
NM03-Virtual

8:40 PM SPECIAL TALK

8:45 PM *NM03.15.01

Exploring the Etching Mechanism of Monoatomic Aluminium Layers During MXene Synthesis Hee-Tae Jung^{1,2}; ¹Korea Advanced Institute of Science & Technology, Korea (the Republic of); ²KAIST Institute for Nanocentury, Korea (the Republic of)

9:15 PM *NM03.15.02

Application of MXenes in Energy Storage Bin Xu; Beijing University of Chemical Technology, China

9:45 PM NM03.15.03

Fabrication of Polyethyleneimine Conjugated Fluorescent MXene Nanosheets and Its Application as Cancer Theranostics Agent Barkha Singh, Rohan Bahadur, Mayuri N. Gandhi and Rohit Srivastava; Indian Institute of Technology (IIT) Bombay, India

10:00 PM NM03.15.04

Cl-Based Hydrothermal Etching Strategy Towards Fluoride-Free MXenes and Heterojunctions Changda Wang^{1,2}; ¹University of Science and Technology of China, China; ²MAX IV lab, Sweden

10:15 PM NM03.15.06

Metamaterial-Based Ring Resonator Sensor for Detection of Poisonous Nitrogen Oxide (NO_x) Gas by Using Fe₃O₄ Doped MXene (Ti₃C₂T_x) Nanosheets Shravani Kale; Defence Institute of Advanced Technology, Pune, India

SESSION NM03.16: MXenes VII
Session Chairs: Tae Hee Han and Chong Min Koo
Wednesday Afternoon, May 25, 2022
NM03-Virtual

9:00 PM *NM03.16.01

Designing MXene-Based Chemical Sensors Using Intercalation Chemistry and Surface Modification Seon Joon Kim^{1,2}; ¹Korea Institute of Science and Technology (KIST), Korea (the Republic of); ²University of Science and Technology, Korea (the Republic of)

9:30 PM NM03.16.03

Microstructural and Compositional Design Principles for High-Entropy MXenes (Ti-V-Nb-Mo)₄C₃ and (Ti-V-Cr-Mo)₄C₃—A High-Throughput First-Principles Study Zhidong Leong¹, Hongmei Jin¹, Zicong Marvin Wong¹, Babak Anasori² and Teck Leong Tan¹; ¹A*STAR, Singapore; ²Indiana University–Purdue University Indianapolis, United States

9:45 PM *NM03.16.04

Assembly of Ti₃C₂T_x MXene into Functional Fibers Tae Hee Han; Hanyang University, Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM NM04

Nanotubes and Related Low-Dimensional Nanostructures
May 9 - May 25, 2022

Symposium Organizers

Don Futaba, National Institute of Advanced Industrial Science and Technology
Alister Page, The University of Newcastle, Australia
Ranjit Pati, Michigan Technological University
Ming Xu, Huazhong University of Science and Technology

* Invited Paper

SESSION NM04.01: Opening
Session Chairs: Don Futaba, Alister Page, Ranjit Pati and Ming Xu
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 301A

10:30 AM *NM04.01.02

ARES™ Autonomous Research Systems Control of Carbon Nanotube Yield and Structure Benji Maruyama¹, Jennifer Carpena-Nunez^{2,3}, John Bulmer^{1,3}, Rahul Rao¹ and Robert Waelder^{1,3}; ¹Air Force Research Laboratory, United States; ²Air Force Research Laboratory, United States; ³UES, Inc., United States

11:00 AM NM04.01.04

Carbon Nanotube (CNT) Growth Using Mixed-Metal Catalysts That Incorporate Heavy Refractory Diffusion Inhibitors—A Route to Extended CNT Growth Michael J. Bronikowski; University of Tampa, United States

SESSION NM04.02: Preparation and Characterization
Session Chairs: Don Futaba and Benji Maruyama
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 301A

1:30 PM NM04.02.03

Rapid Synthesis of Carbon Nanotubes by CVD in High Frequency Induction Heating System for X-Ray Application Jinho Choi¹, Amar P. Gupta¹, Seung Jun Yeo¹, Jaeik Jung², Moonkyoo Kong³ and Jehwang Ryu¹; ¹Kyung Hee University, Korea (the Republic of); ²CAT Beam Tech. Co. Ltd., Korea (the Republic of); ³Kyung Hee University Medical Center, Korea (the Republic of)

1:45 PM NM04.02.05

Synthesis of Templating Hexagonal Boron Nitride on (Non-)Catalytic Substrates for Electronic Devices [Anja Sutorius](#), René Weißing, Michael Wilhelm and Sanjay Mathur; University of Cologne, Germany

2:30 PM NM04.02.06

Quantifying (n,m) Specific SWCNT Partition Conditions in Aqueous Two-Polymer Phase Extraction Christopher Sims and [Jeffrey Fagan](#); National Institute of Standards and Technology, United States

2:30 PM BREAK

2:45 PM NM04.02.07

Improving Geometric Uniformity of Carbon Nanotube Forests by Tuning Catalyst Formation Step in Dynamic Chemical Vapor Deposition Golnaz Najaf Tomaraci¹, Jaegun Lee^{1,2}, Moataz Abdulhafez¹ and [Mostafa Bedewy](#)¹; ¹University of Pittsburgh, United States; ²Pusan National University, Korea (the Republic of)

3:00 PM NM04.10.02

Sulfur Encapsulated in Microporous Carbon Composites for Improved Hydrogen Storage [Charles D. Brewster](#), Sebastien Rochat, Lui Terry and Valeska Ting; University of Bristol, United Kingdom

3:15 PM NM04.10.01

Carbon Nanotube Chemiresistors Coated with Hygroscopic Aqueous Film for the Selective Detection of Hydrolysable Toxic Compounds [SeongWoo Lee](#) and Chang Young Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SESSION NM04.03: Poster Session I: Nanotubes and Related Low-Dimensional Nanostructures I

Session Chairs: Alister Page and Ming Xu

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM04.03.01

Copper Nanowires Covered with Lattice-Rearranged 2D Materials for Flexible Transparent Electronics [Jongyoun Kim](#) and Youngu Lee; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

NM04.03.03

Highly Conductive Direct-write Electrospun PEDOT: PSS Nanofibers [Noori Na](#), Abiral Regmi and Jiyoung Chang; University of Utah, United States

NM04.03.04

Thermal Stability of Pool Boiling Heat Transfer on Vertical Nanowire Surfaces Under Heater Size Effect [Maroosol Yun](#)¹, Wei-Ting Hsu¹, Injoong Chang¹, Juyeong Nam¹, Donghwi Lee², Beom Seok Kim³ and Hyung Hee Cho¹; ¹Yonsei University, Korea (the Republic of); ²Chonbuk National University, Korea (the Republic of); ³Seoul National University of Science and Technology, Korea (the Republic of)

NM04.03.05

Engineered Vertically-Aligned CNT for Plasmon-Enhanced Optical Sensing with Programmable Molecular Delivery [Seong Jae Kim](#), Ji-Hun Jeong, Sukkyung Kang and Sanha Kim; KAIST, Korea (the Republic of)

NM04.03.06

Hygroscopic Micro/Nanolenses Along Carbon Nanotube Ion Channels [Yun-Tae Kim](#) and Chang Young Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of)

NM04.03.07

The Influence of the CNC Contents to the Tensile Properties of Poly(Arylene Ether Sulfone)/Cellulose Nanocrystal Composite Fibers [Minjung Han](#), Min-Jeong Kim, Hyejin Ju, Ga-Hyeun Lee, Changbeom Jeon and Han Gi Chae; Ulsan National Institute of Science and Technology, Korea (the Republic of)

NM04.03.11

TiO₂ Nanorods Synthesized by Hydrothermal Method for Biophotovoltaic Cells Dariana Aguilar Rojas¹, Denisse P. Murillo Sojo¹, [Daniela Zúñiga Rivera](#)¹, Mónica Carmona Córdoba¹, Jose Joaquín Sanabria Gómez¹, Venkatesan Renugopalakrishnan², Barry Bruce³ and Claudia Villarreal¹; ¹Tecnológico de Costa Rica, Costa Rica; ²Northeastern University, United States; ³University of Tennessee at Knoxville, United States

NM04.03.12

Electrical Properties of Pt-SnO₂/MWCNT Catalyst with Improved Catalyst Support Hyeongwoo Min¹, Ji Hyeok Choi¹, [Haecun Kang](#)¹, Dong-Joo Kim² and Young Soo Yoon¹; ¹Gachon University, Korea (the Republic of); ²Auburn University, United States

SESSION NM04.04: Nanotube Applications I

Session Chairs: Shigeo Maruyama, Ranjit Pati and Desiree Plata

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 301A

8:30 AM *NM04.04.01

Functionalized Alkyne Precursors for Direct Placement of Heteroatoms in Carbon Nanotube Growth [Desiree Plata](#)^{1,2}; ¹Massachusetts Institute of

Technology, United States; ²Yale University, United States

9:00 AM *NM04.04.02

Powerful, Large Stroke Electrochemical Carbon Nanotube Yarn Artificial Muscles [Ray H. Baughman](#); The University of Texas at Dallas, United States

9:30 AM NM04.04.03

Building Chiral Representations of Carbon Nanotube RBM Spectra for Synthesis Control and Analysis [Robert Waelder](#)^{1,2}; ¹Air Force Research Laboratory, United States; ²UES, Inc., United States

9:45 AM NM04.04.04

Superstructures of 0D-Magic Semiconductor Clusters—Highly Luminescent and Catalytically Active by Assembly [Woonhyuk Baek](#) and Taeghwan Hyeon; Seoul National University, Korea (the Republic of)

10:00 AM BREAK

10:30 AM NM04.04.06

Nanocomposite Based on Silicon Nanowires-Nanometric Alumina-Conducting Polymer for Flexible Pseudocapacitors Marc Dietrich^{1,2,3}, [Pascal Gentile](#)^{1,2,4}, Anthony Valero^{1,2,3}, Philippe Azaïs^{1,5,4} and Said Sadki^{4,3,1}; ¹CEA Grenoble, France; ²IRIG, France; ³UGA/CNRS, France; ⁴UGA, France; ⁵LITEN, France

10:45 AM NM04.04.07

Facile Fabrication of Bimetallic Ag-Bi High Dense Nanospheres on Carbon Nanotubes for High Performance Supercapacitor Electrodes [Taewon Kim](#) and Wonjoon Choi; Korea University, Korea (the Republic of)

11:00 AM NM04.04.08

Highly Stretchable Thermoelectric Fabrics Woven from Carbon Nanotube-Coated Polymeric Fibers for Wearable Energy Harvesters [Doojoon Jang](#)¹, Kyung Tae Park¹, Sang-Soo Lee¹ and Heesuk Kim^{1,2}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²University of Science and Technology, Korea (the Republic of)

SESSION NM04.05: Nanotube Applications II
Session Chairs: Ray Baughman, Don Futaba and Ming Xu
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 301A

1:30 PM *NM04.05.01

Low-Voltage Operable, Flexible Analog/Digital Mixed-Signal Integrated Circuits Based on Carbon Nanotubes [Yutaka Ohno](#); Nagoya University, Japan

2:00 PM NM04.05.02

Fiber-type All Carbon Thermoelectric Devices Developed Using Wet-Spinning of Semiconducting Single-Walled Carbon Nanotubes [Yong Kim](#), Woong-Ryeol Yu, HyunJoon Yang and YongMin Kim; Seoul National University, Korea (the Republic of)

2:15 PM NM04.05.03

Low Dimensional Carbon Materials for the Next Generation of Energy Storage, EMS, Sensors and Memory Applications [Paolo Bondavalli](#); Thales Research and Technology, France

2:30 PM NM04.05.04

Morphology and Dynamic Viscosity of Novel Phase-Change Systems with Plasma-Functionalized Graphene Nanoflakes for Emerging Methane Storage Technologies [Adam McElligott](#), Jean-Luc Meunier and Phillip Servio; McGill University, Canada

3:15 PM NM04.05.08

Functional Chrysotile Nanotubes for Photodynamic Therapy [Valeria Secchi](#)¹, Irene Villa², Chiara Villa³, Anna Vedda¹, Yvan Torrente³ and Angelo Monguzzi¹; ¹Università Bicocca, Italy; ²Institute of Physics, Czechia; ³Università degli Studi di Milano, Italy

3:00 PM BREAK

3:30 PM NM04.10.10

Photodegradation of Rhodamine Moieties by Controllable Porphyrin-Nanocarbon Agglomerates with Resonant Non-Linear Quenching Properties [Michael Spencer](#); University of Surrey, United Kingdom

SESSION NM04.06: Nanotube Applications III
Session Chairs: Don Futaba, Ming Xu and Takeo Yamada
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 301A

8:30 AM *NM04.06.01

Emerging Applications of Boron Nitride Nanotubes for Advanced Electronics and Biomedicine [Yoke Khin Yap](#); Michigan Technological University, United States

9:00 AM NM04.06.03

Water-Repelling Properties of Low-Dimensional Carbon Nanostructures [Makenna Parkinson](#), Weston Miller and Albert Dato; Harvey Mudd College, United States

9:30 AM BREAK

SESSION NM04.07: Theory & Simulation I
Session Chairs: Alister Page and Yoke Khin Yap
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 301A

10:30 AM NM04.07.02

In Situ SEM Synthesis and 3D Simulation of Carbon Nanotube Forests Ramakrishna Surya, Gordon Koerner, Filiz Bunyak, Prasad Calyam, Kannappan Palaniappan and [Matthew Maschmann](#); University of Missouri, United States

10:45 AM NM04.07.03

Effect of the Nanotube Chirality on Mechanical Properties of Thin Films Composed of Covalently Cross-Linked Carbon Nanotubes Kevin W. Kayang and [Alexey N. Volkov](#); University of Alabama, United States

11:00 AM NM04.10.06

Tailoring Morphology in Titania Nanotube Arrays by Implantation—Experiments and Modelling on Designed Pore Size - and beyond [Astrid Kupferer](#)^{1,2}, Michael Mensing^{1,3}, Jan Lehnert¹, Stephan Mändl¹ and Stefan G. Mayr^{1,2}; ¹Leibniz Institute of Surface Engineering, Germany; ²Universität Leipzig, Germany; ³Fraunhofer Institute for Silicon Technology, Germany

SESSION NM04.08: Theory & Simulation II
Session Chairs: Alister Page and Ranjit Pati
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 301A

1:30 PM NM04.08.02

Rapid Thermochemical Pretreatment for Three-Fold Enhancement of Catalytic Lifetime and Four-Fold Tunability of Density in Chemical Vapor Deposition of Carbon Nanotubes Golnaz Najaf Tomaraei¹, Jaegeun Lee^{1,2}, Moataz Abdulhafez¹ and [Mostafa Bedewy](#)¹; ¹University of Pittsburgh, United States; ²Pusan National University, Korea (the Republic of)

2:15 PM BREAK

SESSION NM04.09: Low Dimensional Nanostructures I
Session Chairs: Don Futaba and Ming Xu
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 301A

3:30 PM *NM04.09.01

The Contrasting Strategies to Enhance Electrical and Thermal Conductivity in Nanocomposites—Direct Contact versus Quantum Tunneling [Seunghyun Baik](#); Sungkyunkwan University, Korea (the Republic of)

4:00 PM NM04.09.02

Chemical Modification of Double-Walled Carbon Nanotubes to Optimize Their Inclusion in Copper Matrix Composites [Mauricio Pavia](#)¹, Mélanie Emo¹, Fahad Alnjiman¹, Emmanuel Flahaut², Brigitte Vigolo¹ and Ewa Kazimierska³; ¹Université de Lorraine, CNRS, Institut Jean Lamour, France; ²CIRIMAT, Université de Toulouse, CNRS, France; ³Swansea University, Energy Safety Research Institute (ESRI), United Kingdom

4:15 PM NM04.09.03

Molecular Doping of Few-Walled Carbon Nanotubes with Ionic Liquid for High-Performance Flexible Thermoelectric Generators [Jaemin Jung](#), Jong Gyu Oh, Sung Hoon Noh, Han Sol Yang and Jaeyoung Jang; Hanyang University, Korea (the Republic of)

4:30 PM NM04.09.04

Self-Catalytic Growth of 1D Materials Within Dislocations in Gold [Lotan Portal](#), Iryna Polishchuk, Maria Koifman Khristosov, Alexander Katsman and Boaz Pokroy; Technion—Israel Institute of Technology, Israel

4:45 PM NM04.09.05

Multicolour Graphene Quantum Dots as a Non-Cytotoxic Platform for Cell Guidance [Inmaculada J. Gómez Pérez](#), Anna Dolečková, Jirina Medalová and Lenka Zajíčková; Masaryk University, Czechia

SESSION NM04.10: Poster Session II: Nanotubes and Related Low-Dimensional Nanostructures II
Session Chairs: Don Futaba and Ranjit Pati
Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM04.10.03

High-Sensitivity and Ultra-Fast Recovery H₂ Sensing Using Suspended Graphene-PEDOT:PSS:PEO Nanofiber Channels Abiral Regmi, Noori Na and Jiyoung Chang; The University of Utah, United States

NM04.10.05

Systematically Analysis of Magneto and Vertical Transport of SrRuO₃/SrTiO₃ Superlattices Hyeonbeom Kim^{1,2}, Seung Gyo Jeong¹, Sung Ju Hong³, Dongseok Suh¹ and Woo Seok Choi¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Center for Integrated Nanotechnologies, Korea (the Republic of); ³Kangwon National University, Korea (the Republic of)

NM04.10.09

Physical Possibilities and Limits of DNA-Enabled Programmable 2D Self-Assembly Nicholas Tjahjono, Evgeni S. Penev and Boris I. Yakobson; Rice University, United States

SESSION NM04.11: Low Dimensional Nanostructures II
Session Chairs: Seunghyun Baik, Vivek Saraswat and Ming Xu
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 301A

8:30 AM NM04.11.02

Oil-Free Compact X-Ray Generator Based on Carbon Nanotube Field Emitters Shalini Rajpoot¹, Jongmin Lim¹, Jinho Choi¹, Amar P. Gupta¹, Jeakyu Jang², Seung Bum Ryu³, Kyung-Sik Yoon¹, Seung Jin Park¹ and Jehwang Ryu¹; ¹Kyung Hee University, Korea (the Republic of); ²CAT Beam Tech. Co. Ltd., Korea (the Republic of); ³DEXCOWIN Co. Ltd., Korea (the Republic of)

8:45 AM NM04.11.03

Charge Transport Dynamics in Microwave Synthesized One-Dimensional Molybdenum Chalcogenides Jessica Ortiz Rodriguez, Joseph Perryman and Jesus Velazquez; University of California, Davis, United States

9:00 AM NM04.11.04

Laser-Treated Transition Metal Oxides for Water Splitting Jakub Wawrzyniak¹, Jakub Karczewski², Emerson Coy³, Katarzyna Grochowska¹ and Katarzyna Siuzdak¹; ¹Institute of Fluid-Flow Machinery, Poland; ²Gdansk University of Technology, Poland; ³Adam Mickiewicz University, Poland

9:15 AM *NM04.11.05

Wafer-Scale Single-Crystal Film Growth of 2D Layered Materials and Heterostructures Young Hee Lee^{1,2}; ¹Sungkyunkwan University, Korea (the Republic of); ²IBS Center for Integrated Nanostructure Physics, Korea (the Republic of)

9:45 AM BREAK

10:15 AM NM04.11.06

Hot-Carrier Relaxation in CdSe/CdS Core/Shell Nanoplatelets Matthew Pelton¹, Yana Wang², Igor Fedin³, Dmitri V. Talapin³ and Stephen K. O'Leary²; ¹University of Maryland Baltimore County, United States; ²University of British Columbia, Canada; ³The University of Chicago, United States

10:30 AM NM04.11.07

Asymmetric "Misfit" Nanotubes—Chemical Affinity Outwits the Entropy at High-Temperature Solid-State Reactions Sreedhara M. B¹, Simon Hettler², Ifat Kaplan-Ashiri¹, Katya Rechav¹, Yishay Feldman¹, Andrey Enyashin³, Lothar Houben¹, Raul Arenal² and Reshef Tenne¹; ¹Weizmann Institute of Science, Israel; ²Universidad de Zaragoza, Spain; ³Institute of Solid State Chemistry UB RAS, Russian Federation

10:45 AM NM04.11.09

1D Transition Metal Chalcogenides: Novel van der Waals Metals for Microelectronic Applications Jing Jin, Michelle Wurch, Thomas Empante and Ludwig Bartels; University of California, Riverside, United States

11:00 AM NM04.10.07

Self-Assembled Hybrid Nanomaterials: Interactions of Lipid Bilayers with Metal Oxide Surfaces of Nanoscale Curvature Tatyana I. Smirnova, Maxim Voinov and Alex I. Smirnov; North Carolina State University, United States

SESSION NM04.12: Low Dimensional Nanostructures III
Session Chairs: Don Futaba, Young Hee Lee, Ranjit Pati and Vivek Saraswat
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 301A

1:30 PM NM04.12.01

Comparative Study of Field Emission Performance of Directly Grown CNTs on Metal Alloy Using CVD and PECVD Processes for X-Ray Source Amar P. Gupta¹, Seung Jun Yeo², Jaek Jung², Jeung Sun Ahn¹ and Jehwang Ryu¹; ¹Kyung Hee University, Korea (the Republic of); ²CAT Beam Tech Co., Ltd, Korea (the Republic of)

1:45 PM NM04.12.02

Effect of Electrostatic Boundary Condition and Orientation on Ferroelectric Nanotube Mojue Zhang; University of Wisconsin–Madison, United States

States

2:00 PM NM04.12.04

Surface Modification of Few-Layered Graphene Nanoplatelets for Enhanced Energy Transportation in Nanofluids Michael Wilhelm, Khan Lê, Anna K. Schmidt-Verma, Veronika Brune and Sanjay Mathur; University of Cologne, Germany

2:45 PM NM04.12.05

Exploring the Best CVD Conditions for Growth of Small-Diameter Single-Wall Carbon Nanotubes Using an Autonomous Research System Brian M. Everhart¹, Rahul Rao², Pavel Nikolaev², Tsung W. Liu³, Diego Gómez-Gualdrón³, Benji Maruyama² and Placidus B. Amama¹; ¹Kansas State University, United States; ²Air Force Research Laboratory, United States; ³Colorado School of Mines, United States

2:30 PM BREAK

3:00 PM NM04.12.06

A Facile Approach for Fabricating Flexible Composite Heaters Based on Laser-Induced Graphene Written on Aramid Substrates Iman Naseri and Mostafa Yourdkhani; Colorado State University, United States

3:15 PM NM04.12.07

Low-Dimensional Nanostructures for Multi-Gas Sensing: Synergistic Effects Between Materials Properties and Machine-Learning-Guided Sensor Designs Radislav A. Potyrailo; GE Global Research, United States

3:30 PM NM04.12.08

Facile Fabrication of Nitrogen-Doped Three-Dimensional Carbon Branches Anchored on Trimetallic Bifunctional Catalysts and their application for Zn-Air Battery Younsun Cha and Wonjoon Choi; Korea University, Korea (the Republic of)

3:45 PM NM04.10.04

The Advanced Electron Microscopy Characterization and Structure-Property Correlation of BaMnO₃ for the Electrocatalytic Oxygen Reduction Reaction Lucia Hughes, Ahin Roy, Clive Downing and Valeria Nicolosi; Trinity College Dublin, The University of Dublin, Ireland

SESSION NM04.13: Nanotubes and Related Low-Dimensional Nanostructures I

Session Chairs: Don Futaba, Alister Page, Ranjit Pati and Ming Xu

Wednesday Morning, May 25, 2022

NM04-Virtual

8:00 AM *NM04.13.01

Manufacturing 2D Crystal Based Devices—From Desktop Inkjet to 100 m/min Industrial-Scale Flexographic Printing Tawfique Hasan; Cambridge University, United Kingdom

8:30 AM *NM04.13.02

Stage-I C₆₀-Intercalated Graphene Films Xianjue Chen; The University of Newcastle, Australia

9:00 AM NM04.13.03

Iron Oxide and Various Metal Oxide Hollow Nanoparticles Engineered by One-Pot Double Galvanic Replacement Reaction and the Application for Anti-Cancer Therapy Aloka S. Paragodaarachchi^{1,2}, Steven Medvedovsky², Justin Fang^{1,2}, Min Kang^{1,2} and Hiroshi Matsui^{1,2,3}; ¹City University of New York, United States; ²Hunter College, United States; ³Weill Cornell Medical College, United States

9:15 AM NM04.13.04

Curviness Percolation Threshold in Transparent, Conductive 2D Networks Consisting of Curvy Nanotubes Yunong Wang, Prithviraj Pachal, Yilin Liu and Ant Ural; University of Florida, United States

9:30 AM NM04.13.05

Efficient Photon Harvesting in Hetero-Layered Scroll Structure Rapti Ghosh¹, Ya-Ping Hsieh¹ and Yang-Fang Chen²; ¹Academia Sinica, Taiwan; ²National Taiwan University, Taiwan

SESSION NM04.14: Nanotubes and Related Low-Dimensional Nanostructures II

Session Chairs: Don Futaba, Alister Page and Ming Xu

Wednesday Morning, May 25, 2022

NM04-Virtual

10:30 AM *NM04.02.01

CVD Synthesis and Application of 1D vdW Heterostructures Based on SWCNTs Yongjia Zheng, Wanyu Dai, Ming Liu, Ya Feng, Shohei Chiashi, Keigo Otsuka, Rong Xiang and Shigeo Maruyama; The University of Tokyo, Japan

11:00 AM NM04.14.01

A Molecular Dynamics Study of the CO₂ Adsorption Properties of Graphyne and Graphdiyne Nanoscrolls Pedro d. Mazon, Aelton B. Santos and Cristiano F. Woellner; Federal University of Paraná, Brazil

11:15 AM NM04.14.02

Cyclic and Helical Symmetry-Adapted Density Functional Theory—Application to the Study of Nanotubes and Their Response to Mechanical Deformations Phanish Suryanarayana; Georgia Institute of Technology, United States

11:30 AM NM04.14.03

Gold Nanowire Functionalized SWCNT paper Electrode for the Electrochemical Sensing of Dopamine in the Presence of Its Interferences Gavin Laflower, Catalina Bui and Janak Paudyal; University of Colorado, Colorado Springs, United States

11:45 AM NM04.14.04

Accurate Predictions of Ion Solvation Under Nanoconfinement Fikret Aydin¹, Alireza Moradzadeh², Camille Bilodeau³, Edmond Y. Lau¹, Eric R. Schwegler¹, Narayana R. Aluru² and Tuan Anh Pham¹; ¹Lawrence Livermore National Laboratory, United States; ²University of Illinois at Urbana-Champaign, United States; ³Rensselaer Polytechnic Institute, United States

11:50 AM NM04.14.05

The On-Site Nanowire-Shape Graphene Formation on Nanoimprinted Si Nanowires for Radial Schottky Junction Solar Cells Wipakorn Jevasuwan, Steaphan M. Wallace, Yoshimasa Sugimoto and Naoki Fukata; National Institute for Materials Science, Japan

11:55 AM NM04.14.06

Functionalized Graphene Origami Metamaterials Jun Cai, Ehsan Estakhrianhaghighi and Hamid Akbarzadeh; McGill University, Canada

12:00 PM NM04.14.09

Engineering Carbon Nanotube Nanostructures in Carbon Fiber Reinforced Epoxy Matrix Composites Ozge Kaynan, Hamed Fallahi, Lisa Perez and Amir Asadi; Texas A&M University, United States

12:15 PM NM04.14.10

The Three-Dimensional Carbon Materials as Lithium-Ion Batteries Electrodes Carolina Rojas Michea, Neida Santacruz, Frank Mendoza, Gerardo Morell and Brad R. Weiner; University of Puerto Rico at Río Piedras, Puerto Rico

SESSION NM04.15: Nanotubes and Related Low-Dimensional Nanostructures III

Session Chairs: Don Futaba, Alister Page and Ming Xu

Wednesday Afternoon, May 25, 2022

NM04-Virtual

9:00 PM *NM04.15.01

Two-Dimensional Inorganic Liquid Crystals Baofu Ding^{1,2}, Bilu Liu² and Hui-Ming Cheng^{1,1}; ¹Chinese Academy of Sciences, China; ²Tsinghua Shenzhen International Graduate School, China

9:30 PM *NM04.15.02

Structure and Property Engineering of Two-Dimensional Carbon Nitride Materials Qinghong Yuan; East China Normal University, China

10:00 PM *NM04.15.03

Developing Industrial Applications of Carbon Nanotubes Takeo Yamada; AIST, Japan

##PAGE_BREAK##

SYMPOSIUM NM05

Advances in Nanodiamonds for Sensing, Biomedical and Other Novel Applications

May 8 - May 23, 2022

Symposium Organizers

Jean-Charles Arnault, CEA Saclay

Shery Chang, University of New South Wales

Edward Chow, National University of Singapore

Olga Shenderova, Adamas Nanotechnologies

* Invited Paper

SESSION NM05.01: Fluorescent Nanodiamond Fabrication and Characterization

Session Chair: David Simpson

Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 303A

1:30 PM *NM05.01.01

Integrating Optically Addressable Spin Defects in Low Dimension Platforms for Quantum Applications F. Joseph P. Heremans^{1,2} and Adam Gali³;
¹Argonne National Laboratory, United States; ²University of Chicago, United States; ³Wigner Research Centre for Physics, Hungary

2:00 PM NM05.01.02

Locating NV Centers in Nanodiamond Using Simultaneous STEM-EELS/EDS Bethany M. Hudak and Rhonda M. Stroud; U.S. Naval Research Laboratory, United States

2:15 PM NM05.01.03

Enhanced NV Fluorescence in Flake Nanodiamond Revealed by Correlative Photoluminescence and Transmission Electron Microscopy Haotian Wen¹, David Kordah², Philipp Reineck³, Alexander Macmillan¹, Huan-Cheng Chang⁴, Christian Dwyer^{5,3} and Shery Chang^{1,1}; ¹University of New South Wales, Australia; ²Centenary College of Louisiana, United States; ³RMIT University, Australia; ⁴Academia Sinica, Taiwan; ⁵Electron Imaging and Spectroscopy Tools, Australia

2:30 PM *NM05.01.04

Optical Activation and Detection of Charge Transport Between Individual Color Centers in Room-Temperature Diamond Artur Lozovoi¹, Harishankar Jayakumar¹, Damon Daw¹, Gyorgy Vizkelethy², Edward Bielejec², Marcus Doherty³, Johannes Flick⁴, Carlos A. Meriles¹ and Lee Bassett⁵;
¹CUNY-City College of New York, United States; ²Sandia National Laboratories, United States; ³The Australian National University, Australia; ⁴Flatiron Institute, United States; ⁵University of Pennsylvania, United States

3:00 PM BREAK

3:30 PM NM05.01.05

Impacts of Ultra-Long High Temperature Annealing on Color Centers and Color Center Spin Properties of Particulate Diamonds Nicholas Nunn¹, Sergey Milikisiyants¹, Alex Smirnov¹, Evgeny Danilov¹, Alexander Shames², Marco Torelli³, Olga A. Shenderova³, Tom Delord⁴, Richard Monge⁴ and Carlos A. Meriles⁴; ¹North Carolina State University, United States; ²Ben-Gurion University of the Negev, Israel; ³Adamas Nanotechnologies, United States; ⁴The City College of New York, United States

3:45 PM NM05.01.06

Theoretical Understanding of the Dynamics of Silicon-Vacancy Color Center Dynamics in Nanodiamonds Chunjing Jia¹, Yan-Kai Tzeng², Yu Lin¹, Thomas P. Devereaux^{1,3} and Steven Chu⁴; ¹SLAC National Accelerator Laboratory, United States; ²Department of Physics, Stanford University, United States; ³Department of Materials Science, Stanford University, United States; ⁴Department of Physics and Department of Molecular and Cellular Physiology, Stanford University, United States

4:00 PM NM05.01.07

Electronic Spin Relaxation and Room Temperature NMR DNP in Microcrystalline HPHT Diamond Particles Alex I. Smirnov¹, Nicholas Nunn¹, Sergey Milikisiyants¹, Olga Shenderova² and Alexander A. Nevzorov¹; ¹North Carolina State University, United States; ²Adamas Nanotechnologies, United States

4:15 PM NM05.08.03

Poster Spotlight: Origins of Enhanced Fluorescence Intensity of Molten Salt Treated Fluorescent Nanodiamond Bowen Wang¹, Karen Privat², Haotian Wen¹, Inga C. Kuschnerus^{1,2}, Yang Tao¹ and Shery Chang^{1,2}; ¹School of Materials Science and Engineering, University of New South Wales, Australia; ²Electron Microscope Unit, Mark Wainwright Analytical Centre, University of New South Wales, Australia

SESSION NM05.02: Biosensing for Disease Detection

Session Chair: Edward Chow

Monday Morning, May 9, 2022

Hawai'i Convention Center, Level 3, 303A

10:30 AM *NM05.02.01

Harnessing Spin-Enhanced Nanodiamonds for Early Disease Diagnosis Rachel McKendry and Benjamin S. Miller; University College London, United Kingdom

11:00 AM NM05.02.02

Targeting of Mannose Receptor with Fluorescent Nanodiamonds—Implications for Locoregional Cancer Diagnostics Petr Cigler; IOCB AS CR vvi, Czechia

11:15 AM NM05.02.03

Magnetically-Sensitive Nanodiamond Thin-Films on Glass Fibers Mona Jani¹, Paulina Czarnecka¹, Saravanan Sengottuvel¹, Mariusz Mrózek¹, Pawel Dabczynski¹, Adam Filipkowski^{2,3}, Ireneusz Kujawa³, Dariusz Pysz³, Wojciech Gawlik¹ and Adam M. Wojciechowski¹; ¹Jagiellonian University, Poland; ²University of Warsaw, Poland; ³Lukasiewicz Research Network - Institute of Microelectronics and Photonics, Poland

SESSION NM05.03: Nanoscale Sensing

Session Chair: Olga Shenderova

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 303A

1:30 PM NM05.03.02

Nanoscale Sensing of Temperature and Viscosity Inside Single Cells Louise Shanahan, [Jack Hart](#), Qiushi Gu, Helena Knowles and Mete Atatüre; University of Cambridge, United Kingdom

1:45 PM NM05.03.03

Nanoscale MRI for Selective Labelling and Localised Free Radical Measurements in the Acrosomes of Single Sperm Cells [Claudia Reyes-San-Martin](#)¹, Thamiir Hamoh¹, Yue Zhang¹, Lotte Berendse¹, Carline Klijn¹, Runrun Li¹, Alina Sigaeva¹, Jakub Kawalko², Aldona Mzyk^{1,3} and Romana Schirhagl¹; ¹University Medical Center Groningen, Netherlands; ²AGH University of Science and Technology, Poland; ³Institute of Metallurgy and Materials Science, Poland

2:00 PM *NM05.03.04

Fluorescent Nanodiamonds—A Versatile Probe for Quantum Biosensing and Imaging [David A. Simpson](#); University of Melbourne, Australia

SESSION NM05.04: Biosensing: Radicals and Chemicals

Session Chair: Petr Cigler

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 303A

3:30 PM *NM05.04.01

Quantum Sensing of Paramagnetic Species Using Nitrogen-Vacancy Centers in Nanodiamonds for Biomedical Applications [Melissa L. Mather](#)¹, Valentin Radu¹, Thomas Bateman-Price¹, Steve Morgan¹ and Philippe Wilson²; ¹The University of Nottingham, United Kingdom; ²Nottingham Trent University, United Kingdom

4:00 PM NM05.04.02

Paramagnetic Sensing by Nanodiamond via Magnetically-Induced Fluorescence Contrast [Marco Torelli](#)¹, Nicholas Nunn², Maxim Voinov², Evgeny Danilov², Alex Smirnov² and Olga Shenderova¹; ¹Adamas Nanotechnologies Inc, United States; ²North Carolina State University, United States

4:15 PM NM05.04.03

In-Solution Quantum Sensing Using Nanodiamond Ensembles [Erin Grant](#)¹, Mina Barzegaramiriolya¹, Liam T. Hall^{1,1}, Lloyd C. Hollenberg¹, Gawain McColl² and David A. Simpson¹; ¹The University of Melbourne, Australia; ²The Florey Institute of Neuroscience and Mental Health, Australia

4:30 PM NM05.04.04

Fluorescence Modulation of Nanodiamond NV- Centers for Neurotransmitter Detection [Mai S. Rashwan](#)^{1,2}, Songtao Xie¹, Zeinab Anwar², Harihara Baskaran¹ and Heidi Martin¹; ¹Case Western Reserve Univ, United States; ²Suez Canal University, Egypt

4:45 PM NM05.04.05

Nanodiamond Diagnostics—Improving Sensitivity by Spin Manipulation [Benjamin S. Miller](#) and Rachel McKendry; University College London, United Kingdom

SESSION NM05.05: Characterization: Structures and Properties

Session Chair: Oliver Williams

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 303A

8:30 AM *NM05.05.01

Advanced X-Ray Scattering and Spectroscopy Techniques to Monitor Formation of Nanodiamond and Other Novel Carbon Nanostructures During Explosive Detonations Joshua A. Hammons¹, Michael H. Nielsen¹, Michael Bagge-Hansen¹, Lisa Lauderbach¹, Ralph Hodgkin¹, Sorin Bastea¹, Oscar Paredes Mellone², Dimosthenis Sakoras², Laurence E. Fried¹ and [Trevor M. Willey](#)¹; ¹Lawrence Livermore National Laboratory, United States; ²SLAC National Accelerator Laboratory, United States

9:00 AM NM05.05.02

Unveiling the Metallic Impurities in Detonation Nanodiamond by a Total Oxidation Treatment [Killian Henry](#)^{1,2}, Mélanie Emo¹, Sébastien Diliberto¹, Jean-Charles Arnault³, Hugues Girard³, Valery Nesvizhevsky⁴, Brigitte Vigolo¹ and Marc Dubois²; ¹Université de Lorraine, CNRS, IJL, France; ²Université Clermont Auvergne, CNRS, ICCF UMR 6296, 24 av. Blaise Pascal, France; ³Université Paris-Saclay, CEA, CNRS, NIMBE, CEDEX, France; ⁴Institut Max von Laue – Paul Langevin, 71 av. des Martyrs, France

9:15 AM NM05.05.03

Characterizing the Colloidal Behavior of Detonation Nanodiamonds in Biologically Relevant Media Inga C. Kuschnerus, Yee Yee Khine, Haotian Wen and [Shery Chang](#); University of New South Wales, Australia

SESSION NM05.06: Medical Applications

Session Chair: Benjamin Miller

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 303A

10:30 AM NM05.06.01

Virus Filtration by Nanodiamond Modified Membranes Henry Bland¹, Isabella Centeleghe², Soumen Mandal¹, Evan Thomas¹, Jean-Yves Maillard² and Oliver A. Williams¹; ¹Cardiff University School of Physics and Astronomy, United Kingdom; ²Cardiff University, United Kingdom

11:00 AM NM05.06.02

Designing Drug-Coated Nanodiamonds for Targeted Delivery Denys Bondar¹, Vadym Mochalin² and Yevgen Karpichev¹; ¹Tallinn University of Technology, Estonia; ²Missouri University of Science and Technology, United States

11:15 AM NM05.06.03

Enhanced Penetrative siRNA Delivery by Nanodiamond Drug Delivery Platform against Hepatocellular Carcinoma 3D Models Jingru Xu^{1,2}, Mengjie Gu^{1,2} and Edward K. Chow^{2,1}; ¹National University of Singapore, Singapore; ²Cancer Science Institute of Singapore, Singapore

11:30 AM NM05.06.04

Materials Science / Technological Development for Transformational New Generation of Dental Implant Coated with Unique Low Cost / Biocompatible / Oral Fluids Corrosion Resistant Ultrananocrystalline Diamond (UNCD) Coating Orlando Auciello^{1,2,3}, Gilberto López-Chávez⁴, Daniel G. Olmedo^{5,6} and Deborah R. Tasat^{7,6}; ¹The University of Texas at Dallas, United States; ²Original Biomedical Implants, LLC, United States; ³Original Biomedical Implants-México, Mexico; ⁴Ingeniería Humana Avanzada, Mexico; ⁵University of Buenos Aires, Argentina; ⁶Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina; ⁷National University of San Martín, Argentina

SESSION NM05.07: Synthesis, Functionalisation and Related Applications

Session Chair: Shery Chang

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 303A

1:30 PM NM05.07.02

Effect of Nanodiamond on the Growth of YBa₂Cu₃O_{7- δ} Film Prepared by Metal Organic Decomposition Valentina Pinto^{1,2}, Ivo Martinez², Angelo Vannozzi¹, Raffaele Lamanna¹, Michela Salamone², Massimo Tomellini², Giuseppe Celentano¹ and Silvia Orlanducci²; ¹ENEA, Italy; ²Università degli Studi di Roma Tor Vergata, Italy

1:45 PM NM05.07.03

Microfabrication of Nanoscale Diamond Tips for Atom Probe Tomography Alexander Bard¹, Daniel Perea², Rainer Stöhr³, Jörg Wrachtrup³ and Peter Pauzaukski^{1,2}; ¹University of Washington, United States; ²Pacific Northwest National Laboratory, United States; ³Universität Stuttgart, Germany

2:00 PM NM05.07.04

Diamond Particles as a Platform for Growth of Extended Solids Olga A. Shenderova¹, Gary McGuire², Marco Torelli^{1,2} and Frederick Tapp²; ¹Adamas Nanotechnologies, United States; ²Rivis Inc., United States

2:15 PM *NM05.07.05

Chemical Activation of Ultrastable Alcohol Terminated HPHT Nanodiamond Surfaces Using a Brominated Intermediate Tsz Cheung¹, Grace Drew¹, Camron Stokes¹, Jorge Lopez-Rosas¹, Sang-Jun Lee², Charles Titus^{2,3}, Dennis Nordlund² and Abraham Wolcott¹; ¹San Jose State University, United States; ²SLAC National Accelerator Laboratory, United States; ³Stanford University, United States

SESSION NM05.08: Poster Session I: Nanodiamond Properties and Applications

Session Chairs: Shery Chang and Edward Chow

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM05.08.03

Poster Spotlight: Origins of Enhanced Fluorescence Intensity of Molten Salt Treated Fluorescent Nanodiamond Bowen Wang¹, Karen Privat², Haotian Wen¹, Inga C. Kuschnerus^{1,2}, Yang Tao¹ and Shery Chang^{1,2}; ¹School of Materials Science and Engineering, University of New South Wales, Australia; ²Electron Microscope Unit, Mark Wainwright Analytical Centre, University of New South Wales, Australia

SESSION NM05.09: Synthesis, Property and Applications

Session Chairs: Jean-Charles Arnault and Shery Chang

Monday Morning, May 23, 2022

NM05-Virtual

8:00 AM *NM05.09.02

Activities Toward Biomedical Applications of Detonation Nanodiamonds Masahiro Nishikawa^{1,2}, Ming Liu¹, Yuto Makino^{1,3}, Taro Yoshikawa¹, Akihiko Tsurui¹ and Tomoaki Mahiko¹; ¹Daicel Corporation, Japan; ²Kyoto University, Japan; ³Osaka University, Japan

8:30 AM NM05.09.03

Study of Biofilm Inhibition in Oral Pathogens by Nanodiamonds Tongtong Zhang¹, Shanthini Kalimuthu^{2,1}, Vidhyashree Rajasekar^{2,1}, Prasanna Neelakantan¹ and Zhiqin Chu¹; ¹The University of Hong Kong, Hong Kong; ²SASTRA Deemed to be University, India

8:45 AM *NM05.09.04

Simultaneous Causes of Charge Transfer Properties of Diamond Nanoparticles from Bayesian Inference Jonathan Y. Ting, Sichao Li and Amanda Barnard; Australian National University, Australia

9:15 AM NM05.09.05

Towards Implementation of Nanodiamonds with Nitrogen-Vacancy Defects as Hyperpolarized MRI Contrast Agents Yuliya Mindarava¹, Rémi Blinder¹, Viatcheslav Agafonov², Valery Davydov³, Christian Laube⁴, Wolfgang Knolle⁴ and Fedor Jelezko¹; ¹Ulm University, Germany; ²Tours University, France; ³L.F. Vereshchagin Institute for High Pressure Physics, RAS, Russian Federation; ⁴Leibniz Institute of Surface Engineering, Germany

9:30 AM *NM05.07.01

Protonation of Diamondoid Molecules Rodney S. Ruoff^{1,2}; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²IBS-Center for Multidimensional Carbon Materials, Korea (the Republic of)

SESSION NM05.10: Functionalisation, Characterisation and Applications

Session Chairs: Edward Chow and Olga Shenderova

Monday Morning, May 23, 2022

NM05-Virtual

10:30 AM BREAK

11:00 AM *NM05.10.02

From the Disaggregation of Human Islet Amylin Aggregates to Defibrillation of Collagen I Clusters—The Applicability of Nanodiamonds and Carbon Quantum Dots Sabine Szuherits; University Lille, IEMN, France

11:30 AM NM05.10.03

XPS Investigation of Surface Graphitized Nanodiamonds—Evidence of a Nano Effect Florent Ducrozet^{1,2}, Hugues Girard¹, Jocelyne Leroy¹, Eric Larquet³, Ileana Florea⁴, Emilie Brun², Cécile Sicard-Roselli² and Jean-Charles Arnault¹; ¹Université Paris-Saclay, CEA, CNRS, NIMBE, France; ²Institut de Chimie Physique, UMR 8000, CNRS, Université Paris-Saclay, France; ³Condensed Matter Physics Laboratory, UMR CNRS 7643, Ecole Polytechnique, France; ⁴Laboratory of Physics of Interfaces and Thin Films, UMR CNRS 7647, Ecole Polytechnique, IP-Paris, France

11:45 AM *NM05.10.04

Surface Chemistry of Nanodiamond to Control the Interactions with Biological Environments Anke Krueger^{1,2}; ¹Julius-Maximilians-Universität Würzburg, Germany; ²Universität Stuttgart, Germany

12:15 PM NM05.10.05

Next-Generation ‘Smart’ Diamond-Silk Dressings for Early Monitoring of Infection and Healing Progression in Burn Wounds Asma Khalid¹, Dongbi Bai¹, Achini Vidanapathirana², Denver Linklater¹, Amanda Abraham¹, Chaitali Dekiwadia¹, Amit Jadhav¹, Billy Murdoch¹, Laura Hung¹, Jean-Philippe Tétienne¹, Philipp Reineck¹, David A. Simpson³, Mark Fear⁴, Suzanne Rea⁴, Allison Cowin⁵, Fiona Wood⁴, Robert McLaughlin², Shadi Houshyar¹, Elena Ivanova¹, Christina Bursill² and Brant Gibson¹; ¹RMIT University, Australia; ²The University of Adelaide, Australia; ³The University of Melbourne, Australia; ⁴The University of Western Australia, Australia; ⁵University of South Australia, Australia

SESSION NM05.11: Nanodiamond Sensing and Applications

Session Chairs: Anke Krueger and Olga Shenderova

Monday Afternoon, May 23, 2022

NM05-Virtual

1:00 PM *NM05.11.01

Perspectives for Color Center-Based Nano-Sensing Elke Neu-Ruffing, Nimba Oshnik and Oliver Roman Opaluch; Technische Universität Kaiserslautern, Germany

1:30 PM NM05.11.02

Magnetic Imaging of Iron in Biomolecules Using Diamond Quantum Sensors Rupak Timalina, Cody Schultz, Suvechhya Lamichhane, Adam Erickson, Sy-Hwang Liou, Rebecca Lai and Abdelghani Laraoui; University of Nebraska-Lincoln, United States

1:45 PM *NM05.11.03

Diamond Spin Qubits for Nanoscale Magnetic Resonance Fedor Jelezko; Ulm University, Germany

2:15 PM NM05.11.04

All-Optical Modulation of NV Centers in Nanodiamonds for Contrast-Enhanced Imaging Lingzhi Wang, Yong Hou and Zhiqin Chu; The University of Hong Kong, China

##PAGE_BREAK##

SYMPOSIUM NM06

Nanoscale Mass Transport Through 2D and 1D Nanomaterials
May 11 - May 25, 2022

Symposium Organizers

Michael Boutilier, Western University
Piran Ravichandran Kidambi, Vanderbilt University
Shannon Mahurin, Oak Ridge National Laboratory
Sui Zhang, National University of Singapore

* Invited Paper

SESSION NM06.01: Lamellar and Nanostructured Membranes

Session Chair: Piran Ravichandran Kidambi

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 303A

8:30 AM NM06.01.02

Monolayer and Laminar 2D Membranes for Molecular Separation Sui Zhang; National University of Singapore, Singapore

8:45 AM NM06.01.04

Nanopores in Self-Assembled Monolayer-to-Multilayer MXene Films—From Fabrication to Application Mehrnaz Mojtavayi and Meni Wanunu; Northeastern University, United States

SESSION NM06.02: Graphene Membranes

Session Chair: Piran Ravichandran Kidambi

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 303A

1:30 PM NM06.02.01

Chemistry and Engineering of Two-Dimensional Materials for Energy-Efficient Molecular Separation Kumar Varoon Agrawal; EPFL, Switzerland

2:00 PM *NM06.02.02

Direct Chemical Vapor Deposition Synthesis of Porous Single-Layer Graphene Membranes with High Gas Permeances and Selectivities Zhe Yuan, Guangwei He, Samuel Faucher, Matthias Kuehne, Sylvia X. Li, Daniel Blankschtein and Michael S. Strano; Massachusetts Institute of Technology, United States

2:30 PM *NM06.02.03

Nanofluidic Transport Across Nanoporous Atomically Thin Graphene and Its Development as a Next-Generation Membrane Rohit N. Karnik; Massachusetts Institute of Technology, United States

3:00 PM BREAK

3:30 PM *NM06.02.04

Materials Design for Graphene-Based Separations Jeffrey C. Grossman and Jatin J. Patil; MIT, United States

4:00 PM NM06.02.05

Large-Area Atomically Thin Graphene Membranes for Sub-Nanometer Scale Separations Peifu Cheng¹, Mattigan M. Kelly¹, Nicole K. Moehring¹, Wonhee Ko², An-Ping Li², Juan C. Idrobo², Michael S. Boutilier³ and Piran Ravichandran Kidambi¹; ¹Vanderbilt University, United States; ²Oak Ridge National Laboratory, United States; ³Western University, Canada

4:15 PM NM06.02.06

Water and Vapor Transport Through Angstrom-Scale Pores in Atomically Thin Graphene Membranes Peifu Cheng¹, Francesco Fornasiero², Melinda L. Jue², Wonhee Ko³, An-Ping Li³, Juan C. Idrobo³, Michael S. Boutilier⁴ and Piran Ravichandran Kidambi¹; ¹Vanderbilt University, United States; ²Lawrence Livermore National Laboratory, United States; ³Oak Ridge National Laboratory, United States; ⁴Western University, Canada

SESSION NM06.03: Poster Session: Nanoscale Mass Transport Through 2D and 1D Nanomaterials

Session Chair: Piran Ravichandran Kidambi

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

NM06.03.01

Shape-Selective Filtration Using Lamellar Block Copolymer Based Slit Membranes [Maninderjeet Singh](#) and Alamgir Karim; University of Houston, United States

NM06.03.02

Optimizing the Fabrication of Electrospun Nanofibrous Membrane Using Fractional Factorial Design [Yajing Zhao](#), Stephanie M. Khaguli, Kemi Y. Chung, Mohammed M. Alshrah and Evelyn Wang; Massachusetts Institute of Technology, United States

SESSION NM06.04: Ion Transport

Session Chairs: Michael Boutilier, Piran Ravichandran Kidambi and Sui Zhang

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 303A

8:30 AM *NM06.04.01

Carbon Nanomembranes (CNMs)—2D Materials for Osmosis and Water Purification [Armin Goelzhaeuser](#); Bielefeld University, Germany

9:00 AM NM06.04.02

Using Thermoelectric MoS₂-Based Thin Films for Novel Desalination and Battery Technologies via Selective Ion Transport [Gabriel Marcus](#) and David Carroll; Wake Forest University, United States

9:15 AM NM06.04.03

Controlling the Structure of Restacked Two-Dimensional Materials for Ion-Selective Separations [Eli V. Hoening](#), Chong Liu and Mingzhan Wang; University of Chicago, United States

9:30 AM BREAK

10:00 AM NM06.04.04

Ion Transport and Selectivity in sub-nm Nanopores—Insights from Integrated Multiscale Simulations [Tuan Anh Pham](#); Lawrence Livermore National Laboratory, United States

10:15 AM NM06.04.05

Cation Controlled Wetting Properties of Vermiculite Membranes and Its Potential for Fouling Resistant Oil-Water Separation Kun Huang¹, Rahul Raveendran Nair¹ and [Robert Marvin](#)²; ¹National Graphene Institute, United Kingdom; ²The University of Manchester, United Kingdom

10:30 AM *NM06.04.06

Transport Through Fluctuating and Defective Materials [Narayana R. Aluru](#); The University of Texas at Austin, United States

11:00 AM NM06.04.07

Facile Synthesis of Large-Area Atomically Thin Graphene Membranes via Isopropanol-Assisted Hot Lamination [Peifu Cheng](#)¹, Nicole K. Moehring¹, Juan C. Idrobo², Iliia N. Ivanov² and Piran Ravichandran Kidambi¹; ¹Vanderbilt University, United States; ²Oak Ridge National Laboratory, United States

11:15 AM NM06.04.08

Artificial Water Channels-Toward Biomimetic Membranes for Desalination [Mihail Barboiu](#); Institut Européen des Membranes, France

SESSION NM06.05: COF and 2D Polymer Membranes

Session Chair: Sui Zhang

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 303A

1:30 PM NM06.05.01

Fully Modifiable, Two-Dimensional Covalent Organic Frameworks—Self-Assembling Systems Enabling Pore Size and Functional Group Modification for Applications in Nanoscale Filtration [John Hoberg](#), Veronica Spaulding, Emily Fretland and Bruce A. Parkinson; University of Wyoming, United States

1:45 PM NM06.05.02

Ab Initio Molecular Dynamics of Covalent Organic Frameworks in an Aqueous Solution of NaCl [Alathea E. Davies](#) and Laura de Sousa Oliveira; University of Wyoming, United States

2:00 PM NM06.05.03

Selective Ion Sieving and Disorder in Membranes Constructed from Two-Dimensional Covalent Organic Frameworks [Bruce A. Parkinson](#), John Hoberg, Katie Li-Oakey, Phuoc Duong and Valerie Kuehl; University of Wyoming, United States

2:30 PM BREAK

SESSION NM06.06: Transport for Biological Systems and Sensing

Session Chair: Sui Zhang

Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 303A

3:00 PM *NM06.06.01

Engineering Adjustable Multi-Pore Devices for Parallel Ion and Molecule Transport [Marija Drndic](#); University of Pennsylvania, United States

3:30 PM NM06.06.02

Nanopores in Two-Dimensional Materials for High-Resolution Biomolecular Sensing [Meni Wanunu](#); Northeastern University, United States

3:45 PM *NM06.06.03

Translocation of DNA Through 2D Nanoslits [Wayne Yang](#)¹, [Radha Boya](#)², [Adnan Choudhary](#)³, [Yi You](#)², [Gangaiah Mettela](#)², [Andre Geim](#)², [Alekssei Aksimentiev](#)³, [Ashok Keerthi](#)², [Aleksandra Radenovic](#)¹ and [Cees Dekker](#)⁴; ¹École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; ²National Graphene Institute, University of Manchester, United Kingdom; ³Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, United States; ⁴Kavli Institute of Nanoscience, TU Delft, Netherlands

4:15 PM NM06.06.04

Controlled Ion Transport and Transverse DNA Sensing Using 2D Heterostructure Nanopores [Siyuan Huang](#)¹, [Sihan Chen](#)¹, [Jangyup Son](#)¹, [Kenji Watanabe](#)², [Takashi Taniguchi](#)², [Rashid Bashir](#)¹ and [Arend M. van der Zande](#)¹; ¹University of Illinois at Urbana-Champaign, United States; ²National Institute for Materials Science, Japan

4:30 PM NM06.07.06

Mass Transport Throughout Anodic TiO₂ Nanotube Layers as Efficient 1D Photocatalyst [Hanna Sopha](#)^{1,2}, [Lina Marcela Sepúlveda](#)¹ and [Jan M. Macak](#)^{1,2}; ¹Univ of Pardubice, Czechia; ²Brno University of Technology, Czechia

SESSION NM06.07: CNT Membranes
Session Chairs: Michael Boutilier, Piran Ravichandran Kidambi and Sui Zhang
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 303A

8:00 AM *NM06.07.01

Nanofluidics in Precise 1D Pores—Ion Diffusion and Ion Transport in Small Diameter Carbon Nanotube Porins [Aleksandr Noy](#)^{1,2}; ¹Lawrence Livermore National Laboratory, United States; ²University of California Merced, United States

8:30 AM NM06.07.02

High-Yield Analysis of Individual Ions and Molecules Through the Interior of Carbon Nanotubes [Hyegi Min](#)^{1,2}; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Yonsei University, Korea (the Republic of)

8:45 AM NM06.07.03

Highly Efficient Electroosmotic Pumping Through Atomically Smooth CNT Conduits with Application in Programmed Drug Delivery [Bruce Hinds](#); University of Washington, United States

9:00 AM *NM06.07.04

Nanoscale Mass Transport in CNT Membranes—From Fundamental Science to Applications [Francesco Fornasiero](#); Lawrence Livermore National Laboratory, United States

9:30 AM NM06.07.05

The Exterior of Single-Walled Carbon Nanotubes as a Millimeter-Long Cation-Preferring Nanochannel [Yun-Tae Kim](#) and [Chang Young Lee](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

9:45 AM BREAK

SESSION NM06.08: Transport of Sub-Atomic Species Through Ultra-Thin Membranes
Session Chairs: Michael Boutilier, Piran Ravichandran Kidambi and Sui Zhang
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 303A

10:15 AM *NM06.08.01

Ion Permeation Through Atomically Thin Crystals [Marcelo Lozada-Hidalgo](#); The University of Manchester, United Kingdom

10:45 AM NM06.08.03

Proton Transport Through Graphene Membranes at Different Length Scales [Pavan Chaturvedi](#)¹, [Nicole K. Moehring](#)¹, [Peifu Cheng](#)¹, [Michael S. Boutilier](#)², [Ivan Vlassiouk](#)³ and [Piran Ravichandran Kidambi](#)¹; ¹Vanderbilt University, United States; ²Western University, Canada; ³Oak Ridge National Laboratory, United States

11:00 AM NM06.08.04

Kinetic Control of Intrinsic Pores in Monolayer Graphene for Large-Area Proton Selective Membranes [Nicole K. Moehring](#)¹, [Pavan Chaturvedi](#)¹, [Peifu Cheng](#)¹, [Michael S. Boutilier](#)² and [Piran Ravichandran Kidambi](#)¹; ¹Vanderbilt University, United States; ²Western University, Canada

11:15 AM NM06.08.06

Graphene Synthesized by Chemical Vapor Deposition as a Hydrogen Isotope Permeation Barrier [Katherine T. Young](#)^{1,2}, Colter Smith², Timothy Krentz³, Dale Hitchcock³ and Eric M. Vogel¹; ¹Georgia Tech Research Institute, United States; ²Georgia Institute of Technology, United States; ³Savannah River National Laboratory, United States

SESSION NM06.09: Transport Processes
Session Chairs: Michael Boutilier, Piran Ravichandran Kidambi and Sui Zhang
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, 303A

1:30 PM NM06.09.01

Computational Investigation of Structure-Selectivity Relationship in Membranes Using Non-Equilibrium Molecular Dynamics Simulations and Advanced Path Sampling Techniques Brian Shoemaker, Hessam Malmir, Tiago Domingues and [Amir Haji-Akbari](#); Yale University, United States

1:45 PM *NM06.09.02

Water and Molecule Transport Through 2D Nanopores and Nanochannels [Slaven Garaj](#); National University of Singapore, Singapore

2:15 PM *NM06.09.03

Selective Permeation under Low-Dimensional Confinement [Hyung Gyu Park](#); Pohang University of Science and Technology, Korea (the Republic of)

SESSION NM06.10: Round Table Discussion
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 303A

5:00 PM ROUND TABLE DISCUSSION OF INVITED SPEAKERS OF SYMPOSIUM NM06

SESSION NM06.11: Nanoscale Mass Transport Through 2D and 1D Nanomaterials I
Session Chair: Shannon Mahurin
Wednesday Morning, May 25, 2022
NM06-Virtual

8:00 AM *NM06.11.01

Angstrom-Scale Capillaries—Ion Selectivity Beyond Steric Effects [Radha Boya](#); University of Manchester, United Kingdom

8:30 AM *NM06.11.02

Science and Applications of 2D Materials Based Membranes [Rahul Raveendran Nair](#); University of Manchester, United Kingdom

9:00 AM NM06.11.03

Membranes of 2D Materials and Capillaries for Mass Transport [Ankit Bhardwaj](#), Raj Kumar Gogoi, Yi You, Goutham Solleti, Ashok Keerthi and Radha Boya; The University of Manchester, United Kingdom

9:15 AM NM06.11.04

Biomimetic Membranes from Membrane Protein-Block Copolymer 2D Materials for Aqueous and Vapor Applications [Yu-Ming Tu](#)¹, Benny D. Freeman¹ and Manish Kumar²; ¹University of Texas at Austin, United States; ²The University of Texas at Austin, United States

9:30 AM *NM06.08.05

Mitigating Heterogeneous Mass Transport Through Polymeric Membrane/2D Material Structure [Saheed Bukola](#), Bryan Pivovar and Jeffrey Blackburn; National Renewable Energy Laboratory, United States

SESSION NM06.12: Nanoscale Mass Transport Through 2D and 1D Nanomaterials II
Session Chair: Shannon Mahurin
Wednesday Afternoon, May 25, 2022
NM06-Virtual

9:00 PM NM06.12.01

How Grain Boundaries and Interfacial Electrostatic Interactions Affect Water and Ion Transport Through Nanoporous Hexagonal Boron Nitride [Bharat Bhushan Sharma](#) and Ananth Govind Rajan; Indian Institute of Science, India

9:15 PM *NM06.12.02

Transport at the Fluid-Solid Interface [Nicolas Hadjiconstantinou](#); MIT, United States

9:45 PM *NM06.12.03

Tunable Nanofluidic Transport Through Graphene Nanopores—Mechanism Illumination and Application Exploration [Luda Wang](#); Peking University, China

10:15 PM NM06.12.04

MXene Nanofluidics—Ion Selectivity [Seunghyun Hong](#)¹, Husam N. Alshareef², Hassan A. Arafat¹ and Faisal AlMarzooqi¹; ¹Khalifa University, United Arab Emirates; ²King Abdullah University of Science and Technology, Saudi Arabia

##PAGE_BREAK##

SYMPOSIUM QT01

Applications and Characterization of Nonequilibrium Electron, Phonon and Polaron Dynamics
May 10 - May 25, 2022

Symposium Organizers

Emiliano Cortés, University of Munich
Michael Nielsen, UNSW Sydney
Annamaria Petrozza, Istituto Italiano di Tecnologia
Ian Sellers, University of Oklahoma

* Invited Paper

SESSION QT01.01: Perovskite Polaron Formation and Dynamics
Session Chairs: Tom Hopper and Annamaria Petrozza
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 304B

10:15 AM *QT01.01.01

Small Polaron Formation in Lead-Free AgBi Semiconductors for Photovoltaic Applications [Laura Herz](#); University of Oxford, United Kingdom

10:45 AM *QT01.01.02

Exciton-Polarons in Hybrid Ruddlesden Popper Metal Halides—Lessons from Coherent Spectroscopy [Ajay Ram Srimath Kandada](#); Wake Forest University, United States

11:15 AM QT01.01.03

Hot Carrier Dynamics, Relaxation and the Effects of Polaron Formation in Metal-Halide Perovskites Shashi Sourabh¹, Hadi Afshari¹, Brandon K. Durant¹, Rebecca A. Schiedt², Vincent R. Whiteside¹, Giles Eperon³, Matthew C. Beard² and [Ian R. Sellers](#)¹; ¹University of Oklahoma, United States; ²NREL, United States; ³Swift Solar, United States

11:30 AM QT01.01.04

Influence of Polaron Occupied Surface Trap States on Photoluminescence Dynamics in CsPbBr₃ Nanocrystals [Aaron Forde](#)^{1,2,2}, Salim Thomas¹, Reed Peterson¹, Amanda Neukirch², Erik Hobbie^{1,1,1} and Dmitri Kilin¹; ¹North Dakota State University, United States; ²Los Alamos National Laboratory, United States

SESSION QT01.02: Hot Carriers in Perovskites
Session Chairs: Laura Herz and Annamaria Petrozza
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 304B

1:30 PM *QT01.02.01

Exploring the Effects of Dimensionality and *In Situ* Solar Cell Behavior on Hot Carriers in Lead Halide Perovskites [Rebecca Scheidt](#)¹, Brian Wieliczka¹, Giles Eperon², Ian R. Sellers³, Joseph Luther¹ and Matthew C. Beard¹; ¹National Renewable Energy Laboratory, United States; ²Swift Solar, United States; ³The University of Oklahoma, United States

2:00 PM QT01.02.03

Towards Systematic Determination of Hot Carrier Metrics in Halide Perovskites [Jia Wei Melvin Lim](#)^{1,2}, David Giovanni¹, Marcello Righetto^{1,3}, Minjun Feng¹ and Tze Chien Sum¹; ¹Nanyang Technological University, Singapore; ²Interdisciplinary Graduate School, Singapore; ³University of Oxford, United Kingdom

2:15 PM BREAK

SESSION QT01.03: Structural and Lattice Dynamics of Perovskites
Session Chairs: Annamaria Petrozza and Meng-Ju Sher
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 304B

3:15 PM *QT01.03.01

Ultrafast Soft-X Spectroscopy for the Investigation of Electron and Lattice Dynamics in Perovskites Eugenio Cinquanta¹, Anna G. Ciriolo¹, Gabriele Crippa^{2,1}, Michele Devetta¹, Lorenzo Gatto^{2,1}, Stavroula Vovla^{1,2}, Salvatore Stagira² and Caterina Vozzi¹; ¹CNR-IFN, Italy; ²Politecnico di Milano, Italy

3:45 PM *QT01.03.02

Ultrafast Structural Deformations in the Hybrid Perovskites Probed by Femtosecond X-Ray and Electron Scattering Aaron Lindenberg; Stanford University, United States

4:15 PM *QT01.03.03

Heat Transformation and Dissipation in Photoexcited Perovskites Tom Hopper^{1,2}; ¹Stanford University, United States; ²Imperial College London, United Kingdom

4:45 PM QT01.03.04

Microscopic Origins of the Ferroelectric and Ferroelastic Effects in Hybrid Halide Perovskites Milos Dubajic¹, Irina Kabakova², Kirrily Rule³, Michael P. Nielsen¹, Arman Soufiani¹, Andreas Pusch¹, Richard Mole³, Gavin Conibeer¹ and Stephen Bremner¹; ¹UNSW, Australia; ²University of Technology Sydney, Australia; ³Australian Nuclear Science and Technology Organisation, Australia

SESSION QT01.04: Hot Carrier Photovoltaics
Session Chairs: Rebecca Schiedt and Ian Sellers
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 304B

8:30 AM *QT01.04.01

Hot Carrier and Phonon Relaxation Dynamics for Photovoltaics Daniel Suchet^{1,2,3}, Hamidreza Esmailpour^{2,4}, Maxime Giteau^{5,3}, Thomas Vezin^{1,2}, Laurent Lombez^{6,4,3} and Jean-François Guillemoles^{2,4,3}; ¹École Polytechnique, France; ²Institut du photovoltaïque d'Ile de France, France; ³NextPV, Japan; ⁴Centre National de la Recherche Scientifique, France; ⁵The University of Tokyo, Japan; ⁶Laboratoire de Physique et Chimie des Nano-objets, France

9:00 AM *QT01.04.02

Seeking Hot Carrier Solar Cells: Valley Photovoltaics David K. Ferry; Arizona State Univ, United States

9:30 AM BREAK

SESSION QT01.05: Exotic Effects Outside Equilibrium
Session Chairs: Aaron Lindenberg and Ian Sellers
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 304B

10:30 AM *QT01.05.01

Coupling of Coherent Magnons to Excitons in 2D Xiaoyang Zhu; Columbia University, United States

11:00 AM QT01.05.02

Magnetic Control of Soft Chiral Phonons Andrey Baydin¹, Felix Hernandez², Martin Rodriguez-Vega³, Anderson Okazaki⁴, Fuyang Tay¹, Timothy Noe¹, Ikufumi Katayama⁵, Jun Takeda⁵, Hiroyuki Nojiri⁶, Paulo Rappi⁴, Eduardo Abramof⁴, Gregory Fiete⁷ and Junichiro Kono¹; ¹Rice University, United States; ²Universidade de Sao Paulo, Brazil; ³Los Alamos National Laboratory, United States; ⁴Instituto Nacional de Pesquisas Espaciais, Brazil; ⁵Yokohama National University, Japan; ⁶Tohoku University, Japan; ⁷Northeastern University, United States

11:15 AM QT01.05.03

Strain-Enhanced Formation of 1D Coherent Exciton-Polaron States in Small Molecule Semiconductors Libin Liang¹ and Madalina I. Furis^{2,3,1}; ¹University of Vermont, United States; ²University of Oklahoma, United States; ³The University of Oklahoma, United States

11:30 AM QT01.05.04

Electron-Phonon Coupling with the Soft Phonon Mode and Slow Electronic Dynamics in the Ferroelectric Semiconductor SbSI Mark Ziffer, Lucas Huber, Feifan Wang, Victoria Posey, Jake Russel, Xavier Roy and Xiaoyang Zhu; Columbia University, United States

SESSION QT01.06: Charge Carrier Dynamics
Session Chairs: Ian Sellers and Xiaoyang Zhu
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 304B

1:30 PM *QT01.06.01

Charge Carrier Transport in Hyperdoped Semiconductors Meng-Ju Sher; Wesleyan University, United States

2:00 PM QT01.06.02

Coherent Electronic Transport in 2D Superatomic Crystals [Milan Delor](#) and Xavier Roy; Columbia University, United States

2:15 PM BREAK

SESSION QT01.07: Ultrafast Phenomena in 2D Materials and Structures

Session Chairs: Michael Nielsen and Rupert Oulton

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 304B

3:30 PM *QT01.07.01

Hot Electrons and Hot Phonons in 2D Semiconductors [Jonathan P. Bird](#); Univ at Buffalo, United States

4:00 PM *QT01.07.02

Hot Phonon and Intervalley Effects on Ultrafast Carrier Relaxation in InGaAs Quantum Wells Yongjie Zou¹, Hamidreza Esmailpour², Daniel Suchet^{2,3}, Jean-François Guillemoles^{2,3} and [Stephen M. Goodnick](#)¹; ¹Arizona State University, United States; ²CNRS-Institut Photovoltaïque d'Ile de France (IPVF), France; ³CNRS-Ecole Polytechnique, France

4:30 PM QT01.07.03

High Q-Factor Room Temperature GaAs/AlAs Phononic Nanocavities Milos Dubajic¹, Sreerag S. J.², Muhammad Hanif¹, [Michael P. Nielsen](#)¹, Rajeev N. Kini² and Stephen Bremner¹; ¹UNSW, Australia; ²Indian Institute of Science Education and Research Thiruvananthapuram (IISER-TVM), India

4:45 PM QT01.07.04

Exciton-Exciton Annihilation Enhanced Diffusion in Monolayer Semiconductors [Shiekh Zia Uddin](#)^{1,2}, Naoki Higashitarumizu^{1,2} and Ali Javey^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

SESSION QT01.08: Poster Session: Non-Equilibrium Dynamics

Session Chairs: Michael Nielsen and Annamaria Petrozza

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

QT01.08.03

Hidden Selection Rules for Understanding Exciton Fission and Dynamics in Organic Crystals [Aaron Altman](#)¹, Sivan Refaely-Abramson² and Felipe H. da Jornada¹; ¹Stanford University, United States; ²Weizmann Institute of Science, Israel

QT01.08.04

Far-From-Equilibrium Dynamics of Self-Trapped Excitons in the Wake of a Swift Ion [Joseph Graham](#)¹, Miguel L. Crespillo^{2,3}, Fernando Agulló-López² and William J. Weber³; ¹Missouri University of Science and Technology, United States; ²Universidad Autónoma de Madrid, Spain; ³The University of Tennessee, Knoxville, United States

QT01.08.06

Electronic Noise in Graphene from First Principles [Iretomiwa Esho](#), Benjamin Hatanpää and Austin J. Minnich; California Institute of Technology, United States

SESSION QT01.09: Hot Carrier Optoelectronics

Session Chairs: Jonathan Bird and Michael Nielsen

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 304B

8:00 AM *QT01.09.01

Harvesting Hot Electrons in Optoelectronic Devices Using Schottky Barriers and Thermal Gradients [Rupert F. Oulton](#)¹, Nicholas A. Gusken^{1,2}, Takeyuki Matsui¹, Ryan Bower¹, Brock Doiron¹, Peter Petrov¹, Anna Regoutz¹, Sarah Fearn¹, Lesley Cohen¹, Neil Alford¹, Johannes Lischner¹ and Stefan A. Maier^{1,3}; ¹Imperial College London, United Kingdom; ²Stanford University, United States; ³Ludwig Maximilians University, Germany

8:30 AM *QT01.09.02

Harnessing Hot Carriers in Semiconductor Nanowires [Jonatan Fast](#), Yen-Po Liu, Adam Burke, Anders Mikkelsen and Heiner Linke; Lund University, Sweden

9:00 AM QT01.09.03

High-Field Transport and Noise in p-Si—A First-principles Study [David S. Catherall](#) and Austin J. Minnich; California Institute of Technology, United States

9:15 AM BREAK

SESSION QT01.10: Computing Non-Equilibrium Dynamics

Session Chair: Stephen Goodnick

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 304B

10:15 AM *QT01.10.01

Optically-Excited Nonequilibrium Dynamics in Quantum Matter [Prineha Narang](#); Harvard University, United States

10:45 AM *QT01.10.02

Ab Initio Quantum Ultrafast Dynamics of Electrons in Materials Adela Habib^{1,2}, Junqing Xu³, Mani Chandra¹, Christian Multunas¹, Sushant Kumar¹, Hiroyuki Takenaka³, Feng Wu³, Yuan Ping³ and [Ravishankar Sundararaman](#)¹; ¹Rensselaer Polytechnic Institute, United States; ²Los Alamos National Laboratory, United States; ³University of California, Santa Cruz, United States

11:15 AM *QT01.10.03

Nonequilibrium Dynamics of Interacting Electrons, Phonons and Excitons from First Principles Marco Bernardi and [Ivan Maliyov](#); California Institute of Technology, United States

11:45 AM QT01.10.04

Investigating the Role of Microscopic Interactions in Electron Hydrodynamics [George Varnavides](#)¹, Adam Jermyn², Yaxian Wang¹, Polina Anikeeva³ and [Prineha Narang](#)¹; ¹Harvard University, United States; ²Flatiron Institute, United States; ³Massachusetts Institute of Technology, United States

SESSION QT01.11: Hot Carriers in Plasmonic and Metallic Systems

Session Chair: Rupert Oulton

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 304B

1:30 PM *QT01.11.01

Very Short and Yet Quite Eventful Life of Hot Carriers in Plasmonic Metals [Jacob Khurgin](#); Johns Hopkins University, United States

SESSION QT01.12: Hot Carrier Plasmonics and Photochemistry

Session Chair: Jacob Khurgin

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 304B

3:00 PM *QT01.12.01

Pathways for Carbon Dioxide Reduction in Plasmonic Hot Carrier Photoelectrochemical Structures Harry A. Atwater and [Xueqian Li](#); California Institute of Technology, United States

3:30 PM QT01.12.02

Selective Plasmon-Induced CO₂ Reduction Using AuPd Alloy Nanoparticle Catalysts [Alan X. Dai](#)¹, Briley Bourgeois¹, Claire Carlin¹, Dayne Swearer¹, Wen-Hui Cheng², Matteo Cargnello¹ and Jennifer A. Dionne¹; ¹Stanford University, United States; ²National Cheng Kung University, Taiwan

SESSION QT01.13: Applications and Characterization of Nonequilibrium Electron, Phonon and Polaron Dynamics I

Session Chair: Michael Nielsen

Tuesday Afternoon, May 24, 2022

QT01-Virtual

8:40 PM *QT01.13.01

Hot Carrier Photovoltaic Devices [Nicholas Ekins-Daukes](#); University of New South Wales Sydney, Australia

9:10 PM QT01.13.02

Non-Equilibrium Heat Transport of Metal-Insulator Superlattice Considering Electron-Phonon Coupling near the Interface [Kyoungjung Kim](#)¹, Yosuke Kurosaki², Naoto Fukatani², Shin Yabuuchi², Yusuke Ira¹, Cheng Shao¹, Jun Hayakawa² and Junichiro Shiomi¹; ¹Tokyo Univ., Japan; ²R&D Group, Hitachi Ltd., Japan

9:25 PM QT01.13.03

Electron-Phonon Coupling in Metal/Dielectric Superlattices from Fully Coupled Monte Carlo Simulation [Cheng Shao](#) and Junichiro Shiomi; The University of Tokyo, Japan

9:40 PM QT01.13.04

Hot Carrier Solar Cells in the Dark [Andreas Pusch](#), Abhinav S. Sharma, Milos Dubajic, Michael P. Nielsen, Stephen Bremner and Nicholas Ekins-Daukes; UNSW Sydney, Australia

9:55 PM *QT01.13.05

Energy Conversion with Plasmonic Nanostructures—Launching of Acoustic Surface Waves and Activation of Chemical Enhancement of Raman Scattering [Stefan A. Maier](#)^{1,2}; ¹LMU Muenchen, Germany; ²Imperial College London, United Kingdom

10:25 PM QT01.13.06

Examination of the Photo-Physical Properties of Single Layer and Multiple Layer Two-Dimensional Hybrid Lead Halide Perovskites David R. Graupner and Dmitri Kilin; North Dakota State University, United States

10:30 PM *QT01.13.07

Perovskite Hot Carrier Dynamics Tze Chien Sum; Nanyang Technological University, Singapore

SESSION QT01.14: Applications and Characterization of Nonequilibrium Electron, Phonon and Polaron Dynamics II
Session Chairs: Emiliano Cortés and Ian Sellers
Wednesday Morning, May 25, 2022
QT01-Virtual

8:00 AM *QT01.14.01

Plasmonic Hot Carriers—Materials and Devices Giulia Tagliabue; École Polytechnique Fédérale de Lausanne, Switzerland

8:30 AM *QT01.14.02

Transition-Metal Doping of Hybrid Perovskites for Ultrafast Spin Control Felix Deschler; Technical University Munich, Germany

9:00 AM *QT01.14.03

Momentum-Resolved Dynamics of Excitons, Electrons and Phonons in Low-Dimensional Materials and Heterostructures Shuo Dong¹, Tommaso Pincelli¹, Samuel Beaulieu¹, Maciej Dendzik¹, Julian Maklar¹, Daniela Zahn¹, Helene Seiler¹, Michele Puppin^{2,1}, Alexander Neef¹, Lutz Waldecker³, Martin Wolf¹, Laurenz Rettig¹ and Ralph Ernstorfer^{4,1}; ¹Fritz Haber Institute of the Max Planck Society, Germany; ²EPFL, Switzerland; ³RWTH Aachen University, Germany; ⁴Technical University Berlin, Germany

9:30 AM QT01.14.05

Polarons in Highly-Polarizable, Chalcogenide Perovskites Semiconductors Tommaso Salzillo^{1,2}, Matan Menahem¹, Boyang Zhao³, Shanyuan Niu⁴, Jayakanth Ravichandran³, Rafael Jaramillo⁵ and Omer Yaffe¹; ¹Weizmann Institute of Science, Israel; ²Università di Bologna, Italy; ³University of Southern California, United States; ⁴Stanford University, United States; ⁵Massachusetts Institute of Technology, United States

##PAGE_BREAK##

SYMPOSIUM QT02

Quantum and Topological Phenomena in Two-Dimensional Systems
May 10 - May 25, 2022

Symposium Organizers

Kaveh Ahadi, North Carolina State University
Barry Bradlyn, University of Illinois at Urbana-Champaign
Ryan Need, University of Florida
Meenakshi Singh, Colorado School of Mines

* Invited Paper

SESSION QT02.01: Heat and Charge Transport in Low Dimensional Materials
Session Chair: Meenakshi Singh
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 302B

1:30 PM *QT02.01.01

Quantum Interference Experiments on the Topological Insulator-Like Surface of Cadmium Arsenide Arman Rashidi, Binghao Guo, Alexander Lygo, David Kealhofer, Robert Kealhofer and Susanne Stemmer; University of California, Santa Barbara, United States

2:00 PM QT02.01.02

Non-Equilibrated to Fully Equilibrated Edge Heat Transport in Hole-Conjugate States of the Fractional Quantum Hall Effect Gaelle Le Breton¹, Raphaëlle Delagrangé¹, Yuanzhuo Hong¹, Rebeca Ribeiro-Palau¹, Kenji Watanabe², Takashi Taniguchi², Patrice Roche³, Prediton Rouleau³ and Francois

Parmenier¹; ¹Centre National de la Recherche Scientifique, France; ²National Institute for Materials Science, Japan; ³Commissariat à l'énergie atomique et aux énergies alternatives, France

2:15 PM *QT02.01.04

AV₃Sb₅ (A=K, Rb, Cs)—A New Class of Topological Kagome Metals Hosting Intertwined Charge Density Wave Order and Superconductivity
Stephen Wilson; Univ of California-S Barbara, United States

3:15 PM QT02.01.06

Chalcogenide Spin Injection from Iron- and Nickel-Based Edge Modulation Doping Gabriel Marcus and David Carroll; Wake Forest University, United States

3:00 PM BREAK

3:30 PM QT02.01.07

Gate-Defined Tellurium Nanowire Quantum Dots Shiva Davari¹, Kenji Watanabe², Takashi Taniguchi² and Hugh O. Churchill^{1,1}; ¹University of Arkansas, United States; ²National Institute for Materials Science, Japan

3:45 PM QT02.01.08

Spatial Impact Range of Single Molecule Magnet on Magnetic Tunnel Junction-Based Molecular Spintronic Devices (MTJMSDs) Marzieh Savadkoochi, Bishnu R. Dahal, Christopher D'Angelo, Andrew Grizzle and Pawan Tyagi; University of the District Columbia, United States

4:00 PM QT02.01.09

Dynamics of Vacancy and Vacancy Lines Formation in Graphene for Qubit Arrays Fozia Sahtout, Abdennaceur Karoui and Branislav Vlahovic; North Carolina Central University, United States

SESSION QT02.03: Topological Superconductivity I

Session Chair: Kaveh Ahadi

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 302B

10:30 AM *QT02.03.01

Topological States in Iron-Chalcogenide Superconductors for Quantum Computing Qiang Li^{1,2}; ¹Brookhaven National Laboratory, United States; ²Stony Brook University, United States

11:00 AM QT02.03.03

Witnessing Quantum Spin Entanglement and Criticality in 2D Triangular Magnet KYbSe₂ Allen Scheie¹, Esteban Ghioldi^{2,3}, Jie Xing¹, Joseph Paddison¹, Nick Sherman^{4,5}, Maxime Dupont^{5,4}, Douglas L. Abernathy¹, Daniel Pajerowski¹, Shang-Shun Zhang⁶, L. O. Manuel³, A. E. Trumper³, Chaitanya Das Pemmaraju⁷, Athena Sefat¹, David Parker¹, Thomas Devereaux⁷, Joel Moore⁴, Christian Batista² and D. Alan Tennant^{1,2}; ¹Oak Ridge National Laboratory, United States; ²The University of Tennessee, Knoxville, United States; ³Instituto de fisica Rosario, Argentina; ⁴University of California, Berkeley, United States; ⁵Lawrence Berkeley National Laboratory, United States; ⁶University of Minnesota, United States; ⁷Stanford University, United States

11:15 AM QT02.03.04

Resolving Emergent Structure States in 2D Systems by High-Energy X-Ray Diffraction Valeri Petkov; Central Michigan University, United States

SESSION QT02.04: Novel Synthetic Approaches for Topological Films

Session Chair: Kaveh Ahadi

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 302B

1:30 PM *QT02.04.01

Dirac Plasmon Polaritons in Topological Insulator Thin Films and Heterostructures Stephanic Law; University of Delaware, United States

2:00 PM QT02.04.02

Magneto-optical Landau Level Spectroscopy of Pb_{1-x}Sn_xSe/EuSe Heterostructures Jiashu Wang¹, Xinyu Liu¹, Hoai Trinh¹, Mykhaylo Ozerov², Maksym Zhukovskiy¹, Tatyana Orlova¹, Dmitry Smirnov² and Badih Assaf¹; ¹University of Notre Dame, United States; ²National High magnetic field lab, United States

2:15 PM BREAK

3:00 PM *QT02.04.03

Thin-Film Synthesis and Characterization of Chalcogenides for Quantum and Topological Phenomena Charles H. Ahn; Yale University, United States

3:30 PM QT02.04.04

High Quality Growth of Cd₃As₂ in (112), (001), and (110) Orientations Using Molecular Beam Epitaxy Anthony Rice, Jocienne Nelson, Brian Fluegel, Andrew Norman and Kirstin Alberi; National Renewable Energy Lab, United States

3:45 PM QT02.04.05

Interaction Induced Magnetism in 2D Kagome Metal-Organic Frameworks on Substrates Bernard Field^{1,2}, Agustin Schiffrin^{1,2} and Nikhil

Medhekar^{1,2}; ¹ARC Centre of Excellence in Future Low Energy Electronics Technologies, Australia; ²Monash University, Australia

SESSION QT02.05: Topological Superconductivity II

Session Chair: Kaveh Ahadi

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 302B

8:00 AM QT02.05.01

Graphene/ α -RuCl₃ Lateral p-n Junctions Sara Shabani and Abhay Pasupathy; Columbia University, United States

8:15 AM *QT02.05.02

Novel Epitaxial Superconductor-Semiconductors for Topological Superconductivity Javad Shabani; New York University, United States

8:45 AM QT02.05.03

Induced Superconducting Pairing in Integer Quantum Hall Edge Modes of InAs Mehdi Hatefipour¹, Joseph J. Cuzzo², Jesse Kanter¹, William M. Strickland¹, Tzu-Ming Lu³, Enrico Rossi² and Javad Shabani¹; ¹New York University, United States; ²William & Mary, United States; ³Sandia National Laboratories, United States

9:00 AM QT02.05.05

Controllably Generating Antisite Defects for Monolayer Transitional Metal Dichalcogenides Qubits Burcu Ozden¹, Tianyi Zhang¹, Daniel A. Pearson¹, Ethan Khan¹, Sunil Uprety², Jiffer E. Razon¹, Kazunori Fujisawa³, He Liu¹, Nestor Pere-López¹, Ke Wang¹, Tamara Isaacs-Smith², Minseo Park² and Mauricio Terrones¹; ¹The Pennsylvania State University, United States; ²Auburn University, United States; ³Shinshu University, Japan

9:30 AM BREAK

SESSION QT02.06: Characterizing Topological Behavior in 2D Materials

Session Chair: Ryan Need

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 302B

10:00 AM *QT02.06.01

2D Magnetic, Ferroelectric and Superconducting van der Waal's Structures Stuart Parkin; Max Planck Institute of Microstructure Physics, Germany

10:30 AM QT02.06.02

Two-Dimensional Heavy Fermion Material Victoria Posey and Xavier Roy; Columbia University, United States

10:45 AM QT02.06.03

Room Temperature Skyrmion in Layered Magnet Hongrui Zhang¹, Yu-Tsun Shao², Rui Chen¹, Xiang Chen¹, Jie Yao¹, David Muller², Robert Birgeneau¹ and Ramamoorthy Ramesh¹; ¹UC Berkeley, United States; ²Cornell University, United States

11:00 AM QT02.06.04

Visualizing Currents in the Quantum Anomalous Hall Regime George M. Ferguson¹, Run Xiao², David Low¹, Ling-Jie Zhou², Anthony Richardella², Cui-Zu Chang², Nitin Samarth² and Katja Nowack¹; ¹Cornell University, United States; ²The Pennsylvania State University, United States

11:15 AM *QT02.06.05

Direct Observation of Anyonic Braiding Statistics in the Fractional Quantum Hall Regime—Lessons from an old Topological System Michael J. Manfra^{1,2}; ¹Purdue University, United States; ²Microsoft Quantum Lab Purdue, United States

11:45 AM QT02.06.06

Detection of Time-Reversal Symmetry Breaking via Waveguide Mode Coupling Ioannis Petrides, Jonathan Curtis, Marie E. Wesson, Nicholas Poniatowski, Charlotte Boettcher, Amir Yacoby and Prineha Narang; Harvard University, United States

12:00 PM QT02.06.07

Highly Excited Rydberg Excitons in a Thin Film of Synthetic Cuprite Jacob C. DeLange, Kinjol Barua and Hadisch Alaician; Purdue University, United States

SESSION QT02.07: Computational Approaches to Topological Materials

Session Chair: Ryan Need

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 302B

1:30 PM QT02.07.01

Ab Initio Studies of Electronic Structures and Magnetic Properties in RMn₆Sn₆ (R = Gd, Tb, Dy, Ho, and Er) Yongbin Lee¹, Ralph Skomski², Xindong Wang³, Arjun Pathak⁴, Bruce Harmon¹, Rob McQueeney⁵ and Liqin Ke¹; ¹Ames Laboratory, United States; ²University of Nebraska–Lincoln, United States; ³Sophycs Technology LLC, United States; ⁴Buffalo State College, United States; ⁵Iowa State University of Science and Technology, United States

1:45 PM QT02.07.02

Annihilation of Magnetic Skyrmion by Quantum Mechanical Tunneling Hannes Jonsson^{1,2}; ¹University of Iceland, Iceland; ²Faculty of Physical Sciences, Iceland

2:00 PM QT02.07.03

Electrically and Magnetically Switchable Nonlinear Photocurrent in *PT*-Symmetric 2D Magnetic Topological Quantum Materials Xiaofeng Qian; Texas A&M University, United States

2:15 PM QT02.07.04

Spin-Valley Locked Edge States Through Staggered Chiral Photonic Crystals with Honeycomb Unit Cell Yeseul Kim, Minkyung Kim and Junsuk Rho; Pohang University of Science and Technology, Korea (the Republic of)

2:30 PM BREAK

3:00 PM QT02.07.05

Topology and Dynamical Liquid Crystallinity in Optically Driven Two-Dimensional Materials Netanel H. Lindner¹, Iliya Esin^{1,2}, Gaurav Gupta¹, Erez Berg³ and Mark Rudner⁴; ¹Technion - Israel Institute of Technology, United States; ²California Institute of Technology, United States; ³Weizmann Institute of Science, Israel; ⁴University of Washington, United States

3:30 PM QT02.07.07

Dual Yin-Yang Flat Bands: Construction and Excitonic Insulator State Feng Liu; The University of Utah, United States

SESSION QT02.08: Quantum and Topological Phenomena in Two-Dimensional Systems I

Session Chairs: Kaveh Ahadi and Barry Bradlyn

Wednesday Morning, May 25, 2022

QT02-Virtual

8:00 AM *QT02.08.01

Understanding the Band Structure and Orbital Magnetism of the Twisted Bilayer Graphene Systems by Pseudo-Landau Level Description Hao Shi¹, Tian Yu Qiao², Jian Peng Liu³ and Xi Dai^{1,2}; ¹The Hong Kong University of Science and Technology, Hong Kong; ²University of California, Santa Barbara, United States; ³ShanghaiTech University, China

8:30 AM QT02.08.02

Synthesis and Characterization of Thin-Film Antiferromagnetic Kagome Metal FeSn Minyong Han¹, Hisashi Inoue², Shiang Fang¹, Caolan John¹, Linda Ye¹, Mun K. Chan³, David Graf⁴, Takehito Suzuki¹, Madhav P. Ghimire⁵, Won Joon Cho⁶, Efthimos Kaxiras⁷ and Joseph Checkelsky¹; ¹Massachusetts Institute of Technology (MIT), United States; ²National Institute of Advanced Industrial Science and Technology, Japan; ³Los Alamos National Laboratory, United States; ⁴Florida State University, United States; ⁵Tribhuvan University, Nepal; ⁶Samsung Advanced Institute of Technology (SAIT), Korea (the Republic of); ⁷Harvard University, United States

8:45 AM QT02.08.03

Theoretical Analysis of Electronic, Vibrational and Thermal Properties for Single-Layer and Chain Quasi 1D Materials (TaSe₃ and ZrTe₃) Topojit Debnath and Roger Lake; University of California, Riverside, United States

9:00 AM QT02.08.04

Crystalline Responses for Rotation-Invariant Higher-Order Topological Insulators Julian May-Mann and Taylor L. Hughes; University of Illinois at Urbana-Champaign, United States

9:15 AM QT02.08.05

Quasiparticle Interference of Monolayer FeSe_xTe_{1-x} on Bi₂Te₃ Guannan Chen¹, Anuva Aishwarya¹, Lin Jiao¹, Jorge O. Rodriguez¹, Mark Hirsbrunner¹, Lianyang Dong², Stephen Wilson², Taylor L. Hughes¹ and Vidya Madhavan¹; ¹University of Illinois at Urbana-Champaign, United States; ²University of California, Santa Barbara, United States

9:30 AM QT02.08.06

Epitaxial Growth of Mn₃Sn on Sapphire Substrates Using Molecular Beam Epitaxy Sneha Upadhyay¹, Tyler Erickson¹, David Ingram¹, Fengyuan Yang² and Arthur Smith¹; ¹Ohio University, United States; ²The Ohio State University, United States

9:45 AM QT02.08.07

Molecular Beam Epitaxy and Structural Characterization of Chromium Distannide Tyler Erickson¹, Sneha Upadhyay¹, David Ingram¹, Fengyuan Yang², Martin Kordesch¹ and Arthur Smith¹; ¹Ohio University, United States; ²The Ohio State University, United States

SESSION QT02.09: Quantum and Topological Phenomena in Two-Dimensional Systems II

Session Chair: Barry Bradlyn

Wednesday Morning, May 25, 2022

QT02-Virtual

10:30 AM QT02.09.01

Determining Intrinsic Defect Densities for High-quality Self-flux Synthesized Transition Metal Dichalcogenides from First Principles and Experimental Thermodynamics Luke Holtzman¹, Preston A. Vargas², Song Liu¹, James Hone¹, Richard Hennig² and Katayun Barmak¹; ¹Columbia University, United States; ²University of Florida, United States

10:45 AM *QT02.09.02

Incoherent Cooper Pairing and Pseudogap Behavior in Monolayer FeSe/SrTiO₃ [Kyle Shen](#), Brendan Faeth and Darrell Schlom; Cornell University, United States

##PAGE_BREAK##

SYMPOSIUM QT03

Higher-Order Topological Structures—From Charge to Spin
May 11 - May 25, 2022

Symposium Organizers

Michele Conroy, Imperial College London
Sinead Griffin, Lawrence Berkeley National Laboratory
Dennis Meier, Norwegian University of Science and Technology (NTNU)
Ramamoorthy Ramesh, University of California, Berkeley

* Invited Paper

SESSION QT03.01: Poster Session: Higher-Order Topological Structures—From Charge to Spin

Session Chair: Michele Conroy
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SESSION QT03.02: Higher-Order Topological Structures—From Charge to Spin I

Session Chairs: Miaofang Chi and Donald Evans
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 302A

8:30 AM *QT03.02.01

Nanoscale and Mesoscale Curvature in Multidomain Ferroelectric Superlattices [Pavlo Zubko](#); University College London, United Kingdom

9:00 AM *QT03.02.02

Engineering Phase Transitions and Dielectric Properties of Nano-Ferroelectrics [Jorge Iniguez](#)^{1,2}; ¹Luxembourg Institute of Science and Technology, Luxembourg; ²University of Luxembourg, Luxembourg

9:30 AM QT03.02.03

Multi-state Switching Dynamics in the Polar Vortex Phase [Piush Behera](#), Eric Parsonnet, Sujit Das, Lucas M. Caretta and Ramamoorthy Ramesh; University of California Berkeley, United States

9:45 AM BREAK

10:15 AM *QT03.02.04

Tailoring the Non-Ising Internal Structure of Ferroelectric Domain Walls [Salia Cherifi-Hertel](#); Strasbourg University and CNRS, France

10:45 AM QT03.02.05

High Electrical Conductivity from Strained Structural Domain Walls [Lukas R. Puntigam](#)¹, Donald M. Evans¹, Markus Althaler¹, Somnath Ghara¹, Lilian Prodan¹, Vladimir Tsurkan^{1,2}, Stephan Krohns¹ and István Kézsmárki¹; ¹University of Augsburg, Germany; ²Academy of Sciences of Moldova, Moldova (the Republic of)

11:00 AM QT03.02.06

3D Geometry and Functional Properties of Ferroelectric Domain Walls [Erik Roede](#)¹, Konstantin Shapovalov², Thomas Moran³, Aleksander B. Mosberg¹, Zewu Yan⁴, Edith Bourret⁵, Bryan Huey³, Antonius T. J. van Helvoort¹ and Dennis Meier¹; ¹Norwegian University of Science and Technology, Norway; ²Institut de Ciencia de Materials de Barcelona, Spain; ³University of Connecticut, United States; ⁴ETH Zürich, Switzerland; ⁵Lawrence Berkeley National Laboratory, United States

11:15 AM *QT03.02.07

Studies of Topological States and Proximity Effects in Functional Materials Demie Kepaptsoglou^{1,2}, Vlado Lazarov², Kenji Nawa³, Lian Li⁴, Michael Weinert⁵ and Quentin Ramasse¹; ¹SuperSTEM, United Kingdom; ²University of York, United Kingdom; ³NIMS, Japan; ⁴West Virginia University, United States; ⁵University of Wisconsin-Milwaukee, United States

SESSION QT03.03: Higher-Order Topological Structures—From Charge to Spin II

Session Chairs: Haidan Wen and Pavlo Zubko

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 302A

1:30 PM QT03.03.01

Controlling a.c. Signals using Charged Ferroelectric Domain Walls Jan Schultheiß¹, Erik Lysne¹, Lukas R. Puntigam², Zewu Yan³, Edith Bourret⁴, Stephan Krohns² and Dennis Meier¹; ¹Norwegian University of Science and Technology, Norway; ²University of Augsburg, Germany; ³ETH Zürich, Switzerland; ⁴Lawrence Berkeley National Laboratory, United States

1:45 PM QT03.03.02

Insulating Improper Ferroelectric Domain Walls as Robust Barrier Layer Capacitors Lima Zhou¹, Lukas R. Puntigam¹, Jan Schultheiß², Donald M. Evans¹, István Kézsmárki¹, Dennis Meier² and Stephan Krohns¹; ¹Universität Augsburg, Germany; ²NTNU Trondheim, Norway

2:00 PM QT03.03.03

Superior Polarization Retention through Engineered Domain Wall Pinning Jan Seidel; University of New South Wales, Australia

2:15 PM QT03.03.04

Nanoengineering Conductivity with Low Dimensional Defects in a Functional Oxide Donald M. Evans^{1,2}, Theodor Secanell Holstad^{2,3}, Aleksander B. Mosberg², Didrik R. Småbråten^{2,4}, Per Erik Vullum^{2,4}, Anup L. Dadlani², Konstantin Shapovalov⁵, Zewu Yan^{6,7}, Edith Bourret⁷, David Gao², Jaakko Akola², Jan Torgersen², Antonius T. J. van Helvoort², Sverre M. Selbach² and Dennis Meier²; ¹University of Augsburg, Germany; ²Norwegian University of Science and Technology (NTNU), Norway; ³Technical University of Denmark (DTU), Denmark; ⁴SINTEF, Norway; ⁵Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain; ⁶ETH Zurich, Switzerland; ⁷Lawrence Berkeley National Laboratory, United States

2:30 PM BREAK

3:00 PM QT03.03.05

Opto-Electro-Mechanical control of Ferroelectric Topological Structures for Ultralow Power Topotronic Devices using Neural Network Quantum Molecular Dynamics Thomas M. Linker¹, Ken-ichi Nomura¹, Shogo Fukushima², Rajiv Kalia¹, Aravind Krishnamoorthy¹, Aiichiro Nakano¹, Kohei Shimamura², Fuyuki Shimojo² and Priya Vashishta¹; ¹University of Southern California, United States; ²Kumamoto University, Japan

3:15 PM QT03.03.06

New Antiferromagnetic Metal Phase and Large Zero-Field Planar Hall Effect in a Rare-Earth Nickelate Spencer Doyle¹, Qi Song¹, Grace A. Pan¹, Betül Pamuk², Padraic Shafer³, William Ratcliff^{4,5}, Antia S. Botana⁶, Luca Moreschini^{7,8} and Julia Mundy¹; ¹Harvard University, United States; ²Cornell University, United States; ³Advanced Light Source, United States; ⁴National Institute of Standards and Technology, United States; ⁵University of Maryland, United States; ⁶Arizona State University, United States; ⁷University of California, Berkeley, United States; ⁸Lawrence Berkeley National Laboratory, United States

3:30 PM *QT03.03.07

Direct Visualization of the Three-dimensional Shape of Skyrmion Strings Shinichiro Seki; The University of Tokyo, Japan

4:00 PM QT03.03.08

Noncollinear Magnetism in MnPtGa Thin Films Ibarra Rebeca^{1,2}, Anastasios Markou¹, Edouard Lesne¹, Bachir Ouladdiaf³, Ketty Beauvois³, Alexandr Sukhanov², Dmytro Inosov² and Claudia Felser¹; ¹Max Planck Institute for Chemical Physics of Solids, Germany; ²Technische Universität Dresden, Germany; ³Institute Laue-Langevin, France

SESSION QT03.04: Higher-Order Topological Structures—From Charge to Spin III

Session Chairs: Salia Cherifi-Hertel and Jan Schultheiß

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 302A

8:00 AM *QT03.04.01

An Ultrafast View of Topological Ferroelectric Nanostructures Haidan Wen; Argonne National Laboratory, United States

8:30 AM QT03.04.02

Direct Imaging of Emergent Chirality Changes in a Polar Meron to Skyrmion Transition in Oxide Superlattices Yu-Tsun Shao¹, Sujit Das², Zijian Hong³, Ruijuan Xu⁴, Swathi Chandrika¹, Fernando Gomez-Ortiz⁵, Pablo Garcia-Fernandez⁵, Long-Qing Chen⁶, Harold Y. Hwang⁴, Javier Junquera⁵, Lane Martin², Ramamoorthy Ramesh² and David A. Muller¹; ¹Cornell University, United States; ²University of California, Berkeley, United States; ³Zhejiang University, China; ⁴Stanford University, United States; ⁵Universidad de Cantabria, Spain; ⁶The Pennsylvania State University, United States

8:45 AM *QT03.04.03

Cryogenic Atomic and 4D-STEM Imaging for 2D Layered Quantum Materials Miaofang Chi; Oak Ridge National Laboratory, United States

9:15 AM QT03.04.04

Higher-Order Topological Superconductivity in Twisted Bilayer Graphene [Aaron Chew](#)¹, Yijie Wang², Bogdan A. Bernevig¹ and Zhi-Da Song¹;
¹Princeton University, United States; ²Peking University, China

9:30 AM BREAK

10:00 AM QT03.04.05

Hidden Higher-Order Topology in Monolayer Hexagonal TMDs [Jun Jung](#) and Yong-Hyun Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

10:15 AM QT03.04.06

Lifetime of Large Magnetic Skyrmions and Antiskyrmions in Discrete Systems [Hannes Jonsson](#)^{1,2}; ¹University of Iceland, Iceland; ²Faculty of Physical Sciences, Iceland

10:30 AM QT03.04.07

Transferring Orbital Angular Momentum to an Electron Beam Reveals Toroidal and Chiral Order [Kavla Nguyen](#)¹, Yi Jiang², Michael C. Cao³, Prafull Purohit⁴, Pablo Garcia-Fernandez⁵, Mark Tate⁴, Celesta Chang⁶, Pablo Aguado-Puente⁷, Jorge Iniguez⁸, Fernando Gomez-Ortiz⁵, Sol Gruner⁴, Javier Junquera⁵, Lane Martin⁹, Ramamoorthy Ramesh⁹ and David Muller⁴; ¹University of Illinois at Urbana-Champaign, United States; ²Argonne National Laboratory, United States; ³Rice University, United States; ⁴Cornell University, United States; ⁵Universidad de Cantabria, Spain; ⁶Massachusetts Institute of Technology, United States; ⁷Queen's University Belfast, United Kingdom; ⁸Luxembourg Institute of Science and Technology, Luxembourg; ⁹University of California, Berkeley, United States

10:45 AM QT03.04.08

Imaging the Controllable Rotation of a Skyrmion Crystal Driven by Femtosecond Laser Pulses [Phoebe Tengdin](#), Benoit Truc, Alexey Sapozhnik, Simone Gargiulo, Ivan Madan, Thomas Schoenenberger, Priya Baral, Ping Che, Arnaud Magrez, Dirk Grundler, Henrik Rønnow, Thomas LaGrange and Fabrizio Carbone; École polytechnique fédérale de Lausanne, Switzerland

11:00 AM QT03.04.09

Generation of Intense and Fast Magnetic Field Pulses Through Domain Wall Displacements in Planar Nanoconduits [Jose Maria Porro](#)^{1,2} and Paolo Vavassori^{3,2}; ¹BCMaterials, Basque Center for Materials, Applications and Nanostructures, Spain; ²Ikerbasque, the Basque Foundation for Science, Spain; ³CIC nanoGUNE, Spain

SESSION QT03.05: Higher-Order Topological Structures—From Charge to Spin IV

Session Chairs: Michele Conroy and Demie Kepaptsoglou

Friday Afternoon, May 13, 2022

Hawai'i Convention Center, Level 3, 302A

1:30 PM QT03.05.01

Imaging Emergent Functionality in 3D [Trygve M. Røeder](#), Theodor Secanell Holstad, Marion Höfling and Hugh Simons; Technical University of Denmark, Denmark

1:45 PM QT03.05.03

Understanding Atomic Scale Electronic and Physical Properties in Polar Topologies [Sandhya Susarla](#); Lawrence Berkeley National Laboratory, United States

2:00 PM QT03.05.05

Magnetic Properties of NdCuGa₃ Single Crystals [Binod K. Rai](#), Lindsay Roy and Patrick O'Rourke; Savannah River National Laboratory, United States

2:45 PM QT03.05.06

Spin Higher-Order Topological Insulators: A Phase-Space Perspective [Ioannis Petrides](#)¹ and Oded Zilberberg²; ¹Harvard University, United States; ²University of Konstanz, Germany

2:30 PM BREAK

3:00 PM QT03.05.07

Programmable Multi-Level Graphene/PZT Memristor Based on Highly Conductive Neutral Domain Walls [Felix Risch](#), Igor Stolichnov, Sadegh Kamaei Bahmaei and Adrian Ionescu; École polytechnique fédérale de Lausanne, Switzerland

SESSION QT03.06: Higher-Order Topological Structures—From Charge to Spin V

Session Chair: Sinead Griffin

Wednesday Morning, May 25, 2022

QT03-Virtual

8:00 AM *QT03.06.01

Electroskyrmionics: Polarization, Phonons and Photons [Jiri Hlinka](#); Czech Academy of Sciences, Czechia

8:30 AM QT03.06.02

First-Principle Investigations of Topological Solitons in Multiferroic Cu₂OSeO₃ [Houssam Sabri](#) and Igor Kornev; Université Paris-Saclay, CentraleSupélec, CNRS, Laboratoire SPMS, France

8:45 AM *QT03.06.03

X-Ray Imaging of Three-Dimensional Magnetization Textures Claire Donnelly; Max Planck Institute for Chemical Physics of Solids, Germany

9:15 AM *QT03.06.04

Emergent Landau Levels of Topological Magnons in a Skyrmion Lattice Christian Pfleiderer; Technical University of Munich, Germany

9:45 AM QT03.03.09

Creating a Ferromagnetic Ground State with High T_c in a Paramagnetic Alloy Through Non-Equilibrium Nanostructuring Xinglong Ye¹, Nuno Fortunato², Abhishek Sarkar¹, Holger Geßwein¹, Di Wang¹, Xiang Chen¹, Benedikt Eggert³, Heiko Wende³, Richard A. Brand³, Hongbin Zhang², Horst Hahn¹ and Robert Kruk¹; ¹Karlsruhe Institute of Technology, Germany; ²Institute of Materials Science, Technische Universität Darmstadt, Germany; ³University of Duisburg-Essen, Germany

SESSION QT03.07: Higher-Order Topological Structures—From Charge to Spin VI

Session Chair: Sinead Griffin

Wednesday Morning, May 25, 2022

QT03-Virtual

10:30 AM QT03.07.02

From Vortex Labyrinths to Polar Bubbles—A Mean-Field Perspective Sergei Prokhorenko¹, Yousra Nahas¹, Qi Zhang², Vivasha Govinden², Suyash Rijal¹, Nagarajan Valanoor² and Laurent Bellaïche¹; ¹University of Arkansas, United States; ²University of New South Wales, Australia

10:45 AM *QT03.07.03

Topology and Control of Ferroelectric Patterning Yousra Nahas¹, Sergei Prokhorenko¹, Qi Zhang², Vivasha Govinden², Nagarajan Valanoor² and Laurent Bellaïche¹; ¹University of Arkansas, United States; ²University of New South Wales, Australia

11:15 AM QT03.05.08

Epitaxial Growth of Frustrated Kagome Lattice Fe-Sn Thin Films Payel Chatterjee, Matthias Hartl, Longfei He, Dennis Meier and Christoph Brüne; Norwegian University of Science and Technology, Norway

##PAGE_BREAK##

SYMPOSIUM QT04

Topology and Exotic Quantum Phases in 3D Materials

May 8 - May 24, 2022

Symposium Organizers

Sugata Chowdhury, Howard University

Anna Isaeva, University of Amsterdam

Xiaofeng Qian, Texas A&M University

Bahadur Singh, Tata Institute of Fundamental Research

* Invited Paper

SESSION QT04.01: Magnetic and Non-Magnetic Topological Insulators I

Session Chair: Anna Isaeva

Sunday Morning, May 8, 2022

Hawai'i Convention Center, Level 3, 302B

9:00 AM QT04.01.02

Neutron Investigations of $\text{Mn}(\text{Bi,Sb})_2\text{Te}_4$ William Ratcliff^{1,2}, Julie Borchers¹, Colin Heikes^{1,2}, Patrick Quartermann¹, Seng Huat Lee³, Zhiqiang Mao³ and Jun Zhu³; ¹NIST, United States; ²University of Maryland, United States; ³The Pennsylvania State University, United States

9:15 AM QT04.01.04

Comparing Cr-Doped $(\text{Bi,Sb}_{1-x})_2\text{Te}_3$ to Graphene as a Future Platform for Quantum Hall Resistance Standards Linsey K. Rodenbach^{1,2}, Alireza R. Panna³, Shamith U. Payagala³, Ilan T. Rosen^{1,2}, Joseph A. Haggmann³, Peng Zhang⁴, Lixuan Tai⁴, Kang L. Wang⁴, Dean G. Jarrett³, Randolph E. Elmquist³, Jason M. Underwood³, David B. Newell³, Albert F. Rigosi³, David Goldhaber-Gordon^{1,2} and Angela Hight Walker³; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States; ³National Institute of Standards and Technology, United States; ⁴University of California, Los

Angeles, United States

9:30 AM BREAK

SESSION QT04.02: Magnetic and Non-Magnetic Topological Insulators II
Session Chair: William Ratcliff
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 302B

10:00 AM QT04.02.03

Magnetoresistance Studies of Defect Formation in Cd₃As₂ Thin Films Jocienne Nelson¹, Anthony Rice¹, Brian Fluegel¹, Chase Brooks², Stephan Lany¹ and Kirstin Alberi¹; ¹National Renewable Energy Laboratory, United States; ²University of Colorado Boulder, United States

10:15 AM QT04.02.04

Growth of the Intrinsic Superlattice Material Bi₄Se₃ by DC Magnetron Sputtering: Layered to Faceted Growth Joseph P. Corbett^{1,2}, Margaret M. Brown^{3,2}, Tobin Muratore^{3,2}, Ryan Laing^{3,2}, Jeff Brown^{4,2}, Jay Gupta⁵ and Amber Reed²; ¹UES Inc., United States; ²Air Force Research Laboratory, United States; ³University of Dayton, United States; ⁴KBR, United States; ⁵The Ohio State University, United States

10:30 AM QT04.02.05

Effects of Dopants in Magnetic and Topological Properties of ZrMnP and HfMnP Tej Nath N. Lamichhane and Mingda Li; Massachusetts Institute of Technology, United States

10:45 AM QT04.02.06

Topological Signatures in Nodal Semimetals through Neutron Scattering Thanh Nguyen¹, Yoichiro Tsurimaki^{1,2}, Ricardo Pablo-Pedro¹, Grigory Bednik³, Tongtong Liu¹, Anuj Apte^{1,4}, Nina Andrejevic¹ and Mingda Li¹; ¹Massachusetts Institute of Technology, United States; ²Stanford University, United States; ³University of California, Santa Cruz, United States; ⁴The University of Chicago, United States

11:00 AM QT04.02.07

Anisotropic Large Diamagnetism in Dirac Semimetals ZrTe₅ and HfTe₅ Sukriti Singh¹, Nitesh Kumar^{1,2}, Subhjit Roychowdhury¹, Chandra Shekhar¹ and Claudia Felser¹; ¹Max Planck Institute for Chemical Physics of Solids, Germany; ²S. N. Bose National Centre for Basic Sciences, India

SESSION QT04.03: Non-Trivial Spin texture and Superconductivity
Session Chair: Bahadur Singh
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 302B

1:30 PM QT04.03.01

Crystal Growth and Characterization of the Topological Superconductor Candidate RhPb₂ and its Related Compounds Nikola Subotic¹, Takashi Mochiku², Yoshitaka Matsushita², Takanari Kashiwagi¹, Osamu Takeuchi¹, Hidemi Shigekawa¹ and Kazuo Kadowaki¹; ¹University of Tsukuba, Japan; ²National Institute for Materials Science, Japan

1:45 PM QT04.03.02

Coexistence of Surface Superconducting and Three-Dimensional Topological Dirac States in Semimetal KZnBi Junseong Song¹, Sunghun Kim², Youngkuk Kim³, Young Hee Lee¹, Binghai Yan⁴, Yeongkwan Kim² and Sung Wng Kim²; ¹Center for Integrated Nanostructure Physics, Institute for Basic Science, Korea (the Republic of); ²Department of Physics, Korea Advanced Institute of Science and Technology, Korea (the Republic of); ³Department of Physics, Sungkyunkwan University, Korea (the Republic of); ⁴Department of Condensed Matter Physics, Weizmann Institute of Science, Israel; ⁵Department of Energy Science, Sungkyunkwan University, Korea (the Republic of)

2:00 PM *QT04.03.04

Visualization of Topological Boundary Modes Manifesting Topological Nodal-Point Superconductivity Nurit Avraham; Weizmann Institute of Science, Israel

2:15 PM BREAK

3:00 PM QT04.03.05

Nanowires of Topological Kondo Insulators as Conduits for Spin-Polarized Tunneling Currents Anuva Aishwarya¹, Zhuozhen Cai¹, Arjun Raghavan¹, Xiaoyu Wang², Xu Li³, Genda Gu⁴, Taylor L. Hughes¹, Fei Liu³, Lin Jiao² and Vidya Madhavan¹; ¹University of Illinois, Urbana-Champaign, United States; ²National High Magnetic Field Laboratory, Florida State University, United States; ³Sun Yat-sen University, China; ⁴Brookhaven National Laboratory, United States

3:15 PM QT04.03.06

Microwave Response in a Topological Superconducting Quantum Interference Device Wei Pan; Sandia National Labs, United States

SESSION QT04.04: Topological Semimetal
Session Chair: Sugata Chowdhury
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 302B

8:00 AM *QT04.04.01

Strongly Correlated Weyl Semimetals Silke Buchler-Paschen; Vienna University of Technology, Austria

8:30 AM QT04.04.02

In-Plane Lattice Tuning of Topological Semimetal Cd₃As₂ for Improved Electronic Properties Thomas G. Farinha^{1,2} and Christopher J. Richardson^{1,2};
¹The University of Maryland, United States; ²Laboratory for Physical Sciences, United States

8:45 AM *QT04.04.03

Exotic Topological Phases of Quantum Matter for Fundamental Science Studies and Applications Arun Bansil; Northeastern University, United States

9:15 AM QT04.04.04

Surface-Driven Nonlinear Planar Hall Effect in Nominally Centrosymmetric Dirac Semimetal SrIrO₃ Thin Films Yusuke Kozuka¹, Shinji Isogami¹, Keisuke Masuda¹, Yoshio Miura¹, Saikat Das¹, Jun Fujioka², Tadakatsu Ohkubo¹ and Shinya Kasai¹; ¹National Institute for Materials Science, Japan; ²University of Tsukuba, Japan

9:30 AM BREAK

10:00 AM QT04.04.06

Molecular Beam Epitaxy Growth of Co₂FeSn: a Heusler Nodal Line Semimetal Candidate with Theorized Giant Room Temperature Anomalous Transport Aaron Engel¹, Dai Quoc Ho², Han Yu³, Shinichi Nishihaya¹, Kaifeng(Felix) Yang¹, Hadass Inbar¹, Paul Crowell³, Anderson Janotti² and Chris Palmstrom¹; ¹University of California, Santa Barbara, United States; ²University of Delaware, United States; ³University of Minnesota, United States

10:15 AM QT04.04.07

Evaluating the Potential of Weyl Semimetals as Future Interconnect Metals Sushant Kumar¹, Yi-Hsin Tu², Sheng Luo³, Nicholas Lanzillo⁴, Tay-Rong Chang², Ravishankar Sundararaman¹, Hsin Lin⁵, Gengchiao Liang³ and Ching-Tzu Chen⁶; ¹Rensselaer Polytechnic Institute, United States; ²National Cheng Kung University, Taiwan; ³National University of Singapore, Singapore; ⁴IBM Research, United States; ⁵Academia Sinica, Taiwan; ⁶IBM Thomas J. Watson Research Center, United States

10:30 AM QT04.04.08

Correlated Hund's Metallic Phase in Kagome Nodal Surface Semimetal: Sc₃Mn₃Al₇Si₅ Subhasis Samanta¹, Kwang-Yong Choi², Heung-Sik Kim¹ and Fabrizio Cossu¹; ¹Kangwon National University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

10:45 AM QT04.04.09

Method for Enhancing the Anomalous Nernst Effect in Magnetic Weyl Semimetals Vsevolod Ivanov¹, Ella Banyas² and Liang Z. Tan¹; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

SESSION QT04.05: Optoelectronic Properties of Quantum Materials

Session Chair: Xiaofeng Qian

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 302B

1:30 PM *QT04.05.01

High Spin-Chern-Number Insulator Phase in α -Antimonene Hsin Lin¹, Baokai Wang², Xiaoting Zhou², Yen-Chuan Lin³ and Arun Bansil²; ¹Academia Sinica, Taiwan; ²Northeastern University, United States; ³National Taiwan University, Taiwan

2:00 PM QT04.05.02

Observation of the Chiral Phonon Activated Spin Seebeck Effect Kyunghoon Kim¹, Eric Vetter¹, Liang Yan², Yu Yang³, Cong Yang¹, Andrew Comstock¹, Ziqi Wang¹, Xiao Li³, Jun Zhou³, Lifa Zhang³, Wei You², Dali Sun¹ and Jun Liu¹; ¹North Carolina State University, United States; ²University of North Carolina at Chapel Hill, United States; ³Nanjing Normal University, China

2:15 PM QT04.05.04

Geometrically Frustrated Phonons in a Topological Kagome Metal Nathan C. Drucker^{1,2}, Thanh Nguyen², Robert Kealhofer³, Yujie Quan³, Kunyan Zhang⁴, Songxue Chi⁵, Douglas L. Abernathy⁵, Susanne Stemmer³, Shengxi Huang⁴, Bolin Liao³ and Mingda Li²; ¹Harvard University, United States; ²Massachusetts Institute of Technology, United States; ³University of California, Santa Barbara, United States; ⁴The Pennsylvania State University, United States; ⁵Oak Ridge National Laboratory, United States

2:30 PM BREAK

3:00 PM QT04.05.05

Leggett Modes in Dirac Semimetals Joseph J. Cuzzo^{1,2}, Wenlong Yu², Paul Davids², Tina M. Nenoff², Daniel Soh², Enrico Rossi¹ and Wei Pan²; ¹William & Mary, United States; ²Sandia National Laboratories, United States

3:15 PM QT04.05.06

Thermal Hall effect in Bi_{1-x}Sb_x topological insulator and Weyl Semimetal Dung D. Vu, Minyue Zhu and Joseph P. Heremans; The Ohio State University, United States

3:30 PM QT04.05.07

Quantum Oscillations and Topological Magnetotransport in Micron-Scale Hall Bars of the Chiral Semimetal CoSi Alan Molinari¹, Federico Balduini¹, Heinz Schmid¹, Marcus Schmidt², Vicky Suess², Marilyne Sousa¹, John Bruley³, Serguei Tchoumakov⁴, Adolfo Grushin⁴, Johannes Gooth² and

Bernd Gotsmann¹; ¹IBM Research Europe - Zurich, Switzerland; ²Max Planck Institute for Chemical Physics of Solids, Germany; ³IBM Thomas J Watson Research Center, United States; ⁴Institut Néel, France

SESSION QT04.06: Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures I
Session Chairs: Sugata Chowdhury and Anna Isaeva
Tuesday Morning, May 24, 2022
QT04-Virtual

8:00 AM *QT04.06.01

Second Order Nonlinear Optical Spectroscopy Studies on Magnetic Weyl Semimetal $\text{Co}_3\text{Sn}_2\text{S}_2$ Liuyan Zhao; University of Michigan, United States

8:30 AM QT04.06.02

Coexistence of Charge Density Wave and Quantum Hall Effect in Bulk CaCu_4As_2 single crystal Souvik Sasmal¹, Vikas Saini¹, Sitaram Ramakrishnan^{2,3}, Gourav Dwari¹, Bishal Maity¹, Jin-Ke Bao², Rajib Mondal⁴, Vikram Tripathi¹, Sander van Smaalen², Bahadur Singh¹ and Arumugam Thamizahvel¹; ¹Tata Institute of Fundamental Research, India; ²University of Bayreuth, Germany; ³Hiroshima University, Japan; ⁴UGC-DAE Consortium for Scientific Research, India

8:45 AM QT04.06.03

Magnetic Field-Induced Type-II Weyl Semimetallic State in Geometrically Frustrated Shastry-Sutherland Lattice Jong-Soo Rhyee¹, Wonhyuk Shon², Kyoo Kim², B. K. Cho³ and Heonjung Kim⁴; ¹Kyung Hee University, Korea (the Republic of); ²Korea Atomic Energy Research Institute, Korea (the Republic of); ³Gwangju Institute of Science and Technology, Korea (the Republic of); ⁴Daegu University, Korea (the Republic of)

9:00 AM QT04.06.04

Novel Alkali Metal Rare-Earth Dichalcogenide, LiYbSe_2 : Structure and Magnetism in a Pyrochlore Lattice Ranuri S. Dissanayaka Mudiyanselage¹, Olivia Vilella², Martin Mourigal², Gabriel Kotliar¹ and Weiwei Xie¹; ¹Rutgers, The State University of New Jersey, United States; ²Georgia Institute of Technology, United States

9:15 AM *QT04.06.05

Spin Textures in Correlated Oxide Devices Probed by Electrical Transport Tamalika Banerjee; University of Groningen, Netherlands

SESSION QT04.07: Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures II
Session Chair: Sugata Chowdhury
Tuesday Morning, May 24, 2022
QT04-Virtual

10:30 AM *QT04.06.06

Intrinsic Magnetic Topological Insulators: Discovery and State-of-the-Art Mikhail M. Otrokov^{1,2}, Sergey V. Ereemeev^{3,4}, Yury M. Koroteev^{3,4}, Igor P. Rusinov⁴, Alexandra Y. Vyazovskaya⁴, Evgenii K. Petrov⁴, Vladimir N. Men'shov⁵, Tatyana V. Menshchikova⁴, Arthur Ernst⁶, Maria Blanco-Rey^{7,8}, Andres Arnau^{7,1,8}, Ilya Klimovskikh⁹, Dmitry Estyunin⁹, Alexander M. Shikin⁹, Ziya S. Aliev¹⁰, Mahammad B. Babanly¹¹, Imamaddin R. Amiraslanov¹⁰, Nadir A. Abdullayev¹⁰, Vladimir N. Zverev¹², Nazim T. Mamedov¹⁰ and Evgueni V. Chulkov^{8,7,9}; ¹Centro de Física de Materiales, Spain; ²IKERBASQUE, Basque Foundation for Science, Spain; ³Institute of Strength Physics and Materials Science, Russian Academy of Sciences, Russian Federation; ⁴Tomsk State University, Russian Federation; ⁵NRC Kurchatov Institute, Russian Federation; ⁶Johannes Kepler University, Austria; ⁷University of the Basque Country, Spain; ⁸Donostia International Physics Center (DIPC), Spain; ⁹Saint Petersburg State University, Russian Federation; ¹⁰Institute of Physics, Azerbaijan National Academy of Sciences, Azerbaijan; ¹¹Institute of Catalysis and Inorganic Chemistry, Azerbaijan National Academy of Sciences, Azerbaijan; ¹²Institute of Solid State Physics, Russian Academy of Sciences, Russian Federation

11:00 AM *QT04.01.01

Tuning the Interplay of Magnetism and Band Topology in Intrinsic Magnetic Topological Insulators Ni_2Ni ; University of California, Los Angeles, United States

11:30 AM *QT04.02.02

Layer Hall effect in Topological Axion Antiferromagnet MnBi_2Te_4 Suyang Xu; Harvard University, United States

##PAGE_BREAK##

SYMPOSIUM QT05

2D Topological Materials—Growth, Theoretical Models and Applications
May 9 - May 25, 2022

Symposium Organizers

Paolo Bondavalli, Thales Research and Technology
Judy Cha, Yale University

Adriana Figueroa, Catalan Institute of Nanoscience and Nanotechnology
Guy Lelay, Aix-Marseille University

* Invited Paper

SESSION Tutorial QT05.00: Theoretical and Experimental Aspects of 2D Topological Materials
Session Chairs: Paolo Bondavalli, Judy Cha, Adriana Figueroa, Guy Lelay and Marco Minissale
Tuesday Morning, May 24, 2022
QT05-Virtual

8:30 AM

The Kubo Formula, its Fundamental, and its Relevance in modern Material Science [Jose Hugo Garcia Aguilar](#); Catalan Institute of Nanoscience and Nanotechnology, Spain

9:00 AM

Introduction to LSQUANT [Jose Hugo Garcia Aguilar](#); Catalan Institute of Nanoscience and Nanotechnology, Spain

9:30 AM

Practical examples of LSQUANT [Jose Hugo Garcia Aguilar](#); Catalan Institute of Nanoscience and Nanotechnology, Spain

10:00 AM Q&A

10:15 AM

Techniques of Epitaxy of 2D Materials Growth [Marco Minissale](#); Aix-Marseille Université, France

10:45 AM

Analytical Techniques of Characterization [Marco Minissale](#); Aix-Marseille Université, France

11:15 AM

Overview of the Different Studied 2D Materials and Emerging Applications and Limitations of 2D Materials [Marco Minissale](#); Aix-Marseille Université, France

SESSION QT05.01: Emerging Properties: Theory and Modelling I
Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 302A

10:30 AM *QT05.01.01

Two-Dimensional Topological Polymers - The Chemistry Way Towards Quasiparticle Physics [Thomas Heine](#); TU Dresden, Germany

11:00 AM *QT05.01.02

Electronic Correlations and Nano-photocurrent in Nodal Semimetals [Yinming Shao](#); Columbia University, United States

SESSION QT05.02: Emerging Properties: Theory and Modelling II
Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 302A

1:30 PM *QT05.02.02

Magnetic Topological Phases in Dissipative Systems [Benedetta Flebus](#); Boston College, United States

2:00 PM QT05.02.03

Effect of Thickness, External Magnetic Field, and Chemical Substitution on the Quantum Phase Transition of Antiferromagnetic MnBi_2Se_4 and Family of Materials [Sugata Chowdhury](#)^{1,2}, Kevin Garrity² and Francesca Tavazza²; ¹Howard University, United States; ²National Institute of Standards and Technology, United States

2:15 PM QT05.02.04

Atomically-Defined Topological Edge Modes in Functionalized Stanene [Jennifer Coulter](#)¹, Mark R. Hirsbrunner², Oleg Dubinkin², Taylor L. Hughes² and Boris Kozinsky¹; ¹Harvard University, United States; ²University of Illinois at Urbana-Champaign, United States

2:30 PM BREAK

3:00 PM QT05.02.05

Nonlinear Hall Effect and Berry Curvature Memory in Emergent 2D Ferroelectric Materials Xiaofeng Qian; Texas A&M University, United States

3:15 PM *QT05.02.06

Discovery of Topological Magnets in 2D and 3D and the New Frontiers M. Zahid Hasan; Princeton Univ, United States

SESSION QT05.03: Growth, Characterization and Potential Applications

Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 302A

8:30 AM *QT05.03.01

Growth of Topological Materials from the 2D to the 3D Level: the Case of Xenos and Ditellurides Carlo Grazianetti, Daya Dhungana, Pinakapani Tummala, Alessio Lamperti, Christian Martella and Alessandro Molle; Consiglio Nazionale delle Ricerche, Italy

9:00 AM QT05.03.02

MBE Growth of Tin-Telluride Thin Films on (001) GaAs Substrates Kaito Tsuboi, Su Nan, Shotaro Kobayashi and Masakazu Kobayashi; Waseda University, Japan

9:15 AM QT05.03.03

Si-Ag $2\sqrt{3}\times 2\sqrt{3}R(30^\circ)$ Surface Alloy Versus Silicene on Ag(111) Guy Lelay¹, Paola De Padova² and Mariusz Krawiec³; ¹Aix-Marseille University, France; ²ISM-CNR, Italy; ³M. Curie-Skłodowska University, Poland

9:30 AM BREAK

10:00 AM *QT05.03.05

Topology and Chirality Claudia Felser; Max Planck Institute, Germany

10:30 AM QT05.03.06

Realization of Internal Interfaces in Nanostructures of Chiral Weyl Semimetals Nitish Mathur^{1,2}, Fang Yuan¹, Guangming Cheng³, Sahal Kaushik⁴, Iñigo Robredo⁵, Maia Vergniory⁵, Jennifer Cano⁴, Song Jin² and Leslie Schoop¹; ¹Princeton University, United States; ²University of Wisconsin--Madison, United States; ³Princeton Institute for Science and Technology of Materials, United States; ⁴Stony Brook University, The State University of New York, United States; ⁵Donostia International Physics Center, Spain

SESSION QT05.04: Advanced Studies on 2D Topological Materials

Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 302A

1:30 PM *QT05.04.01

Spinterface: Quantum Interface Effects with 2D Materials Victor Zatzko¹, Marta Galbiati^{1,2}, Hao Wei¹, Frederic Brunnett¹, Julian Peiro¹, Regina Galceran¹, Maëlis Piquemal-Banci¹, Florian Godel¹, Nicholas Figueiredo-Prestes¹, Simon Dubois^{1,3}, Jean-Christophe Charlier³, Piran Ravichandran Kidambi⁴, Robert Weatherup^{5,6}, Sabina Caneva⁵, Stephan Hofmann⁵, John Robertson⁵, Mauro Och⁷, Cecilia Mattevi⁷, Aymeric Vecchiola¹, Karim Bouzehouane¹, Sophie Collin¹, Bernard Servet⁸, Albert Fert¹, Frédéric Petroff¹, Marie-Blandine Martin¹, Bruno Dlubak¹ and Pierre Seneor¹; ¹Unité Mixte de Physique, CNRS, Thales, Université Paris-Saclay, France; ²Universidad de Valencia, Spain; ³Université Catholique de Louvain, Belgium; ⁴Vanderbilt University, United States; ⁵University of Cambridge, United Kingdom; ⁶University of Oxford, United Kingdom; ⁷Imperial College London, United Kingdom; ⁸Thales Research and Technology, France

2:00 PM *QT05.04.03

Large-Scale 2D Materials Integration for Spintronics Bruno Dlubak¹, Victor Zatzko¹, Marta Galbiati¹, Simon Dubois^{1,2}, Maëlis Piquemal-Banci¹, Florian Godel¹, Cécile Carretero¹, Anke Sander¹, Sophie Collin¹, Aymeric Vecchiola¹, Karim Bouzehouane¹, Mauro Och³, Cecilia Mattevi³, Jean-Christophe Charlier², Stéphane Xavier⁴, Bernard Servet⁴, Robert Weatherup⁵, Sabina Caneva⁵, Stephan Hofmann⁵, John Robertson⁵, Albert Fert¹, Frédéric Petroff¹, Marie-Blandine Martin¹ and Pierre Seneor¹; ¹Unité Mixte de Physique CNRS/Thales, France; ²Université Catholique de Louvain, Belgium; ³Imperial College London, United Kingdom; ⁴Thales Research and Technology, France; ⁵University of Cambridge, United Kingdom

2:30 PM BREAK

3:00 PM QT05.04.05

Thermoelectric transport in the topological insulator Bi₂Se₃ Lakshmi Amulya Nimmagadda¹, Yang Bai¹, James N. Eckstein¹ and Sanjiv Sinha^{1,2}; ¹University of Illinois at Urbana-Champaign, United States; ²Nick Holonyak Micro and Nanotechnology Laboratory, United States

3:15 PM *QT05.04.06

Transport in a Graphene Strain Superlattice Nadya Mason; University of Illinois at Urbana-Champaign, United States

3:45 PM QT05.04.07

Topological Band Engineering of Catalysts toward Highly Efficient Electrochemical Hydrogen Evolution Qun Yang, Guowei Li, Yan Sun and Claudia Felser; Max Planck Institute for Chemical Physics of Solids, Germany

SESSION QT05.05: Poster Session: 2D Topological Materials: Growth, Theoretical Models and Applications

Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

QT05.05.01

Poster Spotlight: The Search for Persistent Currents on Doped 2D Dichalcogenide Platelets [Timothy W. Carlson](#); Wake Forest University, United States

SESSION QT05.06: Functionalisation, Novel Physics and Chemical Properties I

Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 302A

8:30 AM *QT05.06.01

2D Magnets with High Mobility Leslie Schoop and [Nitish Mathur](#); Princeton University, United States

9:00 AM QT05.06.02

Two-Dimensional Type-I, II and III Topological Dirac Semimetals in Group IV Transition Metal Ditelluride Family [Sotirios Fragkos](#)^{1,2}, Evgenia Symeonidou^{1,3}, Polychronis Tsipas¹, Panagiotis Pappas¹, Evangelia Xenogiannopoulou¹ and Athanasios Dimoulas¹; ¹NCSR Demokritos, Greece;

²University of West Attica, Greece; ³Aristotle University of Thessaloniki, Greece

9:15 AM *QT05.06.03

Visualization of Topological States of Matter Using Microwave Impedance Microscopy [Monica Allen](#); University of California, San Diego, United States

9:45 AM BREAK

10:15 AM *QT05.06.04

Chemical, Electrochemical, and Strain Modifications of Two-Dimensional Layers and Heterostructures [Daniel K. Bediako](#); University of California, Berkeley, United States

10:45 AM QT05.06.05

Towards a More Accurate Determination of Thermoelectric Properties of Bi₂Se₃ Epifilms by Suspension via Micromachining Techniques [Donguk Kim](#)¹ and Yun Park^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Institute of Applied Physics, Seoul National University, Korea (the Republic of)

SESSION QT05.07: Functionalisation, Novel Physics and Chemical Properties II

Session Chairs: Paolo Bondavalli, Guy Lelay and Alessandro Molle

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 302A

1:30 PM QT05.07.01

Nonlinear Analysis of 2D Topological Maxwell Lattices [Ian T. Frankel](#)¹, Harry Liu², Haning Xiu³, Kai Qian¹, Kyle Chen⁴, Nicolas Herard¹, Zi Chen³, Nicholas Boechler¹ and Xiaoming Mao²; ¹UCSD, United States; ²University of Michigan, United States; ³Harvard University, United States; ⁴University of Wisconsin–Madison, United States

1:45 PM QT05.05.03

Poster Spotlight: The Search for Persistent Currents on Doped 2D Dichalcogenide Platelets [Timothy W. Carlson](#); Wake Forest University, United States

SESSION QT05.08: 2D Topological Matter

Session Chairs: Paolo Bondavalli and Adriana Figueroa

Monday Morning, May 23, 2022

QT05-Virtual

8:00 AM *QT05.08.01

Atomic-Resolution Real-Space Tracking of Structural Phase Transformations in 2D Quantum Materials [Elisabeth Bianco](#) and Lena Kourkoutis; Cornell University, United States

8:30 AM *QT05.08.02

Quantum Systems Based on Two-Dimensional Semiconductors [Amalia Patane](#); University of Nottingham, United Kingdom

9:00 AM *QT05.08.03

Transversal Transport Coefficients and Topological Properties [Ingrid Mertig](#); MLU Halle, Germany

9:30 AM *QT05.08.04

Orbital Engineering of Atomic Monolayers as Quantum Spin Hall Insulators [Ralph Claessen](#); Julius-Maximilians-Universität Würzburg, Germany

SESSION QT05.09: 2D Topological Materials—Growth, Theoretical Models and Applications I
Session Chairs: Paolo Bondavalli and Judy Cha
Monday Afternoon, May 23, 2022
QT05-Virtual

1:00 PM QT05.09.02

Co-Deposition of Bismuth and Nitrogen on Different Substrates Using Molecular Beam Epitaxy [Ashok Shrestha](#), David Ingram and Arthur Smith; Ohio University, United States

1:15 PM QT05.09.03

Uncovering Hydrodynamic Transport in Topological Semimetals [Yaxian Wang](#), George Varnavides and Prineha Narang; Harvard University, United States

1:30 PM QT05.09.04

Dynamics Analysis of Topological Bistable Maxwell Lattices [Haning Xiu](#)¹, Harry Liu², Xiaoming Mao² and Zi Chen¹; ¹Brigham and Women's Hospital/Harvard Medical School, United States; ²University of Michigan—Ann Arbor, United States

1:45 PM *QT05.09.05

Signatures of Smaller Magic Angles in Twisted Bilayer Graphene [Jennifer Cano](#); Stony Brook University, United States

SESSION QT05.10: 2D Topological Materials—Growth, Theoretical Models and Applications II
Session Chair: Judy Cha
Wednesday Morning, May 25, 2022
QT05-Virtual

8:00 AM *QT05.10.01

Beyond Silicene, from Germanene to Plumbene [Junji Yuhara](#); Nagoya University, Japan

8:30 AM QT05.10.02

Influence of Te Composition on Magneto-Transport Behavior of the Bi₂Te₃ Thin Films Co-Sputtered on Si (100) [Lalit Pandey](#); Indian Institute of Technology Delhi, India

8:45 AM *QT05.10.03

Direct Synthesis of 1T' WSe₂ Nanosheets [Cecilia Mattevi](#); Imperial College London, United Kingdom

##PAGE_BREAK##

SYMPOSIUM QT06

Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures
May 9 - May 23, 2022

Symposium Organizers

Angela Hight Walker, National Institute of Standards and Technology
Liqin Ke, Ames Laboratory
Je-Geun Park, Seoul National University
Srinivasa Rao Singamaneni, The University of Texas at El Paso

* Invited Paper

SESSION Tutorial QT06.00: Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic materials and Heterostructures
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SESSION QT06.01: Spin Dynamics and Excitations
Session Chairs: Yafei Ren and Srinivasa Rao Singamaneni
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 306A

1:30 PM *QT06.01.01
Ultrafast Spin Dynamics in 2D Antiferromagnets Xiao-Xiao Zhang; University of Florida, United States

2:00 PM *QT06.01.02
Ambient-Stable 2D Transition Metal Halides via Organic-Inorganic Encapsulation Mark C. Hersam and Vinod K. Sangwan; Northwestern University, United States

2:30 PM QT06.01.03
Magnons and Electromagnons in Dirac Antiferromagnet CoTiO₃ Yufei Li¹, Thuc T. Mai², Kevin Garrity², Evan Jasper¹, Chase Lyon¹, Daniel Heligman¹, Daniel Shaw³, Jeff Simpson^{4,2}, Kate Ross³, Angela Hight Walker² and Rolando Valdes Aguilar¹; ¹The Ohio State Univ, United States; ²National Institute of Standards and Technology, United States; ³Colorado State University, United States; ⁴Towson University, United States

2:45 PM QT06.01.04
Magnon-Phonon Hybridization in a 2D Antiferromagnet MnPSe₃ Thuc T. Mai¹, Kevin Garrity¹, Amber McCreary¹, Joshua Argo², Jeff Simpson^{3,1}, Vicky Doan-Nguyen², Rolando Valdes Aguilar² and Angela Hight Walker¹; ¹National Institute of Standards and Technology, United States; ²The Ohio State University, United States; ³Towson University, United States

3:00 PM QT06.01.05
Self-Consistently Renormalized Spin-Wave Theory of Magnetic Two-Dimensional van der Waals Materials Liqin Ke and V. V. N. Mkhitarian; Ames Laboratory, United States

3:15 PM BREAK

3:45 PM *QT06.01.06
The Magnetic Hamiltonians for the Layered Transition Metal-PS₃ Antiferromagnets Andrew Wildes; Inst Laue-Langevin, France

4:15 PM QT06.01.07
Spin-Lattice Interaction in Two-Dimensional CrI₃ Computed from First Principles Anna Delin¹, Banasree Sadhukhan¹, Yaroslav O. Kvashnin², Anders Bergman² and Johan Hellsvik¹; ¹KTH Royal Inst of Technology, Sweden; ²Uppsala University, Sweden

SESSION QT06.02: Exploration, Application, and Outlook
Session Chairs: Kenneth Burch and Liqin Ke
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 306A

8:30 AM *QT06.02.01
Artificial Intelligence Guided Studies of Two-Dimensional Magnets Trevor D. Rhone; Rensselaer Polytechnic Institute, United States

9:00 AM *QT06.02.02
Ferromagnetic 2D Materials Andrew T. Wee; National Univ of Singapore, Singapore

9:30 AM BREAK

10:00 AM *QT06.02.03
Proximity Effect in the Heterostructures with 2D Magnetic Materials Ching-Ray Chang^{1,2}, MC Wang¹ and Han-Chun Wu³; ¹National Taiwan Univ, Taiwan; ²Chung Yuan Christian University, Taiwan; ³Beijing Institute of Technology, China

10:30 AM QT06.02.04
Observation of Magnetic Proximity Effects in MoSe₂/CrBr₃ van der Waals Heterostructures Junho Choi, Christopher Lane, Jian-Xin Zhu and Scott Crooker; Los Alamos National Laboratory, United States

10:45 AM QT06.02.05
Chemical Exfoliation and Magnetic Study of 2D VOCl Graciela V. Villalpando, Austin Ferrenti, Xiaoyu Song, Ratnadwip Singha, Robert Kirby and Leslie Schoop; Princeton, United States

SESSION QT06.03: Topological Magnetic Materials
Session Chairs: Angela Hight Walker and Xiao-Xiao Zhang
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 306A

1:30 PM *QT06.03.01

Magnetic Interactions and Defects in Magnetic Topological Insulators Rob McQueeney^{1,2}, Farhan Islam¹, Liqin Ke², Bing Li¹, Ana-Marija Nedic¹, Peter Orth^{1,2}, Daniel Pajeroski³, Simon Riberolles², Deborah Schlagel², Ben Ueland², David Vaknin^{2,1} and Jiaqiang Yan³; ¹Iowa State University, United States; ²Ames Laboratory, United States; ³Oak Ridge National Laboratory, United States

2:00 PM *QT06.03.02

Phonon Magnetic Moment and Chirality—Electronic Geometrical Phase Effect Qian Niu¹ and Yafei Ren²; ¹University of Science and Technology of China, China; ²University of Washington, United States

2:30 PM *QT06.03.03

Magnetism on 2D Honeycomb and Kagome Lattices: CoPS₃ and YMn₆Sn₆ Rebecca Dally¹, Thuc T. Mai¹, Kevin Garrity¹, Michael A. Susner², Benjamin S. Conner², Amber McCreary¹, Michael McGuire³, Angela Hight Walker¹, Nirmal Ghimire^{4,4}, Lekhanath Poudel^{1,5}, D.C. Jones^{4,4}, Dina Michel^{4,4}, Nishchal Thapa Magar⁴, Markus Bleuel^{1,5}, Jidong Jiang⁶, John F. Mitchell⁶, Jeffrey W. Lynn¹ and Igor I. Mazin^{4,4}; ¹National Institute of Standards and Technology, United States; ²Air Force Research Laboratory, United States; ³Oak Ridge National Laboratory, United States; ⁴George Mason University, United States; ⁵University of Maryland, United States; ⁶Argonne National Laboratory, United States

3:00 PM BREAK

3:30 PM QT06.03.04

Long-Range Nuclear Magnetic Ordering in Nanoconfined H₂ at High Temperatures Lui R. Terry¹, Stephane Rols², Mi Tian³, Simon Bending⁴ and Valeska Ting¹; ¹Univ of Bristol, United Kingdom; ²Institut Laue-Langevin, France; ³University of Exeter, United Kingdom; ⁴University of Bath, United Kingdom

3:45 PM *QT06.03.05

Axial Higgs Mode Detected by Quantum Pathway Interference in a 2D Material Kenneth Burch; Boston College, United States

SESSION QT06.04: Transport
Session Chairs: Liqin Ke and Je-Geun Park
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 306A

8:30 AM *QT06.04.01

Structural Phase Transformations and Nanoscale Magnetic Textures in the Layered Magnet CrSBr Revealed by Electron Microscopy Julian Klein¹, Thang Pham¹, Myung-Geun Han², Joachim D. Thomsen^{1,3}, Michael E. Ziebel⁴, Jonathan Curtis³, Michael Lorke⁵, Matthias Florian⁵, Alexander Steinhoff⁵, Kate Reidy¹, Kierstin Torres¹, Ren Wiscons⁴, Xavier Roy⁴, Jan Luxa⁶, Zdeněk Sofer⁶, Frank Jahnke⁵, Yimei Zhu², Prineha Narang³ and Frances Ross¹; ¹Massachusetts Institute of Technology, United States; ²Brookhaven National Laboratory, United States; ³John A. Paulson School of Engineering and Applied Sciences, United States; ⁴Department of Chemistry, Columbia University, United States; ⁵Institut für Theoretische Physik, Universität Bremen, Germany; ⁶Department of Inorganic Chemistry, University of Chemistry and Technology Prague, Czechia

9:00 AM QT06.04.03

Spontaneous Ferroelectric Polarization Tuned Magnon Transport in Multiferroic BiFeO₃ Xiaoxi Huang¹, Sandhya Susarla², Hongrui Zhang¹, Rakshit Jain³, Saba Karimeddiny³, Joseph Mittelstaedt³, Peter Ercius², Daniel Ralph³ and Ramamoorthy Ramesh^{1,2}; ¹University of California Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Cornell University, United States

9:15 AM QT06.04.04

Coupling between Magnetic Order and Charge Transport In a Two-Dimensional Magnetic Semiconductor Xavier Roy; Columbia University, United States

10:00 AM *QT06.04.05

Electrical Control of a Layered Ferromagnetic Semiconductor Goki Eda; National University of Singapore, Singapore

10:00 AM BREAK

10:30 AM QT06.04.06

Spin Injection in 2D Materials using Ferromagnetic Van der Waals Contacts Soumya Sarkar, Yan Wang, Yang Li and Manish Chhowalla; University of Cambridge, United Kingdom

10:45 AM QT06.04.07

Structure–Property Correlations in Magnetic Two-Dimensional Intercalation Compounds Samra Husremovic and Daniel K. Bediako; University of California, Berkeley, United States

SESSION QT06.05: Optics
Session Chairs: Angela Hight Walker and Srinivasa Rao Singamaneni
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 306A

1:30 PM *QT06.05.01

Probing 2D Magnetism with Nanoscale Quantum Magnetometry Brian Zhou; Boston College, United States

2:00 PM QT06.05.02

Linear Polarized Photoluminescence from Crystalline Nanoflakes of NiPS₃ Antiferromagnet prepared by Wet-Chemical Synthesis Vignesh Chandrasekaran, David G. Parobek, Andres E. Llacsahuanga Allica, Xiangzhi Li, Huan Zhao, Andrew Jones, Sergei A. Ivanov and Han Htoon; Los Alamos National Laboratory, United States

2:15 PM QT06.05.03

Highly Chiral Quantum Light Emission in 2D Semiconductor/Magnet Heterostructures Xiangzhi Li, Andrew Jones, Huan Zhao, Vignesh Chandrasekaran and Han Htoon; Los Alamos National Laboratory, United States

2:30 PM BREAK

3:00 PM *QT06.05.06

Exploring Few and Single Layer CrPS₄ with Near-Field Infrared Spectroscopy Janice Musfeldt¹, Sabine Neal¹, Kenneth O'Neal¹, Amanda Haglund¹, David Mandrus¹, Hans Bechtel², Larry Carr³, Kristjan Haule⁴, David Vanderbilt⁴ and Heung-Sik Kim⁵; ¹University of Tennessee, United States; ²Lawrence Berkeley National Laboratory, United States; ³Brookhaven National Laboratory, United States; ⁴Rutgers University, United States; ⁵Kangwon University, Korea (the Republic of)

3:30 PM QT06.05.07

Photoluminescence Study of Fano Resonances in CrPS₄ Maurizio Riesner¹, Rachel Fainblat¹, Adam Budniak², Yaron Amouyal², Efrat Lifshitz² and Gerd Bacher¹; ¹University of Duisburg-Essen, Germany; ²Technion-Israel Institute of Technology, Israel

SESSION QT06.06: Ferromagnetic 2D Materials
Session Chairs: Angela Hight Walker and Liqin Ke
Monday Morning, May 23, 2022
QT06-Virtual

8:30 AM *QT06.06.01

Emergent 2D Ferromagnetism in MBE-Grown van der Waals Materials and Heterostructures Masaki Nakano^{1,2}; ¹University of Tokyo, Japan; ²RIKEN Center for Emergent Matter Science (CEMS), Japan

9:00 AM QT06.06.02

Room Temperature Ferromagnetism in Organic Molecule-Intercalated Fe_{2.7}GeTe₂ Hector Iturriaga¹, Luis Martinez¹, Johnathan A. Landeros¹, Angela Hight Walker², Thuc T. Mai², Cedomir Petrovic³, Sreeprasad Sreenivasan¹, Mohamed F. Sanad¹ and Srinivasa Rao Singamaneni¹; ¹The University of Texas at El Paso, United States; ²National Institute of Standards and Technology, United States; ³Brookhaven National Laboratory, United States

9:15 AM QT06.06.03

Evolution of the Magnetic Properties of Bulk Fe_{2.7}GeTe₂ van der Waals Crystals with the Application of Hydrostatic Pressure Rubyann Olmos, Johnathan A. Landeros and Srinivasa Rao Singamaneni; University of Texas at El Paso, United States

9:30 AM QT06.06.05

Proximity Control of Single Photon Emitting Heterointerfaces Steven T. Hartman and Ghanshyam Pilania; Los Alamos National Laboratory, United States

9:45 AM *QT06.06.06

Collective Excitations in Two-Dimensional Magnetic Atomic Crystals and Moiré Superlattices Probed by Magneto-Raman Spectroscopy Liuyan Zhao; University of Michigan, United States

SESSION QT06.07: Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures
Session Chairs: Liqin Ke and Srinivasa Rao Singamaneni
Monday Afternoon, May 23, 2022
QT06-Virtual

1:30 PM *QT06.07.01

Magnetic Imaging of Domain Walls and Surface Magnetism in Antiferromagnetic Topological Insulator MnBi₂Te₄ Paul M. Sass¹, Jinwoong Kim¹, Jiaqiang Yan², David Vanderbilt¹ and Weida Wu¹; ¹Rutgers University New Brunswick, United States; ²Oak Ridge National Laboratory, United States

2:00 PM QT06.07.03

Trigonal Symmetry Reduction and Correlation Effects in 2D Transition Metal Dihalides MX₂ and Trihalides MX₃ Alexandru Georgescu¹, Andrew Millis^{2,3} and James M. Rondinelli¹; ¹Northwestern University, United States; ²Flatiron Institute, United States; ³Columbia University, United States

2:15 PM *QT06.07.04

Exotic Magnons and Excitons in Quantum Two-Dimensional Magnets Probed by Terahertz and Optical Spectroscopies Jae Hoon Kim; Yonsei University, Korea (the Republic of)

2:45 PM QT06.07.05

Temperature-Dependent Raman Scattering, X-Ray Diffraction, and Magnetization Study of Phase Transitions in Layered Multiferroic CuCrP₂S₆ Michael A. Susner¹, Rahul Rao¹, Benjamin S. Conner¹, Bing Lv² and Benji Maruyama¹; ¹Air Force Research Laboratory, United States; ²The University of Texas at Dallas, United States

SESSION QT06.08: Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures II
Session Chairs: Liqin Ke and Srinivasa Rao Singamaneni
Monday Afternoon, May 23, 2022
QT06-Virtual

4:00 PM *QT06.08.01

A Multimodal Approach to Illuminating Spin-Lattice Coupling Pathways in Layered Magnets Haricharan Padmanabhan¹, Vladimir A. Stoica¹, Peter Kim², Maxwell Poore², Tiannan Yang¹, Xiaozhe Shen³, Alexander Reid³, Ming-Fu Lin³, Huaiyu Wang¹, Nathan Koocher⁴, Danilo Puggioni⁴, Seng Huat Lee¹, Aaron Lindenberg³, Zhiqiang Mao¹, Xijie Wang³, James M. Rondinelli⁴, Long-Qing Chen¹, Richard Averitt², John Freeland⁵ and Venkatraman Gopalan¹; ¹The Pennsylvania State University, United States; ²University of California San Diego, United States; ³SLAC National Laboratory, United States; ⁴Northwestern University, United States; ⁵Argonne National Laboratory, United States

4:30 PM *QT06.08.02

Exploring the Limits of Magnetism in Two-Dimensional Materials Elton J. Santos^{1,2,3}; ¹The University of Edinburgh, United Kingdom; ²Higgs Centre for Theoretical Physics, United Kingdom; ³Institute for Condensed Matter and Complex Systems, United Kingdom

5:00 PM QT06.06.04

Half-Metallic Ferromagnetism in Layered 2D vdW Material CdOHCl Induced by Hole Doping and Electric Field Hrishit Banerjee¹, Paolo Barone² and Silvia Picozzi²; ¹University of Cambridge, United Kingdom; ²Consiglio Nazionale delle Ricerche, Italy

##PAGE_BREAK##

SYMPOSIUM QT07

Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies
May 10 - May 24, 2022

Symposium Organizers

Chitraleema Chakraborty, University of Delaware

Jeffrey McCallum, University of Melbourne

Andre Schleife, University of Illinois at Urbana-Champaign

Bruno Schuler, Empa - Swiss Federal Laboratories for Materials Science and Technology

* Invited Paper

SESSION QT07.01: Quantum Emitters in Diamond
Session Chair: Andre Schleife
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 305B

8:30 AM *QT07.01.01

Point Defects in Semiconductors for Quantum Technologies Chris G. Van de Walle; University of California, Santa Barbara, United States

9:00 AM QT07.01.02

Hybrid Quantum Registers Based on Group IV Defects in Diamond Katharina Senkalla, Mathias Metsch, Petr Siyushev and Fedor Jelezko; Quantum Optics, Ulm University, Germany

9:15 AM QT07.01.03

Numerical Modeling of Multi-Defect Spin Dynamics in a Hyperfine Field Christopher Ciccarino and Prineha Narang; Harvard University, United States

9:30 AM QT07.01.04

Mechanical Control of a Single Nuclear Spin Benjamin Pingault^{1,2}, Smarak Maity¹, Graham Joe¹, Michelle Chalupnik¹, Daniel Assumpcao¹, Eliza Cornell¹, Linbo Shao¹ and Marko Loncar¹; ¹Harvard University, United States; ²Delft University of Technology, Netherlands

9:45 AM BREAK

10:30 AM *QT07.01.05

Spin Coherence and Control of Shallow Donors in Bulk ZnO and Single ZnO Nanowires Kai-Mei Fu; University of Washington, United States

11:00 AM QT07.01.06

Characterization of Color Centers Formed Under Extreme Conditions for Applications in Quantum Information Processing Arun Persaud¹, Wei Liu¹, Qing Ji¹, Jacopo Simoni¹, Vsevolod Ivanov¹, Liang Z. Tan¹, Walid Redjem², Boubacar Kante², Andrew A. Bettiol³ and Thomas Schenkel¹;

¹Lawrence Berkeley National Laboratory, United States; ²University of California Berkeley, United States; ³National University of Singapore, Singapore

11:15 AM QT07.01.07

Nanometer-scale Fabrication and Localization of Quantum Emitters in Diamond Yuqin Duan^{1,1}, Matthew Trusheim^{2,1}, Yu Yang³, Kevin C. Chen^{1,1} and Dirk Englund^{1,1}; ¹Massachusetts Institute of Technology, United States; ²U.S. Army Research Laboratory, United States; ³Raith America, Inc., United States

SESSION QT07.02: Spin Qubits in Silicon Carbide

Session Chairs: Adam Gali and Jeffrey McCallum

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 305B

1:30 PM *QT07.02.01

Creating Integrated Quantum Systems using Classical Silicon Carbide Devices David Awschalom^{1,2} and Christopher P. Anderson¹; ¹University of Chicago, United States; ²Argonne National Laboratory, United States

2:00 PM QT07.02.02

Electric-field Manipulation of Spin-defects in Ferroelectrics Katherine Inzani; The University of Nottingham, United Kingdom

2:15 PM QT07.02.03

Quantum Microscopy with a van der Waals Quantum Sensor Alex Healey¹, Sam Scholten¹, Tieshan Yang², Igor Aharonovich² and Jean-Philippe Tetienne³; ¹University of Melbourne, Australia; ²University of Technology Sydney, Australia; ³RMIT University, Australia

2:30 PM BREAK

SESSION QT07.03: Molecular Quantum Systems by Chemical Design

Session Chairs: Stephen Jesse and Jeffrey McCallum

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 305B

3:30 PM *QT07.03.01

Chemical Synthesis for the Creation of Atomically Precise Qubits Daniel Lorenza¹, Michael Wojnar¹, Sam Bayliss², Berk Diler², Peter Mintun², David Awschalom² and Danna E. Freedman¹; ¹Massachusetts Institute of Technology, United States; ²The University of Chicago, United States

4:00 PM QT07.03.02

Fundamental Mechanisms of Ultra-Low Loss Magnon Dynamics in Vanadium Tetracyanoethylene Donley Cormode¹, Hil Fung Harry Cheung², Huma Yusuf¹, Amanda Trout¹, Seth W. Kurfman¹, Michael A. Chilcote², Yueguang Shi³, Ellen Holmgren¹, Robert Claassen¹, Bryan Orozco¹, Andrew Franson¹, David McComb¹, Michael Flatté³, Gregory D. Fuchs² and Ezekiel Johnston-Halperin¹; ¹The Ohio State University, United States; ²Cornell University, United States; ³The University of Iowa, United States

4:15 PM QT07.03.03

Quantum Algorithms for the Dynamics of Molecular Quantum Systems Kade Head-Marsden and Princha Narang; Harvard University, United States

SESSION QT07.04: Poster Session: Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies

Session Chairs: Chitraleema Chakraborty, Jeffrey McCallum and Andre Schleife

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

QT07.04.01

Magnetic Spectroscopy of the Silicon Vacancy Center in Diamond Florian Frank and Fedor Jelezko; Ulm University, Germany

QT07.04.02

The Origin of Antibunching in Resonance Fluorescence Lukas Hanschke¹, Lucas Schweickert², Juan Camilo López Carreno³, Eva Schöll¹, Katharina Zeuner², Thomas Lettner², Eduardo Zubizarreta Casalengua³, Marcus Reindl⁴, Saimon Filipe Covre da Silva⁴, Rinaldo Trotta⁵, Jonathan J. Finley⁶, Armando Rastelli⁴, Elena del Valle^{3,7}, Fabrice Laussy³, Val Zwiller², Kai Müller⁶ and Klaus Jöns¹; ¹Paderborn University, Germany; ²KTH Royal Institute of Technology, Sweden; ³University of Wolverhampton, United Kingdom; ⁴Johannes Kepler Universität Linz, Austria; ⁵Sapienza Università di Roma, Italy; ⁶Technische Universität München, Germany; ⁷Universidad Autónoma de Madrid, Spain

QT07.04.03

Computational Modeling of Dyes for Excitonic Applications Austin Biaggne and Lan Li; Boise State University, United States

QT07.04.04

Active Space Wavefunction Methods for Defects in Solids [John P. Philbin](#)¹, Kade Head-Marsden¹, Christopher Ciccarino¹, Lukas Muechler² and Prineha Narang¹; ¹Harvard University, United States; ²Penn State University, United States

SESSION QT07.06: Integrated Diamond Photonic Waveguides
Session Chairs: Andre Schleife and Nick Vamivakas
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 305B

9:15 AM *QT07.06.01

Computational Materials Insights Into Solid-State Multiqubit Systems and Quantum Interfaces to Emitters at the Nanoscale [Prineha Narang](#); Harvard University, United States

9:45 AM QT07.06.02

Diamond Nanophotonic Structures for Quantum Spin-Photon Interfaces [Nina Codreanu](#), Maximilian T. Ruf, Julia Maria Brevoord, Richard Norte, Ronald Hanson and Simon Groeblacher; Delft University of Technology, Netherlands

10:00 AM QT07.06.03

Laser Inscription of Integrated Photonic Circuits in Diamond [Giulio Coccia](#)¹, Argyri N. Giakoumaki¹, Vibhav Bharadwaj¹, J. P. Hadden^{2,3}, Anthony Bennett^{3,3}, Belen Sotillo⁴, Paolo Olivero⁵, Reina Yoshizaki⁶, Paul E. Barclay², Alexander Kubanek^{7,7}, Roberta Ramponi¹ and Shane M. Eaton¹; ¹Politecnico di Milano, Italy; ²University of Calgary, Canada; ³Cardiff University, United Kingdom; ⁴Complutense University of Madrid, Spain; ⁵University of Torino, Italy; ⁶The University of Tokyo, Japan; ⁷Ulm University, Germany

10:15 AM BREAK

SESSION QT07.07: Quantum Emitters in 2D Transition Metal Dichalcogenides
Session Chairs: Igor Aharonovich and Jeffrey McCallum
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 305B

10:45 AM QT07.07.01

Resonance Fluorescence from Waveguide-Coupled Strain-Localized Two-Dimensional Quantum Emitters [Eva Schöll](#)^{1,2}, Carlos Errando-Herranz², Raphaël Picard³, Micaela Laini³, Samuel Gyger², Ali Elshaari², Art Branny², Ulrika Wennberg², Sebastian Barbat², Thibaut Renaud², Marc Sartison¹, Mauro Brotons i Gisbert³, Cristian Bonato³, Brian Gerardot³, Val Zwiller² and Klaus Jöns^{1,2}; ¹Paderborn University, Germany; ²KTH Royal Institute of Technology, Sweden; ³Heriot-Watt University, United Kingdom

11:00 AM QT07.07.02

Combined Theory and Scanning Tunnelling Experimental Study of Co-Filled Sulfur Vacancy in WS₂ Wei Chen¹, John C. Thomas², Antonio Rossi², Gian-Marco Rignanesi¹, Sinead M. Griffin², Archana Raja², Alexander Weber-Bargioni² and [Geoffroy Hautier](#)^{3,1}; ¹University Catholique de Louvain, Belgium; ²Lawrence Berkeley National Laboratory, United States; ³Dartmouth College, United States

SESSION QT07.08: Spin Qubits in Silicon Carbide from First Principles
Session Chairs: Kai-Mei Fu and Bruno Schuler
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 305B

1:30 PM *QT07.08.01

Quantum Emitters in Three- and Two-Dimensional Materials Péter Udvarhelyi¹, Song Li¹, Viktor Ivády^{2,3,4}, Gergo Thiering², David Beke^{2,5} and [Adam Gali](#)^{2,5}; ¹Hungarian Academy of Sciences, Hungary; ²Wigner Research Centre for Physics, Hungary; ³Linköping University, Sweden; ⁴Max Planck Institute for Solid State Research, Germany; ⁵Budapest University of Technology and Economics, Hungary

2:00 PM QT07.08.02

Optical Properties of Vacancy-Related Qubit Centers in SiC [Michel G. Bockstedte](#); Johannes Kepler University, Austria

2:15 PM QT07.08.03

First-Principles Study of Proton Irradiated Color Centers in 4H-SiC Mustafa Tobah^{1,2}, Cheng-Wei Lee^{1,3} and [Andre Schleife](#)¹; ¹University of Illinois at Urbana-Champaign, United States; ²University of Michigan–Ann Arbor, United States; ³Colorado School of Mines, United States

2:30 PM BREAK

SESSION QT07.09: Quantum Emitters in Boron Nitride
Session Chair: Bruno Schuler
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 305B

3:30 PM QT07.09.02

Harnessing the Emission from the Quantum Emitters at a Twisted Interface of Hexagonal Boron Nitride [Cong Su](#)^{1,2}, Salman Kahn², Shaul Aloni¹ and Alex Zettl^{2,1}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

SESSION QT07.10: Generating Atomically-Precise Defects in 2D Materials
Session Chairs: Ute Kaiser and Bruno Schuler
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 305B

8:30 AM *QT07.10.01

Building Quantum Defects with Atomic Precision Using the Scanning Transmission Electron Microscope [Stephen Jesse](#); Oak Ridge National Laboratory, United States

9:00 AM QT07.10.03

Impact of Multiple Donors on NV⁻ Centers in Quantum Diamond [Dane W. DeQuilettes](#)^{1,2}, Justin Mallek^{1,2}, Alexander Melville^{1,2}, Eden Price^{1,2}, Tom Osadchy^{1,2}, Linh Pham^{1,2}, Jennifer Schloss^{1,2} and Danielle Braje^{1,2}; ¹Massachusetts Institute of Technology, United States; ²Lincoln Laboratory, Massachusetts Institute of Technology, United States

9:30 AM BREAK

SESSION QT07.11: Solid-State Quantum Dot Emitters
Session Chairs: Chitrалеema Chakraborty and Weibo Gao
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 305B

10:00 AM QT07.11.01

Stimulated Generation of Indistinguishable Single Photons from a Quantum Ladder System Friedrich Sbresny¹, Lukas Hanschke¹, Eva Schöll², William Rauhaus¹, Bianca Scaparra¹, Katarina Boos¹, Eduardo Zubizarreta Casalengua^{3,4}, Elena del Valle^{3,4}, Jonathan J. Finley¹, Klaus Jöns² and [Kai Müller](#)¹; ¹Technical University of Munich, Germany; ²Paderborn University, Germany; ³University of Wolverhampton, United Kingdom; ⁴Universidad Autónoma de Madrid, Spain

10:15 AM QT07.11.02

Decoherence Dynamics of Hole Spin Qubits in Self-Assembled Quantum Dots Tobias Simmet¹, [Friedrich Sbresny](#)¹, William Rauhaus¹, Malte Kremser¹, Hubert Riedl¹, Nikolai Sinitsyn², Lukasz Cywinski³, Kai Müller¹ and Jonathan J. Finley¹; ¹Technische Universität München, Germany; ²Los Alamos National Laboratory, United States; ³Polish Academy of Sciences, Poland

10:30 AM QT07.11.04

A Markov Chain Monte Carlo Method for Statistically Meaningful Multi-Parameter Fits to Quantum Dot Spectroscopy Data [Prashant Ramesh](#)¹, Anagha Kulkarni¹, Weiwen Liu¹, Juan I. Climente², Hanz Y. Ramirez³, Allan Bracker⁴, Dan Gammon⁴, Ryan Zurakowski¹ and Matthew Doty¹; ¹University of Delaware, United States; ²Universitat Jaume I, Spain; ³Universidad Pedagógica y Tecnológica de Colombia, Colombia; ⁴U.S. Naval Research Laboratory, United States

SESSION QT07.12: Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies I
Session Chair: Chitrалеema Chakraborty
Monday Morning, May 23, 2022
QT07-Virtual

8:00 AM *QT07.12.01

Dynamic widefield imaging with Color Defects in Diamond [Kasturi Saha](#); IIT Bombay, India

8:30 AM QT07.12.02

Tailoring Quantum Oscillations of Excitonic Schrodinger's Cats as Qubits Amit Bhunia¹, Mohit K. Singh¹, Maryam A. Huwayz^{2,3}, Mohamed Henini² and [Shouvik Datta](#)¹; ¹IISER-Pune, India; ²University of Nottingham, United Kingdom; ³Princess Nourah Bint Abdulrahman University, Saudi Arabia

8:45 AM QT07.12.03

Structural and Optical Characterization of Erbium-doped Anatase TiO₂ Thin Films on LaAlO₃ (001) [Kida Shin](#)¹, Isaiah Gray², Frederick J. Walker¹, Jeff D. Thompson² and Charles H. Ahn¹; ¹Yale University, United States; ²Princeton University, United States

9:00 AM QT07.12.04

Strain-Effects on Magnetism in Multidefect Graphene Tengyuan Hao and [Zubaer M. Hossain](#); University of Delaware, United States

9:15 AM QT07.12.05

First Principle Characterization of the T-center — a Single Spin Quantum Emitter in Silicon [Oscar Balanacea-Lindvall](#)¹, Rohit Babar¹, Viktor Ivády^{1,2}, Rickard Armiento¹ and Igor A. Abrikosov¹; ¹Linköping University, Sweden; ²Max Planck Institute for the Physics of Complex Systems, Germany

SESSION QT07.13: Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies II
Session Chair: Andre Schleife

Monday Afternoon, May 23, 2022
QT07-Virtual

4:00 PM QT07.13.01

Fabrication of Aligned Top Gates for Atomic Scale Dopant Devices [Pradheep Namboodiri](#)¹, Jonathan Wyrick¹, Xiqiao Wang¹, Christopher Sherald², Fan Fei^{1,2}, Joseph Fox^{1,2}, Joshua Pomeroy¹ and Richard Silver¹; ¹National Institute of Standards and Technology, United States; ²University of Maryland, United States

4:15 PM QT07.13.03

Understanding how Substrate and Intermolecular Interactions Influence the Properties of Supported Polyoxometalate Spin Qubits [Grant E. Johnson](#), Oliva Primera-Pedrozo, Brian O'Callahan, Shuai Tan, Difan Zhang, Xuebin Wang, Wenjin Cao and Eric Baxter; Pacific Northwest National Laboratory, United States

4:30 PM *QT07.13.04

Diamond Surface Functionalization for Nanoscale Magnetic Resonance Imaging and Spectroscopy [Nathalie P. de Leon](#); Princeton University, United States

5:00 PM QT07.13.05

Electron Spin Decoherence Due to Phonons: Unified Many-Body Framework and First-Principles Calculations [Jinsoo Park](#)¹, Jin-Jian Zhou² and Marco Bernardi¹; ¹California Institute of Technology, United States; ²Beijing Institute of Technology, China

5:15 PM QT07.13.06

Polaron Effects on the Optical Properties of Semiconductor Based Spin-Photon Interfaces [Leonard Ruocco](#); The University of British Columbia, Canada

SESSION QT07.14: Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies III
Session Chairs: Qi Lim and Jeffrey McCallum
Monday Afternoon, May 23, 2022
QT07-Virtual

9:00 PM *QT07.14.01

Engineering Qubits in Silicon with Atomic Precision [Michelle Y. Simmons](#)^{1,2}; ¹University of New South Wales, Australia; ²Silicon Quantum Computing, Australia

9:30 PM QT07.14.02

Theoretical Study of Spin Decoherence in Transition Metal Dichalcogenides [Taejoon Park](#), Jaewook Lee, Huijin Park and Hosung Seo; Ajou University, Korea (the Republic of)

9:45 PM QT07.14.03

Decoherence of Nitrogen-Vacancy Spin Ensembles in Diamond in the Nitrogen Electron-Nuclear Spin Bath [Huijin Park](#)¹, Junghyun Lee², Sangwook Han², Sangwon Oh³ and Hosung Seo¹; ¹Ajou university, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of); ³Korea Research Institute of Standard and Science, Korea (the Republic of)

10:00 PM QT07.14.04

Extending the Coherence of Spin Qubits in Hexagonal Boron Nitride by Materials Engineering: A Cluster Expansion Theory Jaewook Lee, Huijin Park and [Hosung Seo](#); Ajou University, Korea (the Republic of)

SESSION QT07.15: Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies IV
Session Chair: Chitrleema Chakraborty
Tuesday Morning, May 24, 2022
QT07-Virtual

8:00 AM *QT07.15.01

Localized Excitons in Two-Dimensional Transitional Metal Dichalcogenides [Sudipta Dubey](#); IIT Kanpur, India

8:30 AM QT07.15.02

Antisite Defect Qubits in Monolayer Transition Metal Dichalcogenides [Jeng-Yuan Tsai](#)¹, Jinbo Pan², Hsin Lin³, Arun Bansil⁴ and Qimin Yan¹; ¹Temple University, United States; ²Chinese Academy of Sciences, China; ³Academia Sinica, Taiwan; ⁴Northeastern University, United States

8:45 AM QT07.15.03

The Role of Chalcogen Vacancies for Atomic Defect Emission in MoS₂ [Christoph Kastl](#)¹, Elmar Mitterreiter¹, Bruno Schuler², Julian Klein³, Daniel Hernangómez-Pérez⁴, Sivan Refaely-Abramson⁴, Jonathan J. Finley¹, Alexander Weber-Bargioni⁵ and Alexander W. Holleitner¹; ¹Technical University of Munich, Germany; ²Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ³Massachusetts Institute of Technology, United States; ⁴Weizmann Institute of Science, Israel; ⁵Lawrence Berkeley National Laboratory, United States

9:00 AM QT07.15.04

Creation of Single Photon Sources in WSe₂ Monolayers by Micrometer-Scaled Trenches [Xinxin Li](#)^{1,2}, Wei Wang² and Xuedan Ma^{2,1}; ¹The University of Chicago, United States; ²Argonne National Laboratory, United States

9:15 AM *QT07.15.05

Atomic Scale Imaging of Electron-Beam-Induced Structural, Chemical, and Number of Layer-Dependent Variations in 2D van der Waals Quantum Materials [Ute A. Kaiser](#); University of Ulm, Germany

9:45 AM QT07.01.08

Voltage-Induced Modulation in the Charge State of Si-Vacancy Defects in Diamond using High Voltage Nanosecond Pulses [Steve Cronin](#); Univ of Southern California, United States

##PAGE_BREAK##

SYMPOSIUM QT08

Group IV Quantum Engineering
May 9 - May 25, 2022

Symposium Organizers

Susan Coppersmith, University of New South Wales
Oussama Moutanabbir, Ecole Polytechnique de Montreal
Douglas Paul, University of Glasgow
Giordano Scappucci, TU Delft University of Technology

* Invited Paper

SESSION QT08.01: Si/SiGe Quantum Information Processing
Session Chairs: Susan Coppersmith and Oussama Moutanabbir
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 305A

8:00 AM *QT08.01.01

Valley and Qubit States in a Si/SiGe Quantum Dot with a Spatially-Modulated Ge Concentration [Mark A. Eriksson](#); Univ of Wisconsin-Madison, United States

8:30 AM *QT08.01.02

Tomography of Universal Two-Qubit Logic Operations in Exchange-Coupled Donor Electron Spin Qubits [Holly G. Stemp](#)¹, Serwan Asaad¹, Mark A. Johnson¹, Mateusz T. Madzik¹, Amber J. Heskes¹, Hannes R. Firgau¹, Arne Laucht¹, Kenneth M. Rudinger², Robin J. Blume-Kohout², Fay E. Hudson¹, Andrew S. Dzurak¹, Kohei M. Itoh³, Alexander M. Jakob⁴, Brett C. Johnson⁴, David N. Jamieson⁴ and Andrea Morello¹; ¹University of New South Wales, Australia; ²Sandia National Laboratories, United States; ³Keio University, Japan; ⁴The University of Melbourne, Australia

9:00 AM QT08.01.04

Field-Effect-Driven Synthetic Rashba Spin-Orbit Coupling in *n*-Si Metal-Oxide Semiconductor [Soobeom Lee](#)^{1,2}, Hayato Koike³, Minori Goto⁴, Shinji Miwa⁴, Yoshishige Suzuki⁴, Naoto Yamashita¹, Ryo Ohshima¹, Ei Shigematsu¹, Yuichiro Ando¹ and Shiraishi Masashi¹; ¹Kyoto University, Japan; ²Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of); ³TDK Corporation, Japan; ⁴Osaka University, Japan

9:15 AM QT08.01.05

Transition Metal Impurities in Silicon—A Computation Search for Semiconductor Qubits [Cheng-Wei Lee](#)^{1,2}, Meenakshi Singh¹, Adele Tamboli^{2,1} and Vladan Stevanovic^{1,2}; ¹Colorado School of Mines, United States; ²National Renewable Energy Laboratory, United States

9:30 AM BREAK

SESSION QT08.02: Superconducting Quantum Information Processing
Session Chair: Mark Eriksson
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 305A

10:30 AM *QT08.02.01

Tuning Andreev Bound States Using a Quantum Dot Embedded in a Superconducting Qubit [Angela Kou](#); University of Illinois at Urbana-Champaign, United States

11:00 AM *QT08.02.02

Enhancing Coherence Properties of Superconducting Quantum Circuits via Materials Engineering Yvonne Gao; National University of Singapore, Singapore

11:30 AM QT08.02.03

Superconducting Proximity Effect in Planar Germanium Alberto Tosato¹, Vukan Levajac¹, Ji-Yin Wang¹, Casper Boor¹, Francesco Borsoi¹, Amir Sammak^{1,2}, Menno Veldhorst¹ and Giordano Scappucci¹; ¹QuTech, Netherlands; ²TNO, Netherlands

11:45 AM QT08.02.04

Fabrication of Aluminum-Silicon-Aluminum Junctions on Si Fins—Towards Fin Based Merged Element Transmons – FinMET Aranya Goswami¹, Anthony P. McFadden², Hadass Inbar¹, Ruichen Zhao^{2,3}, Corey R. McRae^{2,3}, David Pappas^{2,4} and Chris Palmstrom¹; ¹University of California, Santa Barbara, United States; ²National Institute of Standards and Technology, United States; ³University of Colorado Boulder, United States; ⁴Rigetti Computing, United States

SESSION QT08.03: Photonic Quantum Information Techniques

Session Chairs: Yvonne Gao and Angela Kou

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 305A

1:30 PM *QT08.03.01

Ge-on-Si Single-Photon Avalanche Diode Detectors for Short-Wave Infrared Wavelengths Gerald Buller¹, Fiona Thorburn¹, Xin Yi¹, Zoe Greener¹, Laura Huddleston¹, Jaroslav Kirdoda², Bhavana Benakaprasad², Derek D. Dumas², Conor Coughlan², Scott Watson², Ross W. Millar² and Douglas Paul²; ¹Heriot-Watt University, United Kingdom; ²University of Glasgow, United Kingdom

2:00 PM QT08.03.02

First Principles Study of the T-Center in Silicon Diana F. Dahliah¹, Yihuang Xiong², Sinead M. Griffin³, Alp Sipahigil⁴ and Geoffroy Hautier²; ¹Université Catholique de Louvain, Belgium; ²Dartmouth College, United States; ³Lawrence Berkeley National Laboratory, United States; ⁴University of California, Berkeley, United States

2:15 PM BREAK

SESSION QT08.04: Semiconductor Quantum Information Techniques

Session Chairs: Gerald Buller and Holly Stemp

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 305A

2:45 PM QT08.04.01

Atomic Precision Patterning and Alignment for Dopant-Based Quantum Devices James H. Owen, Ehud Fuchs, Robin Santini and John Randall; Zyvex Labs LLC, United States

3:00 PM QT08.04.02

Electric-Dipole Spin Resonance for Light-Holes in Germanium Quantum Well Patrick Del Vecchio and Oussama Moutanabbir; Polytechnique Montréal, Canada

3:15 PM QT08.04.03

Molecular Beam Epitaxy Grown SiGe Heterostructures for Ge Based Quantum Devices Chomani K. Gaspe and Christopher J. Richardson; Laboratory for Physical Sciences, United States

3:30 PM QT08.04.04

Magnetotransport Characterization of P-Type, Gated Ge Quantum Wells Grown by Molecular Beam Epitaxy with Epitaxial Al Contacts Joshua P. Thompson^{1,2}, Chomani K. Gaspe², Mehdi Hatefipour³, William M. Strickland³, Javad Shabani³, Hugh O. Churchill^{1,2,4} and Christopher J. Richardson²; ¹University of Arkansas, United States; ²Laboratory for Physical Sciences, United States; ³New York University, United States; ⁴SAIC, Inc, United States

SESSION QT08.05: Group IV Quantum Engineering

Session Chair: Oussama Moutanabbir

Wednesday Morning, May 25, 2022

QT08-Virtual

8:00 AM *QT08.05.01

Germanium Heterostructures Hosting Spin Qubit and High-Transparency JoFET Devices Andrea Hofmann^{1,2}; ¹Universität Basel, Switzerland; ²IST Austria, Austria

8:30 AM *QT08.05.02

Broad Diversity of Near-Infrared Single-Photon Emitters in Silicon Anais Dreau; CNRS & University of Montpellier, France

9:00 AM *QT08.05.03

First-Principles Hyperfine Tensors and Pseudospin-Electric Coupling for Holes in GaAs and Silicon [Stefano Chesi](#)¹, Pericles Philippopoulos², Dimitrie Culcer³ and William A. Coish⁴; ¹Beijing Computational Science Research Center, China; ²Nanoacademic Technologies, Canada; ³University of New South Wales, Australia; ⁴McGill University, Canada

9:30 AM *QT08.01.03

Quantum Information Processing Using Dopants in Silicon MOS Compatible Devices [Eva Dupont-Ferrier](#)^{1,2}; ¹Université de Sherbrooke, Canada; ²Institut Quantique, Canada

##PAGE_BREAK##

SYMPOSIUM QT09

Light-Matter Strong Coupling in the Infrared and THz—Materials, Methods and New Phenomena
May 11 - May 25, 2022

Symposium Organizers

Hatice Altug, École Polytechnique Fédérale de Lausanne
Lauren Buchanan, Vanderbilt University
Joshua Caldwell, Vanderbilt University
Thomas Folland, University of Iowa

* Invited Paper

SESSION QT09.01: Poster Session: Light-Matter Strong Coupling in the Infrared and THz—Materials, Methods and New Phenomena
Session Chairs: Hatice Altug and Lauren Buchanan
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

QT09.01.01

Vibrational Strong Coupling in Nanoscale Hyperbolic Phonon Polariton Cavities [Alisa Shmidt](#)^{1,1}, Lindsey Miller¹, Joseph R. Matson¹, Thomas G. Folland², Joshua D. Caldwell¹ and Lauren Buchanan¹; ¹Vanderbilt University, United States; ²The University of Iowa, United States

QT09.01.02

Exploring the Effects of Vibrational Strong Coupling on Supramolecular Chemistry—Perylene Crystallization in a Fabry-Perrot Cavity [Federico Modesti](#)¹, Kripa M. Joseph², Thomas Ebbesen² and Peter Erk³; ¹BASF SE, Germany; ²University of Strasbourg, France; ³erConTec GmbH, Germany

SESSION QT09.02: Vibrational Strong Coupling
Session Chairs: Lauren Buchanan and Joshua Caldwell
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 305A

1:30 PM *QT09.02.01

Semi-Empirical Quantum Optics for Mid-Infrared Molecular Nanophotonics [Felipe Herrera](#); Universidad de Santiago de Chile, Chile

2:00 PM QT09.02.02

Vibrational Strong Coupling in Direct Laser Printed Plasmonic MIM Nanopatch Antennas [Nicholas Proscia](#)¹, Michael A. Mecker^{1,2}, Nicholas Sharac¹, Frank K. Perkins¹, Chase Ellis¹, Paul D. Cunningham¹ and Joseph Tischler^{1,3}; ¹U.S. Naval Research Laboratory, United States; ²Advanced Science Research Center, CUNY, United States; ³The University of Oklahoma, United States

2:15 PM QT09.02.03

The Investigation of Polariton Reflection Phase in Hexagonal Boron Nitride [Siyuan Dai](#); Auburn University, United States

2:30 PM BREAK

3:00 PM *QT09.02.05

Molecular Polaritons—Modulation, Impact on Chemistry and Modeling Their Density of States [Blake S. Simpkins](#), Wonmi Ahn, Igor Vurgaftman,

Jeremy Pietron, Kenan Fears, Adam Dunkelberger and Jeff Owrutsky; Naval Research Laboratory, United States

3:30 PM QT09.02.06

Cavity-Modified Unimolecular Dissociation Reactions via Intramolecular Vibrational Energy Redistribution [Derek Wang](#)¹, Tomas Neuman², Susanne Yelin¹ and Johannes Flick³; ¹Harvard University, United States; ²Institut de physique et de chimie des Matériaux de Strasbourg, France; ³Flatiron Institute, United States

3:45 PM *QT09.02.08

Vibrational Polaritonics: Nonlinear Optics and Prospects of Condensation [Joel Yuen-Zhou](#); University of California, San Diego, United States

SESSION QT09.03: Electronic Strong Coupling
Session Chairs: Lauren Buchanan and Joshua Caldwell
Friday Morning, May 13, 2022
Hawai'i Convention Center, Level 3, 305A

8:30 AM QT09.03.01

Highly Non-Linear Interlayer Exciton-Polaritons in Bilayer MoS₂ [Biswajit Datta](#)¹, Mandeep Khatoniar¹, Prathmesh Deshmukh¹, Rezlind Bushati¹, Simone De Liberato², Stephane Kena Cohen³ and Vinod Menon¹; ¹City university of New York, United States; ²University of Southampton, United Kingdom; ³Ecole Polytechnique de Montreal, Canada

8:45 AM QT09.03.02

Cooperativity and Ultrastrong Coupling in Terahertz Metasurfaces [Zizwe Chase](#)¹, Riad Yahiaoui¹, Fuyang Tay², Andrey Baydin², Timothy Noe³, Junyeob Song⁴, Junichiro Kono², Amit Agrawal⁴, Motoaki Bamba⁵ and Thomas Searles¹; ¹University of Illinois at Chicago, United States; ²Rice University, United States; ³Los Alamos National Laboratory, United States; ⁴National Institute of Standards and Technology, United States; ⁵Kyoto University, Japan

9:00 AM *QT09.03.03

Singlet Fission Dynamics Under Strong Light-Matter Coupling [Clàudia Climent](#)¹, David Casanova², Johannes Feist³ and Francisco J. Garcia-Vidal³; ¹University of Pennsylvania, United States; ²Donostia International Physics Center, Spain; ³Universidad Autónoma de Madrid, Spain

9:30 AM BREAK

10:00 AM QT09.03.04

Nonequilibrium Spin-Orbital Dynamics in Mott Insulator YTiO₃ [Jonathan Curtis](#)¹, Michael Fechner², Ankit Disa², Andrea Cavalleri² and Prineha Narang¹; ¹Harvard University, United States; ²Max Planck Institute for the Structure and Dynamics of Matter, Germany

10:15 AM *QT09.03.05

Exciton-Polaritons in 2D Semiconductors [Vinod Menon](#)^{1,2}; ¹The City College of New York, United States; ²CUNY Graduate Center, United States

SESSION QT09.04: Strong Coupling and Nanoscale Cavities
Session Chairs: Lauren Buchanan and Joshua Caldwell
Friday Afternoon, May 13, 2022
Hawai'i Convention Center, Level 3, 305A

1:30 PM *QT09.04.01

Ultrastrong Coupling Phenomena in Extreme-Scale Resonant Nanocavities Sang-Hyun Oh¹ and [Mingze He](#)²; ¹Univ of Minnesota-Twin Cities, United States; ²Vanderbilt University, United States

2:00 PM QT09.04.02

Development of an On-Chip THz Spectrometer with Metamaterial Waveguides [James Seddon](#) and Cyril Renaud; University College London, United Kingdom

2:15 PM *QT09.04.03

Ultrastrong Light-Matter Coupling—Engineering Electronic Wavefunctions with Single Photons [Simone De Liberato](#); University of Southampton, United Kingdom

SESSION QT09.05: Light-Matter Strong Coupling in the Infrared and THz—Materials, Methods and New Phenomena
Session Chair: Thomas Folland
Wednesday Afternoon, May 25, 2022
QT09-Virtual

4:00 PM *QT09.05.01

Enhanced Interactions Between Exciton-Polaritons in Semiconductor Microcavities [Meera Parish](#); Monash University, Australia

4:30 PM *QT09.02.04

Nanoparticle Supercrystals for (Ultra)Strong Light-Matter Coupling [Stephanie Reich](#)¹, Niclas S. Mueller¹, Emanuel Pfizner¹, Joachim Heberle¹, Florian Schulz² and Holger Lange²; ¹Freie Universitaet Berlin, Germany; ²Universität Hamburg, Germany

5:00 PM QT09.05.03

Strong Light-Matter Interaction and Its Applications in Nonlinear and Quantum Optics [Davis Dave Welakuh Mbangheku](#) and [Princha Narang](#); Harvard School of Engineering, United States

5:15 PM QT09.05.04

Adiabatic Compression of Mid-IR Through THz Light in Diamond-Metal Campanile Probe for Ultrawide Spectral Range Nanospectroscopy [Rajasekhar Medapalli](#)¹, [Khushboo Agarwal](#)¹, [Rostislav Mikhaylovskiy](#)¹, [Samuel Jarvis](#)¹, [Sergey Kafanov](#)¹, [Nigel J. Fullwood](#)² and [Oleg V. Kolosov](#)¹; ¹Lancaster University, United Kingdom; ²Lancaster University, UK, United Kingdom

5:30 PM *QT09.05.02

Excitons and Polaritons in van der Waals Heterostructures [Hui Deng](#); Univ of Michigan, United States

##PAGE_BREAK##

SYMPOSIUM QT10

Emerging Phenomena in Moiré Materials
May 10 - May 23, 2022

Symposium Organizers

[Dmitri Efetov](#), Institut de Ciències Fotòiques
[Jia Leo Li](#), Brown University
[Giulia Pacchioni](#), Nature Reviews Materials
[Matthew Yankowitz](#), University of Washington

* Invited Paper

SESSION QT02.02/QT10.03: Joint Session: Emerging Phenomena in Moiré Graphene Systems
Session Chairs: [Ryan Need](#) and [Giulia Pacchioni](#)
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 305A

8:00 AM *QT02.02/QT10.03.01

Superconductivity at Magnetic Phase Transitions in Crystalline Graphene Allotropes [Andrea F. Young](#); University of California, Santa Barbara, United States

8:30 AM *QT02.02/QT10.03.02

Correlated Electron States in Twisted Multilayer Graphene [Philip Kim](#); Harvard University, United States

9:00 AM *QT02.02/QT10.03.03

Correlations, Topology and Unconventional Superconductivity in Magic Angle Twisted Bilayer Graphene [Ali Yazdani](#); Princeton University, United States

10:00 AM BREAK

SESSION QT10.01: Magnetism and Symmetry Breaking in Moiré Systems
Session Chair: [Matthew Yankowitz](#)
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 305A

9:00 AM QT10.01.02

Twisted Bilayer Dirac Spin Liquid [Zhu-Xi Luo](#)¹, [Urban F. Seifert](#)¹ and [Leon Balents](#)^{1,2}; ¹University of California, Santa Barbara, United States; ²Canadian Institute for Advanced Research, Canada

9:15 AM BREAK

9:45 AM *QT10.05.01

The Magic of Moiré Quantum Matter Pablo Jarillo-Herrero; MIT, United States

SESSION QT10.02: Moiré Phenomena in Transition Metal Dichalcogenides

Session Chairs: Jia Leo Li and Matthew Yankowitz

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 305A

1:30 PM QT10.02.01

Twist Angle Controls Interlayer Exciton Lifetimes in van der Waals Heterostructures Junho Choi¹, Matthias Florian^{2,3}, Alexander Steinhoff², Daniel Erben², Kha Tran¹, Liuyang Sun¹, Jiamin Quan¹, Robert Claassen¹, Somak Majumder⁴, Jennifer Hollingsworth⁴, Takashi Taniguchi⁵, Kenji Watanabe⁵, Keiji Ueno⁶, Akshay Singh⁷, Galan Moody⁸, Frank Jahnke² and Xiaoqin E. Li¹; ¹The University of Texas at Austin, United States; ²University of Bremen, Germany; ³University of Michigan—Ann Arbor, United States; ⁴Los Alamos National Laboratory, United States; ⁵National Institute for Materials Science, Japan; ⁶Saitama University, Japan; ⁷Indian Institute of Science, India; ⁸University of California, Santa Barbara, United States

1:45 PM QT10.02.02

Moiré-Localized Interlayer Exciton Visualized by Time- and Angle-Resolved Photoemission Spectroscopy Ouri Karni¹, Elyse Barre¹, Vivek Pareek², Johnathan Georgaras¹, Michael K. Man², Chakradhar Sahoo², David Bacon², Xing Zhu², Henrique B. Ribeiro¹, Adian L. O'Beirne¹, Jenny Hu¹, Abdullah Al-Mahboob², Mohamed Abdelrasoul², Nicholas Chan², Arka Karmakar², Andrew Winchester², Bumho Kim³, Kenji Watanabe⁴, Takashi Taniguchi⁴, Katayun Barmak³, Julien Madeo², Felipe H. da Jornada¹, Tony F Heinz¹ and Keshav M. Dani²; ¹Stanford University, United States; ²Okinawa Institute of Science and Technology, Japan; ³Columbia University, United States; ⁴National Institute for Materials Science, Japan

2:00 PM QT10.02.03

Pressuring-Tuning of Moiré Phonons in MoS₂/WSe₂ Heterostructures Luiz G.P Martins¹, David A. Ruiz-Tijerina², Connor A. Occhialini¹, Matheus J. Matos³, Ji-Hoon Park¹, Qian Song¹, Ang-Yu Lu¹, Mário S. Mazzoni⁴, Pedro Venezuela², Jing Kong¹ and Riccardo Comin¹; ¹MIT, United States; ²Universidad Nacional Autónoma de México, Mexico; ³Universidade Federal de Ouro Preto, Brazil; ⁴Universidade Federal de Minas Gerais, Brazil; ⁵Universidade Federal Fluminense, Brazil

2:15 PM QT10.02.04

Visualizing Moiré Excitons in WS₂/WSe₂ Heterostructures Using Low-Loss EELS Sandhya Susarla¹, Daria Blach², Mit H. Naik³, Zhenglou Li³, Johan Carlstroem¹, Takashi Taniguchi⁴, Kenji Watanabe⁴, Libai Huang², Felipe H. da Jornada⁵, Ramamoorthy Ramesh³, Steven Louie³, Peter Ercius¹ and Archana Raja¹; ¹Lawrence Berkeley National Laboratory, United States; ²Purdue University, United States; ³University of California, Berkeley, United States; ⁴National Institute for Materials Science, Japan; ⁵Stanford University, United States

2:30 PM *QT10.02.05

Twisted van der Waals Heterostructures with Real Time Control Cory Dean; Columbia University, United States

SESSION QT10.04: Imaging and Characterization

Session Chairs: Jonah Herzog-Arbeitman and Giulia Pacchioni

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 305A

10:30 AM QT10.04.02

Twist Angle Dependent Strain Distribution in Stacked Transition Metal Dichalcogenide and Charge Density Mapping Yunyeong Chang¹, Ayoung Yuk², Hyobin Yoo² and Miyoung Kim¹; ¹Seoul National University, Korea (the Republic of); ²Sogang University, Korea (the Republic of)

10:45 AM *QT10.04.04

Electron Correlation and Coupling with Phonon in an ABC Trilayer Graphene/hBN Moire Superlattice Long Ju; Massachusetts Institute of Technology, United States

SESSION QT10.05: Superconductivity in Moiré Systems

Session Chair: Bogdan Bernevig

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 305A

8:30 AM QT10.05.02

Probing Superconductivity in Magic Angle Twisted Trilayer Graphene with Artificial Josephson Junctions Zeyu Hao¹, Andrew Zimmerman¹, Yuval Ronen¹, Danial Haei Najafabadi¹, Kenji Watanabe², Takashi Taniguchi² and Philip Kim¹; ¹Harvard University, United States; ²National Institute for Materials Science (NIMS), Japan

8:45 AM QT10.05.03

Twisted Bilayer Graphene at 2 π Flux—Magnetic Bloch Theorem and Reentrant Correlated Insulators Jonah Herzog-Arbeitman¹, Aaron Chew¹, Dmitri Efetov² and Bogdan A. Bernevig^{1,3,4}; ¹Princeton University, United States; ²ICFO - Institut de Ciències Fòniques, Spain; ³Donostia Physics Center, Spain; ⁴IKERBASQUE, Spain

9:00 AM *QT10.05.04

Evidence for Flat Band Dirac Superconductor Originating from Quantum Geometry Chun Ning (Jeanie) Lau; The Ohio State University, United States

States

9:30 AM *QT10.05.05

Collective Charge Fluctuations and Superconductivity in Twisted Bilayer Graphene and Related Materials Francisco Guinea; IMDEA Materials Institute, Spain

SESSION QT10.06: Emerging Phenomena in Moiré Systems I

Session Chair: Giulia Pacchioni

Monday Morning, May 23, 2022

QT10-Virtual

8:00 AM *QT10.06.01

Imaging Chern Mosaic and Berry-Curvature Magnetism in Magic-Angle Graphene Sameer Grover¹, Matan Bocarsly¹, Aviram Uri¹, Petr Stepanov², Giorgio Di Battista², Indranil Roy¹, Jiewen Xiao¹, Alexander Meltzer¹, Yuri Myasoedov¹, Keshav Pareek¹, Kenji Watanabe³, Takashi Taniguchi³, Binghai Yan¹, Ady Stern¹, Erez Berg¹, Dmitri Efetov² and Eli Zeldov¹; ¹Weizmann Institute of Science, Israel; ²ICFO–The Institute of Photonic Sciences, Spain; ³NIMS, Japan

8:30 AM *QT10.06.02

Quantum Anomalous Hall Effect in Semiconductor Moiré Structures Jie Shan; Cornell University, United States

9:00 AM QT10.06.04

Spectroscopy of Twisted Bilayer Graphene Correlated Insulators Dumitru Calugaru¹, Nicolas Regnault¹, Myungchul Oh¹, Kevin P. Nuckolls¹, Dillon Wong¹, Ryan L. Lee¹, Ali Yazdani¹, Oskar Vafek^{2,3} and Bogdan A. Bernevig^{1,4,5}; ¹Princeton University, United States; ²National High Magnetic Field Laboratory, United States; ³Florida State University, United States; ⁴Donostia International Physics Center, Spain; ⁵IKERBASQUE, Spain

SESSION QT10.07: Emerging Phenomena in Moiré Systems II

Session Chair: Jia Leo Li

Monday Morning, May 23, 2022

QT10-Virtual

10:30 AM *QT10.07.01

From Strong Coupling Superconductivity to Fractionalization in Moire Materials Ashvin Vishwanath; Harvard University, United States

11:00 AM *QT10.07.02

Flavor Ferromagnetism and Superconductivity in Graphene Multilayers Allan MacDonald; The University of Texas at Austin, United States

11:30 AM QT10.04.01

Measuring Local Structural Distortions and Interlayer Spacings of 2D Moiré Materials by Interferometric 4D-STEM Michael Zachman¹, Jacob Madsen², Xiang Zhang³, Pulickel Ajayan³, Toma Susi² and Miaofang Chi¹; ¹Oak Ridge National Laboratory, United States; ²University of Vienna, Austria; ³Rice University, United States

##PAGE_BREAK##

SYMPOSIUM QT11

Superconducting Materials and Applications

May 9 - May 24, 2022

Symposium Organizers

Valeria Braccini, CNR - SPIN

Kazumasa Iida, Nagoya Univ

Qiang Li, Stony Brook University/Brookhaven National Laboratory

Paolo Mele, Shibaura Institute of Technology

* Invited Paper

SESSION QT11.02: Novel Superconductors
Session Chairs: Genda Gu and Jeong Min Park
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 304A

1:30 PM *QT11.02.01

Superconductivity Near a Polar Instability in Incipient Ferroelectrics Kaveh Ahadi; North Carolina State University, United States

2:00 PM QT11.02.02

Double Dome Superconductivity in Kagome Metal $CsV_3Sb_5Sn_x$ Yuzki M. Oey, Brenden Ortiz, Farnaz Kaboudvand, Ram Seshadri and Stephen Wilson; UC Santa Barbara, United States

2:15 PM QT11.02.03

Controllable Phase Slips in 3D Superconducting Diamond Microstructures Georgina M. Klemencic¹, David Perkins², Jonathan Fellows³, Chris Muirhead², Rob Smith², Soumen Mandal¹, Scott Manifold¹, Majdi Salman¹, Sean Giblin¹ and Oliver A. Williams¹; ¹Cardiff University, United Kingdom; ²University of Birmingham, United Kingdom; ³University of Bristol, United Kingdom

2:30 PM BREAK

3:00 PM QT11.02.05

High Magnetic Field Probe of Novel Hydride Superconductors Fedor Balakirev¹, Dan Sun¹, Vasily Minkov², Shirin Mozaffari³, Luis Balicas³ and Mikhail Erements²; ¹Los Alamos National Laboratory, United States; ²Max-Planck Institute for Chemistry, Germany; ³National High Magnetic Field Laboratory, United States

SESSION QT11.03: Topological Superconductors, Theory and Electronics
Session Chairs: Kaveh Ahadi and Qiang Li
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 304A

8:30 AM *QT11.03.01

The Magic Family of Twisted Graphene Superlattices Jeong Min Park; Massachusetts Institute of Technology (MIT), United States

9:00 AM *QT11.03.03

Searching for Ideal Topological Crystalline Insulators and Topological Superconductors in Pb-Sn-In-Te System Genda Gu, Qiang Li and Jhon Tranquada; BNL, United States

9:30 AM QT11.03.05

On Dimer Fluctuations and Phase Separation at the Dimer-Superconductor Transition in $Ir_{1-x}(Pt/Rh)_xTe_2$ Emil Bozin¹, Runze Yu¹, Soham Banerjee^{1,2}, Hechang Lei¹, Ryan Sinclair³, Milinda Abeykoon¹, Haidong Zhou³, Cedimir Petrovic¹ and Zurab Guguchia^{1,2}; ¹Brookhaven National Laboratory, United States; ²Columbia University, United States; ³The University of Tennessee, Knoxville, United States

SESSION QT11.05: Nickelates Superconductors
Session Chairs: Harold Hwang and Jacques Noudem
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 304A

2:00 PM *QT11.05.01

Superconductivity in Infinite-Layer Nickelates Harold Y. Hwang^{1,2}; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

2:30 PM QT11.05.02

Superconducting Quintuple-Layer Square-Planar Nickelates—Superconducting and Electronic Properties (Part I) Grace A. Pan¹, Dan Ferenc Segedin¹, Harrison LaBollita², Qi Song¹, Emilian Nica², Berit H. Goodge³, Andrew T. Pierce¹, Spencer Doyle¹, Steve Novakov⁴, Denisse Córdova Carrizales¹, Alpha T. N'Diaye⁵, Padraic Shafer⁵, Hanjong Paik³, John Heron⁴, Jarad A. Mason¹, Amir Yacoby¹, Lena Kourkoutis³, Onur Erten², Charles M. Brooks¹, Antia S. Botana² and Julia Mundy¹; ¹Harvard University, United States; ²Arizona State University, United States; ³Cornell University, United States; ⁴University of Michigan—Ann Arbor, United States; ⁵Lawrence Berkeley National Laboratory, United States

2:45 PM QT11.05.03

Superconducting Quintuple-Layer Square-Planar Nickelates—Synthetic Strategies and Challenges (Part II) Dan Ferenc Segedin, Grace A. Pan, Spencer Doyle, Jarad A. Mason and Julia Mundy; Harvard University, United States

3:00 PM BREAK

3:30 PM QT11.05.04

Crystallinity Improvements in Infinite-Layer Nickelates—A Look at the Intrinsic Superconducting Phase Diagram Kyuhoo Lee¹, Motoki Osada¹, Bai Yang Wang¹, Berit H. Goodge², Yonghun Lee¹, Woojin Kim¹, Tiffany C. Wang¹, Lena Kourkoutis² and Harold Y. Hwang¹; ¹Stanford University, United States; ²Cornell University, United States

3:45 PM QT11.05.05

Revealing the Role of the Interface for Superconductivity in Infinite-Layer Nickelate Films [Berit H. Goodge](#)^{1,1}, Benjamin Geisler², Kyuho Lee^{3,4}, Motoki Osada^{3,4}, Bai Yang Wang^{3,4}, Danfeng Li^{3,5}, Harold Y. Hwang^{3,4}, Rossitza Pentcheva² and Lena Kourkoutis^{1,1}; ¹Cornell University, United States; ²University of Duisburg-Essen, Germany; ³SLAC National Accelerator Laboratory, United States; ⁴Stanford University, United States; ⁵City University of Hong Kong, China

SESSION QT11.06: Poster Session: Superconductivity

Session Chairs: Valeria Braccini and Paolo Mele

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

QT11.06.01

The Hydrogenated Palladium-Gold Amorphous Alloys—An *Ab Initio* Computer Simulation of Their Structural and Electronic Properties [Alejandro de León Piña](#), Renela M. Valladares, David Hinojosa-Romero, Isaías Rodríguez, Salvador Villarreal and Ariel A. Valladares; Universidad Nacional Autónoma de México, Mexico

QT11.06.02

Superconductivity in Amorphous Bismuth at Negative Pressures [Flor B. Quiroga Bañuelos](#)¹, David Hinojosa-Romero¹, Isaías Rodríguez¹, Alexander Valladares², Renela M. Valladares² and Ariel A. Valladares¹; ¹Instituto de Investigaciones en Materiales, UNAM, México, Mexico; ²Facultad de Ciencias, UNAM, Mexico

QT11.06.03

Ultrafast Light-Induced Lifshitz Transition in High T_c Superconductor Cuprates Ji Dai, [Lukas Hellbrück](#), Michele Puppini, Alberto Crepaldi, Edoardo Martino, Yong Liu, Arnaud Magrez, László Forró, Marco Grioni, Siham Benhabib and Fabrizio Carbone; École Polytechnique Fédérale de Lausanne, Switzerland

QT11.06.04

A McMillan Approach to the Superconductivity of Computer Simulated Amorphous Cu_xZr_{1-x} Alloys [Salvador Villarreal](#)¹, Isaías Rodríguez¹, David Hinojosa-Romero¹, Renela M. Valladares², Alexander Valladares² and Ariel A. Valladares¹; ¹Instituto de Investigaciones en Materiales, UNAM, Mexico; ²Facultad de Ciencias, UNAM, Mexico

QT11.06.05

Magnetotransport Measurements of Superconducting CaMg₂-H at High Pressure [Krista L. Sawchuk](#)¹, Vasily Minkov², Mikhail Erements², Boris Maiorov¹ and Fedor Balakirev¹; ¹Los Alamos National Laboratory, United States; ²Max Plank Institute for Chemistry, Germany

QT11.06.06

Superconducting Ground State of the Topological Superconducting Candidates TixX (X = Ir, Sb) [Manasi Mandal](#)^{1,2} and Ravi Prakash Singh²; ¹Massachusetts Institute of Technology, United States; ²Indian Institute of Science Education and Research Bhopal, India

QT11.06.07

Superconductivity Induced in WB2 by the Formation of Metastable Planar Defects [Ajinkya Hire](#)^{1,1}, Jinhyuk Lim¹, Yundi Quan^{1,1,1}, Jung Soo Kim¹, Stephen R. Xie^{1,1}, Ravhi S. Kumar², Dmitry Popov³, Changyong Park³, Russell J. Hemley^{2,2}, James J. Hamlin¹, Richard Hennig^{1,1}, Peter J. Hirschfeld¹ and Gregory R. Stewart¹; ¹University of Florida, United States; ²University of Illinois at Chicago, United States; ³Argonne National Laboratory, United States

SESSION QT11.07: High-Tc Superconductors Applications

Session Chairs: Andrea Malagoli and Martin Rupich

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 304A

8:30 AM *QT11.07.01

Behavior of Bi-2212 Wires Above Liquid Helium Temperature—Critical Current, Irreversibility Field and Filaments Coupling [Andrea Malagoli](#)¹, Alessandro Leveratto¹, Achille Angrisani Armenio², Andrea Traverso^{1,3}, Gianluca De Marzi² and Giuseppe Celentano²; ¹CNR-SPIN, Italy; ²ENEA, CR Frascati, Italy; ³University of Genova, Italy

9:00 AM *QT11.07.02

Research, Development and Commercialization of Coated Conductors by SuperOx [Sergey Lee](#); SuperOx Japan LLC, Japan

9:30 AM *QT11.07.03

Second Generation Wire Development at AMSC [Martin W. Rupich](#)¹, Vyacheslav Solovyov², Qiang Li^{3,4}, Amit Goyal⁵ and Nicholas M. Strickland⁶; ¹American Superconductor Corp, United States; ²Brookhaven Technology Group, United States; ³Brookhaven National Laboratory, United States; ⁴Stony Brook University, United States; ⁵University of Buffalo, United States; ⁶Victoria University, New Zealand

10:00 AM QT11.01.02

The Potential of MgB₂ Superconductors for Magnetic Levitation of Maglev Vehicles [Jacques G. Noudem](#)^{1,2}, Yiteng Xing¹, Pierre Bernstein¹, Pier Luigi Ribani³, Giacomo Russo³ and Antonio Morandi³; ¹Univ of Caen, France; ²CNRS, France; ³University of Bologna, Italy

SESSION QT11.08: YBa₂Cu₃O_x and Related Compounds

Session Chairs: Sergey Lee and Paolo Mele

Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 304A

1:30 PM *QT11.08.01

Dimensional Influence on the Vortex Movement in Superconducting $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Quasi-One-Dimensional Microwires Rubén Corcuera^{1,2}, Pilar Jiménez-Cavero³, Víctor Leborán⁴, Pavel Strichovanec², Luis Morellón^{1,2}, Francisco Rivadulla^{4,5}, Antonio Badía^{1,2} and Irene Lucas del Pozo^{1,2};
¹Universidad de Zaragoza, Spain; ²Instituto de Nanociencia y Materiales de Aragón (INMA), Spain; ³CRANN, AMBER and School of Physics, Ireland; ⁴Centro Singular de Investigación en Química Biológica y Materiales Moleculares (CIQUS), Spain; ⁵Universidad de Santiago de Compostela, Spain

2:00 PM QT11.08.02

Critical Current Measurements of Cuprate Thin Films in Pulsed Magnetic Fields Christopher Mizzi¹, Fedor Balakirev¹, Ivan Nekrashevich¹, Maxime Leroux², Masashi Miura³, Jens Haenisch⁴ and Boris Maiorov¹; ¹Los Alamos National Laboratory, United States; ²Toulouse National High Magnetic Field Laboratory, France; ³Seikei University, Japan; ⁴Karlsruhe Institute of Technology, Germany

2:15 PM *QT11.08.03

Progress on REBCO Based Conductors for Nuclear Fusion Applications Giuseppe Celentano¹, Andrea Augieri¹, Sandro Chiarelli^{1,2}, Gianluca De Marzi¹, Lorenzo Giannini¹, Marcello Marchetti¹, Luigi Muzzi^{1,2}, Valentina Pinto¹, Gherardo Romanelli¹, Alessandro Rufoloni¹, Angelo Vannozi¹, Alessandro Anemona², Andrea Formichetti², Albano Bragagni³, Massimo Seri³ and Antonio della Corte^{1,2}; ¹ENEA-Frascati, Italy; ²ICAS, Italy; ³TRATOS CAVI SpA, Italy

SESSION QT11.09: Cavities and RF Applications
Session Chairs: Nathan Sitaraman and Sarah Willson
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 304A

8:00 AM QT11.09.01

Optimizing Nb₃Sn Growth for SRF Applications: Nanoscale Morphological and Electronic Characterization of Intermetallic Adlayers on a Highly Ordered Nb Oxide Sarah A. Willson, Rachael Farber and Steven J. Sibener; University Of Chicago, United States

8:15 AM QT11.09.02

Materials Investigation and Surface Design of Superconducting Radio-Frequency Accelerating Cavities at Cornell University Zeming Sun¹, Thomas Oseroff¹, Gabriel Gaitan¹, Ryan Porter¹, Katrina Howard¹, Matthias U. Liepe¹, Zhaslan Baraissov¹, David Muller¹, Nathan S. Sitaraman¹, Tomas A. Arias¹, Ben Francis², Mark K. Transtrum², Yundi Quan³ and Richard Hennig³; ¹Cornell University, United States; ²Brigham Young University, United States; ³University of Florida, United States

8:30 AM QT11.09.03

Theory Results on Novel Surface Preparations for Superconducting Radio-Frequency Cavities Nathan S. Sitaraman¹, Michelle M. Kelley¹, Tomas A. Arias¹, Zeming Sun¹, Matthias U. Liepe¹, Zhaslan Baraissov¹, David A. Muller¹, Mark K. Transtrum², Aiden Harbick² and Reese J. Clawson²; ¹Cornell University, United States; ²Brigham Young University, United States

8:45 AM QT11.09.04

Mitigation of Dielectric Losses in NbN Resonators Using Thermal ALD with Hydrazine Mahmut Sami Kavrik¹, Shaul Aloni¹, David F. Ogletree¹, Irfan Siddiqi^{2,1} and Adam Schwartzberg¹; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

SESSION QT11.10: Iron-Based Superconductors
Session Chairs: Valeria Braccini and Gaia Grimaldi
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 304A

9:00 AM *QT11.10.01

Local Atomic Configuration Control of Superconductivity in BaFe₂As₂ Pnictide Chang-Beom Eom; University of Wisconsin--Madison, United States

9:30 AM *QT11.10.02

Fe(Se,Te) Superconductor is Facing HTS Materials in High Current and High Field Performance Gaia Grimaldi¹, Antonio Leo^{2,1}, Masood R. Khan^{2,1}, Angela Nigro^{2,1}, Andrea Augieri³, Mario Scuderi¹, Valeria Braccini¹ and Marina Putti⁴; ¹CNR, Italy; ²University of Salerno, Italy; ³ENEA, Italy; ⁴University of Genova, Italy

10:00 AM QT11.10.03

Development of a Simple Architecture for the Realization of Fe(Se,Te) Coated Conductors Valeria Braccini¹, Emilio Bellingeri¹, Cristina Bernini¹, Matteo Cialone¹, Gaia Grimaldi¹, Antonio Leo¹, Andrea Malagoli¹, Alberto Martinelli¹, Ilaria Pallecchi¹, Laura Piperno¹, Michela Iebole², Martina Meinero², Marina Putti², Giuseppe Celentano³ and Angelo Vannozi³; ¹CNR - SPIN, Italy; ²University of Genova, Italy; ³ENEA Frascati Research Centre, Italy

SESSION QT11.11: Superconductivity I
Session Chairs: Valeria Braccini and Susannah Speller
Monday Morning, May 23, 2022
QT11-Virtual

8:00 AM *QT11.11.01

Microstructural Engineering of Bulk Superconductors [Susannah C. Speller](#)¹, Zilin Gao¹, Guillaume Matthews¹, Tayeb Mousavi¹, Yunhua Shi², John Durrell² and Chris Grovenor¹; ¹Univ of Oxford, United Kingdom; ²University of Cambridge, United Kingdom

8:30 AM QT11.11.02

TEM Microstructural Investigation of High Current Density YBCO Superconducting Thin Films Grown by Ultrafast Transient Liquid Assisted Growth (TLAG) [Kapil Gupta](#)¹, Lavinia Saltarelli¹, Roger Guzmán¹, Albert Queralto¹, Laia Soler¹, Júlia Jareño¹, Juri Banchewski¹, Silvia Rasi¹, Diana G. Franco¹, Valentina R. Vlad¹, Aiswarya Kethamkuzhi¹, Joffre Gutierrez¹, Susagna Ricart¹, Cristian Mocuta², Xavier Obradors Berenguer¹ and Teresa Puig¹; ¹Institut de Ciència de Materials de Barcelona, Spain; ²Synchrotron SOLEIL, France

8:45 AM QT11.11.03

Relevance and Opportunities of Liquid Tunability in TLAG YBa₂Cu₃O₇ High Performance Superconducting Films [Lavinia Saltarelli](#)¹, Kapil Gupta¹, Silvia Rasi¹, Albert Queralto¹, Aiswarya Kethamkuzhi¹, Diana G. Franco¹, Adrià Pacheco¹, Joffre Gutierrez¹, Susagna Ricart¹, Jordi Farjas², Pere Roura², Cristian Mocuta³, Xavier Obradors Berenguer¹ and Teresa Puig¹; ¹Institut de Ciència de Materials de Barcelona, Spain; ²University of Girona, Spain; ³Soleil Synchrotron, France

9:00 AM QT11.11.04

Superconducting YBa₂Cu₃O_{7-δ} Nanocomposite Films Grown by TLAG-CSD with Embedded BaMO₃ and BaM₂O₆ Nanoparticles [Diana G. Franco](#)^{1,2}, Natalia Chamorro^{1,2}, Júlia Jareño¹, Kapil Gupta¹, Lavinia Saltarelli¹, Albert Queralto¹, Aiswarya Kethamkuzhi¹, Juri Banchewski¹, Josep Ros², Xavier Obradors Berenguer¹, Ramón Yañez², Susagna Ricart¹ and Teresa Puig¹; ¹ICMAB-CSIC, Spain; ²Universitat Autònoma de Barcelona, Spain

9:15 AM QT11.11.05

New Methodology for Cost Effective Coated Conductors—Transient Liquid Assisted Growth (TLAG-CSD) [Roxana Vlad](#), Silvia Rasi, Diana G. Franco, Lavinia Saltarelli, Kapil Gupta, Cornelia Pop, Aiswarya Kethamkuzhi, Albert Queralto, Susagna Ricart, Teresa Puig and Xavier Obradors Berenguer; Institut de Ciència de Materials de Barcelona, Spain

9:30 AM QT11.11.06

Modeling Study and Comparison of Hybrid MgB₂—Ferromagnetic Shielding Designs [Michela Fracasso](#)^{1,2}, Roberto Gerbaldo^{1,2}, Gianluca Ghigo^{1,2}, Francesco Laviano^{1,2}, Andrea Napolitano^{1,2}, Simone Sparacio^{1,2}, Daniele Torsello^{1,2}, Mykola Solovyov³, Fedor Gomory³ and Laura Gozzelino^{1,2}; ¹Politecnico di Torino, Italy; ²INFN Sezione di Torino, Italy; ³Slovak Academy of Science, Slovakia

9:45 AM *QT11.11.07

Wide Range E-J Constitutive Laws for High-Temperature Superconductors [Francesco Grilli](#)¹, Nicolo Riva², Christian Lacroix³, Frederic Sirois³ and Bertrand Dutoit⁴; ¹Karlsruhe Institute of Technology, Germany; ²Massachusetts Institute of Technology, United States; ³Polytechnique Montréal, Canada; ⁴École Polytechnique Fédérale de Lausanne, Switzerland

SESSION QT11.12: Superconductivity II
Session Chairs: Alex Gurevich and Qiang Li
Monday Morning, May 23, 2022
QT11-Virtual

10:30 AM *QT11.12.01

Tuning the High-Field rf Performance of Thick Superconducting Films by Pinning and Surface Nanostructuring. [Alex Gurevich](#); Old Dominion Univ, United States

11:00 AM QT11.12.02

Learning from Disorder in Superconductors with Scanning Probe Microscopy and Data Analytics [Petro Maksymovych](#), Jun Wang, Jiaqiang Yan, Eugene Dumitrescu, Brian Sales, Ben Lawrie and Wonhee Ko; Oak Ridge National Laboratory, United States

11:15 AM *QT11.12.03

Correlation Between Superconducting Properties, Processing and Microstructure in Bi-2212 Round Wires [Chiara Tarantini](#), Temidayo Abiola Oloye, S. Imam Hossain, Fumitake Kametani, Jianyi Jiang, Eric E. Hellstrom and David C. Larbalestier; Florida State University, United States

11:45 AM QT11.12.04

Soft Matter Enabled Superconducting Quantum Materials and Applications [Fei Yu](#), Randal P. Thedford and Ulrich Wiesner; Cornell University, United States

12:00 PM QT11.12.05

Reducing ABO₃ to Infinite Layer ABO₂ Perovskites—A First-Principles Study [Shree Ram Acharya](#) and Valentino R. Cooper; Oak Ridge National Laboratory, United States

SESSION QT11.13: Superconductivity III
Session Chairs: Kazumasa Iida and Paolo Mele
Monday Afternoon, May 23, 2022
QT11-Virtual

6:30 PM *QT11.13.01

Angular Dependence of Vortex Pinning Properties in YBa₂Cu₃O₇ Nanocomposite Films [Tomoya Horide](#) and Kaname Matsumoto; Kyushu Inst of

Technology, Japan

7:00 PM QT11.13.02

Pairing Symmetry in Infinite-Layer Nickelate Superconductors Lin Er Chow¹, Sujith Kunniniyil Sudheesh¹, Proloy Nandi¹, Shengwei Zeng¹, Zhaoting Zhang¹, Xiaomeng Du¹, Zhi Shih Lim¹, Ee Min Elbert Chia² and Ariando Ariando¹; ¹National University of Singapore, Singapore; ²Nanyang Technological University, Singapore

7:15 PM *QT11.13.03

Fabrication of Small Magnets Using (Ba_xA)Fe₂As₂ (A: Na, K) Round Wire with Large Critical Current Tsuyoshi Tamegai¹, Sunseng Pyon¹, Haruto Mori¹, Satoshi Awaji², Hijiri Kito³, Shigeoyuki Ishida³, Yoshiyuki Yoshida³, Hideki Kajitani⁴ and Norikiyo Koizumi⁴; ¹Univ. of Tokyo, Japan; ²Institute for Materials Research, Tohoku Univ., Japan; ³National Institute of Advanced Industrial Science and Technology, Japan; ⁴National Institutes for Quantum and Radiological Science and Technology, Japan

7:45 PM QT11.13.04

K-Doped BaFe₂As₂ / BaFe₂As₂ Bilayer for Bi-Crystal Experiments Kazumasa Iida^{1,2}, Dongyi Qin³, Takafumi Hatano^{1,2}, Hongye Gao⁴, Zimeng Guo^{4,2}, Chao Wang⁴, Hikaru Saito^{4,2}, Satoshi Hata^{4,2}, Michio Naito^{3,2} and Akiyasu Yamamoto^{3,2}; ¹Nagoya Univ, Japan; ²JST CREST, Japan; ³Tokyo University of Agriculture and Technology, Japan; ⁴Kyushu University, Japan

8:00 PM *QT11.13.05

Effect of Low-Energy Ion Irradiation on Flux Pinning and Microstructure in REBCO Coated Conductors Toshinori Ozaki¹, Satoshi Semboshi², Hiroyuki Okazaki³, Hiroshi Koshikawa³, Shunya Yamamoto³, Tetsuya Yamaki³, Atsushi Yabuuchi⁴, Tetsuro Sueyoshi⁵ and Hitoshi Sakane⁶; ¹Kwansei Gakuin University, Japan; ²Tohoku University, Japan; ³National Institutes for Quantum and Radiological Science and Technology, Japan; ⁴Kyoto University, Japan; ⁵Kyushu Sangyo University, Japan; ⁶SHI-ATEX Co., Ltd., Japan

SESSION QT11.14: Superconductivity IV
Session Chairs: Jens Haenisch and Anna Palau
Tuesday Morning, May 24, 2022
QT11-Virtual

8:00 AM QT11.14.01

Characterization of a New Superconducting Magnetic Levitation System with a Large Levitation Force Pierre Bernstein^{1,2,3}, Jacques G. Noudem^{1,2,3} and Yiteng Xing^{1,2,3}; ¹CRISMAT, France; ²Normandy University, France; ³CNRS, France

8:15 AM *QT11.14.02

Nano-Engineered High-Temperature Superconducting Materials and Hybrid Systems for Energy-Efficient Functional Devices Anna Palau¹, Jordi Alcalá¹, Aleix Barrera¹, Alejandro Fernandez-Rodriguez¹, Stefan Marinovic², Lluís Balcells¹, Narcis Mestres¹ and Alejandro Silhanek²; ¹Institut de Ciència de Materials de Barcelona, Spain; ²Experimental Physics of Nanostructured Materials, Q-MAT, CESAM, Belgium

8:45 AM *QT11.14.03

Recent Developments in Fe-Based Superconductors Towards Understanding Their Vortex Matter and Possible Applications Jens Haenisch; Karlsruhe Institute of Technology, Germany

9:15 AM QT11.14.04

Suppression of Oxides Growth in Superconducting Quantum Circuits Using Self-Assembled Monolayers Mohammed Alghadeer^{1,2}, Hussein Hussein², Saleem Rao¹ and Hossein Fariborzi²; ¹King Fahd University of Petroleum and Minerals, Saudi Arabia; ²King Abdullah University of Science and Technology, Saudi Arabia

9:30 AM *QT11.01.01

Process Machine Learning of Iron-Based Superconducting Polycrystalline Bulks Akiyasu Yamamoto¹, Shinnosuke Tokuta¹, Yuta Hasegawa¹, Shinjiro Kikuchi¹, Akimitsu Ishii¹, Yusuke Shimada², Satoshi Hata³ and Akinori Yamanaka¹; ¹Tokyo University of Agriculture and Technology, Japan; ²Tohoku University, Japan; ³Kyushu University, Japan

##PAGE_BREAK##

SYMPOSIUM SB01

Organic Electronics—Multimodal Characterization and Computation-Driven Material Design and Performance
May 9 - May 25, 2022

Symposium Organizers

* Invited Paper

SESSION SB01.01: The Computational Frontier
Session Chair: Lilo Pozzo
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

1:30 PM *SB01.01.01

Machine Learning and Material Science—A Fruitful Integration Alessio Gagliardi, Michael Rinderle and Ioannis Kouroudis; Technische Universitat Munchen, Germany

2:00 PM SB01.01.03

Multiscale Simulations of DNA-Templated Dye Aggregates to Promote Molecular Excitonic Coupling German Barcenás and Lan Li; Boise State University, United States

2:15 PM *SB01.01.04

Gaussian-Process-Driven Optimal Autonomous Data Acquisition for Large-Scale Experimental Facilities Marcus M. Noack; Lawrence Berkeley National Laboratory, United States

3:15 PM *SB01.01.05

Computationally-Assisted Design of Transparent and Color-Neutral Organic Solar Cells Quinn C. Burlingame, Melissa L. Ball, Hannah L. Smith, Antoine Kahn and Lynn Loo; Princeton University, United States

3:00 PM BREAK

3:45 PM SB01.01.06

Predicting Intricate Optical Spectra of Open-Shell Conjugated Organic Polymers Chandra S. Sarap, Yashpal Singh and Neeraj Rai; Mississippi State University, United States

SESSION SB01.02: Poster Session: Organic Electronics—Multimodal Characterization and Computation-Driven Material Design and Performance
Session Chairs: Brian Collins and Xiaodan Gu
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB01.02.01

Multimodal Characterization of Non-Fullerene Organic Solar Cells Based to Assess the Effectiveness of Solvent Plasticizers Obaid Alqahtani^{1,2}, Thomas Ferron^{1,3}, Victor Murcia¹, Terry McAfee^{1,4}, Devin Grabner¹, Julien F. Gorenflot⁵, Tongle Xu⁶, Tainan Duan⁶, Zhipeng Kan⁶ and Brian A. Collins¹; ¹Washington State University, United States; ²Prince Sattam bin Abdulaziz University, Saudi Arabia; ³National Institute of Standards and Technology, United States; ⁴Lawrence Berkeley National Laboratory, United States; ⁵King Abdullah University of Science and Technology, Saudi Arabia; ⁶Chinese Academy of Sciences, China

SB01.02.03

The Relative Roles of Triplet-to-Singlet Exciton Transfer and Reverse Intersystem Crossing in Hyperfluorescent OLED Materials Leonardo E. Sousa¹, Larissa dos Santos Born², Pedro Henrique de Oliveira Neto² and Piotr de Silva¹; ¹Technical University of Denmark, Denmark; ²University of Brasilia, Brazil

SB01.02.04

Crystallization and Epitaxy Study of Organic Molecules on Graphene from 4D Scanning Transmission Electron Microscopy Zixuan Guo¹, Colin Ophus², Karen Bustillo², Ryan Fair¹, Enrique Gomez¹ and Alejandro Briseno³; ¹The Pennsylvania State University, United States; ²Lawrence Berkeley National Laboratory, United States; ³U.S. NAVY NAVAIR, United States

SB01.02.05

Tailoring the Interfacial Band Offset By the Molecular Dipole Orientation for a Molecular Heterojunction Selector Jung Sun Eo, Jaeho Shin, Seunghoon Yang, Takgyeon Jeon, Jaeho Lee, Sanghyeon Choi, Chul-Ho Lee and Gunuk Wang; Korea University, Korea (the Republic of)

SB01.02.06

Molecular-Scale Photodiode with Two-Dimensional Semiconductor Jaeho Shin, Seunghoon Yang, Jung Sun Eo, Takgyeong Jeon, Chul-Ho Lee and Gunuk Wang; Korea University, Korea (the Republic of)

SB01.02.07

Design and Application of Novel Singlet Sink for the Facilitation of Photon Upconversion via Triplet-Triplet Annihilation in Glassy Polymer Films Sonia Stanciu, Yoan Simon and Xiaodan Gu; The University of Southern Mississippi, United States

SB01.02.08

Surface Doping of Rubrene Single Crystals by Molecular Electron Donors and Acceptors Christos Gatsios¹, Andreas Opitz¹, Dominique Lungwitz¹, Ahmed E. Mansour², Thorsten Schultz², Dongguen Shin¹, Sebastian Hammer³, Jens Pflaum³, Yadong Zhang⁴, Stephen Barlow⁴, Seth R. Marder⁴ and Norbert Koch^{1,2}; ¹Humboldt-Universität zu Berlin, Germany; ²Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany; ³Julius-

Maximilians-Universität Würzburg, Germany; ⁴University of Colorado, United States

SB01.02.09

Effect of Substituting Groups and Side Linkages on NIR Absorption and Emission of Cu(I) Dipyrrin Complexes Svetlana V. Kilina; North Dakota State University, United States

SB01.02.10

Charge Mobility Maximization in Organic Field-Effect Transistors via Design of Experiments and Machine Learning Stefano Pecoraro^{1,2}, Stefano Reale² and Mario Caironi¹; ¹Istituto Italiano di Tecnologia, Italy; ²Politecnico di Milano, Italy

SESSION SB01.03: Time Resolved Measurements
Session Chair: Eva M Herzig
Tuesday Morning, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

8:30 AM SB01.03.02

Solution Aggregate Structure Drastically Modulates Electronic Properties of Donor-Acceptor Conjugated Polymers Zhuang Xu¹, Kyung Sun Park², Justin Kwok², Bijal Patel², Prapti Kafle², Daniel Davies² and Ying Diao²; ¹University of Illinois at Urbana-Champaign, United States; ²University of Illinois, Urbana-Champaign, United States

8:45 AM SB01.03.03

Operando X-Ray Scattering of 3-Terminal Electrochemical Devices Based on Organic Mixed Ionic/Electronic Conductors Tyler Quill¹, Alexander Giovannitti¹, Chris Takacs² and Alberto Salleo¹; ¹Stanford University, United States; ²SLAC National Accelerator Laboratory, United States

9:00 AM *SB01.03.04

Analysis of the Structure and Dynamics of Conjugated Polymers via Combined Neutron Scattering and Molecular Simulations Caitlyn Wolf¹, Lorenzo Guio², Sage Scheiwiller¹, Karen Li¹, Christine Luscombe² and Lilo D. Pozzo^{2,1}; ¹University of Washington, United States; ²Univ of Washington, United States

10:00 AM SB01.03.06

Revealing Temperature-Dependent Polymer Aggregation in Solution with Small-Angle X-Ray Scattering Thomas P. Chaney¹, Maged Abdelsamie^{2,3}, Hongping Yan^{3,4}, Sebastian Schneider^{3,4}, Alperen Ayhan⁵, Enrique Gomez^{5,5}, John R. Reynolds⁶ and Michael Toney^{1,3,7}; ¹University of Colorado at Boulder, United States; ²Lawrence Berkeley National Laboratory, United States; ³SLAC National Accelerator Laboratory, United States; ⁴Stanford University, United States; ⁵The Pennsylvania State University, United States; ⁶Georgia Institute of Technology, United States; ⁷University of Colorado Boulder, United States

10:00 AM BREAK

10:15 AM SB01.03.07

Effect of Processing Conditions on the Nanostructure Formation Process in Thin Films—A Multi-Modal Measurement Approach Eva M Herzig, Meike Kuhn and Christopher Greve; Universität Bayreuth, Germany

10:30 AM SB01.03.08

Robust Aggregations Formed in Conjugated Ladder Polymers Solution Due to Rigid Backbone and Low Dissolve Entropy Guorong Ma¹, Mingwan Leng², Zhiqiang Cao¹, Yirui Cao², Shi Li², Daniel Tabor², Lei Fang² and Xiaodan Gu¹; ¹The University of Southern Missis, United States; ²Texas A&M University, United States

10:45 AM SB01.03.09

A Virtual Photo-Conductive AFM Framework to Explore OPV Morphologies Nirmal Baishnab, Balaji S. Pokuri and Baskar Ganapathysubramanian; Iowa State University, United States

SESSION SB01.04: Polymer Morphology
Session Chairs: Brian Collins and Xiaodan Gu
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

1:30 PM *SB01.04.01

Understanding the Reliability of Y-Series Electron Acceptors Under Real-World Conditions Derya Baran; King Abdullah University of Science and Technology, Saudi Arabia

2:00 PM SB01.04.03

Understanding the Phase Behavior of Conjugated Polymer Blends Using Infrared Nanospectroscopy Nathaniel L. Princ¹, Haoyu Zhao¹, Guorong Ma¹, Eliot Gann² and Xiaodan Gu¹; ¹The University of Southern Mississippi, United States; ²Brookhaven National Laboratory, United States

2:15 PM SB01.04.04

Inelastic Neutron Scattering for Measuring Dynamic Disorder in Organic Semiconductors Adam J. Moule¹, Makena Dettmann¹, Lucas Cavalcante¹, Daniel Vong¹ and Luke L. Daemen²; ¹University of California, Davis, United States; ²Oak Ridge National Laboratory, United States

2:30 PM SB01.04.05

4D STEM Orientation Mapping in Anisotropic Molecular Glasses Debaditya Chatterjee¹, Shuoyuan Huang¹, Kaichen Gu², Janguang Yu¹, Harald

Bock³, Lian Yu¹, Mark Ediger¹ and Paul Voyles¹; ¹University of Wisconsin--Madison, United States; ²Exponent, Inc., China; ³Centre de Recherche Paul Pascal, France

3:15 PM *SB01.04.06

Multimodal Characterization Strategies of Organic Semiconductor/Electrolyte Interfaces for Energy Conversion/Storage and Biosensing Erin L. Ratcliff; University of Arizona, United States

3:00 PM BREAK

3:45 PM SB01.04.07

Novel Spectroscopic Characterization Reveals Design Guidelines for High-Performing Redox-Active Polymers Garrett LeCroy¹, Camila Cendra¹, Francis Spano², Alexander Giovannitti¹ and Alberto Salleo¹; ¹Stanford University, United States; ²Temple University, United States

4:00 PM SB01.04.08

Multimodal Characterization of Crystal Structure and Formation in Rubrene Thin Films Reveals Erasure of Orientational Discontinuities Jenna Tan¹, Jordan Dull², Steven Zeltmann¹, Jakhangirkhodja Tulyagankhodjaev³, Brendan Folie¹, Alex Liebman-Pelaez¹, Jonathan Raybin¹, Christian Tanner¹, Trevor Roberts¹, Leo Hamerlynck¹, Sven Doenges⁴, Omar Khatib⁴, Eric Muller⁵, Sam Johnson⁴, Markus Raschke⁴, Chenhui Zhu⁶, Andrew M. Minor¹, Hendrik Ohldag⁶, Barry P. Rand² and Naomi S. Ginsberg¹; ¹University of California, Berkeley, United States; ²Princeton University, United States; ³Columbia University, United States; ⁴University of Colorado Boulder, United States; ⁵Colgate University, United States; ⁶Advanced Light Source, United States

4:15 PM SB01.04.09

Organic Semiconductor Structure Measurements by Polarized Soft X-Ray Scattering Dean M. DeLongchamp; National Institute of Standards and Technology, United States

4:30 PM SB01.04.10

Resonant Tender X-Ray Diffraction Studies of Anion Location in Organic Electrochemical Transistors Lee Richter¹, Lucas Flagg¹, Guillaume Freychet², Ruipeng Li², Tommaso Nicolini³, Natalie Stingelin⁴, Vinayak Bhat⁵, Chad Risko⁵, Jonathan W. Onorato⁶ and Christine Luscombe⁷; ¹National Institute of Standards and Technology, United States; ²Brookhaven National Laboratory, United States; ³Université de Bordeaux, France; ⁴Georgia Institute of Technology, United States; ⁵University of Kentucky, United States; ⁶University of Washington, United States; ⁷Okinawa Institute of Science and Technology Graduate University, Japan

SESSION SB01.05: Mixed Conductor I

Session Chair: Jonathan Rivnay

Wednesday Morning, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

8:30 AM *SB01.05.01

Multimodal Probes of Charge Transport in Organic Mixed Ionic-Electronic Conductors—Interplay of Polymer Structure and Counterion Chemistry David S. Ginger; University of Washington, United States

9:00 AM SB01.05.02

Influence of Side Chains on the N-Type Organic Electrochemical Transistor Performance David Ohayon¹, Achilleas Savva², Weiyuan Du¹, Bryan Paulsen³, Jonathan Rivnay³, Iain McCulloch⁴ and Sahika Inal¹; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²University of Cambridge, United Kingdom; ³Northwestern University, United States; ⁴University of Oxford, United Kingdom

9:15 AM SB01.05.03

The Effect of a Polymer Electrolyte on N-Type Bioelectronic Device Performance Tania C. Hidalgo Castillo, David Ohayon, Victor Druet and Sahika Inal; King Abdullah University of Science and Technology, Saudi Arabia

9:30 AM *SB01.05.04

To Pattern or Not to Pattern? Selecting Side-Chains for Mixed Conducting Polymers Aditi Khot and Brett M. Savoie; Purdue University, United States

10:00 AM BREAK

10:30 AM *SB01.05.05

Designing Mixed Electronic and Ionic Conductors for High Performance and Stable Electrochemical Devices Jianguo Mei; Purdue University, United States

11:00 AM SB01.05.06

Printing Dynamic Color Palettes and Layered Textures Through Modeling-Guided Stacking of Electrochromic Polymers Ke Chen¹, Yukun Wu¹, Liyan You¹, Wenting Wu¹, Xiaokang Wang¹, Di Zhang¹, James Elman², Mustafa Ahmed¹, Haiyan Wang¹, Kejie Zhao¹ and Jianguo Mei¹; ¹Purdue University, United States; ²Filmetrics, Inc, United States

11:15 AM SB01.05.07

Ionic Aromatic Dopant—Air Stable Dopants Enable Direct Write Patterning Zhifan Ke¹, Mustafa Ahmed¹, Wenting Wu¹, Kyle Baustert², Shih-hsin Hsu¹, Liang Pan¹, Kenneth R. Graham² and Jianguo Mei¹; ¹Purdue University, United States; ²University of Kentucky, United States

11:30 AM SB01.05.08

Low Molecular Mass Gelator Assisted Gelation of Conductive Polymers Madhubhashini Lakdusinghe¹, Mahsa Abbaszadeh¹, Satish Mishra¹, Dineshkumar Sengottuvelu¹, Song Zhang², Anthony Benasco², Xiaodan Gu², Sarah Morgan², David Wipf¹ and Santanu Kundu¹; ¹Mississippi State

University, United States; ²The University of Southern Mississippi, United States

11:45 AM SB01.05.09

High-Performance Humidity Sensing in pi-Conjugated Molecular Assemblies Through the Engineering of Electron/Proton Transport and Device Interfaces Nicholas Turetta¹, Marc-Antoine Stoeckel^{1,2}, Rafael Furlan De Oliveira^{1,3}, Félix Devaux⁴, Alessandro Greco⁵, Camila Cendra⁶, Sara Gullace¹, Mindaugas Gicevičius⁷, Basab Chattopadhyay^{4,8}, Jie Liu⁴, Guillaume Schweicher⁴, Henning Sirringhaus⁷, Alberto Salleo⁶, Mischa Bonn⁵, Ellen H. Backus^{5,9}, Yves Geerts⁴ and Paolo Samori¹; ¹Université de Strasbourg, France; ²Linköping University, Sweden; ³Centro Nacional de Pesquisa em Energia e Materiais (CNPEM), Brazil; ⁴Université libre de Bruxelles, Belgium; ⁵Max Planck Institute for Polymer Research, Germany; ⁶Stanford University, United States; ⁷University of Cambridge, United Kingdom; ⁸Norwegian University of Science and Technology, Norway; ⁹University of Vienna, Austria

SESSION SB01.06: Mixed Conductor II

Session Chair: Christine Luscombe

Wednesday Afternoon, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

1:30 PM SB01.06.01

Extraordinary Electrochemical Stability and Extended Polaron Delocalization of Ladder-Type Polyaniline-Analogous Polymers Mingwan Leng¹, Xiaozhou Ji^{1,2} and Lei Fang¹; ¹Texas A&M, United States; ²Stanford University, United States

1:45 PM SB01.06.02

A High-Conductivity n-Type Polymeric Ink for Printed Electronics Chi-Yuan Yang¹, Marc-Antoine Stoeckel¹ and Simone Fabiano^{1,1,2}; ¹Linköping University, Sweden; ²n-Ink AB, Sweden

2:00 PM BREAK

2:30 PM *SB01.06.03

Structure and Transport in Organic Mixed Ionic-Electronic Conductors (OMIECs) During Operation Jonathan Rivnay; Northwestern University, United States

3:00 PM SB01.06.04

Nanoscale Electrical Characterisation of Functional Electrolyte-Gated Transistors by In-Liquid Scanning Dielectric Microscopy—Exploring Different Operating Regimes Shubham Tanwar¹, Sara R. Molina², Ruben M. Solsona¹, Marta M. Torrent², Adrica Kyndiah³ and Gabriel Gomila^{1,4}; ¹Institute for Bioengineering of Catalonia, Spain; ²Institut de Ciència de Materials de Barcelona, Spain; ³Italiano Istituto di Tecnologia, Italy; ⁴Universitat de Barcelona, Spain

3:15 PM SB01.06.05

Controlling Ionic Transport in Conducting Polymers via Chemical Gating Tamanna T. Khan¹, Terry McAfee², Awwad N. Alotaibi¹, Thomas Ferron³ and Brian A. Collins¹; ¹Washington State University, United States; ²Lawrence Berkeley National Laboratory, United States; ³National Institute of Standards and Technology, United States

3:30 PM SB01.06.06

Thermal Conductivity Measurements for Organic Electronic Materials Haoyu Zhao, Guorong Ma, Vikash Kaphle and Xiaodan Gu; The University of Southern Mississippi, United States

SESSION SB01.07: Materials Discover I

Session Chair: Simon Rondeau-Gagne

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

8:30 AM *SB01.07.01

Adaptable Semiconducting Polymer Networks—Exploiting Dynamic Bonds Towards Softer Materials for Organic Electronics Simon Rondeau-Gagne; University of Windsor, Canada

9:00 AM SB01.07.02

In Situ Characterization of Highly Aligned Conjugated Polymer Thin Films Revealing Unique Thermal Behavior and Packing Structure Harry Schrickx¹, Somayeh Kashani¹, Jeromy J. Rech², Wei You³, Harald Ade¹ and Brendan T. O'Connor¹; ¹North Carolina State University, United States; ²Stanford University, United States; ³University of North Carolina at Chapel Hill, United States

9:15 AM SB01.07.03

Kinetic Monte Carlo Simulation of Exciton Dynamics in Organic Non-Fullerene Electron Acceptors Wenchao Yang, Safakath Karuthedath, Julien F. Gorenflot and Frédéric Laquai; King Abdullah University of Science and Technology, Saudi Arabia

9:30 AM SB01.07.04

Comparison of the Deformation Mechanism Between Glassy and Viscoelastic Conjugated Polymer Thin Films Yunfei Wang¹, Song Zhang^{1,2}, Guillaume Freychet³, Zhaofan Li⁴, Kai-Lin Chen⁵, Yu-Cheng Chiu⁵, Wenjie Xia⁴ and Xiaodan Gu¹; ¹University of Southern Mississippi, United States; ²Stanford University, United States; ³Brookhaven National Laboratory, United States; ⁴North Dakota State University, United States; ⁵National Taiwan University of Science and Technology, Taiwan

9:45 AM SB01.07.05

Off-State Bias Stress Stability in Polymer Transistors—An Often Overlooked Prerequisite Ulrike Kraft^{1,2}, Malgorzata Nguyen¹, Weimin Zhang³,

Christian Nielsen⁴, Iain McCulloch⁵ and Henning Sirringhaus¹; ¹University of Cambridge, United Kingdom; ²Max Planck Institute for Polymer Research, Germany; ³King Abdullah University of Science and Technology, Saudi Arabia; ⁴Queen Mary University, United Kingdom; ⁵University of Oxford, United Kingdom

10:00 AM BREAK

10:30 AM *SB01.07.06

Traps and Transport Resistance—The Next Frontier for Stable State-of-the-Art Non-Fullerene Acceptor Solar Cells Christopher Wöpke¹, Clemens Göhler¹, Maria Saladina¹, Xiaoyan Du², Li Nian², Christopher Greve³, Chenhui Zhu⁴, Kaila M. Yallum⁵, Yvonne J. Hofstetter⁶, David Becker-Koch⁶, Ning Li², Thomas Heumüller², Ilya Milekhin¹, Dietrich R. Zahn¹, Christoph J. Brabec², Natalie Banerji⁵, Yana Vaynzof⁶, Eva M Herzig³, Roderick C. MacKenzie⁷ and Carsten Deibel¹; ¹Technische Universität Chemnitz, Germany; ²Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; ³Universität Bayreuth, Germany; ⁴Advanced Light Source, Lawrence Berkeley National Laboratory, United States; ⁵University of Bern, Switzerland; ⁶Technische Universität Dresden, Germany; ⁷University of Nottingham, United Kingdom

11:00 AM SB01.07.07

Acceptors Ionization Energy Mixing Enables to Continuously Tune the Quantum Efficiency of Ternary Solar Cells Julien F. Gorenflot¹, Safakath Karuthedath¹, Sri Harish Kumar Paleti¹, Anirudh Sharma¹, Nicolas Ramos², Hang Yin³, Catherine S. De Castro¹, Nisreen Alshehri¹, Jafar I. Khan¹, Jaime Martin², Gang Li³, Derya Baran¹ and Frédéric Laquai¹; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²POLYMAT, University of the Basque Country UPV/EHU, Spain; ³The Hong Kong Polytechnic University, Hong Kong

11:15 AM SB01.07.08

Evidence That Sharp Donor-Acceptor Interfaces Suppress Recombination, Allowing for Thick Organic Photovoltaics Obaid Alqahtani^{1,2}, Seyed Hosseini³, Thomas Ferron^{1,4}, Terry McAfee^{1,5}, Victor Murcia¹, Kevin Vixie¹, Fei Huang⁶, Ardalan Armin⁷, Safa Shoaee³ and Brian A. Collins¹; ¹Washington State University, United States; ²Prince Sattam bin Abdulaziz University, Saudi Arabia; ³University of Potsdam, Germany; ⁴National Institute of Standards and Technology, United States; ⁵Lawrence Berkeley National Laboratory, United States; ⁶South China University of Technology, China; ⁷Swansea University, United Kingdom

11:30 AM SB01.07.09

Accurate Measurements of Charge Generation in Bulk Heterojunction Solar Cells with Overpulse TDCF Charge Extraction Awwad N. Alotaibi, Obaid Alqahtani and Brian A. Collins; Washington State University, United States

11:45 AM SB01.07.10

Phase Behavior of a Polymer Semiconductor/Elastomer Blend and Connections to Field-Effect Transistor Performance Shayla Nikzad and Zhenan Bao; Stanford University, United States

SESSION SB01.08: Materials Discovery II
Session Chairs: Jason Azoulay and Xiaodan Gu
Thursday Afternoon, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Nautilus 1 & 2

1:30 PM *SB01.08.01

Cartography of the Composition-Performance Landscape in Ternary Organic Photovoltaics Mariano Campoy-Quiles; ICMAB-CSIC, Spain

2:00 PM SB01.08.02

Infrared Photodetection Using Narrow Bandgap Conjugated Polymers Jason D. Azoulay; University of Southern Mississippi, United States

2:15 PM *SB01.08.03

Climbing the Ladder to Advanced Rigid Ladder Polymers Lei Fang; Texas A&M University, United States

SESSION SB01.09: Frontier in Device I
Session Chair: Xiaodan Gu
Tuesday Morning, May 24, 2022
SB01-Virtual

8:00 AM *SB01.09.01

Side-Chain Engineering to Balance Ionic and Electronic Conductivities in Mixed Ionic/Electronic Conductors Christine Luscombe; Okinawa Institute of Science and Technology, Japan

8:30 AM SB01.09.02

Decoupling Complex Multi-Length-Scale Morphology in Non-Fullerene Photovoltaics with Nitrogen K-Edge Resonant Soft X-Ray Scattering Wenkai Zhong¹, Ming Zhang¹, Guillaume Freychet², Gregory Su³, Cheng Wang³ and Feng Liu¹; ¹Shanghai Jiao Tong University, China; ²NSLS-II, Brookhaven National Laboratory, United States; ³Lawrence Berkeley National Laboratory, United States

SESSION SB01.10: Frontier in Device II
Session Chairs: Xiaodan Gu and Eva M Herzig
Tuesday Afternoon, May 24, 2022
SB01-Virtual

9:00 PM SB01.10.03

Supramolecular Assembly of Conjugated Polymers under Vibrational Strong Coupling [Kripa M. Joseph](#); University of Strasbourg, France

9:15 PM SB01.10.04

Solution Process of Fullerene Thin Film by Mist-Vapor Deposition and Its Application to N-Type OFET [Yuto Nanba](#), Kotaro Kobashi and Shigetaka Katori; Tsuyama College, Japan

9:30 PM SB01.10.05

Using Design of Experiment and Machine Learning Approaches to Optimize the Effect of Solvent Additives and Processing Parameters on PM6:Y6 Organic Photovoltaics [Burcu Dursun](#), Guoyan Zhang, Stephen Wong, Alperen Ayhan and Enrique Gomez; The Pennsylvania State University, United States

9:45 PM SB01.10.06

Investigation on the Effect of Molecular Packing on Charge Transfer Characteristics of Y6 Non-Fullerene Acceptor Using Electroabsorption Spectroscopy [Sudhi Mahadevan](#), Liu Taili and Stephen Sai-Wing Tsang; City University of Hong Kong, Hong Kong

10:00 PM SB01.10.07

Prediction of Birefringence for Optical Polymer Materials [Paul Winget](#), H. Shaun Kwak, Mohammad Atif Faiz Afzal, Laura Scarbath-Evers, Alexander Goldberg, Andrea Browning and Mathew Halls; Schrödinger, United States

SESSION SB01.11: Frontier in Device III

Session Chairs: Xiaodan Gu and Ting Lei

Wednesday Morning, May 25, 2022

SB01-Virtual

8:00 AM SB01.11.05

Simulation of Organic Field Effect Transistors In Presence of Stress/Strain Effects Yi Yang, [Robert A. Nawrocki](#), Richard M. Voyles and Haiyan H. Zhang; Purdue University, United States

##PAGE_BREAK##

SYMPOSIUM SB02

Materials, Power Sources, Sensors, Actuators and Mechanics for Untethered Soft Robots

May 9 - May 23, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SB02.01: Actuators

Session Chairs: Vito Cacucciolo, Yu Kuwajima and Shingo Maeda

Monday Afternoon, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

1:45 PM *SB02.01.01

Electrostatic Bellow Muscle—Multifunctional Transducer Based on Zipping Dielectric Liquids Ion-Dan Sirbu¹, Giacomo Moretti², Sandra Dirè¹, Luca Fambri¹, Rocco Vertechy³ and [Marco Fontana](#)⁴; ¹Università di Trento, Italy; ²Universität des Saarlandes, Germany; ³Università di Bologna, Italy; ⁴Scuola Superiore Sant'Anna, Italy

2:15 PM SB02.01.02

Fabricating 3D Soft Pneumatic Actuator with Overhang Features via 3D-Printed Sacrificial Molds [Joseph Lee](#) and Michinao Hashimoto; SUTD Singapore, Singapore

2:30 PM SB02.01.03

High Spatial Resolution, Optical Addressing of Dielectric Elastomer Actuators [Ehsan Hajiesmaili](#) and David R. Clarke; Harvard University, United States

2:45 PM SB02.01.04

Nanocomposite Actuators with Dielectric Fluids Jason H. Nadler^{1,2} and [Jonathan Yaeger](#)¹; ¹Georgia Tech Research Institute, United States; ²Georgia Institute of Technology, United States

3:00 PM BREAK

3:30 PM *SB02.01.06

Untethered Pneumatic Rubber Actuators for Soft Robots Koichi Suzumori and [Hiroyuki Nabae](#); Tokyo Institute of Technology, Japan

4:00 PM SB02.01.08

Fabrication of EHD Fiber Pumps for Soft Robots and Wearables [Michael Smith](#), Vito Cacucciolo and Herbert R. Shea; École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

4:15 PM SB02.01.09

Programmable Microswimmers with Multifunctional Parts for Direction Control and Self-Propulsion Without External Stimuli Cheolheon Park¹, Sunghoon Kwon¹, Wook Park² and [Yeongjae Choi](#)³; ¹Seoul National University, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of); ³Gwangju Institute of Science and Technology, Korea (the Republic of)

4:30 PM SB02.01.10

Chemical Reactions for Gas-Driven Pneumatic Soft Actuators—From Catalysts to Neutralisation Reactions for Oscillating Pneumatic Systems [Marcos Villeda Hernandez](#), Ben Baker, Christian Romero, Michael Dicker and Prof Charl F. Faul; University of Bristol, United Kingdom

SESSION SB02.06: Sensors and Electronics
Session Chairs: Kenjiro Fukuda and Xiaomin Xu
Wednesday Morning, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

8:30 AM *SB02.06.01

Passive Electronic 3D Microfliers with Designs Inspired by Wind-Dispersed Seeds [John A. Rogers](#); Northwestern University, United States

9:00 AM SB02.06.02

Biocompatible Ag Reduction Polymer Composites Bending Sensor [Hyunjung Kim](#)¹, Jeonghun Kim² and Seongmin Kang¹; ¹Chungnam National University, Korea (the Republic of); ²Electronics and Telecommunications Research Institute, Korea (the Republic of)

9:15 AM SB02.06.03

Shrink-Wrappable Electronics—Achieving Curved Electronics Using Shrinkable Substrates Steven Rich¹, Shinyoung Lee¹, [Kenjiro Fukuda](#)^{1,1} and Takao Someya^{1,1,2}; ¹RIKEN, Japan; ²The University of Tokyo, Japan

9:30 AM SB02.06.05

Development of the Flexible Conductive Bonding Method Without Any Adhesive for Wiring of Soft Robots [Masahito Takakuwa](#)^{1,2}, Kenjiro Fukuda², Tomoyuki Yokota³, Daishi Inoue², Shinjiro Umezumi¹ and Takao Someya^{2,3}; ¹Waseda University, Japan; ²RIKEN, Japan; ³The University of Tokyo, Japan

SESSION SB02.07: Artificial Intelligence
Session Chairs: Vito Cacucciolo and Shingo Maeda
Wednesday Afternoon, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

1:30 PM *SB02.07.01

Physical Reservoir Computing—Novel Techniques for Generating Computing Materials [Kohei Nakajima](#); The University of Tokyo, Japan

SESSION SB02.08: Poster Session: Materials, Power Sources, Sensors, Actuators and Mechanics for Untethered Soft Robots

Session Chairs: Vito Cacucciolo, Kenjiro Fukuda, Shingo Maeda and Xiaomin Xu

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB02.08.02

Sustainable Highly Charged Polyimide in Non-Contact Mode Triboelectric Nanogenerator [Jae Won Lee](#)^{1,2}; ¹Yonsei University, Korea (the Republic of); ²Yonsei University KIURI Institute, Korea (the Republic of)

SB02.08.03

Channel-Free Transportation of Liquid Metal Droplets by Magnetically Active Microwall Arrays [Saebohm Jhang](#)¹, Jeong Eun Park¹, Jisoo Jeon¹, Christopher E. Tabor² and Jeong Jae Wie^{1,1}; ¹Inha University, Korea (the Republic of); ²Air Force Research Laboratory, United States

SB02.08.04

Performance-Enhancing Triboelectric Nanogenerator Device Based on PVDF-MOF Composite Nonofibers SangHyun Sohn, GeonJu Choi, BaDa On and Ilkyu Park; Seoul National University of Science and Technology, Korea (the Republic of)

SB02.08.05

Non-Power Multifunctional Flexible Sensors Based on Piezoionic Effect Tian Liang, Takaya Furuyama and Hidenori Okuzaki; University of Yamanashi, Japan

SB02.08.07

Ionic Conductors with Ionic Side Chain for Thermally Stable and Water-Processable for Stretchable and Self-Healable Thermal Sensor and Actuator Sungryoung Kim and Taiho Park; POSTECH, Korea (the Republic of)

SB02.08.08

Dual Terrafoil Appendage for Controlling Lift and Drag Forces on a Bioinspired Digging Robot Dylan Drotman, Shivam Chopra, Michael Tolley and Nick Gravish; University of California, San Diego, United States

SB02.08.09

Towards Untethered Soft Robotic Systems for Industrial Inspection Applications—Challenges and Possibilities Deepak Trivedi¹, Radislav A. Potyrailo¹, Mark Poliks², Shahrzad Towfighian², Chuck Zhang³, Kevin Wang³ and Zachary Farrell⁴; ¹GE Research, United States; ²Binghamton University, The State University of New York, United States; ³Georgia Institute of Technology, United States; ⁴UES, Inc., United States

SB02.08.10

Crosstalk Issues in Untethered Passive Arrays of Dielectric Elastomer Actuators Ehsan Hajiesmaili and David R. Clarke; Harvard University, United States

SB02.08.11

4D Precipitation Printing of Shape Memory Polymer Artificial Muscles Kyra Mclellan, Terek Li and Hani E. Naguib; University of Toronto, Canada

SB02.08.12

A Programmable Soft Tensile Valve for Analog Control of Soft Actuators Jun Kyu Choe, Junsoo Kim, Hyeonseo Song, Joonbum Bae and Jiyun Kim; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB02.08.13

Control of Spontaneous Chiral States in Flocks of Active Magnetic Rollers Alexey Snezhko; Argonne National Laboratory, United States

SB02.08.14

A Crawling Piezoelectric Ribbon—Design, Modeling, Control and Performance Zhiwu Zheng, Prakhar Kumar, Hsin Cheng, Yanan Chen, Minjie Chen, Sigurd Wagner, Naveen Verma and James C. Sturm; Princeton University, United States

SB02.08.18

Enhanced Output Performances of Triboelectric Nanogenerators Based on Facile Phase Inversion Based-Patterning Process GeonJu Choi¹, SangHyun Sohn¹, SeongHo Baek² and Ilkyu Park¹; ¹Seoul National University of Science and Technology, Korea (the Republic of); ²Dankook University, Korea (the Republic of)

SB02.08.19

Optical Fiber-Based Cholesteric Liquid Crystal Cell for Fiber-Optic Sensor Applications Soyeon Ahn, Young Seo Kim, Srinivas Pagidi, Jong-Hyun Kim, Moon-Deock Kim, Young-Jun Yu and Min Yong Jeon; Chungnam National University, Korea (the Republic of)

SB02.01.05

Phase Change in a Low Boiling Point Liquid Enables a Digging Soft Robot Shivam Chopra, Saurabh Jadhav, Nick Gravish and Michael Tolley; University of California, San Diego, United States

SESSION SB02.09: Locomotion
Session Chairs: Vito Cacucciolo, Yu Kuwajima and Shingo Maeda
Thursday Afternoon, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

1:30 PM *SB02.09.01

Efficient Soft Robots with Embodied Intelligence Cecilia Laschi; National University of Singapore, Singapore

2:00 PM SB02.09.02

Photomechanical Jumping of Soft Robotic Liquid Crystalline Polymer Networks Jisoo Jeon¹, Jun-Chan Choi², Gwangseok Lee³, Maenghyo Cho^{3,3}, Hak-Rin Kim^{2,2} and Jeong Jae Wie^{1,1}; ¹Inha University, Korea (the Republic of); ²Kyungpook National University, Korea (the Republic of); ³Seoul National University, Korea (the Republic of)

2:15 PM SB02.09.04

A Novel Mechanism for Untethered Crawling Gel Robots Aishwarya Pantula, Bibekananda Datta, Yupin Shi, Margaret Wang, Siming Deng, Jiayu Liu, Noah Cowan, Thao Nguyen and David H. Gracias; Johns Hopkins University, United States

2:30 PM SB02.09.05

Controlled Actuation of Light-Activated Liquid Crystalline Elastomers Enabled by Tunable Disruption of Order Taylor Hebner, Christopher Bowman and Timothy White; University of Colorado Boulder, United States

2:45 PM BREAK

SESSION SB02.10: Materials and Processing
Session Chairs: Vito Cacucciolo, Yu Kuwajima and Shingo Maeda
Thursday Afternoon, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

3:30 PM *SB02.10.01

High-Performance Soft Electrostatic Actuators for Untethered Robotics [Herbert R. Shea](#); Ecole Polytechnique Federale de Lausanne, Switzerland, Switzerland

4:00 PM SB02.10.02

Functional Composites That Contain Liquid Metal—Toward Soft Machines with Physical Intelligence [Michael Ford](#)¹ and Carmel Majidi²;
¹Lawrence Livermore National Laboratory, United States; ²Carnegie Mellon University, United States

4:15 PM SB02.10.03

Untethered Photothermal Activation of Liquid Metal Polyurethane Nanocomposites for Soft Robotics [Matthew Tan](#), Hyunwoo Bark, Gurunathan Thangavel and Pooi See Lee; Nanyang Technological University, Singapore

4:30 PM SB02.10.05

Iron-Catalyzed Laser-Induced Graphene—A Novel Approach Towards Green Electronics [Christopher H. Dreimol](#)^{1,2}, Guido Panzarasa^{1,2} and Ingo Burgert^{1,2}; ¹ETH Zürich, Switzerland; ²Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland

SESSION SB02.11: Power Sources
Session Chairs: Kenjiro Fukuda and Xiaomin Xu
Friday Morning, May 13, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 3

10:30 AM *SB02.11.01

Reinventing Batteries Through Materials Design [Yi Cui](#); Stanford University, United States

11:00 AM SB02.11.02

Soft Thin-Film Battery Using Mixed-Conducting Particulate Composites for Bioelectronics [Jaehyo Park](#) and Dion Khodagholy; Columbia University, United States

SESSION SB02.12: Actuators and Mechanics
Session Chairs: Vito Cacucciolo and Shingo Maeda
Monday Morning, May 23, 2022
SB02-Virtual

8:00 AM *SB02.12.01

Assistive Soft Robotics and Exoskeleton for Empowering People [Kenji Suzuki](#); University of Tsukuba, Japan

8:30 AM SB02.12.04

Magnetic Soft Robots Enabling New Biomedical Applications [Yoonho Kim](#) and Xuanhe Zhao; Massachusetts Institute of Technology, United States

8:45 AM SB02.12.05

Using Inverse Learning for Controlling Bionic Soft Robot Fish with SMA Actuators [Kewei Ning](#)¹, Pitoyo Hartono² and Hideyuki Sawada¹; ¹Waseda University, Japan; ²Chukyo University, Japan

9:00 AM SB02.08.15

Investigation of Magneto-Mechanical Behaviours of Magnetic-Elastomeric Membranes Using Fibre-Optic Interferometry [Zhi Li](#), Erwin J. Alles, Ivan P. Parkin, Adrien E. Desjardins and Sacha Noimark; University College London, United Kingdom

SESSION SB02.13: Electronics and Energy Harvesting I
Session Chairs: Kenjiro Fukuda and Xiaomin Xu
Monday Afternoon, May 23, 2022
SB02-Virtual

6:30 PM *SB02.13.01

Flexible Triboelectric Nanogenerators for Energy and as Sensors [Zhong Lin Wang](#)^{1,2}; ¹Georgia Institute of Technology, United States; ²Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China

7:00 PM *SB02.13.02

Electronic Skins with Ultrahigh Sensitivity and Tough Interfaces [Chuanfei Guo](#); Southern University of Science and Technology, China

7:30 PM SB02.13.03

Machine-Washable and Breathable Pressure Sensors Based on Triboelectric Nanogenerators Enabled by Textile Technologies [Zhizhen Zhao](#), [Lanyue Gan](#) and [Youfan Hu](#); Peking University, China

7:45 PM SB02.13.04

High-Performance Carbon Nanotube Based Transient Thin-Film Transistors with Good Uniformity for Complementary Electronics [Fan Xia](#) and [Youfan Hu](#); Peking University, China

8:00 PM SB02.13.05

A Highly Sensitive Wearable Fiber-Optic Sensor for Pressure and Shear Force Measurement [Heeju Mun](#), [Jung-Hwan Youn](#) and [Ki-Uk Kyung](#); Korea Advanced Institute of Technology (KAIST), Korea (the Republic of)

8:05 PM *SB02.13.06

Multimodal Flexible Sensor Sheet for Remote Healthcare Application [Kuni Takei](#); Osaka Metropolitan University, Japan

SESSION SB02.14: Electronics and Energy Harvesting II

Session Chairs: [Kenjiro Fukuda](#) and [Xiaomin Xu](#)

Monday Afternoon, May 23, 2022

SB02-Virtual

9:00 PM *SB02.14.01

Bio-Inspired Artificial Vision Using Curved Ultrathin Image Sensor Array [Dae-Hyeong Kim](#)^{1,2}; ¹Institute for Basic Science, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:30 PM *SB02.14.02

Next Generation Smart Apparel "e-skin" Based on Novel Stretchable Electronics [Ichiro Amimori](#); Xenoma Inc., Japan

10:00 PM SB02.14.03

Object Slippage Detection using Soft Sensor with Robotic Closed-Loop Feedback [Tomohito Sekine](#), [Yi-Fei Wang](#), [Jinseo Hong](#), [Yasunori Takeda](#) and [Shizuo Tokito](#); Yamagata University, Japan

10:15 PM SB02.14.04

Fully Printed Flexible Pressure Sensor with a Spontaneously Formed Porous Conductive Architecture [Yi-Fei Wang](#), [Tomohito Sekine](#), [Yasunori Takeda](#), [Jinseo Hong](#), [Ayako Yoshida](#) and [Shizuo Tokito](#); Yamagata University, Japan

10:30 PM SB02.11.03

Ultrathin and Efficient Organic Photovoltaics with Enhanced Air Stability by Suppression of Zinc Element Diffusion [Sixing Xiong](#)^{1,2}, [Kenjiro Fukuda](#)¹, [Yinhua Zhou](#)² and [Takao Someya](#)^{1,3}; ¹RIKEN, Japan; ²Huazhong University of Science & Technology, China; ³The University of Tokyo, Japan

10:45 PM SB02.08.06

54 cm² Large-Area Flexible Organic Solar Modules with Efficiency Above 13% [Lulu Sun](#)¹, [Fei Qin](#)² and [Yinhua Zhou](#)²; ¹RIKEN, Japan, Japan; ²Huazhong University of Science and Technology, China

10:50 PM SB02.08.01

Solution-Processed Electron-Transport Layer-Free Organic Photovoltaics with Liquid Metal Cathodes [Jiachen Wang](#)^{1,2}, [Kenjiro Fukuda](#)^{2,2} and [Takao Someya](#)^{1,2,2}; ¹The University of Tokyo, Japan; ²RIKEN, Japan

##PAGE_BREAK##

SYMPOSIUM SB03

Robotic Materials for Advanced Machine Intelligence

May 11 - May 25, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SB03.01: Bioinspired Actuators
Session Chairs: Michael Bartlett and Jeffrey Lipton
Wednesday Morning, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

9:00 AM *SB03.01.01

Plant-Inspired Soft Actuators Based on Shape-Memory Polymers [Andreas Lendlein](#)^{1,2}; ¹Helmholtz-Zentrum Hereon, Germany; ²University of Potsdam, Germany

9:30 AM SB03.01.02

All-solid Redox-enabled Actuation of Polymer Artificial Muscles [Sevketcan Sarikaya](#)¹, Frank Gardea², Jeffrey T. Auletta³, Alex Langrock³, David Mackie³ and Mohammad Naraghi^{1,1}; ¹Texas A&M University, United States; ²DEVCOM Army Research Laboratory South, United States; ³DEVCOM Army Research Laboratory, United States

9:45 AM SB03.01.03

Multi-functional spiderweb robots for adhesion, actuating, and sensing [Younghoon Lee](#), Won Jun Song and Jeong-Yun Sun; Seoul National University, Korea (the Republic of)

10:00 AM BREAK

10:30 AM SB03.01.05

3D Printing of Photoresponsive Gold Nanorod/Liquid Crystal Elastomer Composites Yuchen Wang, Rui Yin, Jordan R. Raney and [Shu Yang](#); University of Pennsylvania, United States

10:45 AM SB03.01.06

Robust and Repressable Artificial Muscles Based on Liquid Crystalline Elastomers with Dynamic Thiourea Bonds [Suk-Kyun Ahn](#), Jinhyeong Lee and Jaehee Bae; Pusan National Univ, Korea (the Republic of)

11:00 AM SB03.01.07

On-demand Transient Silicone Elastomer Composites for Soft Robotics [Young Hwan Kim](#), Minha Oh, Seungmin Lee, Junsang Lee and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

SESSION SB03.02: Shape Morphing and Mechanics
Session Chairs: Qiguang He, Ryan Truby and Binbin Ying
Wednesday Afternoon, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

1:30 PM *SB03.02.01

Electronics-Free Soft Robot with Multi-Stimuli Responsive Control [Qiguang He](#), Rui Yin, Weijian Jiao, Chengyang Mo, Yucong Hua and Jordan R. Raney; University of Pennsylvania, United States

2:00 PM SB03.02.02

Vital Signal Sensing Through Conformal, Variable Stiffness Gripping for Interlinkage with a Micro-Scale Organ [Yeonwook Roh](#), Seungyong Han, Je-Sung Koh, Daeshik Kang, Daseul Lim, Insic Hong, Changhwan Kim, Doohee Lee, Sunghoon Im, Dongjin Kim, Dohyeon Gong, Baekgyeom Kim, Damin Choi, Chaewan Im, Myungrae Hong and Jieun Park; Ajou University, Korea (the Republic of)

2:15 PM SB03.02.03

An Anti-Freezing, Ambient-Stable and Highly Stretchable Ionic Skin with Strong Surface Adhesion for Wearable Sensing and Soft Robotics [Binbin Ying](#)^{1,2}; ¹Massachusetts Institute of Technology, United States; ²University of Toronto, Canada

2:30 PM BREAK

3:00 PM SB03.02.04

Axial Point Group Auxetics with Emergent Rotational Responses Molly Carton and [Jeffrey Lipton](#); University of Washington, United States

3:15 PM SB03.02.05

Shape Morphing Mechanical Metamaterials for Soft Machines [Michael D. Bartlett](#), Dohgyu Hwang, Edward J. Barron III and A B M Tahidul Haque; Virginia Tech, United States

3:30 PM *SB03.02.06

Reconfigurable Soft Actuators That Can Hold a Load [Herbert R. Shea](#); Ecole Polytechnique Federale de Lausanne, Switzerland, Switzerland

SESSION SB03.03: Poster Session: Actuation, Sensing, and Modeling in Robotic Materials
Session Chairs: Jeffrey Lipton and Barbara Mazzolai
Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB03.03.01

Light Powered Liquid Crystal Elastomer Linear Actuators for Underwater Soft Robotics Wonbin Seo¹, Taylor H. Ware^{2,3}, Haebeom Lee¹ and Hyun Kim⁴; ¹School of Mechanical Engineering, Pusan National University, Korea (the Republic of); ²Department of Biomedical Engineering, Texas A&M University, United States; ³Department of Materials Science and Engineering, Texas A&M University, United States; ⁴Advanced Materials Division, Korea Research Institute of Chemical Technology, Korea (the Republic of)

SB03.03.02

Subcritical Phase Transitions in Supramolecular Liquid Crystalline Elastomers Kristin L. Lewis, Katie M. Herbert and Timothy White; University of Colorado Boulder, United States

SB03.03.05

Material Parameters Identification, Modeling and Experimental Verification of the New Smart Material for Soft Robotics Piotr Bartkowski; Warsaw University of Technology, Poland

SB03.03.06

Reconfigurable, Self-Healing, 3D DLP Printed Soft Robots Laura A. Sowards¹, Joseph G. Beckett^{1,2,3}, Carl J. Thrasher⁴, Braeden Windham^{2,5}, Allyson M. Cox⁵, Timothy H. Osborn⁵ and Robert L. Lowe²; ¹Air Force Research Laboratory, United States; ²University of Dayton, United States; ³UES, Inc., United States; ⁴Massachusetts Institute of Technology, United States; ⁵University of Dayton Research Institute, United States

SB03.03.07

Functional Hydrogels Integration in 3D Printed Microarchitectures for the Production of Magnetically Controlled Microdevices for Targeted Drug Delivery Roberto Bernasconi¹, Fabio Pizzetti¹, Arianna Rossetti¹, Brendan Butler¹, Marinella Levi¹, Salvador Pané², Filippo Rossi¹ and Luca Magagnin¹; ¹Politecnico di Milano, Italy; ²ETH Zürich, Switzerland

SB03.03.08

Electrically Tunable Reflection in Liquid Crystalline Elastomers Alexis T. Phillips, Timothy White, Kyle Schlafmann and Hayden Fowler; University of Colorado Boulder, United States

SB03.03.09

High-Speed Gesture-Cognitive Exo-Glove via Electrostriction Yuri Cho, Vinh Phu Nguyen, Hyun-Ki Lee, Mijin Kim and Seung Tae Choi; Chung-Ang University, Korea (the Republic of)

SB03.09.07

Sensitive and Stretchable Robot Safety Skin Based on Charge Accumulation Characteristics of PVC-Gel and Sintering-Free Liquid Metal Electrode Jongseok Nam, Kwangsook Park, Geonwoo Hwang, Hyejun Jeon, Hyungsoo Kim and Ki-Uk Kyung; KAIST, Korea (the Republic of)

SESSION SB03.04: Small Scale Robotic Materials

Session Chairs: Mihai Duduta, Barbara Mazzolai, Ryan Truby and Huichan Zhao

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

9:00 AM SB03.04.02

Reconfigurable Collective Swimming of Biomimetic Nanocomposite Robots Sukyoung Won^{1,1}, Hee Eun Lee^{1,1}, Young Shik Cho², Jeong Eun Park^{1,1}, Seung Jae Yang¹ and Jeong Jae Wie^{1,1}; ¹Inha University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:15 AM SB03.04.03

Agilely Reconfigurable Nanomotor Swarms Stimulated by Light in an Electric Field Zexi Liang^{1,2} and Donglei (Emma) Fan^{1,3}; ¹Materials Science and Engineering, The University of Texas at Austin, United States; ²Cornell University, United States; ³The University of Texas at Austin, United States

10:00 AM BREAK

SESSION SB03.05: Design and Fabrication

Session Chairs: Mihai Duduta, Barbara Mazzolai and Ryan Truby

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

10:30 AM *SB03.05.01

Granular Actuators—Soft Actuators Made of Discrete Grains Rebecca Kramer-Bottiglio; Yale University, United States

11:00 AM SB03.05.02

New Materials and Fabrication Strategies for Soft Robotics via Photopolymerization Matthew Hausladen, Boran Zhao, Matthew Kubala, Lorraine Francis, Timothy Kowalewski and Christopher J. Ellison; University of Minnesota-Twin Cities, United States

11:15 AM SB03.05.03

Embracing Complexity for Enduring and Adaptive Robots via Autonomous Materials and Additive Manufacturing Robert Shepherd; Cornell

University, United States

SESSION SB03.06: Robotic Material Systems
Session Chairs: Mihai Duduta, Barbara Mazzolai and Ryan Truby
Thursday Afternoon, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

1:30 PM *SB03.06.01

Origami for Tunable Soft Sensors and Actuators Kris L. Dorsey^{1,2,2}, Sonia Roberts², Jack Forman¹ and Hiroshi Ishii¹; ¹Massachusetts Institute of Technology, United States; ²Northeastern University, United States

2:00 PM SB03.06.02

Hydrogels as Sensors, Actuators and Drug Delivery Materials in a Combined Device Jeffrey S. Bates; Univ of Utah, United States

2:15 PM SB03.06.03

Electromagnetically-Controlled Shape Morphing Composite—New Material for Soft Robotics Piotr Bartkowski; Warsaw University of Technology, Poland

2:30 PM *SB03.06.04

Soft Aerial Robotics Mirko Kovac^{1,2}; ¹Imperial College London / Empa Robotics, United Kingdom; ²Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

SESSION SB03.07: Plant-Inspired Robotic Materials
Session Chairs: Mihai Duduta, Barbara Mazzolai and Ryan Truby
Friday Morning, May 13, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

10:30 AM SB03.07.02

Climbing Plant-Like Miniature Machines for Improving Natural Ecosystems Preservation Isabella Fiorello, Alessio Mondini, Fabian Meder and Barbara Mazzolai; Istituto Italiano di Tecnologia, Italy

10:45 AM *SB03.07.04

Motile Plant Structures as Inspiration for Actuating and Sensing Materials Systems in Soft Robots and Soft Machines Thomas Speck; University of Freiburg, Germany

SESSION SB03.08: Electroprogrammable Robotic Materials
Session Chairs: Mihai Duduta, Barbara Mazzolai, Ryan Truby and Huichan Zhao
Friday Afternoon, May 13, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

1:30 PM *SB03.08.01

Electro-Mechanically Responsive Ionoelastomer Heterojunctions Ryan C. Hayward; University of Colorado Boulder, United States

2:00 PM SB03.08.02

Artificial Stimuli-Response System Capable of Conscious Response Seongchan Kim¹, Dong Gue Roe², Youngjin Choi², Dong Hae Ho², Dong Un Lim² and Jeong Ho Cho²; ¹Sungkyunkwan University Advanced Institute of NanoTechnology, Korea (the Republic of); ²Yonsei University, Korea (the Republic of)

2:15 PM *SB03.08.03

Computational E-Skin Using Next Generation Printed Electronics Ravinder Dahiya; University of Glasgow, United Kingdom

SESSION SB03.09: General Session I
Session Chairs: Ryan Truby and Huichan Zhao
Wednesday Morning, May 25, 2022
SB03-Virtual

8:00 AM SB03.09.01

Automated Manipulation of Miniature Objects Underwater Using Air Capillary Bridges—Pick-and-Place, Surface Cleaning and Underwater Origami Tal Weinstein, Hagit Gilon, Or File, Camilla Sammartino and Bat-El Pinchasik; Tel Aviv University, Israel

8:15 AM SB03.09.02

A Biomimetic Soft Robot with Constant-Volume Actuation Inspired by Octopus Muscular Hydrostats Yiyuan Zhang¹, Haonan Zhang¹, Kuang Wang¹, Yuchen Liu¹, Yanru Mo¹, Cecilia Laschi² and Li Wen¹; ¹Beihang University, China; ²National University of Singapore, Singapore

8:30 AM SB03.09.03

3D Magnetic Liquid Crystal Elastomer Composite Structures for Untethered Soft Robotics Xueju Wang; University of Connecticut, United States

8:45 AM SB03.09.04

Genipin-Crosslinked Gelatin Bioplastics for Edible Origami Actuators Spencer Matonis, Bozhong Zhuang, Siya Scindia and Christopher J. Bettinger; Carnegie Mellon University, United States

9:00 AM SB03.09.05

3D Integrated Neuromorphic Humanoid Hand by Multi-Axis Robot 3D Printing Chao Bao and Woo Soo Kim; Simon Fraser University, Canada

9:15 AM SB03.09.06

Magnetic Catheter with Variable Stiffness and Self Sensing Using Electrically Conductive Polymer Zhengxin Yang and Li Zhang; The Chinese University of Hong Kong, Hong Kong

9:20 AM SB03.09.08

A Fully Textile End-effector : Integrated Actuator and Sensor System Ju-Hee Lee, Yeji Han and Min-Woo Han; Dongguk University, Korea (the Republic of)

9:25 AM SB03.09.09

Multi DOF Soft Manipulator that Mimics Elephant Trunk Minchae Kang, Hye Won Lee and Min-Woo Han; Dongguk University, Korea (the Republic of)

SESSION SB03.10: General Session II

Session Chair: Mihai Duduta

Wednesday Morning, May 25, 2022

SB03-Virtual

10:30 AM *SB03.10.01

Thermally Activated Smart Materials for Artificial Muscles and Morphing Applications Kyra McLellan, Ryan Nam, Ji Eun Li, Yu-Chen Sun and Hani E. Naguib; University of Toronto, Canada

11:00 AM SB03.10.02

Soft Multi-Responsive Actuators Based on Laser-Induced Graphene Alexander Dallinger¹, Paul Kindlhofer¹, Anna Maria Coclite¹ and Francesco Greco^{1,2}; ¹Graz University of Technology, Austria; ²Scuola Superiore Sant'Anna, Italy

##PAGE_BREAK##

SYMPOSIUM SB04

Advanced Soft Materials for Bioelectronic Interfaces

May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SB04.01: Poster Session I: Advanced Soft Materials for Bioelectronic Interfaces I

Session Chairs: Hyunhyub Ko and Myung-Han Yoon

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB04.01.01

Bacterial Cellulose Based Adhesive Platform for Oral Disease Management Juhi Singh, Terry W. Steele and Sierin Lim; Nanyang Technological University, Singapore

SB04.01.03

Thermally Drawn Flexible Fibers for Optical and Chemical Stimulation of the Enteric Nervous System Rajib Mondal, Atharva Sahasrabudhe, Karen

Ka Lam Pang and Polina Anikeeva; Massachusetts Institute of Technology, United States

SB04.01.04

Ex Situ Surface Modification of 3D Printed Biocompatible Polylactic Acid (PLA) Using Plasma Micro Discharge—Towards the Enhancement of Cell-Selective Surfaces and Scaffolds for Bioelectronic Interfaces [Mai Tser Yang](#)¹, Subhadip Sarkar¹, Damaris Batz¹, Deidra Hodges², Saquib Ahmed³ and Sankha Banerjee¹; ¹California State University, Fresno, United States; ²Florida International University, United States; ³Buffalo State College, United States

SB04.01.05

Conformable Off-Stoichiometric-Thiol-ene Epoxy Polymer ECoG Array [Eleonora Borda](#), Marta Airaghi Leccardi, Danashi I. Medagoda and Diego Ghezzi; Ecole Polytechnique Federale de Lausanne, Switzerland

SB04.01.07

A Novel Carbon Fiber Electrode Array for Deep Brain Recording and Stimulation [Megan N. Baker](#), Grace Jeanpierre and Samantha Santacruz; University of Texas at Austin, United States

SB04.01.10

Bundle of Thin Multifunctional Fibers Enables Multi-Colors and Multi-Drugs Delivery and Multi-Site Recordings [Jongwoon Kim](#), Earl Gilbert, Hnejj Huang, Bishan Shourie, Yujing Zhang, Daniel English and Xiaoting Jia; Virginia Tech, United States

SB04.01.11

Development and Characterization of PLA-Graphene Composite Based Active Biocompatible Interfaces—Towards the Development of Electroactive Scaffolds and Interfaces for Targeted Drug Delivery [Subhadip Sarkar](#)¹, Mai Tser Yang¹, Damaris Batz¹, Edertho Leal-Quiros^{2,1}, Deidra Hodges³, Saquib Ahmed⁴ and Sankha Banerjee¹; ¹California State University, Fresno, United States; ²University of California, Merced, United States; ³Florida International University, United States; ⁴Buffalo State College, United States

SB04.01.12

Superabsorbent Ion-Conductive Hydrogels with Predefined Nano/Microscale Geometry and Controlled Swelling Properties for Versatile 3D Cell Culture Scaffolds [Sungrok Wang](#), Dongmi Heo, Alexander Tipan and Myung-Han Yoon; Gwangju Institute of Science and Technology, Korea (the Republic of)

SB04.01.13

eSee-Shells—Transparent Electrode Arrays on Polymer Skulls for Cortex-Wide Opto-Electrophysiological Recordings Preston D. Donaldson, Zahra Navabi, Russell E. Carter, Skylar M. Fausner, Leila Ghanbari, Timothy J. Ebner, [Sarah L. Swisher](#) and Suhasa Kodandaramaiah; University of Minnesota, United States

SB04.01.14

Thin, Wireless Photovoltaic Cortical Stimulator [Danashi I. Medagoda](#), Eleonora Borda and Diego Ghezzi; Ecole Polytechnique Federale de Lausanne, Switzerland

SESSION SB04.02: Soft Materials for Bioelectronic Interfaces I

Session Chairs: Pawan Jolly and Jeong-Yun Sun

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 1

9:00 AM SB04.02.01

Influence of Molecular Weight on the Organic Electrochemical Transistor Performance of Ladder-Type Conjugated Polymers Han-Yan Wu^{1,1}, Chi-Yuan Yang¹ and [Simone Fabiano](#)^{1,1,2}; ¹Linköping University, Sweden; ²n-Ink AB, Sweden

9:15 AM SB04.02.02

Molecular-Orientation-Dependent Ion Transport Dynamics in Organic Mixed Ionic Electronic Conductors [Ji Hwan Kim](#)¹, Roman Halaksa², Christian Nielsen² and Myung-Han Yoon¹; ¹Gwangju Institute of Science & Technology, Korea (the Republic of); ²Queen Mary University of London, United Kingdom

9:30 AM *SB04.02.03

Impact of Doping on the Mechanical Properties of Conjugated Polymers [Christian Muller](#); Chalmers University of Technology, Sweden

SESSION SB04.03: Soft Materials for Bioelectric Interfaces II

Session Chairs: Sahika Inal and Christian Muller

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 1

1:30 PM *SB04.03.04

A New Bioelectronic Approach to Continuous Monitoring of Protein Biomarkers [Shana Kelley](#); Northwestern University, United States

2:00 PM SB04.03.01

Ionic Liquid Incorporated Porous Polymers with Tunable Morphology and High Ionic Conductivity for Applications in 3D Printed Sensors [Kumkum Ahmed](#) and Naofumi Naga; Shibaura Institute of Technology, Japan

2:15 PM SB04.03.02

Template-Directed Synthesis of Tissue-Like Conductive Hydrogels for Bioelectronics Jooyeun Chong and Jiheong Kang; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

2:30 PM BREAK

3:00 PM *SB04.03.03

eRapid: Antifouling Nanocomposite Coating Enables Multiplexed Electrochemical Detection of Biomarkers in Samples as Complex as Human Blood Pawan Jolly; Wyss Institute at Harvard, United States

3:30 PM SB04.03.05

Electro-Responsive, Smart Adhesive Utilizing Mussel Adhesive Chemistry Bruce Lee; Michigan Technological Univ, United States

SESSION SB04.04: Poster Session II: Advanced Soft Materials for Bioelectronic Interfaces II

Session Chairs: Michael Dickey and Suk-Won Hwang

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB04.04.01

Laser Enhancement of Pristine PEDOT:PSS Conductivity and Applications in Organic Electronics Joseph Troughton¹, Jhonatan Rodriguez-Pereira², Nathalie Peillon¹, Jan M. Macak², Thierry Djenizian^{1,3} and Marc Ramuz¹; ¹Ecole des Mines de Sainte Etienne, France; ²University of Pardubice, Czechia; ³Al-Farabi Kazakh National University, Kazakhstan

SB04.04.04

Plasmonic MXene Composites for Biomimetic Photothermoionic Nanaochannel with Directional Ion Flow Jeonghee Yeom, Ayoung Choe, Jinyoung Kim, Jeeyoon Kim and Hyunhyub Ko; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB04.04.06

Operation Mechanism of Organic Electrochemical Transistors as Redox Chemical Transducers Siew Ting Melissa Tan and Alberto Salleo; Stanford University, United States

SB04.04.07

Strain Sensor with Self-Healing Ability Using a Dry-Resistant Hydrogel-Based Conductive Composite Jungyoon Seo, Giheon Choi, Seungtaek Oh and Hwasung Lee; Hanyang University, Korea (the Republic of)

SB04.04.08

Electrochemical Synthesis of Soluble Self-Doped poly(3,4-ethylenedioxythiophene) and Application to Flexible Biosensors Yuxin Jing, Fumika Miyai and Hidenori Okuzaki; University of Yamanashi, Japan

SB04.04.10

Alkyl- π Functional Molecular Liquids as Novel Optical and Electronic Soft Materials Ravindra K. Gupta and Takashi Nakanishi; National Institute for Materials Science (NIMS), Japan

SB04.04.11

Rheological Properties of Cellulose Nano Fibrillar Hydrogels at Low Volume Fractions Rebecca Östmans¹, Tobias Benselfelt¹, Stefan Lindström² and Lars Wagberg¹; ¹KTH Royal Institute of Technology, Sweden; ²Linköping University, Sweden

SB04.04.12

Electrically and Ionically Conductive Supramolecular Hydrogels for Bioelectronic Applications Stephen J. O'Neill, Zehuan Huang, Jiaxuan Li, Jade A. McCune, George G. Malliaras and Oren A. Scherman; University of Cambridge, United Kingdom

SB04.04.14

Gel-Gated Graphene Transistor Tattoo Sensors Nandu Koripally, Dmitry Kireev and Deji Akinwande; The University of Texas at Austin, United States

SB04.04.15

A Rapidly Stabilizing Water-Gated Field-Effect Transistors Based on Printed Single-Walled Carbon Nanotubes for Biosensing Applications Fabrizio A. Viola and Mario Caironi; Italian Institute of Technology, Italy

SESSION SB04.05: Soft Materials for Bioelectronic Interfaces III

Session Chairs: Kenjiro Fukuda and Sang-Woo Kim

Wednesday Morning, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 1

9:00 AM SB04.05.01

Integrating Molecular Pendulums with Laser-Engraved Graphene for Continuous Wearable Biosensing Alam Mahmud¹, Connor Flynn¹, Yiran Yang², Jiaobing Tu², Hanie Yousefi¹, Jagotamoy Das¹, Dingran Chang¹, Edward H. Sargent¹, Wei Gao² and Shana Kelley^{3,1,1}; ¹University of Toronto, Canada; ²California Institute of Technology, United States; ³Northwestern University, United States

9:15 AM *SB04.05.02

Laser-Engraved Wearable Bioelectronics Wei Gao; California Institute of Technology, United States

9:45 AM BREAK

10:15 AM *SB04.05.04

Air-Permeable Waterproofing Stretchable Electrodes for Healthcare Devices Unyong Jeong and Sung-Min Park; Pohang University of Science and Technology, Korea (the Republic of)

10:45 AM SB04.05.05

Strategies to Functionalized Liquid Metal Surfaces For Biostable and High Performance Bioelectronic Applications. Huanan Zhang and Taehwan Lim; University of Utah, United States

SESSION SB04.06: Soft Materials for Bioelectronic Interfaces IV

Session Chairs: Wei Lin Leong and Myung-Han Yoon

Wednesday Afternoon, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 1

1:30 PM *SB04.06.01

Strategies of Ultraflexible Organic Devices Toward Self-Powered Bioelectronic Applications Kenjiro Fukuda¹, Steven I. Rich¹, Sixing Xiong¹, Masahito Takakuwa¹ and Takao Someya^{1,2}; ¹RIKEN, Japan; ²The University of Tokyo, Japan

2:00 PM SB04.06.03

Self-Adhesive Intrinsically Conducting Polymer Blends as Conformal Dry Electrodes for High-Quality Epidermal Biopotential Monitoring Jianyong Ouyang; National University of Singapore, Singapore

2:15 PM *SB04.06.04

Triboelectric Nanogenerator as a New Energy Solution for Biomedical Applications Sang-Woo Kim; Sungkyunkwan University, Korea (the Republic of)

3:15 PM SB04.06.05

Soft Thermoelectric Materials for Human Skin—Self-Healing, Stretching and Thermal Contact Properties Jaeyoung Jang; Hanyang University, Korea (the Republic of)

3:00 PM BREAK

3:30 PM SB04.06.06

Flexible and Transparent Reduced Graphene Oxide Strain Gauges with Tuneable Piezoresistivity for Wearable Sensing Applications Joe Neilson and Brian Derby; The University of Manchester, United Kingdom

3:45 PM SB04.06.07

Mechanical Characterization of Collagen Hydrogels by Quasi-static Uniaxial Tensile Experiments Dongchan Jang¹, Jieung Kim¹, Sangmin Lee¹, Taek-Soo Kim¹ and Hyunjoon Kong²; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²University of Illinois at Urbana-Champaign, United States

4:00 PM SB04.06.08

A Self-Powered Pulse Monitoring System Based on Triboelectric Nanogenerator and Supercapacitor for Carotid Artery Pulse Wave Sensing Hyejun Kil, Ey-In Lee, Jiwan Jeon and Jin-Woo Park; Yonsei University, Korea (the Republic of)

SESSION SB04.07: Poster Session III: Advanced Soft Materials for Bioelectronic Interfaces III

Session Chairs: Sahika Inal and Unyong Jeong

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB04.07.01

Noble Stretchable Nanomembrane Electrode with Exceptional Performance Chaehong Lim, Dongjun Jung, Hyung Joon Shim, Taeghwan Hyeon and Dae-Hyeong Kim; Seoul National University, Korea (the Republic of)

SB04.07.02

Multimodal Monitoring of Electrocardiogram and Oximetry by Wearable Textile Bands Jiaxi Liu, Thy Le and Tse Nga Ng; University of California, San Diego, United States

SB04.07.04

Beyond Gallium Oxide—Modifying Liquid Metal Core-Shell Mechanical Properties via SiO₂-Coatings Wilson Kong^{1,2}, Zachary Farrell^{3,1} and Christopher E. Tabor¹; ¹Air Force Research Laboratory, United States; ²National Research Council, United States; ³UES, Inc., United States

SB04.07.05

Stretchable PVA/LiCl Composite Hydration Sensor for Touchless Human-Machine Interface Sangyun Na, Yeju Kwon, Jeonghee Yeom and Hyunhyub Ko; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB04.07.06

Engineered Strain Gradients for Hybrid Integration of Rigid Electronics on Soft Biointerfaces [Valentina M. Paggi](#), Arthur Jaccottet and Stephanie P. Lacour; École Polytechnique Fédérale de Lausanne, Switzerland

SB04.07.07

Binary Spiky/Spherical Nanoparticle Films with Hierarchical Micro/Nanostructures for High-Performance Flexible Pressure Sensors [Young-Ryul Kim](#), Minsoo Kim, Jinyoung Kim, Dong-hee Kang and Hyunhyub Ko; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB04.07.08

Frequency-Selective Acoustic and Haptic Smart Skin for Dual-Mode Dynamic/Static Human-Machine Interface [Dong-hee Kang](#), Jonghwa Park, Heeyoung Chae, Seungse Cho, Youngoh Lee, Jae Joon Kim and Hyunhyub Ko; UNIST, Korea (the Republic of)

SB04.07.09

Triboelectric Array by Selective UV Irradiation of Thermoplastic Block Copolymer for Tactile Sensor [Junho Jang](#), Dongwook Kim, Unyong Jeong and Jinkon Kim; POSTECH, Korea (the Republic of)

SB04.07.10

Highly Elastic and Biodegradable Metallic Glass for Stretchable Disposable Electronics [Jac-Young Bae](#), Kyung-Sub Kim, Young-Seo Kim and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

SB04.07.11

Two-Dimensional Mono-Layered MXene for Flexible Electronic Devices [Jinyoung Kim](#)¹, Geonyoung Jeong¹, Moonjeong Jang², Ki-Seok An² and Hyunhyub Ko¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Korea Research Institute of Chemical Technology, Korea (the Republic of)

SB04.07.12

An e-Body Painting by Printable Liquid Metal for Biometric Measurement [Hisaya Yamane](#)¹, Takaaki Nishikawa¹, Yuta Fukuoka¹, Naoji Matsuhisa^{2,3} and Norihisa Miki¹; ¹Keio university, Japan; ²Keio University, Japan; ³JST, Japan

SB04.07.13

Fabrication of Porous poly(vinylidene fluoride) Fiber via Phase Separation with Low-Toxic Diluent During Thermal Drawing Process [Namhun Her](#), Seungmin Lee, Jung Bin In and Seung Tae Choi; Chung-Ang University, Korea (the Republic of)

SB04.07.14

Antagonistic Diatom Interface for Biotic Triboelectric Nanogenerators Araz Rajabi-Abhari, [Jeehee Lee](#), Haeshin Lee and Il-Kwon Oh; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SB04.07.15

Stretchable Shape Memory Alloy Thin Films for Bioelectronics [Sabrina M. Curtis](#)^{1,2}, Duygu Dengiz¹ and Eckhard Quandt¹; ¹Kiel University, Germany; ²University of Maryland, United States

SB04.07.16

High Elastic Modulus, Ion Responsive Hydrogel as a Wearable Sensor Material [Abhishek Pachauri](#) and Jeffrey S. Bates; The University of Utah, United States

SB04.07.17

Study of Electronic Platforms with Controlled Stretchability Alexa Argento, Eva Von Dell and [Rejhaneh Jamshidi](#); University of Hartford, United States

SB04.07.18

Formulating Conductive Inks of Nanowires Built from Silver Nanoparticle Precursors [Brian M. Cole](#)¹, Faris Albarghouthi¹, Nicholas X. Williams², David Needham¹ and Aaron D. Franklin^{1,1}; ¹Duke University, United States; ²Northwestern University, United States

SB04.07.19

Optimization of the Crystalline Structure of Interlocked Polymer for Piezoelectric Elastomer [Bitgaram Kim](#)¹, Jiae Seo¹, Min-Seok Kim² and Ji-Hun Seo¹; ¹Korea University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

SB04.07.20

Fabrication of Conductive Polymer-Conjugated Citrate-Based Elastic Cardiac Patch [Xinlong Wang](#), Wubin Bai, Yugang Liu, Hanjun Ryu, Chongwen Duan, Bin Jiang, John A. Rogers and Guillermo Amecr; Northwestern University, United States

SB04.07.21

Designing Elastomers for Flexible Intracranial Pressure Sensors [Razieh Khalifehzadeh](#), Siavash Kananian, Ada Poon and Zhenan Bao; Stanford University, United States

SESSION SB04.08: Soft Materials for Bioelectronic Interfaces V

Session Chairs: Mary Donahue and Sheng Xu

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 1

9:30 AM SB04.08.01

3D Printed Dopamine Biosensor [Matteo Massetti](#); Linköping University, Sweden

9:45 AM SB04.08.02

Characterizing Mechanical Properties of PEGDA-Silica Hydrogels for Bone Wound Healing Greta C. Fischer and Jose Luis Leon; California State University, Chico, United States

10:00 AM BREAK

10:30 AM *SB04.08.04

The Material-Tissue Interface is Key to Bioelectronic Implant Performance Thomas Stieglitz^{1,1,1}, Maria Vomero^{2,1,1}, Boehler Christian^{1,1}, Paul Cvancara^{1,1}, Maria Francisca Porto Cruz¹, Jennifer Schulte¹, Ioana-Georgina Vasilas^{1,1}, Calogero Gueli¹, Danesh Ahouri Vajari^{1,1}, Luciano Fadiga^{3,4} and Maria Asplund^{1,1}; ¹University of Freiburg, Germany; ²Columbia University, United States; ³Istituto Italiano di Tecnologia, Italy; ⁴University of Ferrara, Italy

11:00 AM *SB04.08.05

Sustainable Soft Electronic and Robotic Systems Martin Kaltenbrunner; Johannes Kepler University, Austria

11:30 AM SB04.08.06

Chronic Neuromodulation and Recording Tools for Freely Moving Subjects Philipp Gutruf; University of Arizona, United States

11:45 AM SB04.08.07

Towards Dynamic Bioelectronic Implants for Neural Interfaces Christopher M. Proctor; University of Cambridge, United Kingdom

SESSION SB04.09: Soft Materials for Bioelectronic Interfaces VI

Session Chairs: Sahika Inal and Martin Kaltenbrunner

Thursday Afternoon, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral I

1:30 PM *SB04.09.01

Peripheral Nerve Interfaces—Optimizing Wireless Optoelectronic Stimulation Mary J. Donahue; Linköping University, Sweden

2:00 PM *SB04.09.02

Fiber-Based Interfaces with Central and Peripheral Neural Circuits Polina Anikceva; Massachusetts Institute of Technology, United States

2:30 PM SB04.09.03

Multifunctional Ferromagnetic Fiber Robots for Navigation, Sensing and Modulation in Biomedical Applications Yujing Zhang¹, Xiaobo Wu¹, Anand Vadlamani¹, Youngmin Lim¹, Jongwoon Kim¹, Earl Gilbert¹, Shan Jiang¹, Harald Sontheimer², Satoru Emori¹, Daniel English¹, Rafael Davalos¹, Steven Poelzing¹ and Xiaoting Jia¹; ¹Virginia Tech, United States; ²University of Virginia, United States

2:45 PM SB04.09.04

Self-Healing Liquid Metal Composite for Reconfigurable and Recyclable Soft Electronics Michael D. Bartlett, Ravi Tutika and A B M Tahidul Haque; Virginia Tech, United States

3:00 PM BREAK

3:30 PM *SB04.09.05

Soft Ultrasonic Technologies for Deep Tissue Sensing Sheng Xu; University of California, San Diego, United States

4:00 PM SB04.09.06

The Dark Side of the Spine—Using Flexible Bioelectronics to Interface with the Spinal Cord Ben Woodington and Jiang Lei; University of Cambridge, United Kingdom

4:15 PM SB04.09.07

Calcium-Modified Silk-Based Ultrasound Coupling Medium for Ultrasound Applications Sang-Mok Lee¹, Taemin Lee¹, Hyojung Kim¹, Yehhyun Jo¹, Subeen Kim¹ and Hyunjoo J. Lee^{1,2,3}; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²KAIST Institute for Health Science and Technology, Korea (the Republic of); ³KAIST Institute for NanoCentury, Korea (the Republic of)

4:30 PM SB04.09.08

One-Step Fabrication of Doped-Graphene Flexible Biosensors for Electrochemical Detection of Neurotransmitters with Nanomolar Sensitivity Ki-Ho Nam, Moataz Abdulhafez, Elisa Castagnola, Golnaz Najaf Tomaraci, Xinyan Cui and Mostafa Bedewy; University of Pittsburgh, United States

4:45 PM SB04.09.09

Label-Free Sensing of Neuropeptide Y Using AC-Mode Graphene Field Effect Transistors in Physiologically Relevant Fluids Biddut Sarker^{1,2}, Ahmad E. Islam¹, Rhett L. Martineau^{1,2}, Cheri Hamton^{1,2}, Nancy Kelley-Loughnane¹ and Lawrence F. Drummy¹; ¹Air Force Research Laboratory, United States; ²UES, Inc., United States

SESSION SB04.10: General Session I

Session Chairs: Hyunhyub Ko and Myung-Han Yoon

Monday Morning, May 23, 2022

SB04-Virtual

10:30 AM *SB04.08.03

Miniaturized Dopamine Sensor for Midbrain Organoids Eunyong Jang, Yoojeong Kim, Kiup Kim and [Hyunjoo J. Lee](#); KAIST, Korea (the Republic of)

11:00 AM *SB04.10.01

Organic Electronic Devices for Interfacing Cells in Microphysiological Systems Erica Zeglio¹, Sebastian Buchmann¹, Damia Mawad², Mahiar M. Hamed¹ and [Anna Herland](#)^{3,1}; ¹KTH Royal Institute of Technology, Sweden; ²University of New South Wales, Australia; ³Karolinska Inst, Sweden

11:30 AM SB04.10.03

Wearable Electrochemical Platform for Non-Invasive Biofluids Analysis Based on Laser-Induced Graphene Federico Vivaldi^{1,2}, [Alexander Dallinger](#)³, Noemi Poma¹, Andrea Bonini¹, Denise Biagini¹, Pietro Salvo², Arianna Tavanti¹, Francesco Greco^{3,4} and Fabio Di Francesco¹; ¹University of Pisa, Italy; ²National Research Council, Italy; ³Graz University of Technology, Austria; ⁴Scuola Superiore Sant'Anna, Italy

11:45 AM SB04.10.04

Tuning the Impedance of Flexible Neural Interfaces by Controlled Polymerization of PEDOT:PSS to Resolve Epileptic Fast Ripples [Sevedeh Hajar Mousavi](#)¹, Esma Ismailova¹, Gautier Dauluy², Gabreil Dieuset², Mariam Alharrach² and Fabrice Wendling²; ¹École des Mines de Saint-Étienne, France; ²UMR Inserm - Université de Rennes 1, France

11:50 AM SB04.10.05

3D Printing Multifunctional Hydrogels for Controlled Vapor Release Afra Alketbi, [Aikifa Raza](#), Hongaxia Li and TieJun Zhang; Khalifa University of Science and Tehcnology, United Arab Emirates

11:55 AM SB04.10.06

Soft Polymers and Microbial Photosynthesis Rossella Labarile^{1,2}, Danilo Vona², Gabriella Buscemi^{2,1}, Maria Varsalona^{2,1}, Gianluca M. Farinola² and [Massimo Trotta](#)¹; ¹Consiglio Nazionale delle Ricerche, Italy; ²Università degli Studi di Bari Aldo Moro, Italy

12:00 PM SB04.05.03

Enzymatically Polymerized Organic Conductors on Model Membranes [Diana Priyadarshini](#); Linköping University, Sweden

12:15 PM SB04.10.02

Autonomous Self-Healing Interfaces and Devices [Benjamin C. Tee](#)^{1,2}; ¹National University of Singapore, Singapore; ²iHealthtech, Singapore

SESSION SB04.11: General Session II
Session Chairs: Hyunhyub Ko and Myung-Han Yoon
Tuesday Morning, May 24, 2022
SB04-Virtual

8:00 AM *SB04.11.01

Intrinsically-Soft Electronic Materials for Skin-Mountable Electronics [Dae-Hyeong Kim](#)^{1,2}; ¹Institute for Basic Science, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

8:30 AM *SB04.11.02

Ion-to-Ion Amplification Through an Open Junction Ionic Diode [Jeong-Yun Sun](#); Seoul National University, Korea (the Republic of)

9:00 AM *SB04.11.03

Engineering Mixed Ionic/Electronic Materials for On-Skin Electronics and Robotics [Wei Lin Leong](#); Nanyang Technological University, Singapore

9:30 AM *SB04.02.05

Soft, Resorbable Bioelectronics [Suk-Won Hwang](#); Korea University, Korea (the Republic of)

SESSION SB04.12: General Session III
Session Chairs: Hyunhyub Ko and Myung-Han Yoon
Tuesday Afternoon, May 24, 2022
SB04-Virtual

4:00 PM *SB04.12.01

Wearable Sweat Sensors—Towards Big Data for Human Health [Ali Javey](#); University of California, Berkeley, United States

4:30 PM *SB04.12.02

A Novel Electrochemical Conductive Polymer Interface for Controlled Capture/Release of Biological Entities [Jadranka Travas-Sejdic](#)^{1,2}; ¹The University of Auckland, New Zealand; ²The MacDiarmid Institute of Advanced Materials and Nanotechnology, New Zealand

5:00 PM SB04.12.03

Wireless, Battery-Free Push-Pull Microsystems for Membrane-Free Neurochemical Sampling in Freely Moving Animals Guangfu Wu and [Yi Zhang](#); University of Connecticut, United States

5:15 PM SB04.12.04

Soft Biosensing Harnessing Nanoporous Conductive Wires [Momena Monwar](#) and M. Rashed Khan; University of Nevada, Reno, United States

5:20 PM SB04.04.13

Specific Ion Effects on the Assembly of Ionic Amphiphilic Oligomers Elucidated by Spectroscopy and Neutron Reflectivity [Zening Liu](#), Charles P.

Collier, Benjamin Doughty, Tianyu Li, Hanyu Wang, Jim Browning, Kunlun Hong and John Katsaras; Oak Ridge National Laboratory, United States

5:25 PM *SB04.02.04

Bio-Sourced Organic Materials for Biodegradable Electronics [Clara Santato](#); Ecole Polytechnique de Montreal, Canada

##PAGE_BREAK##

SYMPOSIUM SB05

Tissue-Like Bioelectronics and Living Bioelectronic Interfaces

May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SB05.01: Tissue-Like Bioelectronics and Conducting Hydrogels

Session Chairs: Ivan Minev, Alexandra Rutz and Christina Tringides

Monday Afternoon, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Sea Pearl 1

1:30 PM *SB05.01.01

Stretchable and Highly Conductive Polymer Hydrogels [Hidenori Okuzaki](#); University of Yamanashi, Japan

2:00 PM *SB05.01.02

Soft Mixed Conductors Towards Enhanced Sensing and Tissue Regeneration [Jonathan Rivnay](#); Northwestern University, United States

2:30 PM SB05.01.03

Tissue-Like Conductive Hydrogel Materials [Christina M. Tringides](#)^{1,2}, [Marjolaine Boulingre](#)^{1,3} and [David J. Mooney](#)^{1,2}; ¹Harvard University, United States; ²Wyss Institute, United States; ³Ecole Polytechnique Federale Lausanne, Switzerland

2:45 PM SB05.01.04

New Strategies for the Preparation of Electronically-Conductive Hydrogels [Laure V. Kayser](#); University of Delaware, United States

3:00 PM BREAK

3:30 PM *SB05.01.05

Electrically Conductive Hydrogels for Multimodal Bioelectronic Interfaces [Ivan Minev](#); University of Sheffield, United Kingdom

4:00 PM SB05.01.06

Hydrogel Neural Interfaces—A Robust and Modular Toolbox for Neuroscience [Anthony Tabet](#), [Veronica Will](#) and [Polina Anikeeva](#); Massachusetts Institute of Technology, United States

4:15 PM SB05.01.07

Ion-Based Conformable Integrated Neural Implant [Zifang Zhao](#)¹, [Claudia Cea](#)¹, [Jennifer Gelinas](#)^{2,2} and [Dion Khodagholy](#)¹; ¹Columbia University, United States; ²Columbia University Medical Center, United States

SESSION SB05.06 Poster Session: Tissue-Like Bioelectronics and Living Bioelectronic Interfaces

Session Chairs: Alexandra Rutz and Christina Tringides

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB05.06.01

Electrophoretic Hybrid Devices for Brain Cancer Therapy [Tobias Naegele](#), [Johannes Gurke](#) and [George G. Malliaras](#); University of Cambridge, United Kingdom

SB05.06.02

Printing of Wireless Soft Neural Interface Systems for Recording Neural Activities in the Brain Yong Won Kwon^{1,2}, Young-Geun Park^{1,2} and Jang-ung Park^{1,2}; ¹Yonsei University, Korea (the Republic of); ²Yonsei-IBS Institute, Korea (the Republic of)

SB05.06.03

Development of a Transient and Minimally Invasive Neural Interface Adele Fanelli¹, Laura Ferlauto², Paola Vagni³, Katia Monsorno⁴, Elodie Zollinger¹, Olivier Brina⁵, Philippe Reymond⁵, Paolo Machi⁵, Rosa Chiara Paolicelli⁴ and Diego Ghezzi¹; ¹Ecole Polytechnique Federale de Lausanne, Switzerland; ²Università di Bologna, Italy; ³New York University, United States; ⁴Université de Lausanne, Switzerland; ⁵Hôpitaux Universitaires de Genève, Switzerland

SB05.06.04

Chronically Stable Thin-Film PEDOT: PSS Electrodes for Neurostimulation Poppy J. Oldroyd and George G. Malliaras; University of Cambridge, United Kingdom

SB05.06.05

Target Frequency Controllable Vibration Damping Hydrogel Filter for Bio-Attachable Sensors Jehyung Ok and Tae-il Kim; Sungkyunkwan University, Korea (the Republic of)

SB05.06.06

Key Factors for Maximizing the Stability of PEDOT:PSS Organic Electrochemical Transistors Sophia Bidinger, Sanggil Han, George G. Malliaras and Tawfique Hasan; University of Cambridge, United Kingdom

SESSION SB05.09: Tissue-Interfacing and Cell-Mimicking Bioelectronics
Session Chairs: Alejandro Carnicer Lombarte, Damia Mawad and Alexandra Rutz
Thursday Morning, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Sea Pearl 1

8:45 AM *SB05.09.01

Bioelectronic Tools to Study the Gut-Brain Axis Róisín M. Owens; University of Cambridge, United Kingdom

9:15 AM SB05.09.02

Seamless Integration of Bioelectronic Interface in an Animal Model via *In Vivo* Polymerization of Conjugated Oligomers Giuseppina Tommasini¹, Gwennaël R. Dufil², Claudia Tortiglione¹ and Eleni Stavriniidou²; ¹Consiglio Nazionale delle Ricerche, Italy; ²Linköping University, Sweden

9:30 AM SB05.09.03

***In Situ* Electrochemical Generation of Signaling Molecules for Neuronal Modulation** Jimin Park, Karthish Manthiram and Polina Anikeeva; Massachusetts Institute of Technology, United States

9:45 AM BREAK

10:15 AM SB05.09.04

Thin-Film Peripheral Nerve Cuffs for Chronic High-Resolution Interfacing and Long-Term Stability Alejandro Carnicer Lombarte, Alexander Boys, Johannes Gurke, Sam Hilton, Damiano G. Barone and George G. Malliaras; University of Cambridge, United Kingdom

10:30 AM SB05.09.05

Enzymatic Polymerization of Cell-Templated Electrodes Hanne Biesmans, Xenofon Strakosas, Caroline Lindholm, Daniel Simon and Magnus Berggren; Linköping University, Sweden

10:45 AM SB05.09.06

***In Vivo* Polymerization of Thiophene Oligomers in Plants for Energy and Sensing Applications** Gwennaël R. Dufil¹, Daniele Mantione², Daniela Parker¹, Emin Istif^{2,3} and Eleni Stavriniidou¹; ¹Linköping University, Sweden; ²Université de Bordeaux, France; ³Koç University, Turkey

SESSION SB05.10: General Session I
Session Chairs: Antonio Lauto and Damia Mawad
Monday Afternoon, May 23, 2022
SB05-Virtual

9:00 PM *SB05.10.02

Biocompatible Wireless Device for Stimulation and Repair of Peripheral Nerves Without Electrodes Antonio Lauto; Western Sydney University, Australia

9:30 PM SB05.10.03

Soft, Stretchable and Conformable Bioelectronic Device for Neural Modulation Tao Zhou and Xuanhe Zhao; Massachusetts Institute of Technology, United States

9:45 PM SB05.10.04

Growth-Adaptive Biodevices for Pediatric Electronic Medicine Yuxin Liu; Institute of Materials Research and Engineering, Singapore

10:00 PM *SB05.10.06

Integrated Bioelectronic Proton-Gated Logic Elements Utilizing Nanoscale Patterned Nafion Jan G. Glusckke¹, Jakob Seidl¹, Roman Lyttleton^{2,1}, Ky

Nguyen¹, Maxime Lagier¹, Frank Meyer¹, Peter Krogstrup³, Jesper Nygard³, Sebastian Lehmann², Albertus B. Mostert⁴, Paul Meredith⁴ and Adam P. Micolich¹; ¹UNSW Australia, Australia; ²Lund University, Sweden; ³University of Copenhagen, Denmark; ⁴Swansea University, United Kingdom

SESSION SB05.11: General Session II
Session Chairs: Alexandra Rutz and Christina Tringides
Tuesday Morning, May 24, 2022
SB05-Virtual

10:30 AM SB05.11.01

Integrating Protein Pores into Ultrathin Polydopamine Films for Mimicking Cell Membrane Tommaso Marchesi, Christopher Synatschke and Tanja Weil; Max Planck Institute for Polymer Research, Germany

10:45 AM *SB05.11.02

Designing Bioelectronic Materials for Regenerative Medicine Molly Stevens; Imperial College London, United Kingdom

11:15 AM *SB08.09/SB05.07.01

Wireless Organic Neuroprostheses Diego Ghezzi; Ecole Polytechnique Federale de Lausanne, Switzerland

11:45 AM SB06.06/SB05.04.05

In Vitro Model for Retinal Ganglion Cell Reinnervation of Thalamic Target Structures Tobias Ruff¹, Léo Sifringer¹, Simon Steffens², Stephan Ihle¹, Anna Beltraminelli¹, Eylul Ceylan¹, Tao Zhang³, Jens Duru¹, Sean Weaver¹, Blandine Clement¹, Sophie Girardin¹, Aline Renz¹, Srinivas Madduri⁴, Botond Roska⁵ and Janos Vörös¹; ¹ETH Zürich, Switzerland; ²University Zurich, Switzerland; ³EPFL Lausanne, Switzerland; ⁴Universität Basel, Switzerland; ⁵IOB Basel, Switzerland

SESSION SB08.09/SB05.07: Joint Session: Bioelectronics for In Vivo Interfaces I
Session Chairs: Mary Donahue and Alexandra Rutz
Wednesday Morning, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

8:45 AM *SB08.09/SB05.07.02

Magnetolectric Nanomaterials for Wireless Neuronal Modulation Kristen Kozielski; Technical University of Munich, Germany

9:15 AM SB08.09/SB05.07.03

Miniature, Wireless and Battery-Free Neural Interfaces Enabled by Magnetolectric Materials Joshua Chen¹, Gauri Bhawe¹, Zhanghao Yu¹, Fatima Alrashdan¹, Roberto Garcia², Amanda Singer¹, Sunil A. Sheth², Peter Kan², Kaiyuan Yang¹ and Jacob T. Robinson¹; ¹Rice University, United States; ²University of Texas Medical Branch, United States

9:30 AM SB08.09/SB05.07.04

Wireless Magnetolectrically-Driven Organic Light-Emitting Diodes for Optogenetic Stimulation Julian Butscher^{1,2}, Sabina Hillebrandt^{1,2} and Malte Gather^{1,2}; ¹University of St Andrews, United Kingdom; ²University of Cologne, Germany

9:45 AM SB08.09/SB05.07.05

Controlling Cell Signaling via Calcium Influx Modulation Using Magnetic Nanoparticles and Alternating Magnetic Fields Dekel Rosenfeld and Polina Anikeeva; Massachusetts Institute of Technology, United States

10:00 AM BREAK

10:30 AM *SB08.09/SB05.07.06

In Vivo Interrogation of Human Organoids Implanted in Mice Using Transparent Microgrids Madison Wilson¹, Martin Thunemann², Anna Devor² and Duygu Kuzum¹; ¹University of California, San Diego, United States; ²Boston University, United States

11:00 AM SB08.09/SB05.07.07

Passive Drug Delivery Monitoring via Intra Body Communication Leonardo Lamanna¹, Pietro Cataldi¹, Marco Friuli², Christian Demitri² and Mario Caironi¹; ¹Istituto Italiano di Tecnologia, Italy; ²Università del Salento, Italy

11:15 AM SB08.09/SB05.07.08

NeuroString—A Tissue-Like Neurotransmitter Sensor for Interfacing with Brain and Gut Jinxing Li^{1,2} and Zhenan Bao²; ¹Michigan State University, United States; ²Stanford University, United States

11:30 AM SB08.09/SB05.07.09

Flexible Organic Electrochemical Transistor-Based Psychrometer for In Vivo Monitoring of Plant Health Megan N. Renny¹, Elliot Strand¹, Brenna Curvey¹, Natalie Alvarado¹, Eloise Bihari¹, Sean Gleason², Gregory L. Whiting¹ and Robert McLeod¹; ¹University of Colorado, Boulder, United States; ²U.S. Department of Agriculture, United States

SESSION SB08.10/SB05.08: Joint Session: Bioelectronics for In Vivo Interfaces II
Session Chairs: Mary Donahue and Damia Mawad
Wednesday Afternoon, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

1:30 PM *SB08.10/SB05.08.01

Multimaterial Fibers as Bioinspired Actuators [Polina Anikeeva](#); Massachusetts Institute of Technology, United States

2:00 PM SB08.10/SB05.08.02

Flexible Multifunctional Fiber-Based Optoacoustic Emitter for Non-Genetic Bidirectional Neural Communication [Nan Zheng](#)¹, Ying Jiang¹, Shan Jiang², Xiaoting Jia², Jixin Cheng² and Chen Yang¹; ¹Boston University, United States; ²Virginia Tech, United States

2:15 PM BREAK

2:45 PM *SB08.10/SB05.08.04

Soft Bioelectronic Interfaces from 2D MXene Materials [Flavia Vitale](#); University of Pennsylvania, United States

3:15 PM SB08.10/SB05.08.05

Fully Implantable, Ion-Gated, Organic Integrated-Circuits for Chronic, Closed-Loop Epileptic Interventions [Claudia Cea](#), Zifang Zhao, Jennifer Gelinas and Dion Khodagholy; Columbia University, United States

3:30 PM SB08.10/SB05.08.06

Bioelectronic Neuroimmune Interfaces for Studying Brain Tumors [Anthony Tabet](#), Marie Manthey, Veronica Will, Anthony M. Tabet, K. Dane Wittrup and Polina Anikeeva; Massachusetts Institute of Technology, United States

##PAGE_BREAK##

SYMPOSIUM SB06

Bioelectronic Materials and Devices for In Vitro Systems
May 9 - May 24, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SB06.02: Bioelectronic Materials and Devices for in vitro Interfacing

Session Chairs: Gerwin Dijk and Paschalis Gkoupidenis

Monday Afternoon, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

1:30 PM *SB06.02.01

Graft and Random Copolymers Based on Functionalized PEDOT Modi Gu and [Damia Mawad](#); University of New South Wales, Australia

2:00 PM *SB06.02.02

Inkjet-Printing of PEDOT:PSS for Bioelectronics [Sungjune Jung](#); Pohang University of Science and Technology, Korea (the Republic of)

2:30 PM SB06.02.03

Controlling the Neuromorphic Behavior of Organic Electrochemical Transistors [Shunsuke Yamamoto](#)^{1,2} and George G. Malliaras²; ¹Tohoku University, Japan; ²University of Cambridge, United Kingdom

2:45 PM SB06.02.04

Impacts of Gate Voltage on the Stability of Crosslinked PEDOT:PSS Organic Electrochemical Transistors [Song Guo](#); Univ of Southern Mississippi, United States

3:00 PM BREAK

3:30 PM *SB06.02.05

Highly Conductive/Capacitive Three-dimensional Mesh Structures Based on Crystalline PEDOT:PSS Microfibers for Bioelectronic Interfaces [Myung-Han Yoon](#); Gwangju Institute of Science and Technology, Korea (the Republic of)

4:00 PM SB06.02.06

Fast and Long-Term Stable Nanofiber Channel Organic Electrochemical Transistor Sensor [Seung-Hyun Oh](#), Seung-Kyun Kang and Youngchang Joo; Seoul National University, Korea (the Republic of)

4:15 PM SB06.03.01

High-Capacitance Nanoporous Noble Metal Thin Films via Reduction of Metal Oxides [Maciej Gryszel](#)¹, Marie Jakešová² and Eric Glowacki^{1,2};
¹Linköping University, Sweden; ²CEITEC VUT, Czechia

4:30 PM SB06.02.08

Semiconducting Nanowires for Engineering Functional Neural Networks *In Vitro* [Vini Gautam](#); University of Melbourne, Australia

4:45 PM SB06.02.09

Flexible and Hollow Micro Ring Electrode Arrays for Multi-Directional Monitoring of 3D Neuronal Networks [Venkata s. Vajrala](#)¹, Asma Eddarir¹, Sophie Pautot², Christian Bergaud¹ and Ali Maziz¹; ¹Laboratory for Analysis and Architecture of Systems, France; ²SYNTAXYS Neuro Engineering Systems, France

SESSION SB06.03: Poster Session I: Bioelectronic Materials and Devices for In Vitro Systems I

Session Chairs: Róisín Owens and Anna-Maria Pappa

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB06.03.02

Magnetoelastic Sensor-Based Circulating Tumor Cell Capture [Alana MacLachlan](#), Chung-Hui Huang, Emre Kayali, Lang Zhou, Feng Li and Pengyu Chen; Auburn University, United States

SB06.03.03

Protein Redox by Piezoelectric Acousto-Nanodevice Sophia Selvarajan¹, [Eunjeong Byun](#)¹, HyunJi Shim¹, Albert Kim² and Seunghyun Song¹;
¹Sookmyung Women's University, Korea (the Republic of); ²Temple University, United States

SB06.03.04

Monolithic Inkjet-Printed Plasmonic Structures Incorporated Microfluidics [HyunJi Shim](#), Siwon Hwang, Minyoung Choi, Eunjeong Byun, Bongjun Kim and Seunghyun Song; Sookmyung Women's University, Korea (the Republic of)

SB06.03.05

Interfacing Stretchable Electronics and Engineered Neuronal Cultures for *In Vitro* Mechano-Neurobiology [Léo Sifringer](#), Tobias Ruff, Tao Zhang, Eylul Ceylan and Janos Vörös; ETH Zürich, Switzerland

SB06.03.07

Hybrid Nanotubes (HyNTs)-Based Intracellular Molecule Delivery [Kazuhiro Oyama](#)¹ and Takeo Miyake^{1,2}; ¹Waseda University, Japan; ²JST-PRESTO, Japan

SB06.03.08

Micropillar Electrode Array for Enhancing the Maturation of Reprogrammed Cardiac Spheroids [HyoJung Lee](#), Sungjin Min, Seung-Woo Cho and Heon-Jin Choi; Yonsei University, Korea (the Republic of)

SB06.03.09

Tattoo-Like Epidermal Microneedle Electrode for Long-term Electrophysiology Measurement in Daily Life [JooHwan Shin](#) and Tae-il Kim; Sungkyunkwan University, Korea (the Republic of)

SB06.03.10

Electrochemical Cytosensor for Cancer Cell Detection and Evaluation of Anticancer Drug [Won Hur](#), Han Been Lee, Seong Eun Son and Gi Hun Seong; Hanyang University, Korea (the Republic of)

SB06.03.11

Bioelectronic Ion Pumps for Long Term *In Vitro* Applications [Harika Dechiraju](#), John Selberg, Manping Jia and Marco Rolandi; University of California, Santa Cruz, United States

SB06.03.12

Affinity Filter-Integrated Hydrogel Transistor to Monitor Specific Ion Signals [Hyebin Yoo](#)¹, Soon-Bo Kang², Kunwoong Park³, Hyunjae Yoo², Hyun-Ho Lim³, Jeong-Yun Sun² and Seung Soo Oh¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Korea Brain Research Institute, Korea (the Republic of)

SB06.03.14

Enhanced Sensitivity of Graphene Probes in Detection of Electrical Activities of Retina [Xiaosi Zhang](#)¹, Hannah Lee², Thayer Walmsley¹, Edward Levine², Sharon Weiss¹, Deyu Li¹ and Yaqiong Xu¹; ¹Vanderbilt University, United States; ²Vanderbilt University Medical Center, United States

SB06.03.15

Photobiomodulation Sequentially Triggered Intracellular Angiogenic Molecular Mechanisms to Enhance the Therapeutic Efficacy of Adult Stem Cells [Yu-Jin Kim](#) and Suk Ho Bhang; Sungkyunkwan University, Korea (the Republic of)

SB06.03.16

3D Liquid Microelectrode Arrays for Electrophysiological Analysis of Brain Organoids [Enji Kim](#), Young-Geun Park, Mi Jung Kim, Junghoon Kim,

Eunseon Jeong, Seung-Woo Cho and Jang-ung Park; Yonsei University, Korea (the Republic of)

SB06.03.19

A Novel, Hand-Held, Fast, Small Volume Blood Diagnostics Device to Correlate Biomarkers with Mild Cognitive Impairment and Alzheimer's Disease [Jennifer C. Wong](#)^{1,2}, Sean A. Stanek^{1,2}, Haley C. Ellis^{1,2}, Jason L. Mayo^{1,2}, Srivatsan Swaminathan^{1,2} and Nicole Herbots^{1,2}; ¹Alzheimer Bio-Sensors, LLC, United States; ²Arizona State University, United States

SESSION SB06.04/SB05.02: Joint Session: Bioelectronics for Complex Tissues

Session Chairs: Damia Mawad, Anna-Maria Pappa and Alexandra Rutz

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

8:30 AM *SB06.04/SB05.02.01

A Novel Tissue Engineered Organic Bioelectronic Device to Host and Monitor 3D Cell Cultures *In Vitro* [Charalampos Pitsalidis](#)^{1,2}; ¹Khalifa University of Science and Technology, United Arab Emirates; ²University of Cambridge, United Kingdom

9:00 AM *SB06.04/SB05.02.02

2D and 3D Analytical Tools for *In Vitro* Testing of Electroactive Cells [Annalisa Bonfiglio](#)¹, Andrea Spanu¹, Fabio Terranova¹ and Sergio Martinoia²; ¹University of Cagliari, Italy; ²University of Genova, Italy

9:30 AM SB06.04/SB05.02.06

An Organic Bioelectronic Platform for Detecting Tumour-Derived Exosome-Induced Metastasis [Róisín M. Owens](#) and Walther Traberg-Christensen; University of Cambridge, United Kingdom

10:15 AM *SB06.04/SB05.02.05

GelPin Microphysiological Systems for 3D Neural Interfacing Ryan Koppes and [Abigail Koppes](#); Northeastern Univ, United States

10:00 AM BREAK

10:45 AM *SB06.04/SB05.02.04

Multifunctional Conducting Polymer Composite Scaffolds for Human Stem Cell Cultures [Achilleas Savva](#) and Róisín M. Owens; University of Cambridge, United Kingdom

SESSION SB06.05/SB05.03: Keynote Presentation

Session Chairs: Damia Mawad, Anna-Maria Pappa and Alexandra Rutz

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

11:30 AM *SB06.05/SB05.03.01

Input/Output (I/O) Bioelectrical Interfaces with Cells and Tissue Using Nanocarbons [Tzahi Cohen-Karni](#); Carnegie Mellon University, United States

SESSION SB06.06/SB05.04: Joint Session: Bioelectronic Monitoring of Cells and Tissues in vitro

Session Chairs: Damia Mawad, Róisín Owens and Alexandra Rutz

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

1:45 PM SB06.06/SB05.04.00

Light Stimulation of Organic Photocapacitors Induces Action Potentials in Neurons and Ion Channel Gating in Mammalian Cells [Tony Schmidt](#)¹, Marie Jakešová², Vedran Derek³, Linda Waldherr¹, Marta Nowakowska⁴, Oleksandra Tiapko¹, Verena Handl¹, Karin Kornmueller¹, Muammer Üçal⁴, Theresa Rienmüller⁵, Silke Patz⁴, Eric Glowacki² and Rainer Schindl¹; ¹Medical University of Graz, Austria; ²Brno University of Technology, Czechia; ³University of Zagreb, Croatia; ⁴Medical University Graz, Austria; ⁵Graz University of Technology, Austria

2:00 PM *SB06.06/SB05.04.01

Conducting Polymers for *In Vitro* Microelectrode Arrays [George G. Malliaras](#); University of Cambridge, United Kingdom

2:30 PM *SB06.06/SB05.04.03

Functional Neuroelectronic Interfaces Through Artificial Biomembranes [Francesca Santoro](#); Istituto Italiano di Tecnologia, Italy

3:00 PM BREAK

3:30 PM SB06.06/SB05.04.02

Understanding Biological Membranes Using Bioelectronics Zixuan Lu¹ and [Anna-Maria Pappa](#)²; ¹University of Cambridge, United Kingdom; ²Khalifa University, United Arab Emirates

3:45 PM SB06.06/SB05.04.04

Thin-Film Organic Electronic Devices Integrated into Increasingly Complex and More Realistic Glioblastoma Models [Marie Lefevre](#)¹, Gerwin Dijk^{1,2}, Attila Kaszas¹, Loïg Kergoat², Franck Debarbieux^{3,4}, David Moreau¹ and Rodney P. O'Connor¹; ¹EMSE, France; ²Panaxium, France; ³Institut des

Neurosciences de la Timone, France; ⁴Centre Européen de Recherche en Imagerie Médicale, France

4:00 PM SB06.06/SB05.04.06

Electrical Stimulation with PEDOT:PSS—Explorations Beyond the Water Window Gerwin Dijk^{1,2,3}, Hermanus Johannus Ruigrok² and Rodney P. O'Connor²; ¹Stanford University, United States; ²EMSE, France; ³Panaxium SAS, France

SESSION SB06.07/SB05.05: Keynote Presentation
Session Chairs: Damia Mawad, Róisín Owens and Alexandra Rutz
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

SESSION SB06.08: Poster Session II: Bioelectronic Materials and Devices for In Vitro Systems II

Session Chairs: Susan Daniel, Anna-Maria Pappa and Alberto Salleo
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB06.08.01

Detecting Methamphetamine with Organic Electrochemical Transistor (OECT) Xuyang He; The University of Southern Mississippi, United States

SB06.08.02

Electrochemical Aptasensor for Sensitive Dopamine Detection Based on DNA Intercalation of Methylene Blue Using Highly Reliable Low Temperature Co-Fired Ceramic Chip Sang-Heon Park^{1,1}, Jihye Lee^{1,1}, Muaz Draz², Natalia Beshchasna² and Jong-Souk Yeo^{1,1}; ¹Yonsei University, Korea (the Republic of); ²Fraunhofer Institute for Ceramic Technologies and Systems, Germany

SB06.08.07

Electrochemical Synthesis of Conductive Melanin-Like Polymers for Non-Enzymatic Glucose Biosensors Busra Ozlu and Bong Sup Shim; Inha University, Korea (the Republic of)

SESSION SB06.09: Bioelectronics for Subcellular Biophysics

Session Chairs: Susan Daniel and Sahika Inal
Wednesday Morning, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

8:30 AM *SB06.09.01

Lateral Black Lipid Membranes for Studying Peptide-Lipid Interactions Kaori Sugihara; Institute of Industrial Science, the University of Tokyo, Japan

9:00 AM *SB06.09.02

Nanopore Sensors for Topographical and Chemical Imaging of Living Cells Craig Aspinwall, Chih-Chieh Hsieh, Zhihan Wang and Brian Zacher; University of Arizona, United States

9:30 AM SB06.09.03

Control of Bioelectricity Using Bipolar Nanoelectrodes—A New Bioelectronic Tool Frankie J. Rawson¹, Andie Robinson¹, Jacqueline Hicks¹, Paola Sanjuan Alberte¹ and Aleksandr Noy²; ¹University of Nottingham, United Kingdom; ²Lawrence Livermore National Laboratory, United States

9:45 AM SB06.09.04

RNA Biomolecular Electronics for Biophysics and Biosensors Juan M. Artes Vivancos, Keshani Pattiya Arachchilage and Subrata Chandra; University of Massachusetts-Lowell, United States

10:00 AM BREAK

10:30 AM *SB06.09.05

Controlled Ion Transport in Highly-Confined 1D and 2D Materials Aleksandr Noy^{1,2}; ¹Lawrence Livermore National Laboratory, United States; ²University of California, Merced, United States

11:00 AM SB06.09.06

Ionic Contrast Across a Lipid Membrane for Debye Length Extension—Towards an Ultimate Bioelectronic Transducer Yong-Sang Ryu^{1,2}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea University, Korea (the Republic of)

11:15 AM SB06.09.07

Strategies for Wireless Bioelectronics Actuation Inside a Cell Jihun Rho¹, George Alexopoulos¹, Ulises Diaz², Wallace Marshall², H.-S. Phillip Wong¹ and Ada Poon¹; ¹Stanford, United States; ²University of San Francisco, United States

11:30 AM SB06.09.00

Biomembranes on Bioelectronic Devices: Functional Transmembrane Proteins for Sensing Applications Susan Daniel; Cornell University, United States

States

11:45 AM SB06.09.08

Controlled Intracellular Cargo Delivery Using a Polypyrrole-Silicon Nanowire Hybrid Platform [Daniel Loh](#) and Daniel G. Nocera; Harvard University, United States

SESSION SB06.10: in vitro Bioelectronics—Beyond Mammalian Cells

Session Chairs: Anna-Maria Pappa and Charalampos Pitsalidis

Wednesday Afternoon, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

1:30 PM *SB06.10.01

Optical and Bioelectronic Means to Study Copper Transporter Function in Plants [Miriam Huerta](#)¹, Barituziga Banuna¹, Ju-Chen Chia¹, Xenofon Strakosas², Marios Savvakis², Daniel Simon², Olena Vatamaniuk¹ and Susan Daniel¹; ¹Cornell University, United States; ²Linköping University, Sweden

2:00 PM SB06.10.02

Photosynthesis Re-Wired on the Pico-Second Timescale [Tomi K. Baikie](#), Laura T. Wey, Christoph Schnederman, Jenny Zhang and Akshay Rao; University of Cambridge, United Kingdom

2:15 PM SB06.10.03

Magnetic Field Interactions in Redox Cofactor Solutions are Dominated by the Magnetohydrodynamic Effect [Florian Koehler](#)¹, Jimin Park¹, George Varnavides², Marc-Joseph Antonini¹ and Polina Anikeeva¹; ¹Massachusetts Institute of Technology, United States; ²Harvard University, United States

2:30 PM SB06.10.04

Screening SARS-CoV-2 Variant at a Molecular Diagnostic Level Using a Virus Receptor-Based Electrical Biosensor [Hojun Kim](#)¹, Sungwook Park¹, Kyungmin Woo¹, Jeong-Min Kim², Hye-Jun Jo², Youngdo Jeong^{1,3} and Kwanhyi Lee^{1,4}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea Disease Control and Prevention Agency, Korea (the Republic of); ³HY-KIST, Korea (the Republic of); ⁴KU-KIST school, Korea (the Republic of)

2:45 PM *SB06.02.07

Novel Biocompatible Self-Healable Hydrogel Electronics [Eloise Bihar](#)¹, Elliot Strand², Tai Tran¹, Catherine Crichton¹, Robert Mcleod² and Gregory L. Whiting^{1,2}; ¹University of Colorado, United States; ²University of Colorado Boulder, United States

SESSION SB06.11: Bioelectronics-on-a-Chip—Cell-Based Assays

Session Chairs: Miriam Huerta and Donata Iandolo

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

8:30 AM *SB06.11.01

Lab on a Chip Bioelectronics for Closed Loop Monitoring and Control of Physiological Processes [Marco Rolandi](#); University of California, Santa Cruz, United States

9:00 AM SB06.11.02

PEDOT:PSS Electrodes for Dielectrophoretic Cell Positioning and Electroporation [Asmaysinh Gharia](#)^{1,2}, Iain Fraser² and George G. Malliaras¹; ¹University of Cambridge, United Kingdom; ²National Institutes of Health, United States

9:15 AM SB06.11.03

Tumour Treating Fields Effect on Cell Viability is Determined by Cell Orientation and Field Direction [Elise Jenkins](#) and Ben Woodington; University of Cambridge, United Kingdom

9:30 AM SB06.11.04

Wireless Intracellular Nanoactuators—Bioelectronic Therapy for Glioblastoma Multiforme [Akhil Jain](#)¹, Ruman Rahman², Lluïsa Pérez-García³, David Amabilino², Stuart Smith² and Frankie J. Rawson¹; ¹University Nottingham, United Kingdom; ²University of Nottingham, United Kingdom; ³Institut de Nanociència i Nanotecnologia UB (IN2UB), Universitat de Barcelona, Spain

9:45 AM BREAK

10:15 AM SB06.11.05

Electrophoretic Delivery of Anaesthetic Drug Towards Local, On-Demand Pain Therapy [Arghyamalya Roy](#)¹, Alex Bersellini Farinotti², Tobias Abrahamsson¹, Theresia A. Sjöström¹, Dennis Cherian¹, David Nilsson³, Daniel Simon¹, Magnus Berggren¹, Camilla Svensson² and David Poxson¹; ¹Linköping University, Sweden; ²Karolinska Institutet, Sweden; ³Research Institute of Sweden, Sweden

10:30 AM *SB06.11.06

Augmenting the Functionality of Bioelectronics—Sensitivity, Integration and Biomimicry Katharina Lieberth¹, Daria Harig¹, [Paschalis Gkoupidenis](#)¹, Paul W. Blom¹ and Fabrizio Torricelli²; ¹Max Planck Institute for Polymer Research, Germany; ²University of Brescia, Italy

11:00 AM SB06.11.08

Perpetual Antioxidant Nanoparticles as Anti-inflammatories for Chronic Applications of Neural Recording Electrodes [Vicki L. Colvin](#); Brown University, United States

SESSION SB06.12: Bioelectronics-on-a-Chip—Biosensors
Session Chairs: Eloise Bihar and Anna-Maria Pappa
Thursday Afternoon, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 2

1:30 PM SB06.12.01

Integration of Organic Electrochemical Transistor with Electrochemical Aptamer-Based Sensor for Transforming Growth Factor Beta 1 Sensing Xudong Ji and Jonathan Rivnay; Northwestern University, United States

1:45 PM SB06.12.02

Antibiotic Susceptibility Testing in Blood Using Vertical Capacitance Aptasensors KyoSeok Lee, Sun-Mi Lee and Kyung-Hwa Yoo; Yonsei University, Korea (the Republic of)

2:00 PM SB06.12.03

Faradaic Pixels for Precise Manipulation of Physiological Oxygen—On-Demand Hypoxia or Oxidative Stress Eric D. Glowacki; Brno University of Technology, Czechia

2:15 PM SB06.12.04

On-Demand Modifications of Thin-Film Transistors for Label-Free Biosensing Applications Yu Shu¹, Satyajit Das², Feras Alkhalil² and Harish Bhaskaran¹; ¹University of Oxford, United Kingdom; ²PragmatIC Semiconductor, United Kingdom

2:30 PM SB06.12.05

Thermal Detection of Glucose in Urine Using a Molecularly Imprinted Polymer as Recognition Element Bart van Grinsven, Joseph Lowdon, Manlio Caldara, Thomas Cleij, Hanne Diliën and Kasper Eersels; Maastricht University, Netherlands

SESSION SB06.13: Bioelectronic Materials and Devices for in vitro Systems I
Session Chair: Alberto Salleo
Monday Afternoon, May 23, 2022
SB06-Virtual

1:00 PM *SB06.13.01

Opto-Electronically Active Materials for Infection Detection and Control Agneta Richter-Dahlfors^{1,2} and Susanne Löffler¹; ¹Karolinska Institutet, Sweden; ²KTH Royal Institute of Technology, Sweden

1:30 PM SB06.13.02

A Novel Platform for Cell Impedance Spectroscopy Thomas Chalklen, Michael Smith and Sohini Kar-Narayan; University of Cambridge, United Kingdom

1:45 PM SB06.13.03

Designing Sensitivity—A Comparative Analysis of Microelectrode Topologies for Dissolved Oxygen Sensing Daniel Bacheschi¹, Evan Strittmatter¹, Sonya Sawtelle¹ and Mohsen Nami^{1,1,2}; ¹Yale University, United States; ²Yale School of Medicine, United States

SESSION SB06.14: Bioelectronic Materials and Devices for in vitro Systems II
Session Chair: Eloise Bihar
Monday Afternoon, May 23, 2022
SB06-Virtual

6:30 PM *SB06.14.01

Electrochemically Tapping into the Photosynthetic Electron Transport Chain Jenny Zhang; University of Cambridge, United Kingdom

7:00 PM *SB06.14.02

Soft Organic Bioelectronics for Biomedical Innovation Shiming Zhang; The University of Hong Kong, China

7:30 PM *SB06.14.03

Flexible Organic Thin Film Transistors for High-Performance Biosensors Feng Yan; Hong Kong Polytechnic University, China

8:00 PM SB06.14.06

Brain-on-Chip Platform for Studying the Optimum Parameter of Ultrasound Neuromodulation Gandhi Wardhana, Tiago Costa, Massimo Mastrangeli and Wouter Serdijn; Delft University of Technology, Netherlands

8:05 PM SB06.14.07

Image-Based Spatially-Resolved Laser-Activated Cell Sorting Amos C. Lee and Sunghoon Kwon; Seoul National University, Korea (the Republic of)

8:20 PM SB06.14.08

High Efficiency Organic Photovoltaics Based on Non-Fullerene Acceptors (PCE10:ITIC:Y6) for Retinal Prosthesis Hyunsun Song¹, Hyeonhee Roh¹, Jae Young Kim², Byung Chul Lee¹, Bright Walker² and Maesoon Im¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Kyung Hee University, Korea (the Republic of)

SESSION SB06.15: Bioelectronic Materials and Devices for in vitro Systems III

Session Chair: Miriam Huerta
Tuesday Morning, May 24, 2022
SB06-Virtual

8:00 AM SB06.15.02

Cell-Silicon Nanowire Hybrids for Bioelectrical Interrogation with Sub-Cellular Resolution in 3D Tissues [Menahem Y. Rotenberg](#); Technion, Israel

8:15 AM SB06.15.03

Development of Ultrasensitive Sweet Taste Sensor Based on Venus Flytrap Domain of Human Sweet Taste Receptor [Jin-Young Jeong](#)¹, Yeon Kyung Cha², Sae Ryun Ahn³, Junghyun Shin², Yoonji Choi², Tai Hyun Park² and Seunghun Hong²; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Sookmyung Women's University, Korea (the Republic of)

8:30 AM SB06.15.04

Neurites Whispering at Adaptive Sensors—High Spike-Signal-to-Noise Ratio Recorded with Electropolymerized Microelectrode Arrays [Mahdi Ghazal](#)¹, Corentin Scholaert¹, Michel Daher Mansour¹, Sebastien Janel², Nicolas Barois², Sophie Halliez³, Thomas Dargent¹, Yannick Coffinier¹, Sebastien Pecqueur¹ and Fabien Alibert^{1,4}; ¹Institut d'Electronique de Microélectronique et de Nanotechnologie, France; ²Institut Pasteur Lille, U1019 - UMR 9017 - CIIL - Center for Infection and Immunity of Lille, France; ³Inserm Laboratoire UMR-S1172, France; ⁴Laboratoire Nanotechnologies & Nanosystèmes (LN2), Canada

8:45 AM SB06.08.03

Wireless, Highly Sensitive and Diagnostic Contact Lens Sensors [Te Xiao](#)¹ and Takeo Miyake^{1,2}; ¹Waseda University, Japan; ²JST-PRESTO, Japan

8:50 AM SB06.08.03

ATP Synthase and Ion Channel-Integrated Biotransducer [Yukun Chen](#)¹ and Takeo Miyake^{1,2}; ¹Waseda University, Japan; ²JST-PRESTO, Japan

##PAGE_BREAK##

SYMPOSIUM SB07

Bioresponsive Nanotheranostics

May 9 - May 25, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SB07.01: Sensors and Devices

Session Chairs: Weibo Cai and Liangfang Zhang

Monday Morning, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

10:30 AM SB07.01.01

Specific and Portable Graphene Field Effect Biosensor for Simultaneous Detection of Diverse Viruses [Neelotpal Kumar](#), Dalton Towers, Dmitry Kireev, Andrew Ellington and Deji Akinwande; The University of Texas at Austin, United States

10:45 AM SB07.01.02

Theranostics Enabled by the Giant Susceptibility of Magnetic Nanoclusters [Vicki L. Colvin](#); Brown University, United States

11:00 AM *SB07.01.03

Extracellular Matrix Targeted Activity-Based Nanosensors to Visualize Protease Activity in Traumatic Brain Injury [Ester J. Kwon](#), Rebecca Kandell and Julia A. Kudryashev; University of California, San Diego, United States

SESSION SB07.02: Nanomaterials in Oncology (and Beyond)

Session Chairs: Weibo Cai and Zhongmin Tang

Monday Afternoon, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

1:45 PM *SB07.02.01

Designed Synthesis and Assembly of Inorganic Nanomaterials for Medical Applications [Taeghwan Hyeon](#)^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Institute for Basic Science (IBS), Korea (the Republic of)

2:15 PM SB07.02.02

“Chemical Factory”-Guaranteed Chemodynamic Therapy of Orthotopic Liver Cancer [Zhongmin Tang](#) and Weibo Cai; University of Wisconsin, United States

2:30 PM SB07.02.03

X-Ray Induced Photodynamic Therapy by Novel Scintillator Nanoparticles [Fangchao Jiang](#) and Jin Xie; University of Georgia, United States

2:45 PM SB07.02.04

Polymeric Antitumor Systems with Dual Mechanism of Action [Libor Kostka](#)¹, Vladimír Šubr¹, Ladislav Sivák², Marek Kovar² and Tomáš Etrych¹; ¹Institute of Macromolecular Chemistry CAS, Czechia; ²Institute of Microbiology CAS, Czechia

3:00 PM BREAK

3:30 PM *SB07.02.05

Tumor-Targeted Polymer Theranostics for Navigated Surgery, Photodynamic Therapy and Tumor Imaging [Tomáš Etrych](#)¹, Marina R. Tavares¹, Vladimír Šubr¹, Jean-Luc Coll² and Jun Fang³; ¹Institute of Macromolecular Chemistry CAS, Czechia; ²University of Grenoble Alpes, France; ³Faculty of Pharmaceutical Sciences, Sojo University, Japan

4:00 PM SB07.02.06

A Novel Microbubble Platform for Immunotherapy—Using MUSIC to Activate the STING Pathway [Sina Khorsandi](#)¹, Xuefeng Li², Yifan Wang², Robert Mattrey¹, Wen Jiang² and Jacques Lux¹; ¹UT Southwestern Medical Center, United States; ²MD Anderson Cancer Center, United States

SESSION SB07.03: Poster Session I: Bioresponsive Nanotheranostics I

Session Chairs: Weibo Cai and Jie Zheng

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB07.03.02

De Novo Generation of Hybrid Ligands with an Ultra-High Affinity to Desired Targets [Minjong Lee](#), Byunghwa Kang and Seung Soo Oh; Pohang University of Science and Technology, Korea (the Republic of)

SB07.03.03

HPMA-Based Nanomaterials as Tumor-Targeted Theranostics [Marina R. Tavares](#)¹, Vladimír Šubr¹, Jun Fang², Jean-Luc Coll³ and Tomáš Etrych¹; ¹Institute of Macromolecular Chemistry of the Czech Academy of Sciences, Czechia; ²Sojo University, Japan; ³Institute for Advanced Biosciences, France

SB07.03.05

Systematic Comparison of Platinum-Group Metal Nanomaterials as Efficient Enzyme-Mimetics in Biosensing [Alexander Biby](#), Harrison Crawford and Xiaohu Xia; University of Central Florida, United States

SB07.03.06

Molecular Design Strategy of the Efficient Generation of Reactive Oxygen Species and Their Protein Dysfunction Mechanism for Photodynamic Therapy Tae-Hyuk Kwon and [Chae Gyu Lee](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB07.03.08

Direct Synthesis of Monodisperse Water-Soluble Iron Oxide Nanoparticles for Bioimaging Pohlee Cheah and [Yongfeng Zhao](#); Jackson State University, United States

***SB07.03.09**

Highly Efficient Theranostic Nano Vehicles with a Dual Therapeutic Approach Against Triple-Negative Breast Cancer [Shaista Ilyas](#)¹, Annika Szymura¹, Sabri Sahnoun², Pardes Habib³, Felix Mottaghy² and Sanjay Mathur¹; ¹University of Cologne, Germany; ²University Hospital Aachen, RWTH Aachen University, Germany; ³University Hospital, RWTH Aachen University, Germany

SB07.03.10

Nanoparticle-Crosslinked Hydrogels as an Injectable Myocardial Infarction Therapy [Renato S. Navarro](#), Narelli de Paiva Narciso and Sarah Heilshorn; Stanford University, United States

SB07.03.11

Inverse Opals as Diagnostic Sensors [Natalie Nicolas](#); Harvard University, United States

***SB07.03.12**

Tumor-Specific Localization of Multivariate Nanoparticles [Shaista Ilyas](#)¹, Annika Szymura¹, Thomas Fischer¹, Sabri Sahnoun², Pardes Habib³, Felix Mottaghy², Kerstin Wennhold⁴, Hans A. Schlöber⁵ and Sanjay Mathur¹; ¹University of Cologne, Germany; ²RWTH Aachen University, Germany; ³Department of Neurology, University Hospital, RWTH Aachen University, Germany; ⁴Center for Molecular Medicine Cologne and Translational Immunology, University Hospital Cologne, Germany; ⁵Medical Microbiology, Immunology and Hygiene, University Hospital Cologne, Germany

SB07.03.13

Particle Elasticity and Tumor Cell Uptake [Chung-Fan Kuo](#), Fereshtehsadat Mirab and Sheereen Majd; University of Houston, United States

SB07.03.14

Self-Expanding Polymeric Foams for Point-of-Care Hemostatic Treatment of Acute Trauma and Injury [Pritha Sarkar](#) and Kausik Mukhopadhyay; University of Central Florida, United States

SB07.03.15

Protein Assembly on Iron Oxide Nanoparticles for Enhanced *In Vivo* Delivery in HeLa Cells Samuel Hoff^{1,2}, Helene Piraux², John Lomas², Miryana Hemadi² and [Hendrik Heinz](#)¹; ¹University of Colorado at Boulder, United States; ²Universite de Paris, France

SB07.03.16

Cross-Platform Bio-Inks for 3D Printing Seamless Hydrogels as *In Vivo* Pressure Sensing Devices [Ashwin Velraj](#) and Jeffrey S. Bates; University of Utah, United States

SB07.03.17

pH-Triggered Cellulose Nanofibrils-Reinforced Hydrogel Bioadhesives for Tissue Sealant [Seulgi Kim](#) and Jin Woong Kim; Sungkyunkwan University, Korea (the Republic of)

SB07.03.18

A Digestion-and-Turn-on Probe Based on DNA-Templated Silver Nanoclusters Soonwoo Hong, Mathews Jonathan, Yu-An Kuo, Yuan-I Chen, Trung Duc Nguyen and [Tim Yeh](#); Univ of Texas, United States

SB07.03.19

Neutralizing the Systemic Toxicity of Co-Formulations of Chemotherapeutics Using Magneto-Electric Silica Nanocarriers for Specific Therapeutic Action Against Metastatic Cancer Cells Margo Waters¹, Juliane Hopf¹, Vincent Jo Davisson², Paul Helquist¹ and [Prakash Nallathamby](#)¹; ¹University of Notre Dame, United States; ²Purdue University, United States

SB07.03.20

Designing Nanoparticles for Image-Guided and Depth-Independent Magnetothermal Therapy of the Brain Tumors [Hamed Arami](#)¹, Chirag Patel², Edwin Chang², Jianghong Rao² and Sanjiv Sam Gambhir²; ¹University of Washington, United States; ²Stanford University, United States

SB07.03.22

Multicompartmental Scaffolds for Coordinated Periodontal Tissue Engineering [Yao Yao](#), Jeffery Raymond and Joerg Lahann; University of Michigan–Ann Arbor, United States

SESSION SB07.04: Cargo Delivery with Nanomaterials

Session Chairs: Weibo Cai and Liangfang Zhang

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

9:15 AM SB07.04.02

Lipid Nanoparticles for Broad-Spectrum Nucleic Acid Delivery [Petr Cigler](#); IOCB AS CR vvi, Czechia

9:30 AM SB07.04.03

Membrane-Assisted Fugogenic Delivery of Ribonucleoprotein for Efficient CRISPR-Based Gene Therapy Minjong Kim and [Jinmyoung Joo](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

9:45 AM BREAK

10:45 AM SB07.04.08

Inorganic/Organic Nanocomposite Particles (I/O-NP)—A Platform Technology for Future Healthcare Applications Elena Ureña-Horno, Daniel Traynor, Neve Thomson and [Marco Giardiello](#); University of Liverpool, United Kingdom

11:00 AM SB07.04.09

Crafting Designer Nanoreactors for Bioorthogonal Catalysis [Amit Kumar](#); Pohang University of Science and Technology (POSTECH), Korea, Korea (the Republic of)

SESSION SB07.05: Nano-Bio Interactions

Session Chairs: Weibo Cai and Teri Odom

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 1

1:30 PM *SB07.05.01

Cellular Nanosponges for Biological Neutralization [Liangfang Zhang](#); University of California, San Diego, United States

2:00 PM SB07.05.02

Challenging RBC Hitchhiking as a Generic Concept for Targeted Delivery:—Towards an Understanding of the Bionano-Interface [Vincent Lenders](#)¹, Xanthippi Koutsoumpou¹, Stefaan J. Soenen^{1,1}, Jef Rozenski¹, Karel Allegaert^{2,1}, Jaan Toelen¹ and Bella Manshian^{1,1}; ¹KU Leuven, Belgium; ²Erasmus MC University Medical Center, Netherlands

2:15 PM SB07.05.03

Optimisation of UV Enhanced Core–Shell Lanthanide-Doped Upconversion Nanoparticles for Integration with UV-Responsive Polymers to Achieve Optimal Drug Release Under NIR Excitation [Elena Ureña-Horno](#), Isha Gorania and Marco Giardiello; University of Liverpool, United Kingdom

2:30 PM *SB07.05.04

Gold Nanostar Optical Probes for Interrogating Targeted Cell Membrane Interactions [Teri W. Odom](#); Northwestern University, United States

3:00 PM BREAK

3:30 PM *SB07.05.05

Cell-Based Approaches for Therapeutic Selection in Oncology [Shana Kelley](#); Northwestern University, United States

4:00 PM *SB07.05.06

In Vivo Transport and Biochemical Interactions of Gold Nanoparticles [Jie Zheng](#), Bujie Du, Xingya Jiang, Xuhui Ning and Mengxiao Yu; Univ of Texas-Dallas, United States

SESSION SB07.06: Poster Session II: Bioresponsive Nanotheranostics II

Session Chairs: Weibo Cai and Jie Zheng

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB07.06.01

Metal-Doped Graphene Quantum Dots as Ultrasound Contrast Agents [Alina Valimukhametova](#)¹, Bong H. Lee¹, Olivia Fannon¹, Roberto Gonzalez-Rodriguez², Olga S. Zub³, Giridhar R. Akkaraju¹ and Anton V. Naumov¹; ¹Texas Christian University, United States; ²University of North Texas, United States; ³Alfa Radiology Management, INC, United States

SB07.06.02

Gene Regulation Using Nanodiscs Modified with HIF-1- α Antisense Oligonucleotides [Radhika Sharma](#)¹, Yixiao Dong¹, Yuesong Hu¹, Victor Pui-Yan Ma¹ and Khalid Salaita^{1,2}; ¹Emory University, United States; ²Georgia Institute of Technology, United States

SB07.06.03

Sodium Chloride Nanoparticle as a Therapeutic for Bladder Cancer [Shuyue Zhan](#), Wei Yang, Zhengwei Cao, Fangchao Jiang, Jianwen Li and Jin Xie; University of Georgia, United States

SB07.06.04

Developing Upconverting Nanoparticle-Based Force Sensors for *In Vivo* Gastrointestinal Imaging [Cindy Shi](#), Jason Casar, Chris Siefe, Beatriz Robinson, Mía Cano, Julia Kaltschmidt and Jennifer A. Dionne; Stanford University, United States

SB07.06.05

Sniffing Bacteria with a Carbon-Dot Artificial Nose [Nitzan Shauloff](#) and Raz Jelinek; Ben-Gurion University of the Negev, Israel

SB07.06.06

Nanoconjugates to Enhance PDT-Mediated Cancer Immunotherapy by Targeting the Indoleamine-2,3-Dioxygenase Pathway [Wei Yang](#), Xueyuan Yang, Shuyue Zhan, Zhengwei Cao, Jianwen Li, Fangchao Jiang and Jin Xie; University of Georgia, United States

SB07.06.07

Microneedles-on-Bioelectronics for Localized Delivery of Theranostic Nanoparticles and High-Energy Photons to Treat Brain Tumor [Taegy Kang](#)^{1,2}, Youngsik Lee¹, Hye Rim Cho¹, Gil Ju Lee³, Young Min Song³, Seung Hong Choi¹, Taeghwan Hyeon¹ and Dae-Hyeong Kim¹; ¹Center for Nanoparticle Research, Institute for Basic Science (IBS), Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Gwangju Institute of Science and Technology (GIST), Korea (the Republic of)

SB07.06.08

Biocompatible Lanthanide Nanoparticles for Immune Synapse Force Sensing [Ariel Stiber](#), Jennifer A. Dionne, Chris Siefe, Jason Casar, Jefferson Dixon, Vincent Van Unen and Mark Davis; Stanford University, United States

SB07.06.09

Magnetically Guided Drug Delivery into Cardiac Myocytes [Seong D. Kong](#)¹, Byungkwan Lim² and Elyse C. Tighe¹; ¹California Baptist University, United States; ²Jungwon University, Korea (the Republic of)

SB07.06.10

7-dehydrocholesterol Encapsulated Nanoparticles to Enhance Radiotherapy [Jianwen Li](#), Delahunty Ian, Jin Xie, Chaebin Lee, Zhi Liu, Wei Yang, Shuyue Zhan, Zhengwei Cao and Fangchao Jiang; University of Georgia, United States

SB07.06.11

Gold-Iron Nanowires for Radiotherapy and Magneto-Mechanical Therapy of Glioblastoma Multiforme [Jonathan Taylor](#), Darya Kiryushko, George Greaves, Chris Phillips, Matthew Williams, Mary Ryan and Alexandra Porter; Imperial College London, United Kingdom

SB07.06.12

Redox-Sensitive Polyglycerol Nanogels Stimulate the Photo-Responsive Cytotoxicity of an Ir(III) Complex [Chae Gyu Lee](#)¹, Chaiheon Lee¹, Joonhee

Lee^{1,2}, Jung Seung Nam¹, Byeong-Su Kim² and Tae-Hyuk Kwon¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Yonsei University, Korea (the Republic of)

SB07.06.14

Versatile, Solvent-Free Technique to Synthesize Polymer Nanoparticles Trevor Franklin, Danielle Streever and Rong Yang; Cornell University, United States

SB07.06.15

Delivery of HIF1 α siRNA for Atherosclerosis Plaques Using Targeted Polyelectrolyte Complex Micelles Ge Zhang and Matthew V. Tirrell; The University of Chicago, United States

SB07.06.16

Glucose Oxidase/Prussian Blue-Integrated Metal-Organic Frameworks for Effective Cancer Therapy Won Hur, Seong Eun Son, Han Been Lee and Gi Hun Seong; Hanyang University, Korea (the Republic of)

SB07.06.17

In Vitro Studies of Gold Nanoparticles in Cancer Radiotherapy Daniel Traynor, Maria R. Fabbrizi, Elena Ureña-Horno, Neill J. Liptrott, Steve Rannard, Jason L. Parsons and Marco Giardiello; University of Liverpool, United Kingdom

SB07.06.18

Novel Theranostic Nanocarriers for Combined Drug Delivery and Diagnostic Monitoring by Magnetic Resonance Imaging (MRI) Neve Thomson, Faye Hern, Elena Ureña-Horno, Helen Cauldbeck, Harish Poptani, Steve Rannard and Marco Giardiello; University of Liverpool, United Kingdom

SB07.06.19

Nano Cell-Biopsy Using Nanostraws Frida E. Ekstrand, Diogo Volpati, Karl Bacos, Sabrina Ruhmann, Charlotte Ling and Christelle Prinz; Lund University, Sweden

SB07.06.20

Development of Iron Oxide Nanoparticles with Paramagnetic Metal Ion Dopants for Magnetic Resonance Imaging (MRI) Applications Isis P. Carmona-Sepúlveda^{1,2}, Andrea A. Guerrero-Soler^{1,2}, Victoria Y. Soto-Díaz^{1,2} and Dalice Piñero^{1,2}; ¹University of Puerto Rico, Río Piedras, Puerto Rico; ²Molecular Sciences Research Center, Puerto Rico

SB07.06.21

Hydrogel-Based Rapid Cellular Staining for Point-of-Care Diagnostic Applications Lip Ket Chin¹, Jae-Hyeok Choi², Dongyoung Lee² and Hyungsoon Im¹; ¹Massachusetts General Hospital, United States; ²Noul Co. Ltd, Korea (the Republic of)

SB07.06.22

InP QD Based Oil-in-Water Micelles for Photon Upconversion in Biology Paulina Jaimes; The University of Utah, United States

SB07.06.23

Anti-Senescence Ion-Delivering Nanocarrier for Recovering Therapeutic Properties of Long-Term-Cultured Human Adipose-Derived Stem Cells Yeong Hwan Kim and Suk Ho Bhang; Sungkyunkwan University, Korea (the Republic of)

SB07.06.25

Correlating PEG-Depsipeptide Cross-Linking and Degradation Kinetics Using Ultrathin Hydrogel Networks at the Air-Water Interface Shivam Saretha^{1,2}, Makafui Folikumah^{1,2} and Rainhard Machatschek^{1,2}; ¹Institute of Active Polymers and Berlin-Brandenburg Center for Regenerative Therapies, Hereon, Germany; ²Institute of Chemistry, University of Potsdam, Germany

SESSION SB07.07: General Session I
Session Chairs: Sophia Gu and Dawei Jiang
Tuesday Morning, May 24, 2022
SB07-Virtual

8:00 AM *SB07.07.01

Engineering Responsive Metal-Phenolic Materials via Supramolecular Assembly Frank Caruso; University of Melbourne, Australia

8:30 AM SB07.07.04

Lanthanide-Doped Materials as Probes for Hyperspectral Imaging—A Powerful Combination to Assess Nano-Bio Interactions Emille M. Rodrigues and Eva Hemmer; University of Ottawa, Canada

8:45 AM *SB07.07.05

Bioresponsive Drug Delivery Zhen Gu; Zhejiang University, China

9:15 AM *SB07.07.06

Designing Biomaterials for Disease Detection and Exploration Molly Stevens; Imperial College London, United Kingdom

9:45 AM SB07.07.07

Bioinspired Patch for Prevention of Gastrointestinal Anastomotic Leaks Jingjing Wu, Xuanhe Zhao and Hyunwoo Yuk; Massachusetts Institute of Technology, United States

SESSION SB07.09: General Session III
Session Chairs: Dawei Jiang and Dalong Ni
Tuesday Afternoon, May 24, 2022
SB07-Virtual

9:00 PM *SB07.02.07

Black Phosphorus Nanotheranostics [Wei Tao](#)^{1,2}; ¹Harvard Medical School, United States; ²Brigham and Women's Hospital, United States

9:30 PM *SB07.04.05

Utilising Endogenous and Exogenous Stimuli to Control and Understand Drug Delivery from Polymeric Nanomedicines. [Kristofer J. Thurecht](#), Nicholas Fletcher, Craig Bell and Gayathri Ediriweera; The University of Queensland, Australia

SESSION SB07.08: General Session II
Session Chairs: Sophia Gu and Dalong Ni
Wednesday Morning, May 25, 2022
SB07-Virtual

8:00 AM *SB07.08.01

Molecular Optical Imaging Probes as Artificial Urinary Biomarkers for Early Diagnosis [Kanyi Pu](#); Nanyang Technological University, Singapore

8:30 AM *SB07.08.02

Cornell Dots—Bioresponsive Multifunctional Nanomaterials for Theranostic Applications in Oncology [Ulrich Wiesner](#); Cornell University, United States

9:00 AM SB07.08.03

In Situ Remote Control of Nanobiomaterials for Regenerative and Immune Engineering Sunhong Min, Gunhyu Bae, Yuri Kim and [Heemin Kang](#); Dept of Materials Science and Engineering, Korea University, Korea (the Republic of)

9:15 AM SB07.08.04

Gallium Nanodroplets for Anti-Inflammatory Without Interfering with Iron Homeostasis [Chengchen Zhang](#) and Kourosh Kalantar-Zadeh; University of New South Wales Sydney, Australia

9:20 AM SB07.08.05

Effect of Particle Rigidity on Transport across a Blood-Brain Barrier Model [Chung-Fan Kuo](#), Fereshhtesadat Mirab and Sheereen Majd; University of Houston, United States

9:25 AM SB07.08.06

Modification of Silk Protein at Nanoscale for a Versatile Drug Delivery System [Anh T. Dao](#) and Hitoshi Kasai; Tohoku University, Japan

9:30 AM *SB07.08.07

Synthesis and biofunctionalization of Plasmonic and Magnetic Nanoparticles for Biomedical Applications [Nguyen T. Thanh](#); Univ College London, United Kingdom

##PAGE_BREAK##

SYMPOSIUM SB08

Soft Embodiments of Electronics and Devices for Healthcare Applications
May 9 - May 25, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SB08.01: Soft Bioelectronics
Session Chairs: Mary Donahue and Dion Khodagholy

Monday Morning, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

10:30 AM *SB08.01.01

Soft Microfluidic Systems As Bio-Interfaces John A. Rogers; Northwestern University, United States

11:00 AM SB08.01.02

Flexible, Implantable, Pulse Oximetry Sensors for Continuous Monitoring of Arterial Blood Oxygen Levels Joseph Troughton¹, Pauline Brige² and Marc Ramuz¹; ¹Ecole des Mines de Sainte Etienne, France; ²Aix-Marseille Université, France

11:15 AM SB08.01.03

In Vivo Formation of Organic Bioelectronic Hydrogels Xenofon Strakosas¹, Hanne Biesmans¹, Tobias Abrahamsson¹, Karin Hellman², Malin Silvera Ejneby¹, Mary J. Donahue¹, Peter Ekstrom², Fredrik Ek², Marios Savvakis¹, Martin Hjort², David Bliman³, Mathieu Linares¹, Daniel Simon¹, Roger Olsson^{2,3} and Magnus Berggren¹; ¹Linköping University, Sweden; ²Lund University, Sweden; ³University of Gothenburg, Sweden

11:30 AM SB08.01.04

Development of Iontronic Implants Using Hyperbranched Polymeric Membranes for Localized Drug Delivery in Chemotherapy Linda Waldherr¹, Verena Handl¹, Tobias Abrahamsson², Maria Seitaniidou², Marie Jakešová³, Sabine Erschen¹, Tamara Tomin⁴, Nassim Ghaffari Tabrizi-Wizsy¹, Silke Patz¹, Daniel Simon² and Rainer Schindl¹; ¹Medical University of Graz, Austria; ²Linköping University, Sweden; ³CEITEC - Central European Institute of Technology, Czechia; ⁴Technical University of Vienna, Austria

SESSION SB08.02: Neurotechnology for Stimulation
Session Chairs: Mary Donahue and Martin Kaltenbrunner
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

1:45 PM *SB08.02.01

Organic Thin-Film Photocapacitors for Stimulation of the Central and Peripheral Nervous System Eric D. Glowacki; Brno University of Technology, Czechia

2:15 PM SB08.02.02

Laser-Driven Wireless Deep Brain Stimulation Using Temporal Interference and Organic Electrolytic Photocapacitors Florian Missey¹, Mary J. Donahue², Ibrahima Ngom¹, Emma Acerbo¹, Boris Botzanowski¹, Ludovico Migliaccio³, Viktor Jirsa¹, Eric Glowacki³ and Adam Williamson¹; ¹Institut de Neurosciences des Systèmes, France; ²Linköping University, Sweden; ³CEITEC Brno University of Technology, Czechia

2:30 PM SB08.02.03

A Soft and Conformal Cuff Electrode for Selective Stimulation of the Sciatic Nerve in Pigs Samuel Lienemann, Mary J. Donahue, Johan Zötterman, Simon Farnebo and Klas Tybrandt; Linköping Universitet, Sweden

2:45 PM BREAK

SESSION SB08.03: Soft and Stretchable Bioelectronics
Session Chairs: Mary Donahue and Martin Kaltenbrunner
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

3:30 PM *SB08.03.01

Tactile Perception and Wearable Energy Systems via Elastomeric Composites Robert Shepherd; Cornell University, United States

4:00 PM SB08.03.02

Elastic Fabric Nanocomposite Sensors for Movement and Muscle Assessment for Physical Therapy and Rehabilitation Yun-An Lin, Emerson Noble and Kenneth J. Loh; University of California San Diego, United States

4:15 PM SB08.03.04

Ultraflexible and Bio-Conformable Organic Circuits for Healthcare Applications Takafumi Uemura^{1,2}, Naoko Namba², Masahiro Sugiyama^{1,2,3}, Koki Taguchi^{1,2,3}, Mihoko Akiyama¹, Teppei Araki^{1,2,3} and Tsuyoshi Sekitani^{1,2,3}; ¹SANKEN, Osaka University, Japan; ²PhotoBIO-OIL, AIST, Japan; ³Graduate School of Engineering, Osaka University, Japan

4:30 PM SB08.03.05

Electrocardiogram Patch to Monitor Full-Day Activities for Multiple Days Joosung Oh, Jaehyun Kim, Geonwoo Kim, Chae-Eun Shim and Unyong Jeong; Pohang University of Science and Technology, Korea (the Republic of)

SESSION SB08.04: Poster Session I: Soft Embodiments of Electronics and Devices for Healthcare Applications I
Session Chairs: Mary Donahue and Takafumi Uemura
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB08.04.01

Direct Ink Writing 3D Printing for Fabricating Ultra-Deformable Microfluidic Antennas Kento Yamagishi, Terry T. Ching, Wenshen Zhou, Nicole Chian, Shaoying Huang and [Michinao Hashimoto](#); Singapore University of Technology and Design, Singapore

SB08.04.02

Fabrication of Cortisol- and Sodium Lactate-Selective Molecularly Imprinted Polymers for Biomaterial Sensors Informed by Molecular Dynamics Simulations [Yasemin L. Mustafa](#), Emma Daniels, Carmelo Herdes and Hannah Leese; University of Bath, United Kingdom

SB08.04.04

Fully Degradable, Soft and Biocompatible Tungsten/Beeswax Conductive Interconnection for Implantable Bioelectronics [Kyung Su Kim](#) and Jahyun Koo; Korea University, Korea (the Republic of)

SB08.04.05

Superelastic Auxetic Structures For Deployable Stretchable Implants [Duygu Dengiz](#)¹, Sabrina M. Curtis^{1,2}, Justin Jetter¹ and Eckhard Quandt¹; ¹Kiel University, Germany; ²University of Maryland, United States

SB08.04.06

Materials Chemistry Approaches to Generate Tactile Sensations in Haptic Interfaces and Tactile Aids [Charles Dhong](#); University of Delaware, United States

SB08.04.07

Macromesh-Shaped Gold Nanowire Network Electrodes with Low Resistance Under Tensile Strain [Satoshi Takane](#)^{1,2}, Yuki Noda¹, Naomi Toyoshima¹ and Tsuyoshi Sekitani^{1,2}; ¹Osaka University, Japan; ²National Institute of Advanced Industrial Science and Technology (AIST), Japan

SB08.04.08

Ionogel Based Self-Healing, Air-Stable and Flexible Electronics [Jiyoon Kim](#) and Jeong Sook Ha; Korea University, Korea (the Republic of)

SB08.04.09

Fabrication of Stretchable, Self-Healable, and Water-Resistant Electronic Devices Based on Dynamic Covalent Bonding Polyurethane [Somin Kim](#) and Jeong Sook Ha; Korea University, Korea (the Republic of)

SESSION SB08.05/SB02.02: Joint Session: Energy Harvesting and Storage

Session Chairs: Takafumi Uemura and Xiaomin Xu

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

8:45 AM *SB08.05/SB02.02.01

Self-Powered On-Skin Electronics with Ultrathin Organic Devices Takao Someya^{1,2}, Kenjiro Fukuda², [Tomoyuki Yokota](#)¹ and Sunghoon Lee¹; ¹The University of Tokyo, Japan; ²Riken, Japan

9:15 AM SB08.05/SB02.02.02

Development of a Self-Driven Lactate Biosensing System Based on Paper-Based Lactate Biofuel Cell [Isao Shitanda](#), Mizuki Satake, Yuko Yoshihara, Hikari Watanabe and Masayuki Itagaki; Tokyo University of Science, Japan

9:30 AM SB08.05/SB02.02.04

In Vivo Self-Powered Wireless Transmission Using Biocompatible Flexible Energy Harvester [Jaehun An](#)¹, Chang Kyu Jeong² and Keon Jae Lee¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Chonbuk National University, Korea (the Republic of)

10:00 AM BREAK

SESSION SB08.06/SB02.03: Joint Session: Electronics, Integrated Devices

Session Chairs: Kenjiro Fukuda and Takafumi Uemura

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

10:30 AM SB08.06/SB02.03.01

Towards Real-Time Blood Pressure Monitoring via High-Fidelity Iontronic Tonometric Sensors with High Sensitivity and Large Dynamic Ranges [Qingzhou Wan](#), Mark A. Freithaler, Ramakrishna Mukkamala, Aman Mahajan and Feng Xiong; University of Pittsburgh, United States

10:45 AM SB08.06/SB02.03.02

Multifunctional Wearable Sensor for Early Detection of Decubitus Ulcer [Seung-Rok Kim](#)¹, Soyeon Lee¹, Jihee Kim², Eunbin Kim², Hyejun Kil¹, Ju-Hyun Yoo¹, Je-Heon Oh¹, Jiwan Jeon¹, Ey-In Lee¹, Junwoo Jeon¹, Kunhoo Jeon¹, Ju Hee Lee² and Jin-Woo Park¹; ¹Yonsei University, Korea (the Republic of); ²Severance Hospital, Korea (the Republic of)

11:00 AM SB08.06/SB02.03.03

Self-Powered Real-Time Arterial Pulse Monitoring Using Ultrathin Piezoelectric Sensors [Min SeongWook](#) and Keon Jae Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

11:15 AM SB08.06/SB02.03.04

Battery-Free, Wireless, Crack-Activated Pressure Sensor and Movable System for Pressure Injury Prevention Seokjoo Cho, Hyeonseok Han, Yong S. Oh and Inkyu Park; KAIST, Korea (the Republic of)

SESSION SB08.07/SB02.04: Joint Session: Sensors for Robots/Healthcare

Session Chairs: Shingo Maeda and Takafumi Uemura

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

2:00 PM *SB08.07/SB02.04.01

Biosymbiotic, Personalized, 3D Printed, Wireless and Chronic Recording of Biosignals Philipp Gutruf; University of Arizona, United States

2:30 PM SB08.07/SB02.04.02

Self-Powered Piezo-Transmittance Type Strain Sensor Based on an Auxetic Structure Jimin Gu¹, Junseong Ahn^{1,2}, Seokjoo Cho¹, Jun-Ho Jeong² and Inkyu Park¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Korea Institute of Machinery & Materials, Korea (the Republic of)

2:45 PM SB08.07/SB02.04.03

Omni-Directional Tactile Profiling Using a Deformable Pressure Sensor Array Based on Localized Piezoresistivity Jachyun Kim, Chae-Eun Shim, Geonwoo Kim, Joosung Oh and Unyong Jeong; Pohang University of Science and Technology, Korea (the Republic of)

3:00 PM BREAK

SESSION SB08.08/SB02.05: Joint Session: Soft Actuators for Human/Machine Interfaces

Session Chairs: Vito Cacucciolo and Takafumi Uemura

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

3:30 PM *SB08.08/SB02.05.01

HASEL Artificial Muscles—Towards Untethered Soft Robotic Devices that are Fast and Efficient Christoph Keplinger; Max Planck Institute for Intelligent Systems, Germany

4:00 PM SB08.08/SB02.05.02

Hybrid Artificial Muscles Advances Necessary for the Practical Application of Soft Actuators Michael P. Rowe^{1,2}, Maduran Palaniswamy¹, Ryohei Tsuruta¹ and Shardul Panwar¹; ¹Toyota Research Institute of North America, United States; ²Toyota IP Solutions, United States

4:15 PM SB08.08/SB02.05.04

Untethered Biomimetic Soft Robots by Kirigami of Thin-Film Polymer and 3D-Printed Silicone Actuators Terry T. Ching^{1,2}, Joseph Lee¹, Mervin Ng¹, Nicole Chian¹, Martin Tan¹, Yi-Chin Toh³ and Michinao Hashimoto¹; ¹Singapore University of Technology and Design, Singapore; ²National University of Singapore, Singapore; ³Queensland University of Technology, Australia

SESSION SB08.11: Poster Session II: Soft Embodiments of Electronics and Devices for Healthcare Applications II

Session Chairs: Martin Kaltenbrunner and Dion Khodagholy

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB08.11.01

Stretchable and Electrochromic PDMS/PEDOT:PSS/P3MT Composite Films ChanYoung Kim, Jun Ho Myung and Woong-Ryeol Yu; Seoul National University, Korea (the Republic of)

SB08.11.02

miRNA Sensing Based on a Signal-Amplifiable Lipoplex-Composite Hydrogel for Early Diagnosis of Alzheimer's Disease Jaewoo Lim^{1,2} and Eun-Kyung Lim^{1,2}; ¹Korea Research Institute of Bioscience and Biotechnology, Korea (the Republic of); ²University of Science and Technology, Korea (the Republic of)

SB08.11.03

Organic Semiconducting Nanoparticles for Neural Interfacing—Combining Neuroprotective Drug Delivery with Optically Generated Bioelectronic Charge for Enhanced Neuron Growth and Stimulation Matthew J. Griffith¹, Connor Sherwood², Rafael Crovador², Natalie Holmes¹, Julie Cairney¹, Paul Dastoor², Alan Brichta² and Rebecca Lim²; ¹The University of Sydney, Australia; ²The University of Newcastle, Australia

SB08.11.04

Bidirectional Venturi Flowmeter with Capacitive Foam Sensing for Spirometry Measurements Laura L. Becerra, Mohammad Ali Mansourian, Sankaran Ramanarayanan, Ian T. Frankel, Tarek Rafeedi, Patrick P. Mercier, Harinath Garudadri and Tse Nga Ng; University of California, San Diego, United States

SB08.11.06

A Multiple Crosslinked Network Hydrogel (MCNH)-Based Self-Healing Strain Responsive Electrochromic Display Jung Wook Kim and Jeong Sook Ha; Korea University, Korea (the Republic of)

SB08.11.07

NeuroModular—A Modular Backend for Fiber-Based Wireless Bioelectronic Interfaces Harrison Allen, Atharva Sahasrabudhe and Polina Anikeeva; Massachusetts Institute of Technology, United States

SB08.11.08

Snake Fang-Inspired Microneedle Patch with Groove Architectures for Transdermal Delivery of Liquid Formulations Minsu Kang¹, Sang-Hyeon Lee¹, Hyeonseok Song¹, Won-Gyu Bae² and Hoon Eui Jeong¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Soongsil University, Korea (the Republic of)

SB08.11.09

Multifunctional Fiber-Based Neurotechnology Enables Cortical Recording and Modulation in Non-Human Primates Indie Garwood¹, Alex J. Major¹, Marc-Joseph Antonini¹, Josefina Correa¹, Meredith Mahnke¹, Earl K. Miller^{1,1}, Emery N. Brown^{1,1,2} and Polina Anikeeva^{1,1,1}; ¹Massachusetts Institute of Technology, United States; ²Massachusetts General Hospital, United States

SB08.11.10

Magnetothermal Stimulation of Nerve Growth via Remotely Controlled Magnetic Nanoparticles Hannah Field, Dekel Rosenfeld and Polina Anikeeva; Massachusetts Institute of Technology, United States

SB08.11.11

Simultaneous Electrical Stimulation for Inhibiting Bacteria Near Deep Tissue Using Ultrasound-Driven Triboelectric Nanogenerator Bosung Kim, Iman M. Imani and Sang-Woo Kim; Sungkyunkwan University, Korea (the Republic of)

SB08.11.12

Delivery of a Spheroids Incorporated Cell Sheet-Laden Flexible Skin Patch Increases Angiogenesis and M2 Polarization for Wound Healing Sung-Won Kim and Suk Ho Bhang; Sungkyunkwan University (SKKU), United States

SESSION SB08.12: Metabolite Sensors for Healthcare
Session Chairs: Dion Khodagholy and Takafumi Uemura
Thursday Morning, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

8:30 AM *SB08.12.01

Soft Materials and Devices for Bioelectronic Medicine George G. Malliaras; University of Cambridge, United Kingdom

9:00 AM SB08.12.02

Conformal Wearable Sensor Devices for Wireless Monitoring of Physiological State Liam Gillan, Tuija Teerinen, Mika Suhonen, Liisa Kivimäki and Ari Alastalo; VTT Technical Research Centre of Finland Ltd, Finland

9:15 AM SB08.12.03

Analysis of Correlation between Blood Glucose and Tear Glucose Using Smart Contact Lenses Wonjung Park, Byungjun Joo and Jang-ung Park; Yonsei University, Korea (the Republic of)

9:30 AM SB08.12.04

Rapid Battery-Free Glucose Sensing with Phenylboronic Acid Hydrogel and Flexible Interdigitated Capacitor Hajime Fujita¹, Kento Yamagishi², Wenshen Zhou², Yu Tahara³, Shaoying Huang², Michinao Hashimoto^{2,2} and Toshinori Fujie¹; ¹Tokyo Institute of Technology, Japan; ²Singapore University of Technology and Design, Singapore; ³Waseda University, Japan

9:45 AM SB08.12.05

Utilising Stereolithography Based 3D Printing for the Fabrication of Polymeric Swellable Microneedles for Transdermal Drug Delivery Joe Turner^{1,2}, Maisem Laabei² and Hannah Leese^{1,2}; ¹Department of Chemical Engineering, United Kingdom; ²University of Bath, United Kingdom

10:00 AM BREAK

SESSION SB08.13: Soft Neural Interfaces
Session Chairs: Mary Donahue and Martin Kaltenbrunner
Thursday Morning, May 12, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

10:30 AM SB08.13.01

Large-Scale Integrated Organic Electronics for Epilepsy Dion Khodagholy; Columbia University, United States

10:45 AM SB08.13.02

Design and Development of Bidirectional Multifunctional Neural Probes Through Fiber Drawing Marc-Joseph Antonini, Atharva Sahasrabudhe, Anthony Tabet, Melissa Hummel and Polina Anikeeva; Massachusetts Institute of Technology, United States

11:00 AM SB08.13.03

Biodegradable Silicon Nanoneedles for Ocular Drug Delivery Woohyun Park¹, Yale Jeon², Van Phuc Nguyen³, Dong Rip Kim², Yannis M. Paulus^{3,3}

and Chi Hwan Lee^{1,1,1}; ¹Purdue University, United States; ²Hanyang University, Korea (the Republic of); ³University of Michigan–Ann Arbor, United States

11:15 AM SB08.13.04

Ion-Based Communication for Implantable Bioelectronics Zifang Zhao¹, Claudia Cea¹, Jennifer Gelinas^{2,2} and Dion Khodagholy¹; ¹Columbia University, United States; ²Columbia University Medical Center, United States

11:30 AM SB08.13.05

Flexible Interdigitated Electrode for Selective Stimulation of Small Fibers in Humans Santiago Velasco Bosom, Johannes Gurke, Sanggil Han, Michael Lee and George G. Malliaras; University of Cambridge, United Kingdom

11:45 AM SB08.13.06

Smart Hydrogel Ultrasound Resonators for Biomedical Sensing Applications Navid Farhoudi, Prattay D. Kairy, Simon Binder, Lars B. Laurentius, Jules J. Magda, Florian Solzbacher and Christopher F. Reich; The University of Utah, United States

SESSION SB08.14: Liquid and Flexible Metals for Bioelectronics

Session Chairs: Mary Donahue and Martin Kaltenbrunner

Thursday Afternoon, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

1:30 PM *SB08.14.01

Soft Electronics and Sensors Using Liquid Metals Michael Dickey; North Carolina State University, United States

2:00 PM SB08.14.02

Retinal Prosthesis with Three-Dimensional Soft Bioelectrodes Won Gi Chung and Jang-ung Park; Yonsei University, Korea (the Republic of)

2:15 PM SB08.14.03

Liquid 3D Microneedles for Cardiac Recording and Stimulation Sumin Kim, Nam Kyun Kim, Eui Hwa Jang, Sak Lee and Jang-ung Park; Yonsei University, Korea (the Republic of)

2:30 PM SB08.14.04

An Intrinsically Stretchable Polymer Diode That Can Operate at 13.56 MHz Naoji Matsuhisa^{1,2,3}, Simiao Niu³, Stephen O'Neill³, Jiheong Kang³, Yuto Ochiai³, Toru Katsumata^{3,4}, Hung-Chin Wu³, Minoru Ashizawa^{3,5}, Ging-Ji Nathan Wang³, Donglai Zhong³, Xuelin Wang^{3,6}, Xiwen Gong³, Rui Ning³, Huaxin Gong³, Insang You³, Yu Zheng³, Zhitao Zhang³, Jeffrey Tok³, Xiaodong Chen⁷ and Zhenan Bao³; ¹Keio University, Japan; ²JST, Japan; ³Stanford University, United States; ⁴Asahi Kasei Corporation, Japan; ⁵Tokyo Institute of Technology, Japan; ⁶Beihang University, China; ⁷Nanyang Technological University, Singapore

2:45 PM SB08.14.05

Imperceptible Circuits for Wearable and Wireless Reconfigurable Electronic Devices S  verine C. de Mulatier, Mathias Fayolle, Roger Delattre and Sylvain Blayac; Ecole des Mines de Saint Etienne, France

3:00 PM BREAK

SESSION SB08.15: Wearable and Skin Electronics

Session Chairs: Dion Khodagholy and Takafumi Uemura

Thursday Afternoon, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

3:30 PM SB08.15.01

In Situ Cardiac Disease Diagnosis and Treatment Using Multifunctional Epicardium Patch Device with Biomimetic Tissue Adhesive Jae Chul Hwang, Moohyun Kim and Jang-ung Park; Yonsei University, Korea (the Republic of)

3:45 PM SB08.15.02

Directly Printed Soft Three-Dimensional Electrode for High-Density Electromyography Recording Moohyun Kim, Sumin Kim and Jang-ung Park; Yonsei university, Korea (the Republic of)

4:00 PM SB08.15.03

Wireless Textile Moisture and pH Sensor for Wound Care Beatrice Fraboni¹, Marta Tessarolo¹, Luca Possanzini¹, Isacco Gualandri¹, Federica Mariani¹, Leo Torchia¹, Danilo Arcangeli¹, Federico Melandri² and Erika Scavetta¹; ¹Univ of Bologna, Italy; ²PLASTOD srl, Japan

SESSION SB08.16: Novel Materials for Bioelectronics

Session Chairs: Mary Donahue and Takafumi Uemura

Friday Morning, May 13, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 2

9:00 AM SB08.16.01

Additive Manufacturing of Transient Metal for Bioresorbable Sensing Implants Nicolas Fumeaux and Danick Briand; Ecole Polytechnique Federale

de Lausanne, Switzerland

9:15 AM SB08.16.02

Affordable, Wireless, Patch-Type Wearable Transcutaneous Oxygen Sensor Chang-Jin Lim^{1,2}, Ross Emmanuel Triambulo^{1,2}, Junwoo Jeon¹, Sejung Park² and Jin-Woo Park¹; ¹Yonsei University, Korea (the Republic of); ²Asen Company, Korea (the Republic of)

9:30 AM SB08.16.03

Quipu-Inspired, Liquid Metal-Enabled Pressure Transducers (QUILT) for Low-Cost Gastrointestinal Manometry Kewang Nan^{1,2}, Sahab Babae^{1,2} and Giovanni Traverso^{1,2}; ¹Massachusetts Institute of Technology, United States; ²Brigham and Women's Hospital, United States

9:45 AM SB08.16.04

Ultrathin Organic Microsupercapacitors for E-Skin and Implantable Electronics Mehmet G. Say; Linköping University, Sweden

SESSION SB08.17: General Session I
Session Chairs: Mary Donahue and Takafumi Uemura
Tuesday Afternoon, May 24, 2022
SB08-Virtual

9:00 PM SB08.03.03

A Closed-Loop Network Of Wireless, Body-Integrated Devices for Temporary Electrotherapy Yeon Sik Choi and John A. Rogers; Northwestern University, United States

9:15 PM SB08.08/SB02.05.03

Fabrication of Batteryless Soft Control Actuator Using Microfluidics and Contactless Power Supply Ryosuke Matsuda, Song Zihao, Umihiro Kamoto and Hiroki Ota; Yokohama National University, Japan

9:30 PM SB08.18.04

Ultra-Stretchable and Transparent Biocompatible Electrodes Toward Remote Acquisition of Multimodal Physiological Signals Tepei Araki, Shusuke Yoshimoto, Takafumi Uemura, Naoko Kurihira, Yuko Kasai, Toshikazu Nezu, Hirokazu Iida, Junko Sandbrook, Shintaro Izumi and Tsuyoshi Sekitani; Osaka University, Japan

9:45 PM SB08.18.03

Copolymerized Dopamine Enables the Enhancement of Anti-Oxidation, Conductivity and Adhesion of the Platinum-Coated Silver Nanowires/Polyacrylamide Hydrogel Electrode Fang-Min Lin and Wei-Chen Huang; National Yang Ming Chiao Tung University, Taiwan

SESSION SB08.18: General Session II
Session Chairs: Mary Donahue, Martin Kaltenbrunner and Takafumi Uemura
Wednesday Morning, May 25, 2022
SB08-Virtual

8:00 AM SB08.18.01

Wearable Printed PEDOT:PSS Sensor for Face Mask Barrier Integrity and Respiration Rate Monitoring in Covid-19 Pandemics Marina Galliani; EMSE, France

8:15 AM SB08.18.02

Liquid-Metal Based Strain Sensors for Human Activity Monitoring Shawn L. Wang¹, He Li², Qing Wang² and Bing Yao^{2,3}; ¹Episcopal Academy, United States; ²Pennsylvania State University, United States; ³Xidian University, China

8:30 AM *SB08.18.05

Hybrid Response Pressure Sensor (HRPS) for Wearable and Robotic-Finger-Based Pulse Wave Sensing Nanshu Lu; The University of Texas at Austin, United States

9:00 AM *SB08.18.06

Deployable Soft Microelectrode Arrays for the Brain Sukho Song^{1,2}, Florian Fallegger², Alix Trouillet², Nicolas Vachicouras^{1,2} and Stephanie P. Lacour²; ¹Neurosoft Bioelectronics SA, Switzerland; ²Ecole Polytechnique Federale de Lausanne, Switzerland

9:30 AM SB08.18.07

Soft Devices for Tactile Sensing in Healthcare and Virtual Medical Training Applications Benjamin C. Tee^{1,2}; ¹National University of Singapore, Singapore; ²iHealthtech, Singapore

##PAGE_BREAK##

SYMPOSIUM SB09

Genetically-Encoded and Bioinspired Materials Science
May 9 - May 25, 2022

Symposium Organizers

* Invited Paper

SESSION SB09.01: Nanomedicine I
Session Chair: Ritchie Chen
Monday Morning, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

10:30 AM *SB09.01.01
Theranostics with Radiolabeled Nanomaterials Weibo Cai; University of Wisconsin--Madison, United States

11:00 AM SB09.01.02
Membrane Opening on Nanostraws Revealed By Live-Cell STED Microscopy Imaging Elke Hebisch, Martin Hjort, Diogo Volpati and Christelle Prinz; Lund University, Sweden

11:15 AM *SB09.01.03
Carbon Based Nanoscience Hongjie Dai; Stanford University, United States

SESSION SB09.02: Nanomedicine II
Session Chairs: Polina Anikeeva and Molly Stevens
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

1:30 PM SB09.02.01
Genetically-Controlled Protein-Based Polymeric Materials Towards Mimicking Erythrocyte Mechanics David S. Knoff, Samuel Y. Kim and Minkyu Kim; The University of Arizona, United States

1:45 PM SB09.02.02
Designer Protein Chimeras for Next-Generation Cell Therapies Adam W. Perriman; University of Bristol, United Kingdom

2:00 PM *SB09.02.03
Genetically Engineered Cell-Mimicking Nanoparticles for Targeted Drug Delivery Liangfang Zhang; University of California, San Diego, United States

SESSION SB09.03: Bio-Inspired, Biomaterials and Bioelectronics
Session Chairs: Ester Kwon and Molly Stevens
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

3:45 PM SB09.03.01
Hydrogel-Based Artificial Cells for Energy Generation and Communication Isabella N. Westensee, Xiaomin Qian and Brigitte Städler; Interdisciplinary Nanoscience Center, Aarhus University, Denmark

4:00 PM SB09.03.03
The Living Artificial Muscle: Design and Development of a Light Switchable Biohybrid Gel Andrea Diaz-Gaxiola and Adam W. Perriman; University of Bristol, United Kingdom

4:15 PM DISCUSSION TIME

4:30 PM SB09.03.05
A Cell-Based Drug Factory with Sense and Respond Peptide Production via a Bioelectric Device Interface Samantha Fleury, Matthew Parker, Jacob T. Robinson and Omid Veischi; Rice University, United States

4:45 PM SB09.03.06
Biomimetic Coatings on Thin-Film Electrodes for Neurotransmitter Sensing Applications Victoria E. Coyle^{1,2}, Michael Brothers^{1,2}, Sarah

McDonald^{1,2} and Steve Kim¹; ¹Air Force Research Laboratory, United States; ²UES Inc., United States

SESSION SB09.04: Poster Session I: Genetically-Encoded and Bioinspired Materials I

Session Chairs: Polina Anikeeva, Ritchie Chen, Ester Kwon and Molly Stevens

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB09.04.01

3D Bioprinting of Engineered Living Materials Mark Shannon, Adam W. Perriman and Valeska Ting; University of Bristol, United Kingdom

SB09.04.02

Membrane Modification of Extracellular Vesicles for Cardiac Disease Therapy Raquel Cruz Samperio, Corrigan Hicks and Adam W. Perriman; University of Bristol, United Kingdom

SB09.04.03

Effect of Surface Modification via Silica Shells on Magnetic Properties of Iron Oxide Nanoparticles Keisuke Nagao, Robert J. Macfarlane and Polina Anikeeva; Massachusetts Institute of Technology, United States

SB09.04.04

Development of Artificial Membrane Binding Proteins for the Enhancement of Adoptive Cell Therapies Valeria Sandoval Torres^{1,2,3}; ¹University of Bristol, United Kingdom; ²Cytoseek, United Kingdom; ³Consejo Nacional de Ciencia y Tecnologia Mexico, Mexico

SB09.04.05

3D Bioprinted Tumor Spheroid Model for the Assessment of Adoptive Cell Therapy Ximena G. Vasto Anzaldo^{1,2,3}; ¹University of Bristol, United Kingdom; ²Consejo Nacional de Ciencia y Tecnologia, Mexico; ³Cytoseek Ltd., United Kingdom

SB09.04.06

Development of Peptide-Based Hydrogel Scaffolds for the Extended Maintenance of Mesenchymal Stem Cell Phenotype *In Vitro* Claudia V. Leyva Aranda and Jeffrey D. Hartgerink; Rice University, United States

SB09.04.07

The Efficacy of Multi-Domain Peptides in Electrospun Conduits For Regenerating Transected Sciatic Nerves Cheuk Sun Edwin Lai¹, Viridiana Leyva-Aranda¹, Tania L. Lopez-Silva², Victoria Kong¹, Adam Farsheed¹, Carlo D. Cristobal³, Joseph Swain¹, Hyun Kyoung Lee³ and Jeffrey D. Hartgerink¹; ¹Rice University, United States; ²National Institutes of Health, United States; ³Baylor College of Medicine, United States

SB09.04.08

Molecular Engineering of Liquid Crystal-Poly(Ethylene Glycol) (LC-PEG) Block Copolymers for 3D Printed Biomaterial Scaffolds Nathaniel Skilling^{1,2,1}, Kristi Anseth^{1,1} and Timothy White¹; ¹University of Colorado Boulder, United States; ²University of Colorado Anschutz Medical Campus, United States

SB09.04.09

Developing an Empirical Model for Designing Tunable Collagen and Hyaluronic Acid Blended Hydrogels Paulina Babiak, Mazin Hakim, Qinghua Xu, Jessica Torres, Kevin Buno, Sharmila Karumuri³, Ilias Bilionis, Luis Solorio and Julie Liu; Purdue University, United States

SB09.04.10

Influence of Polymerization Conditions on Collagen I, II and III Blend Hydrogels Carly Battistoni¹, Paulina Babiak¹, Leonard Cahya¹, Jason Minnich¹, Alyssa Panitch² and Julie Liu¹; ¹Purdue University, United States; ²University of California, Davis, United States

SESSION SB09.05: Tissue Engineering and Biomaterials I

Session Chairs: Ritchie Chen and Ester Kwon

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

8:30 AM SB09.05.01

From Tuneable Peptide Self-Assembly to Biologically Instructive Materials Jacek K. Wychowaniec^{1,2,3}, Matteo D'Este¹, Mohamed Elsaywy⁴, Alberto Saiani², Aline F. Miller^{2,5}, John Crean³ and Dermot F. Brougham³; ¹AO Research Institute, Switzerland; ²The University of Manchester, United Kingdom; ³University College Dublin, Ireland; ⁴De Montfort University, United Kingdom; ⁵Manchester BIOGEL, United Kingdom

8:45 AM SB09.05.02

Bioorthogonal Click Intracellular Hydrogelation to Control Cell Cycle Behavior Laura Macdougall, Timothy Hoffman, Bruce E. Kirkpatrick, Benjamin Fairbanks, Christopher Bowman, Sabrina Spencer and Kristi Anseth; University of Colorado Boulder, United States

9:00 AM SB09.05.03

Injectable Hydrogels for Mechanically Active Tissues Narelli de Paiva Narciso, Renato S. Navarro, Aidan Gilchrist and Sarah Heilshorn; Stanford University, United States

9:15 AM BREAK

9:45 AM *SB09.05.04

MAPing Principles, Properties and Applications to Tissue Regeneration [Tatiana Segura](#); Duke University, United States

10:15 AM SB09.05.05

3D Bioprinting of Dynamic Covalent Hydrogels Enabled by Small Molecule Competitor and Catalyst [Sarah Hull](#), Junzhe Lou, Christopher D. Lindsay, Ashley D. Westerfield, Lucia G. Brunel, Yan Xia and Sarah Heilshorn; Stanford University, United States

10:30 AM SB09.05.06

In Situ Super-Resolution Imaging of Organoids and Extracellular Matrix Interactions via Photoexpansion Microscopy [Michael Blatchley](#)¹, Kemal A. Gunay¹, Francis M. Yavitt¹, Elijah M. Hawat¹, Peter J. Dempsey² and Kristi Anseth¹; ¹University of Colorado Boulder, United States; ²University of Colorado School of Medicine, United States

10:45 AM SB09.05.07

Programming Complex Cellular Alignment in Engineered Cardiac Tissue [John Ahrens](#), Sebastien Uzel, Mark Skylar-Scott, Mariana Mata, Aric Lu, Katharina Kroll, Wes Fabyan and Jennifer Lewis; Harvard University, United States

11:00 AM *SB09.05.08

4D Optogenetic Regulation of the Cellular Niche [Cole DeForest](#); Univ of Washington, United States

SESSION SB09.06: Bio-Inspired and Self-Assembly
Session Chairs: Ritchie Chen and Molly Stevens
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

2:00 PM SB09.06.02

Switchable Nano-Object Arrays for Material Reconfiguration and Information Representation [Yan Xiong](#)¹, Shih-Ting Wang² and Oleg Gang^{2,1}; ¹Columbia University, United States; ²Brookhaven National Laboratory, United States

2:15 PM SB09.06.03

Bioinspired Underwater Adhesives Using Amyloids from Commercial Proteins Michael Wilson¹, Maryssa Beasley¹, Kenan Fears², Elizabeth Yates³ and [Christopher So](#)²; ¹NRC Post-doctoral Fellow sited in Code 6176, Naval Research Laboratory, United States; ²U.S. Naval Research Laboratory, United States; ³U.S. Naval Academy sited in Code 6176, Naval Research Laboratory, United States

2:30 PM *SB09.06.04

Bioinspired Engineering of Living Material Systems [Shu Yang](#); University of Pennsylvania, United States

3:00 PM BREAK

SESSION SB09.07: Bioelectronics
Session Chairs: Polina Anikeeva and Ritchie Chen
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

3:30 PM SB09.07.02

Using Photovoltaic Nanowires as a Cell Dormancy Switch [Therese Johansson](#)¹, Laura Abariute¹, Lukas Hrachowina¹, Enrique Barrigón¹, Diogo Volpati¹, Steven Limpert¹, Gaute Otnes^{1,2}, Magnus T. Borgström¹ and Christelle Prinz¹; ¹Lund University, Sweden; ²Institute for Energy Technology, Norway

3:45 PM SB09.07.03

Miniaturization of Hydrogel-Based Neural Probes Mediated by Nanoscale Crystallization [Siyuan Rao](#), Sizhe Huang, Kayla Felix, Collin Maley and Qianbin Wang; University of Massachusetts Amherst, United States

4:00 PM *SB09.07.04

Tissue-Like and Genetically Targeted Nanoelectronics for Biology and Medicine [Jia Liu](#); Harvard University, United States

SESSION SB09.08: Self-Assembly, Biophysics and Biomaterials I
Session Chairs: Polina Anikeeva and Ritchie Chen
Wednesday Morning, May 11, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

8:15 AM SB09.08.01

Templating of Calcium Phosphate via Patterned Protein Nanoribbons—A Biomimetic Approach to Enamel Tissue Engineering [Susrut Akkineni](#)¹, Cheng Zhu², Gregory Doerk³, Jiajun Chen⁴, Song Miao⁵, Shuai Zhang^{1,5}, Ashish Kulkarni³, Samuel Hoff², Johan Svensson Bonde⁶, Jinhui Tao⁵, Hendrik Heinz², Stefan Habelitz⁷ and James De Yoreo^{5,1}; ¹University of Washington, United States; ²University of Colorado Boulder, United States; ³Brookhaven National Laboratory, United States; ⁴Lawrence Berkeley National Laboratory, United States; ⁵Pacific Northwest National Laboratory, United States; ⁶Lund University, Sweden; ⁷University of California, San Francisco, United States

8:30 AM SB09.08.02

Controlling Assembly and Reorganization of 2D Protein Polymorphs at Mineral Interfaces [Ying Xia](#)¹, Zhiyin Zhang², Nicole Avakyan², Shuai Zhang^{1,3}, Faik Tezcan² and James De Yoreo^{3,1}; ¹University of Washington, United States; ²University of California, San Diego, United States; ³Pacific Northwest National Laboratory, United States

8:45 AM SB09.08.03

β -Amyloid Fibrils are Biocatalytic [Elad Arad](#)^{1,2}; ¹Ben Gurion University of the Negev (BGU), Israel; ²Ben Gurion University of the Negev, Israel

9:00 AM SB09.08.05

Programming Analytic, Mechanochemical Sensing and Response in Hydrogels with Biochemical Circuits [Lei Zhang](#)¹, Paul Robert¹, Zheliang Wang¹, Thao Nguyen^{1,1}, Joelle Frechette² and Rebecca Schulman^{1,1,1}; ¹Johns Hopkins University, United States; ²University of California, Berkeley, United States

9:15 AM SB09.08.06

Assemblies of DNA-Functionalized Nanoparticles Respond to Wide Ranges of Salt Concentrations [Roger J. Reinertsen](#)¹, Sumit Kewalramani¹, Trung Dac Nguyen¹, Steven Weigand^{1,2}, Monica Olvera de la Cruz¹ and Michael J. Bedzyk¹; ¹Northwestern University, United States; ²Advanced Photon Source (APS)/Argonne National Laboratory, United States

9:30 AM BREAK

10:00 AM *SB09.08.07

Incorporating Hierarchical Structure into Hydrogels with Bioinspired Peptoid Polymers [Adrienne M. Rosales](#); The University of Texas at Austin, United States

10:30 AM SB09.08.08

Design of Silk Biomaterials via Protein Self-Assembly [Ulyana Shimanovich](#); Weizmann Institute of Science, Israel

10:45 AM SB09.08.09

Programmable Dynamic Control of DNA Condensates [Siddharth Agarwal](#), Dino Osmanovic Osmanovic, Melissa Klocke and Elisa Franco; University of California, Los Angeles, United States

11:00 AM SB09.08.10

Tailored Surface Functionalization of Porous Silicon Nanoparticles for Efficient Intracellular Delivery [Kyunghwan Kim](#) and [Jinmyoung Joo](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

SESSION SB09.09: Self-Assembly, Biophysics and Biomaterials II

Session Chairs: Polina Anikeeva and Molly Stevens

Wednesday Afternoon, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 4

3:30 PM *SB09.09.01

Exploring Methods to Control Actin Dynamics with Implications in Synapse Formation [Jerry Yang](#); University of California, San Diego, United States

4:00 PM SB09.09.02

Design of Light-Responsive Protein Assemblies [Zhiyin Zhang](#), Nicole Avakyan and Faik Tezcan; University of California, San Diego, United States

4:15 PM SB09.09.03

Supramolecular Copolymers of Peptides and Peptide Amphiphiles and Their Therapeutic Potential [Ruomeng Qiu](#), Ivan R. Sasselli, Zaida Álvarez, Hiroaki Sai, Wei Ji, Liam C. Palmer and Samuel I. Stupp; Northwestern University, United States

4:30 PM *SB09.09.04

Biophysical and Genetic Cues Regulating the Structural Remodeling of Adipose Tissue Upon Caloric Excess [Cecilia Leal](#); University of Illinois, Urbana-Champaign, United States

SESSION SB09.10: Poster Session II: Genetically-Encoded and Bioinspired Materials II

Session Chairs: Polina Anikeeva, Ritchie Chen, Ester Kwon and Molly Stevens

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB09.10.02

Squid Suckerin-Spider Silk Fusion Protein Hydrogel for Stem Cell-Secretome Delivery in Chronic Wounds [Kenrick Koh](#)^{1,1}, Jun Kit Wang¹, Xiao Yuan, James Chen¹, Hong Sheng Cheng¹, Bartosz Gabryelczyk², Chor Yong, Dalton Tay^{1,1,1}, Nguan Soon, Andrew Tan^{1,1} and Ali G. Miserez^{1,1}; ¹Nanyang Technological University, Singapore; ²Aalto University, Finland

SB09.10.03

Towards Osteogenesis—Utilizing the Power of Cell-Free Protein Synthesis for Regenerative Medicine [Agata Jakimowicz](#) and Adam W. Perriman; University of Bristol, United Kingdom

SB09.10.05

Phenylalanine-Derived Supramolecular Hydrogels for Sustained Release [Brittany L. Abraham](#), Ethan S. Toriki, N'Dea J. Tucker and Bradley L.

Nilsson; University of Rochester, United States

SB09.10.06

Nano-Sized Graphene Oxide as Biocompatible Gene Delivery Carrier for Peptide Nucleic Acid Ahruem Back; Korea Research Institute of Standards and Science, Korea (the Republic of)

SB09.10.07

Development of 4D Cell Culture Platform with Reversibly Photocontrolled Stiffness Boyeong Kang¹, Ik Sung Cho², Vivian Zhang¹, Jae-won Shin² and Julia Kalow¹; ¹Northwestern University, United States; ²University of Illinois Chicago, United States

SB09.10.08

Dynamic Communication Systems Based on Soft Hydrogel Microbial Modulators Yoon Jeong and Joseph Irudayaraj; University of Illinois, United States

SB09.10.10

Artificially Engineered Protein as Material Platform for Antimicrobial Peptides Fathima Doole, Christopher P. Camp, Lauren G. Melcher, Bumjoon Kim, Zhu Zhao, Anne M. Wertheimer and Minkyu Kim; The University of Arizona, United States

SB09.10.11

Corneal Tissue Engineering by Using Peptide Hydrogel/Elastomer Membrane Lamellar Structures Sibel Cetinel¹, Sevilay Burcu Sahin², Ebru Demir² and Kamal Asadipakdel²; ¹SUNUM, Turkey; ²Sabancı University, Turkey

SB09.10.12

Injectable Hydrogel Biosensors Based on Fluorogenic DNA and RNA Probes Irina Drachuk^{1,2}, Svetlana Harbaugh¹ and Jorge Chávez¹; ¹Wright Patterson AFRL, United States; ²UES, Inc., United States

SB09.10.13

Regeneration of Electrophysiologically Functional Atrial Cardiac Tissues on Anisotropic Fibrillar Fibronectin Matrix Do Hoon Kim, Jeffery Creech, Andre Monteiro Da Rocha, Todd Herron, Tae-Hwa Chun and Joerg Lahann; University of Michigan, United States

SB09.10.14

Tumor-Mimetic Fibrillar Fibronectin Constructs Decorated with Hyaluronan Govern the Metastatic Potential of Breast Tumor Cells Dylan B. Neale and Joerg Lahann; University of Michigan, United States

SB09.10.15

Protein Analogous Micelles for Intracellular Delivery of Stapled Peptide Therapeutics Yu Tian, James LaBelle and Matthew V. Tirrell; University of Chicago, United States

SESSION SB09.11: Genetically-Encoded and Bioinspired Materials Science I

Session Chair: Ritchie Chen
Tuesday Afternoon, May 24, 2022
SB09-Virtual

6:30 PM *SB09.11.01

Mimicking Tumors as a S.M.A.R.T.E.R. Way to Treat Transplant Rejection Steven Little; University of Pittsburgh, United States

7:00 PM SB09.11.03

Fabrication of Neurovascular Organoids in Microdevices Tomoki Asaba¹ and Junji Fukuda^{1,2}; ¹Yokohama National University, Japan; ²Kanagawa Institute of Industrial Science and Technology, Japan

7:15 PM SB09.11.04

Large-scale Preparation of Hair Follicle Germs Using Bioprinting and Spontaneous Microgel Contraction Ayaka Nanmo¹, Tatsuto Kageyama^{1,2,3} and Junji Fukuda^{1,2}; ¹Yokohama National University, Japan; ²Kanagawa Institute of Industrial Science and Technology (KISTEC), Japan; ³JST-PRESTO, Japan

7:30 PM *SB09.11.05

Electrogenetic Control of Microbial Consortia via Natural and Synthetic Protein Nanowires Nikhil S. Malvankar; Yale University, United States

SESSION SB09.12: Genetically-Encoded and Bioinspired Materials Science II

Session Chairs: Ritchie Chen, Ester Kwon and Molly Stevens
Wednesday Morning, May 25, 2022
SB09-Virtual

10:30 AM *SB09.12.01

Emergence of Complexity in Chiral Nanostructures Nicholas A. Kotov; University of Michigan, United States

11:00 AM SB09.03.04

Development of an Inflammation-Responsive Hydrogel for On-Demand Local Immunomodulation via Epigenetic Modulation of Macrophages in Acute Wound Healing Hyerim Kim¹, Yunji Joo^{2,3}, Yun-Min Kook², Na Ly Tran^{2,3}, Sang-Heon Kim^{2,3}, Kangwon Lee¹ and Seung Ja Oh^{2,3}; ¹Seoul National University, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of); ³Korea University of Science and

Technology, Korea (the Republic of)

11:15 AM SB09.12.02

Mix & Gel—A New Strategy for the Development of Nanofibrous Cell Scaffolds Through Co-Assembly of Charge Complementary Binary Peptides Abdulwahhab Khedr¹, Mohamed Soliman¹, Jacek K. Wychowanic^{2,3} and Mohamed Elsayy¹; ¹De Montfort University, United Kingdom; ²AO Research Institute, Switzerland; ³University College Dublin, Ireland

11:30 AM SB09.12.04

Tailoring the Nanoscale Environment of Enzymatic Cascades on 3D DNA Scaffolds Jason Kahn¹, Yan Xiong² and Oleg Gang^{1,2}; ¹Brookhaven National Laboratory, United States; ²Columbia University, United States

11:45 AM SB09.12.05

Using a Quasi-3D *Ex Vivo* Skin Dermis Model to Investigate the Potential of Biomaterials to Reprogram Gene Expression in Human Dermal (Myo)Fibroblasts Anna Rhodes and Nuria Oliva-Jorge; Imperial College London, United Kingdom

12:00 PM SB09.11.02

Cost and Time Effective Nanolithography of Reusable Millimeter Size Bone Tissue Replicas for Induced MSCs Differentiation Alessandra Zanut¹, Liu Xiangyu¹, Marcus Weck², Giuseppe de Peppo³ and Elisa Riedo¹; ¹NYU Tandon School of Engineering, United States; ²New York University, United States; ³The New York Stem Cell Foundation Research Institute, United States

##PAGE_BREAK##

SYMPOSIUM SB10

Complex States in the Observation, Control and Utilization of Biomimetic Functionalities—From Fundamentals to Applications
May 10 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SB10.01: Biogenic Synthesis I
Session Chairs: Michio Suzuki and Yoriko Tominaga
Tuesday Morning, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Sea Pearl 2

9:15 AM *SB10.01.01

Biogenic Nanoparticles—The Morphology is Controlled Even by BIM (Biological Induced Mineralization) Yoshiko Okamura; Hiroshima University, Japan

9:45 AM SB10.01.02

Biomimetic Functionalization of Gold Nanoparticles and Nanopyramids with Keratin Giovanni Perotto¹, Marco Contardi¹, Alexa Guglielmelli², Antonella Calogero³, Monica Focsan⁴, Luciano De Sio³ and Athanassia Athanassiou¹; ¹Italian Inst of Technology, Italy; ²Università della Calabria, Italy; ³Università La Sapienza, Italy; ⁴Institute for Interdisciplinary Experimental Research in Bionanoscience, Romania

10:00 AM BREAK

10:30 AM *SB10.01.03

Mesocrystalline Ordering and Phase Transformation of Iron Oxide Biominerals in the Ultrahard Teeth of *Cryptochiton stelleri* David Kisailus; University of California, Irvine, United States

11:00 AM *SB10.01.04

Organic Molecules in the Molluscan Shells Regulate the Fine Microstructures of Biominerals Michio Suzuki; the University of Tokyo, Japan

11:30 AM SB10.01.05

Recombinant Collagen-Like Protein and Hyaluronic Acid Hybrid Gels Mimic Pancreatic Cancer Extracellular Matrix Environment Stephanie Nemece, Sylvia Ganda and Kristopher Kilian; UNSW, Australia

11:45 AM SB10.01.06

Dual-Stimuli-Responsive Polymer Composite with Ultrawide Tunable Stiffness Range Triggered by Water and Temperature Yu Qiu, [Erin Askounis](#), Fangyi Guan, Zihang Peng and Qibing Pei; University of California, Los Angeles, United States

SESSION SB10.02: Neuroengineering
Session Chairs: Antal Berényi and Brandon Mitchell
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Sea Pearl 2

1:30 PM *SB10.02.01
Translational Neuroelectronics [Dion Khodagholy](#); Columbia University, United States

2:00 PM *SB10.02.02
Fiberless Optogenetic Probes for Selective Neuromodulation at Cellular Resolution [Euisik Yoon](#); University of Michigan, United States

2:30 PM SB10.02.03
High-Density Micro-OLEDs on Shank-Shaped CMOS Chips for Optogenetic Implants [Sabina Hillebrandt](#)^{1,2}, Changki Moon^{1,2}, Adriaan Taal³, Ken Shepard³ and Malte Gather^{1,2}; ¹University of Cologne, Germany; ²University of St Andrews, United Kingdom; ³Columbia University, United States

2:45 PM SB10.02.04
Microfluidics within a Well—Vascularization of Tumor Spheroids and Organoids for Drug Screening [Noo Li Jeon](#); Seoul National University, Korea (the Republic of)

3:00 PM BREAK

SESSION SB10.03: Sensing
Session Chairs: Brandon Mitchell and Yoriko Tominaga
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Sea Pearl 2

3:30 PM *SB10.03.01
Machine Learning-Based Self-Powered Acoustic Sensor for Speaker Recognition [Keon Jae Lee](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

4:00 PM SB10.03.02
Real-Time *In Vivo* Detection of Nitric Oxide Using Photonic Microring Resonator [Sakib N. Hassan](#), Xuan Zhao, Vishnu Nair, Guillaume Duret, Christian Schreib, Ashok Veeraraghavan, Omid Veischi and Jacob T. Robinson; Rice University, United States

4:15 PM SB10.03.03
Direct Visualization of Complex Binding States of Molecular Biomarkers on the Surface of Graphene FET Biosensors Biddut Sarker, Cheri Hampton, Ahmad Islam and [Lawrence F. Drummy](#); Air Force Research Laboratory, United States

4:30 PM SB10.03.04
Microcapsules in Granular Hydrogels for Spatial Control of Cellular Activity [Thomas G. Molley](#) and Kristopher Kilian; University of New South Wales, Australia

4:45 PM SB10.03.05
Live Streaming of a Single Cell's Life Over a Local pH-Monitoring Nanowire Waveguide [Moon-Jung Yong](#)^{1,2}, Byunghwa Kang^{3,2}, Un Yang^{1,2}, Seung Soo Oh^{3,2} and Jung Ho Je^{1,2}; ¹X-ray Imaging center, Korea (the Republic of); ²Pohang University of Science and Technology, Korea (the Republic of); ³Biomolecular materials lab, Korea (the Republic of)

SESSION SB10.04: Poster Session: Complex States in the Observation, Control and Utilization of Biomimetic Functionalities
Session Chairs: Brandon Mitchell and Yoriko Tominaga
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SB10.04.01
Thin-Film Crystalline and Spherical Nanocrystalline Biogenic PbS Takumi Konishi, Tomoya Murakami, Yoshiko Okamura and [Yoriko Tominaga](#); Hiroshima University, Japan

SB10.04.02
Directed Evolution of Metal-Organic-Zymes for Artificial Photosynthesis [Guangxu Lan](#)^{1,2}; ¹The University of Chicago, United States; ²Lawrence Berkeley National Laboratory, United States

SB10.04.03
Accelerating DNA-Streptavidin Hydrogel Formation via Base-Pair Mismatch for Enzyme-Free Picomolar MicroRNA Detection Jae Chul Park, [Hyebin Na](#) and Yoon Sung Nam; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SB10.04.07

A Three-Dimensional Structured Brain-Injectable Device with a Curved Pathway JuSeung Lee and Tae-il Kim; Sungkyunkwan University, Korea (the Republic of)

SB10.04.08

A Novel Sensing Method for COVID-19 (SARS-CoV-2 gRNA) on Personal Glucose Meter Utilizing Oxidative Activity of Cerium Oxide Nanoparticles Sang Mo Lee, Hyo Yong Kim and Hyun Gyu Park; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SB10.04.11

Using Intracellular Redox-Reaction to Modulate Cytotoxicity of Photosensitizer Encapsulated in Polyglycerol Nanogels Chae Gyu Lee and Tae-Hyuk Kwon; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SB10.04.12

Material Characterization of High-Energy Electron Irradiated Agarose Hydrogels Catharina Krömmelbein^{1,2}, Martin Mütze^{1,2}, Robert Konieczny¹, Wilhelm Gerdes³, Stefan G. Mayr^{1,2} and Stefanie Riedel^{1,2,3}; ¹Leibniz Institute of Surface Engineering (IOM), Germany; ²University of Leipzig, Germany; ³Cell.Copedia GmbH, Germany

SESSION SB10.05: Complex States in Observations
Session Chairs: Antal Berényi and Brandon Mitchell
Tuesday Morning, May 24, 2022
SB10-Virtual

10:30 AM *SB10.05.01

High-Resolution Microelectrode Arrays to Interface with Human iPSC-Derived Neuronal Cultures and Brain Organoids Urs Frey; MaxWell Biosystems AG, Switzerland

11:00 AM *SB10.05.02

Hydrogen Bonds Affect the Energy, the Coupling and the Ultrafast Dynamics of Interacting Chromophores in Biological and Biomimetic Complexes Elisabetta Collini; University of Padova, Italy

11:30 AM SB10.05.03

Ultrasmall, Bright and Photostable Probes for Live-Cell Optical Super-Resolution Microscopy Based Interrogation of Complex Biological Processes Ulrich Wiesner, Jacob A. Erstling and Rachel Lee; Cornell University, United States

11:45 AM SB10.05.04

Bright, Non-Iridescent Structural Coloration from 2D Clay Nanosheet Suspensions Paulo H. Michels Brito¹, Volodymyr Dudko², Daniel Wagner², Paul Markus², Georg Papastavrou², Leander Michels¹, Josef Breu² and Jon O. Fossum¹; ¹Norwegian University of Science and Technology, Norway; ²Universität Bayreuth, Germany

SESSION SB10.06: Bioelectronics I
Session Chairs: Jun Ohta and Yoriko Tominaga
Tuesday Afternoon, May 24, 2022
SB10-Virtual

6:30 PM *SB10.06.01

Visual Prostheses—Principle and Technology from Biomimetics Perspective Yasuo Terasawa¹ and Jun Ohta²; ¹Nidek Co., Ltd., Japan; ²Nara Institute of Science and Technology, Japan

7:00 PM *SB10.06.02

Breath Odor Biometrics by Artificial Olfaction Sensor Array and Machine Learning Kazuki Nagashima^{1,2}; ¹The University of Tokyo, Japan; ²Japan Science and Technology Agency, Japan

7:30 PM SB10.06.03

Needle-Shape Multifunctional Neural Probe Integrated with Light-Emitting Diodes and Fluidic Channel Kakeru Oya¹, Noriaki Ohkawa², Hiroki Yasunaga¹, Susumu Setogawa², Atsushi Nishikawa³, Loesing Alexander³ and Hiroto Sekiguchi^{1,4}; ¹Toyohashi University of Technology, Japan; ²Dokkyo Medical University, Japan; ³ALLOS Semiconductors GmbH, Germany; ⁴Japan Science and Technology, Precursory Research for Embryonic Science and Technology, Japan

7:45 PM SB10.06.04

Development of Micro-Electrocorticography Device Covering Wide Area of Cortex in Mice Ryota Kanda¹, Shuto Tada¹, Susumu Setogawa², Noriaki Ohkawa² and Hiroto Sekiguchi^{1,3}; ¹Toyohashi University of Technology, Japan; ²Dokkyo Medical University, Japan; ³JST PRESTO, Japan

8:00 PM SB10.06.05

CuO Nanoparticulate Modified Microelectrode for Neurotransmitters Detection by Fast-Scan Cyclic Voltammetry Nicha Sato¹, Makito Haruta¹, Yasumi Ohta¹, Hironari Takehara¹, Hiroyuki Tashiro², Kiyotaka Sasagawa¹, Oratai Jongprateep³ and Jun Ohta¹; ¹Nara Institute of Science and Technology, Japan; ²Kyushu University, Japan; ³Kasetsart University, Thailand

SESSION SB10.07: Bioelectronics II
Session Chairs: Kazuki Nagashima and Hiroto Sekiguchi
Tuesday Afternoon, May 24, 2022
SB10-Virtual

9:00 PM *SB10.07.01

Implantable Optoelectronic Devices for Observation and Control of Biological Functions Jun Ohta, Kiyotaka Sasagawa, Makito Haruta, Hironari Takehara and Hiroyuki Tashiro; Nara Institute of Science and Technology, Japan

9:30 PM *SB10.07.02

Non Label Neurotransmitter Image Sensor Based on CMOS Technology Kazuaki Sawada; Toyohashi University of Technology, Japan

10:00 PM *SB10.07.03

Biodegradable Materials for Electronic Medicine and Biosensors Lan Yin; Tsinghua University, China

10:30 PM SB10.07.04

Zr-Based Metal-Organic Frameworks-Assisted Ice-Recrystallization Inhibition Nayeong Jeon¹, In-ho Jeong², Hyun Woo Park³, Chang-Whan Lee², Hee Jung Lee³ and Eunji Lee¹; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²University of Ulsan, Korea (the Republic of); ³Korea Institute of Materials Science, Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM SF01

Materials Research Needs to Advance Nuclear Fuels, Structural Materials and Wasteforms
May 9 - May 25, 2022

Symposium Organizers

* Invited Paper

SESSION SF01.01: Radiation Effects I
Session Chairs: Maria Okuniewski and Par Olsson
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 327

10:30 AM *SF01.01.01

Surface Near Helium Damage in Materials Studied with a High Throughput Implantation Method Peter Hosemann^{1,2}, Mehdi Balooch¹, Andrew Scott¹, Yujun Xie^{1,2}, Sarah Stevenson¹ and Frances Allen^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

11:00 AM SF01.01.02

Radiation Tolerance of Hollandite Ceramics as Waste Forms for Cs and Transuranic Elements Lumin Wang¹, Li Jiang¹, Tao Ma¹, Kai Sun¹, Yuhan Li¹, Gary Was¹, Mingyang Zhao², Kyle Brinkman² and Jake Amoroso³; ¹Univ of Michigan, United States; ²Clemson University, United States; ³Savannah River National Laboratory, United States

11:15 AM *SF01.01.03

Diffusion of Light Elements (He, T, Li) in B₄C Boron Carbide—A Comparative Study Using Ion Beams Nathalie Moncoffre¹, Mohand Bousseksou^{2,1}, Dominique Gosset³, Gaëlle Gutierrez², Vianney Motte³, Yves Pipon¹, Philippe Sainot⁴ and Thierry Sauvage⁵; ¹IP2I CNRS and Lyon 1 University, France; ²CEA, DES/SRMP JANNUS, Université Paris-Saclay, France; ³CEA, DES/SRMA LA2M, Université Paris Saclay, France; ⁴Univ.Lyon, INSA Lyon, LaMCoS, France; ⁵CNRS CEMHTI, France

SESSION SF01.02: Fuels I
Session Chairs: Michel Freyss and Maria Okuniewski
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 327

1:30 PM *SF01.02.01

Lower Length Scale Fuel Performance Modeling of U-Mo Fuel [Benjamin Beeler](#)^{1,2}, ATM Jahid Hasan¹, Yongfeng Zhang³, Sean Masengale³, Aashique Rezwani³, Gyuchul Park⁴, Maria Okuniewski⁴, Shenyang Hu⁵, Zhi-Gang Mei⁶, Bei Ye⁶, Larry Aagesen², Sourabh Kadambi² and Linu Malakkal²; ¹North Carolina State University, United States; ²Idaho National Laboratory, United States; ³University of Wisconsin–Madison, United States; ⁴Purdue University, United States; ⁵Pacific Northwest National Laboratory, United States; ⁶Argonne National Laboratory, United States

2:00 PM SF01.02.02

Radiation-Enhanced Diffusion of U, Mo and Xe in γ U-10Mo Alloy [Gyuchul Park](#)¹, Benjamin Beeler^{2,3} and Maria Okuniewski¹; ¹Purdue University, United States; ²North Carolina State University, United States; ³Idaho National Laboratory, United States

2:15 PM SF01.02.03

Molecular Dynamics Simulations of Xenon Bubbles in Uranium Mononitride [Jade Li](#) and Samuel Murphy; Lancaster University, United Kingdom

2:30 PM SF01.02.04

Uranium Mononitride (UN) Properties from First-Principles Calculations and *Ab Initio* Molecular Dynamics Simulations [Vancho Kocevski](#), Daniel A. Rehn, Michael Cooper and David Andersson; Los Alamos National Laboratory, United States

2:45 PM SF01.02.05

Finite Element Analysis of the Residual Stresses Arising During the Fabrication of TRISO Coated Nuclear Fuel [Angelo Battistini](#), Thomas Haynes and Mark Wenman; Imperial College London, United Kingdom

3:00 PM BREAK

3:30 PM *SF01.02.06

Computational Thermodynamics—An Invaluable Tool for Predicting the Thermochemical Behavior of Nuclear Materials in All State [Christine Gueneau](#)¹, Mathieu Garrigue¹, Pauline Fouquet-Metivier¹, Eva Lawrence¹, Andrea Quaini¹, Jean-Christophe Dumas¹, Philippe Martin¹, Clement Introini¹, Jerome Sercombe¹ and Bo Sundman²; ¹French Alternative Energies and Atomic Energy Commission (CEA), France; ²OpenCalphad, France

4:00 PM SF01.02.07

Multimodal Serial Sectioning and Synchrotron Micro-Computed Tomography Characterization of High-Burnup U-Mo Fuel [Alejandro L. Figueroa](#)¹, Daniel Murray², Dennis Keiser², Jonova Thomas³, Peter Kenesei³, John Almer³ and Maria Okuniewski¹; ¹Purdue University, United States; ²Idaho National Laboratory, United States; ³Argonne National Laboratory, United States

4:15 PM SF01.02.08

Simulated Advanced Gas-Cooled Reactor Spent Nuclear Fuels—An XRD, XPS and Raman Study [Richard Wilbraham](#)¹, Colin Boxall¹, Elizabeth Howett¹, David Hambley² and Jessica K. Higgins³; ¹Lancaster University, United Kingdom; ²UK National Nuclear Laboratory, United Kingdom; ³Rolls-Royce plc., United Kingdom

4:30 PM SF01.02.09

Cermet Surrogate Nuclear Fuels from Coated Powders [Jonathan A. Johnson](#)¹, Ryan Wilkerson², Stephen DiPietro³ and Gregory B. Thompson¹; ¹University of Alabama, United States; ²NASA Marshall Space Flight Center, United States; ³Exothermics Inc, United States

SESSION SF01.03: Fuels II

Session Chairs: Gianguido Baldinozzi and Ming Tang

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 327

8:30 AM *SF01.03.01

The Dissolution of UO₂-Based Spent Nuclear Fuel Under Storage and Disposal Conditions—Insights from SIMFUEL Studies [Colin Boxall](#); Lancaster University, United Kingdom

9:00 AM SF01.03.02

Constituent Redistribution in U-Pu-Zr Fuels and Its Dependence on Zr Content [Assel Aitkaliyeva](#)¹, Thad Rahn¹, Karen Wright² and Luca Capriotti²; ¹University of Florida, United States; ²Idaho National Laboratory, United States

9:15 AM SF01.03.03

Corrosion Behaviour of High-Density Advanced Technology Fuels [Ghebrehiwot Berhane](#)¹, Colin Boxall¹, Richard Wilbraham¹, David Goddard², Denise A. Lopes³, Ross Springell⁴ and Jacek Wasik⁴; ¹Lancaster University, United Kingdom; ²National Nuclear Laboratory Limited Springfields, United Kingdom; ³Westinghouse Electric Sweden, Sweden; ⁴University of Bristol, United Kingdom

9:30 AM SF01.03.04

Corrosion Studies of Legacy AGR Spent Nuclear Fuel and AGR Simulant Fuels (SIMFuels) [Yifeng Huang](#)¹, Colin Boxall¹, Richard Wilbraham¹, David Hambley², James Goode², Lucy Kissick², Stephen Henderson² and Andrew Taylor²; ¹Lancaster University, United Kingdom; ²National Nuclear Laboratory, United Kingdom

9:45 AM SF01.03.05

Accurate First-Principles Prediction of Thermal Conductivity of UO₂ Over a Wide Temperature Range [Tianli Feng](#)¹ and Xiaolong Yang²; ¹University of Utah, United States; ²Chongqing University, China

10:00 AM BREAK

10:30 AM *SF01.03.06

How Can Raman Spectroscopy be Used to Study Nuclear Fuel? [Lionel Desgranges](#)¹, Patrick Simon² and Aurélien Canizares²; ¹CEA, France; ²CNRS, France

11:00 AM SF01.03.07

Fuel Pulverization Mechanisms Using Cluster and Molecular Dynamics Simulations [Michael W. Cooper](#)¹, Christopher Matthews¹, Rob Daum² and David Andersson¹; ¹Los Alamos National Laboratory, United States; ²Electric Power Research Institute, United States

11:15 AM SF01.03.08

Diffusion in Undoped and Cr₂O₃ Doped Crystalline and Amorphous UO₂ [Megan W. Owen](#)¹, Michael Cooper², Antoine Claisse³, Mattias Puide³, David Goddard⁴, William Lee¹ and Simon C. Middleburgh¹; ¹Bangor University, United Kingdom; ²Los Alamos National Laboratory, United States; ³Westinghouse Electric Sweden AB, Sweden; ⁴National Nuclear Laboratory, United Kingdom

11:30 AM *SF01.03.09

Fundamental and Systematic Methods to Characterise and Explore Materials Relevant to Spent Nuclear Fuel [Gabriel Murphy](#)¹, Zhaoming Zhang², Brendan Kennedy³, Piotr Kowalski¹, Philip Kegler¹, Martina Klinkenberg¹, Andreas Wilden¹, Evgeny Alekseev¹ and Dirk Bosbach¹; ¹FZ Juelich, Germany; ²Australian Nuclear Science and Technology Organisation, Australia; ³The University of Sydney, Australia

SESSION SF01.04: Radiation Effects II
Session Chairs: Gianguido Baldinozzi and Lumin Wang
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 327

1:30 PM *SF01.04.01

Molecular Dynamics Simulations of Radiation Damage Effects in Disordered Waste Forms [Kostya O. Trachenko](#); Queen Mary University of London, United Kingdom

2:00 PM SF01.04.02

Radiation Resistance in Multicomponent Equiatomic Alloys [Fei Gao](#)¹, Angel Chavira¹, Yeping Lin² and Huiqiu Deng²; ¹Univ of Michigan, United States; ²Hunan University, China

2:15 PM *SF01.04.03

Role of Electronic Energy Dissipation on Radiation Damage Production and Evolution in Nuclear Ceramics [William J. Weber](#)¹ and Yanwen Zhang^{2,1}; ¹University of Tennessee, United States; ²Oak Ridge National Laboratory, United States

2:45 PM SF01.04.04

Rate Theory Modeling of Defect Evolution in Fluorite Oxides [Marat Khafizov](#)¹, Joshua Ferrigno¹, Saqeeb Adnan¹, Kaustubh Bawane², Amey Khanolkar², Linu Malakkal², Cody A. Dennett², Chao Jiang², Lingfeng He² and David Hurley²; ¹The Ohio State University, United States; ²Idaho National Laboratory, United States

3:00 PM BREAK

3:30 PM *SF01.04.05

Positron Annihilation Spectroscopy Reveals New Mechanisms and Emerging Phenomena in Radiation Induced Defect Interactions [Farida Selim](#)¹, Sahil Agarwal¹, Hyosim Kim², Nan Li², Yongqiang Wang², Peter Hosemann³ and Blas P. Uberuaga²; ¹Bowling Green State Univ, United States; ²Los Alamos National Laboratory, United States; ³University of California, Berkeley, United States

4:00 PM SF01.04.06

Three-Dimensional Imaging of Radiation-Induced Defects in Metals [Eric Moore Jossou](#)¹, Ana F. Suzana¹, Longlong Wu¹, Tadesse Assefa², Andrea Jokisaari³, Ross Harder⁴, Wonsuk Cha⁴, Ian K. Robinson¹, Cheng Sun³, Jian Gan³, Lynne Ecker¹ and Simerjeet Gill¹; ¹Brookhaven National Laboratory, United States; ²SLAC National Accelerator Laboratory, United States; ³Idaho National Laboratory, United States; ⁴Argonne National Laboratory, United States

4:15 PM SF01.04.07

Effect of Defects on the Thermal Conductivity of Ceramic Breeder Blanket Materials [Megha Sanjeev](#)¹, Mark Gilbert² and Samuel Murphy¹; ¹Lancaster University, United Kingdom; ²CCFE - Culham Centre for Fusion Energy, United Kingdom

SESSION SF01.05: Disorder and Microstructures
Session Chairs: David Andersson and Gianguido Baldinozzi
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 327

8:30 AM *SF01.05.01

Complex Oxides in the Nuclear Fuel Cycle—From Advanced Fuel Candidates to Nuclear Waste Forms [Sarah C. Finkeldej](#); University of California, Irvine, United States

9:00 AM SF01.05.02

Cluster Dynamics Simulations of Point Defects and Fission Gas Evolution in Irradiated UO₂-Based Nuclear Fuels [David Andersson](#), Christopher Matthews, Romain Perriot, Michael Cooper, Benjamin Liu and Christopher Stanek; Los Alamos National Laboratory, United States

9:15 AM SF01.05.03

Anion Excess Bixbyite Gd₂Ce₂O₇: Effect of Radiation on Anion Sublattice Maulik K. Patel¹, Jeffery Aguiar^{2,3}, Gianguido Baldinozzi⁴ and Kurt E. Sickafus^{5,6}; ¹University of Liverpool, United Kingdom; ²The University of Utah, United States; ³Lockheed Martin, United States; ⁴Université Paris-Saclay, France; ⁵Los Alamos National Laboratory, United States; ⁶The University of Tennessee, Knoxville, United States

9:30 AM *SF01.05.04

Characterization of Radiation Effects in Ceramics with Spallation Neutron Probes Maik K. Lang; University of Tennessee, United States

10:00 AM BREAK

10:30 AM *SF01.05.05

FUTURE—Fundamental Understanding of Transport Under Reactor Extremes Blas P. Uberuaga; Los Alamos National Laboratory, United States

11:00 AM SF01.05.06

A Modified Two-Temperature Molecular Dynamics for Simulating Radiation Damage Cascades Ryan J. Hunt¹, Samuel Murphy¹ and Jean-Paul Crocombette²; ¹Lancaster University, United Kingdom; ²CEA, DEN, France

11:15 AM SF01.05.07

Atomistic-Scale Simulations Used to Simulate Creep in Oxide Fuel Conor Galvin, Laurent Capolungo, David Andersson and Michael W. Cooper; Los Alamos National Laboratory, United States

11:30 AM *SF01.05.08

Gaining a Mechanistic Understanding of Nuclear Fuel Material Performance by Combining Modelling and Experiment Simon C. Middleburgh¹, Michael Rushton¹, Fabio Martini¹, Megan W. Owen¹, Mustafa Bolukbasi¹, Sarah Valley¹, Antoine Claisse^{2,1}, Aidan Cole-Baker^{3,1}, Phylis Makurunjel¹, David Goddard^{4,1}, Nicholas Barron⁴ and William Lee¹; ¹Bangor University, United Kingdom; ²Westinghouse Electric Sweden AB, Sweden; ³Jacobs, United Kingdom; ⁴NNL, United Kingdom

SESSION SF01.06: Cladding Interactions and Oxidation
Session Chairs: Gianguido Baldinozzi and Christine Gueneau
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 327

1:30 PM SF01.06.01

A Study for the Development of Accident Tolerant Fuel Cladding Sung Eun Kim, Dae Ho Kim and Hyun-Gil Kim; Korea Atomic Energy Research Institute, Korea (the Republic of)

1:45 PM SF01.06.02

Surface and Grain Boundary Interdiffusion During the Sintering of Mixed Oxides Fuels—A Finite Volume Method Simulation Nadia C. Dempowo^{1,2}, Julien Bruchon², François Valdivieso² and Jacques L  chelle¹; ¹Commissariat    l'  nergie atomique et aux   nergies alternatives, France, France; ²Mines Saint-Etienne, Univ Lyon, UMR 5307 LGF, Centre SMS CNRS, France

2:00 PM SF01.06.03

Hydrothermal Corrosion of PVD and Cold Spray Cr-Coatings on Zircaloy-4 in Different LWR Coolant Environment Rajnikant Umretiya¹, Michael Worku¹, Wanming Zhang¹, Timothy Jurewicz¹, Andrew K. Hoffman¹, Raul Rebak¹ and Jessika Rojas²; ¹GE Research, United States; ²Virginia Commonwealth University, United States

2:15 PM SF01.06.04

Understanding Impacts of Chemistry on Oxidation of FeCrAl Alloys in Multiple Environments Andrew K. Hoffman, Rajnikant Umretiya, Vipul Gupta, Subhrajit Roychowdhury, Bojun Feng, Michael Larsen, Liang Yin and Raul Rebak; GE Research, United States

2:30 PM BREAK

SESSION SF01.07: Fuels III
Session Chairs: Gianguido Baldinozzi and Blas Uberuaga
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 327

3:30 PM SF01.07.01

Atomistic Modeling of Point Defects in Mixed Oxide Fuels—Effect of the U-Pu Distribution Didier Bathellier, Luca Messina, Michel Freyss, Marjorie Bertolus, Serenah Rajaonson, Maciej Karcz and Emeric Bourasseau; CEA, DES, IRESNE, France

3:45 PM SF01.07.02

Neutron Scattering Experiments and Electronic Structure Calculations on U₃O₇ and U₃O₈ Gregory Leinders¹, Gianguido Baldinozzi², Henry Fischer³, Rolando Saniz⁴, Ine Arts⁴, Dirk Lamoen⁴, Clemens Ritter³ and Marc Verwerft¹; ¹SCK CEN, Belgium; ²Universit   Paris-Saclay, France; ³Institut Laue-Langevin, France; ⁴University of Antwerp, Belgium

SESSION SF01.08: Poster Session: Materials Research Needs to Advance Nuclear Fuels, Structural Materials and Wasteforms

Session Chairs: Gianguido Baldinozzi and Maria Okuniewski

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF01.08.01

***In Situ* Cathodoluminescence in Gadolinia Doped Ceria Under High Energy Electron Irradiation** Pooreun Seo¹, Jean-Marc Costantini², Syo Matsumura¹ and Kazuhiro Yasuda¹; ¹Kyushu University, Japan; ²University of Paris-Saclay, France

SF01.08.02

Tailoring High Entropy Alloy (HEA) Thermal Expansion for Advanced Technology Fuel (ATF) Coatings Jack A. Wilson¹, Michael Rushton¹, David Goddard², William Lee¹ and Simon C. Middleburgh¹; ¹Bangor University, United Kingdom; ²National Nuclear Laboratory, United Kingdom

SF01.08.03

Unraveling the Early-Stage Ordering of Krypton Solid Bubbles in Molybdenum—A Multimodal Study Eric Moore Jossou¹, Anton Schneider², Cheng Sun³, Yongfeng Zhang², Shirish Chodankar¹, Dmytro Nykypanchuk¹, Jian Gan³, Lynne Ecker¹ and Simerjeet Gill¹; ¹Brookhaven National Laboratory, United States; ²University of Wisconsin–Madison, United States; ³Idaho National Laboratory, United States

SF01.08.04

Quantifying Radiation Damage Through Stored Energy Released During Defect Annealing in Metals Charles Hirst¹, Fredric Granberg², Boopathy Kombariah³, Penghui Cao⁴, Scott Middlemas³, R. Scott Kemp¹, Ju Li¹, Kai H. Nordlund² and Michael P. Short¹; ¹Massachusetts Institute of Technology, United States; ²University of Helsinki, Finland; ³Idaho National Laboratory, United States; ⁴University of California, Irvine, United States

SF01.08.05

Metastability of Lanthanide Sesquioxide (Ln₂O₃) Polymorphs Vancho Kocovski, Ghanshyam Pilania and Blas P. Uberuaga; Los Alamos National Laboratory, United States

SF01.08.06

Structural Relations in the Nd₂O₃-CeO₂ Pseudo Binary System Henry Charlton¹, Gianguido Baldinozzi², Karl Whittle¹, Christine Bogicevic², Fabienne Karolak² and Maulik K. Patel¹; ¹University of Liverpool, United Kingdom; ²University of Paris Saclay, France

SF01.08.07

Rationalization of the Influence of the Chemical Bonds on the Radiation Tolerance of Compounds Related to the M₇O₁₂ Oxygen-Deficient Fluorite System Luis Casillas¹, Maulik K. Patel², Manabu Ishimaru³, Kurt E. Sickafus⁴ and Gianguido Baldinozzi⁵; ¹Linköping University, Sweden; ²University of Liverpool, United Kingdom; ³Kyushu Institute of Technology, Japan; ⁴Los Alamos National Laboratory, United States; ⁵University of Paris Saclay, France

SF01.08.08

New Insights into UK Base Glass Structure from X Ray and Neutron Scattering Data Combined with NMR Natasha A. Brown¹, Aine Black², Alex C. Hannon³, Frederic Blanc², Gavin Mountjoy⁴, Laura Leay², Maulik Patel², Mike Harrison⁵ and Paul A. Bingham⁶; ¹University of Manchester, United Kingdom; ²University of Liverpool, United Kingdom; ³Rutherford Appleton Laboratory, United Kingdom; ⁴University of Kent, United Kingdom; ⁵National Nuclear Laboratory, United Kingdom; ⁶Sheffield Hallam University, United Kingdom

SF01.08.09

Experimental Characterization of the Chemical Behaviour of Cs, I and Te in UO₂ Morgane Rochedy¹, Chantal Riglet-Martial¹, Jacques Léchelle¹, Vincent Klosek¹, Claire Onofri-Marroncle¹, Doris Drouan¹, Philippe Bienvenu¹, Ingrid Roure¹, Martiane Cabié², Lucia Amidani³ and Marie-Amandine Pinault-Thaury⁴; ¹CEA.DES.IRESNE.DEC, Cadarache, France; ²Université Aix-Marseille, CP2M, France; ³ESRF - The European Synchrotron, France; ⁴Université Versailles St-Quentin-en-Yvelines, GEMaC, France

SF01.08.10

Stabilization of Superionic Delta Bi₂O₃ Phase at Room Temperature by Thermal Nanocrystallization of Bismuth Oxide Glasses Tomasz K. Pietrzak¹, Maciej Nowagiel¹, Agata Jarocka¹, Tomasz Plocinski¹, Julien Trebosc², Olivier Lafon², Marek Wasiecionek¹ and Jerzy Garbarczyk¹; ¹Warsaw Univ. of Technology, Poland; ²Univ. Lille, France

SF01.08.11

Elucidating Radiation Damage in Concrete via Multi-Modal Imaging Nishant Garg; University of Illinois at Urbana-Champaign, United States

SESSION SF01.09: Mechanical Properties

Session Chairs: Maria Okuniewski and Blas Uberuaga

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 327

8:45 AM *SF01.09.01

Dislocation Changes Under Irradiation—A Separate-Effect Study Claire Onofri-Marroncle¹, Catherine Sabathier¹, Doris Drouan¹, Gaëlle Gutierrez², Marion Bricout² and Marc Legros³; ¹CEA, DES, IRESNE, DEC, SA3E, LCPC, France; ²CEA, DES, ISAS, DMN, SRMP, JANNuS, France; ³CNRS/CEMES, France

9:15 AM SF01.09.02

4D-STEM Strain Mapping of Nanometre-Scaled Defect Clusters Joven Lim¹, Eric Prestat¹, Daniel R. Mason¹, Andrea Sand^{2,3}, Aslak Fellman³, Patrik Ikaheimonen^{2,3}, Quentin Ramasse^{4,5} and Grace Burke⁶; ¹UK Atomic Energy Authority, United Kingdom; ²Aalto University, Finland; ³University of Helsinki, Finland; ⁴SuperSTEM Laboratory, United Kingdom; ⁵University of Leeds, United Kingdom; ⁶Oak Ridge National Laboratory, United States

9:30 AM SF01.09.03

***In Situ* Micro Cantilever Beam Bending Tests to Explore the Adherence Strength of Cr Coatings on Zry - 4** [Nan Li](#)¹, Hyosim Kim¹, Dongyue Xie¹, Tim Graening², Andrew Nelson², Tyler Dabney³, Kumar Sridharan³ and Stuart Maloy¹; ¹Los Alamos National Laboratory, United States; ²Oak Ridge National Laboratory, United States; ³University of Wisconsin–Madison, United States

9:45 AM SF01.09.04

Computational Search BCC Refractory Alloys with Enhanced Strength, Ductility and Corrosion Resistance [Aditya Sundar](#)¹, Yong-Jie Hu² and Liang Qi¹; ¹University of Michigan, United States; ²Drexel University, United States

10:00 AM BREAK

10:30 AM *SF01.09.05

Dislocation Loops in Ceramic Nuclear Fuels [Lingfeng He](#)¹, Kaustubh Bawane¹, Pengyuan Xiu¹, Tiankai Yao¹, Marat Khafizov², Miaomiao Jin³ and Jian Gan¹; ¹Idaho National Laboratory, United States; ²The Ohio State University, United States; ³The Pennsylvania State University, United States

11:00 AM SF01.09.06

Modulation of the Electron-Phonon Coupling in 3C-SiC by Lattice Defects and its Ramifications on the Thermal Spike [Joseph Graham](#) and Salah Alsmairat; Missouri University of Science and Technology, United States

11:15 AM SF01.09.07

Surface Condition Effects on Fatigue Behavior of Additive Manufactured 304L/316L Steel [Daniel Morrall](#), William Adams, Dale Hitchcock, Prabhu Ganesan, Hector Colon-Mercado and Timothy Krentz; SRNL, United States

SESSION SF01.10: Defects and Models
Session Chairs: Michael Cooper and Maria Okuniewski
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 327

1:30 PM SF01.10.01

Coupled Experimental-Modelling Development of High Performance Composite UN-UO₂ Fuels [Par Olsson](#)¹, Diogo Ribeiro Costa^{1,2}, Huan Liu¹, Denise Adorno Lopes^{2,1}, Faris Sweidan¹, Antoine Claisse² and Luca Messina³; ¹KTH Royal Inst of Technology, Sweden; ²Westinghouse Electric Sweden, Sweden; ³CEA Cadarache, France

1:45 PM SF01.10.02

Diffusion Between Zr–(Cr, Nb, Ta, Mo) and Cr–(Nb, Mo, Ta) Binary Systems for Accurate Lifetime Prediction of ATF Ella K. Pek and [Ji-Cheng Zhao](#); University of Maryland, United States

2:00 PM SF01.10.04

Hypervelocity Impacts on Plasma Facing Materials through Molecular Dynamics Simulations Alberto Fraile^{1,2}, Prashant Dwivedi², Giovanni Bonny³, Tomas Polcar² and [Simon C. Middleburgh](#)¹; ¹Bangor University, United Kingdom; ²Czech Technical University in Prague, Czechia; ³Nuclear Materials Science Institute, SCK CEN, Belgium

2:15 PM SF01.11.06

Interactions of Selected Fission Products with Uranium Diboride [Fabio Martini](#)¹, Mustafa Bolukbasi¹, Phylis Makurunje¹, Antoine Claisse^{1,2}, Mattias Puide^{1,2}, William Lee^{1,3} and [Simon C. Middleburgh](#)¹; ¹Bangor University, United Kingdom; ²Westinghouse AB, Sweden; ³Imperial College London, United Kingdom

2:30 PM BREAK

SESSION SF01.11: Chemical Interactions
Session Chairs: Gianguido Baldinozzi and Maria Okuniewski
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 327

3:00 PM SF01.11.01

Phosphate Glass Waste Forms to Immobilize Salt Waste Stream for Advanced Reactor Applications [Ming Tang](#); Clemson University, United States

3:15 PM SF01.11.02

Nanomaterial Extraction of Radioactive Metals from Wastewater [Mirvana Hémadi](#)¹, Yawen Xiao¹, Ahmed S. Helal², Steeve Reisberg¹, Laurent Royon¹, Souad Ammar¹ and John Lomas¹; ¹Université de Paris, France; ²Massachusetts Institute of Technology, United States

3:30 PM SF01.11.03

Defect Chemistry and Tritium Accommodation in Li₈PbO₆ from Density Functional Theory [Andrew W. Davies](#) and Samuel Murphy; Lancaster University, United Kingdom

3:45 PM SF01.11.04

Modelling the Oxidation of W and W-Alloys in Fusion Reactor First Walls [Ryan D. Kerr](#)¹, Samuel Murphy¹ and Mark Gilbert²; ¹Lancaster University, United Kingdom; ²UK Atomic Energy Authority, United Kingdom

4:00 PM SF01.11.05

Impact of Lithium Accommodation on Defect Chemistry in ZrO₂ Gareth F. Stephens¹, Yan Ren Than², William Neilson³, Lee J. Evitts¹, Mark Wenman², Samuel Murphy³, Robin Grimes², Aidan Cole-Baker⁴, Susan Ortner⁵, Natasha Gotham⁵, Michael Rushton¹, William Lee^{1,2} and Simon C. Middleburgh¹; ¹Bangor University, United Kingdom; ²Imperial College London, United Kingdom; ³Lancaster University, United Kingdom; ⁴Jacobs, United Kingdom; ⁵National Nuclear Laboratory, United Kingdom

SESSION SF01.12: Advanced Reactors and Modeling of Radiation Damage I

Session Chairs: Unho Lee and Di Yun

Tuesday Afternoon, May 24, 2022

SF01-Virtual

9:00 PM *SF01.12.02

A Novel Metallic Fuel Conceptual Design for Ultra-High Burn-Up Liquid Metal Cooled Fast Reactors Di Yun, Chunyang Wen and Linna Feng; Xi'an Jiaotong University, China

SESSION SF01.13: Advanced Reactors and Modeling of Radiation Damage II

Session Chairs: Chaitanya Deo and Thierry Wiss

Wednesday Morning, May 25, 2022

SF01-Virtual

8:00 AM *SF01.13.01

Computational Study of Radiation-Induced Segregation Mechanisms In Metallic Alloys Chaitanya Deo, Daniel E. Vizoso and Remi Dingreville; Georgia Institute of Technology, United States

8:30 AM SF01.13.02

Atomistic Study of Radiation Damage in Ni/Inconel Multimetallic Layered Composite for Molten-Salt Reactor Shiddartha Paul¹, Daniel Schwen², Michael P. Short³ and Kasra Momeni¹; ¹The University of Alabama, United States; ²Idaho National Laboratory, United States; ³Massachusetts Institute of Technology, United States

8:45 AM SF01.13.03

Advanced Modeling of Tritium Embrittlement in Stainless Steels Eric Hoar, Dale Hitchcock, Timothy Krentz and Lindsay Roy; Savannah River National Laboratory, United States

9:00 AM SF01.13.04

Radiation Effects on Nuclear Waste Forms—How Does the Crystallinity of a Glass-Ceramic Affect Radiation Tolerance? Tamás Zagyva¹, Brian O'Driscoll², Robert W. Harrison³, Tracey Taylor⁴, Mike Harrison⁴ and Laura Leay¹; ¹Dalton Cumbrian Facility, The University of Manchester, United Kingdom; ²The University of Manchester, United Kingdom; ³The University of Manchester, Dalton Nuclear Institute, United Kingdom; ⁴National Nuclear Laboratory, United Kingdom

9:15 AM SF01.13.05

Near- and Off-Equilibrium Phase Transformations in U-(10 and 30)wt.%Zr Samples Measured Using Neutron Diffraction with *In Situ* Heating Walter J. Williams^{1,2}, Sven Vogel³ and Maria Okuniewski²; ¹Idaho National Laboratory, United States; ²Purdue University, United States; ³Los Alamos National Laboratory, United States

##PAGE_BREAK##

SYMPOSIUM SF02

Actinide Materials—From Basic Science to Applications

May 9 - May 24, 2022

Symposium Organizers

SESSION SF02.01: Physics and Spectroscopy I
Session Chairs: Krzysztof Gofryk and Ladislav Havela
Monday Morning, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

11:00 AM *SF02.01.01

Direct Measurement of 5f Delocalization with U XES JG Tobin; University of Wisconsin-Oshkosh, United States

11:30 AM SF02.01.03

Magnetoelastic Properties of 5f Ferromagnet UCu₂P₂ Volodymyr Buturlim¹, Petr Dolezal¹, Oleksandra Koloskova¹, Jiri Prchal¹, Martin Divis¹, Ilja Turek¹, Krzysztof Gofryk², Fuminori Honda³, Dariusz Kaczorowski⁴, Mayerling Martinez^{1,5} and Ladislav Havela¹; ¹Charles University, Czechia; ²Idaho National Laboratory, United States; ³Kyushu University, Japan; ⁴Polish Academy of Sciences, Poland; ⁵CRISMAT Laboratory, France

11:45 AM SF02.01.04

Lanthanide and Actinide Electronic Structure Explored Through Soft X-Ray Spectromicroscopy of Ln/An-2,2':6,2'-terpyridine Coordination Compounds. David Shuh¹, Alexander Ditter¹, Shane Galley², Jacob Branson¹, Stefan Minasian¹, Hendrik Ohldag¹, Eric Norfleet² and Jenifer Shafer²; ¹Lawrence Berkeley National Laboratory, United States; ²Colorado School of Mines, United States

SESSION SF02.02: Physics and Spectroscopy II
Session Chairs: Ladislav Havela and JG Tobin
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

2:00 PM *SF02.02.02

The Electronic and Lattice Dynamics Related Properties of Uranium and Thorium Based Systems Dominik Legut; VSB - Technical University of Ostrava, Czechia

2:30 PM SF02.02.03

Thermodynamics for Actinide Monocarbides and Mononitrides Per Söderlind, Emily E. Moore and Christine Wu; Lawrence Livermore National Laboratory, United States

2:45 PM BREAK

SESSION SF02.03: Plutonium
Session Chair: Paul Tobash
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

3:15 PM *SF02.03.01

Lattice Distortions and Swelling Resilience in Aged δ -Phase Plutonium Jason Jeffries and Mark Wall; Lawrence Livermore National Lab, United States

3:45 PM *SF02.03.02

Thermodynamic and Dynamic Studies of $\delta^{239}\text{Pu}$ and Its Alloys Boris Majorov; Los Alamos National Laboratory, United States

SESSION SF02.04: Condensed Matter Physics
Session Chairs: Jason Jeffries and Jindrich Kolorenc
Tuesday Morning, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

9:00 AM *SF02.04.01

Symmetry of Hidden Ordering and Superconductivity in URu₂Si₂ S. Kambe; Japan Atomic Energy Agency, Japan

9:30 AM SF02.04.03

Uranium Hydrides—From Polar Bonds to Magnetism Ladislav Havela¹, Oleksandra Koloskova¹, Volodymyr Buturlim¹ and Dominik Legut²; ¹Charles University, Czechia; ²IT4Innovations, VŠB-Technical University of Ostrava, Czechia

9:45 AM BREAK

SESSION SF02.05: Theory and Electronic Structure
Session Chairs: S. Kambe and Per Söderlind
Tuesday Morning, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

10:15 AM *SF02.05.01

Dynamical Mean-Field Theory of Uranium Compounds: Magnetism and Spectroscopy Jindrich Kolorenc; Czech Academy of Sciences, Czechia

10:45 AM SF02.05.02

Uranium Hydride Thin Films—Tools of Phase Composition Determination Oleksandra Koloskova¹, Volodymyr Buturlim¹, Evgenia Tereshina-Chitrova¹, Thomas Gouder², Mykhaylo Paukov¹ and Ladislav Havela¹; ¹Charles University, Czechia; ²European Commission, Joint Research Centre (JRC), Germany

11:00 AM SF02.05.04

Modelling the High Temperature Magnetic Order of Plutonium Dioxide Corey Bevan¹, Simon C. Middleburgh¹, Michael Rushton¹, Matthew Gilbert², Par Olsson³ and William Lee¹; ¹Nuclear Futures Institute Bangor, United Kingdom; ²AWE, United Kingdom; ³KTH Royal Institute of Technology, Sweden

SESSION SF02.06: Compounds

Session Chairs: Oleksandra Koloskova and Dominik Legut

Tuesday Afternoon, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

1:30 PM *SF02.06.01

Complex Compounds from the Bottom of the Periodic Table Eteri Svanidze, Andreas Leithe-Jasper and Yuri Grin; Max Planck Institute for Chemical Physics of Solids, United States

2:00 PM *SF02.06.02

Thermodynamic Modeling of Impurities in Actinide Alloys—Assessment of the U-Pu-Fe-Ni-Ga-Al System Emily E. Moore, Alexander Landa, Per Söderlind and Aurélien Perron; Lawrence Livermore National Laboratory, United States

2:30 PM SF02.06.03

Probing the Defect Structure in Single-Phase UO_{2+x} Systems William Cureton¹, Eric O'Quinn¹, Raul Palomares¹, Gianguido Baldinozzi², Jake McMurray³, Joerg C. Neuefeind³, Matthew G. Tucker³, Andrew Nelson³ and Maik K. Lang¹; ¹University of Tennessee, Knoxville, United States; ²Université Paris-Saclay, France; ³Oak Ridge National Laboratory, United States

2:45 PM SF02.06.04

DFT Investigation of the Properties of Plutonium Dioxide Nanoparticles William Neilson and Samuel Murphy; Lancaster University, United Kingdom

3:00 PM BREAK

SESSION SF02.07: Forensics

Session Chairs: Nicholas Butch and Paul Tobash

Tuesday Afternoon, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

3:30 PM *SF02.07.01

Nuclear Forensics—Fission Track Analysis—Simulation and Image Analysis Rami Babayew¹, Noam Elgad¹, Silvie Maskova-Cerna², Jan Lorincik³, Hadas Raveh-Amit¹, David Micheli¹ and Itzhak Halevy¹; ¹NRCN, Israel; ²Department of Condensed Matter Physics, Faculty of Mathematics and Physics, Charles University, Czechia; ³Research Center Rez, Czechia

4:00 PM SF02.07.02

Multiplatform Microanalysis of Actinide Materials for Nuclear Forensics Brandon W. Chung¹, Scott Donald¹, Debra Rosas¹, Nick Teslich¹ and David Shuh²; ¹Lawrence Livermore National Laboratory, United States; ²Lawrence Berkeley National Laboratory, United States

SESSION SF02.08: Chemistry

Session Chairs: Sarah Hernandez and Eteri Svanidze

Wednesday Morning, May 11, 2022

Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

9:00 AM SF02.08.01

Reduction Reactions of Neptunium & Neptunium Analogues with Nitrogen Oxide Species Michael Chimes¹, Colin Boxall¹, Scott Edwards¹, Dave Woodhead² and Robin Taylor²; ¹Lancaster University, United Kingdom; ²National Nuclear Laboratory, United Kingdom

9:15 AM SF02.08.02

Atomic Scale Investigation of Americium Bearing Mixed Oxide Compounds Marjorie Bertolus, Baptiste Labonne and Johann Bouchet; CEA, DES, France

9:30 AM SF02.08.03

Molecular 5 f-Elements Precursors Designed for the Synthesis of Actinide Binary and Ternary Oxide Nanomaterials Aida Raauf, Sanjay Mathur and Anna K. Schmidt-Verma; University of Cologne, Germany

9:45 AM SF02.08.04

Characterizing the Morphology and Chemistry of Oxides Formed on Plutonium Metal Alloys [Scott Donald](#) and Brandon W. Chung; Lawrence Livermore National Laboratory, United States

10:00 AM BREAK

SESSION SF02.09: Nuclear Fuels and Materials
Session Chairs: Volodymyr Buturlim and Rory Kennedy
Wednesday Morning, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

10:30 AM *SF02.09.01

The Combinatorial Approach to Testing and Characterization of Irradiated Fuels and Reactor Structural Materials [Colin Judge](#); Idaho National Laboratory, United States

11:00 AM *SF02.09.02

Accelerating Development of Nuclear Fuels and Materials [Daniel Wachs](#); Idaho National Laboratory, United States

11:30 AM SF02.09.03

The Role of Mass Transfer and Chemical Kinetics in Advanced Nuclear Fuel Partitioning and Reprocessing [Colin Boxall](#)¹, Alexander Jackson¹, Michael Bromley¹, Dave Woodhead² and Robin Taylor^{2,1}; ¹Lancaster University, United Kingdom; ²National Nuclear Laboratory, United Kingdom

SESSION SF02.10: Poster Session: Actinide Materials—From Basic Science to Applications
Session Chairs: Emily Moore and David Shuh
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF02.10.01

Accommodation of Nitrogen in PuO₂ Under Storage Conditions [Reece T. Bedford](#), Samuel Murphy and William Neilson; Lancaster University, United Kingdom

SF02.10.02

Studies into the Effect of Insoluble Fission Products on the Generation of Ag(II) for the Dissolution of MOx Fuel [Michael Chimes](#)¹, Colin Boxall¹ and Chris Maher²; ¹Lancaster University, United Kingdom; ²National Nuclear Laboratory, United Kingdom

SF02.10.04

Experimental and Computational Thermal Conductivity Reduction in Single Crystal Thorium Dioxide From Lattice Defects [Cody A. Dennett](#)¹, Marat Khafizov² and David Hurley¹; ¹Idaho National Laboratory, United States; ²The Ohio State University, United States

SESSION SF02.11: General Session
Session Chairs: Krzysztof Gofryk and Ladislav Havela
Tuesday Afternoon, May 24, 2022
SF02-Virtual

1:00 PM *SF02.11.01

Water Plasma-Induced Redox Reactions on Thin Uranium (IV, V and VI) Oxide Films—A Surface Science Model Study of Nuclear Fuel Surface Corrosion. [Thomas Gouder](#)¹, Rachel Eloirdi¹, Ghada El Jamal² and Mats Jonsson²; ¹European Commission, Germany; ²KTH Royal Institute of Technology, Sweden

1:30 PM SF02.11.02

Tunable Correlated Disorder and Disorder-Phonon Coupling in the pseudo-*bcc* Uranium Molybdenum System γ -(U_{1-x}Mo_x) [Daniel A. Chaney](#)^{1,2}, Alois Castellano³, Alexei Bosak¹, Johann Bouchet³, François Bottin³, Boris Dorado³, Luigi Paolasini¹, Sophie Rennie², Christopher Bell², Ross Springell² and Gerard H. Lander²; ¹European Synchrotron Radiation Facility, France; ²The University of Bristol, United Kingdom; ³CEA, France

1:45 PM SF02.11.03

Defining Qubit Properties in the Early Actinides Lindsay Roy¹, [Stephanie Gamble](#)¹, Thomas Shehee¹ and Henry La Pierre²; ¹Savannah River National Laboratory, United States; ²Georgia Institute of Technology, United States

2:00 PM SF02.11.04

The PreCalc Project—Software Framework for Plutonium Processing [Eric Hoar](#), Kevontrez Jones, Adrian Mistreanu, Thomas Shehee, Lindsay Roy and Kai Han; Savannah River National Laboratory, United States

2:15 PM SF02.11.05

Electronic Properties of Unconventional Superconductors, U₆X (X = Fe, Co, Mn) [Firoza Kabir](#)¹, Ryan Baumbach², Xiixin Ding¹, Madhab Neupane³, Tomasz Durakiewicz¹ and Krzysztof Gofryk¹; ¹Idaho National Laboratory, United States; ²Florida State University, United States; ³University of Central Florida, United States

2:20 PM *SF02.01.02

Limits of 5f Magnetism and 5f-Based Superconductivity Probed by High Pressures [Fuminori Honda](#)^{1,2}; ¹Central Institute of Radioisotope Science and Safety, Kyushu University, Japan; ²Tohoku University, Japan

##PAGE_BREAK##

SYMPOSIUM SF03

Paper-Based Packaging—21st Century Perspectives on an Ancient Material
May 11 - May 24, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SF03.02: Functional Coatings on Paper
Session Chairs: Douglas Coffin and Beko Mesic
Wednesday Afternoon, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

3:30 PM SF03.02.01

Novel Waterborne Dispersion for Paper Based Flexible Packaging Coating—Mechanical Dispersion Process and Improved Properties [Luqing Qi](#), Hanze Ying, Dave Malotky, Mike Gysin, Bernhard Kainz and Jonathan Mason; The Dow Chemical Company, United States

3:45 PM SF03.02.02

Waterborne Barrier Coating for Water and Oil on Paperboard [Sterre Bakker](#)¹, Albert Schenning¹, Catarina Esteves¹ and Gerald Metselaar²; ¹Eindhoven University of Technology, Netherlands; ²BASF, Netherlands

4:00 PM SF03.02.03

Lignocellulosic Biomass as a Sustainable Substrate for Robust Fabrication of Metal-Organic Frameworks (MOFs) [Tahira Pirzada](#), Siyao Wang, Wenyi Xie, Eduardo Barbieri, Charles H. Opperman, Lokendra Pal, Gregory N. Parsons and Saad A. Khan; North Carolina State University, United States

SESSION SF03.03: Poster Session: Paper-Based Packaging—21st Century Perspectives on an Ancient Material

Session Chairs: Douglas Coffin and Beko Mesic
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF03.03.01

Enhancement of Oxygen and Water-Vapor Permeability with Mesoporous Silica Hybrid Packaging Films [Jeong-Ho Chang](#); Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of)

SF03.03.02

Hydrophobic Mesoporous Silica Particles Modified with Non-Fluorinated Alkyl Silanes [Jeong-Ho Chang](#); Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of)

SESSION SF03.01: Paper-Based Electronics
Session Chairs: Robert Abbel and Beko Mesic
Thursday Morning, May 12, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

9:00 AM SF03.01.01

Reinventing Paper—A Sustainable Green Deal and World Prosperity [Elvira Fortunato](#) and [Rodrigo Martins](#); FCT-UNL, Portugal

9:15 AM SF03.01.02

Fabrication of 10-meter Rolls of Paper Electrodes for Energy Storage on a Pilot-Scale Paper Machine Patrik A. Isacson¹, Jesper Edberg², Karl Håkansson², Valerie Chauve³, Karishma Jain⁴, Andreas Fall², Alireza Hajian⁴, Lucie Boiron³, Hjalmar Granberg², Lars Wagberg^{4,4} and Isak Engquist^{1,1}; ¹Linköping University, Sweden; ²RISE Research Institutes of Sweden, Sweden; ³Ahlstrom-Munksjö, France; ⁴KTH Royal Institute of Technology, Sweden

9:30 AM *SF03.01.03

Laser Assisted Roll-to-Roll Manufacturing of Low Cost Wireless Chipless Sensors for Intelligent Food Packaging Rahim Rahimi; Purdue University, United States

10:00 AM BREAK

SESSION SF03.04: Non-Traditional Fibers
Session Chairs: Robert Abbel and Rahim Rahimi
Thursday Morning, May 12, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 1

11:00 AM SF03.04.02

A Study of Parametric Effects and Deformation Anisotropy in Stretch Forming of Palm-Leaf Materials Debapriya Pinaki Mohanty¹, Anirudh Udupa¹, James B Mann² and Srinivasan Chandrasekar¹; ¹Purdue University, United States; ²M4 Sciences Corporation, United States

11:15 AM SF03.04.03

Cottonid—A New Old Paper-Based Material System Matthias Langhans¹, Ronja Scholz², Frank Walther² and Cordt Zollfrank¹; ¹Technische Universität München, Germany; ²Technische Universität Dortmund, Germany

SESSION SF03.05: General Session I
Session Chairs: Douglas Coffin and Hongbin Liu
Monday Afternoon, May 23, 2022
SF03-Virtual

6:30 PM *SF03.05.01

The Strength of Cellulose Nanofibre Sheets Uthpala Garusinghe¹, Swambabu Varanasi², Gil Garnier¹ and Warren Batchelor¹; ¹Monash University, Australia; ²IIT Kharagpur, India

7:00 PM SF03.05.02

Study of Nanocellulose Crosslinking with Organic Acids for Improved Proton Conductivity in Nanocellulose Paper-Based Proton Exchange Membranes Olena Selyanchyn^{1,2}, Roman Selyanchyn², Kazunari Sasaki^{2,2,2} and Stephen M. Lyth^{1,2,2}; ¹Department of Automotive Science, Graduate school for Integrated Frontier Sciences, Japan; ²Kyushu University, Japan

7:05 PM *SF03.05.03

Papertronics and Paperfluidics Seokheun Choi; Binghamton University, The State University of New York, United States

SESSION SF03.06: General Session II
Session Chairs: Hongbin Liu and Beko Mesic
Tuesday Morning, May 24, 2022
SF03-Virtual

8:00 AM *SF03.06.01

Lignin Oil Emulsion as Water Barrier Coatings Peter Rättö, Dimitar Valtakari and Kristina Junel; RISE, Sweden

8:30 AM SF03.06.03

On the Water Transport Through Nanocellulose and PBS Films Peter Rättö¹, Karolin Löfvenborg², Kristina Junel¹ and Omid Hosseinaei¹; ¹RISE, Sweden; ²KTH Royal Institute of Technology, Sweden

8:45 AM *SF03.06.04

Relating Papermaking Process Parameters to Properties of Paperboard with Special Attention to Through Thickness Design Mikael Nygård^{1,2}; ¹BillerudKorsnäs, Sweden; ²KTH Royal Institute of Technology, Sweden

##PAGE_BREAK##

SYMPOSIUM SF04

Progress in Materials Genomics, Synthesis and Characterization of Functional Polymers and Polymer Nanocomposites
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF04.09: General Session II
Session Chairs: Dale Huber and Olin Mefford
Tuesday Afternoon, May 24, 2022
SF04-Virtual

9:00 PM *SF04.09.01

Machine-Learning-Assisted Discovery of High Thermal Conductivity of Polymers with Processability Junko Morikawa; Tokyo Institute of Technology, Japan

9:30 PM *SF04.09.02

Leveraging Polymer Theory for Improved Machine Learning Debra Audus; NIST, United States

10:00 PM SF04.09.03

Accelerating the Data-Driven Discovery of Biomaterials by Ultrafast Controlled Ring Opening Polymerizations Binhong Lin¹, Caleb N. Jadrich¹, Vince E. Pane¹, Tim Erdmann², Pedro L. Arrechea², Charles Dausse², James L. Hedrick², Nathaniel Park² and Robert M. Waymouth¹; ¹Stanford University, United States; ²IBM Research, United States

10:15 PM SF04.09.04

Utilizing Continuous Flow Reactors and Real Time Process Monitoring for the Synthesis of Tailored Segmented Polyurethanes Xabier Lopez de Pariza^{1,2}, Tim Erdmann², Pedro L. Arrechea², Leron Perez², Charles Dausse², Nathaniel Park², James L. Hedrick² and Haritz Sardon¹; ¹Universidad del País Vasco / Euskal Herriko Unibertsitatea, Spain; ²IBM Research, United States

10:30 PM SF04.09.05

Advancing Polymeric Material Design Towards Enhanced Sour Gas Separations John Yang and Yang Liu; Aramco Research Ctr, United States

10:45 PM SF04.06.06

Stimuli-Responsive Nanostructured Polymer Particles—From Synthesis to Application Kang Hee Ku; UNIST, Korea (the Republic of)

10:50 PM SF04.06.04

Highly Conductive PEDOT Core-Shell Nanofiber for Electromagnetic Shielding with Ultraflexible and Lightweight. Sol Lee, Junghyo Nah, Minje Kim, Chang Geun Kim and Min Cheol Kim; Chungnam National University, Korea (the Republic of)

SESSION Tutorial SF04.00: Leveraging Data Resources for Functional Polymers and Polymer Nanocomposite Research—Principles and Examples
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SESSION SF04.01: Designing Functional Nanoparticles
Session Chairs: Olin Mefford and Linda Schadler
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 324

10:30 AM *SF04.01.01

Designing Optical Metamaterials from Colloidal Noble Metal Nanocrystal Assemblies Cherie R. Kagan; University of Pennsylvania, United States

11:00 AM SF04.01.02

Preparing Chiral Hydrogel by Using Coordination-Assembly Complex of Cobalt Oxide Nanoparticles for Chiromechanical Response Chung Man Lim and Nicholas A. Kotov; University of Michigan, United States

11:15 AM SF04.01.03

Tunable Two-Dimensional Self-Assembly of Ag Nanocubes with Binary Ligands—A Computational and Experimental Study Yufei Wang¹, Yu Xie¹, Yilong Zhou², Gaurav Arya² and Andrea R. Tao¹; ¹UC San Diego, United States; ²Duke University, United States

11:30 AM SF04.01.04

hybrid FePt/Fe₃O₄ Synthesis with Short Duration for Multifunctional Application Yunji Eom, [Yumin Kang](#), Satish Kasturi, Sri Ramulu Torati and CheolGi Kim; DGIST, Korea (the Republic of)

11:45 AM SF04.01.05

Synthesis of Shape-Controlled Polymer Nano/Microstructures Using Initiated Chemical Vapor Deposition (iCVD) Polymerization in Structured Liquids [Apoorva Jain](#), Soumyamouli Pal, Nicholas L. Abbott and Rong Yang; Cornell University, United States

SESSION SF04.02: Materials Genome and Design of Polymer Nanocomposites

Session Chairs: Catherine Brinson and Linda Schadler

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 324

1:30 PM *SF04.02.01

Polymer Informatics—Beyond Homopolymers [Rampi Ramprasad](#); Georgia Institute of Technology, United States

2:00 PM *SF04.02.02

Phase Behavior of Polymer-Grafted Nanoparticles [Amalie L. Frischknecht](#); Sandia National Laboratories, United States

2:30 PM SF04.02.03

Accelerated Polymer Electrolyte Discovery Enabled by an Automated High Throughput Tool [Michael A. Stolberg](#), Yang Shao-Horn and Jeremiah Johnson; Massachusetts Institute of Technology, United States

2:45 PM SF04.02.04

Synthesis of Polymer Modified Substituted Ferrite Nanomaterials Guided by Density Functional Theory and Machine Learning [Olin T. Mefford](#)¹, Zichun Yan¹, Paul Meza-Morales¹, Venkata R. Punyapu¹, Anish Chaluvadi¹, Sara FitzGerald², Thomas Crawford² and Rachel Getman¹; ¹Clemson University, United States; ²University of South Carolina, United States

3:00 PM BREAK

3:30 PM SF04.02.05

A Mesoscale Computational Approach to Study Non-Solvent Phase Separation Toward Inducing CNT-Polymer Blending [Yichen Deng](#) and Marilyn L. Minus; Northeastern University, United States

3:45 PM SF04.02.06

Using Simulations and Data to Understand the Effect of the Interphase on Polymer Nanocomposite Properties [Boran Ma](#), Nicholas Finan and Catherine Brinson; Duke University, United States

4:00 PM SF04.02.07

Integrating High-Throughput Experiments with Machine Learning Models for Macromolecule-Based Nanomaterials—A Case Study in DNA-Stabilized Metal Clusters [Stacy Copp](#); University of California, Irvine, United States

4:15 PM SF04.02.08

Solution Behavior of Single-Chain Amphiphilic Random Heteropolymers [Shayna Hilburg](#)¹, Ting Xu² and Alfredo Alexander-Katz¹; ¹Massachusetts Institute of Technology, United States; ²University of California, Berkeley, United States

SESSION SF04.03: Advances in the Synthesis and Functionalization of Polymer Nanocomposites

Session Chairs: Catherine Brinson and Dale Huber

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 324

9:00 AM *SF04.03.01

Exploration of Photoresponsive Materials [Javier Read de Alaniz](#); University of California, Santa Barbara, United States

9:30 AM SF04.03.02

Advancing Rewarming for Cryopreservation Through Scalable Polymer Coating of Iron Oxide Nanoparticles [Jacqueline Pasek-Allen](#), Zhe Gao, Randall Wilharm, Valerie C. Pierre and John C. Bischof; University of Minnesota, United States

9:45 AM BREAK

10:15 AM SF04.03.04

Supramolecular “Bandwagoning”—From Symmetry Breaking in Polymer Grafting on Nanoparticles to Their Assembly into Reconfigurable Open Networks [Ahyoung Kim](#)¹, Thi Vo², Hyosung An¹, Proгна Banerjee³, Lehan Yao¹, Shan Zhou¹, Chansong Kim¹, Chang Qian¹, Delia Milliron³, Sharon Glotzer² and Qian Chen¹; ¹University of Illinois at Urbana-Champaign, United States; ²University of Michigan–Ann Arbor, United States; ³The University of Texas at Austin, United States

10:30 AM SF04.03.05

Macroscopic Materials Assembled from Nanoparticle Superlattices [Robert J. Macfarlane](#); Massachusetts Institute of Technology, United States

10:45 AM SF04.03.06

Functional Nanocomposites of Lead Telluride Percolating Networks [Drew Vecchio](#), Suneel Joglekar, Mark D. Hammig and Nicholas A. Kotov;

University of Michigan, United States

11:00 AM SF04.03.07

Light-Induced Stacking of Metal-Free 2,2'-Bipyridine Derivatives and Polymers Connor Filbin, Christopher Mallon, Matthew Tucker and Ying Yang; University of Nevada, Reno, United States

11:15 AM SF04.03.08

Enhancing the Dielectric Breakdown Strength and Energy Density of Solid-State Polymeric Capacitors by Chain End Manipulations Maninderjeet Singh¹, Mei Dong², Karen Wooley² and Alamgir Karim¹; ¹University of Houston, United States; ²Texas A&M University, United States

11:30 AM SF04.03.09

Burn-Dry—Fabrication of Porous Carbon Networks via Polymer-Templated Rapid Thermal Annealing James Nicolas M. Pagaduan¹, Sadaki Samitsu², Jordan Varma³, Todd Emrick¹ and Reika Katsumata¹; ¹University of Massachusetts Amherst, United States; ²National Institute for Materials Science, Japan; ³The University of Mississippi, United States

11:45 AM SF04.03.10

Modification of Thermo-Responsive Smart Hydrogels by Embedding Prefabricated Gold and Silver Nanoparticles Klaudia Rueckmann and Julia Koerner; Leibniz University Hannover, Germany

SESSION SF04.04: Nanocomposite Synthesis and Characterization

Session Chairs: Dale Huber and Olin Mefford

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 324

1:30 PM *SF04.04.01

Templated and Nanostructured Polymer Layered Colloids—From Non-Lithographic Patterning to Melt Processing Rigoberto C. Advincula^{1,2,3}; ¹Case Western Reserve University, United States; ²The University of Tennessee, Knoxville, United States; ³Oak Ridge National Laboratory, United States

2:00 PM SF04.04.02

Simultaneous Nanocrystalline and Amorphous Phase Mapping of Polymer Blend Using Cryogenic 4D-STEM Jennifer Donohue¹, Steven Zeltmann¹, Karen Bustillo², Benjamin Savitzky², Mary Ann Jones³, Gregory Meyers³, Colin Ophus² and Andrew M. Minor¹; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Dow, United States

2:15 PM SF04.04.03

Utilizing Self-Assembled Mesoporous Metal Oxide Matrices as a Platform for Specific, Isolated Studies of Polymer-Surface Adsorption and Interactions David W. Collinson and Reinhold H. Dauskardt; Stanford University, United States

2:30 PM SF04.04.04

Investigating the Dielectric Constant of Functionalized Barium Titanate Within a Polymer Nanocomposite Emma Cooper¹, Eduardo De Anda¹, Evan Flitz^{2,1}, Zoe Kedzierski¹, Halie Kim¹, Albert Dato¹ and Todd Monson³; ¹Harvey Mudd College, United States; ²Pomona College, United States; ³Sandia National Laboratories, United States

2:45 PM BREAK

SESSION SF04.05: Polymer Nanocomposites for Sustainability

Session Chairs: Dale Huber and Olin Mefford

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 324

3:15 PM SF04.05.01

Bioplastic Nanocomposites—Effects of Nanofillers in Biomass Matrix Materials Andrew M. Jimenez, Paul Grandgeorge, Hareesh Iyer, Konstantina Mason, Marissa Nelsen and Eleftheria Roumeli; University of Washington, United States

3:30 PM SF04.05.02

Tailoring the Surface Modification of Cellulose Nanofibrils for Nanocomposite Applications Rosella Telaretti, Mats Johansson and Eva Malmström; KTH Royal Institute of Technology, Sweden

SESSION SF04.06: Poster Session: Materials Genomics and Characterization of Functional Polymers and Polymer Nanocomposites

Session Chairs: Catherine Brinson, Dale Huber, Olin Mefford and Linda Schadler

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF04.06.01

Sub-100-nm Nearly Monodisperse n-Paraffin/PMMA Phase Change Nanobeads Ho Young Woo, Da Won Lee, Tae Yeol Yoon, Jong Bae Kim, Ji-Yeon Chae and Taejong Paik; Chung-Ang University, Korea (the Republic of)

SF04.06.02

Formation of SAM(Self-Assembled Monolayers) on an Electroplated Hard Au-Ni Alloy Layer by Thiol-Based Sealing Agent for Enhancing Anti-Corrosive Property [Subin Kim](#), Wonyoung Heo, Jimin Lim, Jungmin Oh and Injoon Son; Kyungpook National University, Korea (the Republic of)

SF04.06.03

Reversible Color Transitions of Polydiacetylene Under Heating-UV Irradiation Cycles Yun Kyung Jung and [Hee Yeon Sagong](#); Inje University, Korea (the Republic of)

SF04.06.05

Functional MOF/Polymer Nanocomposites with Improved Processability for Sustainable Energy Applications [Chiara Petrillo](#) and Valeska Ting; University of Bristol, United Kingdom

SF04.06.07

Elaborate Microencapsulation of Thermochromic Chiral Mesogens for Colorimetric Temperature Microprobes [Yoonjin Oh](#), Ji-Won Kim and Shin-Hyun Kim; KAIST, Korea (the Republic of)

SF04.06.08

Rheological Properties for Printability of Graphene-PDMS Nanocomposites [Ioanna Katsamba](#), Jaboc Faulkner and Xiulin Ruan; Purdue University, United States

SF04.06.09

Designing Transparent and Durable Polymeric Coatings for Dust Mitigation [Andrea Molina Moreno](#) and Kausik Mukhopadhyay; University of Central Florida, United States

SF04.06.10

Controlling Functionality and Self-Assembly of PDI-Based Supramolecular Polymers by Targeted Modification [Maximilian J. Hagemann](#), Henry E. Symons and Prof Charl F. Faul; University of Bristol, United Kingdom

SF04.06.11

Bicontinuous Nanoporous Frameworks Supported Metal Nanocatalysts—A New Type of Catalytic Nano-Reactors for Continuous Selective Hydrogenation of Alkynes [Dawoon Jeong](#), Wangsuk Oh and Ji-Woong Park; Gwangju Institute of Science and Technology, Korea (the Republic of)

SF04.06.12

Establishing Molecular Interactions Between Conjugated Polymers and Catalytic Enzymes for High Performance Biosensors [David Ohayon](#) and Sahika Inal; King Abdullah University of Science and Technology, Saudi Arabia

SF04.06.13

Data-Driven Soft Material Design [Juyoung Leem](#), Yue Jiang, Ashley Leibham, Yan Xia and Xiaolin Zheng; Stanford University, United States

SF04.06.14

Differential Composition and Gene Expression Among Microbiomes of Military Aircraft and Vehicles Potentially Associated with Variable Biocorrosion and Biodeterioration [Dominique Wagner](#)^{1,2}, Vanessa Varaljay¹, Blake Stamps^{2,1}, Caitlin Bojanowski¹, Audra Crouch^{2,1}, Carrie Drake^{2,1}, Christopher Ecker^{2,1}, Bradley Stevenson³ and Wendy Crookes-Goodson¹; ¹Air Force Research Laboratory, United States; ²UES, Inc., United States; ³The University of Oklahoma, United States

SF04.06.15

Multiplex Electrospinning for Polymer Deposition and Novel Macroscale Structures [Harold W. Pearson-Nadal](#), Isaac C. Gilfeather, Jessica M. Andriolo and Jack L. Skinner; Montana Technological University, United States

SF04.06.16

Continuous Mesoporous Framework with Entrapped Enzymes—A Structural and Analytical Platform for Nanofluidic Biocatalysis [Wangsuk Oh](#) and Ji-Woong Park; Gwangju Institute of Science and Technology, Korea (the Republic of)

SF04.06.17

From Polyethylene Coated MOF Nanoparticles to a New Screening Method for Optimized Polymer-MOF Hybrid Materials—Reducing Stealth Effects and Enhancing Drug Delivery Processes [Ilona Wagner](#), Simon Spiegel, Frank Kirschnöfer, Alexander Welle and Manuel Tsotsalas; Karlsruhe Institute of Technology, Germany

SF04.06.18

Quantitative Measurements of the Influence of Polymer Brush Length on Magnetic Nanoparticle Interactions and Signal Enhancement During Linear Aggregation via Magnetic Particle Spectroscopy [Arabella R. Hunter](#) and Olin T. Mefford; Clemson University, United States

SF04.06.20

Orientated Self-Assembly and Phase Transition of Silk Fibroin Observed by *In Situ* Atomic Force Microscopy [Chenyang Shi](#)^{1,2,3}, Shuai Zhang^{2,1}, Xiangyang Liu³ and James De Yoreo^{1,2}; ¹Pacific Northwest National Laboratory, United States; ²University of Washington, United States; ³Xiamen University, China

SF04.06.21

Designing Transition Metal/Polymer Nanocomposite Derived Macroscopic Carbon Fiber Towards Highly Stable Catalysis [Ga-Hyeun Lee](#)¹, Seok-Jin Kim², Jung-Eun Lee^{3,1}, Hyejin Ju¹, Minjung Han¹, Changbeom Jeon¹ and Han Gi Chae¹; ¹Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of); ²King Abdullah University of Science and Technology, Saudi Arabia; ³Korea Institute of Science and Technology, Korea (the Republic of)

SF04.06.22

3D-Printed Biomass-Based Nanocomposite Structures Andrew M. Jimenez, Paul Grandgeorge, Mallory Parker, Konstantina Mason, Brandon Lou,

Nadya Peek and [Eleftheria Roumeli](#); University of Washington, United States

SF04.06.24

Polymeric Conductive Microneedles for Real-Time Monitoring of Biomarkers [Tony Keirouz](#)^{1,2}, Yasemin L. Mustafa^{1,2}, Joe Turner^{1,2} and Hannah Leese^{1,2,2}; ¹Department of Chemical Engineering, University of Bath, United Kingdom; ²University of Bath, United Kingdom

SF04.06.25

Processing-Structure-Property Relationships in ABS Nanocomposites [Evan Flitz](#)¹, Arpita Bhutani², Jonathan T. Griffin², Sean Wu² and Albert Dato²; ¹Pomona College, United States; ²Harvey Mudd College, United States

SF04.06.26

Heterobifunctional RAFT Polymers for Simultaneous, Orthogonal Bioconjugations [Anthony Berardi](#), Yeongun Ko and Joerg Lahann; University of Michigan, United States

SF04.06.27

Effect of Agglomerations on Dielectric Properties of Polymer Nanocomposites [Prajakta V. Prabhune](#)¹, Anton van Beek², Wei Chen² and Catherine Brinson¹; ¹Duke University, United States; ²Northwestern University, United States

SESSION SF04.07/EN07.06: Joint Session: Achieving Functionality by Polymeric Material Structure
Session Chairs: Rainhard Machatschek, Olin Mefford and Ying Yang
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 324

8:30 AM SF04.07/EN07.06.01

Predicting Optical Properties of Cellulose-Based Materials Using Multiscale Modeling [Yaroslava G. Yingling](#), Albert L. Kwansa and Merve Fedai; North Carolina State University, United States

9:00 AM SF04.07/EN07.06.02

Cellulose Derived Hierarchical Nanopore-Spaced Membranes by Murray's Law for Gas Capture and Storage [Haiyan Mao](#)¹, Jing Tang², Yi Cui² and Jeffrey Reimer¹; ¹University of California, Berkeley, United States; ²Stanford University, United States

9:15 AM SF04.07/EN07.06.03

Using Cellulose as a Template for Zinc Oxide Formation [Billy Hoogendoorn](#), Richard T. Olsson, Björn K. Birdsong and Xiong Xiao; KTH Royal Institute of Technology, Sweden

9:30 AM SF04.07/EN07.06.04

Antioxidant Technology for Lifetime Enhancement in Polymer Electrolyte Membranes for Fuel Cell Applications [Jin Young Kim](#); Korea Institute of Science and Technology (KIST), Korea (the Republic of)

9:45 AM BREAK

10:15 AM *SF04.07/EN07.06.05

Degradable Polymer Synthesis via Photopolymerization [Brent Sumerlin](#); University of Florida, United States

10:45 AM SF04.07/EN07.06.06

Contributions of Boronic Ester Substituents to the Dynamics and Mechanical Properties of Elastic Vitrimer Networks [Zoriana Demchuk](#)¹, Zhen Zhang¹, Xiao Zhao¹, Sheng Zhao², Jiancheng Luo¹, Alexei Sokolov^{1,2} and Pengfei Cao¹; ¹Oak Ridge National Lab, United States; ²The University of Tennessee, Knoxville, United States

11:00 AM SF04.07/EN07.06.07

Nanoscale PDMS Brushes as a Replacement for Perfluoroalkyl Substances (PFAS) [Kevin Golovin](#); University of Toronto, Canada

11:15 AM SF04.07/EN07.06.08

Real-Time Assessment of Mechanical Integrity in Self-Healing Polymers [Wenle Li](#)¹ and Nancy R. Sottos²; ¹China University of Petroleum, China; ²University of Illinois at Urbana-Champaign, United States

SESSION SF04.08: General Session I
Session Chairs: Catherine Brinson, Dale Huber, Olin Mefford and Linda Schadler
Tuesday Morning, May 24, 2022
SF04-Virtual

8:00 AM *SF04.08.01

Synthesis of Inorganic and Hybrid Functional Nanostructures Using Polymer Templates [Elena Shevchenko](#)^{1,2}, Diana Berman³ and Supratik Guha^{1,2}; ¹Argonne National Laboratory, United States; ²The University of Chicago, United States; ³University of North Texas, United States

8:30 AM *SF04.08.02

Life-Like "Self-Oscillating" Polymer Gels as Functional Softmaterials [Ryo Yoshida](#); The University of Tokyo, Japan

9:00 AM SF04.08.04

Lightweight PVDF Nanocomposites for EMI Shielding Applications Using Copper Sulphide 'Flowers' on 'In Situ' Reduced Graphene Oxide

Template [Devansh Sharma](#), Aishwarya V. Menon and Suryasarathi Bose; IISc, India

9:05 AM *SF04.08.05

Metastable Self-Assembled Structures Formed During Dynamic Processes [Xiao-Min Lin](#); Argonne National Laboratory, United States

9:35 AM SF04.08.06

Resource Recovery from Lithium-Ion Batteries with Macromolecules [Xiong Xiao](#), Billy Hoogendoorn, Yiqian Ma, Suchithra Ashoka Sahadevan, James M. Gardner, Kerstin Forsberg and Richard T. Olsson; KTH – Royal Institute of Technology, Sweden

##PAGE_BREAK##

SYMPOSIUM SF05

Autonomous Materials for the Next-Generation of Smart Systems
May 8 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF05.01: Material Advances in 3D Printing
Session Chair: Yoav Matia
Sunday Morning, May 8, 2022
Hawai'i Convention Center, Level 3, 319A

10:15 AM *SF05.01.01

Collective Cell Behavior in 3D Cell Assemblies—3D Printed Structures, Random Aggregates and Perfectly Precise Arrays [Thomas Angelini](#); University of Florida, United States

10:45 AM *SF05.01.02

Designing Robotic Materials from Sensorized Soft and Architected Matter [Ryan L. Truby](#); Northwestern University, United States

11:15 AM SF05.01.03

Effects of External Acoustic Stimuli Applied to Electrochemical Surfaces and Interfaces [Luis A. Chavez Atayde](#), Luis C. Delfin Manriquez, Vamshi Chillara, Eric Davis, Sergio Diaz-Abad, Alexander Gupta, Cristian Pantea, Edward F. Holby and Ulises Martinez; Los Alamos National Laboratory, United States

SESSION SF05.02: Material Based Autonomous Control
Session Chair: Amir Gat
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 319A

1:30 PM *SF05.02.01

Power Amplification of Soft Artificial Muscles for Rapid Actuation [Michael Tolley](#), Adrienne F. Minori, Saurabh Jadhav, Haojin Chen and Samantha Fong; University of California, San Diego, United States

2:00 PM SF05.02.02

A Dynamically Reprogrammable Metasurface with Self-Evolving Shape Morphing Yun Bai¹, Heling Wang², Yeguang Xue², Jin-Tae Kim², Xinchun Ni², Tzu-li Liu², Yiyuan Yang², Mengdi Han², Yonggang Huang², John A. Rogers² and [Xiaoyue Ni](#)¹; ¹Duke University, United States; ²Northwestern University, United States

2:15 PM SF05.02.03

A Metafluid With Multistable Density and Internal Energy States [Ofek Peretz](#), Ezra Ben Abu, Anna Zigelman, Sefi Givli and Amir Gat; Technion - Israel Institute of Technology, Israel

2:30 PM BREAK

SESSION SF05.03: Advances in Autonomous Materials
Session Chair: Hyeon An
Sunday Afternoon, May 8, 2022
Hawai'i Convention Center, Level 3, 319A

3:15 PM *SF05.03.01

2D, 3D and 4D Printing of Smart Materials [Shlomo Magdassi](#); Hebrew Univ of Jerusalem, Israel

3:45 PM *SF05.03.02

Programming Tangible World [Jiyun Kim](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

4:15 PM SF05.03.03

Programmable Architectures Using Highly Deformable Elastic Lattice for Multidimensional Soft Actuators [Seonggun Joe](#)¹, Ouriel Blich², Shlomo Magdassi² and Lucia Beccai¹; ¹Istituto Italiano di Tecnologia, Italy; ²Hebrew University of Jerusalem, Israel

4:30 PM SF05.03.04

Temperature Responsive Smart Photonic Polymers for Printable Autonomous Sensors [Yari Foelen](#) and Albert Schenning; Eindhoven University of Technology, Netherlands

4:45 PM SF05.03.05

Design of Polymeric Thin Films to Direct Microbial Biofilm Growth, Virulence and Metabolism [Rong Yang](#) and Trevor Franklin; Cornell University, United States

SESSION SF05.04: Smart System
Session Chair: Amir Gat
Monday Morning, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

10:30 AM

Viscous Flow in 1D Metamaterials and Soft Robots [Amir Gat](#); Technion-Israel Institute of Technology, Israel

10:45 AM DISCUSSION TIME

11:00 AM SF05.04.02

Autonomous Microinjectors for Enteral Insulin Delivery Arijit Ghosh, [Wangqu Liu](#), Gayatri Pahapale, Ling Li, Si Young Choi, Liyi Xu, Qi Huang, Florin Selaru and David H. Gracias; Johns Hopkins University, United States

11:15 AM SF05.04.03

Ultrathin Skin-Attachable TiO_x Synaptic Array Integrated with an Organic Photodiode for Finger Gesture Recognition [Haein Cho](#)¹, In Ho Lee², Jiong Jang¹, Hanbee Lee², Sungjun Park² and Gunuk Wang¹; ¹Korea University, Korea (the Republic of); ²Ajou University, Korea (the Republic of)

11:30 AM SF05.04.04

Real-Time Monitoring of Local Intraocular Pressure Distributions Applied to Retina for Diagnosis and Treatment of Glaucoma [Hunkyu Seo](#) and Jang-ung Park; Yonsei University, Korea (the Republic of)

11:45 AM SF05.04.05

Multifunctional Adaptive Sensing of Complex Ambient Environments Using Reconfigurable Material-Electrodes Circuits [Radislav A. Potyrailo](#); GE Global Research, United States

12:00 PM SF05.04.06

Skin Integrated Electronic Interfaces for Augmentative and Alternative Communication [Jin Pyo Lee](#), Yeonwoo Jang, Hyeonseo Song, Suwoo Lee, Jiyun Kim and Jung Hyo Kim; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SESSION SF05.05: Material Advances for Soft Robotics
Session Chair: Lucia Beccai
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

1:30 PM *SF05.05.01

Robust Collective Locomotion with and Without Coordination [Daniel I. Goldman](#); Georgia Institute of Technology, United States

2:00 PM *SF05.05.02

Embodied and Distributed Energy Circulation, Powering and Computing Network for Soft Robots [Hyeon Seok An](#)¹, Yoav Matia¹, Nathan Lazarus² and Robert Shepherd¹; ¹Cornell University, United States; ²U.S. Army Research Laboratory, United States

2:30 PM SF05.05.03

Microvascular-Based, Tunable Stiffness Elastomers [Caroline M. Schell](#), Joshua Schultz and Michael Keller; The University of Tulsa, United States

2:45 PM SF05.05.04

Magneto-hydrodynamic Levitation for High-Performance Flexible Pumps Yoav Matia^{1,2}, Hyeon S. An², Robert Shepherd² and Nathan Lazarus¹; ¹U.S. Army Research Laboratory, United States; ²Cornell University, United States

3:00 PM SF05.05.05

Highly NIR-Reflective Coatings for Soft Robotics Sensing Simone Lantean¹, Matteo Lo Preti^{1,2} and Lucia Beccai¹; ¹Istituto Italiano di Tecnologia, Italy; ²Scuola Superiore Sant'Anna, Italy

3:15 PM BREAK

SESSION SF05.06: Self Powered Devices
Session Chair: Robert Shepherd
Monday Afternoon, May 9, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

3:30 PM SF05.06.01

Graphene-Based Pyroelectric System for Near-Field Energy Conversion Ivan Latella^{1,2} and Philippe Ben-Abdallah^{1,2}; ¹Laboratoire Charles Fabry, France; ²Universitat de Barcelona, Spain

3:45 PM SF05.06.02

Janus Wood Membranes for Autonomous Water Transport and Fog Collection Yong Ding^{1,2}; ¹ETH Zurich, Switzerland; ²Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

4:00 PM SF05.06.03

Ultrasensitive Self-Powered Pressure Sensor by Triboelectric Nanogenerator for Acoustic Sensing Soyeon Lee and Jin-Woo Park; Yonsei University, Korea (the Republic of)

4:15 PM SF05.06.04

Self-Powered Electrochemical Microwave Devices for Wireless Chemical Sensing Siew Ting Melissa Tan and Alberto Salleo; Stanford University, United States

4:30 PM SF05.06.05

Autonomous Resonance-Tuning Energy Harvesters Based on Adaptive Clamping Systems Dong-Gyu Lee, Joonchul Shin and Hyun-Cheol Song; Korea Institute of Science and Technology, Korea (the Republic of)

4:45 PM SF05.06.06

Generalized Weisskopf-Wigner Model of Triboelectroluminescence Lok C. Lew Yan Voon¹, Javier Hasbun¹, Morten Willatzen² and Zhong Lin Wang²; ¹University of West Georgia, United States; ²Chinese Academy of Sciences, China

SESSION SF05.07: Poster Session: Autonomous Materials for the Next-Generation of Smart Systems

Session Chairs: Lucia Beccai and Yoav Matia

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF05.07.01

Fabrication of Printable Colorimetric Food Sensor Based on Hydrogel at Low Concentration of Ammonia Mirim Ham, Soohyun Kim and Hyunjung Lee; Kookmin University, Korea (the Republic of)

SF05.07.02

Programming Self-Powered Soft Magnetic Systems Hyeonseong Song¹, Youn-Kyoung Baek² and Jiyun Kim¹; ¹UNIST, Korea (the Republic of); ²Korea Institute of Materials Science, Korea (the Republic of)

SF05.07.03

Triboelectric Yarns with Electrospun Functional Polymer Coatings for Wearable Energy Harvesting and Sensing Applications Tommaso Busolo¹, Piotr Szewczyk², Malavika Nair¹, Urszula Stachewicz² and Sohini Kar-Narayan¹; ¹University of Cambridge, United Kingdom; ²AGH University of Science and Technology, Poland

SF05.07.06

Spider Silk Inspired PEBA/Goethite Nanocomposite for Stronger Triboelectrification Linards Lapčinskis, Kaspars Mālnieks, Artis Linarts and Andris Šutka; Riga Technical University, Latvia

SF05.07.07

Rationally Nanoengineered Tough-Gels for Sustainable Atmospheric Water Harvesting Hyunchul Park, Iwan Haechler, Thomas Schutzius and Dimos Poulikakos; ETH Zurich, Switzerland

SF05.07.11

Heat Resistant and Robust Superhydrophobic Coatings Fabricated by Functionalized Nanoparticles Anna K. Schmidt-Verma, Thomas Fischer and Sanjay Mathur; Universität zu Köln, Germany

SF05.07.12

Gel Time Engineering in Bacteria-Embedded Silk Hydrogels Rhett L. Martineau¹, Alexandra V. Bayles², Chia Hung³, Kristofer G. Reyes⁴, Matthew E. Helgeson⁵ and Maneesh Gupta³; ¹UES, Inc/Air Force Research Laboratory, United States; ²University of Delaware, United States; ³Air Force Research Laboratory, United States; ⁴University at Buffalo, The State University of New York, United States; ⁵University of California, Santa Barbara, United States

SF05.07.13

Magnetic Responsive Tubular Scaffolds Printed by Means of Melt Electrowriting Paula G. Saiz^{1,2}, Roberto Fernandez de Luis¹ and Ana Catarina Lopes¹; ¹BCMaterials, Spain; ²UPV/EHU, Spain

SF05.07.14

Magnetophoretic Decoupling Element for Controlling Interaction Between Magnetic Particles Byeonghwa Lim, Hyeonseol Kim, CheolGi Kim and Keonmok Kim; DGIST, Korea (the Republic of)

SF05.07.15

Novel Eco-Friendly Chalcogenide Glass Systems and Their Lenses for Infrared Thermal Imaging Systems Tae Yeon Lee^{1,2}, Seon Hoon Kim¹, Jung-Hwan In¹, Soyoung Kim¹, Doo-Gun Kim¹, Ju Hyeon Choi¹, Jinhyeok Kim² and Karam Han¹; ¹KOREA PHOTONICS TECHNOLOGY INSTITUTE, Korea (the Republic of); ²Chonnam National University, Korea (the Republic of)

SF05.07.16

Effect of Lanthanum Oxide on Glass Formation Range and Properties of B₂O₃-ZnO-WO₃ Glass System for Optical Lens Yoon Hee Nam, Karam Han, Jung-Hwan In, Seon Hoon Kim, Soyoung Kim, Doo-Gun Kim and Ju Hyeon Choi; Korea Photonics Technology Institute, Korea (the Republic of)

SESSION SF05.08: Functional Hydrogel

Session Chair: Lucia Beccai

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

11:15 AM SF05.08.02

Biomimetic Microanalytical System for On-Demand Analyte Detection Katharina Cu¹, Matthias Franzreb¹ and Joerg Lahann^{2,1}; ¹Karlsruhe Institute of Technology, Germany; ²University of Michigan–Ann Arbor, United States

11:30 AM SF05.08.03

Electro-Actuators Based on Polycationic Hydrogel Networks Annael M. Sort-Montenegro, Colm B. Delaney, Maya Kaikov, Erika Deasy, Luke Dowling and Larisa Florea; Trinity College Dublin, Ireland

11:45 AM SF05.08.04

Controllable Clustering Transition Based on Temperature-Response Hydrogel by Optimizing Elastic Modulus Jiseong Choi¹, Junsoo Kim², Suim Lim¹, Jeonghun Kim³ and Seongmin Kang¹; ¹Chungnam National University, Korea (the Republic of); ²Harvard University, United States; ³Electronics and Telecommunications Research Institute, Korea (the Republic of)

12:00 PM SF05.08.05

Thermo-Responsive Smart Gating Wood Membranes Yong Ding^{1,2}; ¹ETH Zurich, Switzerland; ²Empa–Swiss Federal Laboratories for Materials Science and Technology, Swaziland

SESSION SF05.09: Self Healing Materials

Session Chair: Robert Shepherd

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

1:30 PM SF05.09.00

Autonomous Materials, Forming the Smart Systems of the Future Robert Shepherd; Cornell University, United States

1:45 PM DISCUSSION TIME

2:00 PM SF05.09.02

Sustained Self-Healing of Fiber-Reinforced Polymer Composites via *In situ* Thermal Remending Jason Patrick and Alexander Snyder; North Carolina State University, United States

2:15 PM SF05.09.03

Self-Healing for Microvascular Seals in Gas Transmission MD Mahfujul H. Khan; The University of Tulsa, United States

2:30 PM SF05.09.04

Molecular Examination of Healable Polymers with Covalent Adaptive Networks Aniruddh Vashisth; University of Washington, United States

2:45 PM SF05.09.05

Self-Healing Materials to Reduce Unintended Methane Release Anna E. Williams, MD Mahfujul H. Khan and Michael Keller; The University of Tulsa, United States

3:00 PM BREAK

SESSION SF05.10: Material Based Computation
Session Chair: Amir Gat
Tuesday Afternoon, May 10, 2022
Hilton, Mid-Pacific Conference Center, 6th Floor, Coral 5

3:45 PM *SF05.10.02

Mechanics-Based Material Computing using Physical ReLU Spring Networks Daniel Nelson¹, Benjamin Grossmann¹, Timothy Vincent¹, Amanda Criner², Andrew Gillman² and [Phil Buskohl](#)²; ¹UES, Inc., United States; ²Air Force Research Laboratory, United States

4:15 PM SF05.10.03

Self-Folding Shape-Memory Elastomer Composites with Controlled Topographies [Oscar Rabaux](#), Raphaël Riva and Christine Jerome; University of Liege, Belgium

4:30 PM SF05.10.04

Tunable Response in Liquid Crystalline Elastomers for Complex and Reprogrammable Actuations [Tayler Hebner](#), Christopher Bowman and Timothy White; University of Colorado Boulder, United States

4:45 PM SF05.10.05

Multi-State Soft Machine Programmed by DNA Oligonucleotide Codes [Ruohong Shi](#), Kuan-Lin Chen, Joshua Fern, Yixin Liu, Siming Deng, Noah Cowan, David H. Gracias and Rebecca Schulman; Johns Hopkins University, United States

5:00 PM SF05.10.06

WITHDRAWN (NO SHOW) SF05.10.01 Smart Materials with Tunable Properties Based on Low Melting Point Alloys [Wanliang Shan](#)¹, Yang Jiao², Amir Mohammadi Nasab³, Siavash Sharifi¹ and Chenxu Zhao¹; ¹Syracuse University, United States; ²Arizona State University, United States; ³Yale University, United States

SESSION SF05.11: General Session I
Session Chairs: Hyeon Seok An and Robert Shepherd
Tuesday Afternoon, May 24, 2022
SF05-Virtual

6:30 PM *SF05.11.01

Triboelectric Nanogenerator for Self-Powered Sensors and Systems [Zhong Lin Wang](#); Georgia Institute of Technology, United States

7:00 PM *SF05.11.02

Electrochemistry for Autonomous Navigation of Small Vehicles and Healing of Metal Parts [James H. Pikul](#); University of Pennsylvania, United States

7:30 PM SF05.11.03

A Continuously Operated Electrochemical System Driven by Low-Grade Thermal Energy [Xiaoya Li](#), Jia Li, Jeonghun Yun, Angyin Wu, Caitian Gao and Seok Woo Lee; Nanyang Technological University, Singapore

7:45 PM SF05.11.04

Shape-Programmable Three-Dimensional Microfluidics [Xueju Wang](#); University of Connecticut, United States

8:00 PM SF05.11.05

Designing Plasmonic Nanostructures for Smart Materials [Yadong Yin](#); University of California, Riverside, United States

SESSION SF05.12: General Session II
Session Chair: Hyeon Seok An
Tuesday Afternoon, May 24, 2022
SF05-Virtual

9:00 PM *SF05.12.01

Biomimetic Approaches with Stretchable Ionics [Jeong-Yun Sun](#); Seoul National University, Korea (the Republic of)

9:30 PM *SF05.04.01

Smart Contact Lenses for Wireless Medical Diagnosis [Jang-ung Park](#)^{1,2}; ¹Yonsei University, Korea (the Republic of); ²Institute for Basic Science (IBS), Korea (the Republic of)

##PAGE_BREAK##

SYMPOSIUM SF06

Recent Advances in Structural Materials from Bulk to Nanoscale
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF06.01: 3D Hierarchical Structures Composed of Metal Nanostructures I
Session Chairs: Heung Nam Han, Ju-Young Kim, Hyuck Mo Lee and Sang Ho Oh
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 313A

8:30 AM *SF06.01.01

Enhanced Mechanical Properties of Nanoporous Gold by Controlling External and Internal Microstructures Hansol Jeon, Eunji Song and Ju-Young Kim; UNIST (Ulsan National Institute of Science and Technology), Korea (the Republic of)

9:00 AM SF06.01.02

The Role of Twin Boundaries and other Microstructural Features in Mechanical Behavior of Additively Manufactured Metal and Metal Alloy Microlattices Rebecca A. Gallivan, Max Saccone, Thomas T. Tran and Julia R. Greer; California Institute of Technology, United States

9:15 AM SF06.01.03

Scalable Fabrication of Thin-Shell Oxide Nanoarchitectures via Proximity-Field Nanopatterning—Toward Ultrahard and Flexible Nanocomposite Film Gwangmin Bae, Dongchan Jang, Seung Min J. Han and Seokwoo Jeon; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:30 AM SF06.01.04

Temperature-Dependent Deformation Behavior of Nanostructured Tungsten Scaffolds and Interpenetrating Tungsten–Silicon Oxycarbide Nanocomposites Andreas Stein¹, Zhao Wang¹, Kevin Schmalbach¹, Nathan Mara¹, David Poerschke¹, Lee Penn¹ and Antonia Antoniou²; ¹Univ of Minnesota, United States; ²Georgia Institute of Technology, United States

9:45 AM SF06.01.05

Heterogeneous Metallic Nanoporous Structures Obtained via Nanoscale Low-Temperature Welding Natalya Kublik¹, Stanislaw Niazorau¹, Amm G. Hasib¹, Sridhar Niverty², Nikhilesh Chawla³ and Bruno Azeredo¹; ¹Arizona State University, United States; ²Pacific Northwest National Laboratory, United States; ³Purdue University, United States

10:00 AM BREAK

10:30 AM SF06.01.09

Anomalous Elastic Limit of ZnO from a Uniform and Aligned 3D Nanoshell Structures for Piezoelectric Applications Kisun Kim¹, Hoon Kim¹, Seokjung Yun¹, Wonsik Kim¹, Jeongjae Ryu¹, Hyeongyun Nam¹, Seung Min J. Han^{1,2}, Seungbum Hong^{1,2} and Seokwoo Jeon^{1,2}; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²KAIST Institute for NanoCentury, Korea (the Republic of)

10:45 AM SF06.01.10

Nanoscale Sculptured Stainless Steel with Electrochemically Deposited Copper for Mechanically Stable Joints and Optimal Electrical Properties Catarina Schmidt, Chima Obobi Kalu, Juergen Carstensen and Rainer Adelung; Kiel University, Germany

SESSION SF06.02: 3D Hierarchical Structures Composed of Metal Nanostructures II
Session Chairs: Karsten Durst and Gi-Dong Sim
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 313A

2:00 PM *SF06.02.01

Accelerated Development of Al Alloys for Additive Manufacturing Ryan T. Ott¹, Seungjin Nam¹, Emrah Simsek¹ and Hunter Henderson²; ¹Ames Laboratory (USDOE), United States; ²Lawrence Livermore National Laboratory, United States

2:30 PM SF06.02.02

Influence of Heat Treatment on the Hydrogen Embrittlement of Inconel 718 Fabricated by Laser Powder Bed Fusion Dong-Hyun Lee¹, Yakai Zhao², Soo Yeol Lee¹, Dirk Ponge³ and Eric A. Jägle⁴; ¹Chungnam National University, Korea (the Republic of); ²Nanyang Technological University, Singapore; ³Max-Planck-Institut für Eisenforschung GmbH, Germany; ⁴Universität der Bundeswehr München, Germany

2:45 PM SF06.02.04

Tunable On-Wafer Porous Anodic Aluminum Substrates for Advanced Nanomaterials Design Templates for Nanomaterial Synthesis Nam Kim, Keith E. Gregorczyk, Marco Casareto, Gary Rubloff and Sang Bok Lee; University of Maryland, United States

3:00 PM BREAK

SESSION SF06.03: Alloy Fabrication and Processing Methods/Bulk Alloy I

Session Chairs: Heung Nam Han and Ill Ryu

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 313A

3:30 PM SF06.03.01

Matrix-Dispersoid Mechanical Interaction in Microstructurally Stable Hierarchical and Nanocrystalline Alloys—A SAXS/WAXS Study Shruti Sharma, Kiran Solanki and Pedro Peralta; Arizona State University, United States

3:45 PM SF06.03.02

The Influence of Aging on the Mechanical Behavior of Sputter Deposited Ni-Mo-W Thin Films with Mo Content Above the Solubility Limit Yuhyun Park, KenHee Ryou, Pyuck-Pa Choi and Gi-Dong Sim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

4:00 PM SF06.03.03

Strengthening and Thermal Stability of MgLiCa Alloys Processed by Severe Plastic Deformation Heather Salvador¹ and Suveen N. Mathaudhu^{2,3}; ¹University of California, Riverside, United States; ²Colorado School of Mines, United States; ³Pacific Northwest National Laboratory, United States

4:15 PM SF06.03.04

Solid-State Dissimilar Bulk Joining of Additively Manufactured Maraging Steel and Conventional Martensitic Stainless Steel Shengwei Zhang¹, Lihong Cai¹, Tran Van Loi¹, Stephen Yeboah Boakye², Sung Tae Hong¹, Hoon-Hwe Cho² and Dong-Hyun Kim³; ¹University of Ulsan, Korea (the Republic of); ²Hanbat National University, Korea (the Republic of); ³Korea Institute of Industrial Technology, Korea (the Republic of)

4:30 PM SF06.03.05

Multi-Scale Mechanical Characterization of Additively Manufactured Inconel 718 Kwanghyeok Lim, KenHee Ryou, Jae-Hoon Choi, Ji-Young Kim, Gwang-Hyo Choi, Pyuck-Pa Choi and Gi-Dong Sim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SESSION SF06.04: Poster Session I: Recent Advances in Structural Materials from Bulk to Nanoscale I

Session Chairs: Heung Nam Han and Seung Min Han

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF06.04.01

Elastic Wave Characteristics from Crack Initiation and Propagation of High-Strength Steel (HV550) Immersed in Acetic Acid Solution Kyoungee Gu, Jae-Eun Paeng and Ki-Woo Nam; Pukyong National University, Korea (the Republic of)

SF06.04.03

Nanoscale Ductile Deformation by Nanoscratch Test at Extremely Low Load of Brittle Materials Dong-Hyun Seo, Eun-chaee Jeon, Ji-Youn Kwak and Dong-Hyeon Kim; University of Ulsan, Korea (the Republic of)

SF06.04.05

Controlled Phase Separation of Supercritically Dried Polymer-Based and Polymer Nanocomposite-Based Aerogels Ying Mu, Xiaoli Li and Marilyn L. Minus; Northeastern University, United States

SF06.04.06

Micro- and Nano-Structural Analysis of the Interfaces Critical to the Mechanical Performance of SiC Monofilaments Nathan Sutemire^{1,2}, Micheal V. Rix², Stephen Kyle-Henney², Mark A. Baker¹ and Mark J. Whiting¹; ¹University of Surrey, United Kingdom; ²TISICS Ltd., United Kingdom

SF06.04.08

Effect of Mono- and Divalent Extra-Framework Cations on the Structure and Accessibility of Porosity in Chabazite Zeolites Huan Doan; University of Bristol, United Kingdom

SF06.04.10

Consolidation of Ni-Ti Based Metallic Glass and Its Pseudoelasticity After Crystallization Jeongsoo Kim¹, Kim Won Tae² and Do Hyang Kim¹; ¹Yonsei University, Korea (the Republic of); ²Cheongju University, Korea (the Republic of)

SF06.04.11

Application of Neutron Grating Interferometry in Metal Additive Manufacturing Youngju Kim^{1,2}, Michael C. Daugherty^{1,2}, Jacob LaManna², Eli Baltic², David Jacobson², Nikolai Klimov², Caitlyn Wolf², Ryan Murphy², Kathleen Weigandt², Seung Wook Lee³, Wookjin Lee³, Jongyul Kim⁴ and Daniel Hussey²; ¹University of Maryland, United States; ²National Institute of Standards and Technology, United States; ³Pusan National University, Korea (the Republic of); ⁴Korea Atomic Energy Research Institute, Korea (the Republic of)

SF06.04.12

Analysis of Geometric Factors for Higher Young's Modulus in an Open Structure Sang Joon Lee, SangHyuk Yoo, Sunil Moon and Keonwook Kang;

Yonsei University, Korea (the Republic of)

SESSION SF06.05: Strength and Plasticity at Different Length Scales and the Deformation Mechanisms I

Session Chairs: Seung Min Han and George Pharr

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 313A

8:30 AM *SF06.05.01

Progress in the Development of High Strain Rate Nanoindentation Testing George M. Pharr¹, Benjamin L. Hackett¹, Christopher C. Walker¹, P. S. Phani² and Warren Oliver³; ¹Texas A&M University, United States; ²ARCI, India; ³KLA, United States

9:00 AM SF06.05.02

Novel Mechanisms for the Formation of Dislocation Cell Patterns in BCC Metal Jaehyun Cho^{1,2}, Luke Hsiung², Robert Rudd² and Sylvie Aubry²; ¹NASA Ames Research Center - AMA Inc., United States; ²Lawrence Livermore National Laboratory, United States

9:15 AM SF06.05.03

Graphene-Induced Surface Stiffening of Copper Studied by Nanoindentation Jad Yaacoub¹, Mitisha Surana¹, Ganesh Ananthkrishnan¹, Matthew Poss¹, Harley Johnson¹, Nikhil Admal¹, Pascal Pochet² and Sameh Tawfik¹; ¹University of Illinois at Urbana Champaign, United States; ²Institut de Recherche Interdisciplinaire de Grenoble (iriG), France

9:30 AM SF06.05.04

Role of Graphene in Deformation Behavior of Cu-Graphene Nanolayered Composite Seung Min J. Han; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:45 AM SF06.05.05

Atomic-Scale Unique Interface Observation of η -Precipitates in Al-Zn-Mg Alloy Hwangsun Kim, Howook Choi, Juhyun Oh, Ho Kwon, Eun Soo Park, Sungwoo Lee, Gun-Do Lee, Miyoung Kim and Heung Nam Han; Seoul National University, Korea (the Republic of)

10:00 AM BREAK

SESSION SF06.06: Numerical Model for Designing of New Alloys and Mechanical Behaviour Analysis I

Session Chairs: Wei Cai and Seunghwa Ryu

Tuesday Morning, May 10, 2022

Hawai'i Convention Center, Level 3, 313A

10:30 AM *SF06.06.01

Entropic Effects on the Rate of Thermally Activated Dislocation Cross-Slip in FCC Nickel Yifan Wang and Wei Cai; Stanford University, United States

11:00 AM SF06.06.02

Transfer Learning for Enhancing the Homogenization-Theory-Based Prediction of Elasto-Plastic Response of Particle/Fiber-Reinforced Composites Jiyoung Jung, Yongtae Kim, Jinkyoo Park and Seunghwa Ryu; KAIST, Korea (the Republic of)

11:15 AM SF06.06.04

Modulating Hardness in $\text{Sc}_2(\text{Ru}_{x-1}\text{TM}_x)\text{B}_4$ Through Empirical Considerations and Computational Analysis Jacob Hickey and Jakoah Brgoch; University of Houston, United States

SESSION SF06.07: Strength and Plasticity at Different Length Scales and the Deformation Mechanisms II

Session Chairs: Jaafar El-Awady and Ju-Young Kim

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 313A

2:15 PM SF06.07.02

Twinning and Phase Transformation in Ti and Mg Lei Cao, Amir Zahiri and Jamie Ombogo; University of Nevada, Reno, United States

2:30 PM SF06.07.03

Size Effect of Shape Memory Nanoparticles Studied by Constructing Size-Stress-Temperature Phase Diagram Ji Young Kim¹, So Yeon Kim^{1,2}, Jinwoo Kim^{1,3}, Kooknoh Yoon¹, Wook Ha Ryu¹, Won-Seok Ko⁴ and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²Massachusetts Institute of Technology, United States; ³Korea Institute of Science and Technology, Korea (the Republic of); ⁴Ulsan National Institute of Science and Technology, Korea (the Republic of)

2:45 PM SF06.07.05

Strain-Modulated Ferroelectricity in SrMnO_3 Thin Films via *In Situ* Strain Engineering SeongMin a. Park¹, Chang Jae Yoon¹, Gopinathan Anoop¹, Tae Yeon Kim¹, Young-Min Kim² and Ji Young Jo¹; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

3:00 PM BREAK

SESSION SF06.08: Alloy Fabrication and Processing Methods/Bulk Alloy II

Session Chairs: Seung Min Han and Douglas Stauffer

Tuesday Afternoon, May 10, 2022

Hawai'i Convention Center, Level 3, 313A

3:30 PM SF06.08.01

Interfacial Plasticity Mediated by Lath Boundaries in Reduced-Activation Ferritic/Martensitic Steels Hadi Ghaffarian, Ye-Eun Na and Dongchan Jang; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

3:45 PM SF06.08.02

Investigating the Plastic Deformation Kinetics in Ultrafine Grained and Nanocrystalline Metal Thin-Films Using *In Situ* TEM Nanomechanical Testing Sandra Stangebye, Yin Zhang, Kunqing Ding, Josh Kacher, Ting Zhu and Olivier Pierron; Georgia Institute of Technology, United States

4:00 PM SF06.08.03

Microcantilever Bending Experiments and Measurement of the Elastic Size Effect Based on Gradient Elasticity Jae-Hoon Choi, Hojang Kim, Ji-Young Kim, Kwanghyeok Lim, Byung-Chai Lee and Gi-Dong Sim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

4:15 PM SF06.08.04

Analysis of the Matrix/Precipitates Interface According to the Growth Behavior of Aluminum Nitride Formed on the Subsurface of NAK80 Steel During Laser Nitriding Won Sang Shin, Seungwoo Baek and Yoon Jun Kim; Inha University, Korea (the Republic of)

4:30 PM SF06.08.05

How Solute-Contaminant Structures Alter Nanocrystalline Stability and Strength Jonathan Priedeman¹, B. C. Hornbuckle², Sean J. Fudger², Kristopher A. Darling² and Gregory B. Thompson¹; ¹The University of Alabama, United States; ²U.S. Army Research Laboratory, United States

SESSION SF06.09: Strength and Plasticity at Different Length Scales and the Deformation Mechanisms III

Session Chairs: David Bahr and Gi-Dong Sim

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 313A

8:30 AM *SF06.09.01

Effect of Carbon Addition and Passivation on the Mechanical Behavior of Freestanding Al Thin Films Gi-Dong Sim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:00 AM SF06.09.02

Surface Engineering to Form Ultra-Fine Grains and a Hardened Surface in Ti Alloys David F. Bahr, David A. Brice, Siavash Ghanbari and Raheleh M. Rahimi; Purdue University, United States

9:15 AM SF06.09.03

Plasticity in bcc Metals is Controlled by Integrated Thermally-Activated Smooth Flow and Athermal Avalanche Flow Quentin Rizzardi¹, Cameron McElfresh², Gregory Sparks^{1,3}, Douglas D. Stauffer⁴, Jaime Marian² and Robert Maass^{5,1}; ¹University of Illinois at Urbana-Champaign, United States; ²University of California, Los Angeles, United States; ³The Ohio State University, United States; ⁴Bruker Corporation, United States; ⁵Federal Institute of Materials Research and Testing (BAM), Germany

9:30 AM SF06.09.04

Shaping Amorphous Silica at Nanoscale by Controlling E-Beam Induced Plasticity Sung-gyu Kang, Jeongin Paeng, Heung Nam Han and In-Suk Choi; Seoul National University, Korea (the Republic of)

9:45 AM SF06.09.05

Temperature Dependence of Dislocation Core Configuration in Pure Ti David Jany and Daryl Chrzan; UC Berkeley, United States

10:00 AM BREAK

SESSION SF06.10: Numerical Model for Designing of New Alloys and Mechanical Behaviour Analysis II

Session Chairs: Hojun Lim and Ill Ryu

Wednesday Morning, May 11, 2022

Hawai'i Convention Center, Level 3, 313A

10:30 AM *SF06.10.01

Investigating Plastic Anisotropy Using Crystal Plasticity Simulations and Machine Learning Techniques Hojun Lim¹, Taejoon Park², David Montes de Oca Zapiain¹ and Farhang Pourboghra²; ¹Sandia National Laboratories, United States; ²The Ohio State University, United States

11:00 AM SF06.10.02

Neural Networks Approach to Correlate Plastic Properties with Indentation Data in Anisotropic Metals Heung Nam Han, Kyeongjae Jeong, Kyungyul Lee, Siwhan Lee and Dongil Kwon; Seoul National University, Korea (the Republic of)

11:15 AM SF06.10.03

Atomistic Simulations on Phase Transformation and Deformation Behaviors of Shape-Memory Alloys at the Nanoscale Won-Seok Ko; University of Ulsan, Korea (the Republic of)

11:30 AM SF06.10.04

Multiscale Modeling of Size-Dependent Plasticity Ill Ryu; The University of Texas at Dallas, United States

SESSION SF06.11: Advanced Characterization Tools for Microstructure Analysis I

Session Chairs: In-Suk Choi and Seung Min Han

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 313A

1:30 PM *SF06.11.01

Dislocation and Crack Avalanche Characteristics from Coupled Acoustic Emission Measurements and *In Situ* Experiments in Metals Jaafar A. El-Awady and Mostafa Omar; Johns Hopkins University, United States

2:00 PM SF06.11.02

Investigation of the Cracking Threshold of Silicate Glasses Using Nanoindentation Yvonne C. Dieudonné and George M. Pharr; Texas A&M University, United States

2:15 PM SF06.11.03

Predict the Temperature Dependence of the Elastic Limit in Metallic Glasses from the Energy-Strain Landscape Picture Yifan Wang¹, Jing Liu², Jian-Zhong Jiang² and Wei Cai¹; ¹Stanford University, United States; ²Zhejiang University, China

2:30 PM BREAK

SESSION SF06.12: Alloy Fabrication and Processing Methods/Bulk Alloy III

Session Chairs: Eun Soo Park and Ill Ryu

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 313A

3:45 PM SF06.12.01

Role of Interlath Austenite in Microstructural Strain Localization in Martensitic Stainless Steels Cem Tasan, Hyunseok Oh and Menglei Jiang; Massachusetts Institute of Technology, United States

4:00 PM SF06.12.03

Endorsing Deformability of Brittle Hf-Based Bulk Amorphous Alloy by Controlling Effective Strain Song-Yi Kim¹, Jurgen H. Eckert^{2,3} and Min-Ha Lee^{4,1}; ¹Korea Institute of Industrial Technology, Korea (the Republic of); ²Montanuniversität Leoben, Austria; ³Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; ⁴KITECH North America, United States

4:15 PM SF06.12.04

Microstructure Engineering in Metastable Beta Titanium Alloys by Tuning Highly-Indexed Deformation Twinning Dian Li, Wenrui Zhao and Yufeng Zheng; University of Nevada, Reno, United States

4:30 PM SF06.12.05

Effects of Thermo-Mechanical Processing on the Mechanical Properties and the Nanoscale Precipitates in a Ni-Based Superalloy Vitor V. Rielli¹, Felix Theska¹, Flora Godor², Christian Gruber², Aleksandar Stanojevic², Bernd Oberwinkler² and Sophie Primig¹; ¹University of New South Wales, Australia; ²voestalpine BÖHLER Aerospace GmbH & Co KG, Austria

4:45 PM SF06.12.06

Investigation of Self-Healing Property in Co-Based Superalloy by Autonomous B Segregation Kooknoh Yoon¹, Jung Soo Lee^{2,1}, Hyungi Miin¹, Ji Young Kim¹, Dongwoo Lee³, Won-Seok Ko², Taisuke Sasaki⁴ and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²University of Ulsan, Korea (the Republic of); ³Sungkyunkwan University, Korea (the Republic of); ⁴National Institute for Materials Science, Japan

SESSION SF06.13: Poster Session II: Recent Advances in Structural Materials from Bulk to Nanoscale II

Session Chairs: Ju-Young Kim and Ill Ryu

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF06.13.01

Microstructure Characterisation of cp-Ti and Metastable β Titanium Alloy Ti-15Mo Processed by Rotational Constrained Bending Tomas Krajnak¹, Milos Janecek¹, Peter Minarik¹, Jozef Vesely¹, Petr Cejpek¹, Jeno Gubicza², Hung Pham², Arseniy Raab³ and Georgy Raab³; ¹Charles University, Czechia; ²Eötvös Loránd University, Hungary; ³Ufa State Aviation Technical University, Russian Federation

SF06.13.03

Atom Probe Investigation of Early Stage Clustering by Cyclic Ageing and Conventional Heat Treatment Methods in Al-Zn-Mg-(Cu) Alloy System Sohail Shah; NTNU, Norway

SF06.13.08

Harmless Crack Characteristics by Shot Peening of Steels with Different Carbon Content Kyounghee Gu¹, Chang-Seok Oh², Cheol-Su Kim¹, Seok-Hee Kang¹, Jae-Eun Paeng¹ and Ki-Woo Nam^{1,1}; ¹Pukyong National University, Korea (the Republic of); ²POSCO, Korea (the Republic of)

SF06.13.09

Effect of Laser Surface Cleaning of Corroded 304L Stainless Steel on Microstructure and Mechanical Properties Seungwoo Baek¹, Won Sang Shin¹, Yoon Jun Kim¹ and Changkyoo Park²; ¹Inha University, Korea (the Republic of); ²Korea Institute of Machinery and Materials, Korea (the Republic of)

SF06.13.10

Quantitative Phase-Field Modeling Microstructural Evolution of Fe-Cr: A GPU-Accelerated Study Jeonghwan Lee and Kunok Chang; Kyung Hee University, Korea (the Republic of)

SF06.13.11

Assessment of Interpolation Schemes of Elasticity at Particle-Matrix Interface in the Phase-Field Method Wooseob Shin and Kunok Chang; Kyung Hee University, Korea (the Republic of)

SF06.13.12

Structural Evolution of Preceramic Polymers Precursors upon Thermal Treatment by Synchrotron Radiation Techniques and Reverse Monte Carlo Simulations Haira G. Hackbarth¹, Brandon Ackley², Timothy Pruynt², Matthew Dickerson² and Nicholas Bedford¹; ¹UNSW, Australia; ²Air Force Research Laboratory, United States

SESSION SF06.14: High and Medium Entropy Alloys I

Session Chair: Eun Soo Park

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 313A

8:30 AM *SF06.14.01

Engineering Atomic-Level Complexity in 3D Transition Metal-Based Complex Concentrated Alloys Hyunseok Oh^{1,2}, Khorgolkhuu Odbadrakh^{3,4,5}, Sang Jun Kim¹, Wook Ha Ryu¹, Kooknoh Yoon¹, Sai Mu⁴, Fritz Koermann^{6,7}, Yuji Ikeda^{6,8}, Cem Tasan², Dierk Raabe⁶, Takeshi Egami^{4,3} and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²Massachusetts Institute of Technology, United States; ³The University of Tennessee, Knoxville, United States; ⁴Oak Ridge National Laboratory, United States; ⁵National University of Mongolia, Mongolia; ⁶Max-Planck-Institut für Eisenforschung, Germany; ⁷Delft University of Technology, Netherlands; ⁸University of Stuttgart, Germany

9:00 AM SF06.14.02

Nano-scale Heterogeneous Medium-entropy Alloy with High Yield Strength Fabricated by Laser-Powder Bed Fusion Additive Manufacturing Heechan Jung¹, Hyungsoo Lee², Alireza Zargaran³, Jungwan Lee³ and Seok Su Sohn¹; ¹Korea University, Korea (the Republic of); ²Korea Institute of Materials Science, Korea (the Republic of); ³Pohang University of Science and Technology, Korea (the Republic of)

9:15 AM SF06.14.03

Gradient Interface in High Entropy Alloy Reinforced Ti-Nb-Zr Heterostructure Alloys for Improved Strength and Wear Resistance without Scarifying Ductility Muhammad Akmal¹ and Ho Jin Ryu^{1,2}; ¹Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); ²Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:30 AM SF06.14.04

Effects of Amorphous Formation by Si Addition on Microstructure, Mechanical and Tribological Properties for CrCoNiSi Film Fabricated by Magnetron Sputtering Young Mok Kim¹, Wansu Song¹, Tae Jin Jang¹, Hyeonwoo Park¹, Gyeongbeom Lee², Joungwook Kim², Eunsoo Yang² and Seok Su Sohn¹; ¹Korea University, Korea (the Republic of); ²LG Electronics, Korea (the Republic of)

9:45 AM SF06.14.05

Investigation on the Resistance of Hydrogen Embrittlement of FCC Single-Phase Medium-Entropy Alloys with Controlled Solid-Solution Strengthening and Stacking Fault Energy Dae Cheol Yang¹, Han-Jin Kim², Sang Yoon Song¹ and Seok Su Sohn¹; ¹Korea university, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

10:00 AM BREAK

SESSION SF06.15: Alloy Fabrication and Processing Methods/Bulk Alloy IV

Session Chairs: Heung Nam Han and Michael Mills

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 313A

10:30 AM *SF06.15.01

Local Phase Transformations—A New Creep Strengthening Mechanism in Ni-Base Superalloys Michael Mills; The Ohio State University, United States

11:00 AM SF06.15.02

Room Temperature Crack-Healing in an Atomically Layered Ternary Carbide Hemant J. Rathod¹, Thierry Ouisse², Miladin Radovic¹ and Ankit

Srivastava¹; ¹Texas A&M University, United States; ²Université Grenoble Alpes, France

11:15 AM SF06.15.03

Free Volume Redistribution in Amorphous Interfaces During Relaxation of a Spray Deposited Amorphous Alloy [Jonathan M. Gentile](#)¹, David Sprouster¹, Bin Cheng¹, Daniel Olds², Evelina Vogli³ and Jason R. Trelewicz¹; ¹Stony Brook University, United States; ²Brookhaven National Laboratory, United States; ³Liquidmetal Coatings, United States

11:30 AM SF06.15.05

TEM Study of Friction Stir Welding Joints of 316L Steel and 5083 Al Alloy [Mayerling Martinez](#)^{1,2}, Petr Hrcuba², Florent Moisy¹, Florent Picot³, Richard Retoux¹, Bernadette Domenges¹ and Eric Hug¹; ¹CRISMAT Laboratory, France; ²Charles University, Czechia; ³PROBENT PROJET, France

SESSION SF06.16: Advanced Characterization Tools for Microstructure Analysis II

Session Chairs: Dongchan Jang and Ill Ryu

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 313A

2:00 PM *SF06.16.01

Exploring Strength and Ductility of Non-Equilibrium Microstructures Using Nano- and Micromechanics Daniel Sorensen¹, Eric Hintsala², Bernard R. Becker² and [Douglas D. Stauffer](#)²; ¹Boston Scientific, United States; ²Bruker Nano Surfaces, United States

2:30 PM SF06.16.02

Investigation of Stress Corrosion Cracking in CMSX-4 Turbine Blade Alloys Using Deep Learning Assisted X-Ray Microscopy and Correlated Microscopy [Hrishikesh Bale](#)¹, Maadhav Kothari¹, Andy Holwell¹, Simon Gray² and Johnathan Leggett³; ¹Carl Zeiss Research Microscopy Solutions, United States; ²Cranfield University, United Kingdom; ³Rolls Royce, United Kingdom

2:45 PM SF06.16.03

Rapid Characterization of Cyclic Response of Small-Volume Metal Samples Using Spherical Microindentation Stress-Strain [Camilla Johnson](#)¹, Soumya Mohan¹, Reji John² and Surya Kalidindi¹; ¹Georgia Institute of Technology, United States; ²Air Force Research Laboratory, United States

3:00 PM BREAK

SESSION SF06.17: Alloy Fabrication and Processing Methods/Bulk Alloy V

Session Chairs: Dongchan Jang and Seong-Woong Kim

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 313A

3:30 PM SF06.17.01

Investigation of Alloy Grain Boundary Effects in the High-Temperature Oxidation & Cr Volatilization of 22 wt.% Cr Ferritic Stainless Steel Using 3D EBSD Analysis [Yoon Seok Ko](#)^{1,2}, Byung Kyu Kim¹, Heung Nam Han² and Dong-Ik Kim¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

3:45 PM SF06.17.02

Thermal Stability of the Microstructure of Mg Alloys with Segregated Stacking Faults Klaudia Fekete¹, [Daria Drozdenko](#)¹, Petr Cejpek¹, Patrik Dobron¹, Michiaki Yamasaki² and Yoshihito Kawamura²; ¹Charles University, Czechia; ²Kumamoto University, Japan

4:00 PM SF06.17.03

Kinetics of Direct Iron Reduction Using Hydrogen in Steelmaking [Xueli Zheng](#), Yi Cui and Leora E. Dresselhaus-Marais; Stanford University, United States

4:15 PM SF06.17.05

A Study on Joint Fabrication of Dissimilar Copper and Aluminum Alloys by Electrically Assisted Pressure Joining [Tu-Anh T. Bui](#)¹, Thanh-Thuong Do¹, Ji-Won Kang¹, Sung Tae Hong¹, Heung Nam Han² and Siwhan Lee²; ¹University of Ulsan, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

4:30 PM SF06.17.06

Effect of Microstructure Features of Rapidly Solidified Ribbon-Consolidated Mg-Zn-RE Alloys on Mechanical and Corrosion Performance [Daria Drozdenko](#)¹, Michiaki Yamasaki², Kristian Mathis¹, Patrik Dobron¹, Pavel Lukac¹, Shin-ichi Inoue² and Yoshihito Kawamura²; ¹Charles University, Czechia; ²Kumamoto University, Japan

4:45 PM SF06.18.04

Bone-Inspired Composites—A Path Towards Multifunctionality [Flavia Libonati](#); University of Genoa, Italy

SESSION SF06.18: Nanocomposites and Multilayers

Session Chairs: Ryan Ott and Jian Wang

Friday Morning, May 13, 2022

Hawai'i Convention Center, Level 3, 313A

10:30 AM *SF06.18.01

Amorphous Ceramic and Metallic Composites for the Applications in Extreme Environments [Jian Wang](#) and Bingqiang Wei; University of Nebraska--Lincoln, United States

11:00 AM SF06.18.02

Probing Structure-Property Relationships in Cu-Ni and Cu-Zn alloys in Nanofoam Form with Nanoindentation [Alexandra Loaiza Lopera](#) and David F. Bahr; Purdue University, United States

11:15 AM SF06.18.03

Surface Modification of Carbon Fiber Towards Enhanced Interfacial Adhesion in Epoxy Composites [Zoriana Demchuk](#)¹, [Jiadeng Zhu](#)¹, [Yijie Jiang](#)², [Rigoberto C. Advincula](#)³ and [Pengfei Cao](#)¹; ¹Oak Ridge National Lab, United States; ²University of North Texas, United States; ³Oak Ridge National Laboratory, United States

SESSION SF06.19: General Session I
Session Chairs: Dong-Woo Suh and Ohmura Takahito
Monday Morning, May 23, 2022
SF06-Virtual

8:00 AM *SF06.19.01

Heterogeneity Based Microstructure Control in Advanced High Strength Steels [Ji Hoon Kim](#)¹, [Guiyoung Gu](#)¹, [Seok Hwan Hong](#)¹, [Minseo Koo](#)², [Eun-Young Kim](#)² and [Dong-Woo Suh](#)¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²POSCO, Korea (the Republic of)

8:30 AM SF06.19.03

Combinatorial Mechanical Investigation of Thin-Film Alloys Through High-Throughput Membrane Deflection Experiment [Donghyun Park](#) and Dongwoo Lee; Sungkyunkwan University, Korea (the Republic of)

8:45 AM SF06.19.04

Pure Copper 3D Architectures Fabricated Using Laser Powder Bed Fusion [Sung-gyu Kang](#)¹, [Sören Bieler](#)², [Daniel Heußen](#)³, [Ramil Gainov](#)⁴, [Zhongji Sun](#)¹, [Kerstin Weinberg](#)², [Gerhard Dehm](#)¹ and [Rajaprakash Ramachandramoorthy](#)¹; ¹Max-Planck-Institut für Eisenforschung, Germany; ²University of Siegen, Germany; ³ILT Fraunhofer, Germany; ⁴RWTH Aachen University, Germany

9:00 AM SF06.19.05

Optimization for Strength and Conductivity of Cu-Ni-Si Alloy with Discontinuous Precipitation [Jee Hyuk Ahn](#)^{1,2}, [Seung Zeon Han](#)¹, [Eun-Ae Choi](#)¹ and [Heung Nam Han](#)²; ¹Korea Institute of Materials and Science, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:15 AM SF06.19.06

Development of Microstructural Control for Laser-PBF Ti-6Al-4V [Sayaka Maruta](#); Mitsubishi Heavy Industries, LTD, Japan

9:30 AM SF06.19.07

Property Degradation of Helium Ion Irradiated Tungsten Thin-Film Alloys [Haechan Jo](#), [Sanghun Park](#), [Daegun You](#) and [Dongwoo Lee](#); Sungkyunkwan University, Korea (the Republic of)

9:45 AM SF06.19.08

Mechanical Characteristics of High Pressure Sintered ZrB₂-TiB₂ and ZrB₂-SiC Composite Materials [Tetiana Prikhna](#)¹, [Anastasiya Lokatkina](#)¹, [Richard Haber](#)², [Pavlo Barvitskyi](#)¹, [Viktor Moshchil](#)¹, [Myroslav Karpets](#)¹ and [Alexander Borimskyi](#)¹; ¹V. Bakul Institute for Superhard Materials of the National Academy of Sciences of Ukraine, Ukraine; ²Rutgers, The State University of New Jersey, United States

9:50 AM SF06.13.13

Advanced Physical Properties of Natural Vermiculite Clay [Barbara Pacakova](#) and [Jon O. Fossum](#); Norwegian University of Science and Technology, Norway

9:55 AM SF06.15.04

Comprehensive Studies into Microstructural Modifications and Corresponding Electrochemical Behaviors of Metal Alloys from Solid-State Joining and Processing Methods [Hoon-Hwe Cho](#)¹, [Sam Y. Anaman](#)¹, [Solomon Ansah](#)¹, [Sung Tae Hong](#)², [Jong-Sook Lee](#)³ and [Heung Nam Han](#)⁴; ¹Hanbat National University, Korea (the Republic of); ²University of Ulsan, Korea (the Republic of); ³Chonnam National University, Korea (the Republic of); ⁴Seoul National University, Korea (the Republic of)

SESSION SF06.20: General Session II
Session Chairs: Ihor Radchenko and Masato Wakeda
Tuesday Morning, May 24, 2022
SF06-Virtual

8:00 AM *SF06.20.01

Atomistic Evaluation of Strengthening Factors in Iron Alloys Based on Computational Interaction Analysis of Lattice Defects [Masato Wakeda](#); National Institute for Materials Science, Japan

8:30 AM SF06.20.02

Workflow Consisting of DNN-Based Segmentation Method and Persistent Homology Analysis for Feature Extraction from Microstructural Images [Takayuki Kanda](#), [Kumi Motai](#), [Tomonori Kimura](#), [Masafumi Nougima](#) and [Sayaka Tanimoto](#); Hitachi Ltd., Japan

8:45 AM SF06.20.03

Size Dependent Strengthening of Highly Textured Cu-BN Multilayers [Nai q. Chen](#)¹, Mingyu Gong¹, Engang Fu², Tongxiang Fan¹ and Yue Liu¹; ¹Shanghai Jiao Tong University, China; ²Peking University, China

9:00 AM SF06.20.04

Multiscale Investigation of Shear Relaxation in Shock Loading—A Top-Down Perspective [Jingnan Liu](#), Guisen Liu and Yao Shen; Shanghai Jiao Tong University, China

9:15 AM SF06.20.05

Development of Coupled Crystal Plasticity Finite Element-Phase Field (CPFE-PF) Model for Studying Microstructure Evolution and Designing High Performance Hexagonal Metals and Alloys [Hanxuan Mo](#)¹, Guisen Liu¹, Jian Wang² and Yao Shen¹; ¹The State Key Lab of Metal Matrix Composites, School of Materials Science and Engineering, Shanghai Jiao Tong University, China; ²Department of Mechanical and Materials Engineering, University of Nebraska-Lincoln, United States

9:30 AM SF06.20.06

Interface Rotation in Cu/Nb Accumulative Roll Bonded (ARB) Nanolaminates [Ihor Radchenko](#)^{1,2}, Wenxin Zhu¹, Liu Qing³, Rahul Sahay², Pooi See Lee³, Nagarajan Raghavan², Olivier Thomas⁴, Arief Budiman² and Kai Chen¹; ¹Xi'an Jiaotong University, China; ²Singapore University of Technology and Design, Singapore; ³Nanyang Technological University, Singapore; ⁴Centre National de la Recherche Scientifique, France

9:45 AM SF06.20.07

Machine Learning Guided Exploration of High Strength Thin-Film Alloys [Taeyeop Kim](#), Haechan Jo, Kangsan Kim and Dongwoo Lee; Sungkyunkwan University, Korea (the Republic of)

SESSION SF06.21: General Session III
Session Chairs: Kyung-suk Kim and Gi-Dong Sim
Tuesday Morning, May 24, 2022
SF06-Virtual

10:30 AM *SF06.21.01

Roles of Hard Nanophases in Dynamic Toughening of Self-Healing Structural Nanocomposites [Kyung-suk Kim](#), Hanxun Jin and Catherine Machnicki; Brown University, United States

11:00 AM SF06.21.02

Studies on the Effect of Crystallographic Orientation on Scratch Characteristics of Single Crystal Nickel [Vamsi K. Majeti](#), Jayant Jain and Devendra K. Dubey; Indian Institute of Technology Delhi, India

11:15 AM SF06.21.03

Multifunctional Nanostructured Thin-Film Polyimide Aerogels with Ultra High Thermal Insulation Properties [Omid Aghababaei Tafreshi](#), Shahriar Ghaffari Mosanenzadeh, Zia Saadatnia, Chul Park and Hani Naguib; University of Toronto, Canada

11:30 AM *SF06.07.01

Nanoindentation Constant Contact Pressure Creep Experiments—A New Approach for Studying Thermally Activated Dislocation Mechanism [Karsten Durst](#); Technische Universitaet Darmstadt, Germany

##PAGE_BREAK##

SYMPOSIUM SF07

In Situ Material Performance and Dynamic Structure Characterization Under Coupled Extremes
May 9 - May 25, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SF07.01: Metals—In Situ Microscopy
Session Chairs: Cody Dennett and Khalid Hattar

Monday Morning, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

10:30 AM SF07.01.01

Utilizing *In Situ* TEM to Decipher the Nanomechanical Properties of Helium Implanted Metals [Eric Lang](#)¹, Nathan Madden¹, Caitlin Taylor², Patrick Price¹, Khalid Hattar¹ and Raj Tandon¹; ¹Sandia National Laboratories, United States; ²Los Alamos National Laboratory, United States

10:45 AM SF07.01.02

Advanced Characterization of Irradiation Induced Defects in Tungsten Using STEM Optical Sectioning [Eric Prestat](#)^{1,2,3}, Joven Lim³, Geri Topore², Daniel R. Mason³, Aslak Fellman⁴, Andrea Sand^{4,5}, Graeme Greaves⁶, Stephen E. Donnelly⁶, Grace Burke^{2,7} and Quentin Ramasse^{1,8}; ¹SuperSTEM Laboratory, United Kingdom; ²The University of Manchester, United Kingdom; ³UK Atomic Energy Authority, United Kingdom; ⁴University of Helsinki, Finland; ⁵Aalto University, Finland; ⁶University of Huddersfield, United Kingdom; ⁷Oak Ridge National Laboratory, United States; ⁸University of Leeds, United Kingdom

11:00 AM *SF07.01.03

Nuclear Materials and Ion Irradiation Studies Using the JANNUS-Orsay *In Situ* Dual Ion Beam Transmission Electron Microscope [Aurelie Gentils](#); Universite Paris-Saclay, CNRS/IN2P3, IJCLab, France

SESSION SF07.02: Ceramics—In Situ Microscopy
Session Chairs: Cody Dennett and Khalid Hattar
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

1:30 PM *SF07.02.01

Characterizing Interfacial Properties Using Ultrahigh Temperature *In Situ* TEM Based Mechanical Loading and Coupled Ion Irradiation [Shen J. Dillon](#)^{1,2}; ¹University of California, Irvine, United States; ²University of Illinois at Urbana Champaign, United States

2:00 PM SF07.02.02

Light Induced Structural Alterations in Ni/NiO Core-Shell Co-Catalysts on Rh-Doped SrTiO₃ for Solar Hydrogen Evolution [Piyush Haluai](#) and Peter A. Crozier; Arizona State University, United States

2:15 PM SF07.02.03

Highly Stable Nanolamellar MXene-Derived Carbides by Phase Transformation of Ti₃C₂T_x and Mo₂TiC₂T_x; MXenes for Extreme Environments [Brian Wyatt](#), Wyatt Highland, Kartik Nemani, Bowen Zhang and Babak Anasori; Indiana University - Purdue University of Indianapolis, United States

2:30 PM *SF07.02.04

The Role of Interfaces in Ceramics Exposed to Extreme Environments [Izabela Szlufarska](#), Jianqi Xi, Hongliang Zhang and Jun Kim; University of Wisconsin, United States

3:00 PM BREAK

SESSION SF07.03: Fusion Materials—Simulation and Computation
Session Chairs: Khalid Hattar and Samuel Murphy
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

3:30 PM *SF07.03.01

Multiscale Simulations of Irradiation Defects—From the Electronic Scale to Continuum [Pui Wai Ma](#), Daniel R. Mason and Sergei L. Dudarev; United Kingdom Atomic Energy Authority, United Kingdom

4:00 PM SF07.03.02

Molecular Dynamics Simulations of Radiation Damage in YBa₂Cu₃O₇ Michael Rushton¹, Rebecca Gray² and [Samuel Murphy](#)²; ¹Bangor University, United Kingdom; ²Lancaster University, United Kingdom

4:15 PM SF07.03.03

Predicting Spall Strength of Metals and Alloys Using Data Analytics and Machine Learning Techniques [Keara Frawley](#), Harikrishna Sahu, Naresh Thadhani and Rampi Ramprasad; Georgia Institute of Technology, United States

SESSION SF07.04: Fusion Materials—Plasma and Radiation Exposure
Session Chairs: Cody Dennett and Flyura Djurabekova
Tuesday Morning, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

8:45 AM SF07.04.01

Ultrafast Time-Resolved Measurement of Phonon Dynamics in Radiation-Damaged Tungsten [Mianzhen Mo](#)¹, Zhijiang Chen¹, Artur Tamm², Yongqiang Wang³, Mungo Frost¹, Nicholas Hartley¹, Ryan J. Hunt⁴, Fuhao Ji¹, Samuel Murphy⁴, Silvia Pandolfi¹, Peihao Sun¹, Xiaozhe Shen¹, Correa

Alfredo² and Siegfried Glenzer¹; ¹SLAC National Accelerator Lab, United States; ²Lawrence Livermore National Laboratory, United States; ³Los Alamos National Laboratory, United States; ⁴Lancaster University, United Kingdom

9:00 AM *SF07.04.02

Burning Plasma Relevant Fusion Materials Research Using the PISCES Linear Plasma Devices Matt J. Baldwin, Fengjen Chang, Russ P. Doerner, Daisuke Nishijima, Marlene Patino, Michael Simmonds, Brandon Schwendeman, Anze Zaloznik and George Tynan; University of California at San Diego, United States

9:30 AM *SF07.04.03

Advanced Material and Component Behavior Under Fusion Loading Conditions Christian Linsmeier¹, Jan W. Coenen¹, Marius Wirtz¹, Johann Riesch², Henri Greuner², Andrey Litnovsky¹, Janina Ertmer¹, Martin Bram¹, Yiran Mao¹, Daniel Schwalenberg¹, Thorsten Loewenhoff¹, Gerald Pintsuk¹, Arkadi Kreter¹, Marcin Rasinski¹, Xiaoyue Tan¹, Bernhard Unterberg¹ and Rudolf Neu²; ¹Forschungszentrum Julich GmbH, Germany; ²Max-Planck-Institut für Plasmaphysik, Germany

10:00 AM BREAK

SESSION SF07.05: Ceramics—Thermophysical Properties
Session Chairs: Cody Dennett and Flyura Djurabekova
Tuesday Morning, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

10:30 AM *SF07.05.01

Piezomagnetism in Uranium Dioxide Krzysztof Gofryk; Idaho National Laboratory, United States

11:00 AM SF07.05.02

Luminescence Mechanisms of Amorphous Silica Under Low-Temperature Ion-Beam Irradiation—Role of High Electronic Excitation Density and Collisional Processes on Complex Interplay Between Emitting Centers Miguel L. Crespillo^{1,2}, Joseph Graham³, Fernando Agulló-López¹, Yanwen Zhang⁴ and William J. Weber²; ¹University Autonomous of Madrid, Spain; ²The University of Tennessee, Knoxville, United States; ³Missouri University of Science and Technology, United States; ⁴Oak Ridge National Laboratory, United States

11:15 AM SF07.05.03

Modeling of Chloride Effect on Localized Corrosion Initiation at Grain Boundary Sites of Passive Oxide Surfaces Aditya Sundar, Ganlin Chen and Liang Qi; Univ of Michigan, United States

11:30 AM SF07.05.04

Operando Analysis of a Solid Oxide Fuel Cell in Environmental Transmission Electron Microscopy Quentin Jeangros¹, Matthieu Bugnet², Thierry Epicier³, Cédric Frantz¹, Stefan Diethelm¹, Dario Montinaro⁴, Elizaveta Tyukalova⁵, Yevheniy Pivak⁶, Jan Van herle¹, Aicha Hessler-Wyser¹ and Martial Duchamp^{3,7}; ¹EPFL, Switzerland; ²Université de Lyon, INSA de Lyon, UCBL, France; ³Université de Lyon, UCBL, France; ⁴SOLIDpower SA, Switzerland; ⁵Nanyang Technological University, Singapore; ⁶DENSsolutions, Netherlands; ⁷Univ. Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University, Singapore

SESSION SF07.06: Method Advances for In Situ Microscopy
Session Chairs: Cody Dennett and Khalid Hattar
Tuesday Afternoon, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

1:45 PM *SF07.06.01

In Situ TEM Investigation of Irradiation-Induced Defect Formation and Evolution in Fe/Fe-Oxide Heterostructures—Evidence of Surprisingly High Mobility of Defects in the Fe Oxide Scale Djamel Kaoumi, Angelica Lopez Morales, Jacob Cooper and Martin Owusu-Mensah; North Carolina State University, United States

2:15 PM SF07.06.02

STEM-Based Techniques to Characterize Nano-Scale Defects Under Coupled Irradiation and Temperature Sean Mills^{1,2}, Alex Lin², Peter Ercius² and Andrew M. Minor^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

2:30 PM *SF07.06.03

What is the Physical Limit of Coupled In Situ Microscopy Experiments? Khalid Hattar; Sandia National Laboratories, United States

3:00 PM BREAK

SESSION SF07.07: Corrosion, Diffraction and Scattering
Session Chairs: Cody Dennett and Khalid Hattar
Tuesday Afternoon, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

3:30 PM *SF07.07.03

Beam-On Coupled Effects in Nuclear Materials—Irradiation-Slowed Corrosion, In Situ Void Swelling Detection, and Plasma-Facing Component

Monitoring Michael P. Short¹, Weiye Zhou¹, Benjamin R. Dacus¹, Kevin B. Woller¹, Nouf M. AlMousa^{2,1}, Adria Peterkin¹, Wande Cairang¹, Owais Waseem¹, Sara Zangi¹, Sara E. Ferry¹, Yang Yang³, Andrew M. Minor⁴, Khalid Hattar⁵, Cody A. Dennett⁶, Guiqiu (Tony) Zheng¹, Peter W. Stahle¹, Mark T. Lapington⁷, Felix Hofmann⁷, Minyi Zhang⁷ and Djamel Kaoumi⁸; ¹Massachusetts Institute of Technology, United States; ²Princess Nourah Bint Abdul Rahman University, Saudi Arabia; ³The Pennsylvania State University, United States; ⁴Lawrence Berkeley National Laboratory, United States; ⁵Sandia National Laboratories, United States; ⁶Idaho National Laboratory, United States; ⁷University of Oxford, United Kingdom; ⁸North Carolina State University, United States

4:00 PM SF07.07.05

Insights into Hydrogen Storage in Porous Materials from Neutron Scattering Under Extreme Conditions Valeska Ting^{1,2}, Lui Terry^{1,2}, Mi Tian³, Nuno Bimbo⁴ and Tim Mays⁵; ¹University of Bristol, United Kingdom; ²Bristol Composites Institute, United Kingdom; ³University of Exeter, United Kingdom; ⁴University of Southampton, United Kingdom; ⁵University of Bath, United Kingdom

SESSION SF07.08: Poster Session: In Situ Coupled Extremes

Session Chairs: Cody Dennett and Samuel Murphy

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF07.08.01

Development of Fast Scanning Calorimetry Methods to Characterize Ion-Irradiation Effects on Thermal Properties Rachel Connick¹, Charles Hirst¹, Avery Nguyen¹, Nouf M. AlMousa^{1,2}, R. Scott Kemp¹ and Michael P. Short¹; ¹Massachusetts Institute of Technology, United States; ²Princess Nourah bint Abdulrahman University, Saudi Arabia

SF07.08.02

Mechanical Deformation-Induced Precipitation and Increase in Strength of Al7075 Alloy Abhinav Parakh¹, Andrew Lee¹, Stella Chariton², Melody Wang¹, Mehrdad Kiani¹, Vitali Prakapenka² and Wendy Gu¹; ¹Stanford University, United States; ²Argonne National Laboratory, United States

SF07.08.03

Effect of the Incommensurate Bi-III Phase on the Bi-Sb System Under Extreme Condition Moran Emuna^{1,2}, Shir Ben-Shalom¹, Yaron Greenberg², Eyal Yahel², Aviva Melchior² and Guy Makov¹; ¹Ben-Gurion University of the Negev, Israel; ²NRCN, Israel

SESSION SF07.09: High Strain Rates and Positrons

Session Chairs: Cody Dennett and Samuel Murphy

Wednesday Morning, May 11, 2022

Hilton, Kalia Conference Center, 2nd Floor, Kahili 2

8:30 AM *SF07.09.01

In Situ Positron Beam for Material Characterization Under Coupled Extremes Farida Selim¹, Adric Jones¹, Hyosim Kim², Peter Hosemann³, Blas P. Uberuaga² and Yongqiang Wang²; ¹Bowling Green State Univ, United States; ²Los Alamos National Laboratory, United States; ³University of California, Berkeley, United States

9:00 AM SF07.09.02

Atomistic Simulations of Growth Mechanisms of Hydrogen Blisters in Copper Alvaro Lopez Cazalilla and Flyura Djurabekova; University of Helsinki, Finland

9:15 AM SF07.09.03

In Situ X-Ray Phase Contrast Imaging of an Additively Manufactured High-Solids Loaded Polymer Composite Under Shock-Compression Karla Wagner, Gregory Kennedy, Min Zhou and Naresh Thadhani; Georgia Institute of Technology, United States

9:30 AM SF07.09.04

Laser-Driven High-Velocity Microparticle Impacts on Polymeric Materials Steven E. Kooi; Massachusetts Institute of Technology, United States

9:45 AM SF07.09.05

Spectroscopic Characterizations of Polymers Under Ultrahigh Strain Rate Loading Nha Uyen Huynh, Sasha Gardner, Andrew Cooksy and George Youssef; San Diego State University, United States

SESSION SF07.10: In Situ Coupled Extremes Virtual Presentations

Session Chairs: Cody Dennett and Yuanyuan Zhu

Wednesday Morning, May 25, 2022

SF07-Virtual

10:30 AM *SF07.10.01

Understanding Radiation Damage of High Temperature Superconductors Under Relevant Operating Conditions for Fusion Magnets Susannah C. Speller¹, William Iliffe¹, Rebecca Nicholls¹, Yatir Linden¹, Sofia Diaz-Moreno² and Chris Grovenor¹; ¹Univ of Oxford, United Kingdom; ²Diamond Light Source, United Kingdom

11:00 AM *SF07.10.02

Size Affected Toughening and Strain Rate Sensitivity of Silicon [Daniel Kiener](#)¹, Inas Issa¹, Stefan Kolitsch², Anton Hohenwarter¹, Peter J. Imrich³, Reinhard Pippan² and Christoph Gammer²; ¹Montanuniversität Leoben, Austria; ²Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; ³Infinitec Technologies AG, Austria

11:30 AM SF07.10.03

Temperature and Irradiation Behavior of Piezoelectric Materials for Nuclear Reactor Sensors [Ryan Chesser](#) and Marat Khafizov; The Ohio State University, United States

11:45 AM SF07.10.04

In Situ Thermal Oxidation Process of Tungsten Under Fusion Relevant Accidental Conditions Maanas Togaru¹, Rajat Sainju¹, Lichun Zhang¹, Weilin Jiang² and [Yuanzhan Zhu](#)^{1,2}; ¹University of Connecticut, United States; ²Pacific Northwest National Laboratory, United States

##PAGE_BREAK##

SYMPOSIUM SF08

Far from Equilibrium Microstructure Evolution in Metals
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF08.01: Rapid Deformation I
Session Chairs: Saryu Fensin and Mitra Taheri
Monday Morning, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

10:30 AM *SF08.01.01

New Regimes of High Energy Density Materials Science* [Bruce Remington](#); Lawrence Livermore Nat Lab, United States

11:00 AM SF08.01.02

Modeling the Shock-Induced Phase Transformation Behavior in Fe Microstructures at the Atomic Scales and Mesoscales [Ke Ma](#), Avinish Mishra and Avinash M. Dongare; University of Connecticut, United States

11:15 AM SF08.01.03

High Strain-Rate Nanoindentation Testing of Single-Crystal FCC and BCC Metals [Benjamin Hackett](#)¹, Christopher Walker¹, Wesley Higgins¹, Yuwei Zhang¹, P. S. Phani², Warren Oliver³ and George M. Pharr¹; ¹Texas A&M University, United States; ²International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), India; ³KLA Corporation, United States

11:30 AM SF08.01.04

Dynamic Transmission Electron Microscopy for Non-Equilibrium Microstructure Evolution Joseph McKeown¹, John Roehling¹, [Thomas Voisin](#)¹, Michael Grapes¹, Amy Clarke², Timothy Weihs³, Tatu Pinomaa⁴, Anssi Laukkanen⁴, Nikolas Provatas⁵ and Jorg M. Wiezorek⁶; ¹Lawrence Livermore National Laboratory, United States; ²Colorado School of Mines, United States; ³Johns Hopkins University, United States; ⁴VTT Technical Research Centre of Finland, Finland; ⁵McGill University, Canada; ⁶University of Pittsburgh, United States

11:45 AM SF08.01.05

Virtual Texture Analysis Approach to Characterize Atomistic Microstructures Under High-Rate Deformation Avinish Mishra, Marco J. Echeverria, Ke Ma, Shayani Parida, Ching Chen, Sergey Galitskiy and [Avinash M. Dongare](#); University of Connecticut, United States

SESSION SF08.02: Rapid Solidification I
Session Chairs: Allison Beese and Remi Dingreville
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

1:30 PM SF08.02.01

Microstructure of Additively Manufactured Al Alloys Effects the as-Built Mechanical Properties [Richard Woods](#)¹, Neil Harrison², Peter Fox¹ and

Maulik Patel¹; ¹University of Liverpool, United Kingdom; ²Carpenter Additive, United Kingdom

1:45 PM *SF08.02.02

Metallic Alloy Microstructure Development Under Additive Manufacturing Conditions Amy Clarke; Colorado School of Mines, United States

2:15 PM *SF08.02.04

Controlling the Thermal Stability of Additively Manufactured Alloys—A New Materials Design Paradigm Matteo Seita, Shubo Gao, Carmelo Todaro and Xiaogang Wang; Nanyang Technological University, Singapore

2:45 PM BREAK

SESSION SF08.03: Radiation I

Session Chairs: Benjamin Hackett and Maylise Nastar

Monday Afternoon, May 9, 2022

Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

3:30 PM SF08.03.01

Defect Buildup and Microstructural Evolution in High-Entropy Alloys Under High Fluence Irradiation Flyura Djurabekova, Fredric Granberg, Emil Levo, Filip Tuomisto and Kai H. Nordlund; University of Helsinki, Finland

3:45 PM *SF08.03.02

Generalized Self-Organization of Alloy Microstructure Induced by Irradiation Pascal M. Bellon, Robert Averback, Gabriel F. Bouobda Moladje, Qun Li and Sourav Das; Univ of Illinois-Urbana-Champ, United States

4:15 PM SF08.03.03

In Situ Thermoelastic Property Evolution of Ni-Based Concentrated Solid Solution Alloys Under Extremes Cody A. Dennett; Idaho National Laboratory, United States

SESSION SF08.04: Severe Plasticity I

Session Chairs: Zachary Cordero and Thomas Niendorf

Tuesday Morning, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

8:30 AM *SF08.04.01

Extreme Stress Gradients in Cyclically Loaded Polycrystalline Alloys Sven Gustafson¹, Wolfgang Ludwig² and Michael Sangid¹; ¹Purdue University, United States; ²European Synchrotron Radiation Facility, France

9:00 AM *SF08.04.02

Local Deformation Mapping of Microstructures Jan Schroers and Arindam Raj; Yale University, United States

9:30 AM SF08.04.03

Characterization of Dislocations Evolution in Microscale Compression and Torsion of Cu Bin Zhang¹, Andrew C. Meng² and Wen Jin Meng¹; ¹Louisiana State University, United States; ²University of Pennsylvania, United States

9:45 AM SF08.04.04

Transformation-Mediated Twin Nucleation in Hexagonal Close-Packed Metals Lei Cao, Amir Zahiri and Jamie Ombogo; University of Nevada, Reno, United States

10:00 AM BREAK

SESSION SF08.05: Nanostructure Evolution

Session Chairs: Eric Detsi and Michael Sangid

Tuesday Morning, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

10:30 AM SF08.05.01

The Effect of Grain Boundaries on the Evolution of Microstructure in Metal Nanocomposites Emmeline Sheu¹, Zirui Mao¹, YiFan Zhang², Jon K. Baldwin² and Michael J. Demkowicz¹; ¹Texas A&M University, United States; ²Los Alamos National Laboratory, United States

10:45 AM SF08.05.02

Unraveling Contributions to Thermal Stability in Nanocrystalline Alloys Using Nanometallic Multilayers William S. Cunningham¹, Sean Mascarenhas¹, Sebastian Riano², Sooyeon Hwang³, Andrea M. Hodge^{2,2}, Khalid Hattar⁴ and Jason R. Trelewicz^{1,5}; ¹Stony Brook University, United States; ²University of Southern California, United States; ³Brookhaven National Laboratory, United States; ⁴Sandia National Laboratories, United States; ⁵Stony Brook University, The State University of New York, United States

11:00 AM *SF08.05.03

Hierarchical Morphologies in Vapor and Laser Deposited Immiscible Alloys Amit Misra¹ and Ben Derby²; ¹University of Michigan–Ann Arbor,

United States; ²Los Alamos National Laboratory, United States

11:30 AM SF08.05.04

Implications of Ternary Solute Additions to the Granular Stability and Mechanical Behavior of Nanocrystalline Alloys Thomas Koenig¹, Ilias Bikhmetov¹, Gregory B. Thompson¹ and Garritt Tucker²; ¹University of Alabama, United States; ²Colorado School of Mines, United States

SESSION SF08.06: Rapid Deformation II
Session Chairs: Jaafar El-Awady and Janelle Wharry
Tuesday Afternoon, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

1:30 PM *SF08.06.01

Understanding Evolution of Metal Microstructures during Dynamic Deformation at Atomic Scales Avinash M. Dongare, Avinish Mishra, Marco J. Echeverria and Ke Ma; University of Connecticut, United States

2:00 PM SF08.06.02

High Strain Rate Nanoindentation Testing of Mg-Zn Alloys Using Piezoelectric Load Cell Measurements Christopher Walker¹, Benjamin L. Hackett¹, Suhas Eswarappa Prameela^{2,2}, Timothy Weihs^{2,2} and George M. Pharr¹; ¹Texas A&M University, United States; ²Johns Hopkins University, United States

2:15 PM SF08.06.03

The Effect of Internal Damage Accumulation on the Stress-Strain Response of a Metallic Glass Amlan Das¹, Catherine Ott¹ and Robert Maass^{2,1}; ¹University of Illinois at Urbana-Champaign, United States; ²Federal Institute of Materials Research and Testing (BAM), Germany

SESSION SF08.07: Rapid Solidification II
Session Chairs: Amy Clarke and Christian Leinenbach
Tuesday Afternoon, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

3:30 PM *SF08.07.01

On the Impact of Rapid Solidification and Intrinsic Heat Treatment in Additive Manufacturing—From Microstructure to Properties Thomas Niendorf; University of Kassel, Germany

4:00 PM SF08.07.02

Microstructural and Texture Evolution of Titanium Alloys During Additive Manufacturing Alec Saville¹, Jake Benzing², Sven Vogel³, Adam Creuziger² and Amy Clarke¹; ¹Colorado School of Mines, United States; ²National Institute of Standards and Technology, United States; ³Los Alamos National Laboratory, United States

4:15 PM SF08.07.03

Laser Powder Bed Fusion of Novel 2xxx Series Al-Cu Alloys—Manufacturability, Microstructure and Mechanical Properties Marvin Schuster^{1,2}, Anthony De Luca¹, Aditi Mathur¹, Dagmara Kucajda¹, Ehsan Hosseini¹ and Christian Leinenbach¹; ¹Empa, Switzerland; ²École Polytechnique Fédérale de Lausanne, Switzerland

SESSION SF08.08: Poster Session: Far from Equilibrium Microstructure Evolution
Session Chair: Manyalibo Matthews
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF08.08.01

Strategizing with Unique Hot Isostatic Pressing Treatments to Increase Productivity During Post-Processing and Take Advantage of Microstructural Heterogeneities in Laser-Melted Inconel 718 Parts Jake Benzing¹, Orion Kafka¹, Nik Hrabe¹, Don Godfrey², Philipp Schumacher³, Chad Beamer⁴ and Frank DelRio⁵; ¹National Institute of Standards and Technology, United States; ²SLM Solutions, United States; ³SLM Solutions GmbH, Germany; ⁴Quintus Technologies, United States; ⁵Sandia National Laboratories, United States

SF08.08.02

Solute Composition and Cryogenic Temperature Effects on the Stability of Nano-Twins Under Load Jarod Robinson¹, Akarsh Verma², Eric R. Homer² and Gregory B. Thompson¹; ¹The University of Alabama, United States; ²Brigham Young University, United States

SF08.08.03

Effect of Strain Rate on Texture Formation Behavior in High Temperature Deformation of AZ80 Magnesium Yebeen Ji, Jeong Hoon Lee and KwonHoo Kim; Pukyong National University, Korea (the Republic of)

SF08.08.06

Effect of Al₂Ca Precipitation on Plane Strain Deformation Behaviors of AZ61 Magnesium Alloy Kibeom Kim, Seongmook Cho and KwonHoo Kim; Pukyong National University, Korea (the Republic of)

SESSION SF08.09: Radiation II
Session Chairs: Pascal Bellon and Ben Derby
Wednesday Morning, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

8:30 AM *SF08.09.01

Insight on High-Dose Radiation Damage Buildup by Multistage Molecular Dynamics Simulations Kai H. Nordlund, Fredric Granberg and Flyura Djurabekova; University of Helsinki, Finland

9:00 AM SF08.09.02

Effect of Radiation-Induced Point Defects on Phase Transformations in FeNi Alloys Quentin Tencé¹, Estelle Meslin¹, Maylise Nastar¹, Brigitte Décamps², Isabelle Mouton¹ and Marie Loyer-Prost¹; ¹CEA Saclay, France; ²IJC/lab, France

9:15 AM SF08.09.03

He Implantation Responses in Cu-W Nanocomposites Digvijay Yadav¹, Peng Chen¹, Yongqiang Wang², Jon K. Baldwin², Michael J. Demkowicz¹ and Kelvin Y. Xie¹; ¹Texas A&M University, United States; ²Los Alamos National Laboratory, United States

9:30 AM *SF08.09.04

Deformation Twinning and Transformations in Concentrated Solid-Solution fcc Fe- and Ni-Based Alloys Under Irradiation Janelle P. Wharry, Chao Yang and Caleb D. Clement; Purdue University, United States

10:00 AM BREAK

SESSION SF08.10: Severe Plasticity II
Session Chairs: Avinash Dongare and Arindam Raj
Wednesday Morning, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

10:45 AM *SF08.10.01

Oxidizer Compatible Materials for Reusable Staged Combustion Rocket Engines Zachary C. Cordero; MIT, United States

11:15 AM SF08.10.02

High Load Sliding, Deformation Microstructures, Strength and Hardening for Gradient Bulk Nanostructures Darcy Hughes; Sandia National Laboratories (ret), United States

11:30 AM SF08.10.03

Investigating the Strain Rate Dependence of Hardness of Cu/Mo Nanolaminate Films Using Conventional and High Strain Rate Nanoindentation Methods Wesley Higgins, Christopher Walker, Benjamin L. Hackett and George M. Pharr; Texas A&M University, United States

11:45 AM SF08.15.02

Rocks and Metal—Parallel Solid Phase Plasticity Mechanisms and Non-Equilibrium Microstructures During Intense Shear Deformation Suveen N. Mathaudhu^{1,2} and Arun Devaraj²; ¹Colorado School of Mines, United States; ²Pacific Northwest National Laboratory, United States

SESSION SF08.11: Surface and Interface Behaviors
Session Chairs: Matteo Seita and Kelvin Xie
Wednesday Afternoon, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

3:30 PM SF08.11.01

Non-Arrhenius Grain Boundary Migration Explained by Classical Thermally Activated Mechanisms Akarsh Verma¹, Darcey Britton¹, Oliver K. Johnson¹, Gregory B. Thompson² and Eric R. Homer¹; ¹Brigham Young Univ, United States; ²The University of Alabama, United States

3:45 PM SF08.11.02

Molecular Phase Field—A Physics-Based Model of Interfaces David W. Jacobson¹, Reza D. Kamachal² and Gregory B. Thompson¹; ¹University of Alabama, United States; ²Bundesanstalt für Materialforschung und -prüfung, Germany

4:00 PM SF08.11.04

Structural Instability in High Surface-to-Volume Ratio Nanoporous Metals Studied Using Small- and Wide-Angle X-Ray Scattering Techniques Alexander Ng¹, Samuel Welborn^{1,2} and Eric Detsi¹; ¹University of Pennsylvania, United States; ²SLAC National Accelerator Laboratory, United States

4:15 PM *SF08.11.05

The role of Grain-Boundary Migration on Irradiation-Fatigue Brad L. Boyce¹, Samuel Briggs², Nathan Heckman¹, Christopher Barr¹, Elton Chen¹, Doug Medlin¹, Remi Dingreville¹ and Khalid Hattar¹; ¹Sandia National Laboratories, United States; ²Oregon State University, United States

SESSION SF08.12: Phase Transformations
Session Chair: Suveen Mathaudhu

Thursday Morning, May 12, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

8:30 AM *SF08.12.01

Using Solid-Liquid Phase Transformation in Fusible Metals as a Self-Healing Mechanism for Next Generation Metal-Ion Battery Anodes Lin Wang and Eric Detsi; Univ of Pennsylvania, United States

9:00 AM SF08.12.02

Understanding the Development and Characteristics of Non-Equilibrium Microstructures in Hydrogel Enabled Additively Manufactured Metals and Alloys Rebecca A. Gallivan, Max Saccone, Thomas T. Tran and Julia R. Greer; California Institute of Technology, United States

9:15 AM SF08.12.03

Thermodynamic Evaluation of Irreversible Amorphization in W-Containing Metallic Glass Composite YoungJun Kwon, Yoon Jung Won, Keun Won Lee, Ho-Seok Nam and Ki Sub Cho; Kookmin University, Korea (the Republic of)

9:30 AM *SF08.12.04

Understanding Phase Transformations During Additive Manufacturing Toward the Design of Functionally Graded Materials Allison M. Beese; The Pennsylvania State University, United States

10:00 AM BREAK

SESSION SF08.13: Radiation III
Session Chairs: Eric Homer and Kai Nordlund
Thursday Morning, May 12, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

11:00 AM *SF08.13.01

Impact of Non-Equilibrium Lattice Point Defects on Semi-Coherent Precipitation and Segregation at Structural Defects Maylise Nastar^{1,2}, Lisa Belkacemi¹, Estelle Meslin^{1,2}, Marie Loyer-Prost^{1,2}, Liangzhao Huang¹, Luca Messina³ and Thomas Schuler^{1,2}; ¹CEA Saclay, France; ²Université Paris-Saclay, France; ³CEA Cadarache, France

11:30 AM SF08.13.02

Full Energy Range Primary Radiation Damage Model Par Olsson and Qigui Yang; KTH Royal Inst of Technology, Sweden

11:45 AM SF08.13.03

Effect of Simulation Technique on the High-Dose Irradiation Response of Nuclear Materials Fredric Granberg¹, Jesper Byggmästar¹, Daniel R. Mason² and Kai H. Nordlund¹; ¹University of Helsinki, Finland; ²UK Atomic Energy Authority, United Kingdom

SESSION SF08.14: Rapid Solidification III
Session Chairs: Wesley Higgins and Christian Leinenbach
Thursday Afternoon, May 12, 2022
Hilton, Kalia Conference Center, 2nd Floor, Lehua Suite

1:30 PM *SF08.14.01

The Interplay of Local Chemistry and Plasticity in Controlling Microstructure Formation During Laser Powder Bed Fusion of Metals Markus Sudmanns¹, Andrew Birnbaum², Yejun Gu¹, Athanasios Iliopoulos², Patrick Callahan², John Michopoulos² and Jaafar A. El-Awady¹; Johns Hopkins University, United States; ²United States Naval Research Laboratory, United States

2:00 PM SF08.14.02

Effect of Rapid-Solidification Structures on the Deformation Behavior and Thermal Stability of an AM 316L Stainless Steel Thomas Voisin¹, Marissa Linne¹, Jean-Baptiste Forien¹, Nicolas Bertin¹, Margaret Wu¹, Tatu Pinomaa², Anssi Laukkanen², Kirubel Teferra³, Sylvie Aubry¹, Manyalibo Matthews¹, Y. Morris Wang⁴ and Nathan Barton¹; ¹Lawrence Livermore National Laboratory, United States; ²VTT Technical Research Center of Finland, Finland; ³US Naval Research Laboratory, United States; ⁴University of California Los Angeles, United States

2:15 PM SF08.14.03

Direct Observation of 3D Atomic Packing in Amorphous Materials Dennis Kim¹, Yakun Yuan¹, Jihan Zhou¹, Dillan Chang¹, Fan Zhu¹, Yasutaka Nagaoka², Minh Pham¹, Stanley Osher¹, Peter Ercius³, Andreas Schmid³ and Jianwei (John) Miao¹; ¹University of California, Los Angeles, United States; ²Brown University, United States; ³Lawrence Berkeley National Laboratory, United States

SESSION SF08.16: Far from Equilibrium Microstructure Evolution I
Session Chair: Michael Demkowicz
Tuesday Morning, May 24, 2022
SF08-Virtual

8:00 AM SF08.16.01

Mechano-Chemical Segregation in a Fe-Based Bulk Metallic Glass at Room Temperature Dmitri V. Louzguine^{1,2}; ¹Advanced Institute for Materials

Research (WPI-AIMR), Tohoku University, Japan; ²AIST, Japan

8:15 AM SF08.16.02

The Effect of Ultrasonic Treatment Conditions on the Melt Quality and Microstructure of AlSiMgCu Alloy Ho Sung Jang^{1,2}, Jong Bae Jeon³, Yoon Suk Choi² and Sunmi Shin¹; ¹Korea Institute of Industrial Technology, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Dong-A University, Korea (the Republic of)

8:20 AM SF08.16.03

Thermomechanical Processing of Magnesium Alloys to Promote Strengthening via Deformation-Induced Clustering and Precipitation Suhas Eswarappa Prameela¹, Peng Yi¹, Taisuke Sasaki², Michael Falk¹ and Timothy Weihs¹; ¹Johns Hopkins University, United States; ²National Institute for Materials Science, Japan

8:35 AM SF08.16.04

Understanding Damage Nucleation and Evolution in Tantalum Microstructures during Spall Failure at the Atomic Scales Marco J. Echeverria, Avinish Mishra and Avinash M. Dongare; University of Connecticut, United States

8:50 AM SF08.16.05

Structure-Dynamics Relationships in Cryogenically Deformed Metallic Glass Jurgen H. Eckert^{1,2}; ¹Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; ²Montanuniversität Leoben, Austria

9:05 AM *SF08.16.06

Additive Manufacturing of Permanent Magnetic NdFeB Using Laser Powder Bed Fusion—Process-Structure-Property Relationships Nesma Aboukhaïr^{1,2}, Julian Wu¹, Michele Degano¹, Ian Ashcroft¹ and Richard Hague¹; ¹The University of Nottingham, United Kingdom; ²Technology Innovation Institute, United Arab Emirates

SESSION SF08.17: Far from Equilibrium Microstructure Evolution II

Session Chair: Michael Demkowicz

Tuesday Morning, May 24, 2022

SF08-Virtual

10:30 AM *SF08.16.07

Precision Nanocrystallization by CNC-Controlled Surface Mechanical Attrition Treatment Mark Atwater; Liberty University, United States

##PAGE_BREAK##

SYMPOSIUM SF09

High Entropy Materials II—From Fundamentals to Potential Applications

May 9 - May 25, 2022

Symposium Organizers

* Invited Paper

SESSION SF09.01 Structural/Mechanical Properties I

Session Chairs: Andrew Minor and Eun Soo Park

Monday Afternoon, May 9, 2022

Hawai'i Convention Center, Level 3, 325B

2:00 PM *SF09.01.04

Short Range Order and the Evolution of Deformation Mechanisms in the CrCoNi Medium Entropy Alloy Andrew M. Minor^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States

2:30 PM *SF09.01.05

Suppressed Radiation-Induced Dynamic Recrystallization in CrFeCoNiCu High-Entropy Alloy Hyejung Chang^{1,2}, Jinyeon Kim^{1,3}, Jong Wook Lim¹, Joon Kon Kim¹, Do Hyang Kim⁴ and Eun Soo Park³; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Missouri University of Science and Technology, Korea (the Republic of); ³Seoul National University, Korea (the Republic of); ⁴Yonsei University, Korea (the Republic of)

3:00 PM SF09.01.06

***In Situ* TEM and Computer-Aided Analysis of Individual Dislocation Motion Through a Cantor Alloy at Room and Liquid Nitrogen Temperature** Marc Legros; CEMES CNRS, France

3:15 PM SF09.01.07

Local Characterization of High Entropy Materials Using X-Ray Absorption Fine Structure Spectroscopy Christina Rost¹, Tyler Valentine¹, Daniel Rossi¹, Alessandro Mazza², Lujin Min³, Matthew Webb⁴, George N. Kotsonis³, Jon-Paul Maria³, Zhiqiang Mao³, John Heron³ and T. Zac Ward²; ¹James Madison University, United States; ²Oak Ridge National Laboratory, United States; ³The Pennsylvania State University, United States; ⁴University of Michigan, United States

3:30 PM SF09.01.08

Ordering and Magnetism of Cr in FCC Solid Solutions Flynn Walsh^{1,2}, Robert O. Ritchie^{1,2} and Mark Asta^{1,2}; ¹Lawrence Berkeley National Laboratory, United States; ²University of California, Berkeley, United States

SESSION SF09.02 Refractory High Entropy Alloy
Session Chairs: Daniel Gianola and Matthew Kramer
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 325B

9:00 AM *SF09.02.02

Pathways for Plastic Deformation in Refractory Multi-Principal Element Alloys Daniel S. Gianola; University of California, Santa Barbara, United States

9:30 AM SF09.02.03

Superior High-Temperature Strength in a Supersaturated Refractory High-Entropy Alloy Rui Feng¹, Bojun Feng², Michael C. Gao³, Chuan Zhang⁴, Joerg C. Neufeind¹, Jonathan D. Poplawsky¹, Yang Ren⁵, Ke An¹, Michael Widom² and Peter Liaw⁶; ¹Oak Ridge National Laboratory, United States; ²Carnegie Mellon University, United States; ³National Energy Technology Laboratory, United States; ⁴Computherm, LLC, United States; ⁵Argonne National Laboratory, United States; ⁶The University of Tennessee, Knoxville, United States

10:15 AM *SF09.02.05

Theory-Guided Combinatorial Synthesis and Characterization of Refractory Multi-Principal Element Alloys Matthew J. Kramer^{1,2}, Gaoyuan Ouyang¹, Prashant Singh¹, Duane J. Johnson^{1,2} and Jun Cui^{2,1}; ¹Ames Laboratory, United States; ²Iowa State University, United States

10:00 AM BREAK

10:45 AM SF09.02.06

Exploring Strength-Ductility Synergy for bcc Refractory HEAs Through Integration of First-Principles Calculations, Statistical Learning and CALPHAD Yong-Jie Hu¹, Chris Tando¹, Liang Qi² and Peter Liaw³; ¹Drexel University, United States; ²University of Michigan, United States; ³The University of Tennessee, Knoxville, United States

11:00 AM SF09.02.07

A Fast and Robust Method for Predicting the Phase Stability of Refractory Complex Concentrated Alloys Using Pairwise Mixing Enthalpy Zhaohan Zhang, Mu Li, John D. Cavin, Katharine Flores and Rohan Mishra; Washington University in St. Louis, United States

11:15 AM SF09.02.08

ULtrahigh TEmperture Refractory Alloys (ULTERA) Database Adam M. Krajewski, Shuang Lin, Marcia Ahn, Hui Sun, Arindam Debnath, Allison M. Beese, Wesley Reinhart and Zi-Kui Liu; The Pennsylvania State University, United States

11:30 AM SF09.02.09

Hydrogen Accommodation in the TiZrNbHfTa High Entropy Alloy, Christopher Moore^{1,2,3}, Jack A. Wilson^{1,4}, Michael Rushton¹, William Lee^{1,5,3}, Jack Astbury³ and Simon C. Middleburgh^{1,6}; ¹Bangor University, United Kingdom; ²Royal Society of Chemistry, United Kingdom; ³Tokamak Energy, United Kingdom; ⁴National Nuclear Laboratory, United Kingdom; ⁵Royal Academy of Engineering, United Kingdom; ⁶Institute of Materials, Minerals and Mining, United Kingdom

SESSION SF09.03 Theoretical Modeling and Computational Simulations
Session Chairs: Robert Maass and Ji-Cheng Zhao
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 325B

1:30 PM *SF09.03.01

Insights on Phase Formation from Thermodynamic Calculations and Machine Learning of 2436 Experimentally Measured High Entropy Alloys Chuangye Wang and Ji-Cheng Zhao; University of Maryland, United States

2:00 PM *SF09.03.02

Composition Design of High-Entropy Alloys with Deep Sets Learning Wei Chen¹, Chen Cai², George Kim¹, Peter Liaw³ and Yusu Wang²; ¹Illinois Institute of Technology, United States; ²University of California, San Diego, United States; ³The University of Tennessee, Knoxville, United States

2:30 PM SF09.03.03

Defect-Informed Figure of Merit for the High-Throughput Screening of New High-Entropy Materials Dibyendu Dey and Liping Yu; University of

Maine, United States

2:45 PM SF09.03.04

Investigation of Short-Range Order in CrCoNi from First-Principles Energy Density Method [Yang Dan](#); University of Illinois at Urbana-Champaign, United States

3:00 PM BREAK

3:30 PM SF09.03.05

Stacking Fault Energies in Ni-Based Concentrated Alloys Using Density Functional Theory and Machine Learning Gaurav Arora and [Dilpuneet S. Aidhy](#); University of Wyoming, United States

3:45 PM SF09.03.06

Design of Multi-Principal Element Alloys with Generalized Polynomial Solution Model [John D. Cavin](#)^{1,2}, Zhaohan Zhang¹ and Rohan Mishra¹; ¹WUSTL, United States; ²Northwestern University, United States

4:00 PM SF09.03.07

Optimizing Strength and Corrosion Resistance of CoCrFeNi Alloys via DFT Calculations [Wenjun Cai](#); Virginia Polytechnic Institute and State University, United States

4:15 PM SF09.03.08

Conditional Generative Modeling for Inverse Design of High-Entropy Alloys with Tailored Hardness [Arindam Debnath](#), Shunli Shang, Zi-Kui Liu and Wesley Reinhart; The Pennsylvania State University, United States

SESSION SF09.04: Poster Session: High Entropy Materials II—From Fundamentals to Potential Applications

Session Chairs: Hyejung Chang and Eun Soo Park

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF09.04.01

Asymmetry of Element-Specific Lattice Distortion in 3D Transition Metal-Based Complex Concentrated Alloys [Hyunseok Oh](#)^{1,2}, Khorgolkhuu Odbadrakh^{3,4}, Yuji Ikeda^{5,6}, Sai Mu⁴, Fritz Koermann^{5,7}, Chengjun Sun⁸, Hye Sang Ahn¹, Kooknoh Yoon¹, Duancheng Ma⁹, Cem Tasan², Takeshi Egami^{4,3} and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²Massachusetts Institute of Technology, United States; ³The University of Tennessee, Knoxville, United States; ⁴Oak Ridge National Laboratory, United States; ⁵Max-Planck-Institut für Eisenforschung, Germany; ⁶University of Stuttgart, Germany; ⁷Delft University of Technology, Netherlands; ⁸Argonne National Laboratory, United States; ⁹Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

SF09.04.02

Atomic-Scale Measurement of Chemical Short-Range Order (C-SRO) in CrMnFeCoNi High Entropy Alloys and Its Effect on the Deformation Behaviors Kooknoh Yoon¹, Hyunseok Oh², Baptiste Gault^{3,4}, Dierk Raabe³ and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²Massachusetts Institute of Technology, United States; ³Max-Planck-Institut für Eisenforschung, Germany; ⁴Imperial College London, United Kingdom

SF09.04.03

Short Range Order Correlated with Hardening and Softening Behavior of High Entropy Brasses and Bronzes [Anna M. Soper](#)¹, Jonas Kaufman², Aurora Pribram-Jones³, Lori Bassman¹ and Kevin Laws⁴; ¹Harvey Mudd College, United States; ²University of California, Santa Barbara, United States; ³University of California, Merced, United States; ⁴University of New South Wales, Australia

SF09.04.09

A Study of Ideal Glass State via High Entropy Metallic Glasses [Ji Young Kim](#)¹, Geun Hee Yoo¹, Jung Soo Lee², Jinyeon Kim¹, Hyejung Chang³, Jinwoo Hwang⁴ and Eun Soo Park¹; ¹Seoul National University, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of); ³Korea Institute of Science and Technology, Korea (the Republic of); ⁴The Ohio State University, United States

SF09.04.10

Nanotribology of High Entropy Alloy Thin Films [Gokay Adabasi](#)¹, Koichi Tanaka², Aditya Deshpande², Suneel Kodambaka² and Mehmet Baykara¹; ¹University of California, Merced, United States; ²University of California, Los Angeles, United States

SF09.04.11

Exploring M₃O₄ Spinel High-Entropy Oxide Nanoparticles for Emissions Catalysis [Sreya Paladugu](#) and Katharin Page; University of Tennessee, Knoxville, United States

SF09.04.12

Sol-gel Synthesis of Ceria-Zirconia-Based High-Entropy Oxides as High-Promotion Catalysts for the Synthesis of 1,2-Diketones from Aldehyde Dalibor Tatar¹, Jelena Kojcinovic¹, Aleksandar Miletic², Gabor Varga³ and [Igor Djerdj](#)¹; ¹Department of Chemistry, Josip Juraj Strossmayer University of Osijek, Croatia; ²University of Novi Sad, Serbia; ³University of Szeged, Hungary

SF09.04.13

Synthesis of Nanoporous Structure by Selective Phase Dissolution of AlCoCrFeNi High Entropy Alloy and Its Electrochemical Properties as Supercapacitor Electrode [Kim Chamil](#)¹, Kong Kyeong Ho¹, Jae Ik Hyun¹, Kim Yong Joo¹, Kim Won Tae² and Do Hyang Kim¹; ¹Yonsei University, Korea (the Republic of); ²Cheongju University, Korea (the Republic of)

SF09.04.14

First Principles Study of Phase Stability, Mechanical Properties, Martensitic Transformation and Phonon Dispersion of Ni₄₄Ti₃₅Zr₁₅Co₆ Alloy System Tapasendra Adhikary; Indian Institute of Technology Kharagpur, India

SESSION SF09.05 Phase Stability of High Entropy Alloy
Session Chairs: Easo George and Eun Soo Park
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 325B

10:00 AM *SF09.01.03

Collective Dislocation Motion and Localization of Slip in an HEA Quentin Rizzardi¹, Peter Derlet² and Robert Maass^{3,1}; ¹University of Illinois at Urbana-Champaign, United States; ²Paul Scherrer Institute, Switzerland; ³Federal Institute of Materials Research and Testing (BAM), Germany

10:30 AM SF09.05.02

Tuning Phase Transformations in Epsilon-Martensite—Pathways to Extend the Limit of Metastability Engineering Shaolou Wei and Cem Tasan; Massachusetts Institute of Technology, United States

10:45 AM SF09.05.03

Influence of Co/Ni Ratio on the Shape Memory Effect in the CrMnFeCoNi Alloy System Je In Lee¹, Wook Ha Ryu², Hyunseok Oh³, Eun Soo Park² and Koichi Tsuchiya⁴; ¹Pusan National University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Massachusetts Institute of Technology, United States; ⁴National Institute for Materials Science, Japan

11:00 AM SF09.05.04

Martensitic Phase Transformation in CrCoNi Medium- and CrMnFeCoNi High-Entropy Alloy Werner Skrotzki¹, Robert Chulist², Aurimas Pukenas¹, Anton Hohenwarter³ and Reinhard Pippan³; ¹TU Dresden, Germany; ²Polish Academy of Sciences, Poland; ³Montanuniversität Leoben, Austria

SESSION SF09.06 Structural/Mechanical Properties II
Session Chairs: Je In Lee and B.S. Murty
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 325B

1:45 PM *SF09.06.01

Novel Precipitate Strengthening Mechanism in a Medium-Entropy Alloy Easo P. George^{1,2} and Ying Yang¹; ¹Oak Ridge National Laboratory, United States; ²The University of Tennessee, Knoxville, United States

2:15 PM SF09.06.03

Strain Distribution Analysis Using PED Technique at the Interface of L2₁ Precipitates in Al-Cr-Fe-Ni-Ti Complex Concentrated Alloy System Minyoung Na¹, Woochul Kim², Hyeyoung Cho¹, Heounjun Kwon², Youngsang Na², Jongwoo Won², Karam Lim² and Hyejung Chang¹; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Korea Institute of Materials Science, Korea (the Republic of)

2:30 PM SF09.06.05

Tailored Complex Concentrated Alloys 3D Printed from Oxide Precursors Katie D. Koube, Collin Stiers, Taylor Sloop, Hyounjun Sim and Josh Kacher; Georgia Institute of Technology, United States

3:15 PM SF09.06.07

Analysis of the Influence of the Composition of Fe-Cr-Ni-X (X=Mn, Co) Alloys on the Corrosion Properties using Diffusion Multiples for Rapid Realization of Potential Material Combinations Yasemin Yesilcicek, Annica Wetzel, Julia Witt, Ozlem Ozcan and Christiane Stephan-Scherb; Federal Institute for Materials Research and Testing, Germany

3:00 PM BREAK

3:30 PM SF09.06.08

Creep-Resistant Cr-Mn-Fe-Co-Ni High-Entropy Alloys Having a Single FCC Phase Min-Gu Jo^{1,2}, Jin-Yoo Suh¹, Myung-Yeon Kim¹, Han-Jin Kim¹, Woo-Sang Jung¹, Dong-Ik Kim¹ and Heung Nam Han²; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

SESSION SF09.07 Functional Properties and Innovative Applications
Session Chairs: Tianshu Li and Peter Liaw
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 325B

10:00 AM *SF09.07.01

Entropy-Maximized Materials for Electrocatalysis Applications Tao Wang¹, Yifan Sun¹ and Sheng Dai^{2,1}; ¹Oak Ridge National Laboratory, United States; ²The University of Tennessee, Knoxville, United States

10:30 AM SF09.07.02

Transition-Metal-Based High Entropy Oxide Materials for Non-Enzymatic Electrochemical Sensing of Sweat Biomarkers Ziyu Yin and Tyler Ray; University of Hawaii, United States

10:45 AM SF09.07.03

Understanding the Structure-Property Relationship in Bio-Enabled High Entropy Nanocatalysts Bijil Subhash¹, Agus Poerwoprajitno¹, Soshan C. Tilley¹, Rose Amal¹, Richard Tilley¹, Nicholas Bedford¹, Bernt Johannessen² and Lars Thomsen²; ¹University of New South Wales, Australia; ²Australian Synchrotron, Australia

11:00 AM SF09.07.04

Gradient Structure Design of High- and Medium- Entropy Alloy via Novel Surface Modification Techniques Timothy A. Listyawan and Nokeun Park; Yeungnam University, Korea (the Republic of)

SESSION SF09.08 High Entropy Oxides
Session Chairs: Sheng Dai and Hyunseok Oh
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 325B

1:45 PM *SF09.08.01

Computational Discovery of Co-Existence of Multiple Short-Range Orders in Si-Ge-Sn Medium-Entropy Alloys Xiaochen Jin, Shunda Chen and Tianshu Li; George Washington Univ, United States

2:15 PM SF09.08.02

Entropic Effects Explain Colossal Softening and Negative Thermal Expansion in Empty Perovskites Igor Zaliznyak and Alexei Tkachenko; Brookhaven National Laboratory, United States

2:30 PM SF09.08.03

Microstructural Reconfiguration in High-Entropy Oxides George N. Kotsonis, Leixin Miao, Nasim Alem and Jon-Paul Maria; The Pennsylvania State University, United States

2:45 PM SF09.08.04

Corrosion Properties and Protective Oxide Film Characteristics of CrMnFeCoNi High Entropy Alloy and CrCoNi Medium Entropy Alloy Annica Wetzel¹, Ozlem Ozcan¹, Julia Witt¹ and Michael Rhode^{2,3}; ¹Bundesanstalt für Materialforschung und -prüfung, Germany; ²Bundesanstalt für Materialforschung, Germany; ³Otto von Guericke Universität Magdeburg, Germany

3:00 PM BREAK

3:30 PM SF09.08.05

Thermal and Ablation Properties of a High-Entropy Metal Diboride—(Hf_{0.2}Zr_{0.2}Ti_{0.2}Ta_{0.2}Nb_{0.2})B₂ Md Shafkat Bin Hoque¹, Milena Milich¹, Mingde Qin², Md Sabbir Akhanda¹, Kathleen F. Quiambao-Tomko¹, Sashank Shivakumar², Eric R. Hoglund¹, John Tomko¹, Jeffrey L. Braun¹, Joshua Gild², David Olson³, Kiumars Aryana¹, Yee Rui Koh¹, Roisul Galib¹, John T. Gaskins³, Mona Zebarjadi¹, Jian Luo² and Patrick E. Hopkins¹; ¹University of Virginia, United States; ²University of California, San Diego, United States; ³Laser thermal analysis, United States

3:45 PM SF09.08.06

Unsupervised Machine Learning Assisted TEM Study of Phase Formation and Microstructure Tuning in Entropy-Stabilized Oxide Thin Films Leixin Miao, George N. Kotsonis, Jon-Paul Maria and Nasim Alem; Department of Materials Science and Engineering, The Pennsylvania State University, United States

4:00 PM SF09.08.07

Crystal Growth and Phase Composition of High-Entropy Rare-Earth Sesquioxides Matheus Pianassola^{1,2}, Joshua Safin^{1,2}, Can Agca³, Jake McMurray³, Charles Melcher^{1,4,2} and Mariya Zhuravleva^{1,2}; ¹University of Tennessee, Knoxville, United States; ²Scintillation Materials Research Center, United States; ³Oak Ridge National Laboratory, United States; ⁴The University of Tennessee, Knoxville, United States

4:15 PM SF09.08.08

Entropy Stabilization, Local Structure and Short-Range Ordering in Oxides with α -PbO₂ Structure Solveig S. Aamlid¹, Graham Johnstone^{1,1,2}, Mohamed Oudah^{1,1}, Alannah Hallas^{1,1} and Joerg Rottler^{1,1}; ¹The University of British Columbia, Canada; ²University of Toronto, Canada

SESSION SF09.09 General Session I
Session Chairs: Koichi Tsuchiya and Kooknoh Yoon
Tuesday Afternoon, May 24, 2022
SF09-Virtual

9:00 PM *SF09.09.01

FCC-HCP Phase Stability and Grain Refinement Behavior in Cr₂₀Mn₂₀Fe₂₀Co_{40-x}Ni_x High-Entropy Alloys Koichi Tsuchiya; National Institute for Materials Science, Japan

9:30 PM *SF09.01.02

Plastic Deformation of Single Crystals of Equiatomic and Non-Equiatomic High- and Medium Entropy Alloys of the Cr-Mn-Fe-Co-Ni and Its Sub-Systems Haruyuki Inui, Kyosuke Kishida, Zhenghao Chen and Le Li; Kyoto University, Japan

10:00 PM SF09.09.05

High Entropy Approach Starting from a Corner of the Phase Diagram in Designing High Strength Fe-Based Alloys Dmitri V. Louzguine^{1,2}; ¹AIMR, Tohoku University, Japan; ²AIIST, Japan

10:15 PM SF09.09.02

Effects of Annealing on the Atomic-Scale Structures and Mechanical Properties in Single Crystals of the Equiatomic Cr-Co-Ni Medium-Entropy Alloy Le Li, Zhenghao Chen, Mitsuhiro Ito, Shogo Kuroiwa, Kyosuke Kishida and Haruyuki Inui; Kyoto University, Japan

10:30 PM SF09.09.03

Alloy Design of Cr-Co-Ni-Based Medium-Entropy Alloys for High Strength and High Ductility Zhi Wang, Le Li, Zhenghao Chen, Kyosuke Kishida and Haruyuki Inui; Kyoto University, Japan

10:35 PM SF09.04.05

Elevated Temperature Deformation Behavior of AlCoCrFeNi High Entropy Alloy Ji-Woon Lee¹, Chulwoong Han², Junhee Han², Hyoseo Lee², Nakyung Oh³ and Soong-Keun Hyun³; ¹Kongju National University, Korea (the Republic of); ²Korea Institute of Industrial Technology, Korea (the Republic of); ³Inha University, Korea (the Republic of)

10:40 PM SF09.06.06

Effect of Fe Contents on the Plane Stress Crack Growth Resistance of Fe_x(CoCrMnNi)_{100-x} High Entropy Alloys at Cryogenic Temperature Sangyeon Park¹, Jae Bok Seol¹, Jung Gi Kim¹, Im Doo Jung², Nokeun Park³ and Hyokyung Sung¹; ¹Gyeongsang National University, Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of); ³Yeungnam University, Korea (the Republic of)

10:55 PM SF09.04.07

Clarification of Phase Stability and Oxidation Mechanism for TiZrHfTaX (X= Ta, Cr) by Using Thermodynamic Calculation Yuki Komiya, Daiki Haginiwa, Yasuo Kogo and Yutato Arai; Tokyo University of Science, Japan

SESSION SF09.10: General Session II
Session Chairs: Cecilia Cao and Jurgen Eckert
Wednesday Morning, May 25, 2022
SF09-Virtual

8:00 AM *SF09.02.01

Order Phenomena and Mechanical Properties in Refractory High Entropy Alloys of the System Ta-Mo-Cr-Ti-Al Stephan Laube¹, Steven Schellert², Alexander Kauffmann¹, Daniel Schliephake¹, Bronislava Gorr¹, Hans-Juergen Christ² and Martin Heilmaier¹; ¹Karlsruhe Institute of Technology, Germany; ²University of Siegen, Germany

8:30 AM *SF09.09.04

Transition Metal-Based High Entropy Alloy Microfiber Electrodes with Improved Corrosion Behavior and Hydrogen Activity Jurgen H. Eckert^{1,2}; ¹Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; ²Montanuniversität Leoben, Austria

9:00 AM SF09.09.06

High Entropy Based Relaxor Ferroelectrics for Energy Storage and Energy Conversion Pao-Wen Shao, Deng Li Ko, Ti Hsin and Ying-Hao Chu; National Yang Ming Chiao Tung University, Taiwan

9:15 AM SF09.09.07

Machine-Learning Potentials Enable Predictive and Tractable High-Throughput Screening of Random Alloys Max Hodapp and Alexander Shapcev; Skolkovo Institute of Science and Technology, Russian Federation

9:30 AM SF09.04.08

Material Design for TiZrHfNbTaB_x—A Boundary Material of Refractory High Entropy Alloys and Ceramics Yutato Arai, Manami Saito and Yasuo Kogo; Tokyo University of Science, Japan

##PAGE_BREAK##

SYMPOSIUM SF10

Emerging Functional Oxides and Interfaces
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF10.01: Spin, Charge and Topology I
Session Chairs: Alex Demkov and Jaekwang Lee
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 312

10:45 AM *SF10.01.01

A New Era in Ferroelectrics Ramamoorthy Ramesh; University of California, Berkeley, United States

11:15 AM *SF10.01.03

Charged Higher Order Topologies in Room Temperature Magnetoelectric Multiferroic Thin Films Kalani Moore¹, Eoghan O'Connell¹, Sinead M. Griffin², Ursel Bangert¹, Michael Schmidt³, Valeria Nicolosi⁴, Clive Downing⁴, Louise Colfer³, Lynette Keeney³ and Michele S. Conroy^{5,1}; ¹University of Limerick, Ireland; ²Lawrence Berkeley National Laboratory, United States; ³Tyndall National Institute, Ireland; ⁴Trinity College Dublin, The University of Dublin, Ireland; ⁵Imperial College London, United Kingdom

SESSION SF10.02: Spin, Charge and Topology II
Session Chairs: Jaekwang Lee and Rohan Mishra
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 312

2:00 PM SF10.02.02

Strain-Induced Interfacial Ferromagnetism in (111)-Oriented LaNiO₃ Films Margaret Kane¹, Arturas Vailionis¹, Megan Holtz², Lauren Riddiford¹, Purnima P. Balakrishnan³, Alexander Grutter³, Apurva Mehta⁴ and Yuri Suzuki¹; ¹Stanford University, United States; ²Colorado School of Mines, United States; ³National Institute of Standards and Technology, United States; ⁴SLAC National Accelerator Laboratory, United States

2:15 PM SF10.02.03

Emergent Topological Phase Transition Dynamics of Polar Skyrmions Elizabeth Donoway^{1,2}, Yu-Tsun Shao³, Sujit Das¹, Lucas Caretta¹, David Muller³ and Ramamoorthy Ramesh^{1,2}; ¹University of California, Berkeley, United States; ²Lawrence Berkeley National Laboratory, United States; ³Cornell University, United States

2:30 PM *SF10.02.04

Topological Spin Textures in Multiferroic and 2D vdW Materials Xiuzhen Yu; RIKEN, Japan

3:00 PM BREAK

3:30 PM SF10.02.05

Tunable Spin Exchange Splitting in Graphene-Perovskite Oxide Heterostructure Dongwon Shin¹, Hyeonbeom Kim¹, Sung Ju Hong², Schwan Song³, Sungkyun Park³, Dongseok Suh¹ and Woo Seok Choi¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Kangwon University, Korea (the Republic of); ³Pusan National University, Korea (the Republic of)

3:45 PM SF10.02.06

Interfacial Exchange Coupling in Epitaxial La_{0.7}Sr_{0.3}CoO₃/La_{0.7}Sr_{0.3}MnO₃ Heterostructures Mingzhen Feng¹, Nolan Ahlm¹, I-Ting Chiu¹, Dayne Sasaki¹, Alpha T. N'Diaye², Christoph Klewe², Padraic Shafer², Apurva Mehta³ and Yayoi Takamura¹; ¹University of California, Davis, United States; ²Lawrence Berkeley National Laboratory, United States; ³SLAC National Accelerator Laboratory, United States

4:00 PM SF10.02.07

Flexoelectricity in Magnetic Materials John D. Cavin^{1,2}, Rohan Mishra¹ and James M. Rondinelli²; ¹WUSTL, United States; ²Northwestern University, United States

4:15 PM SF10.02.08

Relation Between Residual Strain and Magnetic Properties of Hybrid Semiconductor Nanowires with Intermetallic Phases Slawomir Kret¹, Anna Kaleta¹, Serhii Kryvyi¹, Krzysztof Morawiec¹, Katarzyna Gas¹, Maciej Sawicki¹, Nevill Szwacki² and Janusz Sadowski^{1,3}; ¹Polish Academy of Sciences, Poland; ²University of Warsaw, Poland; ³Linnaeus University, Sweden

SESSION SF10.03: Poster Session I: Emerging Functional Oxides and Interfaces I
Session Chairs: Jaekwang Lee and Rohan Mishra
Monday Afternoon, May 9, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF10.03.02

Ternary Sulfides as Electrocatalysts for Water Splitting Shantanu Singh, Ahamed Maniyanganam, Billal Zayat, Eric T. McClure, Boyang Zhao, Nicholas Humphrey, Jingyi Ran, Brent C. Melot, Shaama M. Sharada, Sri Narayan and Jayakanth Ravichandran; University of Southern California, United States

SF10.03.03

Spin Hall Effect Driven Spin Transport at Two-Dimensional Conducting SrTiO₃ Surface Mi-Jin Jin^{1,2}, Doo-Seung Um³, Kohei Ohnishi⁴, Sachio Komori¹, Nadia Stelmashenko¹, Daeseong Choe⁵, Jung-Woo Yoo⁵ and Jason Robinson¹; ¹University of Cambridge, United Kingdom; ²Institute for Basic Science, United States; ³Sejong University, Korea (the Republic of); ⁴Kyushu University, Japan; ⁵Ulsan National Institute of Science and Technology, Korea (the Republic of)

SF10.03.04

Frustrated Magnetism in Rare-Earth Titanate Pyrochlore Thin Films Grown by Molecular Beam Epitaxy Margaret A. Anderson, Johanna Nordlander, EliseAnne C. Koskelo, Charles M. Brooks and Julia Mundy; Harvard University, United States

SF10.03.05

Correlating Surface Structures and Nanoscale Friction of CVD Multi-Layered Graphene Min Gi Choi, Seonha Park, Habeom Lee and Songkil Kim; Mechanical Engineering, Pusan National University, Korea (the Republic of)

SF10.03.07

Highly Durable Shell Formation on Rh for Increased Amount of Metal-Support Interfaces from Enhanced Surface Defect Sites by Fe Doping on CeO₂ Gunjoo Kim and Hyunjoo Lee; KAIST, Korea (the Republic of)

SF10.03.09

Novel Solid-State Synthesis of Platinum-Alloy Nanoparticles via Uniform Decomposition of Bimetallic Compounds on Carbon Tae Yong Yoo^{1,2}, Ji Mun Yoo^{1,2}, Yung-Eun Sung^{1,2} and Taeghwan Hyeon^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Center for Nanoparticle Research, Institute for Basic Science, Korea (the Republic of)

SF10.03.10

Effect of Doping Concentration on Ferroelectricity in Hafnia Jun-Cheol Park and Sanghan Lee; Gwangju Institute of Science and Technology, Korea (the Republic of)

SF10.03.11

Temperature Dependence of Spin-Orbit Torques Exerted by a 2DEG in CoFeB/LaTiO₃/SrTiO₃ Thin-Film Heterostructures Lauren Riddiford, Xin Yu Zheng, Fen Xue, Shan X. Wang and Yuri Suzuki; Stanford University, United States

SF10.03.14

Diffusion in Doped and Undoped Amorphous Zirconia Megan W. Owen¹, Michael Rushton¹, Lee J. Evitts¹, Antoine Claisse², Mattias Puide², William Lee¹ and Simon C. Middleburgh¹; ¹Bangor University, United Kingdom; ²Westinghouse Electric Sweden AB, Sweden

SF10.03.16

Magnetism Induced by Nitrogen Doping in Ferroelectric HfO₂ ChangHoon Kim and Jun Hee Lee; UNIST, Korea (the Republic of)

SF10.03.17

A Pioneering Tactic to Design and Develop Highly Sensitive and Selective Gas Sensors—Exsolution Catalyst Bharat Sharma¹, Jan G. Korvink¹ and Jae-ha Myung²; ¹KIT - Karlsruhe Institut für Technologie, Germany; ²Incheon National University, Korea (the Republic of)

SF10.03.18

Fast Responding and Highly Reversible Gasochromic H₂ Sensor Using Pd-Decorated Amorphous WO₃ Thin Films Sung Hwan Cho¹ and Ho Won Jang^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Graduate School of Convergence Science and Technology, Seoul National University, Korea (the Republic of)

SF10.03.19

Atomic-Scale Observation of Monoclinic Nanodomain in VO₂ with Ultra-Fast and Energy Efficient Metal-Insulator Transition Hyeji Sim, Yunkyu Park, Junwoo Son and Si-Young Choi; Pohang University of Science and Technology (POSTECH), Korea (the Republic of)

SF10.03.20

Synthesis and Characterization of Novel Magnetic Nanodiscs for Magnetothermal and Magnetomechanical Transduction Ye Ji Kim, James M. LeBeau and Polina Anikeeva; Massachusetts Institute of Technology, United States

SF10.03.21

Synthesis and Characterization of Strontium Cobaltite Membranes Under Topotactic Transformations Hudson Shih, Yayoi Takamura and Seung Sae Hong; University of California, Davis, United States

SF10.03.22

Atomic-Scale Understanding of the Role of Dopant (Al, Zr) on the Structural Properties of Nickel-Rich Cathode for Lithium-Ion Batteries So-Yeon Kim¹, Yu-Jeong Yang¹, Eun Gyu Lee², Gi-Yeop Kim¹, Sungho Choi² and Si-Young Choi¹; ¹POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY, Korea (the Republic of); ²Korea Research Institute of Chemical Technology, Korea (the Republic of)

SF10.03.23

High Mobility Two-Dimensional Electron Gas in PbZr_{0.5}Ti_{0.5}O₃/BaSnO₃ Heterostructure Jaejin Hwang and Jaekwang Lee; Pusan National University, Korea (the Republic of)

SF10.03.24

Fabrication of Carbon-Coated Fe₃O₄-SnO₂ Core-Shell Nanocomposites via Surface Carboxylation and Amination Gye Sek An¹ and Jae Uk Hur²; ¹Kyonggi University, Korea (the Republic of); ² Hanyang University, Korea (the Republic of)

SF10.03.27

Compositional Patterning in Carbon Implanted Titania Nanotubes Astrid Kupferer^{1,2}, Alexander Holm^{1,2}, Andriy Lotnyk³, Stephan Mändl³ and Stefan G. Mayr^{1,2}; ¹Leibniz Institute of Surface Engineering, Germany; ²Universität Leipzig, Germany; ³Leibniz-Institute of Surface Engineering, Germany

SESSION SF10.04: Novel Functionalities I
Session Chairs: Woo Seok Choi and Ramamoorthy Ramesh
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 312

8:30 AM *SF10.04.01

Epitaxial BaTiO₃ for Emergent Silicon-Integrated Optical Computing Alex Demkov; The University of Texas, United States

9:00 AM SF10.04.03

Electrically Controllable Kirigami Structures in Free-Standing Ferroelectric Thin Films Donghoon Kim, Minsoo Kim, Bradley Nelson, Xiangzhong Chen and Salvador Pané; ETH Zurich, Switzerland

9:45 AM *SF10.04.04

Deterministic Control of Ferroelectric Polarization by Ultrafast Laser Pulses Laurent Bellaiche; University of Arkansas, United States

9:30 AM BREAK

10:15 AM SF10.04.05

Topotactic Transformations in Perovskite Oxide Thin Films Yayoi Takamura¹, I-Ting Chiu¹, Min-Han Lee^{2,2}, Shaobo Cheng³, Shenli Zhang⁴, Larry Heki⁵, Zhen Zhang⁶, Yahya Mohtashami⁵, Pavel Lapa², Mingzhen Feng¹, Ryan Fillhouer¹, Junjie Li^{2,2}, Padraic Shafer⁷, Alpha T. N'Diaye⁷, Christoph Klewe⁷, Apurva Mehta⁸, Jon Schuller⁵, Giulia Galli⁴, Shriram Ramanathan⁶, Yimei Zhu³ and Ivan K. Schuller²; ¹University of California, Davis, United States; ²University of California, San Diego, United States; ³Brookhaven National Laboratory, United States; ⁴The University of Chicago, United States; ⁵University of California, Santa Barbara, United States; ⁶Purdue University, United States; ⁷Lawrence Berkeley National Laboratory, United States; ⁸SLAC National Accelerator Laboratory, United States

10:30 AM SF10.04.06

Lone-Pair Electrons Enhanced Giant Nonlinear Optical Susceptibility in γ -NaAsSe₂ Jingyang He¹, Abishek Iyer², Michael Waters², Sumanta Sarkar², Rui Zu¹, James M. Rondinelli², Mercuri Kanatzidis² and Venkatraman Gopalan¹; ¹Penn State, United States; ²Northwestern University, United States

10:45 AM SF10.04.07

Flat-Band Ferroelectricity for Densest Memory Fists Discovered in HfO₂ Jun Hee Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SESSION SF10.05: Novel Functionalities II
Session Chairs: Sinead Griffin and Jaekwang Lee
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 312

1:30 PM *SF10.05.01

Navigating and Predicting Oxide Synthesis Recipes in High-Dimensional Thermodynamic Space Wenhao Sun; University of Michigan, United States

2:00 PM SF10.05.02

Structural Ripples and Nanoscale Bubble Domains in a Freestanding Ultrathin Ferroelectric - Dielectric - Ferroelectric Heterostructure Saidur R. Bakaul¹, Sergei Prokhorenko², Qi Zhang¹, Youssa Nahas², Laurent Bellaiche², Amanda Petford-Long¹ and Nagarajan Valanoor³; ¹Argonne National Laboratory, United States; ²University of Arkansas, Fayetteville, United States; ³University of New South Wales, Australia

2:15 PM SF10.05.03

Modulating the Ferroelectricity of Hafnium Zirconium Oxide Ultrathin Films via Interface Engineering to Control the Oxygen Vacancy Distribution Joonbong Lee¹, Myeong Seop Song², Woo-Sung Jang³, Jinho Byun⁴, Hojin Lee¹, Min Hyuk H. Park², Jaekwang Lee⁴, Young-Min Kim³, Seung Chul Chae² and Taekjib Choi¹; ¹Sejong University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of); ³Sungkyunkwan University, Korea (the Republic of); ⁴Pusan National University, Korea (the Republic of)

2:30 PM SF10.05.05

Emergent Ferroelectric Functionality in Square Tensile Strained BaTiO₃ Film Yoon Seok Oh¹, Jun Han Lee¹, Nguyen Xuan Duong², Min-Hyoung Jung³, Hyun-Jae Lee¹, Ahyoung Kim⁴, Youngki Yeo⁵, Junhyung Kim¹, Gye-Hyeon Kim¹, Byeong-Gwan Cho⁶, Jaegyung Kim⁵, Furqan Ul Hassan Naqvi⁷, Chang Won Ahn², Young-Min Kim³, Tae Kwon Song⁸, Jae-Hyeon Ko⁷, Tae-Yeong Koo⁶, Changhee Sohn¹, Kibog Park¹, Chan-Ho Yang⁵, Sang Mo Yang⁴, Jun Hee Lee¹, Hu Young Jeong¹ and Tae Heon Kim²; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²University of Ulsan, Korea (the Republic of); ³SKKU, Korea (the Republic of); ⁴Sogang University, Korea (the Republic of); ⁵Korea Advanced Institute of Science and Technology, Korea (the Republic of); ⁶Pohang Accelerator Laboratory, Korea (the Republic of); ⁷Hallym University, Korea (the Republic of); ⁸Changwon National University, Korea (the Republic of)

2:45 PM SF10.05.06

Observation of Negative Piezoelectricity in HfO₂-Based Thin-Film Capacitors Pratyush P. Buragohain¹, Sangita Dutta^{2,3}, Haidong Lu¹, Sebastjan Glinsek², Hugo Aramberri⁴, Claudia Richter⁴, Pamenas Kariuki^{4,5}, Terence Mittmann⁴, Takanori Mimura⁶, Takao Shimizu^{6,7}, Hiroshi Funakubo⁶, Uwe Schroeder⁴, Emmanuel Defay², Jorge Iniguez^{2,3} and Alexei Gruverman¹; ¹University of Nebraska-Lincoln, United States; ²Luxembourg Institute of Science and Technology, Luxembourg; ³University of Luxembourg, Luxembourg; ⁴NaMLab gGmbH, Germany; ⁵TU Dresden, Germany; ⁶Tokyo Institute of Technology, Japan; ⁷National Institute for Materials Science (NIMS), Japan

SESSION SF10.06: Microscopy and Spectroscopy I
Session Chairs: Albina Borisevich and Young-Min Kim

Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 312

8:30 AM *SF10.06.01

Correlation of Local Crystal/Electronic Structures with Activity and Durability of Oxygen Electrocatalysis in Complex Oxides Sung-Yoon Chung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:00 AM SF10.06.03

Real-Time Quantum Dynamics for Controlling Polarization Switching in Ferroelectric Materials Bryan M. Wong; University of California, Riverside, United States

9:15 AM *SF10.06.04

Tailoring Topology in Real and Reciprocal Space in Oxides Sinead M. Griffin; Lawrence Berkeley National Laboratory, United States

9:30 AM BREAK

10:15 AM SF10.06.06

Electron Microscopic Understanding of Domain-Wall-Free Ferroelectricity in Y Doped HfO₂ Min-Su Kim¹, Kyoung-June Go¹, Hyun-Jae Lee², Kyoungjun Lee³, Takao Shimizu⁴, Seung Chul Chae³, Jun Hee Lee² and Si-Young Choi¹; ¹Pohang University of Science and Technology (POSTECH), Korea (the Republic of); ²Ulsan National Institute of Science and Technology, Korea (the Republic of); ³Seoul National University, Korea (the Republic of); ⁴National Institute for Materials Science, Japan

SESSION SF10.07: Microscopy and Spectroscopy II

Session Chairs: Robert Klie and Xiuzhen Yu

Wednesday Afternoon, May 11, 2022

Hawai'i Convention Center, Level 3, 312

1:30 PM *SF10.07.01

Advanced Electron Energy Loss Spectroscopy Investigations of Heterointerfaces for Spintronics Applications Quentin Ramasse¹, Demie Kepaptsoglou¹ and Vlado Lazarov²; ¹SuperSTEM Laboratory, United Kingdom; ²University of York, United Kingdom

2:00 PM SF10.07.02

Atomic-Level Imaging and Quantification of Dopants in a Semiconducting Complex Oxide Kasper Hunnestad¹, Constantinos Hatzoglou¹, Muhammad Z. Khalid¹, Per Erik Vullum^{1,2}, Zewu Yan^{3,4}, Edith Bourret⁴, Antonius T. J. van Helvoort¹, Sverre M. Selbach¹ and Dennis Meier¹; ¹Norwegian University of Science and Technology, Norway; ²SINTEF Industry, Norway; ³ETH Zürich, Switzerland; ⁴Lawrence Berkeley National Laboratory, United States

2:15 PM SF10.07.03

Identification of Atomic-Scale Electrocatalytically-Relevant Depth in Manganese Oxide Heterostructures Jegon Lee¹, Prajwal Adiga², Sang A Lee³, Seung Hyun Nam¹, Hyun-Ah Ju¹, Min-Hyoung Jung¹, Hu Young Jeong⁴, Young-Min Kim¹, Cindy Wong², Radwan Elzein², Rafik Addou², Kelsey A. Stoerzinger^{2,5} and Woo Seok Choi¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Oregon State University, United States; ³Pukyong National University, Korea (the Republic of); ⁴Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁵Pacific Northwest National Laboratory, United States

2:30 PM BREAK

3:00 PM *SF10.07.04

Atomic-Resolution Study of Complex Oxides for Multi-Valent Ion Battery Cathodes Robert F. Klie; University of Illinois-Chicago, United States

3:30 PM SF10.07.05

Deep Learning Crystallographic Mapping of Polycrystalline Hf_{0.5}Zr_{0.5}O₂ Thin Films Young-Hoon Kim¹, Sang-Hyeok Yang¹, MyoungHo Jeong², Min-Hyoung Jung¹, Daehye Yang¹, Hyangsook Lee², Tachwan Moon², Jinseong Heo², Hu Young Jeong³, Eunha Lee² and Young-Min Kim¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Samsung Electronics, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of)

3:45 PM SF10.07.06

Giant Optical Anisotropy in Quasi-One-Dimensional Transition Metal Chalcogenides Having Periodic Structural Modulations Guodong Ren¹, Boyang Zhao², Hongyan Mei³, Arashdeep S. Thind¹, Jad Salman³, Nan Wang², Tengfei Cao¹, John D. Cavin⁴, Han Wang², Mikhail Kats³, Miaofang Chi⁵, Jayakanth Ravichandran² and Rohan Mishra¹; ¹Washington University in St. Louis, United States; ²University of Southern California, United States; ³University of Wisconsin-Madison, United States; ⁴Washington University in St. Louis, United States; ⁵Oak Ridge National Laboratory, United States

SESSION SF10.08: Poster Session II: Emerging Functional Oxides and Interfaces II

Session Chairs: Miaofang Chi and Young-Min Kim

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF10.08.02

Thermodynamic and Kinetic Properties of Ceramic Oxide Grain Boundaries with High Dopant Concentrations Tara M. Boland, Arunima K. Singh, Peter Rez and Peter A. Crozier; Arizona State University, United States

SF10.08.03

Simultaneous Mapping of Elemental Distribution and Ionic Displacement in Multiferroic BiFeO₃ Thin Film via a Picoscale-Precision STEM-EDX Sang-Hyeok Yang¹, Sung Su Lee², Hyun-Jae Lee³, Jun Hee Lee³, Ji Young Jo², Hu Young Jeong³ and Young-Min Kim¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Gwangju Institute of Science and Technology, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of)

SF10.08.04

Enhanced Second Harmonic Generation in Ferroelectric (Zn, Mg)O Wurtzite System Rui Zu, Gyunghyun Ryu, Jingyang He, Kevin Ferri, Angela Cleri, Susan Trolrier-McKinstry, Jon-Paul Maria and Venkatraman Gopalan; The Pennsylvania State University, United States

SF10.08.05

Atomistic Study of Site-Selective Doping Behavior in SnO₂ Yeongrok Jin¹, Woo-Sung Jang², Sang-Hyeok Yang², Seon Je Kim², Young-Hoon Kim², Young-Min Kim² and Jaekwang Lee¹; ¹Pusan National University, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of)

SF10.08.07

Highly Sensitive Ion-Sensors with Symmetrically Gated Coplanar Metal-Oxide Electrochemical Transistors YoungWoo Jang¹, Jingu Kang¹, Hun-Bum Park¹, Sanghee Moon¹, Myung-Seok Choi² and Sung Kyu Park¹; ¹Chung-Ang University, Korea (the Republic of); ²Konkuk Univeristy, Korea (the Republic of)

SF10.08.08

Unveiling Invisible Surface Corrugation on CVD Graphene Seonha Park, Min Gi Choi, Seokjun Kim and Songkil Kim; Pusan National University, Korea (the Republic of)

SF10.08.09

High-Performance Electrochemical Carbon Dioxide Reduction Reaction with Designing Sub-Nanometer Space in Tin Oxide Nanoparticles Mun Young Kim, Woo Hyeong Sim and Hyung Mo Jeong; Sungkyunkwan University, Korea (the Republic of)

SF10.08.10

The Design and Characterization of Self-Forming Barrier with Co Alloy for Highly Reliable Advanced Interconnects Yoongu Lee, Cheol Kim, Geosan Kang and Youngchang Joo; Seoul National University, Korea (the Republic of)

SF10.08.11

High-Performance Dielectric Ceramics/Polymer Composite Films for Energy-Harvesting Applications Fazli Akram^{1,2}, Amir Ullah³, Tae Heon Kim², Ill Won Kim², Abdennaceur Karoui¹ and Chang Won Ahn²; ¹North Carolina Central University, United States; ²University of Ulsan, Korea (the Republic of); ³Islamia College, Pakistan

SF10.08.12

An Effective PEC Tandem Cell, Based on Sputtered Surfaces with Samarium Doped SrTiO₃ Photoanode Michael Arnold; Fraunhofer IKTS, Germany

SF10.08.13

Anisotropic Light Absorption and Charge Transport Properties of Epitaxial BiVO₄ Films Viktoria F. Kunzelmann¹, Chang-Ming Jiang^{1,2}, Irina Ihrke¹, Tim Rieth¹, Alex Henning¹, Johanna Eichhorn¹ and Ian D. Sharp¹; ¹Technical University of Munich, Walter Schottky Institute, Germany; ²National Taiwan University, Taiwan

SF10.08.14

Ultra-High Temperature Stable Hydrophobic Coatings Fabricated by Phased-Controlled Synthesis of Lanthanum-Based Materials Anna K. Schmidt-Verma, Vanessa Nahrstedt, Thomas Fischer and Sanjay Mathur; Universität zu Köln, Germany

SF10.08.15

First Epitaxial Thin Film of Low-Bandgap Manganese Vanadium Oxide (MnV₂O₄) Kamal Rudra^{1,2}, Pramod Ravindra², Mahek Mehta², Shwetha Bhat² and Sushobhan Avasthi²; ¹University of Michigan, United States; ²Indian Institute of Science, India

SF10.08.17

Laser-Induced Trapping of Metastable Amorphous-MO_x/C Nanocomposites Elijah M. Davis^{1,2} and Dibyendu Mukherjee^{1,2}; ¹The University of Tennessee, Knoxville, United States; ²Nano-BioMaterials Laboratory for Energy, Energetics & Environment (nbml-E3), United States

SF10.08.19

Oxide Semiconductor-Based Ferroelectric NAND Flash Memory for 3D Memory Applications Ik-Jyae Kim, Min-Kyu Kim, Dongshin Kim and Jang-Sik Lee; Pohang University of Science and Technology, Korea (the Republic of)

SF10.08.21

Electronic Transport and Interface Properties of (MgZnCd)O Based Ternary and Quaternary Alloys Gary Pennington, John Leventis, C. Ay and M. A. De La Cruz; Towson University, United States

SF10.08.22

Atomic level Variations of Strain-Fields at Surfaces and Steps on CeO₂ Nanoparticles Under Different Reducing Conditions Piyush Haluai, Tara M. Boland, Ethan L. Lawrence and Peter A. Crozier; Arizona State University, United States

SF10.08.23

Dynamic Symmetry Breaking in BaTiS₃ Towards Tunable Linear IR Birefringence Boyang Zhao^{1,1}, Guodong Ren², Hongyan Mei³, Shantanu Singh¹, Jad Salman³, Arashdeep S. Thind², Shanyuan Niu¹, Nan Wang¹, Qinai Zhao¹, Han Wang^{1,1}, Simon Teat⁴, Mikhail Kats³, Rohan Mishra² and Jayakanth Ravichandran^{1,1}; ¹University of Southern California, United States; ²Washington University in St. Louis, United States; ³University of Wisconsin-Madison, United States; ⁴Advanced Light Source, United States

SF10.08.24

Intrinsic Switching in Ferroelectric Y:HfO₂ Thin Film Capacitors Pratyush P. Buragohain¹, Adam Erickson², Takanori Mimura³, Takao Shimizu^{3,4}, Hiroshi Funakubo³ and Alexei Gruverman¹; ¹University of Nebraska–Lincoln, United States; ²University of Nebraska-Lincoln, United States; ³Tokyo Institute of Technology, Japan; ⁴National Institute for Materials Science (NIMS), Japan

SF10.08.25

Adsorption and Diffusion of Oxygen on Pure and Partially Oxidized Metal Surfaces Krishan Kanhaiya and Hendrik Heinz; University of Colorado at Boulder, United States

SF10.08.26

Revealing the Structure and Oxygen Transport at Interfaces in Complex Oxide Heterostructures via ¹⁷O NMR Spectroscopy Michael A. Hope^{1,2}, Bowen Zhang², Bonan Zhu², David M. Halat², Georges Menzildjian³, Zhuoran Wang³, Anne Lesage³, Lyndon Emsley¹, Judith MacManus-Driscoll² and Clare P. Grey²; ¹EPFL, Switzerland; ²University of Cambridge, United Kingdom; ³Université de Lyon, France

SESSION SF10.09: Interface, Strain and Defect Engineering

Session Chairs: Miaofang Chi and Young-Min Kim

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 312

8:45 AM *SF10.09.01

Local Observations of Defects and Disorder in Ferroelectrics and Their Impact on Phase Transition Behavior Albina Borisevich¹, Kyle Kelley¹, Sabine M. Neumayer¹, Michael A. Susner², Michael Mcguire¹, Anna N. Morozovska³, Eugene A. Eliseev⁴, Panchapakesan Ganesh¹, Sergei Kalinin¹, Nina Balke⁵, Petro Maksymovych¹ and Rama K. Vasudevan¹; ¹Oak Ridge National Laboratory, United States; ²Air Force Research Laboratory, United States; ³Institute of Physics, National Academy of Science of Ukraine, Ukraine; ⁴Institute for Problems of Materials Science, National Academy of Science of Ukraine, Ukraine; ⁵North Carolina State University, United States

9:15 AM SF10.09.02

Multilevel Strain Accomodation in an Single-Crystalline BiFeO₃ Thin Film at Multiple Length Scales Wooseon Choi¹, Bumsu Park¹, Jaejin Hwang², Gyeongtak Han¹, Sang-Hyeok Yang¹, Jong Chan Kim³, Hyeon Jun Lee⁴, Ji Young Jo⁴, Albina Borisevich⁵, Hu Young Jeong³, Sang Ho Oh¹, Jaekwang Lee² and Young-Min Kim¹; ¹Sungkyunkwan University, Korea (the Republic of); ²Pusan National University, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of); ⁴Gwangju Institute of Science and Technology, Korea (the Republic of); ⁵Oak Ridge National Laboratory, United States

9:30 AM SF10.09.03

Emergent Interface Vibrational Structure of Oxide Superlattices Eric R. Hoglund¹, De-Liang Bao², Andrew O'Hara², Sara Makarem¹, John Tomko¹, Jordan A. Hachtel³, Sokrates Pantelides^{2,2}, Patrick E. Hopkins^{1,1,1} and James M. Howe¹; ¹University of Virginia, United States; ²Vanderbilt University, United States; ³Oak Ridge National Laboratory, United States

9:45 AM BREAK

SESSION SF10.10: Materials Design and Characterization

Session Chairs: Young-Min Kim and Quentin Ramasse

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 312

10:15 AM *SF10.10.01

Tracking the Surface Chemistry and Composition of Complex Oxides *In Situ* During Growth Jayakanth Ravichandran; University of Southern California, United States

10:45 AM SF10.10.02

Deformed Crystalline Structures of Vanadium Oxide Films with Modified Metal-Insulator Transition and Asymmetric Magnetoresistance Jae-Hyun Ha, Kwongjin Park, Jung-Il Hong and Chun-Yeol You; Daegu Gyeongbuk Institute of Science & Technology (DGIST), Korea (the Republic of)

11:00 AM SF10.10.03

Heterogeneous Integration of Single-Crystalline Rutile Nanomembranes with Steep Phase Transition on Silicon Substrates Dong Kyu Lee¹, Yunkyu Park¹, Hyeji Sim¹, Jinheon Park¹, Younghak Kim², Gi-Yeop Kim¹, Chang-Beom Eom³, Si-Young Choi¹ and Junwoo Son¹; ¹Pohang University of Science and Technology, Korea (the Republic of); ²Pohang Accelerator Laboratory, Korea (the Republic of); ³University of Wisconsin–Madison, United States

11:15 AM SF10.10.04

Structural and Electronic Properties of Iridate Epitaxial Thin Films Emily Lindgren, Sanyum Channa and Yuri Suzuki; Stanford University, United States

SESSION SF10.11: Emerging Functional Oxides and Interfaces I

Session Chairs: Miaofang Chi and Rohan Mishra

Monday Afternoon, May 23, 2022

SF10-Virtual

1:00 PM *SF10.11.01

Piezoelectric and Ferroelectric Properties of Novel Layered van der Waals Crystals [Nina Balke](#); North Carolina State University, United States

1:30 PM SF10.11.02

Time-Voltage Dependent Evolution of Anti-Frenkel Defects in ErMnO₃ [Jiali He](#)¹, Ursula Ludacka¹, Donald M. Evans¹, Theodor Secanell Holstad¹, Erik Roede¹, Kasper A. Hunnestad¹, Konstantin Shapovalov², Zewu Yan^{3,4}, Edith Bourret⁴, Antonius T. J. van Helvoort¹, Sverre M. Selbach¹ and Dennis Meier¹; ¹Norwegian University of Science and Technology (NTNU), Norway; ²Institute of Materials Science of Barcelona, Spain; ³ETH Zürich, Switzerland; ⁴Lawrence Berkeley National Laboratory, United States

1:45 PM SF10.11.03

In Situ Analysis of Ferroelastic Domains in LaAlO₃ [John J. Scott](#)¹, Blai Casals Montserrat², Ekhard Salje² and Miryam Arredondo¹; ¹Queen's University Belfast, United Kingdom; ²University of Cambridge, United Kingdom

2:00 PM SF10.11.04

The Rational Design of New Antiferroelectrics and Ferroelectrics [Joseph W. Bennett](#); University of Maryland Baltimore County, United States

2:15 PM SF10.11.05

Observation and Control of Nano-Domains in Improper Ferroelectric Gd₂(MoO₄)₃ [Ivan Ushakov](#)¹, Theodor Secanell Holstad¹, Didier Perrodin², Edith Bourret², Thomas Tybell¹ and Dennis Meier¹; ¹Norwegian University of Science and Technology, Norway; ²Lawrence Berkeley National Laboratory, United States

2:20 PM SF10.11.06

Gold Nanorods for Improving Near-Infrared Attenuation in SnO₂:F Thin Films [Alfredo Campos](#); Universidad Tecnologica de Panama, Panama

2:25 PM SF10.11.07

Quantitative Analysis of Organic-Metal Interactions—New IFF MD Models, Get it Right [Cheng Zhu](#), Samuel Hoff and Hendrik Heinz; university of colorado boulder, United States

2:30 PM SF10.11.08

The Effect of Intrinsic Layer on the Performance of Oxide-Based p-i-n Hetero Junctions Integrating p-SnOx and n-InGaZnO [Donghun Lee](#) and Sunghwan Lee; Purdue University, United States

2:35 PM SF10.11.09

Defect Formation and Interface Charge Transfer at Misfit Dislocations in CeO₂/MgO Heterostructure [Pratik P. Dholabhai](#); Rochester Institute of Technology, United States

2:40 PM SF10.11.10

Simultaneous Atomic-Resolution Imaging of Light and Heavy Elements in Functional Materials by CoM-STEM [Michael Zachman](#)¹, Zhenzhong Yang², Yingge Du² and Miaofang Chi¹; ¹Oak Ridge National Laboratory, United States; ²Pacific Northwest National Laboratory, United States

SESSION SF10.12: Emerging Functional Oxides and Interfaces II

Session Chairs: Young-Min Kim and Jaekwang Lee

Monday Afternoon, May 23, 2022

SF10-Virtual

9:00 PM *SF10.12.01

Three-Dimensional Imaging by Large-Angle Illumination STEM [Ryo Ishikawa](#)^{1,2}, Naoya Shibata^{1,3} and Yuichi Ikuhara^{1,3}; ¹The University of Tokyo, Japan; ²Japan Science and Technology Agency, Japan; ³Japan Fine Ceramics Center, Japan

9:30 PM SF10.12.02

Interfacial Mg⁺⁺ Diffusion in Epitaxial Fe₃O₄ Thin Films [Krishna Prasad Koirala](#), Linda Wangoh, Le Wang, Mohammad D. Hossain, Vijayakumar Murugesan, Karl Mueller, Zihua Zhu, Chongmin Wang and Yingge Du; Pacific Northwest National Laboratory, United States

9:45 PM SF10.12.06

One-pot Fabrication and Characterization of Bioactive CeO_{2-x} Nanocrystals with Enhanced Radical Scavenging Potential [Sayoni Sarkar](#), Rohit Srivastava and Ajit R. Kulkarni; IIT Bombay, India

9:50 PM SF10.12.10

Construction of Hollow Nanocoils via Controlled Interfacial Reaction in Colloidal Solution [Jun Hwan Moon](#)¹, Moo Young Lee², Bum Chul Park¹, Yoo Sang Jeon¹, Seunghyun Kim¹, Taesoon Kim¹, Min Jun Ko¹, Kang Hee Cho², Ki Tae Nam² and Young Keun Kim¹; ¹Korea University, Korea (the Republic of); ²Seoul National University, Korea (the Republic of)

9:55 PM *SF10.02.01

Spiral Spin State Mediated by Chiral Phonon in Artificial Superlattices [Woo Seok Choi](#); Sungkyunkwan University, Korea (the Republic of)

10:25 PM SF10.08.16

Multicolor, Dual-Image, Printed Electrochromic Displays Based on Tandem Configuration [Keon-Woo Kim](#); Pohang University of Science and Technology, Korea (the Republic of)

SESSION SF10.13: Emerging Functional Oxides and Interfaces III
Session Chairs: Young-Min Kim and Jaekwang Lee
Tuesday Morning, May 24, 2022
SF10-Virtual

8:00 AM SF10.12.03

Simultaneous Enhancement of Piezoelectric and Elastic Properties in Codoped AlN System with B and Sc Huirong Jing¹, Yaowei Wang¹, Qiuhaowen¹, Xiaomeng Cai¹, Ke Liu¹, Weiming Li², Lei Zhu³, Xin Li³ and Hong Zhu¹; ¹Shanghai Jiao Tong University, China; ²Shanghai Institute of IC Materials, China; ³Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

8:05 AM SF10.12.04

Establishment of Control Method for Ferroelectric Properties in (Al_{1-x}Sc_x)N Films Shinnosuke Yasuoka¹, Ryoichi Mizutani¹, Reika Ota¹, Takahisa Shiraiishi¹, Takao Shimizu², Masato Uehara³, Hiroshi Yamada³, Morito Akiyama³ and Hiroshi Funakubo¹; ¹Tokyo Institute of Technology, Japan; ²National Institute for Materials Science, Japan; ³Agency of Industrial Science and Technology, Japan

8:10 AM SF10.12.08

Powder ALD(Atomic Layer Deposition)-Processed LSCF(Lanthanum Strontium Cobalt Ferrite) Cathodes for Solid Oxide Fuel Cell to Suppressing Sr-Exsolution Sung Eun Jo, Byung Chan Yang, Hyong June Kim and Jihwan An; Seoul National University of Science & Technology, Korea (the Republic of)

8:15 AM SF10.12.09

Epitaxial SrRuO₃ Freestanding Membranes Through Selective Etching of Sacrificial Buffer Layers Muhammad Sheeraz¹, Min-Hyoung Jung², Jin San Choi¹, Yong Jin Jo¹, Shinuk Cho¹, Ill Won Kim¹, Young-Min Kim², Sanghoon Kim¹, Hu Young Jeong³, Chang Won Ahn¹ and Tae Heon Kim¹; ¹University of Ulsan, Korea (the Republic of); ²Sungkyunkwan University, Korea (the Republic of); ³Ulsan National Institute of Science and Technology, Korea (the Republic of)

8:20 AM *SF10.12.07

Defect Engineering of the Magnetic and Topological Properties of Natural van der Waals Heterostructural Compounds nMnTe.mBi₂Te₃ Jiaqiang Yan; Oak Ridge National Laboratory, United States

8:50 AM SF10.01.02

Large Rashba Spin-Orbit Effect by Orbital Engineering at SrTiO₃-Based Correlated Interfaces Ganesh Ji Omar and Ariando Ariando; National University of Singapore, Singapore

##PAGE_BREAK##

SYMPOSIUM SF11

Advances in Design, Synthesis and Characterization of Functional Heteroanionic Materials
May 11 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION SF11.01: Synthesis and Characterization of Heteroanionic Materials I
Session Chairs: Stephan Lany and James Rondinelli
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 325A

8:30 AM SF11.01.01

Tuning the Structural and Magnetic Properties of Layered Manganese Oxysulfides—Synthesis and Topochemical Manipulations of CaSrMnO₂Cu_{1-x}S₃ Viktoria Falkowski^{1,2}, Samuel G. Booth^{3,2} and Simon Clarke^{1,2}; ¹University of Oxford, United Kingdom; ²The Faraday Institution, United Kingdom; ³The University of Sheffield, United Kingdom

8:45 AM *SF11.01.02

Anionic Ordering in Novel Aurivillius Oxyfluorides, Magnetism and Multiferroicity Olivier Mentré, Angel Arevalo-Lopez, Marie Colmont, Miguel Juarez and Sébastien Saitzek; UCCS, France

9:15 AM SF11.01.03

Anionic (Dis)order and Fluoride Dynamics in Complex Transition Metal Oxyfluorides from High-Resolution Solid-State NMR Spectroscopy Kent J. Griffith and Kenneth R. Poeppelmeier; Northwestern University, United States

9:30 AM BREAK

SESSION SF11.02: Design of Heteroanionic Materials
Session Chairs: Jill Wenderott and Patrick Woodward
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 325A

10:00 AM *SF11.02.01

Effect of Disorder on the Properties of Anion-Doped Wide-Bandgap Semiconductors Julia E. Medvedeva; Missouri Univ of S&T, United States

10:30 AM SF11.02.02

Heteroanionic Materials Discovery via *Ab Initio* Hydrothermal Synthesis-by-Design Lauren N. Walters, Chi Zhang, Vinayak P. Dravid, Kenneth R. Poeppelmeier and James M. Rondinelli; Northwestern University, United States

10:45 AM SF11.02.03

Crystal and Electronic Structure Predictions in Oxide-Nitrides and Interfaces with Hetero-Anionic Interlayers Abhishek Sharan and Stephan Lany; National Renewable Energy Laboratory, United States

11:00 AM SF11.02.04

Discovery of the Novel Sustainable *n*-Type Thermoelectrics Zn₂NX (X = Cl, Br, I) by Anion Mutation of ZnO Kieran B. Spooner and David O. Scanlon; University College London, United Kingdom

SESSION SF11.03: Synthesis and Characterization of Heteroanionic Materials II
Session Chairs: Kent Griffith and Anke Weidenkaff
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 325A

1:30 PM *SF11.03.01

Low-Temperature Topochemical Reactions as a Route to Novel Mixed-Anion Materials Michael Hayward; University of Oxford, United Kingdom

2:00 PM SF11.03.02

***In Situ* Ammonolysis Reveals Pathway to Low Temperature Synthesis of High Surface Area Cubic Molybdenum Oxynitrides** Elise Goldfine, Jill Wenderott, Matthew Sweers, Shobhit Pandey, Linsey Seitz, Michael J. Bedzyk and Sossina Haile; Northwestern University, United States

2:15 PM *SF11.03.03

Exploring the Relationship Between Local Bonding Preferences and Long Range Crystallographic Order Patrick Woodward; Ohio State University, United States

SESSION SF11.04: Poster Session: Heteroanionic Materials
Session Chairs: Steven May and James Rondinelli
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF11.04.01

High Performance and Surface Stability of Fe-Bi Heteroanionic Compounds for Electrocatalytic Oxygen Evolution Reaction Seunghwan Jo¹, John Hong² and Jung Inn Sohn¹; ¹Dongguk University, Korea (the Republic of); ²Kookmin University, Korea (the Republic of)

SF11.04.02

Effect of Post-Deposition Fluorination Treatment on the Structure and Electrical Transport Properties of Epitaxial La_{0.67}Ca_{0.33}MnO_{3-y} Thin Films Benjamin Moore¹, Maegan Jennings¹, Taylor Pettaway¹, Michael Aladejebi¹, Joseph Kromer¹, Sean Beahn¹, Caleb Maddux¹, Grace Yong² and Rajeswari M. Kolagani¹; ¹Towson University, United States; ²Loyola University, United States

SESSION SF11.05: Heteroanionic Thin Films
Session Chair: Steven May
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 325A

10:30 AM *SF11.05.01

Designer Mixed-Anion Materials for Solar-Energy Harvesting and Fluoride-Ion Batteries Steven T. Hartman and Rohan Mishra; Washington

University in St. Louis, United States

11:00 AM *SF11.05.02

Exploring Electronic Functionalities of Transition Metal Oxynitrides in Thin-Film Form [Tetsuya Hasegawa](#); Univ of Tokyo, Japan

SESSION SF11.06: Energy Applications for Heteroanionic Materials

Session Chairs: Viktoria Falkowski and Julia Medvedeva

Thursday Afternoon, May 12, 2022

Hawai'i Convention Center, Level 3, 325A

3:30 PM SF11.06.01

Late-Transition Metal Oxynitrides: Overcoming Challenges by Leveraging Their Earlier Counterparts [Matthew Sweers](#), Bingzhang Lu and Linsey Seitz; Northwestern University, United States

3:45 PM SF11.06.02

$Y_2Ti_2O_5S_2$ —A Quasi-Layered Oxysulphide for Thermoelectric Energy Generation [Katarina Brlec](#) and David O. Scanlon; University College London, United Kingdom

4:00 PM *SF11.06.03

Perovskite-Type Oxynitride Substitution Material [Anke Weidenkaff](#); Technical University of Darmstadt, Germany

SESSION SF11.07: Synthesis and Characterization of Heteroanionic Materials III

Session Chairs: Oliver Clemens and Hiroshi Kageyama

Monday Morning, May 23, 2022

SF11-Virtual

10:30 AM *SF11.07.01

3D ED for Determining Anion Order, *Ex Situ* and *In Situ* Daphne Vandemeulebroucke, Maria Batuk and [Joke Hadermann](#); Univ of Antwerp, Belgium

11:00 AM *SF11.07.02

Tuning the Chemical and Physical Properties of Mixed-Anion Compounds [Simon Clarke](#); Univ of Oxford, United Kingdom

11:30 AM *SF11.07.03

Designing Polar Mixed-Anion Materials [Emma E. McCabe](#); Durham University, United Kingdom

SESSION SF11.08: Optical Properties of Heteroanionic Materials

Session Chair: Steven May

Monday Afternoon, May 23, 2022

SF11-Virtual

6:30 PM *SF11.08.01

Topochemical Synthesis of Mixed-Anion Oxide Epitaxial Thin Films [Akira Chikamatsu](#); Ochanomizu University, Japan

7:00 PM *SF11.08.02

Metastable Layered Oxynitrides for Visible-Light Photocatalysis [Kazuhiko Maeda](#); Tokyo Inst of Technology, Japan

7:30 PM *SF11.08.03

Pleochroism of the *5d* oxychloride $Ca_3ReO_5Cl_2$ —A Unique Optical Property of the Mixed-Anion Compound [Daigorou Hirai](#)¹, Takeshi Yajima¹, Daisuke Nishio-Hamane¹, Changsu Kim¹, Hidefumi Akiyama¹, Mitsuki Kawamura¹, Takahiro Misawa¹, Nobuyuki Abe², Taka-hisa Arima² and Zenji Hiroi¹; ¹Institute for Solid State Physics, University of Tokyo, Japan; ²The University of Tokyo, Japan

8:00 PM SF11.08.04

Voltage Control of Patterned Properties in Lateral Oxide/Oxyfluoride Strontium Ferrate Heterostructures [Benjamin Lefler](#)¹, William M. Postiglione², Chris Leighton² and Steven May¹; ¹Drexel University, United States; ²University of Minnesota Twin Cities, United States

8:15 PM SF11.08.05

Synthesis and Characterization of the New Phase of Ferric Hydroxide Intercalated with Heteroanionic Material [DaeBeom Lee](#)¹, Bum Chul Park¹, Sung-Chul Kim², Min Jun Ko¹, Thomas Myeongseok Koo¹, Sung Ok Won² and Young Keun Kim¹; ¹Korea university, Korea (the Republic of); ²Korea Institute of Science and Technology, Korea (the Republic of)

SESSION SF11.09: Oxynitrides and Catalysis

Session Chairs: Joke Hadermann and Houria Kabbour

Tuesday Morning, May 24, 2022

SF11-Virtual

10:30 AM *SF11.09.01

Nitride Tuning of Transition Metal Oxides [Amparo Fuertes](#); Institut de Ciència de Materials de Barcelona (CSIC), Spain

11:00 AM *SF11.09.02

New High Oxidation State Transition Metal Nitrides Simon D. Klotz and [John P. Attfield](#); University of Edinburgh, United Kingdom

11:30 AM *SF11.09.03

Structure and Composition Change in New Materials for Catalysis [Yoji Kobayashi](#); King Abdullah University of Science and Technology, Saudi Arabia

SESSION SF11.10: Advanced Heteroanionic Materials

Session Chairs: Emma McCabe and James Rondinelli

Tuesday Afternoon, May 24, 2022

SF11-Virtual

1:00 PM *SF11.10.01

Design and Discovery of Multiple Anion Functional Materials—Synthesis, Structure, Computation and Machine Learning [Matthew Rosseinsky](#); University of Liverpool, United Kingdom

1:30 PM *SF11.10.02

Electrochemistry Meets Oxyfluorides—The Alteration of Magnetic Properties via Battery Chemistry [Oliver Clemens](#); Uni Stuttgart, Germany

2:00 PM *SF11.10.03

Designing New Superconductors with Mixed Anions Jean Baptiste Vaney, Sophie Tencé, Bapiste Vignolle, Etienne Gaudin, Etienne Durand, Mathieu Duttine, Christine Labrugère and [Alain Demourgues](#); ICMCB-CNRS-University of Bordeaux, France

##PAGE_BREAK##

SYMPOSIUM SF12

Bioinspired Structural Composites—Advances in Experiments, Simulations and AI-Based Design
May 9 - May 25, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SF12.01: Biopolymers Driven Architected Materials—Design, Synthesis and Characterization I

Session Chairs: Hendrik Heinz and Dhriti Nepal

Monday Morning, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

10:30 AM *SF12.01.01

Bio-Enabled Functional Materials—From Ultrastrong Actuation to Photonic and Emissive Structures [Vladimir Tsukruk](#); Georgia Institute of Technology, United States

11:00 AM *SF12.01.02

DNA-Programmed Assembly of Nanoparticle Superlattices with Dynamic and Tailorable Mechanical and Optical Phenomena [Robert J. Macfarlane](#); Massachusetts Institute of Technology, United States

11:30 AM *SF12.01.03

Design, Interfacial Mechanics and Applications of Mussel-Inspired Polymers Peyman Delparastan¹, Katerina Malollari¹, Arianna Avellan¹, Kelsey DeFrates¹, Joakim Engstrom¹, Brylee Tiu¹, Kyueui Lee¹, Cody Higginson¹, Jing Cheng¹, Yiran Li¹, Yi Cao² and [Phillip B. Messersmith](#)¹; ¹University of California, Berkeley, United States; ²Nanjing University, China

12:00 PM SF12.01.04

Bioinspired Designed Interfaces Between Proteins and Inorganic Crystals for Templated Assembly and Co-Assembly [Sakshi Yadav](#)¹, Shuai

Zhang^{2,1}, Harley Pyles², David Baker² and James De Yoreo^{1,2}; ¹Pacific Northwest National Laboratory, United States; ²University of Washington, United States

SESSION SF12.02: Biopolymers Driven Architected Materials—Design, Synthesis and Characterization II

Session Chairs: Hendrik Heinz, Dhriti Nepal and Joshua Uzarski

Monday Afternoon, May 9, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

2:00 PM *SF12.02.02

Silk Based Nanocomposites with Tunable Mechanical Properties [David L. Kaplan](#); Tufts University, United States

2:30 PM BREAK

3:00 PM SF12.02.03

***In Situ* Visualization of the Hierarchical Anisotropy of 3D Printed Lyotropic Liquid Crystals** [Adrian Rodriguez-Palomo](#)¹, Viviane Lutz-Bueno², Manuel Guizar-Sicairos², Xiaobao Cao³, Roland Kádár¹, Martin Andersson¹ and Marianne Liebi^{1,4}; ¹Chalmers University of Technology, Sweden; ²Paul Scherrer Institute, Switzerland; ³ETH Zurich, Switzerland; ⁴EMPA—Swiss Federal Laboratories for Materials Science and Technology, Switzerland

3:15 PM SF12.02.04

***In Situ* Characterizing the Conformational Modulation of R-Bodies, a pH-Dependent Force Generator in Bacteria** Shuai Zhang^{1,2}, Guangyang Cai¹, Jiajun Chen³, Paul Ashby³, Justin Kollman¹ and James De Yoreo^{2,1}; ¹University of Washington, United States; ²Pacific Northwest National Laboratory, United States; ³Lawrence Berkeley National Laboratory, United States

3:30 PM SF12.02.05

Toward Ordered Materials Based on Self-Assembled Iridescent *Cellulophaga lytica* (*C. lytica*) Biofilms Claretta J. Sullivan¹, [Kennedy Brown](#)¹, Chia Hung¹, Mark DeSimone², Vincent Chen¹, Maneesh Gupta¹, Abby Juhl¹, Matthew Dickerson¹, Patrick Dennis¹, Milana Vasudev² and Nancy Kelley-Loughnane¹; ¹AFRL, United States; ²University of Massachusetts Dartmouth, United States

3:45 PM SF12.02.06

Evolutionary Origin of Silk Material Hierarchy [Ori Brookstein](#)¹, Eyal Shimoni² and Ulyana Shimanovich¹; ¹Weizmann Institute of Science, Israel; ²Weizmann Institute of Science, Israel

SESSION SF12.03: Poster Session: Bioinspired Structural Composites—Advances in Experiments, Simulations and AI-Based Design

Session Chairs: Hendrik Heinz, Dhriti Nepal, Bret Rogers and Vikas Varshney

Monday Afternoon, May 9, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF12.03.01

Additive Manufacturing of Drag Reducing Synthetic Surfaces Inspired by Shark Denticles [Daniel D. Lim](#) and Grace Gu; University of California, Berkeley, United States

SF12.03.02

Metallic Open Channel Colloidal Superlattices [Yuanwei Li](#), Wenjie Zhou, Ibrahim Tanriover, Koray Aydin and Chad Mirkin; Northwestern University, United States

SF12.03.03

Oriented Self-Assembly of Natural Photosystems with Surface Modified Carbon Nitride Nanosheets for Efficient Photoconversion [Nyeongbeen Jo](#) and Yoon Sung Nam; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SF12.03.04

The Intrinsically Disordered Worm Jaw Protein, Nvjp-1—A Liquid-liquid Phase Separated Material for Advanced Applications [Sanaz Farajollahi](#)^{1,2}, Michael Crenshaw^{1,2}, Nina Lombardo^{1,2}, Joseph Slocik^{1,2}, Peter Mirau², Rajesh Naik² and Patrick Dennis²; ¹UES, United States; ²Air Force Research Laboratory, United States

SF12.03.05

Bioinspired Structured Chitosan/Silica Composites for Passive Radiative Daytime Cooling [Tobias Lauster](#), Kishin Matsumori and Markus Retsch; University of Bayreuth, Germany

SF12.03.06

Bioinspired Nanocomposites for Next-Generation Batteries [Ahmet Emre](#), Emine S. Turali-Emre, Ji-Young Kim and Nicholas A. Kotov; University of Michigan, United States

SF12.03.07

Design of Functionally Graded Bioinspired Pillar Adhesives Using Bayesian Optimization [Maya Horii](#) and Grace Gu; University of California, Berkeley, United States

SF12.03.08

Facile, Energy Efficient Microscale Fibrillation of Polyacrylamides under Ambient Conditions [Menandro Cruz](#), Darshil U. Shah, Nina C. Warner, Jade A. McCune and Oren A. Scherman; University of Cambridge, United Kingdom

SF12.03.09

Active Anti-Icing and De-Icing Surface Based on Magneto-Responsive Photothermal Composite Cilia [Jaecil Kim](#)¹, Sang-Hyeon Lee¹, Minho Seong¹, Somi Kim¹, Hyejin Jang¹, Moon Kyu Kwak² and Hoon Eui Jeong¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Kyungpook National University, Korea (the Republic of)

SF12.03.10

From Spectroscopy Image to Mechanical Properties—Customizable Characterization Platform for Multiscale Structural Materials Using the Image-Particle Converter and GPU-Accelerated Lattice Spring Model [Yuan Chiang](#)¹, Ya-Yun Tsai¹, Meng-Lin Tsai¹, Ting-Wai Chiu^{1,2,3} and Shu-Wei Chang¹; ¹National Taiwan University, Taiwan; ²Academia Sinica, Taiwan; ³National Taiwan Normal University, Taiwan

SF12.03.11

3D Nano-Writing of Biopolymers [Un Yang](#), Moon-Jung Yong, Byunghwa Kang, Seung Soo Oh and Jung Ho Je; Pohang University of Science and Technology, Korea (the Republic of)

SF12.03.12

Hydrogel-Shelled Photonic Microbeads for Structural-Color Inks [Seong Kyeong Nam](#), Jong Bin Kim, Sanghyuk Park and Shin-Hyun Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

SF12.03.14

Protein-Based Adhesives for Biocomposites [Kristi Singh](#)^{1,2}, [Carter Bibler](#)², [Sanaz Farajollahi](#)^{1,2}, [Patrick Dennis](#)¹ and [Joseph Slovic](#)^{2,1}; ¹Air Force Research Laboratory, United States; ²UES, Inc., United States

SESSION SF12.04: Self Assembly of Interphase Tailored Nanostructures—Advanced Characterization I

Session Chairs: Ken Caster, Hendrik Heinz and Dhriti Nepal

Tuesday Morning, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

8:00 AM *SF12.04.01

Polymer-Grafted, Layered Transition Metal Dichalcogenide for Nano-Laminates and Nano-Composites [Ali Jawaid](#), [Lucas Beagle](#), [Nicholas Glavin](#) and [Richard A. Vaia](#); Air Force Research Laboratory, United States

8:30 AM *SF12.04.02

Ideas for Creating Impact Resistant Polymeric Materials by Tuning Molecular Topology [Sinan Ketten](#); Northwestern University, United States

9:00 AM *SF12.04.03

A New Computational Method (CREASE) for Analyzing Small Angle Scattering Profiles from Macromolecular Materials [Arthi Jayaraman](#); University of Delaware, United States

9:30 AM *SF12.04.04

Using AI to Unlock Nature's Secrets to Design Mechanical Metamaterials [Catherine Brinson](#), [Mary Bastawrous](#) and [Zhi Chen](#); Duke University, United States

10:00 AM SF12.05.03

Establishing the Rules for the Organization and Crystallization of Colloidal Anisotropic Nanoparticles [Wenjje Zhou](#), [Yuanwei Li](#), [Zizhuo Liu](#), [Ziyin Huang](#), [Koray Aydin](#) and [Chad Mirkin](#); Northwestern University, United States

SESSION SF12.05: Self Assembly of Interphase Tailored Nanostructures—Advanced Characterization II

Session Chairs: Hendrik Heinz, Dhriti Nepal and Joshua Uzarski

Tuesday Afternoon, May 10, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

1:45 PM *SF12.05.01

Smart Polymer Interfaces—From Biologically Inspired to Biologically Applied Designs [Rana Ashkar](#); Virginia Tech, United States

2:15 PM SF12.05.04

Rapid Synchronized Fabrication of Vascularized Thermosets and Composites [Mayank Garg](#)^{1,1}, [Jia En Aw](#)^{1,1}, [Xiang Zhang](#)², [Polette Centellas](#)^{1,1}, [Leon M. Dean](#)^{1,1}, [Evan M. Lloyd](#)^{1,1}, [Ian D. Robertson](#)^{1,1}, [Yiqiao Liu](#)¹, [Mostafa Yourdkhani](#)^{1,3}, [Jeffrey Moore](#)^{1,1}, [Philippe H. Geubelle](#)^{1,1} and [Nancy R. Sottos](#)^{1,1}; ¹University of Illinois at Urbana-Champaign, United States; ²University of Wyoming, United States; ³Colorado State University, United States

SESSION SF12.13: Poster Session II

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF12.03.13

Tailoring Structure and Biofunctionality of Low-Density Nanocellulose Aerogels [Jowan Rostami](#)¹, [Korneliya Gordeyeva](#)¹, [Tobias Bensefelt](#)^{1,2},

Ekeram Lahchaichi¹, Stephen Hall³, Anastasia Riazanova¹, Per Larsson¹, Goksu Cinar Ciftci¹ and Lars Wagberg¹; ¹KTH Royal Institute of Technology, Sweden; ²Nanyang Technological University, Singapore; ³Lund University, Sweden

SESSION SF12.06: Mechanics of Biomaterials and Composites—Coupling Modeling to Experiments I

Session Chairs: Hendrik Heinz, Dhriti Nepal and Vikas Varshney

Wednesday Morning, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

8:30 AM *SF12.06.01

Correlative Nanoscale Spectroscopy of Nanocomposites at the Extreme Limits of Molecular-scale Confinement [Reinhold H. Dauskardt](#); Stanford University, United States

9:00 AM *SF12.06.02

Strength and Fatigue versus Morphology of Nanotubes Assemblies—Computer-Simulated Nitant I. Gupta, Evgeni S. Penev and [Boris I. Yakobson](#); Rice University, United States

9:30 AM *SF12.06.03

Multiscale, Multiphysics Simulation Meets AI-Based Science for Advanced Materials Design [Peter Coveney](#), Maxime Vassaux and James L. Suter; University College London, United Kingdom

10:00 AM BREAK

10:30 AM *SF12.06.04

Atomic-Scale Hybrid Materials Design for Structural and Other Functionalities [Ajit K. Roy](#); Air Force Research Laboratory, United States

11:00 AM SF12.06.05

The Interplay Between Thermal Transport and Bio-Inspired Structural Materials [Zhiting Tian](#); Cornell University, United States

SESSION SF12.07: Mechanics of Biomaterials and Composites—Coupling Modeling to Experiments II

Session Chairs: Hendrik Heinz, Dhriti Nepal and Ming-Jen Pan

Wednesday Afternoon, May 11, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

2:00 PM *SF12.07.01

Biological Blueprints For Architected Impact Resistant Materials [David Kisailus](#); University of California, Irvine, United States

2:30 PM BREAK

3:00 PM *SF12.07.04

Characterization of fl-CNT/Polymer Composite Material Interfaces—Molecular Dynamics Studies [Gregory Odegard](#), Sagar Patil, Prathamesh Deshpande, Prashik Gaikwad, Swapnil Bamane and Will Pisani; Michigan Technological University, United States

3:30 PM SF12.07.06

Machine Learning for Carbon Nanotube Yarn Mechanical Properties [Jordan Winetrou](#)¹, Qi Zhao², Yusu Wang² and Hendrik Heinz¹; ¹University of Colorado, Boulder, United States; ²University of California, San Diego, United States

3:45 PM SF12.07.07

Bio-Inspired Mode-I Fracture and Fatigue Crack Healing in CFRP Composites Using Thermoplastic Healants [Samit Roy](#), Sameer Mulani and Nilesh Vishe; University of Alabama, United States

SESSION SF12.08: Nature Inspired Dynamic Composites

Session Chairs: Chris Crouse, Ming-Jen Pan and Bret Rogers

Thursday Morning, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

8:30 AM SF12.08.01

3D Printing High-Performance Nanocellulose and Chitosan Composites—The Importance of Nanostructuring and Complexation [Rigoberto C. Advincula](#)^{1,2,3}; ¹Case Western Reserve University, United States; ²The University of Tennessee, Knoxville, United States; ³Oak Ridge National Laboratory, United States

8:45 AM SF12.08.02

Musculoskeletal System-Mimetic Nanocomposite Robots for Agile and Multimodal Magnetic Swimming [Jeong Jae Wie](#), Sukyoung Won and Hee Eun Lee; Inha University, Korea (the Republic of)

9:00 AM SF12.08.03

Creation of Bio-Functional Plastics with Renewable Surfaces [Joseph Slocik](#), Patrick Dennis, Sanaz Farajollahi, Kristi Singh and Rajesh Naik; Air Force Research Laboratory, United States

9:15 AM SF12.08.05

From Diatom Frustule to the Design of Novel Bioinspired Lightweight Materials [Flavia Libonati](#) and Lidovico Musenich; University of Genoa, Italy

9:30 AM SF12.08.06

Development of Anisotropic Triple Network Hydrogels with Superior Mechanical and Adhesive Properties for Artificial Tendon [Suji Choi](#) and Jaeyun Kim; Sungkyunkwan University, Korea (the Republic of)

9:45 AM SF12.08.07

Morphing Capabilities and Processing Susceptibility of Vitrimers and Vitriemer Nanocomposites Amber M. Hubbard¹, Yixin Ren¹, Peter Papaioannou¹, Alireza Sarvestani², Catalin Picu³, Dominik Konkolewicz⁴, Ajit Roy¹, Vikas Varshney¹ and [Dhriti Nepal](#)¹; ¹Air Force Research Laboratory, United States; ²Mercer University, United States; ³Rensselaer Polytechnic Institute, United States; ⁴Miami University, United States

SESSION SF12.09: Panel Discussion: Bioinspired Structural Composites—Advances in Experiments, Simulations and AI Based Design

Session Chairs: Hendrik Heinz and Dhriti Nepal

Thursday Afternoon, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

1:30 PM OPENING INTRODUCTION OF TOPICS, POINTS OF DISCUSSION AND PANEL EXPECTATIONS

1:35 PM PANEL INTRODUCTIONS

1:40 PM PANELIST'S OVERVIEW

2:05 PM *SF12.09.01

PANEL DISCUSSION: Bioinspired Structural Composites—Advances in Experiments, Simulations and AI Based Design [Carole C. Perry](#)¹, David L. Kaplan², Hilmar Koerner³, Catherine Brinson⁴, Jesse Tice⁵, Morley Stone⁶ and Yury Gogotsi⁷; ¹Nottingham Trent University, United Kingdom; ²Tufts University, United States; ³Air Force Research Laboratory, United States; ⁴Duke University, United States; ⁵Northrop Grumman, United States; ⁶Institute for Human and Machine Cognition, United States; ⁷Drexel University, United States

2:55 PM CLOSING REMARKS

3:00 PM BREAK

SESSION SF12.10: Open Forum: Collaboration and Partnership Opportunities

Session Chairs: Hendrik Heinz and Dhriti Nepal

Thursday Afternoon, May 12, 2022

Hilton, Mid-Pacific Conference Center, 6th Floor, South Pacific 4

3:30 PM INTRODUCTIONS OF THE PANELISTS

3:35 PM *SF12.10.01

Program Overviews by each Panelist [Birgit Schwenzer](#)¹, Ken Caster², Bret Rogers³, Joshua Uzarski⁴ and Jesse Tice⁵; ¹National Science Foundation, United States; ²Air Force Office of Scientific Research, United States; ³Air Force Research Laboratory, United States; ⁴U.S. Army Research Laboratory, United States; ⁵Northrop Grumman Corporation, United States

4:05 PM Q&A WITH AUDIENCE

SESSION SF12.11: General Session I

Session Chairs: Hendrik Heinz, Dhriti Nepal, Carole Perry and Emilie Siochi

Wednesday Afternoon, May 25, 2022

SF12-Virtual

1:00 PM *SF12.11.01

Bioinspired Assembly of Peptide and DNA-Based Nanostructures [George C. Schatz](#); Northwestern University, United States

1:30 PM SF12.11.03

Statistical Field Theory for the Free Energy of an Electro-Mechanical Polymer Chain—Non-Local Dipole-Dipole Interactions in the Fixed Applied Field Ensemble [Pratik Khandagale](#)¹, Carlos G. Cervera², Gal deBotton³, Carmel Majidi¹ and Kaushik Dayal¹; ¹Carnegie Mellon University, United States; ²University of California, Santa Barbara, United States; ³Ben-Gurion University of the Negev, Israel

1:45 PM SF12.11.05

Modifying Composite Interfaces to Maximise Physical Performance and Functionality [Luke Henderson](#); Deakin University, Australia

2:00 PM SF12.11.06

Non-destructive Hardness Prediction via Deep Learning Image Regression Models [Andrew Lew](#)¹, Pupa Gilbert² and Markus Buehler¹; ¹Massachusetts Institute of Technology, United States; ²University of Wisconsin–Madison, United States

2:05 PM SF12.11.07

Self-assembled Crystalline Diblock Copolypeptoid Nanostructures Revealed by 3D Cryogenic Electron Microscopy [Tianyi Yu](#)¹, Xubo Luo¹, David Prendergast¹, Nitash Balsara^{1,2}, Ronald Zuckermann¹ and Xi Jiang¹; ¹Lawrence Berkeley National Lab, United States; ²University of California, Berkeley, United States

SESSION SF12.12: General Session II
Session Chairs: Hendrik Heinz, Dhriti Nepal, Carole Perry and Emilie Siochi
Wednesday Afternoon, May 25, 2022
SF12-Virtual

6:30 PM *SF12.12.01

Graph Theoretical Descriptors for Biomimetic Nanoparticles and Fibrous Nanocomposites [Nicholas A. Kotov](#); University of Michigan, United States

7:00 PM SF12.12.03

Direct Writing of Structurally Colored 2D Graphics and 3D Objects Using Colloidal Inks [Jong Bin Kim](#)¹, Changju Chae², Sang Hoon Han¹, Su Yeon Lee² and Shin-Hyun Kim¹; ¹Korea Advanced Institute of Science and Technology, Korea (the Republic of); ²Korea Research Institute of Chemical Technology, Korea (the Republic of)

7:15 PM SF12.12.04

Hierarchically Porous Stimuli-Responsive Chitosan/MXene (Ti₃C₂T_x) Foams by Two-Step Crosslinking Mechanism [Stephanie K. Lee](#)¹, Il Yub Choi¹, Jin Hyun Lee² and Jonghwan Suhr^{1,1}; ¹Sungkyunkwan University, Korea (the Republic of); ²Inha University, Korea (the Republic of)

7:20 PM SF12.07.03

Investigating Interfaces in the Cell Wall of Fast-Growing Plant for Next-Generation Composites [Anamika Prasad](#); South Dakota State University, United States

##PAGE_BREAK##

SYMPOSIUM SF13

From Actuators and Energy Harvesting Storage Systems to Living Machines
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION Tutorial SF13.00: Soft Actuators and Robotic Systems for Living Machines
Session Chairs: Muhammad Farhan, Andreas Lendlein, Yue Liu and Fabian Meder
Monday Morning, May 23, 2022
SF13-Virtual

8:30 AM

Soft Actuators [Muhammad Farhan](#); Helmholtz Zentrum Hereon, Germany

9:30 AM Q&A

9:45 AM

In-Situ Characterization by Atomic Force Microscopy [Yue Liu](#); Helmholtz-Zentrum Geesthacht, Germany

10:45 AM Q&A

11:00 AM

Energy Conversion in Living Plants [Fabian Meder](#); Italian Institute of Technology, Italy

SESSION SF13.01: Soft Actuators I
Session Chairs: Kris L. Dorsey and Ruike Renee Zhao
Monday Morning, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

10:30 AM *SF13.01.01

Soft Energy Harvesters and Actuators Using Liquid Metal [Michael Dickey](#); North Carolina State University, United States

11:00 AM SF13.01.02

Multifunctional Magnetic Origami Robots [Ruike Renee Zhao](#); Stanford University, United States

11:15 AM *SF13.01.03

Programming Intelligence in Liquid Crystal Elastomer Composites: From Actuation to Energy Harvesting [Shu Yang](#); University of Pennsylvania, United States

SESSION SF13.02: Soft Actuators II
Session Chairs: Andreas Lendlein and Pablo Valdivia y Alvarado
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

3:00 PM *SF13.02.01

Applications of Large Strain Near Phase Instabilities in Relaxor Ferroelectric Single Crystals [Christopher Lynch](#)¹, Peter Finkel², Ahmed Amin³ and Margo Staruch²; ¹University of California, Riverside, United States; ²U.S. Naval Research Laboratory, United States; ³Undersea Warfare Center, United States

3:30 PM SF13.02.02

Light-Triggered Temperature-Responsive Hydrogel Actuator Reinforced with Bacterial Cellulose for Soft Robotics [Daehwan Park](#)^{1,2}, Jin Woong Kim² and Chinedum Osuji¹; ¹University of Pennsylvania, United States; ²Sungkyunkwan University, Korea (the Republic of)

3:45 PM SF13.02.03

Printable and Self-Healing Gelatin Conductive Ink for Dielectric Elastomer Actuators and Strain Sensors [Geonoh Choe](#), Tae K. An and Yong J. Jeong; Korea National University of Transportation, Korea (the Republic of)

4:00 PM SF13.02.04

Sequential Coupling of Functions in Hydrogels Enables Shape-Memory Hydrogels with pH, Enzyme- or an Inverse Temperature Sensitivity [Marc Behl](#)¹, Lucile Tartivel^{1,2}, Zewang You^{1,2}, Maria Balk^{1,2}, Anna-Maria Block¹ and Andreas Lendlein^{1,2}; ¹Helmholtz-Zentrum hereon, Germany; ²University of Potsdam, Germany

4:15 PM SF13.02.05

Nanowire-Forest Grown Shape Memory Alloy for Fast Actuation and Its Application to Bio-Inspired Robotics [Saewoong Oh](#) and Il-Kwon Oh; KAIST, Korea (the Republic of)

4:30 PM SF13.02.06

Sensitive Multi-Stimuli Responsive Actuating Films Driven by Submolecular Switching [Michael Leveille](#)¹, Jin Ke², Muharrem Acerce¹, Changchun Wang², Sayantani Ghosh¹ and Jennifer Q. Lu¹; ¹University of California, Merced, United States; ²Fudan University, China

SESSION SF13.03: Biomaterials/Devices
Session Chairs: Andreas Lendlein and Ruike Renee Zhao
Tuesday Morning, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

9:00 AM *SF13.03.01

Smart 3D Microtechnologies for Biology and Human Health [David H. Gracias](#); Johns Hopkins University, United States

9:30 AM SF13.03.02

Motion-Activated Zn-Air Battery as a Power Supply to Smart Contact Lenses [Erfan Pourshaban](#), Adwait Deshpande, Mohit U. Karkhanis, Aishwaryadev Banerjee, Chayanjit Ghosh, Hanseup Kim and Carlos H. Mastrangelo; University of Utah, United States

9:45 AM SF13.03.03

Soft Matter Actuators for Muscle-Replacement Applications [Ben Baker](#), Marcos Villeda Hernandez, Leo Kershaw, Christian Romero, Johnathan M. Rossiter and Prof Charl F. Faul; University of Bristol, United Kingdom

10:00 AM BREAK

10:30 AM SF13.03.04

Manipulation and Assembly of Anisotropic Nanoparticles with Ultrahigh Precision and Versatility in Both Position and Angle Control [Huaizhi Li](#), Daniel Teal, Zexi Liang and Donglei (Emma) Fan; The University of Texas at Austin, United States

10:45 AM *SF13.03.05

Biodegradable and Biocompatible Actuators for Soft and Biohybrid Robotics [Victoria Webster-Wood](#) and Wenhuan Sun; Carnegie Mellon University, United States

SESSION SF13.04: Biomaterials/Devices and Energy Harvesting
Session Chairs: Kris L. Dorsey and Pablo Valdivia y Alvarado
Tuesday Afternoon, May 10, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

1:30 PM *SF13.04.01

Bone-Inspired Autonomously Reinforcing and Damage-Mitigating Materials [Sung Hoon Kang](#); Johns Hopkins University, United States

2:00 PM SF13.04.02

Polarization-Induced Polymer Dielectric Layers for Multifunctional Triboelectric Applications with Self-Healing and High-Performance [Minsoo Kim](#)¹, Young-Ryul Kim¹, Pothanagandhi Nallepalli², Jung Kwon Oh² and Hyunhyub Ko¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Concordia University, Canada

2:45 PM *SF13.04.04

Piezoelectric Fibers [Philippe Poulin](#); University of Bordeaux, France

2:30 PM BREAK

3:15 PM SF13.04.05

Hybrid Energy Harvester Utilizing Dual Stimulus of Temperature and Humidity Enabled by Thermoelectric and Hydrons Byungseok Seo, [Hyesu Han](#) and Wonjoon Choi; Korea University, Korea (the Republic of)

SESSION SF13.05: 3D/4D-Printing
Session Chairs: Kris L. Dorsey and Ruike Renee Zhao
Wednesday Morning, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

8:30 AM *SF13.05.01

Multimaterial 3D/4D Printing for Functional Composites [Hang \(Jerry\) Qi](#); Georgia Inst of Technology, United States

9:00 AM SF13.05.02

Freeform Liquid 3D-Printing of Silicone/Epoxy Hybrid Resins for the Fabrication of Functionally Graded Materials Applied to Soft Robotics [Theo Calais](#), Vincent S. Joseph, Elgar Kanhere, Thileepan Stalin, Aby Raj Plamootil, Snehal Jain and Pablo Valdivia y Alvarado; Singapore University of Technology and Design, Singapore

9:15 AM SF13.05.03

Spinodal Metamaterials as Pneumatic Actuators for Complex Shape Morphing [Andreas Walker](#) and Kristina Shea; ETH Zurich, Switzerland

9:30 AM *SF13.05.04

New Materials and Approaches for 2D and 3D Printing of Responsive Objects [Shlomo Magdassi](#); Hebrew Univ of Jerusalem, Israel

10:00 AM BREAK

10:30 AM SF13.05.05

Nanostructured Layers and 4D Printed Materials—Scalable Stimuli-Responsive Functionality [Rigoberto C. Advincula](#)^{1,2,3}; ¹Case Western Reserve University, United States; ²The University of Tennessee, Knoxville, United States; ³Oak Ridge National Laboratory, United States

10:45 AM DISCUSSION TIME

11:00 AM SF13.05.07

Computational Design of 4D Printed Tunable Pneumatic Valves [Joël N. Chapuis](#) and Kristina Shea; ETH Zürich, Switzerland

11:15 AM SF13.05.08

Tunable Silicone/Epoxy Hybrid Resins for the Fabrication of Functionally Graded Materials Applied to Flying Devices [Theo Calais](#)¹, Vincent S. Joseph¹, Elgar Kanhere¹, Snehal Jain¹, Thileepan Stalin¹, Aby Raj Plamootil¹, Quoc Viet Nguyen², Wei Leong Chan² and Pablo Valdivia y Alvarado¹; ¹Singapore University of Technology and Design, Singapore; ²National University of Singapore, Singapore

SESSION SF13.06: Plants
Session Chairs: Andreas Lendlein and Ruike Renee Zhao
Wednesday Afternoon, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 1

1:30 PM *SF13.06.01

Developmental Themes of a Climbing Cactus—A Bio-Inspired Approach for New Actuator Technologies [Patricia Soffiatti](#)^{1,2} and Nick Rowe²;

¹FEDERAL UNIVERSITY OF PARANÁ STATE, Brazil; ²Botany & Plant Modelling - AMAP, France

2:00 PM *SF13.06.02

Nature-Derived Multifunctional Materials and Nature-Inspired Designs [Hongli Zhu](#); Northeastern University, United States

2:30 PM *SF13.06.03

From Plants and Soft Animals—Lessons for a New Generation of Living Machines [Barbara Mazzolai](#); Istituto Italiano di Tecnologia, Italy

3:00 PM SF13.05.06

Micropatterned 2D Pyrolytic Carbon Microlattices Fabricated via Stereolithography [Akira Kudo](#)¹, Kazuya Ohmuro¹, Yuta Yamamoto¹, Kaisei Furudate¹, Shinnosuke Kamohara¹ and Mingwei Chen²; ¹Tohoku University, Japan; ²Johns Hopkins University, United States

SESSION SF13.07: Poster Session: From Actuators and Energy Harvesting Storage Systems to Living Machines

Session Chairs: Andreas Lendlein and Pablo Valdivia y Alvarado

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF13.07.01

Programmable Mechanical Properties in Dynamic Reaction-Induced Phase Separated Thia-Michael Networks [Nicholas Boynton](#)¹, Joseph Dennis², Neil Dolinski¹, James Lettow¹, Shrayesh Patel^{1,3} and Stuart Rowan^{1,4,3}; ¹University of Chicago, United States; ²U.S. Army Research Laboratory, United States; ³Argonne National Laboratory, United States; ⁴The University of Chicago, United States

SF13.07.05

Light-Actuated Anisotropic Microactuators from CNT/Hydrogel Nanocomposites [Aoife Gregg](#), Michael De Volder and Jeremy Baumberg; University of Cambridge, United Kingdom

SF13.07.06

Working Fluid Enhancement for a Solar Water Heater System towards Hawaii with Nanofluids [Takuya P. Wise](#); University of Hawaii at Manoa, United States

SF13.07.07

Retention and Deformation of the Blue Phases in Liquid Crystalline Elastomers [Kyle Schlafmann](#) and Timothy White; University of Colorado - Boulder, United States

SF13.07.08

Solid-State Tunable Thermal Energy Storage for Building Envelopes [Shuang Cui](#)^{1,2}; ¹The University of Texas at Dallas, United States; ²National Renewable Energy Laboratory, United States

SESSION SF13.08: General Session I

Session Chairs: Kris L. Dorsey and Ruike Renee Zhao

Tuesday Morning, May 24, 2022

SF13-Virtual

8:00 AM *SF13.08.01

Material-Form-Scale Effects of Shape Memory Alloy (SMA) Actuators [Sung-Hoon Ahn](#)¹, Minsoo Kim², Hugo Rodrigue³, Hyun-Taek Lee⁴, Salvador Pané², Min-Woo Han⁵ and Jae-Kyung Heo¹; ¹Seoul National University, Korea (the Republic of); ²Swiss Federal Institute of Technology Zurich, Switzerland; ³Sungkyunkwan University, Korea (the Republic of); ⁴Inha University, Korea (the Republic of); ⁵Dongguk University, Korea (the Republic of)

8:30 AM *SF13.08.02

Long-Life-Cycle and Damage-Recovery Artificial Muscles via Controllable and Observable Self-Clearing Process [Huichan Zhao](#); Tsinghua University, China

9:00 AM SF13.08.03

Synthesis and Characterisation of Multifunctional Ba_{0.95}Ca_{0.05}Sn_{0.09}Ti_{0.91}O₃ Ceramic [Pravin F. Varade](#), Adityanarayan H. Pandey, N Venkataramani and Ajit R. Kulkarni; Indian Institute of Technology Bombay, India

9:15 AM SF13.08.04

Improving the Durability of Soft EPIC Actuators by Modifying Their Viscoelastic Properties by Using a Skin-Inspired Hybrid Polymer Film [Hyunwoo Kim](#), Minjae Cho, Chongyoung Chung and Ki-Uk Kyung; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

9:30 AM *SF13.08.05

Fabrication of 4D Multifunctional Living Systems [Peer Fischer](#)^{1,2}; ¹Max Planck Institute, Germany; ²Universität Stuttgart, Germany

10:00 AM SF13.07.02

High Piezoelectric Characteristic of SnS₂/SnS Heterostructure for Piezoelectric Nanogenerator [Minje Kim](#), Sol Lee, Chang Geun Kim, Min Cheol Kim and Junghyo Nah; Chungnam National University, Korea (the Republic of)

SESSION SF13.09: General Session II
Session Chair: Kris L. Dorsey
Tuesday Afternoon, May 24, 2022
SF13-Virtual

1:00 PM *SF13.09.01

Soft Matter Transducers for Wearable Energy Harvesting & Power Carmel Majidi; Carnegie Mellon University, United States

1:30 PM SF13.09.02

Actuating Micro-Bowls with a Temperature-Memory Yue Liu^{1,2}, Karl Kratz¹ and Andreas Lendlein^{1,2}; ¹Helmholtz-Zentrum Hereon, Germany; ²University of Potsdam, Germany

1:45 PM SF13.09.03

Magnetoelectric Coupling in Inorganic/Organic Hybrid Composite Thin Films Muireann A. de hOra¹, Ahmed Kursumovic¹, Josep Castell-Queralt², Aliona Nicolenco², Jordi Sort² and Judith MacManus-Driscoll¹; ¹University of Cambridge, United Kingdom; ²Universitat Autònoma de Barcelona, Spain

1:50 PM SF13.09.04

Origami Hand for Soft Robotics Driven by Thermally Controlled Polymeric Fiber Actuators Muhammad Farhan¹, Karl Kratz¹, Marc Behl¹ and Andreas Lendlein^{1,2}; ¹Helmholtz-Zentrum Hereon, Germany; ²University of Potsdam, Germany

2:05 PM *SF13.09.05

Computational Design of Thermo-Responsive Hydrogel Crawlers Thao Nguyen, Bibekananda Datta, Aishwarya Pantula and David H. Gracias; Johns Hopkins Univ, United States

##PAGE_BREAK##

SYMPOSIUM SF14

Novel Frontiers in 3D and 4D Multi-Photon Micro-Fabrication—Materials, Methods and Applications
May 9 - May 24, 2022

Symposium Organizers

* Invited Paper

SESSION Tutorial SF14.00: The Foundations of 3D Laser Nanoprinting
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SESSION SF14.01: New Materials and Technologies I
Session Chairs: Larisa Florea and Virgilio Mattoli
Monday Afternoon, May 9, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 2

1:30 PM *SF14.01.01

3D/4D Two-Photon and Two-Step Laser Nanoprinting—Recent Progress Martin Wegener; Karlsruhe Institute of Technology, Germany

2:00 PM SF14.01.02

3D Fabrication of PEDOT:PSS Containing Microstructures via Two-Photon Polymerization Jason Delente¹, Srikanth Kolagatla¹, Naroa López-Larrea², Miryam Criado-Gonzalez², David Mecerreyes² and Larisa Florea¹; ¹School of Chemistry & AMBER, The SFI Research Centre for Advanced Materials and BioEngineering Research, Trinity College Dublin, Ireland; ²POLYMAT University of the Basque Country UPV/EHU, Spain

2:15 PM SF14.01.03

Additive Manufacturing of 3D ZrO₂:Eu³⁺ Luminescent Microstructures Jedrzej P. Winczewski¹, Manuel Herrera Zaldivar², Arturo Susarrey Arce¹ and Han Gardeniers¹; ¹University of Twente, Netherlands; ²Universidad Nacional Autónoma de México, Mexico

2:30 PM SF14.01.04

Analyzing the Interior of 3D Polymer Nanostructures by SEM Imaging of Ultrathin Sections [Irene U. Wacker](#)¹, Ernest R. Curticean² and Rasmus R. Schröder^{1,2}; ¹University of Heidelberg, Germany; ²University Hospital Heidelberg, Germany

2:45 PM BREAK

3:15 PM SF14.01.06

Characterization of Radical-Mediated and [2+2] Cycloaddition Photocrosslinking of Maleimide Monomers and Macromers [Bruce E. Kirkpatrick](#) and Kristi Anseth; University of Colorado Boulder, United States

3:30 PM SF14.01.07

3D Printing of Ultra-Strong and Hierarchically Porous Nanoarchitectures Using Nanocluster-Based Photoresists [Qi Li](#), John Kulikowski, David Doan and Wendy Gu; Stanford University, United States

3:45 PM *SF14.01.08

4D Elastic Microstructures for Robotics and Integrated Photonics [Sara Nocentini](#)^{1,2}, Daniele Martella^{1,2}, Camilla Parmeggiani^{3,2} and Diederik S. Wiersma^{3,2,1}; ¹National Institute for Metrological Research, Italy; ²European Laboratory for Nonlinear Spectroscopy, Italy; ³University of Florence, Italy

SESSION SF14.02: Applications I

Session Chairs: Shlomo Magdassi and Martin Wegener

Tuesday Morning, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 2

9:00 AM SF14.02.02

Multiphoton Applications in Laser-Fusion Research—From Printing Fusion-Fuel Targets with Sub-150-nm Features to Acquiring Three-Dimensional Structural and Elemental Information of the Target [David Harding](#)^{1,1}, Sarah M. Fess¹, Mark Bonino¹, Robert Earley¹, Yong-Feng Lu², Xi Huang², Peixun Fan², Sean Regan^{1,1} and Mike Campbell¹; ¹University of Rochester, United States; ²University of Nebraska–Lincoln, United States

9:15 AM SF14.02.03

Two-Photon 3D Printing of Hydrophobic Membranes to Control Gas-Liquid-Solid Interfaces [Xiaoxing Xia](#)¹, Daniel Corral², Thomas Moore¹, Michael Ingeman¹, Eric Duoss¹ and Sarah Baker¹; ¹Lawrence Livermore National Laboratory, United States; ²Stanford University, United States

9:30 AM SF14.02.04

Fabrication of Shells and Foams via Two-Photon Polymerization for Laser-Fusion Experiments [Sarah M. Fess](#)¹, [David Harding](#)^{1,1}, Mark Bonino¹, Peixun Fan², Yong-Feng Lu², Robert Earley¹, Xi Huang², Sean Regan^{1,1} and Mike Campbell¹; ¹University of Rochester, United States; ²University of Nebraska–Lincoln, United States

10:15 AM SF14.02.06

Direct Laser Writing and Wet Metallization of Bioinspired Artificial Bacterial Flagella [Roberto Bernasconi](#)¹, Gea Prioglio¹, Carlos Alcantara², Salvador Pané² and Luca Magagnin¹; ¹Politecnico di Milano, Italy; ²ETH Zürich, Switzerland

10:00 AM BREAK

10:30 AM SF14.02.07

Biomimetic Super-Hydrophobic Surfaces Patterned via 3D Laser Lithography [Omar Tricinci](#), Francesca Pignatelli and Virgilio Mattoli; Center for Materials Interfaces, Istituto Italiano di Tecnologia, Italy

10:45 AM SF14.02.08

Direct Laser Writing of Bioinspired Architectures with Novel Polysaccharide-Based Photoresists [Maximilian Rothhammer](#)¹, Dominic Meiers², Gordon Zyla³, Evgeny Gurevich⁴, Georg von Freymann² and Cordt Zollfrank¹; ¹Technische Universität München, Germany; ²Technische Universität Kaiserslautern, Germany; ³Foundation for Research and Technology-Hellas, Greece; ⁴FH Münster, Germany

SESSION SF14.03: New Materials and Technologies II/Panel Discussion: Future Directions/Opportunities of Multi-Photon Microfabrication

Session Chairs: Harald Giessen and Sara Nocentini

Tuesday Afternoon, May 10, 2022

Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 2

1:30 PM *SF14.03.01

Determining the Order of Absorption in Multiphoton Photoresists [John T. Fourkas](#) and Nikolaos Liaros; University of Maryland, United States

2:00 PM SF14.03.02

Living Microstructures by Combining Laser Printing and Dynamic Covalent Exchange of Alkoxyamines Yixuan Jia¹, Christoph A. Spiegel², Eva Blasco² and [Manuel Tsotsalas](#)¹; ¹KIT, Germany; ²Universität Heidelberg, Germany

2:15 PM SF14.03.03

Photonic Micro-Actuators [Larisa Florea](#)¹, Colm B. Delaney¹, Jing Qian², Marc del Pozo³, A. Louise Bradley² and Albert Schenning³; ¹Trinity College Dublin, Ireland; ²School of Physics and AMBER, Trinity College Dublin, Ireland; ³Eindhoven University of Technology, Netherlands

2:30 PM SF14.03.04

Dual Networks Polymer Structures with Functional and Mechanical Gradients for Direct Laser Writing (DLW) [Giovanni Fortunato](#), Francesco

Picchioni, Patrizio Raffa and Ranjita K. Bose; Rijksuniversiteit Groningen, Netherlands

2:45 PM SF14.03.05

Transfer Technique of Direct Laser Written Micro-Structures on Complex Surfaces via Ultrathin Films Handling [Andrea Ottomaniello](#)¹, Frank M. Den Hoed², Marco Carlotti¹, Omar Tricinci¹, Patrizio Raffa² and Virgilio Mattoli¹; ¹Istituto Italiano di Tecnologia, Italy; ²University of Groningen, Netherlands

3:00 PM BREAK

3:30 PM SF14.03.06

Direct Laser Writing of Bioinspired Functional Materials [Colm B. Delaney](#)¹, Thomas G. Parton², Benjamin Droguet², Larisa Florea¹ and Silvia Vignolini²; ¹Trinity College Dublin, Ireland; ²University of Cambridge, United Kingdom

3:45 PM SF14.03.07

Fabrication and Design of 4D Hydrogel Microstructures Displaying Reversible Sugar Induced Actuation [Alexa Ennis](#), Deanna Nicdao, Colm B. Delaney and Larisa Florea; Trinity College Dublin, the University of Dublin, Ireland

4:00 PM PANEL DISCUSSION: FUTURE DIRECTIONS/OPPORTUNITIES OF MULTI-PHOTON MICROFABRICATION

SESSION SF14.04: Applications II
Session Chairs: Eva Blasco and Larisa Florea
Wednesday Afternoon, May 11, 2022
Hilton, Kalia Conference Center, 2nd Floor, Hibiscus 2

2:00 PM SF14.04.02

Two-Photon Printing of Glassy Metasurfaces with Circular Dichroic Memory [Madelyn P. Jeske](#) and Mitchell Anthamatten; University of Rochester, United States

2:15 PM SF14.04.03

Novel Active Three-Dimensional (3D) Tunable Spiral Zone Plate Fabricated Using Femtosecond Pulse Direct Laser Writing (fs-DLW) [Saurabh Awasthi](#), Amir Chamanara and SeungYeon Kang; University of Connecticut, United States

2:30 PM SF14.04.04

Scalable Fabrication of Nanolattices Enabled by Metasurface Based 3D Interference Lithography [Matias Kagias](#), Andrew Friedman, Seola Lee, Tianzhe Zheng, Andrei Faraon and Julia R. Greer; California Institute of Technology, United States

SESSION SF14.05: Poster Session: Novel Frontiers in 3D and 4D Multi-Photon Micro-Fabrication—Materials, Methods and Applications
Session Chairs: Eva Blasco and Virgilio Mattoli
Wednesday Afternoon, May 11, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF14.05.02

Post-Functionalization of Photocured Microstructures by Living Polymerization [Frank M. Den Hoed](#)^{1,2}, Tjon Chen¹, Marco Carlotti², Virgilio Mattoli² and Patrizio Raffa¹; ¹University of Groningen, Netherlands; ²Istituto Italiano di Tecnologia, Italy

SF14.05.03

Direct Laser Writing of Silica Nanoparticle Composites for Mechanical Reinforcement of Hydrogel Networks [Amrutha Augustine](#), Colm B. Delaney and Larisa Florea; Trinity College Dublin, The University of Dublin, Ireland

SESSION SF14.06: New Materials and Technologies III
Session Chairs: Eva Blasco and Virgilio Mattoli
Tuesday Morning, May 24, 2022
SF14-Virtual

10:30 AM *SF14.06.01

The Importance of Dedicated Resins in 3D Microfabrication and Their Applications [Benjamin Richter](#), Marc Hippler, Daniel Götz, Lara Eckstein, Alexander Quick and Fabian Niesler; Nanoscribe GmbH & Co. KG, Germany

11:00 AM SF14.06.03

4D Printed Programmable Structures [Christoph A. Spiegel](#)^{1,1,2} and Eva Blasco^{1,1,2}; ¹Heidelberg University, Germany; ²Karlsruhe Institute of Technology, Germany

11:15 AM *SF14.06.04

Light-Based Additive Manufacturing for Applications in Photonics, Biomedicine and Photocatalysis [Maria Farsari](#); FORTH/IESL, Greece

SESSION SF14.07: New Materials and Technologies IV
Session Chairs: Eva Blasco and Virgilio Mattoli
Tuesday Afternoon, May 24, 2022
SF14-Virtual

1:00 PM *SF14.07.01

Dynamic Photoresists for Precision 3D Laserlithography Based on Wavelength Resolved Photochemistry [Christopher Barner-Kowollik](#); Queensland University of Technology, Australia

1:30 PM SF14.07.02

Direct Laser Writing of Complex 3D Ag Nanoparticle Patterns Inside Prefabricated Polymer Microstructures [Luisa Lavelle](#), Srikanth Kolagatla, Colm B. Delaney and Larisa Florea; Trinity College Dublin, Ireland

##PAGE_BREAK##

SYMPOSIUM SF15

Thermal Processes and Management Under Unconventional Conditions
May 9 - May 24, 2022

[Symposium Organizers](#)

* Invited Paper

SESSION SF15.01: Thermal Properties in 2D Materials I
Session Chairs: Roman Anufriev and Michael Pettes
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 309

10:30 AM *SF15.01.01

Thermal Transport in Layered Materials and Devices Alexander Gabourie¹, Aditya Sood¹, Eilam Yalon², Miguel Munoz Rojo³, Sam Vaziri¹, Saurabh Suryavanshi¹ and [Eric Pop](#)¹; ¹Stanford University, United States; ²Technion-Israel Institute of Technology, Israel; ³University of Twente, Netherlands

11:00 AM SF15.01.02

Design of Temperature Coefficient of Resistance of Graphene Composite for Rapid Heating Elements Ji-Hwan Ha, Hyunwoo Kim and [Sunghoon Park](#); Soongsil University, Korea (the Republic of)

11:15 AM SF15.01.03

Ordered Opals Monolayers on Quasi-Arbitrary Substrates for Extreme Heat Flux Applications [Carlos D. Diaz](#), Diane Li, Youngsup Song, Geoffrey Vaartstra, Cameron Kilpatrick and Evelyn Wang; Massachusetts Institute of Technology, United States

SESSION SF15.02: Thermoelectrics
Session Chairs: Michael Pettes and Meenakshi Singh
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 309

1:30 PM *SF15.02.01

Gonipolar Thermoelectrics [Joseph P. Heremans](#)¹, Joshua E. Goldberger¹, Wolfgang Windl¹, Michael Scudder¹ and Bin He²; ¹The Ohio State University, United States; ²Max Planck Institute for Chemical Physics of Solids, Germany

2:00 PM SF15.02.02

Interfacial Patterning to Create High ZT Thermoelectric Materials [Shane G. Davies](#) and Steven P. Hepplestone; University of Exeter, United Kingdom

2:15 PM SF15.02.03

Thermoelectric Measurements in Superconductor-Ferromagnet Hybrids [Meenakshi Singh](#), Kirsten E. Blagg and Portia Allen; Colorado School of

Mines, United States

2:30 PM BREAK

SESSION SF15.03: Thermal Properties in 2D Materials II
Session Chairs: Michael Pettes and Meenakshi Singh
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 309

3:00 PM *SF15.03.01

Interface and Defect Modification of 2D Materials [Michael T. Pettes](#); Los Alamos National Laboratory, United States

3:30 PM SF15.03.02

Desolvation-Induced Versatile Transfer Printing of Binder-Free Boron Nitride Film with Thermal, Optical Dual Functionality [Yujin Han](#) and Yeon Sik Jung; KAIST, Korea (the Republic of)

3:45 PM *SF15.03.03

Transition of Thermal Behavior in Graphite Under High Pressure [Yaguo Wang](#); Mechanical Engineering, Texas Materials Institute, The University of Texas at Austin, United States

4:15 PM SF15.03.04

Investigation of the Optical Properties of hBN Nanoparticles for High Solar Reflection [Ioanna Katsamba](#), Andrea L. Felicelli and Xiulin Ruan; Purdue University, United States

SESSION SF15.04: Thermal Properties in 2D Materials III
Session Chairs: Roman Anufriev and Michael Pettes
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 309

10:15 AM *SF15.04.01

Electron-Phonon Interaction and the Wiedemann-Franz Law in Graphene Mir Mohammad Sadeghi¹, Yajie Huang¹, Chao Lian¹, Feliciano Giustino¹, Emanuel Tutuc¹, Allan MacDonald¹, Takashi Taniguchi², Kenji Watanabe³ and [Li Shi](#)¹; ¹The University of Texas at Austin, United States; ²National Institute for Materials Science, Japan; ³National Institute for Materials Science, Japan

10:45 AM SF15.04.02

Effect of Twist Angle on Thermal Transport Crossing 2D Bilayers [Lenan Zhang](#)¹, Yang Zhong¹, Ji-Hoon Park¹, Qichen Song¹, Xiangyu Li¹, Long Li², Liang Guo², Jing Kong¹, Gang Chen¹ and Evelyn Wang¹; ¹Massachusetts Institute of Technology, United States; ²Southern University of Science and Technology, China

11:00 AM SF15.04.04

Electrically Controlled Heat Transport in Multilayer Graphene [Pietro Steiner](#) and Coskun Kocabas; University of Manchester, United Kingdom

SESSION SF15.05: Thermal Materials and Devices I
Session Chairs: Woochul Lee and Yunhui Wu
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 309

2:00 PM SF15.05.01

Quantum of Thermal Conductance of Nanofilms Due to Surface-Phonon Polaritons [Jose Ordonez-Miranda](#)^{1,2}, Yangyu Guo², Saeko Tachikawa², Sebastian Volz^{1,2} and Masahiro Nomura²; ¹LIMMS-IIS, Japan; ²IIS, The University of Tokyo, Japan

2:15 PM SF15.05.02

Macroscale Ballistic Heat Conduction by Surface Phonon-Polaritons [Yunhui Wu](#), Jose Ordonez-Miranda, Laurent Jalabert, Saeko Tachikawa, Roman Anufriev, Sebastian Volz and Masahiro Nomura; University of Tokyo, Japan

2:30 PM SF15.05.03

Thermal Conductivity and Diffusivity of Piezoelectric PZT Stack [Brandi Wooten](#)¹, Ryo Iguchi², Ken-ichi Uchida^{2,3,3}, Gerrit Bauer^{3,3,4} and Joseph P. Heremans¹; ¹The Ohio State University, United States; ²National Institute for Materials Science, Japan; ³Tohoku University, Japan; ⁴University of Groningen, Netherlands

2:45 PM SF15.05.04

Measurement of Thermal Conductivity in a Supercooled Hydrogel-Salt Complex Near Its Phase Transition [Daniel Hsieh](#), Youngmun Lee, Mayur Prabhudesai, Jay Taylor, Sung Bum Kang, Arpit Dwivedi, Paul Braun, Nenad Miljkovic and Sanjiv Sinha; University of Illinois at Urbana Champaign, United States

SESSION SF15.07: Machine Learning in Thermal Properties
Session Chairs: James Carpenter and Patrick Schelling
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 309

9:00 AM SF15.07.01

Machine Learning-Based Solutions for Thermo-Mechanical Reliability of GaN MMIC Power Amplifiers Sumin Kang¹, Jae Hak Lee¹, Seung Man Kim¹, Ah-Young Park¹ and Sung-Il Kim²; ¹Korea Institute of Machinery & Materials, Korea (the Republic of); ²Electronics and Telecommunications Research Institute, Korea (the Republic of)

9:15 AM SF15.07.02

The Voxalized Atomic Structure Machine Learning Framework for Modeling Structure-Property Relationships in High Entropy Alloys Matthew C. Barry¹, Kristopher E. Wise², Michael Chandross³, Surya Kalidindi¹ and Satish Kumar¹; ¹Georgia Institute of Technology, United States; ²NASA Langley Research Center, United States; ³Sandia National Laboratories, United States

9:30 AM BREAK

SESSION SF15.06: Poster Session I: Thermal Properties and Management I
Session Chairs: James Carpenter, Jose Ordonez-Miranda and Yunhui Wu
Tuesday Afternoon, May 10, 2022
5:00 PM - 7:00 PM
Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF15.06.01

Spontaneous Laser-Induced Micropatterning on Pre-Strained Elastomeric Surfaces Eunseung Hwang, Jaemook Lim and Sukjoon Hong; Hanyang University, Korea (the Republic of)

SF15.06.02

Modeling the Frequency-Dependent Response of Heterojunction Thermal Diodes for AC-to-DC Thermal Rectification Trevor J. Shimokusu, Qing Zhu, Natan Rivera and Geoffrey Wehmeyer; William Marsh Rice University, United States

SF15.06.04

Ultrawhite and Lightweight Boron Nitride Nanoplatelet Paints for Daytime Radiative Cooling Andrea L. Felicelli, Fernando Barrios, Yun Zhang, Joseph A. Peoples, George Chiu and Xiulin Ruan; Purdue University, United States

SF15.06.05

Solenoid Actuating Electrocaloric Cooling Device with Relaxor Ferroelectric Polymer Dong Hyun Seo¹, Gil Ju Lee² and Young Min Song¹; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²Pusan National University, Korea (the Republic of)

SESSION SF15.08: Thermal Modeling
Session Chairs: Jose Ordonez-Miranda and Patrick Schelling
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 309

10:30 AM *SF15.08.01

Impact of Four-Phonon Scattering on Thermal Conductivity and Radiative Cooling Properties Xiulin Ruan; Purdue Univ, United States

11:00 AM SF15.08.02

First-principles Predictions of Temperature-dependent Raman and Optical Responses Zherui Han and Xiulin Ruan; Purdue University, United States

11:15 AM SF15.08.03

Linear-Response Functions for Phonon-Mediated Heat Transport Patrick K. Schelling; Univ of Central Florida, United States

11:30 AM SF15.08.04

Thermal Conductivity Prediction of Ceramic Materials at High Temperature Zherui Han and Xiulin Ruan; Purdue University, United States

SESSION SF15.09: Thermal Measurement Techniques
Session Chairs: Jose Ordonez-Miranda and Patrick Schelling
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 309

1:30 PM *SF15.09.01

Direct Measurement of Electron Thermal Conductivity Using Ultra-High Resolution Spatiotemporal Mapping Mauricio Segovia and Xianfan Xu; Purdue Univ, United States

2:00 PM SF15.09.02

Broad-Bandwidth Photothermal Microscopy for Real-Time Studies of Nanoparticle-Assisted Melting and Resolidification Suhun Jo, William L. Schaich and Bogdan Dragnea; Indiana University Bloomington, United States

2:15 PM *SF15.09.03

Nanoscale Materials Defect States Imaging and Quantitative Interpretation Ajit K. Roy; Air Force Research Laboratory, United States

2:45 PM SF15.09.04

Phonon Mean Free Path Spectroscopy in Silicon and Silicon Carbide Nanomembranes in the 4 - 400 K Range Roman Anufriev, Jose Ordonez-Miranda, Yunhui Wu and Masahiro Nomura; The University of Tokyo, Japan

SESSION SF15.10: Poster Session II: Thermal Properties and Management II

Session Chairs: Bachir El Fil and Jose Ordonez-Miranda

Wednesday Afternoon, May 11, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF15.10.02

Phase Change Materials Encapsulated by Silica/Polydopamine/Cellulose Nano Fiber for Thermal Energy Storage Taeksu P. Kim and Bong Sup Shim; Inha University, Korea (the Republic of)

SF15.10.03

Characterization and Prediction of Thermal Expansion Coefficients for 2D Transition Metal Dichalcogenide Monolayers Yang Zhong¹, Lenan Zhang¹, Ji-Hoon Park¹, Samuel Cruz¹, Chad Wilson¹, Youngsup Song¹, Long Li², Liang Guo², Jing Kong¹ and Evelyn Wang¹; ¹Massachusetts Institute of Technology, United States; ²Southern University of Science and Technology, China

SESSION SF15.11: Thermal Materials and Devices II

Session Chairs: James Carpenter and Marat Khafizov

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 309

8:45 AM *SF15.11.01

The Importance of Accurate Material Properties in Thermofluid Modeling for Extreme Temperatures and Pressures Kaiyuan Jin, Akshay Krishna, David Brown and Timothy Fisher; University of California, Los Angeles, United States

9:15 AM SF15.11.03

Impact of Dislocation Loops on Thermal Conductivity of Fluorite Oxides Marat Khafizov¹, Miaomiao Jin², Amey Khanolkar³, Cody A. Dennett³, Saqeeb Adnan¹, Lingfeng He³ and David Hurley³; ¹The Ohio State University, United States; ²The Pennsylvania State University, United States; ³Idaho National Laboratory, United States

9:30 AM SF15.11.04

Determining Deformation Behavior of AISI 9310 Steel Varying Temperature and Strain Rate for Aerospace Applications Adanma Akoma, Kevin Sala, Chase Sheeley and Lesley Frame; University of Connecticut, United States

9:45 AM BREAK

SESSION SF15.12: Energy Management and Harvesting I

Session Chairs: Peter Bermel and Satish Kumar

Thursday Morning, May 12, 2022

Hawai'i Convention Center, Level 3, 309

10:30 AM *SF15.12.01

Robust Ceramic/Metal Composites for High-Temperature Heat Exchangers for Concentrated Solar Power Yujie Wang¹, Camilla McCormack¹, Priyatham Tumurugoti¹, Alexander Strayer¹, Adam Caldwell¹, Thuan Nguyen¹, Sunghwan Hwang¹, Qingzi Zhu², Mehdi Pishahang², Asegun Henry², Kevin Trumble¹, Grigorios Itkos¹, Mario Caccia¹ and Ken Sandhage¹; ¹Purdue University, United States; ²Massachusetts Institute of Technology, United States

11:00 AM SF15.12.02

Determining the Effectiveness of Radiative Cooler-Integrated Solar Cells Seyeon Heo¹, Young Min Song¹ and Gil Ju Lee²; ¹Gwangju Institute of Science and Technology, Korea (the Republic of); ²Pusan National University, Korea (the Republic of)

11:15 AM SF15.12.03

Investigating Micropatterned Thermochromic Coatings for Space Vehicle Thermal Management Joseph A. Peoples¹, Sydney Taylor², Christopher Massina², Kurt Eyink³ and Xiulin Ruan¹; ¹Purdue University, United States; ²NASA Johnson Space Center, United States; ³Air Force Research Laboratory, United States

SESSION SF15.13: Energy Management and Harvesting II
Session Chairs: Bachir El Fil and Satish Kumar
Thursday Afternoon, May 12, 2022
Hawai'i Convention Center, Level 3, 309

1:45 PM SF15.13.01

Rugate Filter Design and Characterization for Ultra-High Temperatures (up to 1700 °C) [Peter Bernel](#); Purdue University, United States

2:00 PM SF15.13.03

Tailored Indoor Setup for Characterization of Passive Daytime Cooler [Qimeng Song](#)¹, Thomas Tran¹ and Markus Retsch^{1,2}; ¹Bayreuth University, Germany; ²Bavarian Polymer Institute, Germany

2:15 PM SF15.13.04

Thickness Optimization for Passive Radiative Daytime Cooling with Polymeric Materials Kai Herrmann, [Tobias Lauster](#), Qimeng Song and Markus Retsch; University of Bayreuth, Germany

2:30 PM BREAK

3:00 PM SF15.13.05

Highly Efficient and Salt Rejecting Solar Evaporation via a Wick-Free Confined Water Layer [Xiangyu Li](#)¹, Lenan Zhang¹, Yang Zhong¹, Arny Leroy¹, Zhenyuan Xu², Lin Zhao¹ and Evelyn Wang¹; ¹Massachusetts Institute of Technology, United States; ²Shanghai Jiao Tong University, China

3:15 PM SF15.13.06

A Novel Coating Method for Superior Kinetics in Adsorption Energy Systems [Bachir El Fil](#), Xiangyu Li, Carlos D. Diaz, Cody Jacobucci and Evelyn Wang; MIT, United States

3:30 PM SF15.13.07

Use of Pressure as an Unconventional Dynamic Control Variable on Desorption-Based Thermal Energy Storage [Patrick Shamberger](#), Sourav Chakravarty, Wenting Mo and Nurbek Ozganov; Texas A&M University, United States

3:45 PM SF15.13.08

Design of a High Performance Compact Atmospheric Water Harvester Under Extremely Conditions [Xiangyu Li](#), Buxuan Li, Arny Leroy, Yang Zhong and Evelyn Wang; Massachusetts Institute of Technology, United States

4:00 PM *SF15.13.09

Thermal Transport in Ultrawide Bandgap Materials and Devices Robert Montgomery¹, Jingjing Shi¹, Patrick E. Hopkins² and [Samuel Graham](#)^{3,1}; ¹Georgia Institute of Technology, United States; ²University of Virginia, United States; ³University of Maryland, United States

4:30 PM SF15.13.10

Towards Precise Tunability of Coefficient of Thermal Expansion in Epoxies [Erica Redline](#), Jeffrey C. Foster, Chad L. Staiger and Jason W. Dugger; Sandia National Laboratories, United States

4:45 PM SF15.13.11

Thermal Conductivity of Electrospun PEO/PEDOT:PSS Nanofiber Produced by Near-Field Electrospinning Method [Anh Tuan Nguyen](#) and Woochul Lee; University of Hawaii at Manoa, United States

5:00 PM SF15.13.12

Multiphase Liquid Metal Soft Composites for Thermal Management of Microelectronics [Wilson Kong](#)^{1,2}, Robert Y. Wang¹ and Konrad Rykaczewski¹; ¹Arizona State University, United States; ²Air Force Research Laboratory, United States

5:15 PM SF15.13.13

Control of Thermal Transport at Ultrahigh Temperatures by Immiscible Oxide Heterostructures [Sean McSherry](#)¹, Matthew Webb¹, Jonathan Kaufman², Zihao Deng¹, Emmanouil Kioupakis^{1,1}, Keivan Esfarjani^{2,2,2}, John Heron¹ and Andrej Lenert¹; ¹University of Michigan–Ann Arbor, United States; ²University of Virginia, United States

SESSION SF15.14: Thermal Transport I
Session Chairs: Yi Li and Annie Zhang
Monday Afternoon, May 23, 2022
SF15-Virtual

6:30 PM *SF15.14.01

Cryogenic Heat Transfer in High Electron Mobility Transistors—Phonon Radiation and Superfluid Helium Boiling [Austin J. Minnich](#); California Institute of Technology, United States

7:00 PM SF15.14.03

Thermal Transport Properties of Hybrid Semiconductors Investigated by Vibrational-Pump Visible-Probe Spectroscopy Shunran Li¹, Zhenghong Dai², Hao Dong¹, Linda Li¹, Yoonseo Nah¹, Nitin Padture² and [Peijun Guo](#)¹; ¹Yale University, United States; ²Brown University, United States

7:15 PM SF15.14.06

Synthesis and Testing of Graphene Composites for Thermal and Electromagnetic Interference Shielding at Elevated Temperatures [Fariborz Kargar](#), Zahra Barani and Alexander A. Balandin; University of California, Riverside, United States

7:30 PM SF15.14.07

A Prototype of High-Temperature Vacuum Prober from 300 K to 1200 K for Continuous 3-Omega Thermal Measurements [Laurent Jalabert](#)¹, Jose Ordonez-Miranda¹, Saeko Tachikawa², Yunhui Wu², Roman Anufriev², Masahiro Nomura² and Sebastian Volz¹; ¹LIMMS-CNRS/IIS Univ of Tokyo, Japan; ²IIS, The University of Tokyo, Japan

SESSION SF15.15: Thermal Transport II
Session Chairs: Yi Li and Annie Zhang
Monday Morning, May 23, 2022
SF15-Virtual

10:30 AM *SF15.15.01

Thermal Conduction Across a Weakly Interacting Interface in 2D Materials Constructs [Yong-Wei Zhang](#), Zhun-Yong Ong, Hangbo Zhou and Gang Zhang; Institute of High Performance Computing, Singapore

11:00 AM SF15.15.02

Spatial Thermal Conductivity Variation of Particulate-Filled Thermal Interface Materials [Zeichen Zhang](#), Piyush Kulkarni, Morteza Bagheri, Fatemeh Hejripour, Bahgat Sammakia and Scott N. Schiffrs; Binghamton University, United States

11:15 AM SF15.15.03

Novel Method for *In Situ* Thermal Property Evaluation of Thermal Interface Materials [Piyush Kulkarni](#), Fatemeh Hejripour, Zeichen Zhang, Bahgat Sammakia and Scott N. Schiffrs; Binghamton University, United States

11:30 AM SF15.15.04

Thermal Transport in Self-Assembled Materials—From High Anisotropy to High Temperatures [Markus Retsch](#); University of Bayreuth, Germany

11:45 AM SF15.15.05

Electrical vs Spatial Symmetry in Geometrically Defined Single-Material Graphene Thermoelectric Devices [Oleg V. Kolosov](#)¹, Eli Castanon^{1,2,3}, Jean Spièce¹, Charalambos Evangelis¹, Matthew Hamer³, Sergio Gonzalez-Munoz¹, Andy Niblett¹, Joanna Zultak³, Olga Kazakova² and Roman Gorbachev³; ¹Lancaster University, United Kingdom; ²NPL, United Kingdom; ³National Graphene Institute, United Kingdom

12:00 PM SF15.15.06

Study of Thermal Conductivity of Liquid Metal with a Series of Fillers Through Homebuilt Experimental Setup [Michael Zhang](#); Lake Oswego High School, United States

12:05 PM *SF15.15.07

Thermal Effects in Quasi-2D Quantum Charge-Density-Wave Devices Operational in Extreme Radiation Environments [Alexander A. Balandin](#); University of California, Riverside, United States

SESSION SF15.16: Energy Management and Harvesting III
Session Chairs: Yi Li and Annie Zhang
Tuesday Morning, May 24, 2022
SF15-Virtual

8:00 AM SF15.16.01

Printing onto Dissimilar Materials by Selective Laser Melting for Electronics Cooling Applications [Arad Azizi](#), Nasim Anjum, Matthew Heitner, Fatemeh Hejripour, Bahgat Sammakia, Changhong Ke and Scott N. Schiffrs; Binghamton University, United States

8:15 AM SF15.16.02

Materials and Melt Pool Characterization During Selective Laser Melting Through a Scanning Modulated Laser [Nicholas S. Tomasello](#), Arad Azizi, Fatemeh Hejripour and Scott N. Schiffrs; Binghamton University, United States

8:30 AM SF15.16.04

Thermoelectric Properties of Nanocrystalline Silicon Film Grown by PECVD [Battogtokh Jugdersuren](#)¹, Xiao Liu², James C. Culbertson², Christopher N. Chervin² and Rhonda M. Stroud²; ¹Jacobs Engineering Group, United States; ²Naval Research Laboratory, United States

##PAGE_BREAK##

SYMPOSIUM SF16

Advanced Materials for Antibacterial, Antiviral and Antifungal Applications—From Micro to Nano
May 9 - May 25, 2022

Symposium Organizers

* Invited Paper

SESSION SF16.01: Nano-, Micro-Structured Surfaces and Coatings—Structure-Function Relationships I
Session Chairs: Rafik Naccache and Ketul Popat
Monday Morning, May 9, 2022
Hawai'i Convention Center, Level 3, 306B

10:30 AM SF16.01.01

Mechano-Bactericidal Activity of Bioinspired Glass Nanopatterns Martyna Michalska, Sophia K. Laney, Tao Li, Mark Portnoi, Nicola Mordan, Elaine Allan, Manish K Tiwari, Ivan P. Parkin and Ioannis Papakonstantinou; University College London, United Kingdom

10:45 AM SF16.01.02

Poly(d-glucose carbonate)-Based Crosslinked Networks for Renewable and Degradable Coatings Yidan Shen, Yue Song, Soon-Mi Lim, Yen-nan Lin, David Tran, Mei Dong, Ching Pang, Guorong Sun, Ashlee Jahnke and Karen Wooley; Texas A&M University, United States

11:00 AM SF16.01.03

Antimicrobial Effects of Piezoelectric Charges Carolina Montoya and Santiago Orrego; Temple University, United States

11:15 AM SF16.01.04

Nanoscale Surface Properties of SU-8 Polymer Modulate *Xylella fastidiosa* Motility, Adhesion and Colonization Silambarasan Anbumani¹, Aldeliane M. da Silva¹, Andrei Alaferdov¹, Marcos V. Puydinger dos Santos¹, Isis G. Carvalho², Mariana de Souza e Silva², Stanislav Moshkalev¹, Hernandes F. Carvalho¹, Alessandra A. de Souza² and Monica A. Cotta¹; ¹University of Campinas, Brazil; ²Agronomic Institute of Campinas, Brazil

11:30 AM *SF16.01.05

Antimicrobial Strategies Based on Natural Sources and Biomimetic Materials Rui L. Reis^{1,2}; ¹University of Minho, Portugal; ²ICVS/3B's – PT Government Associate Laboratory, Portugal

SESSION SF16.02: Nanocomposite Textiles and Wound Dressings
Session Chairs: Rafik Naccache and Ketul Popat
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 306B

1:30 PM SF16.02.01

Silicate-Based Films with Antimicrobial Efficacy for Burn Wound Treatments Kausik Mukhopadhyay and Kaitlyn Crawford; University of Central Florida, United States

1:45 PM SF16.02.02

Anti-Pathogenic Hydrogel Nanospine Patch for Controlling Stem Cell Behavior Donghyuk Lee, Chaebin Park, Hyukjoo Kwon and Hoon Eui Jeong; Ulsan National Institute of Science and Technology, Korea (the Republic of)

2:00 PM SF16.02.03

Highly Cross-Linked, Phosphorus-Based Hydrogels as Drug-Loaded Wound-Dressing Ramiro Marroquin-Garcia, Jeroen Royakkers, Rocio Arrequin-Campos, Thomas Cleij, Kasper Eersels, Bart van Grinsven and Hanne Diliën; Maastricht University, Netherlands

2:30 PM BREAK

SESSION SF16.03: Nano-, Micro-Structured Surfaces and Coatings—Structure-Function Relationships II
Session Chairs: Diego Mantovani and Fabio Variola
Monday Afternoon, May 9, 2022
Hawai'i Convention Center, Level 3, 306B

3:00 PM SF16.03.01

Polymer Thin Films Designed to Decrease Microbial Pathogenicity by Altering Metabolic Activity Trevor Franklin, Jiayan Lang, Yinan Wu, Sijin Li and Rong Yang; Cornell University, United States

3:15 PM SF16.03.02

Antifouling Performance of Nanoscale Polydimethylsiloxane Brushes Kevin Golovin; University of Toronto, Canada

3:30 PM SF16.03.03

Polydopamine-Based Coatings that Kill Bacteria and Inactivate SARS-CoV-2 Virus William A. Ducker; Virginia Tech, United States

3:45 PM SF16.03.05

Antibacterial Surfaces Made Up of Cicada Wings Replicated Through Secondary Mode Electrohydrodynamic Instability Dae Joon Kang; Sungkyunkwan University, Korea (the Republic of)

4:00 PM SF16.03.06

Replica Molding of Naturally Inspired Surfaces to Produce Antibacterial Nanostructured Biomaterials Graham Reid¹, James McCormack², Lucia Podhorska², Jessica McFadden², Shauna Flynn¹ and Susan Kelleher^{1,2}; ¹Dublin City University, Ireland; ²University College Dublin, Ireland

SESSION SF16.04: Drug- and Ion-Releasing Surfaces and Coatings I
Session Chairs: Diego Mantovani, Rafik Naccache, Ketul Popat and Fabio Variola
Tuesday Morning, May 10, 2022
Hawai'i Convention Center, Level 3, 306B

9:00 AM SF16.04.02

Responsive Hybrid Nanomaterials for Eradicating Bacterial Infections Miryana Hémati¹, Sergio Moya², Christine Gravier Pelletier¹, Romain Briandet³, John Lomas¹, Steeve Reisberg¹ and Laurent Royon¹; ¹Université de Paris, France; ²CIC biomagune, Spain; ³INRAE, AgroParisTech, Université Paris-Saclay, France

9:15 AM *SF16.04.03

Graphene-Based Anti-Microbials: Nanostructured Coatings and 3D Printed Nanocomposites Rigoberto C. Advincula^{1,2,3}; ¹Case Western Reserve University, United States; ²The University of Tennessee, Knoxville, United States; ³Oak Ridge National Laboratory, United States

9:45 AM BREAK

10:15 AM SF16.04.04

Glycoconjugate-Functionalized Magnetic Nanoparticles—A Tool for Selective Killing of Targeted Bacteria via Magnetically Mediated Energy Delivery. Olin T. Mefford, Yash Raval, Anna Stamstag, Cedric Taylor, Benjamin Fellows, Guohui Huang and Tzuen-Rong Tzeng; Clemson University, United States

10:30 AM SF16.04.05

Small Nanoclay—Big Antibacterial Opportunities Ofer -. Prinz Setter¹, Alva -. Gilboa¹, Ariel -. Movsowitz¹, Sarah -. Goldberg¹ and Ester -. Segal^{1,2}; ¹Technion - Israel Institute of Technology, Israel; ²Technion – Israel Institute of Technology, Israel

10:45 AM SF16.04.06

Novel Hybrid Nanostructured Materials for Controlling Viruse and Bacteria Jun-Won Kook and Kwon-Young Choi; Ajou University, Korea (the Republic of)

11:00 AM SF16.04.07

Reshaping *De Novo* Protein Switches into Bioresponsive Material Formats for Sensing Applications Luciana d'Amoné¹, Giusy Matzeu¹, Alfredo Quijano-Rubio², Gregory Callahan¹, Fiorenzo Omenetto¹ and David Baker²; ¹Tufts University, United States; ²University of Washington, United States

SESSION SF16.05: Drug- and Ion-Releasing Surfaces and Coatings II
Session Chairs: Rafik Naccache and Fabio Variola
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 306B

2:00 PM SF16.05.01

Antiviral Nanostructures Henry Bland¹, Isabella Centeleghe², Soumen Mandal¹, Evan Thomas¹, Jean-Yves Maillard² and Oliver A. Williams¹; ¹Cardiff University School of Physics and Astronomy, United Kingdom; ²Cardiff University, United Kingdom

2:15 PM SF16.05.03

Engineered Biomimetic Nanoparticles for Antibacterial Activity Emine S. Turali-Emre, Brendan Knittle, Nicole Sorensen, J. Scott VanEpps and Nicholas A. Kotov; University of Michigan, United States

2:30 PM SF16.05.04

Nanotechnology Strategies Towards a Sustainable Agriculture Nubia Zuverza; The Connecticut Agricultural Experiment Station, United States

3:00 PM BREAK

SESSION SF16.06: Advanced Materials for Antimicrobials
Session Chairs: Diego Mantovani and Ketul Popat
Tuesday Afternoon, May 10, 2022
Hawai'i Convention Center, Level 3, 306B

3:15 PM SF16.06.01

Immobilization of Lysozyme on Zwitterionic Poly(4-vinylpyridine) Thin Films Enables Antifouling and Antibacterial Surfaces [Alexandra Khlyustova](#), Mia Kirsch, Yifan Cheng and Rong Yang; Cornell University, United States

3:30 PM SF16.06.02

Fabrication of Superhydrophobic Surface via a Novel Air-Assisted Electro spray Method [Thu H. Nguyen](#), Joshua J. Goulas, ZiZhou He, Xiao-dong Zhou and Ling Fei; University of Louisiana at Lafayette, United States

3:45 PM SF16.06.03

Nanospace-Confined Synthesis of *Catalytic-Motile* Nanocrystals for Biofilm Eradication, Drug-Delivery and Water Purification [Nitee Kumari](#); POSTECH, Korea (the Republic of)

4:00 PM *SF16.06.04

Fortified Antibacterial Efficacy Through Sustained Biocidal Effect and High-Temperature Superhydrophobicity [Sanjay Mathur](#)^{1,2}; ¹University of Cologne, Germany; ²Indian Institute of Technology, Madras, India

4:30 PM SF16.06.05

A Multilayered Edible Coating to Extend Produce Shelf Life [Elisabetta Ruggeri](#)¹, Doyoon Kim², Yunteng Cao², Silvia Fare³, Luigi De Nardo³ and Benedetto Marelli²; ¹Tufts University, United States; ²Massachusetts Institute of Technology, United States; ³Politecnico di Milano, Italy

4:45 PM SF16.06.06

Biomimetic Phage Mimicking Antimicrobial Nanoparticles for Antibiotic Free, Bactericidal Action Against the Multi-Drug Resistant ESKAPE Class of Pathogens Juliane Hopf, Margo Waters, Johanna Olesk, Veronica Kalwajty, Shaun Lee and [Prakash Nallathamby](#); University of Notre Dame, United States

SESSION SF16.07: Poster Session: Advanced Materials for Antibacterial, Antiviral and Antifungal Applications—From Micro to Nano

Session Chairs: Diego Mantovani and Ketul Popat

Tuesday Afternoon, May 10, 2022

5:00 PM - 7:00 PM

Hawai'i Convention Center, Level 1, Kamehameha Exhibit Hall 2 & 3

SF16.07.02

ZnO Nanostructures by Hot Water Treatment for Photocatalytic Bacterial Disinfection [Dakota Ungerbuehler](#)¹, [Thomas Burke](#)¹, [Ranjitha Hariharalakshmanan](#)², [Cindy White](#)¹ and [Tansel Karabacak](#)²; ¹Harding University, United States; ²University of Arkansas at Little Rock, United States

SF16.07.04

Nanostructure Based Wettability Modification of TiAl6V4 Alloy Surface for Anti-Biofilm—Superhydrophilic, Superhydrophobic and Slippery Surface [Jeong-Won Lee](#)¹, [Chang-Hun Lee](#)², [Sung Jae Kim](#)³, [Jung-Ah Cho](#)², [Je-Un Jeong](#)¹ and [Yoon-Gi Heo](#)¹; ¹Chosun University, Korea (the Republic of); ²Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of); ³Hallym University, Korea (the Republic of)

SF16.07.06

Anti-Biofilm Activity of Chiral Graphene Nanoparticles [Misché Hubbard](#), [Christopher Altheim](#), [J. Scott VanEpps](#) and [Nicholas A. Kotov](#); University of Michigan, United States

SF16.07.07

Biodegradable Nanocomposites with Antibacterial Silica Nanoparticles and Their Food Packaging Applications [Sangwook Woo](#), [Kyungtae Park](#) and [Jinkee Hong](#); Yonsei University, Korea (the Republic of)

SF16.07.08

Biofouling-Resistant Composite Tubular Devices with Magneto-Responsive Dynamic Undulatory Inner Walls [Geonjun Choi](#), [Hyejin Jang](#), [Minho Seong](#), [Kahyun Sun](#) and [Hoon Eui Jeong](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

SF16.07.09

Long-term Repellency of Various Liquids by Interconnected Reentrant Structures [Seung Min Oh](#), [Seo Rim Park](#), [Suhyun Choi](#), [Young Tae Cho](#) and [Seok Kim](#); Changwon National University, Korea (the Republic of)

SF16.07.10

Enhancing Antibacterial Property of Nanostructured Aluminum Foil by Essential Oil [Quinshell Smith](#)¹, [Kenneth Burnnett](#)¹, [Nawab Ali](#)¹, [John Bush](#)¹ and [Tansel Karabacak](#)²; ¹University of Arkansas in Little Rock, United States; ²University of Arkansas at Little Rock, United States

SF16.07.11

Slippery Microstructured Surfaces for Reducing Touch Contamination of Pathogen-Laden Respiratory Droplets [Woo Young Kim](#), [Seok Kim](#) and [Young Tae Cho](#); Changwon National University, Korea (the Republic of)

SF16.07.12

Experimental Study on Long-Term Characteristics of Water Repellency in Microcavity Structures [Seo Rim Park](#), [Seung Min Oh](#), [Seok Kim](#) and [Young Tae Cho](#); Changwon National University, Korea (the Republic of)

SF16.07.13

Creating Efficient Anti-Bacterial Surfaces on Catheters with Antibiotic-Free Liquid Coatings [Chun Ki Fong](#)¹, [Marissa Andersen](#)², [Ana Flores-Mireles](#)² and [Caitlin Howell](#)¹; ¹University of Maine, United States; ²University of Notre Dame, United States

SESSION SF16.08: Advanced Materials for Antimicrobials I
Session Chairs: Diego Mantovani, Rafik Naccache and Fabio Variola
Wednesday Morning, May 11, 2022
Hawai'i Convention Center, Level 3, 306B

9:15 AM SF16.08.01

Reusable Janus Self-Cleaning Nanofibrous Air Filters Haran Lee¹, Hyonguk Kim¹, Seong Kyung Hong², Yeondo Jeong¹, Jong Hyeon Ban¹, Chan Park¹, Byeongjun Lee¹, Jungmin Kim¹, Jeongbeom Kang¹, Jongwon Yoon¹ and Seong J. Cho¹; ¹Chungnam National University, Korea (the Republic of); ²Pohang University of Science and Technology (POSTECH) Department of Mechanical Engineering, Korea (the Republic of)

9:30 AM SF16.08.02

Design of Antifouling Amphiphilic Interfaces with Molecular Heterogeneities to Control Biofilm Formation and Bacterial Behavior Alexandra Khlyustova, Mia Kirsch and Rong Yang; Cornell University, United States

9:45 AM SF16.08.03

Graphene Based Framework Materials as Self-Sterilizing Multi-Pollutant Air Filtration Media Armin Reimers¹, Ala Bouhanguel², Fabian Schuett¹, Lena M. Saure¹, Morten Möller¹, Albert Subrenat², Ali S. Nia³, Yves Andres² and Rainer Adelung¹; ¹Christian-Albrecht-Universität zu Kiel, Germany; ²IMT-Atlantique, France; ³Technische Universität Dresden, Germany

10:00 AM BREAK

10:30 AM SF16.08.04

Transparent Silver Oxide Coating That Inactivates SARS-CoV-2 and Kills Bacteria Mohsen Hosseini¹, Alex W. Chin², Myra D. Williams¹, Saeed Behzadinasab¹, Joseph O. Falkinham III¹, Leo L. Poon² and William A. Ducker¹; ¹Virginia Polytechnic Institute and State University, United States; ²The University of Hong Kong, Hong Kong

10:45 AM SF16.08.05

A New Fouling-Resistant Strategy with Dynamic Undulatory Topographical Motion for Efficient Suppression of Biofilm Formation Hyejin Jang¹, Minsu Kang¹, Moon Kyu Kwak² and Hoon Eui Jeong¹; ¹Ulsan National Institute of Science and Technology, Korea (the Republic of); ²Kyungpook National University, Korea (the Republic of)

11:00 AM SF16.08.06

Catechol-Containing Polymer as Self-Activating Antipathogenic Coating Bruce Lee; Michigan Technological Univ, United States

SESSION SF16.09: Advanced Materials for Antimicrobials II
Session Chairs: Diego Mantovani and Rafik Naccache
Wednesday Afternoon, May 11, 2022
Hawai'i Convention Center, Level 3, 306B

3:30 PM SF16.09.01

Liquid-Coated Air and Water Filters Resist Bacterial Biofouling Justin Hardcastle¹, Daniel P. Regan¹, Chun Ki Fong¹, Rushabh Shah², Shao-Hsiang Hung², Aydin Cihanoglu², Jessica D. Schiffman² and Caitlin Howell¹; ¹University of Maine, United States; ²University of Massachusetts Amherst, United States

3:45 PM SF16.09.02

In Situ One-Step Direct Loading of Agents in Acrylic-Based Coatings Deposited by Aerosol-Assisted Open-Air Plasma for Controlled Release Application Gabriel Morand^{1,2}, Pascale Chevallier¹, Michael Tatoulian² and Diego Mantovani¹; ¹Université Laval, Canada; ²Institut de Recherche de Chimie Paris (Chimie ParisTech-PSL), France

4:00 PM SF16.09.03

Fluorographene-Based Biocompatible Anti-Biofouling Coating with Superior Properties Ishita Agrawal^{1,1}, Rajesh K. Sharma^{1,2} and Slaven Garaj^{1,1,1}; ¹National University of Singapore, Singapore; ²Singapore-MIT Alliance for Research and Technology Centre, Singapore

SESSION SF16.10: Antifouling, Photocatalytic, Self-Cleaning and Superhydrophobic Surfaces and Coatings
Session Chairs: Rafik Naccache and Fabio Variola
Thursday Morning, May 12, 2022
Hawai'i Convention Center, Level 3, 306B

8:45 AM SF16.10.01

Plasma-Based Strategies to Control the Release of Ag⁺ on Short- and Long-Term Periods from Ag-Based Antibacterial Coatings Linda V. Bonilla-Gameros, Pascale Chevallier and Diego Mantovani; Université Laval, Canada

9:00 AM SF16.10.02

On-Demand Synthesis of Antiseptics at the Site of Infection for Treatment of Viral and Drug-Resistant Bacterial Infections Rong Yang; Cornell University, United States

9:15 AM SF16.10.03

Polysaccharides-Catechols Films Loaded with Antibiotic as Antibacterial Drug Release System Pascale Chevallier¹, Helton J. Wiggers², Francesco Copes¹ and Diego Mantovani^{1,2,3}; ¹Laboratory for Biomaterials and Bioengineering, Canada Research Chair I in Biomaterials and Bioengineering for the

Innovation in Surgery, Canada; ²Laboratory for Biomaterials and Bioengineering (LBB) - BioPark, Brazil; ³Laboratory for Biomaterials and Bioengineering, Canada Research Chair I in Biomaterials and Bioengineering for the Innovation in Surgery, Canada

SESSION SF16.11: General Session I
Session Chair: Fabio Variola
Wednesday Morning, May 25, 2022
SF16-Virtual

8:00 AM *SF16.11.01

Developmental Strategies to Address Prosthetic Infection of Biomaterials Bikramjit Basu; Indian Institute of Science, India

8:30 AM SF16.04.01

Using Aerosolized Silicon Nanoparticles Towards Development of Masks Designed to Filter Specific Viruses Ayman Rezk¹, Juvairiah Ashraf¹, Wafa Alnaqbi¹, Sabina Abdul Hadi², Ghada Dushaq³, Aisha Alhammadi¹, Tala El Kukhun⁴, Mahmoud Rasras³, Ahmad Nusair⁵, Munir Nayfeh⁶ and Ammar Nayfeh¹; ¹Khalifa University of Science and Technology, United Arab Emirates; ²University of Dubai, United Arab Emirates; ³New York University Abu Dhabi, United Arab Emirates; ⁴University of Toronto, Canada; ⁵Cleveland Clinic Abu Dhabi, United Arab Emirates; ⁶University of Illinois at Urbana-Champaign, United States

8:45 AM SF16.11.03

Synthesis and Coating of Copper Nanoparticle Embedded Carbon Matrix for Antimicrobial Applications Amirali S. Akhavi, William C. Coley, Pedro A. Pena, Mihrimah Ozkan and Cengiz S. Ozkan; University of California, Riverside, United States

9:00 AM SF16.11.04

Functional Coatings Optimization Through Colloidal Assembly Ignacio Martin-Fabiani; Loughborough University, United Kingdom

9:15 AM SF16.11.05

Fluorine-Free Superhydrophobic Coating with Antibiofilm Properties Based on Pickering Emulsion Templating Mor Maayan¹, Karthik A. Mani² and Guy Mechrez²; ¹The Hebrew University of Jerusalem, Israel; ²Volcani Center, ARO, Israel

9:30 AM SF16.11.06

Multifunctional Nanoparticles for Magnetic Dyeing and Antimicrobial Finishing Jianchuan Wen and Yuyu Sun; University of Massachusetts Lowell, United States

SESSION SF16.12: General Session II
Session Chair: Rafik Naccache
Tuesday Afternoon, May 24, 2022
SF16-Virtual

9:00 PM *SF16.12.01

Antimicrobial Nanotextured Surfaces Nathalie Tufenkji¹, Amin Valiei¹, Nicholas Lin¹, Christopher Moraes¹, Dao Nguyen¹, Reghan Hill¹, Geoffrey McKay¹, Jean-Francois Bryche², Paul Charette², Michel Canva² and Mira Okshevsky¹; ¹McGill University, Canada; ²Universite de Sherbrooke, Canada

9:30 PM SF16.12.02

Coal-Derived Graphene Oxide/Copper Ferrite Nanocomposites with Antibacterial and Sonophotocatalytic Properties for Wastewater Remediation Nomin Tserendulam¹, Lkhagvasuren Munkhchuluun¹, Zolzaya Naranbaatar¹, Munkh-Erdene Erdene-Ochir¹, Davaajargal Darambazar^{1,2}, Nergui Uranbileg^{1,3}, Tegshjargal Khishigjargal¹ and Ganzorig Chimed¹; ¹National University of Mongolia, Mongolia; ²New Mongol Institute of Technology, Mongolia; ³Mongolian Academy of Sciences, Mongolia

9:45 PM SF16.12.03

Potentials of Graphene-cuprous Oxide Nanocomposites for the Removal of Antibiotic Resistant Bacteria Lkhagvasuren Munkhchuluun¹, Nomin Tserendulam¹, Zolzaya Naranbaatar¹, Ankhbayar Enkhbaatar², Munkh-Erdene Erdene-Ochir¹, Tegshjargal Khishigjargal¹ and Ganzorig Chimed¹; ¹National University of Mongolia, Mongolia; ²Second State Central Hospital, Mongolia

10:00 PM SF16.12.04

Machining Medium Effect on Biocompatibility of Titanium-Based Dental Implants Nina Erwin^{1,2}, Debashish Sur^{1,3} and G. Bahar Basim¹; ¹NSF center for Particle and Surfactant Systems, United States; ²University of Florida, United States; ³University of Virginia, United States

10:15 PM SF16.12.05

Transparent Surface Coatings that Kill Antimicrobial-Resistant Bacteria within Minutes and Inactivate the COVID-19 Virus Saeed Behzadinasab¹, Myra D. Williams¹, Mohsen Hosseini¹, Leo L. Poon², Alex W. Chin², Joseph O. Falkinham III¹ and William A. Ducker¹; ¹Virginia Tech, United States; ²The University of Hong Kong, Hong Kong

10:30 PM SF16.12.06

Novel Antibacterial Hydrophilic Hard Coating Containing New Designed Antibacterial Agent Won-Suk Chang, Inki Kim and Ginam Kim; Samsung Advanced Institute of Technology, Korea (the Republic of)

10:45 PM SF16.12.07

ZnO Nanowires-PLA Fiber Hierarchical Structure for Antibacterial Surface Sang Won Byun¹, Bum Chul Park¹, Youngjun Ju¹, DaeBeom Lee¹, Ji Beom Shin¹, Kyung-Min Yeon², Yu Jin Kim¹, Prashant Sharma³, Nam-Hyuk Cho³, Jungbae Kim¹ and Young Keun Kim¹; ¹Korea University, Korea (the Republic of); ²Samsung C&T Corporation, Moldova (the Republic of); ³Seoul National University College of Medicine, Korea (the Republic of)

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