

THE AVS 67TH INTERNATIONAL SYMPOSIUM & EXHIBITION

On behalf of the AVS, we invite you to submit an abstract to the AVS 67th International Symposium and Exhibition, which will be held October 24 – 29, 2021 in Charlotte, North Carolina. The AVS Symposium is the premier forum for the presentation and discussion of the science and technology of materials, interfaces, and processing.

This year, the Symposium's theme is **"Advances in Interfacial Science for Energy and The Environment."** The challenges facing the development and implementation of new energy sources and solutions to outstanding environmental problems have never been more important. The AVS 67th Annual Symposium will highlight the emergent science and technology of materials and techniques for environmental applications and energy transformation. AVS 67 will be an ideal forum for presentation and discussion of your latest results and will provide many opportunities to connect with other engineers and scientists.

A sampling of sessions that encompass this theme include:

- Electronic and Photonic Devices for Energy Conversion and Storage
- Bioenergy and Biomass Conversion
- 2D Materials for Electrochemical, Energy, and Environmental Applications
- Structural Characterization of Energy Materials
- Analysis of Surfaces and Interfaces Related to Energy and the Environment
- Astrochemistry and Surfaces for Space and Extreme Environments
- Vacuum Technology for Fusion Research
- Hybrid Nanomaterials Based on Biologically-Inspired Approaches
- Advances in Heterogeneous Electrocatalysis
- Atomic Layer Processing: Integration of Deposition and Etching for Advanced Material Processing
- Environmental Interfaces
- Catalysis at the Metal Oxide Interface
- Pushing the Boundaries of Energy Transfer in Materials
- MEMS Technology for Energy and Environment
- Energy Efficient Nanoelectronics
- Plasma-Engineered Materials and Interfaces for the Environment
- Electronic Interfaces and Contacts

In addition, we will feature programming on innovative topical areas. Focus Topics at this meeting include: 2D Materials; Actinides and Rare Earths; Fundamental Discoveries in Heterogeneous Catalysis; Advanced Ion Microscopy and Ion Beam Nano-Engineering; New Trends in Structural and Electronic Characterization of Materials, Interfaces, and Surfaces Using Synchrotron and FEL Based Light Sources; Chemical Analysis and Imaging at Interfaces; Spectroscopic Ellipsometry; and for the first time, Smart Multifunctional Materials for Nanomedicine and Leaders in Energy and The Environment. We also wish to highlight the Materials and Processes for Quantum Information Science Focus Topic as a forum for the new *AVS Quantum Science (AQS)* journal.

These topics will complement our traditional strong core of fundamental surface science and interfacial phenomena, applied surface science, surface engineering, micro- and nano-electronics, nanoscale science and technology, manufacturing science and technology, thin films, plasma science and technology, micro- and nano-electromechanical systems, electronic and photonic materials, biomaterials, and vacuum science and technology.

As you examine the Call for Abstracts, we are sure that you will find many sessions that interest you as well as oral and poster sessions that will be opportunities to showcase your latest research. Poster presentations in particular, are a great way to promote your work and interact one-on-one with many scientists and engineers in a relaxed environment. In addition, some Divisions plan to host "Flash" presentation sessions, in which poster presenters will each have 2-3 minutes to give an oral presentation summarizing their poster. Awards for posters and oral presentations given by students are also offered by many divisions and groups. AVS 67 will also have a special poster session to highlight Undergraduate research with prizes for the top presentations.

As well as the technical program, there will be an extensive equipment and vendor exhibition, short courses, and many networking and career advancement and recruitment events for those launching their careers as well as for established researchers. If you are new to the AVS community, WELCOME! We are positive that you will find the symposium to be a great place to meet new colleagues and friends with whom to share ideas for years to come. We encourage you to participate in this year's Symposium by submitting an abstract before the deadline of **Monday, May 3rd**. Also, please note that for AVS 67 we are allowing you to present one oral abstract as well as one poster abstract so please consider submitting both!

We look forward to seeing you at AVS 67 in Charlotte!

Dan Killelea
2021 Program Chair

Mohan Sankaran
2021 Program Vice-Chair

AVS recognizes that the global COVID-19 pandemic continues to impact face-to-face meetings. We anticipate seeing you in Charlotte, NC, and we will continue to comply with COVID-19 guidelines (local, state, and federal). As a result, all meeting plans are subject to change to stay in compliance with these COVID-19 guidelines. Hybrid options will be considered as needed. Should an in-person meeting not be feasible, a virtual component will be planned. Additional details will be made available as the event draws closer.

PROGRAM COMMITTEE

PROGRAM CHAIR

Dan Killelea
Loyola University Chicago
dan_killelea@avs.org

PROGRAM VICE-CHAIR

Mohan Sankaran
Univ. of Illinois at Urbana-Champaign
Mohan_sankaran@avs.org

2D MATERIALS

Topic Co-Chair: Batzill, Matthias,
University of South Florida
Topic Co-Chair: Gunlycke, Daniel, U.S.
Naval Research Laboratory
Topic Co-Chair: Oleynik, Ivan, University
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Edmonds, Mark, Monash Univ., Australia
Gao, Hongjun, Chinese Academy of
Sciences, China
Hanbicki, Aubrey T., Laboratory for
Physical Sciences
Jariwala, Deep, California Institute of
Technology
Katoch, Jyoti, Carnegie Mellon Univ.
Kim, Jeewan, Massachusetts Institute
of Technology
King, Phil, University of St Andrews, UK
Luican-Mayer, Adina, University of
Ottawa, Canada
Robinson, Jeremy, U.S. Naval Research
Laboratory
Tutuc, Emanuel, Univ. of Texas at Austin
van der Zande, Arend, University of
Illinois at Urbana-Champaign
Wang, Qing Hua, Arizona State Univ.
Wiesendanger, Roland, University of
Hamburg, Germany

ACTINIDES AND RARE EARTHS

Topic Co-Chair: Shuh, David, Lawrence
Berkeley National Laboratory
Topic Co-Chair: Tobin, James G.,
University of Wisconsin-Oshkosh
Denecke, Melissa, International Atomic
Energy Agency, Austria
Durakiewicz, Tomasz, NSF
Geeson, David, AWE
Gofryk, Krzysztof, Idaho National Lab
Havela, Ladislav, Charles University,
Prague, Czech Republic
Newberg, John, Los Alamos National Lab
Petit, Leon, Daresbury Laboratory, UK

Tereshina-Chitrova, Evgeniya, Charles
University, Prague, Czech Republic
Gertrud Zwicknagl, Technische
Universität Braunschweig, Germany

ADVANCED ION MICROSCOPY AND ION BEAM NANO-ENGINEERING

Topic Co-Chair: Livengood, Richard,
Intel Corporation, USA
Topic Co-Chair: Ovchinnikova, Olga, Oak
Ridge National Laboratory
Gölzhäuser, Armin, Bielefeld University,
Germany
Hlawacek, Gregor, Helmholtz-Zentrum
Dresden Rossendorf, Germany
Notte, John A., Carl Zeiss PCS, Inc.
Ogawa, Shinichi, National Institute of
Advanced Industrial Science and
Technology (AIST)
Tan, Shida, Intel Corporation

ADVANCED SURFACE ENGINEERING

Topic Chair: Lin, Jianliang, Southwest
Research Institute
Kodambaka, Suneel, University of
California, Los Angeles
Lee, Jyh-Wei, Ming Chi University of
Technology, Taiwan, Republic of China
Mangolini, Filippo, The University of
Texas at Austin
Matjaz, Panjan, Jožef Stefan Institute,
Slovenia

APPLIED SURFACE SCIENCE

Topic Chair: Ventrice, Jr., Carl A. SUNY
Polytechnic Institute
Counsell, Jonathan, Kratos Analytical
Limited
Ellsworth, Ashley, Physical Electronics
Engelhard, Mark, Pacific Northwest
National Laboratory
Fisher, Gregory, Physical Electronics, Inc.
Gaskell, Karen, University of Maryland,
College Park
Harrison, Elisa, Ford Motor Company
Herman, Gregory, Oregon State
University
Mahoney, Christine, Corning Inc.
Piao, Hong, Fujifilm Electronic Materials
Inc., USA
Robinson, Zachary, SUNY Brockport
Rosenberg, Samantha, Sandia National Lab
Shard, Alexander, National Physical Lab, UK

Thevuthasan, Theva, Pacific Northwest
National Laboratory
Zakel, Julia, IONTOF GmbH, Germany

ATOMIC SCALE PROCESSING

Topic Chair: Joseph, Eric A., IBM T.J.
Watson Research Center
Agarwal, Sumit, Colorado School of Mines
Barry, Seán, Carleton University, Canada
Chang, Jane, Univ. of California, Los Angeles
Chen, Donna, University of South Carolina
Clendenning, Scott, Intel
Creatore, Adriana, Eindhoven University
of Technology, The Netherlands
deMarneffe, Jean-Francois, IMEC, Belgium
Dendooven, Jolien, Ghent Univ., Belgium
Detavernier, Christophe, Ghent
University, Belgium
Engelmann, Sebastian, IBM T.J. Watson
Research Center
George, Steven M., University of
Colorado at Boulder
Hamaguchi, Satoshi, Osaka Univ., Japan
Hilton, Jessica, SPECS
Hofmann, Tino, University of North
Carolina at Charlotte
Huffman, Craig, Micron Technology
Kachian, Jessica, Intel Corporation
Kanarik, Keren, Lam Research Corp.
Kessels, W.M.M. (Erwin), Eindhoven
Univ. of Technology, The Netherlands
King, Sean W., Intel Corporation
Lill, Thorsten, Lam Research
Myers-Ward, Rachael L., U.S. Naval
Research Laboratory
Parsons, Gregory, North Carolina State Univ.
Poedt, Paul, TNO-Holst Centre
Reinke, Petra, University of Virginia
Rogers, Bridget, Vanderbilt University
Walker, Amy, University of Texas at Dallas
Wheeler, Virginia, U.S. Naval Research Lab
Yanguas-Gil, Angel, Argonne National Lab

BIOMATERIAL INTERFACES
Topic Chair: Howell, Caitlin, Univ. of Maine
Fears, Kenan, U.S. Naval Research Lab
Goacher, Robyn E., Niagara University
Graham, Daniel, Univ. of Washington
Hanley, Luke, University of Illinois at Chicago
Jarvis, Karyn, Swinburne University of
Technology, Australia
Jerach, Jordan, IONpath
McArthur, Sally, Swinburne University
of Technology, Australia

Parekh, Sapun, Univ. of Texas at Austin
Valtiner, Markus, Vienna University of
Technology, Austria

BIOMATERIALS PLENARY SESSION

Topic Chair: Howell, Caitlin, Univ. of Maine

CHEMICAL ANALYSIS AND IMAGING AT INTERFACES

Topic Co-Chair: Kolmakov, Andrei,
National Institute of Standards and
Technology (NIST)

Topic Co-Chair: Yu, Xiao-Ying, Pacific
Northwest National Laboratory

ELECTRONIC MATERIALS AND PHOTONICS

Topic Chair: King, Seth, University of
Wisconsin - La Crosse

Banerjee, Parag, Univ. of Central Florida

Cleveland, Erin, U.S. Naval Research Lab

Douglas, Erica, Sandia National Labs

Filler, Michael A., Georgia Inst. of Tech.

Han, Sang M., University of New Mexico

Henry, Michael David, Sandia National Labs

Hilton, Jessica, SPECS

Joseph, Eric A., IBM T.J. Watson

Research Center

Kapadia, Rehan, Univ. of Southern California

Kawasaki, Jason, University of

Wisconsin - Madison

McDonnell, Stephen, Univ. of Virginia

Myers-Ward, Rachael L., U.S. Naval

Research Laboratory

Paquette, Michelle M., University of

Missouri-Kansas City

Strandwitz, Nicholas, Lehigh University

Wiggins, Bryan, Intel Corporation

EXHIBITOR TECHNOLOGY

SPOTLIGHT WORKSHOPS

Topic Chair: Degennaro, Jeannette, AVS

FUNDAMENTAL DISCOVERIES IN

HETEROGENEOUS CATALYSIS

Topic Co-Chair: Arnadottir, Liney,

Oregon State University

Topic Co-Chair: Baber, Ashleigh, James

Madison University

Flaherty, David W., University of Illinois
at Urbana-Champaign

Parkinson, Gareth S., TU Wien, Austria

Roy, Sharani, University of Tennessee
Knoxville

Schauermaun, Svetlana, Christian-

Albrechts-University Kiel, Germany

Senanayake, Sanjaya, Brookhaven

National Laboratory

Utz, Arthur, Tufts University

Weaver, Jason, University of Florida

LEADERS IN ENERGY AND THE ENVIRONMENT

Topic Co-Chair: Brown, Sarah,
University of Chicago

Topic Co-Chair: Hannagan, Ryan, Tufts
University

Cramer, Laura, Tufts University

Das, Anusheela, Northwestern
University

MAGNETIC INTERFACES AND NANOSTRUCTURES

Topic Chair: Ohldag, Hendrik, Lawrence
Berkeley National Laboratory

Topic Co-Chair: Lauter, Valeria, Oak
Ridge National Laboratory

Barsukov, Igor, UC Riverside

Castro, Germán Rafael, Spanish CRG

BM25-SpLine Beamline at the ESRF

Donath, Markus, Westfälische Wilhelms-
Universität Münster, Germany

Enders, Axel, Univ. of Bayreuth, Germany

Gai, Zheng, Oak Ridge National Lab

Holcomb, Mikel B., West Virginia Univ.

Kaspar, Tiffany, Pacific Northwest

National Laboratory

King, Seth, Univ. of Wisconsin-La Crosse

Mankey, Gary, The Univ. of Alabama

Oleynik, Ivan, Univ. of South Florida

Shuh, David, Lawrence Berkeley

National Laboratory

Szulczewski, Greg, Univ. of Alabama

MANUFACTURING SCIENCE AND TECHNOLOGY

Topic Chair: Diebold, Alain C., SUNY

Polytechnic Institute, Albany

Cady, Nathaniel C., SUNY Polytechnic
Institute, Albany

Joseph, Eric A., IBM T.J. Watson

Research Center

Kaarsberg, Tina, Department of Energy

Rogers, Bridget, Vanderbilt University

Rubloff, Gary, University of Maryland,
College Park

Svedberg, Erik, National Academies of
Sciences, Engineering, and Medicine

MATERIALS AND PROCESSES FOR QUANTUM INFORMATION SCIENCE

Topic Co-Chair: Adiga, Vivekananda,

IBM, T.J. Watson Research Center

Topic Co-Chair: Myers-Ward, Rachael L.,
U.S. Naval Research Laboratory

Topic Co-Chair: Richardson,
Christopher, Lab. for Physical Sciences

Blain, Matthew, Sandia National Labs

Bouyer, Philippe, CNRS, France

Bylander, Jonas, Chalmers University of
Technology, Sweden

Chen, Yong P., Purdue University

Fuentes, Ivette, Univ. of Nottingham, UK

Gorman, Brian, Colorado School of Mines

Joseph, Eric A., IBM T.J. Watson

Research Center

Kok, Pieter, University of Sheffield, UK

Pappas, David, National Institute of
Standards and Technology (NIST)

Queen, Daniel, Northrop Grumman

Rubinsztein-Dunlop, Halina, University
of Queensland, Australia

Silver, Richard, National Institute of
Standards and Technology (NIST)

Yeats, Andrew, U.S. Naval Research Lab

MEMS AND NEMS

Topic Chair: Wang, Max Zenghui,
University of Electronic Science and
Technology of China

Topic Co-Chair: Qian, Zhenyun,
Northeastern University

Blain, Matthew, Sandia National Labs

Davis, Robert, Brigham Young University

Hentz, Sébastien, Université Grenoble
Alpes, CEA, LETI, France

Hiebert, Wayne, National Institute for
Nanotechnology, Canada

Ilic, B. Robert, National Institute for
Science and Technology (NIST)

Jordan, Matthew, Sandia National Labs

Metzler, Meredith, Univ. of Pennsylvania

Zorman, Christian, Case Western

Reserve University

NANOSCALE SCIENCE AND TECHNOLOGY

Topic Co-Chair: Cohen, Sidney,
Weizmann Institute of Science, Israel

Topic Co-Chair: Brown, Keith, Boston Univ.

Baykara, Mehmet, University of
California Merced

Burnham, Nancy, Worcester Polytechnic Inst.

Celano, Umberto, IMEC

Czaplewski, David, Argonne National Lab

Dagderviren, Omur, University of
Quebec, Canada

Fantner, Georg, École Polytechnique
Fédéral de Lausanne, Switzerland

Hanbicki, Aubrey T., Laboratory for
Physical Sciences

Li, An-Ping, Oak Ridge National Lab

Liu, Xiaolong, Cornell University

Luican-Mayer, Adina, Univ. Ottawa

McCreary, Kathy, Naval Research Laboratory

Mody, Jay, Global Foundries

Su, Chanmin, Bruker Nano

Tu, Qing, Texas A&M University

Wang, Canhui, Johns Hopkins University

NEW TRENDS IN STRUCTURAL ELECTRONIC CHARACTERIZATION OF MATERIALS, INTERFACES, AND SURFACES USING SYNCHROTRON AND FEL BASED LIGHT SOURCES

Topic Co-Chair: Castro, Germán Rafael,
Spanish CRG BM25-SpLine Beamline
at the ESRF

Topic Co-Chair: McChesney, Jessica,
Argonne National Laboratory
Liu, Zhi, ShanghaiTech University, China
Molodtsov, Serguei, European XFEL
GmbH, Germany

Morais, Jonder, Universidade Federal do
Rio Grande do Sul - UFRGS

Säthe, Conny, Max IV Laboratory

Schneider, Claus Michael, Forschungszentrum
Juelich GmbH, Germany

Taleb-Ibrahimi, Amina, Synchrotron
SOLEIL, France

PLASMA SCIENCE AND TECHNOLOGY

Topic Chair: Walton, Scott, U.S. Naval
Research Lab

Agarwal, Ankur, KLA-Tencor

Agarwal, Sumit, Colorado School of Mines

Arnold, John, IBM Research Division,
Albany, NY

Darnon, Maxime, LN2, CNRS /
Université de Sherbrooke, 3IT, Canada

Despiau-Pujo, Emilie, LTM, Univ.

Grenoble Alpes, CNRS, France

Engelmann, Sebastian, IBM T.J. Watson
Research Center

George, Steven M., University of
Colorado at Boulder

Gordon, Michael, University of California
at Santa Barbara

Hayashi, Hisataka, KIOXIA

Johnson, Erik V., LPICM, CNRS, Ecole
Polytechnique, Paris

Kanarik, Keren, Lam Research Corp.

Kessels, W.M.M. (Erwin), Eindhoven

Univ. of Technology, The Netherlands

Koga, Kazunori, Kyushu Univ., Japan

Lishan, David, Plasma-Therm LLC

Maeda, Kenji, Hitachi High Technologies
America Inc.

O'Connell, Deborah, Univ. of York, UK

Pargon, Erwine, LTM, Univ. Grenoble
Alpes, CEA-LETI, France

Ranjan, Alok, TEL Technology Center,
America, LLC

Reniers, François, Université Libre de
Bruxelles, Belgium

Samukawa, Seiji, Tohoku University

Sankaran, Mohan, Univ. of Illinois at
Urbana-Champaign

Sriraman, Saravanapriyan, LAM Research

Tatsumi, Tetsuya, Sony Semiconductor
Solutions Corporation

Tian, Wei, Applied Materials, Inc.

van de Sanden, Richard M.C.M., DIFFER,
Eindhoven Univ., The Netherlands

Vitale, Steven, MIT Lincoln Laboratory

Wang, Mingmei, TEL Technology Center,
America, LLC

Yeom, Geun Young, Sungkyunkwan
University, Republic of Korea

SMART MULTIFUNCTIONAL MATERIALS FOR NANOMEDICINE

Topic Co-Chair: Reniers, François,
Université Libre de Bruxelles, Belgium

Topic Co-Chair: Satriano, Cristina,
University of Catania, Italy

SPECTROSCOPIC ELLIPSONOMETRY

Topic Chair: Hofmann, Tino, University
of North Carolina at Charlotte

Topic Co-Chair: Darakchieva, Vanya,
Linköping University, Sweden

Topic Co-Chair: Diebold, Alain C., SUNY
Polytechnic Institute, Albany

Topic Co-Chair: Hilfiker, James, J.A.
Woollam Co., Inc.

SURFACE SCIENCE

Topic Chair: Chen, Donna, University of
South Carolina

Altman, Eric, Yale University

Bluhm, Hendrik, Fritz Haber Institute,
Germany

Dohnalek, Zdenek, Pacific Northwest
National Laboratory

Groot, Irene, Leiden University, The
Netherlands

Iski, Erin, University of Tulsa

Reinke, Petra, University of Virginia

Schauermann, Swetlana, Christian-
Albrechts-University Kiel, Germany

Sykes, Charles, Tufts University

Utz, Arthur, Tufts University

Zaera, Francisco, University of
California, Riverside

Zhu, Junfa, National Synchrotron
Radiation Laboratory and Department
of Chemical Physics, University of
Science and Technology of China

THIN FILMS

Topic Chair: Yanguas-Gil, Angel,
Argonne National Laboratory

Akyildiz, Halil, Uludag Univ., Turkey

Banerjee, Parag, Univ. of Central Florida

Becker, Joe, Kurt J. Lesker

Conley, Jr., John F., Oregon State Univ.

Creatore, Adriana, Eindhoven University
of Technology, The Netherlands

Grubbs, Robert, Micron Technology, Inc.

Gupta, Subhadra, University of Alabama

Jur, Jesse, North Carolina State Univ.

Kachian, Jessica, Intel Corporation

Losego, Mark, Georgia Institute of Technology

Mackus, Adrie, Eindhoven University of
Technology, The Netherlands

Nejati, Siamak, Univ. of Nebraska-Lincoln
Park, Jin-Seong, Hanyang University, Korea

Peng, Qing, University of Alabama

Poodt, Paul, TNO-Holst Centre

Stiff-Roberts, Adrienne, Duke University

Vallee, Christophe, SUNY POLY, Albany

Vanfleet, Richard, Brigham Young University

Wang, Xinwei, Peking University

Wheeler, Virginia, U.S. Naval Research Lab

UNDERGRADUATE POSTER SESSION

Topic Co-Chair: Arnadottir, Liney,
Oregon State University

Topic Co-Chair: Baber, Ashleigh, James
Madison University

Topic Co-Chair: Iski, Erin, Univ. of Tulsa

VACUUM TECHNOLOGY

Topic Chair: Ricker, Jacob, National Inst.
of Standards and Technology (NIST)

Topic Co-Chair: Carter, Jason, Argonne
National Laboratory

Alfrey, Jason, Vacuum Technology, Inc.

Arnold, Paul, MKS Instruments, Inc.

Bagge-Hansen, Michael, Lawrence
Livermore National Laboratory

Brucker, Gerardo, MKS Instruments,
Inc., Pressure and Vacuum

Measurement Group

Fedchak, James, National Institute of
Standards and Technology (NIST)

Heinbuch, Scott, MKS Instruments, Inc.

Hendricks, Jay, National Institute of
Standards and Technology (NIST)

Lanza, Giulia, SLAC National Accelerator Lab

Li, Yulin, Cornell University

Lushtak, Yevgeniy, Cornell University

Omelayo, Sol, Lawrence Berkeley Lab,
University of California, Berkeley

Scherschligt, Julia, National Institute of
Standards and Technology (NIST)

Stutzman, Marcy, Jefferson Lab

Van Drie, Alan, TAE Technologies

Wuest, Martin, INFICON

2D MATERIALS FOCUS TOPIC (2D)

The 2D Materials Focus Topic will review the world-wide effort exploring 2D materials regarding their synthesis, characterization, processing, properties, and applications. The presentations will cover growth and fabrication; characterization including microscopy and spectroscopy; nanostructures including heterostructures; dopants, defects, and interfaces; properties including electronic, magnetic, optical, mechanical, and thermal properties; surface chemistry, functionalization, bio and sensor applications; device physics and applications; novel 2D materials; and novel quantum phenomena in 2D materials.

2D1+AP+EM+PS+SS+TF: 2D Materials Growth and Fabrication

Marc Miskin, University of Pennsylvania, "Microscopic Robots"

Peter Sutter, University of Nebraska–Lincoln, "Synthesis of van der Waals Materials: Novel Heterostructures and Control of Interlayer Twist"

2D2+MI: Electron Microscopy and Spectroscopy of 2D Materials

Tai-Chang Chiang, University of Illinois, "Novel Electronic Structure of Single Molecular Layers and Ultrathin Films"

Sung-Kwan Mo, Lawrence Berkeley Lab, "Electronic Structures of Two-Dimensional Topological Materials"

2D3+HC+MN+NS+SS: Scanning Probe Microscopy and Spectroscopy of 2D Materials

Ken Shih, University of Texas, "Scanning Tunneling Microscopy and Spectroscopy of 2D Material Heterostructures"

Miguel Ugeda, Donostia International Physics Center, Spain, "Multifractal Superconductivity in a Two-Dimensional Transition Metal Dichalcogenide in the Weak Disorder Regime"

2D4+EM+HC+NS+QS+TF: Dopants, Defects, and Edges in 2D Materials

Pinshane Huang, University of Illinois, "Characterizing Unconventional Strain and Bending in 2D Materials and Heterostructures with Aberration-Corrected STEM"

Jani Kotakoski, University of Vienna, Austria, "Physical and Chemical Control Over 2D Materials in the Electron Microscope"

2D5: Optical and Valley Properties of 2D Materials

Kristie Koski, UC Davis

2D6+EM+MN+NS+QS: Electromechanical and Optoelectronic Properties in 2D Materials

Deng Hui, University of Michigan, "Interlayer Excitons in Van Der Waals Heterostructures"

Frank Koppens, ICFO, Spain

2D7+EM+NS+PS+QS: Properties of Layered 2D Materials, including Heterostructures and Twistronics

Yuan Cao, MIT

Brian LeRoy, University of Arizona, "Designer Electronic States in van der Waals Heterostructures"

2D8+MI+NS+QS: Correlated Properties in 2D Materials, including Magnetism, Charge Density Waves, and Superconductivity

Adam Tsen, University of Waterloo, Canada, "2D Magnetism and Spintronics"

2D9+EM+LD+SS: Electronic and Vibrational Properties in 2D Materials and Heterostructures for Device Applications

Saptarshi Das, Pennsylvania State University, "Brain Inspired Electronics and Neuromorphic Computing Based on 2D Materials"

Archanda Raja, Lawrence Berkeley Lab, "Tuning Energy Levels and Energy Flow in Nanomaterials using the External Environment"

2D10+AP+BI+HC+NS+PS+SS+TF: Adsorption and Functionalization on 2D Materials

Mark Hersam, Northwestern University, "2020 AVS Medard W. Welch Award Lecture: Chemically Tailoring Interfaces in Two-Dimensional Heterostructures"

Kian Ping Loh, NUS, Singapore

Damien Voiry, University of Montpellier, France, "Nanofluidics from Exfoliated Two-Dimensional Materials"

2D11+BI+LD+MN+PS+SS+TF: 2D Materials for Electrochemical, Energy, and Environmental Applications

Kwabena Bediako, UC Berkeley, "Manipulating Electrochemical Reactions in Van Der Waals Heterostructures"

2D12+EM+MI+SS: 2D Materials Theory, Computation, and Materials Discovery

Udo Schwingenschlogel, KAUST, Saudi Arabia, "First-Principles Calculations of 2D Materials for Gas Sensing Applications"

Vivek Shenoy, University of Pennsylvania, "Modeling the Growth of 2D Crystals: Analytical, Phase-Field and Machine Learning Methods"

2D13: 2D Materials Poster Session

ACTINIDES AND RARE EARTHS FOCUS TOPIC (AC)

Actinides and rare earths exhibit many unique and diverse physical, chemical and magnetic properties resulting in large part from the complexity of their 5f and 4f electronic structure. The Actinide and Rare Earth Sessions focus on the chemistry, physics and materials science of f-electron materials. Emphasis will be placed upon the 4f/5f electronic and magnetic structure, surface science, thin film properties, and applications to energy-related issues.

The role of fundamental f-electron science in resolving technical challenges posed by actinide materials will be stressed, particularly with regard to energy applications, including energy generation, novel nuclear fuels, and structural materials. Both basic and applied experimental approaches, including synchrotron-radiation-based and neutron-based investigations, as well as theoretical modeling computational simulations, will be featured, with the aim of explaining the observed behavior in these complex materials. Of particular importance are the issues important to nuclear energy and security, including fuel synthesis, oxidation, corrosion, intermixing, stability in extreme environments, prediction of properties via bench-marked simulations, separation science, and forensics. Specific sessions will be devoted to a continued, focused emphasis on the advances in the theory and measurements of core-level spectroscopies for the study of actinides and rare earths. This Focus Topic will also address advances in chemistry/materials sciences for environmental management and will promote the participation of early career scientists.

AC1+LS+MI: Magnetism, Electron Correlation, and Superconductivity in the Actinides and Rare Earths

Nicholas Butch, NIST/UMD, "Novel Spin-Triplet Superconductivity in Uranium Ditelluride"

Vitalij Pecharsky, Iowa State University, "The Quest for the Holy Grail, or How Does One Control the Structure and Magnetism of Complex Rare Earth Materials?"

AC2+AS: Chemistry and Physics of the Actinides and Rare Earths

Tori Forbes, University of Iowa, "Overcoming Challenges in the Interpretation of Actinyl Vibrational Bands Within Solids and on Polymer Surfaces"

Roland Schulze, Los Alamos National Lab, "Thermodynamics of Small Molecule Reactions at Uranium Surfaces"

Jenifer Shafer, Colorado School of Mines, "Sulfur Containing Ligands for Actinide Separations: How Do They Work?"

AC3+AS+LS: Forensics

Michael Kristo, Lawrence Livermore National Lab, "Nuclear Forensics 2020: A Strategic Inflection Point?"

Jesse Ward, Pacific Northwest National Lab, "Tracking Uranium Speciation by Synchrotron Spectromicroscopy"

AC4+LS+MI: Actinide and Rare Earth Theory

Enrique Batista, Los Alamos National Laboratory, "Surface Properties of Actinide Dioxides; Crystal Growth and Catalysis"

David Dixon, University of Alabama, "Extending Our Understanding of f-Element Oxidation States Using Computational Chemistry"

Lindsay Roy, SRNL, "The PreCalc Project: Multiscale Framework for Predicting Morphology of Plutonium Oxide Particles"

AC5+LS: New Experimental Approaches

Lucia Amidani, HCDR, France, "New Experimental Approaches"

Gerald Seidler, University of Washington, "Lanthanide and Actinide XAS in the Lab: How does it Work, and How Does It Complement Synchrotron Beamlines?"

Dimosthenis Sokaras, SLAC National Accelerator Laboratory, "High-Energy-Resolution X-Ray Spectroscopy and Actinides Research at SLAC"

AC6+LS: Early Career Scientists

Mukesh Bachhav, Idaho National Laboratory, "Chemical and Microstructural Analysis of Nuclear Fuels at Nano-Length Scale Using Atom Probe Tomography"

Yusen Qiao, Lawrence Berkeley National Lab, "Understanding the 4f Covalency of Lanthanide Tris(cyclopentadienyl) Complexes by X-ray Absorption Spectroscopy, Magnetism, and Theory"

Jennifer Shusterman, Hunter College, "Aqueous Isotope Harvesting for Production of Target Material for Cross Section Measurements"

AC7: Actinides and Rare Earths Poster Session

ADVANCED ION MICROSCOPY AND ION BEAM NANO-ENGINEERING FOCUS TOPIC (HI)

The Advanced Ion Microscopy & Ion Beam Nano-Engineering focus topic targets research in focused ion beam technology and applications, with emphasis on applying novel ion beam technologies - to deliver unique solutions in microscopy, nano-fabrication, metrology, materials engineering, and other analytical techniques. With origins in Gas Field Ion Source Helium Ion Microscopy (GFIS-HIM), this session has expanded to include the full spectrum gas particle beams and sources including Liquid Metal Ion Sources (LMIS), a breadth of solid state and alloy sources, plasma-cusp ion sources, cold beams, and neutral beams, for various use in research and application.

HI1: Advanced Ion Microscopy & Surface Analysis Applications

Matthew Ball, Cambridge University, UK

Matthias Schmidt, Ludwig Maximilian University, Munich, Germany, "Imaging of Microbiological Systems using the HIM"

Annalena Wolff, Queensland University of Technology (QUT), Australia, "Focused Ion Beams in Biology: Revealing Nature's Tiniest Structures using the Helium Ion Microscope"

HI2: Novel Beam Induced Material Engineering & Nano patterning

Wolfgang Lang, University of Vienna, Austria, "Nanoscale Vortex Pinning Structures in High-temperature Superconductors Created in a Helium Ion Microscope"

Juergen Linder, Helmholtz-Zentrum Dresden Rossendorf, Germany

Alex Zettl, University of California at Berkeley

HI3: Emerging Ion Sources, Optics, and Applications

Anjam Khurshed, National University of Singapore

Jiro Matsuo, Kyoto University, SENTA, JST, Japan, "Cluster Ion Beams: A New Tool for Characterization and Processing of Organic and Biological Materials"

HI4: Advanced Ion Microscopy & Nano-Engineering Poster Session

ADVANCED SURFACE ENGINEERING DIVISION (SE)

The program of Advanced Surface Engineering Division (SE) will cover a wide range of topics in surface engineering focusing on plasma-assisted vapor deposition, coating characterization, and utilizing surface engineering for industrial applications. The program includes four oral sessions and a poster session. The four technical sessions will be led by high profile invited speakers who will highlight recent advances in fundamental and cutting-edge research in surface engineering. The session "Vapor Depositions and HiPIMS in Surface Engineering" will emphasize the latest progress in surface modification and synthesizing thin films and coatings on all kinds of materials via vapor depositions, especially, advances in high density plasma-assisted deposition technologies, HiPIMS. The session "Nanostructured and Multifunctional Thin Films and Coatings" will feature presentations on the design and development of advanced nanostructured coatings for achieving multifunctionality to be used in various environments, e.g. wear, erosion, corrosion, high temperature, etc. Studies focusing on the deep understanding of the relationship between process, structure, and properties of advanced coatings and modified surfaces are appreciated. The session "Mechanical and Tribological Properties/Characterization of Thin Films and Coatings" will highlight contributions on fundamental understanding and applied research aspects for thin film and coating mechanical and tribological properties. The contribution includes new and advanced surface characterization techniques, analysis and characterization of modified surfaces, and the interaction of the surface with environment. The last session "New Trends and Industrial Application in Surface Engineering" invites contributors from academia and industry that focus on revealing future trends in surface engineering, e.g., new metallic glass coatings, high-entropy alloy (HEA) coatings, super hydrophobic surface, etc. In addition, contributions that show how surface engineering can assist to solve real world problems in the industry will be included. SE will establish for the first time an award to recognize young investigators for their outstanding participation and research based on presentations in SE program sessions. Up to three finalists and one first prize winner will be selected and announced towards the end of the SE program.

SE1: Vapor Deposition and HiPIMS in Surface Engineering

Jon Tomas Gudmundsson, University of Iceland, "On the Low Deposition Rate and Ionized Flux Fraction in High Power Impulse Magnetron Sputtering"

Wan-Yu Wu, Da-Yeh University, Taiwan, Republic of China, "Low Temperature Thin Film Deposition on Flexible Substrate Using HiPIMS Technique"

SE2: Nanostructured and Multifunctional Thin Films and Coatings

Paul Mayrhofer, Technische Universitaet Wien, Austria, "High-Entropy Ceramic Thin Films; A Case Study of Nitrides, Oxides and Diborides"

SE3: Mechanical and Tribological properties/Characterization of Thin Films and Coatings

Giovanni Ramirez, Bruker Nano Surfaces, "Catalytically Active Nanocomposite Coatings for Tribological Applications"

SE4: New Trends and Industrial Applications in Surface Engineering

Jinn P. Chu, National Taiwan University of Science and Technology, Taiwan, Republic of China, "Metallic Glass: A Novel and Emerging Coating For Various Industrial Applications"

SE5: Advanced Surface Engineering Poster Session

APPLIED SURFACE SCIENCE DIVISION (AS)

The Applied Surface Science Division provides a forum for research in surface preparation, modification, and utilization for practical applications with a focus on Characterization of Surfaces, Interfaces, and Nanomaterials. The Division has long been the premier gathering place for the global community of surface analysts with historic emphasis on techniques such as SIMS, XPS, and Auger spectroscopies. We have long-standing analytical interests with traditional sessions such as quantitative surface analysis, industrial problem solving and advances in technique development. Our contributors present a blend of fundamental research in measurement science along with cutting-edge applied studies in nanoscience, materials for energy conversion, semiconductor processing, polymers, biotechnology and more. We strive to grow in new areas for future development in applied surface analysis and analytical data processing. For AVS 67 we are also encouraging contributions focusing on the roles of surfaces and interfaces in materials, technologies, and processes relating to energy and the environment. Novel surface analytical

methods for providing insight into surfaces, such as Atom Probe, Hard x-rays, Ellipsometry and in operando techniques are welcome. We also welcome and encourage contributions concerning reproducibility issues.

AS1+BI+CA+LS: Quantitative Surface Analysis

David Cant, National Physical Laboratory, UK, "Hard Targets : Developing Tools for Quantitative Haxpes"

Peter License, The University of Nottingham, UK, "Ionic Liquids in Vacuo: Suck-it and See!"

AS2+BI+CA+LS+NS+SE+SS: Analysis of Surfaces and Interfaces Related to Energy and the Environment

Julia Maibach, Karlsruhe Institut for Technology (KIT), Germany, "Batteries at Work: Ambient Pressure Photoelectron Spectroscopy for Lithium Ion Batteries"

Svitlana Pylypenko, Colorado School of Mines, "Analysis of Surfaces and Interfaces in Polymer Electrolyte Membrane Fuel Cell and Electrolyzer Devices"

AS3+AC+BI+CA: Getting the Most out of your Analysis using Complimentary Techniques

Alexander Gray, Temple University, "Combining Multiple X-Ray Spectroscopic and Scattering Techniques to Probe Emergent Electronic Phenomena at Oxide Interfaces"

AS4+HC+PS+SE+SM: Modification of Surfaces and Interfaces for Practical Applications

Robyn E. Goacher, Niagara University, "Going Beyond Superficial Surface Analysis for Transforming Plants into Value-added Products"

AS5+AC+BI+SS: Applied Surface Science and Data Processing

Brian Gorman, Colorado School of Mines, "Hardware and Data Analysis Methods for Integrating TEM and Atom Probe Tomography"

AS6+BI: Combining Depth Profiling with Surface Analysis

Birgit Hagenhoff, Tascon, Germany, "Towards Organic 3D Characterization: SIMS Analysis Using Ar Cluster Ions"

AS7: Charles S. Fadley Memorial Session (ALL INVITED SESSION)

Maria Asensio, Materials Science Institute of Madrid, Spain, "The Role of Photoelectron Diffraction Effects in Surface States at the Fermi Level: Revisiting the Si(111) 7x7 Surface"

Alexander Gray, Temple University, "Synergies between Synchrotron and Lab-Based X-Ray Techniques for the Studies of Complex Materials and Interfaces"

Martina Müller, Universität Konstanz, "Functional and Quantum Oxides Explored by Hard X-rays"

Bongjin Simon Mun, Gwangju Institute of Science and Technology, Republic of Korea, "Study of Surface Chemical Reactions With Ambient Pressure XPS"

Inna Vishik, University of California at Davis, "High Resolution Angle-Resolved Photoemission Spectroscopy Studies of Quantum Materials"

AS8: Applied Surface Science Division Poster Session

ATOMIC SCALE PROCESSING FOCUS TOPIC (AP)

The AVS 67 program will feature for the second time, the Atomic Scale Processing Focus Topic. This focus topic will provide a unique forum to expand the scope of atomic layer deposition (ALD) and atomic layer etching (ALE) processes towards understanding the fundamentals needed to achieve true atomic scale precision. The emphasis will be on synergistic efforts, across multiple AVS divisions and groups, to generate area selective processes as well as novel characterization methods to advance the field of processing at the atomic scale. We are excited to offer several sessions in collaboration with Plasma Science & Technology Division, the Thin Film Division as well as the Electronic Materials and Photonics Division focusing on area selective deposition, characterization and metrology to enable atomic scale processing, atomic layer process chemistry and surface reactions and atomic layer etching.

AP1+2D+EM+MN+PS+TF: Area Selective Processing and Patterning

John G. Ekerdt, University of Texas at Austin, "Area Selective ALD of Metals and Metal Alloys"

Woo-Hee Kim, Hanyang University, Republic of Korea

Alex Martinson, Argonne National Laboratory, "In-situ Characterization of the Earliest Stages of Selective ALD Growth and Inhibition"

Christophe Vallee, SUNY POLY, Albany, "Strategies for a Selective Deposition Process Combining Deposition and Etching Steps in the Same Tool"

AP2+EL+MS+NS+SS+TF: Advancing Metrology and Characterization to Enable Atomic Scale Processing

Thomas Grehl, IONTOF GmbH, Germany, "The Thinner, The Better - Characterization of Ultra-thin Films by Low Energy Ion Scattering (LEIS)"

Harm Knoops, Eindhoven University of Technology, The Netherlands, "Ellipsometric Characterization of ALD/ALE Films"

Sung Park, Molecular Vista, "Nanoscale Chemical Analysis and Mapping of Atomic Scale Processes via Photo-Induced Force Microscopy"

AP3+2D+MN+PS+TF: Atomic Layer Processing: Integration Of Deposition And Etching For Advanced Material Processing

Anuja De Silva, IBM Research at Albany Nanotech Albany, NY, "Atomic Layer Processing for Advanced Patterning Applications"

Gert J. Leusink, TEL Technology Center, America, LLC, "Challenges and Opportunities of Atomic Layer Processes for Selective Patterning Solutions"

Sashi Vyas, Intel

AP4+PS+SS+TF: Beam Studies/Surface Reaction Analysis and Emerging Applications of Atomic Scale Processing

D. Howard Fairbrother, Johns Hopkins University, "Charged Particle Deposition of Nanostructures and Thin Films: A Surface Science Perspective"

Kees Hagen, TU Delft, The Netherlands, "Nano-prototyping"

Noriaki Toyoda, University of Hyogo, Japan, "Surface Reactions with Low-Energy Cluster Beams for Atomic Layer Etching"

Ivo Utke, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland

AP5+PS+TF: Thermal Atomic Layer Etching

Andreas Fischer, Lam Research Corporation, "Isotropic Atomic Layer Etching in High Aspect Ratio Structures"

AP6: Atomic Scale Processing Poster Session

BIOMATERIAL INTERFACES DIVISION (BI)

The 2021 AVS program from the Biomaterial Interfaces Division presents an interdisciplinary forum for the discussion of fundamental aspects of bio-interface science and engineering. The BI program brings together recent advances made in materials science and molecular biology with sophisticated surface and interface analysis methods along with theoretical and modeling approaches for biological systems and biomaterials. Focus areas for this year include: Biofabrication; Bioanalytics; Bioelectronics and Biosensing; Diagnostics; Cutting edge Bio: Bio-Nano, Bioenergy and Biomass Conversion; 3D Bio; High-Resolution Microscopy; both in- and ex-situ Characterization of Biological and Biomaterial Surfaces; Biomolecules and Biophysics and Interfaces; Microbes and Fouling at Surfaces. In addition we will be hosting sessions in the topic area of Matter-to-Life, including Synthetic and Programmable Cells, Synthetic Life at the Nanoscale, and the Route to Replication. Our program will also feature our highly interactive BID Poster session, including a Flash Poster session Tuesday afternoon before the main poster session. We therefore invite submissions of Flash/Poster Presentations. Student entrants will be considered for awards for the best Flash/Poster contributions.

BI1: Microbes and Fouling at Surfaces

Ana Flores Mireles, University of Notre Dame, "Understanding the Role of Catheter-Associated Protein Deposition in the Development of CAUTI"

BI2: Biomolecules and Biophysics at Interfaces

Yuhang Hu, Georgia Tech, "Using Indentation to Characterize the Poroelastic and Adhesion Properties of Soft and Wet Materials"

BI3: Characterization of Biological and Biomaterials Surfaces

BI4: Bioanalytics and Diagnostics

BI5+NS: Biomaterials and Nanomaterials Fabrication

Benham Akhavan, University of Sydney, Australia, "Plasma Surface Engineering of Bone Implantable Materials"

BI6: 3D Structures and 3D Analysis of Biomaterials

Laura Arriaga, Autonomous University of Madrid, Spain, "Emulsion-Templated Vesicles in Motion"

BI7: Simulation and Modeling of Biomaterials and Biosystems

Sinan Keten, Northwestern University, "Bioinspired and Biological Adhesion at Interfaces"

BI8: High-Resolution Microscopy of Biosystems and Biomaterials

Mary Kraft, University of Illinois, "NanoSIMS Imaging of Cholesterol and Sphingolipids in Cell Membranes"

BI9: In situ Characterization of Biomaterials

BI10: Bioelectronics and Biosensing

BI11: Bioenergy and Biomass Conversion

Thomas Schwartz, University of Maine, "A Platform Chemical Approach for the Production of Biobased Chemicals"

BI12: Matter-to-Life I Synthetic and Programmable Cells

Joachim Spatz, University of Heidelberg, Germany, "Bottom-Up Assembly of Synthetic Cells"

BI13: Matter-to-Life II Synthetic Life at the Nanoscale

Eberhard Bodenschatz, Max Planck Institute, Germany, "Stimuli-Responsive Core-Gap-Shell Microcapsules for Matter to Life"

BI14: Matter-to-Life III the Route to Replication

Hendrik Dietz, TU Munich, Germany

BI15: Biomaterial Interfaces Poster & Flash Session

CHEMICAL ANALYSIS AND IMAGING AT INTERFACES FOCUS TOPIC (CA)

Chemical and physical processes occurring at surfaces and gas-liquid, solid-liquid, and gas-solid interfaces are crucial for many applications and yet their analysis often represents grand scientific and engineering challenges. The Chemical Analysis and Imaging at Interfaces Focus Topic symposium aims to survey and disseminate the latest developments in experimental methods and understanding of the of interfacial physical and chemical processes relevant (but not limited) to materials synthesis, microfabrication, energy/catalysis research, biomedical applications, environmental sciences, and surface modifications, to name a few. In particular, in (ex-) situ/in vivo/operando chemical imaging, microscopy and spectroscopy studies using electron, X-ray, ion, neutron beams as well as optical methods and synchrotron radiation/ free-electron lasers facilities are strongly encouraged. Attention will also be paid to correlative spectroscopy and microscopy methods, modern image/spectra processing and machine learning techniques. Contributions are invited including but not limited to experimental, fundamental research, industrial R&D, novel analytical techniques/approaches and metrology of realistic surfaces and interfaces.

CA1+AS+LS+MN+SS+VT: Environmental Interfaces

Gilbert Nathanson, University of Wisconsin, "Measuring the Depth Profiles of Surfactants, Ions, and Solvent at the Angstrom Scale"

Kevin Wilson, Lawrence Berkeley Laboratory, "Interfacial Chemistry of Atmospheric Organic Aerosols and Droplets"

CA2+2D+AS+BI+HC+LS+MN+NS+SM+SS: In situ Microscopy, Spectroscopy and processing at Liquid-Solid-Gas Interfaces

Jon Min Yuk, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea, "Development of Graphene Liquid Cells and Their Applications for In-Situ Electron Microscopy"

Haimei Zheng, Lawrence Berkeley Laboratory, "In situ Transmission Electron Microscopy Imaging of Dynamic Phenomena at Solid-Liquid Interfaces"

CA3+HC+LS+MN+SS+VT: Multiphase Interfacial Analysis and Imaging

Jinghua Guo, Lawrence Berkeley National Laboratory, "In-Situ/Operando Soft X-Ray Spectroscopy Characterization of Chemical Interfaces"

Robert Weatherup, Oxford University, UK, "Probing Catalytic and Electrochemical Interfaces with X-ray Spectroscopies under Real-world Conditions"

CA4+AS+BI+MN+SM: Modeling and Multi-dimensional data processing of interfacial processes

Alex Belianinov, Oak Ridge National Lab, "Image Processing and Multivariate Analysis in Ion and Electron Microscopy Data"

Michael Zwolak, NIST, "From Bulk to Constriction: Scaling Analysis of Ionic Transport Through Nanopores and Channels"

CA5+AS+MN+SE+SM+SS: Progress and Challenges in Industrial Applications

Jeff Gelb, Sigray, Inc., "Emerging Techniques in Laboratory X-Ray Analysis"

Julia Zakel, ION TOF, USA, "Recent Innovations in ToF-SIMS and their Industrial Applications"

CA6+2D+AS+MN+SE+SM+SS: Novel Developments and Approaches of Interfacial Analysis

Joseph Dura, NIST, "Neutron Reflectometry: In-Operando Depth Profiles of Buried Interfaces"

Andrei Fedorov, Georgia Tech, "Direct-Write Electron Beam Processing of Topologically Complex Functional Nanomaterials using Thermo-Electrically Energized Multiphase Precursor Jets"

CA7: Chemical Analysis and Imaging at Interfaces Poster Session

ELECTRONIC MATERIALS AND PHOTONICS DIVISION (EM)

The Electronic Materials and Photonics Division welcomes abstract submissions in any aspect of the science and engineering of materials, interfaces, and processing that advance the production and/or fundamental understanding of electronic, photonic, and optoelectronic technologies. Topics planned for AVS 67 include materials, processes, and devices for advanced logic, memory, and interconnect applications, as well as a session for computational methods to discover new materials and devices. Consistent with the theme of AVS 67, we are devoting sessions to the advances in interfacial science necessary for electronic and photonic devices for energy and the environment. Topics include, but are not limited to, computational modeling, 2.5D and 3D heterogeneous integration, low-power electronics, power electronics, photovoltaics, and thermoelectrics. We will also hold a session covering the latest advances in electronic and photonic nanostructure synthesis, assembly, and properties, as well as the techniques required for their characterization on the nanoscale. As in past years, we will offer graduate student poster awards as well as post-doc travel awards to help create a forum in which younger scientists can present their work and develop relationships for the future.

EM1+BI+NS+PS+TF: Electronic and Photonic Materials and Devices

Rehan Kapadia, University of Southern California, "2020 AVS Peter Mark Memorial Award Lecture: Efficient Graphene Hot Electron Devices: Electrochemistry"

EM2+PS+TF: New Devices and Materials for Logic, Memory, and Interconnects

Zhiguo Qian, Intel Corporation, "Advanced Packaging Interconnects"

Bhadri Varadarajan, Lam Research Corporation, "New Materials Development to Meet Future Integration Needs"

EM3+TF: Wide and Ultra-wide bandgap materials and devices

Brianna Klein, Sandia National Laboratories

EM4+BI+MI+MN+NS: Bottom-up Nanostructures

Samuel G. Carter, U.S. Naval Research Laboratory, "Epitaxial Quantum Dots for Quantum Science and Technology"

Julia Greer, CalTech

EM5+MI: Electronic and Photonic Devices for Energy Conversion and Storage

Joshua Choi, University of Virginia, "Impact of Atomic Structure and Dynamics on Solar Cell Performance of Metal Halide Perovskite Thin Films"

Kristopher O. Davis, University of Central Florida, "Photon Management, Surface Passivation, Carrier Selectivity, and Carrier Transport"

Vivian Ferry, University of Minnesota, "Light Management Strategies for Photovoltaic Modules and Luminescent Solar Concentrators"

EM6+MN: 2.5 and 3D Heterogeneous Integration

Ravi Mahajan, Intel

Jian Shi, Rensselaer Polytechnic Institute, "Remote Epitaxy of Complex Materials"

EM7+PS+TF: Atomic Scale Processing for Devices

Ola Nilsen, University of Oslo, Norway, "Building MOFs from the Gas Phase at the Molecular Level - Active Surfaces by Combining Organics with Inorganics"

Jin-Seong Park, Hanyang University, South Korea

EM8+TF: Accelerated Materials and Device Discovery: Simulation and Modeling

Elif Ertekin, University of Illinois, "Accelerated Discovery of New Thermoelectrics: High-throughput Approach to Dopability Predictions in Diamond like Semiconductors"

EM9: Electronic Materials and Photonics Poster Session

FUNDAMENTAL DISCOVERIES IN HETEROGENEOUS CATALYSIS FOCUS TOPIC (HC)

The Fundamental Discoveries in Heterogeneous Catalysis (HC) Focus Topic highlights recent advances in the understanding of the atomic and molecular basis for heterogeneously-catalyzed reactions on solid surfaces. This will be the fifth time the HC Focus Topic has been organized. This year, HC is coordinated with the Surface Science (SS), Applied Surface Science (AS), and Thin Films (TF) Divisions, and the 2D Materials (2D), Light Sources (LS), and Chemical Analysis and Imaging (CA) Focus Topics. Emphasis will be on facilitating dialogue between surface science-based and applied communities studying heterogeneously-catalyzed systems. In addition to previous session topics including theoretical models, nanoscale structures, reaction pathways, machine learning and artificial intelligence, and other novel studies of active surfaces, several new areas will be explored. New sessions will focus on bridging gaps and ambient pressure studies, single atom catalysts, and electrocatalysis, in line with the Symposium theme on Interfacial Science for Energy and The Environment. HC will highlight connections among theoretical and experimental approaches with the goal of revealing key details of the fundamental chemistry and physics underlying heterogeneous catalysis. Of particular interest are developments in chemical understanding, atomic-level details, and predictive models of reactions catalyzed by metal surfaces.

HC1+SS: Mechanisms and Reaction Pathways in Heterogeneously-Catalyzed Reactions

Aravind Asthagiri, The Ohio State University, "Reactivity of Transition Metal Surface Under Oxygen-Rich Conditions"

Tim Schäfer, University Göttingen, Germany, "Molecular Beam Surface Scattering of Chiral Molecules: Towards Enantioselective Detection of Surface Reaction Products"

HC2+2D+NS+SS+TF: Nanoparticles and Nanoscale Structures in Heterogeneous Catalysis

Bert Chandler, Trinity University, "Fundamental Studies of Small Molecule Activation at the Metal-Support Interface of Au/MOx Catalysts"

Sara Mason, University of Iowa, "Transformations and Reactivity of Complex Metal Oxides from First Principles and Thermodynamics"

HC3+SS: Utilization of Theoretical Models, Machine Learning, and Artificial Intelligence for Heterogeneously-Catalyzed Reactions

Frank Abild-Pederson, Stanford University, "Theoretical Modeling in Heterogeneous Catalysis Understanding Catalysts under Operating Conditions"

Ping Liu, Brookhaven National Laboratory, "Alkali-promoted Copper-based Catalysts for CO₂ Activation"

HC4+SS: Bridging Gaps in Heterogeneous Catalysis

Ib Chorkendorff, SurfCat, Technical University of Denmark, Denmark, "A Surface Science Approach for Conversion of Sustainable Energy"

Robert McCabe, NSF, "Building Bridges Between University, National Laboratory, and Industrial Research"

HC5+AS+CA+LS+SS: Ambient Pressure Studies of Heterogeneous Catalysis

Maya Kiskinova, Elettra-Sincrotrone Trieste, Italy, "Microscopic Insights on Properties of Catalysts using Synchrotron-based Imaging and Spectroscopy"

José A. Rodriguez, Brookhaven National Laboratory, "Fundamental Studies of C₁ Chemistry on Inverse Oxide/Metal Catalysts"

HC6+SS: Advances in Heterogeneous Electrocatalysis

Marc Koper, Leiden University, The Netherlands, "Electrochemical Surface Science of Platinum"

Feng Lin, Virginia Tech, "Reversible Surface Transformation Enables the Revivification of Mixed Metal Hydroxide Water Oxidation Catalysts"

HC7+SS: Single Atom Catalysis

Christophe Copéret, ETH Zurich, Switzerland, "Single Sites through Surface Organometallic Chemistry"

Núria López, ICIQ, Spain, "Electronic Structure and Dynamics of Single Atom Catalysts"

HC8: Fundamental Discoveries in Heterogeneous Catalysis Poster Session

LEADERS IN ENERGY AND THE ENVIRONMENT FOCUS TOPIC (LD)

The Leaders in Energy and The Environment (LD) Focus Topic is organized by young investigators within AVS to highlight cutting edge research related to energy and the environment. Within the scope of AVS 67's theme of "Advances in Interfacial Science for Energy and The Environment," this Focus Topic will solicit abstracts concerning next generation materials studied at the atomic scale with cutting edge technology. There will be three sessions that focus on understanding the catalytic properties of metal oxide interfaces, pushing the boundaries of energy transfer in materials, and advanced materials for electronic and environmental applications. To foster collaboration within AVS, these sections will be co-sponsored by a variety of Focus Topics and Divisions. In addition to numerous invited talks from scientific leaders in these areas, each session will also promote the work of young investigators by selecting one contributed abstract from a graduate student/postdoc to be highlighted as an invited talk. These sections aim to bring together a diverse set of researchers, each working in related fields to highlight the significant advances interfacial studies have provided in environmental and energy research.

LD1+HC+SS: Catalysis at the Metal Oxide Interface

Melissa Hines, Cornell University

Bruce D. Kay, Pacific Northwest National Laboratory, "Fundamental Surface Science Studies of Small Molecule Adsorption and Reactivity on Model Oxide Catalysts"

Beatriz Roldan Cuenya, Fritz Haber Institute of the Max Planck Society, Germany

LD2+NS: Pushing the Boundaries of Energy Transfer in Materials

Nan Jiang, University of Illinois at Chicago, "Probing Molecule-Substrate Interactions at Angstrom Scale by Ultrahigh Vacuum Tip-Enhanced Raman Spectroscopy"

Shaowei Li, University of California, San Diego

Latha Venkataraman, Columbia University, "Electron Transfer at the Single-Molecule Level"

LD3+2D+NS+SS: Advanced Materials for Electronic and Environmental Applications

Anibal Boscoboinik, Brookhaven National Laboratory

Jeffrey R. Guest, Argonne National Laboratory, "Atomic-Scale Imaging of Optically-Active Nanoscale Systems"

Anna Regoutz, Imperial College London, UK, "HAXPES for Device Applications: From the Surface into the Bulk"

LD4: Leaders in Energy and the Environment Poster Session

MAGNETIC INTERFACES AND NANOSTRUCTURES DIVISION (MI)

This year's Magnetic Interfaces and Nanostructures Division program features pioneering, provocative, introductory, and emerging results in topical areas related to magnetic interfaces and nanostructures. Particular attention will be given to research areas in magnetism that are of strong interest to the AVS community so that maximum overlap with other divisions and focus topics can be achieved. The program will cover a wide area of topics ranging from chiral magnetism and spin orbit effects at interfaces to magnetism in magnetocaloric materials. The focus of the program is to cover areas of magnetism that are fascinating from a fundamental point of view but which carry significance for future applications. In addition, we would like to especially focus on the synergy between the research areas covered by MI and their role for the development of new materials and devices for the information society. For this reason the program will feature a special mini-symposium "Highlighting Women Researching Magnetism." The Magnetic Interfaces and Nanostructures Division will be selecting the best graduate student presentation from finalists for the Leo Falicov Award. MI will also offer an award for postdoctoral fellows who will be presenting papers at this International Symposium. The winners of both awards will be announced towards the end of the meeting.

MI1: Topological Insulator Heterostructures

Badih Assaf, University of Notre Dame, "Magnetism in Topological Crystalline Insulator Heterostructures"

Leonid Rokhinson, Purdue University, "Building New Platforms to Form Non-Abelian Excitations"

MI2: Spin Landscape I: Magnetic Structures in Real and Momentum Space

Sinead Griffin, Lawrence Berkeley National Laboratory, "Topological Multiferroics"

Art Smith, Ohio University, "Surface Magnetic Properties of Spintronic Nitride Materials Studied using Spin-polarized Scanning Tunneling Microscopy & Spectroscopy"

MI3: Spin Landscape II: Magnetic Structures for Energy-Efficient Computing/Devices

Daniel Wegner, Radboud University, The Netherlands, "From Spin Spirals to Spin Glasses - Imaging Complex Magnetism on the Atomic Scale"

MI4: Mini Symposium: Highlighting Women Researching Magnetism

Jamileh Beik Mohammadi, Loyola University New Orleans, "Magnetic Exchange and Anisotropy in Perpendicular Magnetic Tunnel Junction Nanopillars: Experiment and Micromagnetic Modeling"

Michelle Jamer, United States Naval Academy, "Moving Toward Antiferromagnetic Straintronics"

Claudia Meves, University of Alabama, "Computational Frontier of Spintronic Materials"

Annika Schlenhoff, University of Hamburg, Germany, "Vacuum Resonance States as Atomic-Scale Probes of Noncollinear Surface Magnetism"

MI5: Magnetic Interfaces and Nanostructures Poster Session

MANUFACTURING SCIENCE AND TECHNOLOGY GROUP (MS)

The Manufacturing Science and Technology sessions bring together invited speakers to highlight the challenges needing to be addressed for successful manufacturing of next generation devices and technologies. Our sessions are meant to generate synergy among scientists and engineers working across the spectrum of these technologies, including basic science research, metrology, processing, and development, to encourage everyone to keep these manufacturing challenges in mind as they move the technologies forward. This year we are highlighting the areas of Atomically Precise Manufacturing, Manufacturing for Quantum Computing, and Manufacturing of AI Hardware.

MS1+AP+NS+TF: Science and Technology for Atomically Precise Manufacturing

Parag Banerjee, University of Central Florida, "At the Edge of Thickness: ALD Enabled, Few Monolayer Precision Engineering of Interfaces and Surfaces"

Michael Koltonski, Micron Technology

Shashank Misra, Sandia National Laboratories, "Digital Electronics at the Atomic Scale"

Tetsuya Tatsumi, Sony Semiconductor Solutions Corporation, Japan, "Control of Plasma and Surface Reactions for Atomically Precise Device Fabrication"

MS2+AP+EM+NS+QS+TF: Science and Technology of Manufacturing for Quantum Computing

Jerry Chow, IBM Research Division, T.J. Watson Research Center

Philip Hemmer, Texas A&M University, "Qbit Manufacturing"

Quanxi Jia, University of Buffalo, SUNY, "Superconducting Materials for Quantum Computing: Approaches, Challenges, and Opportunities"

Jason Orcutt, IBM, "Reproducible Superconducting Circuits for Quantum Information Processors"

Mohammad Soltani, Raytheon, "Photonic Platforms"

MS3+AP: Science and Technology of manufacturing AI Hardware

Nicholas Breil, Applied Materials Inc., "Memory Materials, Integration and Design for Analog Compute Applications"

Michael Lercel, ASML, "EUV Lithography"

Alec Talin, Sandia National Laboratories, "Low Power Computing with Ion Tunable Electronic Materials"

J. Joshua Yang, University of Massachusetts Amherst, "Memristive Devices for AI Applications"

MS4: Manufacturing Science and Technology Poster Session

MATERIALS AND PROCESSES FOR QUANTUM INFORMATION SCIENCE FOCUS TOPIC (QS)

With the emergence of innovative quantum technologies and the consequent ability to create, control and manipulate quantum systems, we can now create quantum objects that are extremely well defined, well characterized and well controlled. The Materials and Processes for Quantum Information Science Focus Topic will cover topics which interface micro-fabrication, surface science, materials science with quantum information science. These include quantum systems made from superconducting circuits, semiconductors, defects. Topics will cover superconducting qubits, color centers, ion traps, quantum metrology as well as supporting technology of single photon amplifiers, multiplexers and advances in cryogenic systems, vacuum technology, microwave to optical conversion schemes etc. Challenges in achieving high coherence devices and making precision measurements using quantum systems will be addressed. Apart from the oral sessions, we will have a poster session, which will provide an opportunity for researchers to interact with their peers in the field.

QS1+EM+MN: Systems and Devices for Quantum Information

Corey Rae, National Institute of Standards and Technology (NIST) and University of Colorado Boulder, "Dielectric Loss Extraction for Superconducting Microwave Resonators"

Sven Rogge, University of New South Wales, Australia, "Materials for Silicon Quantum Computation and Simulation"

QS2+EM+SS: Systems and Devices for Quantum Computing

Andrew Cleland, University of Chicago, "Superconducting Qubits: Technology for Remote Coupling"

Chris Palmstrøm, University of California at Santa Barbara, "Epitaxial Growth of Superconductor/Semiconductor Heterostructures for Quantum Computing"

Jonilyn Yoder, MIT Lincoln Laboratory, "Engineering Superconducting Quantum Systems"

QS3+EM+SS: High Coherence Qubits for Quantum Science

Peter Krogstrup, Niels Bohr Institute, Denmark, "Engineering Interfaces for High Coherence Qubits"

Eric Zhang, IBM Research

Tracy Northup, Universität Innsbruck, Austria, "Photonic Interfaces for Ion-trap Quantum Computers"

QS4+2D+EM+MN: SiC, Diamond and Related Materials for Quantum Sciences

Mark Eriksson, University of Wisconsin, "High-speed Manipulation of Silicon Quantum Dot Qubits"

Mark Gyure, University of California Los Angeles, "SiGe Heterostructures for Si-based Qubits"

QS5+EM+MN: The Quantum Metrology Revolution

Mark Kasevich, Stanford University

Jun Ye, JILA, "Quantum Matter, Simulation, and Metrology"

QS6+EM+VT: Color Centers: From Materials to Quantum Technologies

Han Htoon, Los Alamos National Laboratory, "Organic Color Center in Single Wall Carbon Nanotubes: A New Material for Quantum Information Science"

Vladimir Shalaev, Purdue University, "Quantum Photonics with Metamaterials"

Joerg Wrachtrup, University of Stuttgart, Germany, "Probing Material Properties With a Nanoscale Quantum Sensor"

QS7+EM: Materials and Processes for Quantum Information Science Poster Session

MEMS and NEMS GROUP (MN)

The MEMS and NEMS Technology Group program will highlight recent advances in broad areas of micro/nanoelectromechanical systems (MEMS/NEMS), especially latest fundamental studies of novel materials, processes, devices, and emerging functions and applications of MEMS/NEMS, in various areas. The AVS 67 MN program will include a focus on integration and interface. Specific highlights for AVS 67 will be nanotribology and nanomechanics at the interface and MEMS technology for energy and environment. Our program will also include MEMS/NEMS heterogeneous integration, and nanomechanics and optomechanics for quantum computing and sensing. The program continues to embrace latest progress in optical MEMS/ NEMS, micro/nanophotonics, optomechanics, quantum MEMS/ NEMS, resonant systems, CMOS-MEMS, mesoscopic dynamics and dissipation processes, environmental sensors, harsh-environment transducers, and MEMS/NEMS-enabled energy and sensing/imaging technologies, etc. It also aims to capture some of the latest advances in soft materials, flexible and implantable MEMS/NEMS for biosensing, bio-inspired microsystems, wearable and wireless healthcare.

MN1+BI+EM: MEMS Technology for Energy and Environment

Gregory Whiting, University of Colorado Boulder, "Printed Biodegradable Sensors for in-situ Monitoring of Nitrate and Moisture in Soil"

MN2+2D+SE+SS: Nanotribology and Nanomechanics at the Interface

Anirudha Sumant, Argonne National Laboratory, "Superlubricity: Eliminating Friction and Wear in Microscale Machines to Macroscale Mechanical Systems"

Juan Xia, University of Electronic Science, China, "Interlayer Vibration Mechanics in 2D TMDC Revealed by Ultra-low-frequency Raman Spectroscopy"

MN3+2D+NS+QS: MEMS & NEMS Enabled Sensing & Imaging

Robert W. Carpick, University of Pennsylvania, "Nanoscale Contact, Adhesion, Friction, and Wear of 2D Materials Studied by a Novel In-situ TEM-based AFM Method"

John Marohn, Cornell University, "Electric Force Microscopy: Achieving Nanosecond Time Resolution using Phase Kicks and Getting the Tip-Sample Interaction Right using Lagrangian Mechanics"

MN4+2D+NS+QS: Nanomechanics and Optomechanics for Quantum Computing and Sensing

Troy Olsson, University of Pennsylvania, "Aluminum Scandium Nitride Microdevices for Next Generation Nonvolatile Memory and Microelectromechanical Systems"

MN5+AP+BI+EM+NS+PS+SE+TF: MEMS and BioMEMS Processes, Materials, and Devices

Xuqian Zheng, University of Florida, "Beta Gallium Oxide (β -Ga₂O₃) Resonant Micro-/Nano-electromechanical Systems (M/NEMS)"

MN6: MEMS and NEMS Heterogeneous Integration

Alejandro Griñe, Sandia National Laboratories, "Chip-Scale, Minimally Supported Optomechanical Devices with High Finesse for Sensing"

John Kitching, NIST, "Chip-scale Atomic Devices with Integrated Photonics"

MN7: MEMS and NEMS Poster Session

NANOSCALE SCIENCE AND TECHNOLOGY DIVISION (NS)

Sessions in the Nanoscale Science and Technology Division cover the science and technology of the creation, characterization, and function of nanoscale assemblies and structures, exploiting the unique properties associated with low dimension and size. Our program provides a rich forum for exploring a wide range of phenomena which can be induced, measured, and exploited at the nanoscale. The sessions strongly emphasize new and exciting technologies and instrumentation, with scanning probe and near-field microscopies being particularly highlighted. Science at the nanoscale, including cutting-edge technologies and fundamental research, is central to the divisional themes. Specific topics include: mechanical and electrical phenomena at the nanoscale, sensors and sensing, quantum phenomena, nanophotonics, nanofabrication and spectroscopy. The relevance of these topics to society in general, such as their role in environmental and energy-related problems is particularly emphasized in the AVS 67 program. In parallel, the influence of nanoscale structure on properties of materials and constructs at larger dimensions will be discussed. This year, in addition to the scientific sessions, NSTD is organizing a workshop on undergraduate education in nanoscale science and technology. We hope this will be of general interest and bring a useful forum for the educators amongst our attendees.

NS1+AS+BI+EM+LD+SS: Scanning Probe Microscopy and Spectroscopy for Energy and Environment

Marina Leite, University of California, Davis, "Tackling Instabilities in Hybrid Perovskites from the Macro- to the Nanoscale"

NS2+MI+QS+SS: Quantum States at Surfaces

Shahal Ilani, Weizmann Institute of Science, Israel, "Visualizing Strongly Interacting Quantum Matter"

Vidya Madhavan, University of Illinois at Urbana-Champaign, "STM Measurements of Spin-Polarized Currents Carried by the Topological Surface States of SmB₆ Nanowires"

NS3+MN+QS+SM+SS: Nanomechanics – Including Nanoscale-Dependent Materials' Properties and Quantum Effects

Sonia Antoranz Contera, Oxford, UK, "Mapping Nanoscale Viscoelasticity and Relaxation Times Underlying Growth and Shape of Multicellular Organisms using Multifrequency AFM"

Konrad Lehnert, JILA, "Quantum Phononics"

Jeremy Munday, University of California at Davis, "Engineering Quantum Forces and Torques"

NS4+AP+BI+SS: Advances in Scanning Probe Technologies

Takeshi Fukuma, Kanazawa University, Japan, "Visualizing 3D Self-Organizing Systems by In-liquid AFM"

Markus Raschke, University of Colorado Boulder, "Advances in Optical Nano-Probe Imaging: Probing Structure, Coupling, and Dynamics on the Molecular Scale"

NS5+BI+SS+TF: Emergent Properties of Nanostructured Surfaces: from Metasurfaces to Superhydrophobic

Chuck Black, Brookhaven National Lab, "Self-assembly Based Nanofabrication using Block Copolymers"

Alexandra Boltasseva, Purdue University, "Deep Machine Learning Assisted Photonics"

Teri Odom, Northwestern University, "Nanoscale Optics in Flatland"

NS6+MI: Energy Efficient Nanoelectronics

An Chen, IBM Almaden Research Center, "Nanoelectronic Devices and Architectures for Energy-Efficient Computing"

Robert Wolkow, University of Alberta, Canada/Quantum Silicon Inc., Canada, "Atom Defined Silicon Circuit Elements Enable Very Low Power and Fast Computing"

NS7+AP+BI+SM: Nanofabrication

Oleg Gang, Brookhaven National Laboratory, "Programming Assembly of 3D Nanoscale Systems"

John Randall, Zyvex Labs, "Digital Atomic Scale Fabrication Applied to Integrated Solid State Quantum Devices"

NS8+SS: Spectroscopic Atomic Force Microscopies for Nanophotonics and Sensing

Andrea Alu, CUNY, "Metamaterials and Polaritons for Imaging and Sensing"

Rainer Hillenbrand, CIC nanoGUNE, Spain, "Advances in IR and THz Nanoimaging and Nanospectroscopy"

NS9: Nanoscale Science and Technology Poster Session

NEW TRENDS IN STRUCTURAL ELECTRONIC CHARACTERIZATION OF MATERIALS, INTERFACES, AND SURFACES USING SYNCHROTRON AND FEL BASED LIGHT SOURCES FOCUS TOPIC (LS)

The increasing need for energy coupled with growing concerns about climate change is one of the greatest challenges of our society. Renewable energy is one of the solutions to replace fossil fuels, but sustainability imposes combination with efficient conversion and storage. Notwithstanding the vast R&D activities the technology has not reached the maturity to comprise the high-conversion and high-power range due to the fact that successful operation of solar cells and batteries is determined by numerous physical, chemical, electrical and thermal processes, occurring over wide spatial and temporal ranges. One of the most promising guides for solving technology problems is to understand the evolving device properties via in-situ and operando analyses and here the synchrotron and FEL-based methods have become indispensable tools to provide rational guidelines for technological breakthroughs. New insights into the governing processes that are crucial for development of engineering strategies for the next

generation energy devices have been attained via operando synchrotron and FEL-based methods and will be presented by the selected speakers in the LS sessions.

LS1+2D+MI: Magnetism Dichorism and Spin-Resolved Techniques of Magnetic Materials

Nicholas Brookes, European Synchrotron Radiation Facility, France, "Soft X-ray Resonant Inelastic Scattering (RIXS) to Study the Magnetic and Electronic Properties of Materials"

Mikel Holcomb, West Virginia University, "My Adventures with Synchrotrons: From Discovering New Types of Magnetism to Helping NASA"

LS2+2D+MI+SS: Photoemission spectroscopy Applied to Interfacial Science

Gerd Schönhense, Johannes Gutenberg-Universität, Mainz, Germany, "Bulk and Interface Hard-X-ray Bandmapping with Spin Resolution Combining Full-field Momentum Imaging with ToF-recording"

Shigenori Ueda, National Institute for Materials Science, Japan, "Variable X-ray Polarization, External Magnetic Field, and Spin-resolution for Buried Interfaces by Hard X-ray Photoemission"

LS3+CA+MI+SE+SS: Microscopy and Imaging Techniques Exploiting Enhance Coherence Properties

Ana Diaz, Paul Scherrer Institut (PSI), Switzerland, "Non-Destructive Nanotomography of Materials using X-Ray Ptychography"

Mark Sutton, McGill University, Canada, "Extending Time-Resolved X-Ray Diffraction using Coherence"

LS4+2D+SS: Structural Characterization of Energy Materials

Ute Cappel, KTH Royal Institute of Technology, Sweden, "Time-Resolved Photoelectron Spectroscopy of Solar Cell Materials"

Alex Frano, University of California at San Diego, "The 'Quantumness' of Quantum Materials Understood Via Resonant X-Ray Scattering"

LS5: New Trends in Structural Electronic Characterization of Materials, Interfaces, and Surfaces Using Synchrotron and FEL Based Light Sources Poster Session

PLASMA SCIENCE AND TECHNOLOGY DIVISION (PS)

The Plasma Science & Technology program highlights state-of-the-art advances in plasma science, ranging from fundamental studies of plasma physics and chemistry, plasma-matter interactions to new applications for plasma processing. Our diverse international community includes researchers from academia, national laboratories, and industry covering topics extending from the latest advancements in plasma research for established fields such as semiconductor fabrication to newer areas of study such as energy research, novel materials synthesis, catalysis, and biomedical applications, where plasma is either the focus or the enabling tool. Abstracts describing novel research are solicited in areas concerning: Advanced BEOL: Interconnect Materials and Etching; Advanced FEOL: plasma processing for logic devices; EUV and Multipatterning: Advanced Packaging, Thermal Management, and Heterogeneous Integration; Plasma Processing for Advanced and Emerging Memory Technologies; Plasma-assisted Atomic Layer Etching; Plasma Surface Interactions; Plasma Deposition and ALD processes for coatings and thin films; Plasma Diagnostics, Sensors and Control; Plasma Sources; Modelling of plasmas, Plasma-Driven Processes, and Machine Learning; Atmospheric Pressure Plasmas and their applications; Plasma Chemistry and Catalysis; Plasmas for the environment (e.g. water, air, soil treatment); Plasma-engineered materials and interfaces for the environment; Plasma and plasma-engineered materials for energy savings; Plasma for medicine and biointerfaces; Plasma for antimicrobial treatments. We accept abstracts for both oral sessions and poster sessions, which provide an excellent opportunity for one-on-one discussions of new results with colleagues. Special consideration will be given to papers that highlight cross-disciplinary issues of the research. The authors are also encouraged to submit their original results to the accompanying AVS journals.

PS1+EM: Advanced BEOL: Interconnect Materials and Etching

Suketu Parikh, AMAT- Applied Materials, "Industry Trends in Interconnect Technology"

PS2+EM: Advanced FEOL: Plasma Processing for Logic Devices

Yoshi Ishii, Hitachi High-Tech America, Inc., "2021 AVS PSTD Young Investigator Award Talk: Plasma Treatment on SiGe for Improvement of Interface Trap Density by Inducing Si Segregation"

Eric Miller, IBM Research Division, Albany, NY, "Etch Processes for Enabling Next Generation Devices"

PS3+AP+EM+TF: EUV and Multipatterning: Advanced Packaging, Thermal Management, and Heterogeneous Integration

Sophie Thibaut, TEL, "Multipatterning of Immersion and EUV Lithography"

Rich Wise, Lam Research

PS4+SE: Atmospheric Pressure Plasmas and their Applications

Ana Sobota, TU Eindhoven, Netherlands, "The Influence of the Target on the Plasma in Atmospheric Pressure Non-Thermal Plasma Jets"

PS5+AP+EM+TF: Plasma Assisted Atomic Layer Etching

Takayoshi Tsutsumi, Nagoya University, Japan, "Surface Reaction Analysis during Atomic Layer Etching Processes for Si-compound"

PS6: Modelling of Plasmas, Plasma-Driven Processes, and Machine Learning

Anne Bourdon, Ecole Polytechnique, France, "Current Modeling and Simulation Challenges of Low-Temperature Plasmas"

PS7+AP+TF: Plasma Deposition and ALD Processes for Coatings and Thin Films

Silvia Armini, IMEC, Belgium

PS8: Plasma Diagnostics, Sensors and Control

Jean-Paul Booth, CNRS, Ecole Polytechnique, France, "2019 Plasma Prize Invited Talk: What We Still Don't Know About Plasmas in Simple Diatomic Gases- or How a DC Plasma in Pure O₂ Can Be an Ideal Test-Bed for Experimental Validation of Simulations"

PS9+SE: Plasma Sources

John Chambers, AGC North America, "Linear Hollow-cathode PECVD for High Deposition Rate Coatings and Varied Properties of Deposited Materials"

PS10+AS+BI+EM+SS: Plasma-Surface Interactions

John Daugherty, Lam Research, "Plasma-wall Interactions: Implications for Advanced Chamber Material Requirements"

PS11+AS: Plasma Chemistry and Catalysis

David B. Go, University of Notre Dame, "Understanding and Designing Plasma-Catalysis Systems using Experiments and Simulations"

Michail Tsampas, Dutch Institute for Fundamental Energy, The Netherlands, "Plasma Activated Electrolyser for Nitrogen Fixation by Water"

PS12: Plasmas for Environment: Water, Air, Soil Treatment

Selma Mededovic, Clarkson University, "Plasma-Induced Formation of Reactive Chlorine Species and Their Effect on Interfacial Kinetics"

PS13+TF: Plasma-engineered Materials and Interfaces for the Environment

Ellen Fisher, Colorado State University, "2020 Plasma Prize Invited Talk: Optimizing Plasma Processes to Lower Environmental Impact through Understanding Fundamental Plasma Kinetics and Energetics"

PS14+TF: Plasma and Plasma-engineered Materials for Energy Savings

Floran Peeters, Dutch Institute for Fundamental Energy Research, "Next Generation "Birkeland-Eyde": From NH₃ to NO"

PS15+EM: Plasma Processing for Advanced and Emerging Memory Technologies

Nicole Saulnier, IBM, "Plasma Process Requirements for Emerging Memories"

PS16+BI+SM: Plasma for Antimicrobial Treatment, Medicine, and Biointerfaces

Marcela Bilek, The University of Sydney, Australia, "Recent Advances in Plasma Processing for the Creation of Tunable Biofunctional Surfaces and Interfaces"

Michael Keidar, The George Washington University, "Cold Atmospheric Plasma Devices for SARS-CoV-2 Disinfection"

PS17: Plasma Science and Technology Poster Session

SMART MULTIFUNCTIONAL MATERIALS FOR NANOMEDICINE FOCUS TOPIC (SM)

Advanced point-of-care nanobiosensors and multifunctional drug delivery nanoplatforms have tremendous potential to revolutionize the future personalized nanomedicine in the simultaneous diagnosis and therapy, which takes the name of theranostics. The new Smart Multifunctional Materials for Nanomedicine Focus Topic at AVS 67 brings together the most applicative aspects, mostly health care-oriented but also connected to the areas of environment (e.g., biosafety and ecotoxicological challenges) and energy (e.g., energy-converting issues in photo-, radiation-, ultrasound-, magnetic field-, microwave-, electric field-, and radiofrequency-based nanomedicine or electricity generation by self-propelled cooperative mechanisms), of hybrid bio-interface science and plasma surface engineering, in close connection with BI and PS Divisions, respectively. Topics covered in the three planned sections include: biologically-inspired, hybrid multifunctional dynamic structures able to respond to changes in their environment for self-regulating thermal and lighting systems, targeted drug delivery (e.g., physical-, chemical-, and biological-responsive nanomedicine for precision drug delivery and cancer therapy), sensing, multi-component nanostructures for collective optical, self propellant and electrocatalysis properties; plasma-based processing of surfaces and nanofabrication, medicinal plasma; theranostics, wound healing and tissue repair.

SM1+AS+BI+CA+MI+SS: Hybrid Nanomaterials Based On Biologically-Inspired Approaches

Tak-Sing Wong, The Pennsylvania State University, "Biologically Inspired Materials for Health Diagnostics and Water Sustainability"

SM2+AS+CA+PS+SS: Design and Fabrication of Multifunctional (Nano)materials by Plasma Chemistry (and Their Appropriate Plasma Reactors)

Davide Mariotti, University of Ulster, UK, "Exploring Materials Opportunities With Atmospheric Pressure Microplasmas"

SM3+BI: Nanomedicine, Theranostics, Wound Healing and Tissue Repair

Paolo Antonio Netti, University of Naples Federico II, Italy, "Advanced Biomaterials for Health Care"

Ling Peng, Centre Interdisciplinaire de Nanoscience de Marseille Aix-Marseille University, France, "Supramolecular Dendrimer Nanosystems for Biomedical Applications"

SM4: Smart Multifunctional Materials for Nanomedicine Poster Session

SPECTROSCOPIC ELLIPSOMETRY FOCUS TOPIC (EL)

The Spectroscopic Ellipsometry Focus Topic integrates themes ranging from classical material science and thin film characterization to nanometer scale science and novel optical sensing concepts. We will host three oral sessions dedicated to traditional applications of spectroscopic ellipsometry in optical materials and thin film characterization as well as new and emerging topics. The first session will focus on classical research topics of ellipsometry as for instance optical coatings and inorganic thin films characterization. Furthermore, presentations on the ellipsometric investigation of novel optical and electronic materials and materials with subwavelength structures will be included. In the second oral session, we will host presentations on novel experimental and theoretical approaches including for instance imaging ellipsometry. The third oral session is dedicated to the application of Spectroscopic ellipsometry for the Characterization of Organic Films and Biological Materials. As a highlight, the best student paper, which is selected based on the quality of the research, its presentation, and the discussion during the symposium, will be awarded. A poster session is also planned.

EL1+TF: Optical Characterization of Thin Films and Nanostructures

Rüdiger Schmidt-Grund, Technical University Ilmenau, Germany, "Spectroscopic Study of Cationic Order in Spinel Ferrite Thin Films"

EL2: Spectroscopic Ellipsometry: Novel Applications and Theoretical Approaches

Maria Losurdo, CNR-NANOTEC, Italy, "Potential and Perspective of Ellipsometry in Materials Science"

EL3: Application of SE for the Characterization of Organic Films and Biological Materials

Christoph Cobet, Johannes Kepler University, Austria, "In-Situ Optical Exploration of Electrochemically Induced Conformation Changes at Solid Liquid Interfaces – A Source of new Electronic Properties "

EL4: Spectroscopic Ellipsometry Poster Session

SURFACE SCIENCE DIVISION (SS)

The Surface Science Division provides a forum for cutting edge and foundational research that involves solid surfaces and interfaces including gas-solid and liquid-solid interactions. This Division's overarching goal is to provide the atomistic insights on solid surfaces and interfaces needed to advance our understanding of materials systems and benefit society. This year's sessions address reaction dynamics and mechanisms at surfaces, with special emphasis on unique chemistries occurring on oxide, chalcogenide, and semiconductor surfaces. Technical developments in recent years have greatly expanded our capabilities to investigate reactions with operando methods, thus promoting the study of catalytic surfaces as well as environmental and atmospheric surfaces under realistic pressure conditions. We also focus on photochemistry and electrochemistry for energy applications, molecular organization at surfaces, and the chemistry of thin film growth and etching. This year we introduce a dedicated session on astrochemistry and surfaces for space and extreme environments. One of the sessions will host the Morton M. Traum award for exciting research presented by students in the Surface Science Division, and another session hosts a Memorial Symposium for Patricia Thiel in recognition of her invaluable contributions to research in surface science.

SS1+CA+TF: Dynamics and Mechanisms at Surfaces and Interfaces

Theofanis Kitsopoulos, Max Planck Institute for Biophysical Chemistry and Institute of Physical Chemistry, University of Göttingen, Germany, "Probing the Kinetics and Dynamics on Metal Surfaces using Ion Imaging Methods"

Hrvoje Petek, University of Pittsburgh, "How Plasmons Decay into Hot Electrons in Metals, as seen by Plasmonic Photoemission"

SS2+AS+QS: Artificial Intelligence, Machine Learning, and Quantum Chemistry

Andreas Heyden, University of South Carolina, "Machine Learning and Uncertainty Quantification in Computational Heterogeneous Catalysis"

SS3+AS+BI+CA+HC+LD+PS: Environmental and Atmospheric Interfaces

Markus Ammann, Paul Scherrer Institut (PSI), Switzerland, "Chemistry and Hydrogen Bonding Environment at the Surface of Minerals, Aqueous Solutions and Ice as Seen by X-ray Photoelectron and Electron Yield NEXAFS Spectroscopies"

SS4+CA+HC+NS: Photochemistry and Electrochemistry Surfaces for Energy Applications

Prashant Kamat, University of Notre Dame, "Halide Ion Mobility in Metal Halide Perovskites and its Impact on Photovoltaic Performance"

SS5+AP+AS+HC+LD+SE+TF: Reactivity of Oxide and Chalcogenide Surfaces

Ye Xu, Louisiana State University, "Interaction of Small Heteroatomic Organic Compounds with Ceria"

SS6+2D+AP+PS+TF: Surface Chemistry of Film Growth and Etching

Stacey Bent, Stanford University, "Mechanisms of Film Growth by Atomic Layer Deposition"

SS7+AP+AS+HC+LD+SE+TF: Oxides and Semiconductor Surfaces and Interfaces

Sanjaya Senanayake, Brookhaven National Laboratory, "Deciphering Pathways for Selective Oxidation of C-H Bonds Over Metal Oxide Surfaces"

SS8+2D+AP+BI+NS+TF: Molecular Organization at Surfaces

Meike Stohr, University of Groningen, The Netherlands, Netherlands, "Molecular Nanostructures on Metals vs. Graphene"

SS9+SE: Astrochemistry and Surfaces for Space and Extreme Environments

John Hennessy, Jet Propulsion Laboratory, California Institute of Technology, "Atomic Layer Processing for Space-based Optical Coatings"

Ewine van Dishoeck, Leiden University, The Netherlands, Netherlands, "Molecular Processes in Ultrahigh Vacuum Between the Stars"

SS10: Memorial Session in Honor of Patricia Thiel (ALL INVITED SESSION)

Jürgen Behm, Ulm University, Germany, "Surface Science Model Studies of Electrode-Electrolyte Interactions"

Alex Belianinov, Oak Ridge National Laboratory, "Helium Ion Microscopy for Surface Modification and Characterization"

Jim Evans, Ames Laboratory, "Formation and Evolution of Metal Nanoclusters at Surfaces: Thiel Group Studies"

Vincent Fournée, University of Lorraine, France, "Metal and Molecular Thin Films Templated on Quasicrystalline Surfaces"

Cynthia Jenks, Argonne National Laboratory, "The Many Facets of Surface Chemistry: In Honor of Pat Thiel"

Dapeng Jing, Ames Laboratory, "Encapsulation of Copper at the Surface of Bulk MoS₂"

Ann Lii-Rosales, University of Colorado Boulder, "Atomic Scale Processing Strategies: From Metal Encapsulation to Metal Etching"

Da-Jiang Liu, Iowa State University, "Stability and Dynamics of Sulfur-Metal Complexes on Coinage Metal Surfaces"

Thomas Michely, University of Cologne, Germany, "Cluster Superlattice Membranes"

Karina Morgenstern, Ruhr University Bochum, Germany, "The Influence of Alloying on Surface Kinetics"

Jeong Young Park, Korea Advanced Institute of Science and Technology, Republic of Korea, "Atomic Scale Investigation of Friction Properties of Quasicrystals and Beyond"

Miquel Salmeron, Lawrence Berkeley National Laboratory, "From Surfaces and Interfaces: Advancing Operando Studies"

Michael Tringides, Iowa State University, "High Quality 2-D Materials Paradoxically Characterized from Broad Diffraction Features"

SS11: Surface Science Division Poster Session**THIN FILMS DIVISION (TF)**

The Thin Film Division offers several core oral sessions and one poster session. A broad range of outstanding invited speakers will cover the breadth of thin film science, thin film interfaces, technology, and applications. We have several sessions dedicated to ALD and CVD, encompassing from surface reactions and growth mechanisms to novel processes, precursors, scale up, and emerging applications, and sessions dedicated to novel materials by a wide range of deposition processes, including epitaxial films and interfaces, solution based methods, and the application of simulation and machine learning to thin film growth. Additionally, the division has a strong focus on the application of thin films, including microelectronics and advanced memory applications, interfaces and contacts, flexible electronics, plasmonic, photonic, and metamaterials, energy, and catalysis. It has also a session dedicated to advances in deposition methods of wide bandgap and ultrawide bandgap materials. This year, the division is also introducing two new sessions on thin films for quantum computing and it also features a session on interfacial phenomena in thin film growth. Finally, the division continues its focus on organic and hybrid materials, including the modification of polymers using vapor infiltration methods and the vapor deposition of functional polymer films. As in past years, we will host a student-focused session to highlight the Harper Award candidates in which the student finalists will present their work in an interactive "TEDTalk" type of forum.

TF1+AP: Manufacturing and Scale-Up of CVD and (Spatial) ALD

Wei-Min Li, Leadmicro

TF2+2D+AP+SS: ALD and CVD: Surface Reactions, Mechanisms, and Kinetics

Rong Chen, Huazhong University of Science and Technology, China, "Inherent Selective Atomic Layer Deposition Strategies and Applications"

TF3+AP+MN+SS: Novel ALD Processes

Shi-Jin Ding, Fudan University, China, "Atomic-Layer-Deposited Metal Oxide Semiconductor Films for Electronic Devices"

TF4+PS+SE: HiPIMS for Emerging and Advanced Materials

Brian Jurczyk, Starfire Industries LLC

David Ruzic, University of Illinois at Urbana-Champaign, "2020 AVS Gaede-Langmuir Award Lecture: How Advances in High-Power Magnetron Impulse Sputtering (HiPIMS) Can Control Ion Energy, Ionization, and have High Deposition Rates"

TF5+AP: ALD/CVD Precursors

Won-Jun Lee, Sejong University, Republic of Korea, "Heteroleptic Titanium Precursors for ALD of TiO₂"

TF6+SS: Simulations and Machine Learning Applied to Thin Film Phenomena

TF7+AP+SS: Nucleation and Interface Phenomena in Thin Film Deposition and ASD

Mariona Coll, ICMAB - CSIC, Spain, "Novel Metalorganic Precursors for ALD Functional complex Oxide Thin Films"

Vincent Vandalon, Eindhoven University of Technology, The Netherlands, "Mechanistic Insight into Atomic Layer Deposition during Initial Growth by In-situ Diagnostics"

TF8+SS: Epitaxial Thin Films and Interfaces

Jason Kawasaki, University of Wisconsin-Madison, "Epitaxy, Exfoliation, and Strain-Induced Magnetism in Rippled Heusler Membranes"

TF9+BI: Solution-based Thin Film Deposition

Aram Amassian, North Carolina State University, "Solution-based Coating of Next Generation Polycrystalline and Monocrystalline Semiconductors"

TF10+HC+SS: Thin Films for Energy and Catalysis

TF11+AP+EM+MI: ALD/CVD Thin Films for Integrated Solutions in Advanced Memory Applications

TF12+EM: Thin Films for Microelectronic Applications

Baratunde Cola, Georgia Institute of Technology, "Progress in Practical Carbon Nanotube Optical Rectenna Development"

TF13+EM+MI: Thin Films in Plasmonic, Metamaterials and Photonic Applications

Joshua Caldwell, Vanderbilt University, "Refractive Index Control of IR Light in Highly Anisotropic Media"

TF14+EM: Electronic Interfaces and Contacts

Prineha Narang, Harvard University, "Ab Initio Predictions of Electron-Phonon and Phonon-Phonon Interactions and Transport in Quantum Materials"

TF15+EM: Thin Films for Emerging Applications: Flexible Electronic, Pyroelectric, Phase Change, and Other Functional Materials

TF16+BI: Vapor Deposition of Functional Polymer Thin Films

Malancha Gupta, University of Southern California

TF17+BI+EM: Vapor Deposition and Vapor Infiltration for Synthesizing Organic-Inorganic Hybrid Thin Films and Interfaces

Tamar Segal-Peretz, Technion – Israel Institute of Technology, Israel, "Sequential Infiltration Synthesis - From Design Rules to New Architectures of Metal Oxide Growth within Polymers"

TF18+EM: Wide and Ultra-Wide Bandgap Thin Films: Advances in Deposition and Novel Materials

Sriram Krishnamoorthy, University of Utah, "Metalorganic Vapor-phase Epitaxy of Gallium (Aluminum) Oxide Thin Films and Heterostructures for High Power and High Frequency Electronics"

TF19+2D+MI: Chalcogenide Materials and Applications

TF20+2D+EM: Low Dimensional Materials in Tunnelling Applications

TF21+2D+EM+MI: Thin Films for Quantum Computing

Dipanjana Mazumdar, Southern Illinois University, "Physical Properties of Binary Chalcogenide Thin Films Grown by Magnetron Sputtering"

TF22+AP: ALD and CVD for Nanostructured and High Aspect Ratio Materials

Neil P. Dasgupta, University of Michigan, Ann Arbor, "Rational Design of Hierarchically-Structured Nanomaterials with Tailored Interfaces Using Atomic Layer Deposition: Bridging Length Scales from Atoms to Bulk"

TF23: Thin Film Poster Session

VACUUM TECHNOLOGY DIVISION (VT)

The Vacuum Technology Division provides a forum for research in achieving, maintaining, measuring, and analyzing vacuum or vacuum processes across a wide range of pressures, gas compositions, and applications. The 2021 program includes the following topics: Vacuum Measurement; Vacuum Pumping; Large Vacuum Systems; Accelerator; Vacuum Quality Control. New topics, highlighted by special sessions, are entitled "Vacuum Technology for Quantum Applications," "Next Generation Synchrotron Light Sources," and "Fusion Research." The poster session features the VT Student Poster Competition, where students of any discipline are invited to share their innovative solutions to vacuum equipment challenges. Student awards will also be given for the best oral presentations.

VT1: Vacuum Measurement, Partial Pressure, and Gas Analysis

Klaus Bergner, VACOM, Vakuum Komponenten & Messtechnik GmbH, Germany, "Innovations in Gauges and Gas Analysis"

VT2: Vacuum Pumping and Extreme High Vacuum

Lucia Lain Amador, CERN, Switzerland, "Small Diameter NEG Coated Vacuum Chambers by Copper Electroforming"

VT3: Gas Dynamics, Modeling, and Simulation

Marton Ady, CERN, Switzerland, "SynRad and MolFlow for Vacuum Analysis of CERN"

VT4: Leaks, Flows, and Material Outgassing

Katharina Battes, Karlsruhe Institute of Technology (KIT), Germany, "Outgassing of Polymers for High Vacuum"

VT5: Aerospace and Large Vacuum System

Tom Kammermerier, Leybold USA Inc., "Vacuum Technology of Hyperloop"

VT6: Vacuum Technology for Accelerators

Marc Ross, SLAC National Accelerator Laboratory, "LCLS-II HE Vacuum Design and Requirements"

VT7: Particle Control, Quality Control, Ultraclean Systems

Joshua Spradlin, Jefferson Lab, "Particulate and Contamination Control and Analysis at Jefferson Lab"

VT8: Vacuum Technology for Quantum applications

David Leibbrandt, National Institute of Standards and Technology (NIST), "The NIST Quantum Logic Clock and its Vacuum Performance"

VT9+MI: Next Generation Synchrotron Light Source

Marek Grabski, Lund University, Sweden, "Next Generation Synchrotron Light Source"

VT10+PS: Vacuum Technology for Fusion Research

Christian Day, Karlsruhe Institut of Technology (KIT), Germany, "Vacuum Technology for Fusion Research"

Enrico Maccallini, SAES Getters, Italy, "Large Pumping Systems for Fusion Applications"

Robert Pearce, ITER Organization, France, "Vacuum Technology Development at the ITER Fusion Project"

Jorge Rocca, Colorado State University, "Innovations in Vacuum Technology for Fusion"

Charles Smith, US ITER, "Vacuum Development at US ITER Project"

VT11: Vacuum Technology Poster Session

SPECIAL SESSIONS & EVENTS

AVS 67 PLENARY LECTURE: Professor Alec Wodtke from the Georg-August University of Göttingen and The Max Planck Institute for Biophysical Chemistry, Germany, will be presenting our Plenary Lecture entitled, "Pump-probe Experiments With Neutral Matter: A New Approach to the Kinetics of Surface Reactions," on Monday, October 25, 5:30-6:30 p.m.

BIOMATERIALS PLENARY SESSION (BP)

The Biomaterials Interfaces program kicks off with the now traditional Biomaterials Plenary Session. This year we are pleased to have presentations from two prominent scientists who will present their cutting edge research on Materials and Biology for Energy Applications.

BP1: Biomaterials Plenary Session: Materials and Biology for the Future of Energy and the Environment

Steven Benner, Foundation for Applied Molecular Evolution and Firebird Biomolecular Sciences LLC

Christine D. Keating, Penn State University

NANOSCALE SCIENCE AND TECHNOLOGY DIVISION PLENARY SESSION (NP)

Starting a new tradition in the Nanoscale Science and Technology Division (NSTD), we celebrate 28 years of nanoscience in AVS by kicking off the week with two major events that highlight the exciting work going on across the myriad of disciplines that connect with nanoscience. In this session highlighting our awards winners and finalists, we will start with a plenary talk by the 2021 NSTD Recognition Winner Robert Carpick on "Seeing the Hidden Interface: Revealing Nanoscale Mechanisms of Contact, Adhesion, and Friction by *in situ* Experiments." Subsequently, we will shift to our younger generation with the Graduate Student and Early Career Award Finalist Lightning Talks.

NP1: Nanoscale Science and Technology Plenary Session

*Robert Carpick, University of Pennsylvania, "Seeing the Hidden Interface: Revealing Nanoscale Mechanisms of Contact, Adhesion, and Friction by *in situ* Experiments"*

EXHIBITOR TECHNOLOGY SPOTLIGHT (EW): AVS 67 Exhibitors are provided the opportunity to present commercial and/or scientific announcements relating to their products and services to symposium attendees during technical session breaks in the stage area of the exhibit hall. Papers submitted and material presented during the presentation must provide technical information and/or analysis using a specific exhibitor product, technique or service. The 20-minute presentations will be held in stage area of the exhibit hall and will take place during symposium session breaks to ensure maximum attendance. Cost is \$600 (\$500 for Corporate Members). For space availability, contact Jeannette DeGennaro: jeannette@avs.org.

EW1 Exhibitor Technology Spotlight Session

UNDERGRADUATE POSTER SESSION (UN)

AVS 67 will host the first undergraduate poster session, open to any undergraduate researcher. This special session provides undergraduate researchers the opportunity to present and network with students, professors, and industry leaders! We welcome the newest members of AVS to share their important work with all society members and greatly encourage participation! Registration is discounted for undergraduate students and prizes will be awarded for the top presentations.

UN1: Undergraduate Poster Session

AVS VENDOR EXHIBIT: The Exhibit comprises an extensive display of tools, equipment and services for Surface Science; Biomaterial Interfaces; Electronic Materials & Photonics; Magnetic Interfaces; Manufacturing Science; MEMS/NEMS; Nanoscience; Thin Film; Plasma Science; Vacuum Technology, educational material, career services and professional literature, journals and publications. Each year, the technical symposium expands into new and exciting technical disciplines which bring new exhibitors showing new technology and research methods. The continuously expanding technical program consistently keeps our Symposium fresh and exciting for exhibitors and attendees alike. The exhibits will be open from Tuesday morning until Thursday afternoon (October 26-28, 2021). Please contact exhibits@avs.org for additional information. You may also review our website www.avs.org.

AVS PRESENTATIONS ON DEMAND: We will be inviting all Symposium presenters to submit their PowerPoint slides as a PDF for inclusion in the AVS Technical Library. All presenters will be contacted prior to the meeting with the instructions and deadlines. We hope you will consider participating in this exciting program!

AVS LATE BREAKING SESSION: There will be opportunities for presentation of post-deadline discoveries in all fields relevant to the AVS membership. Submissions that address topics in surfaces, interfaces, films, nanometer-scale phenomena, emerging technologies, or new innovations. Abstracts will be solicited starting in mid-July for either (1) an individual 20 minute oral presentation, or (2) a poster presentation. Late Breaking Abstracts will be used to fill holes in the program and they must be submitted via the AVS website by Thursday, August 23, 2021. Notification of acceptance/rejection will be made soon thereafter. Please check the AVS 67 (www.avs.org) website for details and submission guidelines in mid-July.

AVS SHORT COURSES: Short courses that offer specialized training in specific areas of vacuum science and related technologies will be offered all week, commencing on Monday, October 25, 2021. Registration and additional details will be posted on the AVS website in early July.

AVS SPONSORSHIP PROGRAM: AVS is a not-for-profit Society that offers a myriad of services, programs and events related to science and technology in the fields of vacuum, materials, interfaces and processing to scientists and engineers from around the world. An extensive recognition and exposure program, which is active before and during the Symposium, is available to our Symposium Sponsors. As a Symposium Sponsor, your logo will appear on the AVS website, in the Technical/Exhibitor Program, on signage and slide shows at the Symposium. The earlier you commit to AVS Symposium Sponsorship, the greater exposure you will receive. To learn more about Sponsorship opportunities, please contact Jeannette DeGennaro at 212-248-0200 ext. 229 or jeannette@avs.org or Yvonne Towse at 212-248-0200 ext. 222 or yvonne@avs.org.

ONLINE ABSTRACT SUBMISSION ONLY: www.avsSymposium.org

Deadline: 11:59 p.m. ET, Monday, May 3, 2021

Supplemental data (1-2 pages, 1MB) will also be accepted via the submission site.

Instructions may be found at the web site above.

******NEW FOR AVS 67: A presenter may present ONE ORAL AND ONE POSTER at the Symposium******

ORAL Sessions: Rooms will be set up with projectors, screens, microphones, and laptops (PCs).

POSTER Sessions: Each poster presenter will be allotted space that is 4 feet wide by 4 feet high. Please make your poster no larger than 46 inches wide by 46 inches high to ensure it fits nicely into the allotted space.

AVS recognizes that the global COVID-19 pandemic continues to impact face-to-face meetings. We anticipate seeing you in Charlotte, NC, and we will continue to comply with COVID-19 guidelines (local, state, and federal). As a result, all meeting plans are subject to change to stay in compliance with these COVID-19 guidelines. Hybrid options will be considered as needed. Should an in-person meeting not be feasible, a virtual component will be planned. Additional details will be made available as the event draws closer.

AVS AWARDS & TRAVEL GRANTS

All award applications for AVS National and Division/Group awards may be found at the following link: (<http://www.avs.org/awards>). Please contact Angela Klink, Member Services Administrator, (angela@avs.org, 212-248-0200 ext. 221) for any additional information.

AVS PROFESSIONAL AWARDS

Each year, the AVS solicits nominations for major national awards. These include the Medard W. Welch Award, the Gaede-Langmuir Award, the John A. Thornton Memorial Award and Lecture, the Peter Mark Award, Fellow of the Society and the George T. Hanyo Award. Nominations are due March 31, 2021 and should be submitted through the AVS online award submission site. Nomination information is available on www.avs.org or through Angela Klink (212-248-0200, ext. 221 or angela@avs.org).

NATIONAL STUDENT AWARDS

Students may apply for one National Student Award and one Division/Group Award in a given year.

Each year, the AVS solicits nominations for eight graduate student awards. These are the Russell and Sigurd Varian Award, the Nellie Yeoh Whetten Award, the Dorothy M. and Earl S. Hoffman Award, two Dorothy M. and Earl S. Hoffman Scholarships (N.B. the Hoffman Award and Scholarships are distinct from the Hoffman Travel Grants described below) and three Graduate Research Awards. The nomination procedures are on www.avs.org or through Angela Klink (212-248-0200, ext. 221 or angela@avs.org) Applicants should use the AVS online award submission site. **The deadline is May 3, 2021.**

DOROTHY M. AND EARL S. HOFFMAN TRAVEL GRANTS

The Hoffman Travel Grants have been created in an effort to promote student involvement in AVS and encourage their participation in the annual AVS International Symposium. These travel grants will be given to any applying graduate students who meet the following criteria: 1) you must be the presenter of an accepted Symposium abstract, 2) you must be a full-time graduate student, 3) the grant is not transferable, 4) you must attend the Symposium to receive the grant and, 5) you are not eligible to receive the grant if you are receiving any other travel support from AVS. An invitation e-mail will be sent to eligible students (late June 2021) and the student should apply for the grant by return e-mail to the AVS National Office. The application deadline is Friday, August 13, 2021. Should your application be approved, you will receive an e-mail notification by Friday, September 17, 2021. Grants will be given on a random basis until the 2021 funds are depleted. Funds for the grant recipients will be available at the Symposium Registration Manager's desk, and you will also be asked to present a student I.D. Please note that all travel grants must be collected at the meeting.

DIVISION/GROUP STUDENT AWARDS

Students may apply for one National Student Award and one Division/Group Award in a given year.

The **Applied Surface Science Division** is once again offering the opportunity for students to participate in its annual student award competition – where three finalists will present their research to their ASSD peers and compete for cash awards! Students who are interested in competing are required to **submit** an abstract for a poster or talk to one of the ASSD or ASSD co-sponsored sessions to be eligible. **Presentation during an AVS International Symposium session is required for eligibility.** Three finalists will be selected by the ASSD Student Awards Committee from the overall applicant pool. The finalists will present a “capsule” (3-slide, 5-minute) presentation to the judges during the Tuesday night ASSD Business Meeting. The finalists will be ranked based upon their presentation skills, scientific merit and originality of their work. First, second, and third place prizes are \$750, \$450 and \$300 respectively. In addition to the grand monetary prize, the student that wins the best presentation award will be reimbursed for the 2022 AVS International Symposium registration at the student rate. The winner will also be asked to submit an abstract to an ASSD or ASSD co-sponsored session in 2022. Students wishing to participate in the competition should complete the application on the awards submission site and **submit an abstract by May 3, 2021.**

Biomaterial Interfaces Division is offering student awards (\$250, \$150 and \$100) for the best combined Flash and Poster Presentation based on their PhD research. These awards are sponsored by our AVS Biointerphases journal. All PhD students presenting at both the flash poster presentation and the poster session will be considered for the prizes automatically. They will be judged on the scientific merit and originality of their research, as well as the quality of presentation. Individuals more than one year past the date when their PhD degree was awarded are not eligible to compete for the student prize. Inquiries may be addressed to Dr. Daniel Graham, djgraham@uw.edu.

The **Electronic Materials & Photonics Division (EMPD) Student Poster/Presentation Award** is given at the annual AVS International Symposium and Exhibition. All abstracts, both poster and oral, submitted to an EMPD session will be automatically considered. The presenting author must be a graduate or undergraduate student at the time of submission. Awards will be judged on the scientific merit and originality of their research, their contribution to it, as well as the quality of their presentation. Poster award candidates must be present during the EMPD poster session for judging. The Award consists of a certificate and a \$500 cash prize. Multiple awards are anticipated.

The **Electronic Materials & Photonics Division (EMPD) Student Travel Award** given annually to graduate and undergraduate students who have an accepted abstract AND will be presenting in an EMPD session at the International Symposium. All accepted abstracts with a student as presenting author are automatically considered. Multiple awards are anticipated.

Magnetic Interfaces & Nanostructures Division: Leo M. Falicov Student Award has been established in memory of Professor Leo M. Falicov to recognize outstanding research performed by a graduate student in areas of interest to MIND. Finalists will be selected on the basis of abstract submission, and will receive a cash award upon attending the AVS International Symposium and presenting their paper in an oral MIND session. The winner will be selected on the basis of the oral presentation, considering quality of research and clarity of presentation, and will receive a cash prize and a certificate. Interested applicants should complete the application on the awards submission site and submit a copy of the submitted AVS abstract and a letter of recommendation before the abstract deadline of **May 3, 2021**.

Manufacturing Science and Technology Group is pleased to announce and solicit applications to be competitively awarded to up to 2 graduate students who present papers in MSTG sponsored sessions. The purpose of the MSTG award is to both encourage participation of students in the MSTG program and to acknowledge the valuable contributions they make in advancing state-of-the-art in manufacturing science and technology. Full-time university graduate students with primary appointments at universities are eligible to apply. Preference will be given to those who give oral presentations of their papers. Students awarded the MSTG Award will receive a grant. Submission materials consist of: 1) Letter of application describing the student's research (1 pg. max.); 2) Letter of endorsement by the student's research advisor (1 pg. max.); 3) Copy of submitted abstract; 4) CV (2 pg. max) 5) completed application materials should be submitted through the awards submission site by the **deadline of May 3, 2021**

MEMS and NEMS Technical Group is pleased to announce two types of student awards. One is "Outstanding Paper Award" competition at the AVS Symposium and Exhibition. The number of student awardee(s) will be determined at the discretion of MN Awards Committee. The award includes a cash prize (\$200) and a certificate to the well deserving student presenting his/her research in a MN-sponsored oral session. Both graduate and undergraduate students are eligible. All students presenting at our oral sessions will be considered for the prizes automatically. They will be judged on the scientific merit and originality of their research as well as the quality of presentation. In addition, the MN group will consider a "Best Research Work Award" by offering a registration waiver to the well deserving graduate/undergraduate student submitting an abstract to the MN session. This award will be solely based on the quality of work described in the abstract. All students will automatically be considered for this award as well. MEMS and NEMS students are also encouraged to apply for the National Student Awards which should be submitted through the awards submission site by the deadline of **May 3, 2021**.

The **Nanoscale Science and Technology Division Graduate Competition** As nanoscience has continued to expand its impact in diverse fields including quantum science, biology, mechanics, and energy, the Nanometer-Scale Science and Technology Division (NSTD) has been a hub of research broadly related to instrumentation, lithography, manipulation, imaging, and translation to industry. The NSTD holds a Graduate Competition at the annual AVS International Symposium to highlight and celebrate exceptional researchers working on the frontiers of nanoscience. All graduate students presenting a poster or oral presentation in an NSTD sponsored or co-sponsored session are encouraged to apply. To apply submit a cover letter, resume, advisor support letter, and AVS abstract to the awards submission site by the deadline date of **May 3, 2021**. For eligibility, the applicant must not have received a doctoral degree at the time of abstract submission. All finalists will receive a student registration waiver for the conference!!! All finalists will be selected by the NSTD Awards Committee, and they will be informed in September 2021. All finalists must present a five minute talk (with additional time for questions) at the NSTD Awards Competition, which is tentatively planned for noon on Wednesday of the symposium week. The winner will be selected based on the quality of the talk, the responses to subsequent questions, and the level of the research. The graduate award winner will receive a certificate and a cash award of \$500. This award is made possible by financial support from NSTD's sponsors, who in 2019 were Bruker, Park Systems, Asylum Research (Oxford Instruments), Nanoscribe, and SPECS TII.

John Coburn and Harold Winters Student Award in Plasma Science and Technology Student Merit Awards recognize meritorious achievements by students in an area fostered and encouraged by the Plasma Science and Technology Division, while also encouraging student participation in the Division. The John Coburn and Harold Winters Award is given in recognition of outstanding research achievements *and* an oral presentation given by a Student Merit Award winner at the AVS International Symposium. The following materials are required to apply for the Award: 1) A curriculum vitae of the nominee; 2) A **one-page letter of recommendation from the student's research advisor/mentor**; 3) A copy of the nominee's submitted abstract for the AVS International Symposium. An eligible nominee must have their abstract accepted to the AVS International Symposium for the year they are nominated and be a registered student at the time of the earliest deadline for abstract submission. Only one student from a given research group may be nominated in each year and previous winners of the Coburn and Winters Award are not eligible. A maximum of six (6) Student Merit Award winners will be selected by the PSTD Awards Committee on the basis of technical/scientific merit and originality of research. Each Merit Award winner will receive a cash award and an official certificate and must present their research in a private session of the PSTD Awards Committee. This private presentation will be *in addition to* the regularly scheduled PSTD oral session at the AVS Symposium. The Coburn and Winters Award winner will be selected from the Student Merit Awardees based on the quality of both the research and oral presentation. The overall winner will receive an additional cash prize and certificate. All materials should be submitted on the awards submission site and must be received on or before **May 3, 2021**.

The **Surface Science Division** solicits nominations for the Morton M. Traum Surface Science Student Award to be given to the best student presenter at the AVS International Symposium. **Who can apply?** Candidates for the award must be registered to give an oral or poster presentation at the AVS International Symposium and be either a current graduate student or have received their Ph.D. degree in the year of the Symposium. Up to five finalists will be selected to compete with posters during the Surface Science poster session; these poster presentations are in addition to any presentation they are registered for at the Symposium but presents the same scientific content. **What are the prizes?** All finalists and the winner will receive cash prizes starting at \$1000 for the winner, and certificates. The winner's name will be added to the list of previous winners in the Symposium technical program, the AVS website, and on a plaque on display at the Symposium. **How do I participate?** Traum award applicants should submit on the AVS website 1) a copy of the abstract submitted to the AVS that includes the abstract submission number; 2) an extended abstract that does not exceed two pages (including tables, figures, and references); 3) their expected graduation date, 4) two letters of recommendation, and 5) an AVS application form for student awards. Please use the online award submission site to complete your application. **Deadline: May 3, 2021.**

Thin Film Division James Harper Award and Graduate Student Award: The ThinFilm Division's premier, competitive graduate student award is in honor of James M.E. Harper, who was a pioneer in the thin film areas of interconnects and silicides, and was active in the AVS as a Trustee, Director, vice-program chair, Thin Film chair, and many other roles. Finalists for the award will be chosen based on the application packages below. The finalist will then compete for the final Harper Award by presenting their work along the lines of a short, 15 minute TED-talk at the AVS symposium, where they will be judged in real time for both content as well as presentation quality and originality. The Harper Award consists of a plaque and cash prize of \$800. Other finalists will receive Thin Film Graduate Student Awards of \$400. To be eligible for the Harper Award, the student must be the presenter of an oral presentation in the Thin Film Division sessions at the AVS meeting and must be a currently registered graduate student on the date of the abstract submission deadline. Interested applicants should send 1) their CV; 2) a copy of their submitted AVS abstract; and 3) a letter of recommendation from their research advisor. Application materials should be submitted through the awards submission site. **Deadline: May 3, 2021.**

Vacuum Technology Division Student Poster Competition: **Vacuum Technology Division Student Poster Competition** – Known as the “Student-Built Vacuum System Competition (alias - Junkyard Wars of Vacuum Technology),” this is a competition for student posters that describe the design, development, and/or use of “student-built vacuum systems.” Although these types of vacuum systems may not represent state-of-the-art technology, they often reflect ingenious designs that are guided by unique functionality, and/or are constrained by limited resources. Competitive submissions are expected to reveal inspired and/or cost-effective solutions to real-world issues encountered in typical vacuum system designs. The competition is open to any student who has built a vacuum system for any research purpose. The resulting research project, whether complete or not, should be presented along with the vacuum challenges that have been undertaken. The posters will be judged during the poster session and cash prizes of up to \$500 will be awarded to the winners of the competition. The application deadline for entering the competition is the same as the abstract deadline which is **May 3, 2021**. Students desiring to enter the competition should submit the poster abstract and application directly in the awards submission site and submit the abstract to the VTD poster abstracts call. Inquiry may be directed to the VTD Student Award Coordinator, Julia Scherschligt (julia.s@nist.gov).

Vacuum Technology Division Student Presenter: This Award is given at the annual AVS International Symposium to encourage students to present their research work in the VTD sessions during the Symposium. To qualify for the award, the applicants must be a full-time student (graduate or undergraduate) at an accredited educational or/and research institute. Candidate students shall submit an abstract to the annual AVS International Symposium & Exhibition for an oral presentation which meets requirements and deadlines and must be the presenter (16-minute talk + 4-minute Q&A) at the AVS Symposium. A panel will judge the student presenters, and the awardee will be selected based on the quality of the presented works (with emphasis on his/her contribution to the presented works) and on the presentation, itself. The VTD Student Presenter award consists of a certificate and a cash prize up to \$500. The application may be done by going to awards submission site. Inquiry may be directed to the VTD Student Award Coordinator, Julia Scherschligt (julia.s@nist.gov). **Deadline is May 3, 2021.**

SOCIETY/DIVISION/GROUP PROFESSIONAL AWARDS (NOT FOR STUDENTS)

The **AVS Applied Surface Science Division (ASSD) Peter M. A. Sherwood Mid-Career Professional Award** recognizes achievements leading to exceptional progress in research and development made by professionals in their mid-career in an area of interest to the ASSD. The award consists of a cash award plus a plaque. The **nomination deadline is April 15, 2021** The nomination package must contain the nomination form, nominating letter, biographical materials and three supporting letters. The Awardee will give a featured talk at the AVS International Symposium where the award will be presented. Travel support is available to attend the Symposium. The Award will be made only if an appropriate candidate is identified. Packages must be submitted to Alex Shard (alex.shard@npl.co.uk). See the [AVS Awards website](#) for the nomination form and full submission guidelines.

The **AVS Advanced Surface Engineering Division (ASED)** establishes the *ASED Young Investigator Award* to recognize outstanding participation and research based on presentations in ASED program sessions at the AVS International Symposium. PhD students or engineers/researchers from industry or academia up to 3 years after PhD graduation, who are/will be members of the ASED of AVS, are eligible. Up to three finalists will be selected. Each finalist will receive a certificate and \$500 prize after presenting his/her work at the Symposium. One first prize winner will be selected to receive an additional \$500 (\$1000 total). Members of the ASED AVS Program Committee will judge all nominations and make the selection of finalists and first prize winner, the latter based on the quality of the presentation and a 20-minute interview conducted during the Symposium week. All nomination materials must be compiled by the Nominator and submitted as a package. The **complete** nomination package is to be sent **electronically** to the current Chair of the ASED Awards Committee (asedawards@avs.org) such that it is received by **May 3, 2021**. Late or incomplete application packages will not be evaluated. **Nomination Procedure:** The Nominator, who is either the supervisor of the young researcher or a senior colleague in the case of a junior academic, shall submit the following items to the current Chair of the ASED Awards Committee by the Abstract Submission deadline, May 3, 2021 for AVS International Symposium. Late or incomplete applications will not be evaluated: Recommendation letter from the Nominator, abstract submitted to the ASED program of the AVS International Symposium; both oral and poster presentations are eligible, two-page description of the research of the young investigator, including a clear and concise description of the aim of the research and its relationship to the status of the field, a summary of the applicant's specific contributions, exceptional ability, and future promise, resume, which shall include education and employment history with dates, awards and honors received, current professional/technical affiliations (including AVS) and related activities, and complete publication list with full citations.

The **AVS Biomaterial Interfaces Division (BID)** invites applications for the **Early Career Researcher (ECR) Award**. Open to all authors submitting an abstract to a BID session at the Annual International Symposium, the prize consists of symposium registration and \$500 towards travel costs as well as an honorary presentation in a relevant BI session. The nominee's Ph.D. or equivalent degree must have been earned less than 15 years prior to January 1 of the award year. Required application materials: 1) a nominating letter and two supporting letters, 2) a biography and CV of the nominee, and 3) a copy of the nominee's abstract submitted to the AVS symposium. Application materials will be reviewed and the award winner chosen by the BID Executive Committee. Application materials should be sent by email to: Dr. Daniel Graham, djgraham@uw.edu. Deadline: May 3, 2021

Electronic Materials & Photonics Division Postdoctoral Travel Award is given annually to postdoctoral fellows who have an accepted abstract AND will be presenting an EMPD presentation at the International Symposium. The application consists of (i) a copy of the accepted abstract with Program Number, (ii) a recommendation letter from the advisor, and (iii) CV, plus (iv) a cover letter of request. Multiple awards are anticipated. Deadline: annually on August 2 Submissions and inquiries should be directed to sjm3qf@virginia.edu

Magnetic Interfaces and Nanostructures Division: The MIND Postdoctoral Award recognizes outstanding contributions to the areas of interest to MIND. The award comes with a certificate and a cash prize for the winner. Postdoctoral fellows (except for former winners) who will be presenting their papers at this year's International Symposium in an oral MIND session are welcome to apply. The application consisting of (i) a copy of the accepted abstract, (ii) a recommendation letter from her/his advisor, (iii) her/his CV, plus (iv) a cover letter should be sent to Markus Donath (markus.donath@uni-muenster.de) by the **deadline October 1 of the Symposium year**.

Nanoscale Science and Technology Division Early Career Competition: As nanoscience has continued to expand its impact in diverse fields including quantum science, biology, mechanics, and energy, the Nanometer-Scale Science and Technology Division (NSTD) has been a hub of research broadly related to instrumentation, lithography, manipulation, imaging, and technology translation. The NSTD holds an Early Career Competition at the annual AVS International Symposium to highlight and celebrate exceptional researchers working on the frontiers of nanoscience. Post-doctoral researchers as well as beginning independent researchers presenting a poster or oral presentation in an NSTD sponsored or co-sponsored session are encouraged to apply.

To apply, send a cover letter, resume, and AVS abstract to the NSTD Awards Coordinator: Georg E. Fantner (georg.fantner@epfl.ch) as a single PDF file. For consideration, the application must be sent by 11:59 PM CDT, May 3, 2021. For eligibility, the applicant must hold a doctoral degree for no more than five years at the time of abstract submission. Note that this award is meant to highlight work performed after the Ph.D. and thus research performed towards a doctorate will not be considered. Applications from industry, national laboratories, and academic institutions are encouraged. All postdoctoral award finalists will be selected by the NSTD Awards Committee, and they will be informed in September 2021. All finalists must present a five minute talk (with additional time for questions) at the NSTD Awards Competition, which is tentatively planned for noon on Wednesday of the symposium week. The winner will be selected based on the quality of the talk, the responses to subsequent questions, and the level of the research. The postdoc NSTD award winner will receive a certificate and a cash award of \$500. Depending on the needs of the following year's AVS Symposium, the winner will be considered for an invited talk. This award is made possible by financial support from NSTD's sponsors, who in 2019 were Bruker, Park Systems, Asylum Research (Oxford Instruments), Nanoscribe, and SPECS TII.

The Nanotechnology Recognition Award The Nanotechnology Recognition Award recognizes members of NSTD for outstanding scientific and technical contributions in the science of fabrication, characterization, and fundamental research employing nanometer-scale structures, scanning probe microscopy, technology transfer involving nanometer-scale structures, and/or the promotion and dissemination of knowledge and development in these areas. The award comprises a cash award plus a certificate. The nomination is for 2022, and the deadline is May 3, 2021. The nomination material should include a nominating letter, biographical material, and 3 supporting letters, which should be emailed as a single pdf file to Georg E. Fantner (georg.fantner@epfl.ch). The Award will be presented at the AVS International Symposium and conference registration will be waived for the award winner. This award is made possible by financial support from NSTD's sponsors, who in 2019 were Bruker, Park Systems, Asylum Research (Oxford Instruments), Nanoscribe, and SPECS TII.

The **Plasma Science & Technology Division** is pleased to solicit nominations for the Plasma Prize, which is awarded annually for outstanding scientific and technical contributions to the fields of plasma science and technology that are fostered and encouraged by PSTD. These areas are those represented in the programs of the AVS International Symposia, as well as in topical conferences sponsored by PSTD, and those areas defined in the PSTD's By-laws. The contribution may be in the nature of sustained or single (e.g., outstanding achievement or publication), significant contributions to theory or experiment, discovery, understanding, inventions, measurements, technique development, or management. The nominee must have published work in JVST or presented work in the PSTD sessions of the AVS International Symposia and be a current AVS Platinum member. Please submit ONLY the following required application materials: (1) A nominating letter citing the contributions and any involvement in the AVS community by the nominee, (2) A biography and Curriculum Vitae of the nominee. The nomination should be made by colleagues or others who are well acquainted with the nominee. Application materials will be reviewed and the award winner chosen by the PSTD Fellowship-Awards Committee. The award consists of an honorary lecture at one of the PSTD oral sessions at the International Symposium, a certificate citing the accomplishments of the recipient, and a cash prize. Nominations must be submitted as a single pdf file by email to: Francois Reniers (Francois.Reniers@ulb.be). **Nomination deadline: May 3, 2021**

The **Plasma Science and Technology Division** is committed to promoting the advancement of young scientists and engineers along with future leaders in plasma science and technology. In support of this mission, the Plasma Science and Technology Division is pleased to solicit nominations for the *PSTD Young Investigator Award*. The nominee must be a young scientist or engineer, who has made outstanding basic and/or applied science and engineering contributions in an area of importance to the Plasma Science and Technology Division. The submissions

are reviewed based on the merit of the nominee's contributions to the field of plasma science and technology. To be eligible, the nominee must have no more than 7 years of full-time employment after their highest degree was earned, prior to January 1 of the award year, and be a current AVS Platinum member. Required application materials include: 1. A nominating letter that includes a description citing the reason for nomination; 2. Two letters that support the nomination; 3. A biography and CV of the nominee. The applicant must also submit an abstract to the International Symposium in PSTD sponsored session in the year of the nomination. Application materials will be reviewed and the award winner chosen by the PSTD Fellowship-Awards Committee. The award consists of an honorary lecture at one of the PSTD oral sessions at the International Symposium, a certificate citing the accomplishments of the recipient, and a cash prize. Application materials should be sent to Francois Reniers (Francois.Reniers@ulb.be). **Nomination deadline: May 3, 2021.**

The **Thin Film Division** is pleased to solicit nominations for a prestigious award, the **Paul H. Holloway Young Investigator Award**. This award is named after Professor Paul H. Holloway, who has a distinguished history of scholarship and services to AVS and is still very involved in AVS. The nominee must be a young scientist or engineer who has contributed outstanding theoretical and experimental work in an area important to the AVS Thin Film Division and be a current AVS member. The nominee's Ph.D. or equivalent degree must have been earned less than 7 years prior to January 1 of the award year. Required application materials: 1. a description citing the reason for nomination; 2. a nominating letter and two supporting letters; 3. a biography and CV of the nominee. It is expected that an applicant will also submit an abstract to the Annual Symposium in Thin Film sponsored or co-sponsored session. Application materials will be reviewed and the award winner chosen by the TFD Awards Committee. The award consists of a cash prize, a certificate citing the accomplishments of the recipient, and an honorary lecture at one of the TFD oral sessions at the International Symposium. Application materials should be sent to Robert Grubbs at rkssouthwest@yahoo.com. **Deadline: May 3, 2021.**

Thin Film Division Distinguished Technologist Award: The Award serves to recognize individuals who have provided exceptional technical support of thin film research or related development activities. We are all indebted to the support provided at some point in our careers by outstanding technologists or technicians, and this award is meant to recognize the importance of that role in thin film research and development. There is no requirement that a nominee be an AVS member, however membership and/or an active role in the society at the national or local level is advantageous. The nominee must have provided outstanding technical support to a laboratory research or development program in an area of interest to the Thin Film Division, as evidenced by a nomination letter, and a letter of support. It is expected that the nomination come from an active AVS member. The award includes a plaque, a \$500 cash award, and up to \$500 in travel expenses to the AVS International Symposium. These will be presented to the awardee at the annual AVS Symposium & Exhibition by the Thin Film Division. The winner does not have to be present to receive the award but is encouraged to attend. The Distinguished Technologist Award will be granted to a maximum of one person per year. The award was created in 2015 by the New Mexico Chapter of AVS to honor its founders and their many contributions. The New Mexico Chapter of AVS provided the endowment for this Award. Required application materials include 1) a nominating letter and one letter of support, and 2) a brief biography and CV of the nominee. Application materials will be reviewed and the award winner chosen by the TFD Awards Committee. Application materials should be sent by email to Robert Grubbs rkssouthwest@yahoo.com by **May 3, 2021.**

The **VTD Early Career Award** strives to recognize outstanding experimental and/or theoretical work related to vacuum science and technology by a scientist or engineer early in their career. The contributions can be directly in the field of vacuum science such as vacuum metrology and measurement, gas dynamics, or designing vacuum equipment, or to related fields such as gas analysis or surface science for accelerator applications. The nominee does not have to be a current member of the AVS. To be eligible, the nominee must meet AT LEAST ONE of the following three criteria: The nominee is not older than thirty-eight (38) years of age during of the year in which the award is made; the nominee is within 10 years of their undergraduate degree or 5 years of their graduate degree during the year which the award is made; or the nominee holds an early career membership in the AVS. Final eligibility will be subject to the judgment of the VTD Early-Career sub-committee. The award consists of an \$800 cash award and a certificate setting forth the reasons for the award. The awardee is expected to give an invited talk in one of the VTD sessions at the AVS National Symposium during the year in which the award is given. To be considered for this award please submit: 1) A nomination letter, not more than 2 pages long, that cites at least one major contribution or significant accomplishment, which should be summarized in three sentences or less and supported by publications, presentations, patents, or other evidence included in the nomination package; 2) A curriculum vitae including a short (one paragraph) biography; 3) at least (1) one letter of recommendation. A phone or web interview with candidates may also be requested. Self-nominations are acceptable. Application materials or questions should be sent by email to the VTD Student Award Coordinator, Julia Scherschligt (julia.s@nist.gov). **Deadline: May 3, 2021.**

Theodore E. Madey Award: AVS, in cooperation with the Polish Vacuum Society (PVS), is pleased to solicit nominations for the 2023 Theodore E. Madey Award. In the spirit of its namesake, the Award fosters collaboration between Polish and North American scientists. The Awardee is sponsored to visit Poland, present a seminar at a university, and engage in scientific discussions. The Awardee will be selected on the bases of: (1) outstanding theoretical and/or experimental research in areas of interest to the AVS and PVS, including surface science; (2) demonstrated leadership in international collaborative research; and (3) the potential to develop fruitful new international collaborations within the span of his/her career. Required nomination materials include: 1) a letter from the nominator that describes the ways in which the applicant fits the criteria for this award; 2) two supporting recommendation letters; 3) CV (5 pages maximum) which should include education, employment history, professional recognitions (invited, appointed or elected positions), and awards; and 4) complete list of publications, patents, and invited talks. Nomination documents must all be in PDF format. Nomination materials will be reviewed, and the award winner will be selected, by a special committee consisting of both AVS and PVS members. The AVS and PVS contingents will alternate in taking the leadership in award selection, e.g. AVS in 2022 and PVS in 2024. Nominations are due in even-numbered years, and awards are given in odd-numbered years. Nominations are viable for two consecutive award cycles. **Nomination materials for the 2023 award should be sent by email to: Angela Klink, AVS Member Services Administrator, angela@avs.org by March 31, 2022.**