



# AVS 70th International Symposium & Exhibition

November 3-8, 2024 | Tampa Convention Center | Tampa, FL

## CALL FOR ABSTRACTS

We are delighted to invite you on behalf of the AVS to submit an abstract for the AVS 70<sup>th</sup> International Symposium & Exhibition, scheduled to be held at the Tampa Convention Center in Tampa, FL, USA, from November 3 - 8, 2024. The AVS Symposium serves as a premier platform for presenting and discussing interdisciplinary science and technology in the fields of materials, interfaces, and processing, catering to both the research and manufacturing communities.

Our symposia cultivate a dynamic, multidisciplinary environment that transcends traditional disciplinary boundaries. They feature papers from AVS Technical Divisions, Groups, Focus Topics, and Mini-Symposia, focusing on emerging technologies, many of which significantly contribute to the overarching conference theme.

The theme for this year's Symposium is "Innovating Sustainability: Next Generation Energy and Quantum Devices and their Characterization." This theme underscores topics of national and international significance, which are increasingly vital to the AVS community. We warmly invite you to explore the program and submit your abstract, enabling your participation in this exciting event! Below is a list of AVS Divisions, Technical Groups, Focus Topics, and Mini-Symposia sessions planned for AVS 70. Take a moment to review the diverse session themes and submit your oral or poster abstract to the topic that best aligns with your research. ***Each topic listed below has specified areas of interest, available on the submission site. When submitting to your chosen topic, ensure you select either the oral or poster session. The program committee will thoroughly review the abstracts and make the most appropriate scheduling decisions as they build their sessions.***

- 2D Materials (2D)
- Actinides and Rare Earths (AC)
- Advanced Microscopy and Spectroscopy to Explore Field-Assisted Chemistry (AMS)
- Advanced Surface Engineering (SE)
- AI/ML for Scientific Discovery (AIML)
- Applied Surface Science (AS)
- Atomic Scale Processing (AP)
- Quantum Science (QS)
- Biomaterials Interfaces (BI) & Plenary Session (BP)
- Chemical Analysis & Imaging of Interfaces (CA)
- CHIPS Act (CPS)
- Electronic Materials and Photonics (EM)
- Light Sources Enabled Science (LS)
- Magnetic Interfaces and Nanostructures (MI)
- Manufacturing Science and Technology (MS)
- MEMS and NEMS (MN)
- Nanoscale Science and Technology Plenary Session (NSP)
- Plasma Science and Technology (PS)
- Spectroscopic Ellipsometry (EL)
- Surface Science (SS)
- Thin Films (TF)
- Undergraduate Poster Session (UN)
- Vacuum Technology (VT)
- AVS Quantum Science Workshop (AQS All-Invited Session)

Focused topic sessions and mini-symposia complement our traditionally strong core of sessions on 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.

We are confident that you will find many sessions of interest, as well as oral and poster sessions providing opportunities to showcase your latest research. Poster presentations are an excellent way to promote your work and engage in one-on-one interactions with many scientists and engineers in a relaxed environment. AVS 70 will also feature a special poster session to highlight undergraduate research, with prizes for the top presentations. Please note that for AVS 70, you are allowed to present one oral abstract and one poster abstract, so please consider submitting both! In addition to a vibrant technical program, there will be an extensive equipment and vendor exhibition, short courses, and numerous networking, career advancement, and

recruitment events for those launching their careers and established researchers. Opportunities to apply for travel grants, as well as student, early career, and professional awards, are also available.

If you are new to the AVS community, WELCOME! We are confident 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 13, 2024.

We eagerly anticipate your valuable contribution to the AVS 70<sup>th</sup> International Symposium & Exhibition.



Mark Engelhard  
Pacific Northwest National Laboratory  
AVS 70 Program Chair



Stephanie Law  
Pennsylvania State University  
AVS 70 Program Vice-Chair

## AVS 70 PROGRAM COMMITTEE

### PROGRAM CHAIR:

Mark Engelhard  
Pacific Northwest National Laboratory  
Mark\_engelhard@avs.org

### PROGRAM VICE CHAIR:

Stephanie Law  
Pennsylvania State University  
Stephanie\_law@avs.org

### 2D MATERIALS (2D)

Topic Co-Chair: Jyoti Katoch, Carnegie Mellon University  
Topic Co-Chair: Kai Xiao, Oak Ridge National Laboratory  
Matthias Batzill, University of South Florida  
Huamin Li, University at Buffalo-SUNY  
Cristina Satriano, University of Catania, Italy  
Fei Yao, University at Buffalo

### ACTINIDES AND RARE EARTHS (AC)

Topic Chair: James G. Tobin, University of Wisconsin-Oshkosh  
Topic Co-Chair: Ladislav Havela, Charles University, Prague, Czech Republic  
Topic Co-Chair: David Shuh, Lawrence Berkeley National Laboratory  
Edgar Buck, Pacific Northwest National Lab  
Tomasz Durakiewicz, National Science Foundation  
Krzysztof Gofryk, Idaho National Laboratory  
Itzhak Halevy, Ben Gurion University Be'er Sheva, Israel  
Alison Pugmire, LANL  
Paul Roussel, AWE, UK

Eteri Svanidze, Max Planck Institute for Chemical Physics of Solids, Germany  
Evgenia Tereshina-Chitrova, Institute of Physics CAS, Prague, Czechia  
Gertrud Zwicknagl, Technische Universität Braunschweig, Germany

### ADVANCED MICROSCOPY AND SPECTROSCOPY TO EXPLORE FIELD-ASSISTED CHEMISTRY (AMS)

Topic Co-Chair: Shawn Kathmann, Pacific Northwest National Laboratory  
Topic Co-Chair: Sten V. Lambeets, Pacific Northwest National Laboratory  
Topic Co-Chair: Daniel Perea, Pacific Northwest National Laboratory

### ADVANCED SURFACE ENGINEERING

Topic Chair: Filippo Mangolini, The University of Texas at Austin  
Topic Co-Chair: Diana Berman, University of North Texas  
Topic Co-Chair: Ivan Petrov, University of Illinois at Urbana-Champaign  
Topic Co-Chair: Fan-Bean Wu, National United University, Taiwan

### AI/ML FOR SCIENTIFIC DISCOVERY (AIML)

Topic Co-Chair: Alain Diebold, SUNY Poly  
Topic Co-Chair: Erica Douglas, Sandia National Lab  
Topic Co-Chair: Tina Kaarsberg, Department of Energy  
Alex Belianinov, Sandia National Laboratories  
Thomas Hardin, Sandia National Laboratories

### APPLIED SURFACE SCIENCE (AS)

Topic Co-Chair: Alexander Shard, National Physical Laboratory, UK  
Topic Co-Chair: Julia Zakel, IONTOF GmbH, Germany  
Paul Bagus, University of North Texas  
Steve Consiglio, Tokyo Electron  
Gregory L. Fisher, Physical Electronics  
Andrew Francis, Medtronic, Inc.  
Jodi Grzeskowiak, Tokyo Electron  
Jordan Lerach, ImaBiotech Corp.  
David Morgan, Cardiff University, UK  
Hong Piao, FUJIFILM Electronic Materials USA., Inc.  
Samantha G. Rosenberg, Lockheed Martin  
P.M.A. Sherwood, Kansas State University  
Timothy Spila, University of Illinois  
Lyndi Strange, PNNL  
Tanguy Terlier, Rice University  
Theva Thevuthasan, Pacific Northwest National Lab.

### ATOMIC SCALE PROCESSING MINI-SYMPOSIUM (AP)

Topic Co-Chair: Bobby Bruce, IBM TJ Watson Research Center  
Topic Co-Chair: Eric A. Joseph, IBM Research Division, T.J. Watson Research Center  
Sumit Agarwal, Colorado School of Mines  
Silvia Armini, IMEC Belgium  
Parag Banerjee, University of Central Florida  
Flores Calaza, UNL-Conicet, Argentina  
Jean-Francois deMarneffe, IMEC, Belgium  
Sebastian Engelmann, IBM T.J. Watson Research Center  
Steven M. George, University of Colorado at Boulder

Michael Gordon, University of California at Santa Barbara  
Peter Gordon, Carleton University, Canada  
Satoshi Hamaguchi, Osaka University, Japan  
Tino Hofmann, University of North Carolina at Charlotte

Craig Huffman, Micron  
April Jewell, Jet Propulsion Laboratory (NASA/JPL)  
Jessica Kachian, Intel Corporation  
Keren J. Kanarik, Lam Research Corp.  
Erwin Kessels, TU / Eindhoven, Netherlands  
Sean W. King, Intel Corporation  
Markku Leskela, University of Helsinki, Finland  
Mark Losego, Georgia Institute of Technology  
Stephen McDonnell, University of Virginia  
Chanaka Munasinghe, Intel  
Michelle M. Paquette, University of Missouri-Kansas City  
Gregory N. Parsons, North Carolina State Univ.  
Petra Reinke, University of Virginia  
Mikko Ritala, University of Helsinki, Finland  
Bridget Rogers, Vanderbilt University  
Fred Roozeboom, Univ. of Twente, Netherlands  
Alexander Shard, National Physical Lab, UK  
Dmitry Suyatin, AlixLabs, Sweden  
Amy Walker, University of Texas at Dallas  
Julia Zakel, IONTOF GmbH, Germany

#### **AVS QUANTUM SCIENCE WORKSHOP (ALL-INVITED SESSION) (AQS)**

Topic Co-Chair: Andre Schleife, University of Illinois at Urbana-Champaign  
Philippe Bouyer, Quantum Delta, Netherlands  
Joe Castellano, AIP Publishing  
Charles R. Eddy, Jr., Office of Naval Research Global - London, UK

#### **BIOMATERIAL INTERFACES/BIOMATERIALS PLENARY (BI/BP)**

Topic Chair: Kenan Fears, U.S. Naval Research Laboratory  
Topic Co-Chair: Sapun Parekh, University of Texas at Austin  
Joe Baio, Oregon State University  
Pierluigi Bilotto, CEST GmbH, Austria  
Morgan Hawker, California State Univ., Fresno  
Christopher So, U.S. Naval Research Laboratory

#### **CHEMICAL ANALYSIS AND IMAGING OF INTERFACES (CA)**

Topic Co-Chair: Andrei Kolmakov, National Institute of Standards and Technology (NIST)  
Topic Co-Chair: Xiao-Ying Yu, Oak Ridge National Laboratory

#### **CHIPS ACT MINI-SYMPOSIUM (CPS)**

Topic Co-Chair: Alain Diebold, SUNY Poly  
Topic Co-Chair: Erica Douglas, Sandia National Lab  
Topic Co-Chair: Timothy Gessert, Gessert Consulting LLC., USA

#### **ELECTRONIC MATERIALS AND PHOTONICS (EM)**

Topic Co-Chair: Parag Banerjee, University of Central Florida  
Topic Co-Chair: Erin Cleveland, University of Maryland  
Erica Douglas, Sandia National Lab  
Michael Filler, Georgia Institute of Technology  
Cheng Gong, University of Maryland  
Sang M. Han, University of New Mexico  
Michael David Henry, Sandia National Lab  
Jason Kawasaki, Univ. of Wisconsin - Madison  
Seth King, University of Wisconsin - La Crosse  
Stephen McDonnell, University of Virginia  
Michelle M. Paquette, Univ. of Missouri-Kansas City  
Angus Rockett, Colorado School of Mines  
Nicholas Strandwitz, Lehigh University  
Samantha Tomiko Jaszewski, Sandia National Laboratory

#### **EXHIBITOR TECHNOLOGY SPOTLIGHT SESSIONS (EW)**

Topic Chair: Jeannette DeGennaro, AVS

#### **LIGHT SOURCES ENABLED SCIENCE MINI-SYMPOSIUM (LS)**

Topic Co-Chair: Jakub Drnec, ESRF, Grenoble, France  
Topic Co-Chair: Jessica McChesney, Argonne National Laboratory  
Topic Co-Chair: Slavomir Nemsak, Advanced Light Source, Lawrence Berkeley National Laboratory

#### **MAGNETIC INTERFACES AND NANOSTRUCTURES (MI)**

Topic Chair: Valeria Lauter, Oak Ridge National Laboratory  
Igor Barsukov, UC Riverside  
Markus Donath, Muenster University, Germany  
Axel Enders, University of Bayreuth, Germany  
Zheng Gai, Oak Ridge National Laboratory  
Mikel B. Holcomb, West Virginia University  
Tiffany Kaspar, Pacific Northwest National Lab  
Jeffry Kelber, University of North Texas  
Greg Szulczewski, The University of Alabama

#### **MANUFACTURING SCIENCE AND TECHNOLOGY (MS)**

Topic Co-Chair: Erica Douglas, Sandia National Laboratory  
Topic Co-Chair: Tina Kaarsberg, Department of Energy

#### **MEMS and NEMS (MN)**

Topic Co-Chair: Jaesung Lee, University of Central Florida  
Topic Co-Chair: Yanan Wang, University of Nebraska-Lincoln  
Robert Davis, Brigham Young University  
Vikrant Gokhale, Naval Research Laboratory  
Mieko Hirabayashi, Sandia National Labs  
Matthew Jordan, Sandia National Laboratories  
Sushma Kotru, University of Alabama

Robert Roberts, University of Texas at El Paso  
Christian Zorman, Case Western Reserve Univ.

#### **NANOSCALE SCIENCE AND TECHNOLOGY (NSP)**

Topic Chair: Adina Luican-Mayer, University of Ottawa, Canada  
Topic Co-Chair: Nikolai Klimov, National Institute of Standards and Technology  
Deep Jariwala, University of Pennsylvania

#### **PLASMA SCIENCE AND TECHNOLOGY (PS)**

Topic Co-Chair: Michael Gordon, University of California at Santa Barbara  
Topic Co-Chair: Angelique Raley, TEL US  
Sumit Agarwal, Colorado School of Mines  
John Arnold, IBM Research Div., Albany, NY  
Philippe Bezaud, IMEC, Belgium  
David Boris, Naval Research Laboratory  
Bobby Bruce, IBM TJ Watson Research Center  
Luxherta Buzi, IBM Research Division, T.J. Watson Research Center  
Maxime Darnon, CNRS/Université de Sherbrooke, Canada  
Emilie Despiau-Pujo, CNRS-LTM, Université Grenoble Alpes, France  
Sathya Ganta, Applied Materials  
David Go, Notre Dame University  
Hisataka Hayashi, DAIKIN INDUSTRIES, LTD., Japan  
Yohei Ishii, Hitachi High Tech. America Inc.  
Erwin Kessels, TU / Eindhoven, Netherlands  
Catherine Labelle, GLOBALFOUNDRIES  
Thorsten Lill, Lam Research Corporation  
David Lishan, Plasma-Therm LLC  
Lei Liu, Lam Research Corp.  
Pingshan Luan, TEL Technology Center, America, LLC  
Kenji Maeda, Hitachi High Technologies, Japan  
Nathan Marcha, IBM T. J. Watson Research Center  
Eric Miller, IBM Research Division, Albany, NY  
Premkumar Panneerchelvam, KLA-Tencor  
Erwine Pargon, CNRS-LTM, Université Grenoble Alpes, France  
Floran Peeters, LeydenJar Technologies  
Nicolas Posseme, STMicroelectronics, France  
Francois Reniers, Univ. libre de Bruxelles, Belgium  
Mohan Sankaran, University of Illinois at Urbana-Champaign  
Jeffrey Shearer, TEL Technology Center, America, LLC  
Tetsuya Tatsumi, Sony Semiconductor Solutions Corporation, Japan  
Necip Uner, Middle East Technical Univ., Turkey  
Richard M.C.M. van de Sanden, Eindhoven University of Technology, The Netherlands  
Steven Vitale, MIT Lincoln Laboratory  
Scott Walton, Naval Research Laboratory  
Jerry Wang, Applied Materials  
Mingmei Wang, Lam Research Corp.

#### **QUANTUM SCIENCE AND TECHNOLOGY MINI-SYMPOSIUM (QS)**

Topic Co-Chair: Ekta Bhatia, NY CREATES

Topic Co-Chair: Andre Schleife, University of Illinois at Urbana-Champaign  
 Charles R. Eddy, Jr., Office of Naval Research Global - London, UK  
 Sebastian Engelmann, IBM T.J. Watson Research Center  
 Russell Gleason, Infleqtion  
 Jay Hendricks, National Institute of Science and Technology  
 Sean Jones, Argonne National Laboratory  
 Jaesung Lee, University of Central Florida  
 Corey Rae McRae, University of Colorado Boulder/National Institute for Science and Technology (NIST)  
 David Pappas, Rigetti Computing  
 Alex Tingle, Cold Quanta  
 Yanan Wang, University of Nebraska-Lincoln

#### **SPECTROSCOPIC ELLIPSOMETRY (EL)**

Topic Co-Chair: Alyssa Mock, Weber State Univ.  
 Topic Co-Chair: Megan Stokey, Milwaukee School of Engineering  
 G. Andrew Antonelli, Onto Innovation  
 David Aspnes, North Carolina State University  
 Alain Diebold, SUNY Poly  
 James Hilfiker, J.A. Woollam Co., Inc.  
 Tino Hofmann, University of North Carolina at Charlotte  
 Schubert Mathias, Univ. of Nebraska-Lincoln  
 Nikolas Podraza, University of Toledo  
 Frank K. Urban, Florida International University  
 Stefan Zollner, New Mexico State University

#### **SURFACE SCIENCE (SS)**

Topic Chair: Florencia Calaza, UNL-Conicet, Argentina  
 Topic Co-Chair: Nan Jiang, Univ. of Illinois – Chicago  
 Eric Altman, Yale University  
 Lifeng Chi, FUNSOM - Soochow Univ., China

Irene Groot, Leiden University, The Netherlands  
 Dan Killelea, Loyola University Chicago  
 Barbara Lechner, Technical University of Munich, Germany  
 Sabine Maier, Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Germany  
 Reinhard Maurer, University of Warwick, UK  
 Jean-Sabin McEwen, Washington State Univ.  
 Mildred Quintana, Universidad Autónoma de San Luis Potosí, Mexico  
 Dario Stacchiola, Center for Functional Nanomaterials, BNL

#### **THIN FILMS (TF)**

Topic Co-Chair: April Jewell, Jet Propulsion Laboratory (NASA/JPL)  
 Topic Co-Chair: Mark Losego, Georgia Institute of Technology  
 Joe Becker, Kurt J. Lesker Company  
 David Bergsman, University of Washington  
 Ashley Bielinski, Argonne National Laboratory  
 Devika Choudhury, ASM  
 John Conley, Jr., Oregon State University  
 Lauren Garten, Georgia Institute of Technology  
 Steven M. George, Univ. of Colorado at Boulder  
 Elton Graugnard, Boise State University  
 Robert Grubbs, IMEC, Belgium  
 Subhadra Gupta, University of Alabama  
 Bharat Jalan, University of Minnesota  
 Jessica Kachian, Intel Corporation  
 Adrie Mackus, Eindhoven Univ., Netherlands  
 Siamak Nejati, University of Nebraska-Lincoln  
 Blake Nuwayhid, Naval Research Laboratory  
 Gregory N. Parsons, North Carolina State Univ.  
 Sagar Udyavara, Lam Research  
 Christophe Vallee, SUNY POLY, Albany  
 Richard Vanfleet, Brigham Young University  
 Rong Yang, Cornell University

Matthias Young, University of Missouri  
 Junjie Zhao, Zhejiang University, China

#### **UNDERGRADUATE POSTER SESSION (UN)**

Topic Co-Chair: Liney Arnadottir, Oregon State University  
 Topic Co-Chair: Ashleigh Baber, James Madison University  
 Topic Co-Chair: Joshua Blechle, Wilkes University  
 Topic Co-Chair: Morgan Hawker, California State University, Fresno  
 Topic Co-Chair: Erin Iski, University of Tulsa

#### **VACUUM TECHNOLOGY (VT)**

Topic Chair: Giulia Lanza, SLAC National Accelerator Laboratory  
 Topic Co-Chair: Sol Omolayo, Lawrence Berkeley Lab, University of California, Berkeley  
 Klaus Bergner, VACOM, Germany  
 James A. Fedchak, National Institute of Standards and Technology (NIST)  
 Russell Gleason, Infleqtion  
 Jay Hendricks, National Institute of Science and Technology  
 Yulin Li, Cornell University  
 Yev Lushtak, Lawrence Berkeley Lab  
 Christopher Malocsay, UC Components Inc.  
 Freek Molkenboer, TNO Science and Industry, the Netherlands  
 Jacob Ricker, NIST  
 Julia Scherschligt, National Institute of Standards and Technology  
 Charles Smith, ORNL  
 Marcy Stutzman, Jefferson Lab  
 Alex Tingle, Cold Quanta  
 Alan Van Drie, TAE Technologies  
 Martin Wüest, INFICON Ltd., Liechtenstein  
 Steven Wulfsberg, SAES Group



**2D MATERIALS (2D):** The 2D Materials program is the home for all aspects of 2D-materials science and technology, covering their synthesis, characterization, processing, properties, and applications. 2D materials are defined as extended two-dimensional molecular sheets and van der Waals crystals. Papers are solicited in growth and fabrication; novel 2D materials; topological and quantum phenomena in 2D and layered materials; properties including electronic, magnetic, optical, mechanical properties; characterization including microscopy and spectroscopy; surface chemistry, functionalization, dopants, defects, and interfaces; nanostructures including heterostructures; devices; and applications in health, sensor, environmental, energy, electronics, and quantum information science. Beginning 2024, the 2D Materials Group is pleased to announce annual student poster awards with an aim at providing a platform for young scientists to interact and present their research work to a large audience from diverse fields.

Areas of Interest: 2D Materials is seeking abstracts in areas of interest including, but not limited to the following topics:

- **2D Materials: Synthesis and Processing**
- **2D Materials: Photoemission Spectroscopy**
- **2D Materials: Scanning Probe Microscopy and Electron Microscopy**
- **2D Materials: Electronic, Mechanical, Magnetic and Optical Properties**
- **2D Materials: Defects, Dopants, Edges, Functionalization, and Intercalation**
- **2D Materials: Heterostructures, Twistronics, and Proximity Effects**
- **2D Materials: Devices and Applications**

#### **2D1: 2D Materials Oral Session**

##### **Invited Speakers:**

*Aaron Bostwick*, Advanced Light Source, Lawrence Berkeley National Laboratory

*Vikram Deshpande*, University of Utah

*Susan Fullerton*, University of Pittsburgh

*Arkady Krasheninnikov*, Helmholtz Zentrum Dresden Rossendorf, Germany

*Young Hee Lee*, Sungkyunkwan University, Republic of Korea, “van der Waals Layered Magnetic Semiconductors”

*Qiong Ma*, Boston College

*Abhay N Pasupathy*, Columbia University

*Joshua A. Robinson*, Penn State University

*Peter Sutter*, University of Nebraska

*Andrey Turchanin*, University of Jena, Germany

*Young-Jun Yu*, Chungnam National University, Republic of Korea, “Ultra-Low Energy Consumption Memory Study Using 2D Materials Heterostructures”

*Peng Zhou*, Fudan University

*Tiancong Zhu*, Purdue University, “Visualizing and Manipulating Chiral Edge States in a Moiré Quantum Anomalous Hall Insulator”

#### **2D2: 2D Materials Poster Session**

**ACTINIDES AND RARE EARTHS (AC):** Actinide and Rare Earth Focus Topic: Actinides and rare earths exhibit unique and diverse physical, chemical and magnetic properties resulting from the complexity of the 5f and 4f electronic structure. The Actinide and Rare Earth Focus Topic Session concentrates on the fundamental chemistry, physics, materials, and interface science of f-electron materials with an emphasis on all aspects of nuclear technology while facilitating the involvement of early career scientists. The role of fundamental f-electron science in resolving challenges posed by actinide chemistry and materials will be central, particularly with regard to topics such as separation science, nuclear fuels, structural materials, nuclear energy processes, nuclear safeguards/forensics, and stewardship. Contemporary experimental approaches, including synchrotron radiation-based investigations and emerging techniques, all coupled to theory, will be featured to understand these complex materials.

Areas of Interest: Actinides and Rare Earths is seeking abstracts in areas of interest in the following topics:

- **fundamental chemistry, physics, materials, and interface science of f-electron materials**
- **nuclear technology, separation science, nuclear fuels, structural materials, nuclear energy processes, nuclear safeguards/forensics, and stewardship**
- **early career scientists**
- **role of fundamental f-electron science in resolving challenges posed by actinide chemistry and materials**
- **contemporary experimental approaches, including synchrotron radiation-based investigations and emerging techniques**
- **theory**

#### **AC1: Actinides and Rare Earths Oral Session**

##### **Invited Speakers:**

*Mark Croce*, LANL, “Making Use of X-ray Emission Signatures in the Scanning Electron Microscope to Understand f-Element Speciation and Phase”

*Christopher Dares*, Florida International University

*Stuart Dunn*, AWE, UK, "A New Approach for Nuclear Forensics Investigations of Uranium Dioxide : Exhibiting the Applications of Laboratory Based Photoelectron Spectroscopy with Hard and Soft X-ray Sources"

*Shin-ichi Fujimori*, SPring8, Japan

*William Knafo*, LNCMI, CNRS, France, "Incommensurate Antiferromagnetism in UTe<sub>2</sub> Under Pressure"

*Juliane Maerz*, Helmholtz Zentrum Dresden-Rossendorf, Germany

*Leonid Pourovskii*, Ecole Polytechnique CPHT, France

*Andrea Severing*, University of Cologne, Germany, "New Spectroscopic Insights into Correlation Effects And Covalency of U 5f Electrons In Uranium Intermetallic Compounds"

*Hao Tjeng*, Max Planck Institute for Chemical Physics of Solids, Germany, "Stabilization of U 5f<sub>2</sub> Configuration in UTe<sub>2</sub> Through U 6d Dimers in the Presence of Te<sub>2</sub> Chains"

*Ping Yang*, LANL

## **AC2: Actinides and Rare Earths Poster Session**

**ADVANCED MICROSCOPY AND SPECTROSCOPY TO EXPLORE FIELD-ASSISTED CHEMISTRY (AMS):** The AMS Focus Topic targets recent developments aimed at unraveling the effects of strong external electric fields on chemical reactivity. External electric fields can be used to alter thermodynamics and kinetics of chemical reactions with as great or better influence than with temperature or pressure alone. It opens new opportunities across fundamental and applied areas in chemistry/material science and brings new perspectives on precision chemistry. The experimental portion focuses on advanced microscopy and spectroscopy techniques to explore field-assisted chemistry (e.g., Atom Probe/Atomic Force Microscopies, Electron holography, and Raman/Stark vibrational spectroscopies, etc.). The theoretical portion focuses on modelling local electric fields (e.g., quantum or classical), underlying these approaches and their impact on surface and molecular chemical and physical properties.

Areas of Interest: AMS is seeking abstracts in areas of interest in the following topics:

- **Field-assisted Chemistry**
- **Near-field chemistry**
- **Atom Probe Microscopy**
- **Electron holography**
- **Raman spectroscopy**
- **Stark effect**
- **Atomic Force Microscopy**
- **Transmission Electron Microscopy**
- **Scanning Tunneling Microscopy**
- **Interfaces**
- **Surface techniques**
- **Electro-Catalysis and Catalysis**
- **Corrosion**

## **AMS1: Advanced Microscopy and Spectroscopy to Explore Field-Assisted Chemistry Oral Session**

### **Invited Speakers:**

*Richard Forbes*, University of Surrey, UK, "Atom-Probe, Field-Ion and Charged-Surfaces Theories as Viewpoints on Electric-Field-Assisted Chemistry"

*Stefan Grimme*, Universität Bonn, Germany

*Tanya Prozorov*, Ames Laboratory

*Thierry Visart de Bocarmé*, Université libre de Bruxelles, Belgium

## **AMS2: Advanced Microscopy and Spectroscopy to Explore Field-Assisted Chemistry Poster Session**

**ADVANCED SURFACE ENGINEERING (SE):** The Advanced Surface Engineering Division program will cover state-of-the-art developments of techniques and processes for improving the surface properties of materials for protection in demanding contact conditions and aggressive environments (wear-, oxidation-, corrosion-resistant, tribological surfaces).

Areas of Interest: Advanced Surface Engineering is seeking contributions that further developing methods to tailor the multifunctional properties of surfaces, including electronic, magnetic, optical, thermal, and mechanical. Other themes include:

- **HiPIMS, Pulsed Plasmas, and Energetic Deposition**
- **High Entropy and Other Multi-Principal-Element Materials**
- **Tribology, Mechanical properties, and Adhesion of Coatings and Engineered Surfaces**
- **Advanced Theoretical Approaches for Materials Discovery and Design**
- **Surface Engineering Solutions for Sustainable Development**

Contributions on the use, optimization, and development of advanced characterization techniques for establishing structure-property-processing-performance relationships for coatings and thin films are also highly welcome.

## SE1: Advanced Surface Engineering Oral Session

*Marcus Hans*, RWTH Aachen University, Germany, "Towards Responsible Surface Engineering"

*Johanna Rosén*, Linköping University, Sweden

## SE2: Advanced Surface Engineering Poster Session

**AI/ML FOR SCIENTIFIC DISCOVERY (AIML):** This focus topic will bring together leaders in the rapidly growing field of data science, artificial intelligence, and machine learning (AI/ML) for materials, processes, and interfaces to drive scientific discovery. AI, ML and deep learning (DL) are being utilized to understand materials at the atomic scale, discover new scientific laws, and even design the next generation of advanced microelectronics for AI/ML. As researchers from academia to industry search for more effective means of advancing technology, AI/ML is being utilized as a means to reduce the burden on resources that have long relied on traditional experiments and computationally heavy modeling and simulation. This focus topic will bring together the community to disseminate the latest advances in the field, discuss challenges, and share future directions for AI & ML.

Areas of Interest: AI/ML is seeking abstracts in the following areas of interest:

- 1. Driving scientific discovery through AI/ML:** developing and evaluating new materials/processes/devices with AI/ML to reduce experimental design and computationally expensive modelling; methods for utilizing AI/ML to predict performance (e.g., materials, devices, etc.);
- 2. Experimental design for the age of big data:** design of experiments, testing and data collection to maximize data generation and improve through-put and fundamental understanding; developing data sets and tools for training models; autonomous experiments and testing; methods for data management; model quality, uncertainty quantification and trust in AI models
- 3. AI/ML for characterization, including synthetic data generation, from materials to systems:** applying physics based models; extraction of physicochemical information; microscopy, spectroscopy, etc.
- 4. AI for AI:** catapulting next generation semiconductors and devices for AI/ML by utilizing AI/ML to drive device design, neuromorphic computation, non von Neumann architecture, and Beyond Moore
- 5. AI/ML vs physical principles:** In contrast to AI/ML, the possibility of discovering fundamental approaches to predicting materials properties is also being explored (e.g., discovery of a topological periodic table).

## AIML1: AI/ML for Scientific Discovery Oral Session

### Invited Speakers:

*Brad Boyce*, Sandia National Laboratories, "BeyondFingerprinting: ML-guided process optimization using high-throughput experiments and simulations"

*Noa Marom*, Carnegie Mellon University

*Colin Ophus*, Lawrence Berkeley Lab

## AIML2: AI/ML for Scientific Discovery Poster Session

**APPLIED SURFACE SCIENCE (AS):** The Applied Surface Science Division (ASSD) provides a world-leading forum for the design and characterization of the surfaces and interfaces that underpin technologies ranging from medical implants to electronic devices. The Division addresses both the fundamental and practical surface analytical science of next-generation devices including batteries, photovoltaics, semiconductors and superconductors to support innovation in sustainable technologies. ASSD provides a blend of contributors from academia, industry and national laboratories which enables a constructive and friendly atmosphere for debate and the development of productive collaboration. For AVS 70 we especially invite abstracts addressing the interfacial characterization of next generation energy and quantum devices. A particular focus is the extraction of chemical and physical information from core-level spectroscopies and the relationship between the electronic structure of the system and the data.

Areas of Interest: Applied Surface Science is seeking abstracts in areas of interest in the following topics:

- **Quantitative Surface Analysis**
- **Characterization of Energy and Quantum Materials**
- **Future Challenges of Industry**
- **Complementary Techniques**
- **Theory for Surface Processes**
- **Machine Learning and Data Evaluation**

## AS1: Applied Surface Science Oral Session

### Invited Speakers:

*Jochen Autschbach*, University of Buffalo, "Calculating X-Ray Absorption of f-Element Systems: Spectra vs. Chemical Bonding"

*Sarah Bamford*, La Trobe University, Australia, "Stitching, Stacking, and Multilayering: Practical Evaluation of ToF-Sims Data with Machine Learning"

*Thierry Conard*, IMEC, Belgium, "The Challenge of Quantifying Photoemission Spectra Using Multiple Photon Energies"

*Anton Ievlev*, Oak Ridge National Laboratory

Marcus Rohnke, Justus Liebig University Giessen, Germany, "Characterization of Sodium Ion Batteries - from Postmortem to Operando Analysis"

Kevin Rosso, Pacific Northwest National Laboratory, "Experimental Findings that are Compelling to Theoreticians"

## **AS2: Applied Surface Science Poster Session**

**ATOMIC SCALE PROCESSING MINI-SYMPOSIUM (AP):** The Atomic Scale Processing Mini-Symposium is aimed to 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 and the application of such processing on various areas of interest to the broader AVS community. 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, atomic layer process chemistry and surface reactions and atomic layer etching.

Areas of Interest: The Atomic Scale Processing Mini-Symposium is seeking abstracts in areas of interest including the following topics:

**Theme 1: Area selective processing and patterning**

**Theme 2: Advancing Metrology and Characterization to enable Atomic Scale Processing**

**Theme 3: Atomic Layer Processing: Integration of deposition and etching for advanced material processing**

**Theme 4: Thermal and Plasma enhanced Atomic Layer Etching**

**Theme 5: Thermal and Plasma-Enhanced Atomic Layer Deposition (ALD)**

**Theme 6: Emerging Applications for ALD including Precursors and Surface Reactions**

**AP1: Atomic Scale Processing Mini-Symposium Oral Session**

**AP2: Atomic Scale Processing Mini-Symposium Poster Session**

**AVS QUANTUM SCIENCE WORKSHOP (ALL-INVITED SESSION) (AQS):** Industry around quantum materials and quantum information science is currently evolving rapidly with focus on synthesis and device fabrication, algorithm and library development, and exploration of early applications of quantum computing, sensing, storage, network, amongst others. In addition to technological and scientific advancement on a fundamental level, this requires rapid training of a particularly skilled workforce at the intersection of these fields. While this is true for many interdisciplinary fields, there is a risk that the gap that needs to be bridged is particularly large between fundamentals fields of quantum mechanics, math, computer science, and domain science. In this all-invited session, we will have speakers from academia, industry, national labs, and funding agencies to describe their perspective on the state of the art and to outline challenges. We envision the discussion of concrete strategies to address these challenges and brainstorming on what is most needed immediately to shape the near-term future of the workforce that will support quantum industry. This Workshop will be followed by a number of QS mini-symposium sessions throughout the week.

**AQS1: AVS Quantum Science (AQS) Workshop All-Invited Oral Session**

**Invited Speakers:**

*Government: Tomasz Durakiewicz, National Science Foundation*

*Non-Profit: Jonathan Felbinger, SRI / QED-C*

*Quantum/Short Course Organizer: Tim Gessert, Gessert Consulting, LLC*

*Industry: Josh Mutus, Rigetti Computing*

*Academia: Chris Palmstrøm, University of California, Santa Barbara*

*National Lab: Kathy-Anne Soderberg, Air Force Research Laboratory*

This workshop will be followed by QS scientific sessions throughout the week.

**BIOMATERIAL INTERFACES (BI):** The Biomaterials Interfaces Division is organizing a series of sessions to provide an interdisciplinary forum for the presentation and 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, and theoretical and modeling approaches for biological systems. The BI program begins with the traditional Sunday afternoon Plenary Session on Innovating Bio/sustainability. We also invite submissions of Flash/Poster Presentations, to be made in a dedicated session with an accompanying Networking Session involving associated poster presentations. Joint BID/Biointerphases prizes will be awarded for the best student Flash/Poster presentations. Early career scientists should check out the Biointerphases Special Topic Collection, The Future of Biointerface Science 2024. This collection will feature the perspective early-career scientists have on the future of biointerface science. Postdocs or senior PhD students on the verge of applying for faculty positions are particularly encouraged to share their views on the field. Select contributing authors will be invited to present their work and compete for the Biointerphases Ascending Researcher Award. All invited speakers will be supported by a travel award and the winner of the Ascending Researcher Award and associated article will be widely promoted via email and on social and professional networks.



Areas of Interest: Biomaterial Interfaces is seeking abstracts in the following areas of interest:

- **Microbes and Fouling at Surfaces:** includes microbial adhesion, colonization analysis, and antifouling/foul-release behavior
- **Biomolecules and Biophysics at Interfaces:** includes biomolecular interactions, blood-contacting materials, and infection and immunity
- **Characterization of Biological and Biomaterials Surfaces:** includes microscopy, spectroscopy, mechanical analysis, and scanning probe techniques
- **Biosensors and Diagnostics:** includes biomolecular recognition and signaling, electrochemical analysis of biomolecules and systems, and novel strategies and devices
- **Biomaterials and Nanomaterials fabrication:** includes thin films, polymer and hybrid coatings, biologically inspired materials, plasma produced biomaterials, and 3D biomaterials
- **Bioenergy:** includes biomaterials for fuels, biomass conversion, and heterogeneous catalysis of biomaterials

#### **BI1: Biomaterial Interfaces Oral Session**

##### **Invited Speakers:**

*Marta Bally*, Umeå Universitet, Sweden, "Cell Surface Mimics: Bioanalytical Tools to Study and Detect Viruses"

*Yaroslava Yingling*, North Carolina State University

#### **BI2: Biomaterial Interfaces Poster Session**

**CHEMICAL ANALYSIS AND IMAGING OF INTERFACES (CA):** Chemical and physical processes occurring at surfaces and gas-liquid, solid-liquid, and gas/plasma-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 is designed as a cross-disciplinary "melting pot" and aims to 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/ FEL facilities are strongly encouraged. Attention will also be paid to correlative spectroscopy and microscopy methods, modern image/spectra processing and AI-enabling data analytics 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.

Areas of Interest: Chemical Analysis and Imaging of Interfaces is seeking abstracts in the following areas of interest:

- **Advancements in operando / in-situ characterization of energy and environmental interfaces**
- **Solid-liquid interfaces in biomaterials and nanomaterials**
- **Modeling, AI-assisted learning, and Multi-dimensional data analysis for interfacial processes**
- **Progress in multimodal, multidimensional measurements and metrologies**
- **Materials and Interfaces for high-frequency/power electronics**
- **Electron/ion/ x-ray beam microscopy, spectroscopy, and processing in harsh (radiation, chemical, and thermal) environments including plasmas**

#### **CA1: Chemical Analysis and Imaging of Interfaces Oral Session**

##### **Invited Speakers:**

*Benjamin Jacobs*, Protochips Inc.

*Barbara Lechner*, Technical University of Munich, Germany, "The Dynamics of Encapsulated Clusters Under the Microscope"

*David Mitlin*, The University of Texas at Austin

*Robert Nemanich*, Arizona State University

*David Prendergast*, Lawrence Berkeley National Laboratory

*Milos Toth*, University of Technology Sydney, Australia

#### **CA2: Chemical Analysis and Imaging of Interfaces Poster Session**

**CHIPS ACT MINI-SYMPOSIUM (CPS):** This topic will explore aspects of the new initiatives in the semiconductor industry funded by the CHIPS Act. The CHIPS Act establishes new research centers for IC technology (National Semiconductor Technology Center); a new center for packing including heterogeneous integration; a National Metrology Center at NIST; assists funding new IC manufacturing and packaging factories; and workforce development.

Areas of Interest: The CHIPS Act Mini-Symposium is seeking abstracts in the following areas of interest:

- **National Semiconductor Technology Center**
- **IC technology Roadmaps**
- **Packaging Technology Center**
- **Semiconductor Workforce Development**

## **CPS1: CHIPS Act Mini-Symposium Oral Session**

**Erica Douglas, Sandia National Lab, "CHIPS Act Panel Session Chair"**

### **Invited Speakers:**

*Markus Kuhn*, Rigaku, "Challenges and Opportunities in Characterization and Metrology for the Microelectronics and Advanced Packaging Technologies (MAPT) Roadmap"

*Nancy Louwagie*, Normandale Community College

*Volker Sorger*, University of Florida, "CHIPS Act and Optoelectronics, Devices, and AI/ML"

*Victor Zhirmov*, SRC, "Strategic Roadmapping for Sustainable ICT"

## **CPS2: CHIPS Act Mini-Symposium Poster Session**

**ELECTRONIC MATERIALS AND PHOTONICS (EM):** The Electronics Materials and Photonics Division (EMPD) is soliciting abstracts that will address the latest advancements in materials and devices for computing and sensing, energy conversion, storage and harvesting. Abstracts that report experimental and theoretical discoveries underpinning the structure-property-synthesis correlations of new materials and their integration into devices are welcome. EM seeks abstracts on four topical areas:

1. Materials and Devices for Advanced Computing and Sensing ( NST, 2D, MS, CA and TF ) – These sessions will highlight advances in semiconductor materials, processes and integration, as applied to low-power logic, memory and high-to-ultrahigh wide bandgap devices. Novel techniques that highlight CMOS + x ( x = piezoelectric, ferroelectric, multiferroics and phase change) integration will be of interest. Manufacturing strategies that enable 2D materials-based devices, new interconnects and BEOL devices are welcome. This theme will be integrated with AP and CPS mini symposiums.

2. Materials and Devices for Quantum and Neuromorphic Applications ( QS, NST, 2D, CA and TF ): These sessions will highlight advances in processes and integration of materials to quantum computing and sensing, and neuromorphic and analog computing. Of interest are topics which highlight low-dimensional and topological materials integration into devices and emphasize metrology and characterization techniques that further our understanding of such devices. This theme will be integrated with the QS mini symposium.

3. Material and Devices for Energy Conversion, Storage and Harvesting ( NST, 2D, MS, CA and TF ): These sessions will highlight the materials, process and integration challenges of solar cells, batteries and energy harvesting devices. Novel approaches to engineering light trapping structures, new absorber materials and transparent conductors are welcome. Manufacturing challenges in battery electrodes and electrolyte design are of interest. Synthesis and integration of thermoelectrics for thermal management applications are encouraged. This theme will be integrated with the AP mini symposium.

4. Novel Materials and Devices for Electronic and Photonic Applications ( NST, 2D, MS, CA and TF ): These sessions will highlight the materials and process challenges of electronic and photonic devices that exploit plasmonics, metamaterials and metasurfaces as platforms for enhanced light-matter interaction. Heterogeneous integration schemes that highlight the interplay of process and device performance are welcome. Topical areas also include the critical role of surfaces, interfaces and defects that affect quality and reliability of such devices. This theme will be integrated with the AP mini symposium.

As in past years, we will offer multiple awards including a graduate student poster and presentation awards as well as post-doc and graduate student travel awards to help create a forum in which younger scientists can present their work and develop relationships for the future. EMPD will continue to host its successful Early Career Professionals (ECP) Session highlighting the work accomplished by ECPs relating to electronic and photonic materials and devices. As such, abstracts from ECPs are highly encouraged.

Areas of Interest: Electronic Materials and Photonics is seeking abstracts in the following areas of interest:

- **Materials and Devices for Advanced Computing and Sensing**
- **Materials and Devices for Quantum and Neuromorphic Applications**
- **Material and Devices for Energy Conversion, Storage and Harvesting**
- **Novel Materials and Devices for Electronic and Photonic Applications**

## **EM1: Electronic Materials and Photonics Oral Session**

*Todd Bauer*, DARPA

*Vivian Ferry*, University of Minnesota, "Tunable Metamaterials: Electrochemical Materials and Switchable Chiral Nanostructures"

*Uwe Schroeder*, NaMLab GmbH, TU Dresden, Germany, "Thin Film Physics of Ferroelectric HfO<sub>2</sub> and ZrO<sub>2</sub> - From Laboratory Demonstrations to Semiconductor Chips"

*Srikanth Singamaneni*, Washington University in St. Louis, "Harnessing Plasmon-enhanced Fluorescence for Ultrasensitive Biosensing and Bioimaging"

## **EM2: Electronic Materials and Photonics Poster Session**

**LIGHT SOURCES ENABLED SCIENCE MINI-SYMPOSIUM (LS):** Recent rapid development and implementation of 4th generation synchrotron sources and free electron lasers opens further opportunities to study materials with high intensity, coherent X-ray beams. Development of new techniques, together with improvement of more established approaches, allows unprecedented insight and holistic understanding of the structure, chemical environment, electronic structure across a broad range of length scales from the atomic scale to macroscopic scales, over time scales from femtoseconds to minutes, hours and days in a variety of conditions from ultra-high vacuum to ambient pressure to high pressures. In this mini symposium we will highlight some recent science advances in characterizing energy conversion and storage materials, and quantum materials.

Areas of Interest: Light Sources Enabled Science is designed to seeking abstracts in the cutting-edge science enabled at synchrotron and free electron laser light sources specifically in the area of quantum materials and energy storage and conversion materials.

#### **LS1: Light Sources Enabled Science Mini-Symposium Oral Session**

##### **Invited Speakers:**

*Katherine Harmon*, Stanford University, "In situ Synchrotron Characterization of Materials Synthesis and Electrochemical Interfaces"

*Andrey Shavorsky*, Max IV Laboratory, Sweden, "Microsecond Dynamics of Surface Reactions Studied by the Time-resolved Ambient Pressure XPS with Chemical Perturbations"

#### **LS2: Light Sources Enabled Science Mini-Symposium Poster Session**

**MAGNETIC INTERFACES AND NANOSTRUCTURES (MI):** The Magnetic Interfaces and Nanostructures Division (MIND) highlights results in topical areas related to exchange and spin-orbit induced phenomena in low dimensional structures. The focus of the program is to cover areas of magnetism that are fascinating from a fundamental point of view and are also significant for future applications. We especially emphasize the synergies between the research areas covered by MIND and their role in future energy and quantum devices. We will select the best graduate student presentation from finalists for the Leo Falicov Award and will also offer an award for postdoctoral fellows who will be presenting papers at the MIND sessions. The winners of both awards will be announced towards the end of the meeting.

*Areas of Interest: The Magnetic Interfaces and Nanostructures Division is seeking abstracts in the following areas of interest:*

- **2D magnetism**
- **Altermagnetism**
- **Nanomagnetism**

#### **MI1: Magnetic Interfaces and Nanostructures Oral Session**

*Hang Chi*, Ottawa University, Canada, "Interface Tunable Magnetism in Transition Metal Telluride Thin Films and Heterostructures"

*Libor Šmejkal*, Uni Mainz, Germany

*Hariharan Srikanth*, University of South Florida

*Max Ünzelmann*, University of Würzburg, Germany

#### **MI2: Magnetic Interfaces and Nanostructures Poster Session**

**MANUFACTURING SCIENCE AND TECHNOLOGY (MS):** We focus on manufacturing science and technology and policy of interest to semiconductor and related manufacturing industries. AVS70's theme of Sustainability is top of mind for the semiconductor industry our topic would build on our Energy Efficiency Scaling for 2 Decades (EES2) talks from AVS69 and also include talks addressing PFAS reduction, EPA's AIM Act-HFC reduction, replacement of high GWP refrigerants and addressing e-waste through reuse and recycling. Second is our Workforce Panel where we'd feature mainly manufacturers, but also representatives who have worked on EWD Chapters of recent roadmaps and a perspective from customers of AVS short course. Third is a joint effort with TFD highlighting where thin film techniques can now enable design and fabrication of highly complex electronic devices. In response to concerns about the standards battery community not being part of AVS, this topic would highlight the profound contrast between thin film microfabrication and thick film processing (as used in conventional batteries). Recent extensions of microfabrication employ mobile ions as well as electrons to realize iontronic devices for thin film batteries, capacitors, sensors, electrochromics, analog memory for neuromorphic computing. Thin film microfabrication of iontronic devices ensures flexible, controlled configurations designed for high performance.

*Areas of Interest: Manufacturing Science and Technology is seeking abstracts in the following areas of interest:*

- **Sustainability Policy impact on Semiconductor Industry/manufacturing**
- **What Semiconductor Manufacturers want from their Workforce**
- **Thin film microfabrication of EC-RAM, capacitors and batteries**

#### **MS1: Manufacturing Science and Technology Oral Session**

#### **MS2: Manufacturing Science and Technology Poster Session**

**MEMS and NEMS (MN):** The MEMS and NEMS Technology Group (MN) program will highlight recent advances in the broad areas of micro/nanoelectromechanical systems (MEMS/NEMS), especially the latest fundamental studies of novel materials and processes, devices, and emerging functions and applications of MEMS/NEMS, in various areas. Our program will include resonant low-dimensional materials and nonlinear MEMS/NEMS resonators, which create intriguing possibilities for integrating these devices with existing fluidic, electronic, and optical on-chip networks. The program continues to embrace the latest progress in 2.5D/3D heterogeneous integration/packaging, additive manufacturing, nanomechanics, optomechanics, quantum phononics, resonant systems, CMOS-MEMS, mesoscopic dynamics, dissipation processes, sensors and actuators, harsh-environment transducers, magnetoacoustics, and MEMS/NEMS-enabled energy technologies, etc. It also aims to capture some of the latest advances in soft materials, flexible and implantable MEMS/NEMS, wearable and wireless healthcare, environmental bio-MEMS, and bio-inspired microsystems. Poster presentations by undergraduate students are encouraged.

Areas of Interest: MEMS/NEMS is seeking abstracts in the following areas of interest:

- **Quantum Phononics and Optomechanics (Joint Session with Quantum Science):** Optomechanical and phononic devices and systems in quantum regimes.
- **Bio MEMS/Environmental MEMS:** Soft materials, flexible and implantable MEMS/NEMS, wearable and wireless healthcare, bio-MEMS, environmental MEMS, and bio-inspired microsystems.
- **RF MEMS/Magnetic MEMS:** Emerging materials (WBG, UWBG, piezoelectric, and magnetic materials), designs, and resonant MEMS and magnetoacoustic devices.
- **Nanomechanics:** Resonant low-dimensional (1D, 2D) materials, nonlinear resonators, and coupled resonators for emerging applications.
- **Microscale Additive Manufacturing:** Design and fabrication of 3D microscale devices, systems, and packaging based on additive manufacturing techniques.
- **Heterogeneous Integration/Packaging:** Advanced integration and packaging techniques, including heterogeneous integration, bulk and surface micromachining, and wafer bonding.

#### **MN1: MEMS and NEMS Oral Session**

##### **Invited Speakers:**

*Reza Abdolvand*, University of Central Florida

*Bob Patti*, NHanced Semiconductors

#### **MN2: MEMS and NEMS Poster Session**

**NANOSCALE SCIENCE AND TECHNOLOGY (NS):** The Nanoscale Science and Technology Division (NS) seeks to showcase broadly new developments in nanoscale science and technology with particular focus on frontiers in scanning probe microscopy, nanofabrication, nanopatterning, in-situ nanoscale characterization and manipulation, electronic and photonic nanoscale devices, light-matter interactions at the nanoscale. Moreover, we will highlight advances in focused ion beam (FIB) instrumentation, ion beam imaging, cross-sectioning and tomography. For AVS 70, we also encourage contributions focusing on development of instrumentation for nanoscale characterization for example for accessing smaller timescales, correlated phenomena, magnetism, etc. We strive to survey new developments in nanoscale devices for next-generation computing, including solid-state and nanofluidics as well as nanoscale defect-enabled energy and quantum devices.

Areas of Interest: Nanoscale Science and Technology is seeking abstracts in the following areas of interest:

- **Frontiers in scanning probe microscopy**
- **Advances in nanofabrication**
- **Light-matter interactions at the nanoscale**
- **Focused ion beam (FIB) instrumentation**
- **Ion beam imaging, cross-sectioning and tomography**
- **Nanoscale characterization including time resolution, magnetic sensitivity, etc.**
- **Nanofluidics**
- **Nanodevices**
- **Nanoscale defects enabling novel devices**

#### **NS1: Nanoscale Science and Technology Oral Session**

##### **Invited Speakers:**

*Keith Brown*, Boston University

*Julia Deitz*, Sandia National Laboratories, USA

*Mark Hersam*, Northwestern University, "Boron in the 2D Limit: Borophene, Borophane, and Beyond"

*Dahlia Klein*, Weizmann Institute of Science, Israel, "Measuring Electrostatic Potential in a Moiré Superlattice using the Atomic SET"

*Son T Le*, Laboratory for Physical Sciences, "Defect Manipulation in van der Waals Heterostructures and its Applications"

*Yiyang Li*, University of Michigan, "Oxygen Ion Transport in Refractory Metal Oxides for Microelectronic Devices"

*Alec Talin*, Sandia National Laboratories, USA

#### **NS2: Nanoscale Science and Technology Poster Session**

**PLASMA SCIENCE AND TECHNOLOGY (PS):** The Plasma Science & Technology Division program highlights state-of-the-art advances in plasma science, ranging from fundamental studies of plasma physics and chemistry to plasma-matter interactions and new applications for plasma processing. Our diverse international community from academia, national facilities and industry focuses on the latest advancements in plasma research as applied to semiconductor fabrication and processing, as well as newer areas including atmospheric pressure plasmas, chemical and energy conversion, novel materials synthesis, catalysis, and biomedical applications where plasma is the enabling tool. Novel applications of AI / ML to plasma processing are also encouraged.

For AVS 70, the PSTD is seeking abstracts that fall within the following themes:



**Plasma etching, deposition, and processing for advanced device fabrication:** State-of-the-art front (FEOL) and back (BEOL) end of line patterning and processing for logic devices, emerging memory applications, quantum devices, and photonics; advanced packaging, chiplets & heterogeneous integration.

**Plasma enhanced atomic layer processing:** Area selective deposition, characterization and metrology to enable atomic scale processing, atomic layer process chemistry, surface reactions and atomic layer etching. Novel thin film deposition processes and material synthesis studies are also encouraged.

**Plasmas and plasma-surface interactions - experiment and modeling:** Fundamental understanding of plasma-surface interactions, modeling and simulation challenges associated with plasma-based materials synthesis, processing, and etching; kinetic, fluid, hybrid and data-driven models; control; and experimental validation of simulations.

**Plasma sources, diagnostics, sensing, and control:** Novel plasma generation schemes and (ion beam) sources at low and high pressures; plasma diagnostics; pulsed plasmas and waveform shaping; process sensing and control schemes.

**Plasmas for chemical, energy and sustainable applications:** Emerging venues where plasmas provide unique advantages in chemical, environmental, energy, and biological applications. New plasma processes for sustainable technologies (chemical conversion, batteries, fuel cells, electrochemistry, photovoltaics, low GWP gases) and atmospheric pressure processing. Making today's processes more energy efficient and environmentally friendly.

Areas of Interest: Plasma Science and Technology is seeking abstracts in the following areas of interest:

- **Plasma Processing for Advanced Logic and Memory Device Fabrication**
- **Plasma Processing for Emerging Device Technologies**
- **Area Selective Processing and Patterning**
- **Plasma ALD/ALE**
- **Plasma Processes for Coatings and Thin Films**
- **Plasma Surface Interactions**
- **Plasma Modeling**
- **Plasma Sources, Diagnostics, Sensing and Control**
- **Plasma Chemistry, Catalysis and Applications for the Environment and Sustainability**
- **Atmospheric Pressure Plasmas and their Applications**

#### **PS1: Plasma Science and Technology Oral Session**

##### **Invited Speakers:**

*Rebecca Anthony*, Michigan State University, "Nonthermal Plasmas for Advanced Nanomanufacturing"

*Heeyeop Chae*, Sungkyunkwan University (SKKU), Republic of Korea

*Timo Gans*, Dublin City University, Ireland, "Sensing and Control of Radio-Frequency Driven Plasmas"

*Masaru Hori*, Nagoya University, Japan

*Masaru Izawa*, Hitachi High Technologies, Japan

*Michael Johnson*, Naval Research Laboratory

*Kazunori Koga*, Kyushu University, Japan, "Stress Reduction of Hydrogenated Amorphous Carbon Films by Controlling Incorporation of Carbon Nanoparticles"

*Amanda Lietz*, North Carolina State University, "Modeling to Guide Optimization of Plasma Sources for Semiconductor Processing and Fusion"

*Youn-Jin Oh*, LAM Research

*Kandabara Tapily*, Tokyo Electron, "Technology Enablement by Area Selective Processes"

#### **PS2: Plasma Science and Technology Poster Session**

**QUANTUM SCIENCE AND TECHNOLOGY MINI-SYMPOSIUM (QS):** The AVS 70 Quantum Science & Technology Mini-Symposium is poised to present the latest advancements and explore the future of quantum science and its diverse applications. This year's AVS Symposium theme, "*Innovating Sustainability: Next Generation Energy and Quantum Devices and Their Characterization*," highlights that quantum is a major focus for the international conference this year. Our global community, including academia, government labs, non-profit, and industry innovators, will explore topics from Solid State Quantum Computing to Quantum Internet, Power Distribution, and Quantum roadmap. Over four days, our program will feature oral sessions each morning and afternoon, featuring invited lectures by renowned experts and numerous insightful contributed talks.

Areas of Interest: Quantum Science and Technology is seeking abstracts in the following areas of interest:

**Solid State Quantum Computing – Materials for Quantum Computing and Quantum Materials:** Monday morning will unfold with discussions on the latest materials driving quantum computation, including high-quality factors, and cutting-edge materials science. This session aims to foster interactions at the confluence of materials science and quantum technology.

**Quantum Sensors – NV sensors, superconducting nanowire single-photon detectors (SNSPDs), transition-edge sensors (TESs), and supporting infrastructure:** Next, we will highlight the advancements in quantum sensors, such as NV centers and superconducting detectors. Attendees will engage with presentations on innovative findings that are redefining sensing technologies.

**Quantum Internet, Power Distribution:** The symposium will then transition to exploring quantum internet and power distribution infrastructure. This session will consist of talks related to the infrastructure that will revolutionize communication and energy distribution. Join a forward-thinking community pushing the boundaries of quantum networking and power systems that utilize quantum principles.

**Quantum Roadmap and Quantum-Inspired Materials:** The roadmap for future quantum technologies will be discussed, with a focus on visionary strategies and materials inspired by quantum mechanics. This collaborative session is where the blueprint for future quantum advancements will be refined.

**NSF National Centers and Quantum Foundries:** Be part of a session highlighting the important role of NSF MIP centers and Quantum foundries in advancing quantum research. Learn about the FREE access to state-of-the-art growth facilities, the availability of materials-on-demand, and the support in characterization and theory that these centers provide to the research community. Directors from the Quantum Foundry and the MIP center will discuss the services they offer and the research conducted at these centers. Here's your chance to connect and leverage these facilities for your research endeavors.

**Atomic Qubits – Neutral atoms and trapped ions:** This session is dedicated to atomic qubits, where experts on neutral atoms, trapped ion technologies, and associated technologies such as optics, cryogenics, and surface science will present. It's an opportunity to showcase research and engage with leaders at the forefront of quantum computing.

**Joint Sessions on Interdisciplinary Quantum Applications:**

We invite all participants to also attend the joint session on quantum science and technology with Electronic Materials, Optomechanics, Phononics, and Vacuum Technology. These sessions share a synergetic relationship of different fields with quantum applications. Each session is a mosaic of talks, where traditional skills meet the mystique of quantum science, offering clarity and direction for those navigating the quantum revolution. It's in these gatherings that one often finds the unexpected connections, where traditional expertise meets the enigmatic world of quantum science, and new pathways emerge.

**Quantum Science and Technology Mini-Symposium Poster Session:** This session will feature a range of posters presenting current research in quantum science and technology, providing an opportunity for detailed discussion and academic exchange.

**Note: The Sunday Workshop and Panel on Quantum Industry & Workforce Development will kickstart the event, featuring invited speakers. While this workshop is not open for abstract submissions, it remains a crucial part of our program. It offers a unique opportunity to hear from experts in academia, government labs, non-profits, and industry about developments in various sectors, followed by a panel discussion addressing groundbreaking questions in quantum. Please join us at the AQS Workshop on Sunday to gain insights from this all-invited lineup.**

Join us at AVS 70, where the journey into quantum science is not just about understanding the universe's most fundamental workings—it's about shaping them.

**QS1: Quantum Science and Technology Mini-Symposium Oral Session**

**Invited Speakers:**

*David Awschalom*, The University of Chicago

*Kristi Beck*, Lawrence Livermore National Laboratory

*Gabriella Carini*, Brookhaven National Laboratory

*Jiun-Haw Chu*, University of Washington

*Barbra Goldstein*, NIST-Gaithersburg

*John W. Harter*, University of California Santa Barbara, "The UCSB NSF Quantum Foundry"

*Yan Li*, Pennsylvania State University, "Quantum Computing for Transient Analysis and Optimization of Renewable Energy Systems"

*Akshay Murthy*, Fermi National Accelerator Laboratory, "Identifying and Mitigating Sources of Loss in Superconducting Qubits"

*Darrell Schlom*, Cornell University

*Chen Wang*, University of Massachusetts Amherst

**QS2: Quantum Science and Technology Mini-Symposium Poster Session**

**SPECTROSCOPIC ELLIPSOMETRY (EL):** The Spectroscopic Ellipsometry Group integrates themes ranging from classical materials science and thin film characterization to nanometer-scale science and novel optical sensing concepts. We will host five oral sessions dedicated to traditional applications of spectroscopic ellipsometry in optical materials and thin film characterization as well as new and emerging topics. The aim of the Spectroscopic Ellipsometry group is to improve the accessibility of this conference for undergraduate and graduate students. To this end, we have worked with our industry partners to establish funding to offset the registration costs of students. Additionally, the J.A. Woollam Co. continues to proudly sponsor the Outstanding Student Oral Award as well as the Outstanding Student Poster award.

Areas of Interest: Spectroscopic Ellipsometry is seeking abstracts in the following areas of interest:

- **Workforce Development: Reserved for student speakers to showcase their many contributions to the field and demonstrate the workforce development needed as metrology needs continue to grow in industry.**
- **Fundamental ellipsometry applications: Applications such as Mueller matrix ellipsometry, in-situ ellipsometry, anisotropy, finite ellipsometry, and biological applications.**

- **Emerging applications:** Groundbreaking applications in areas like quantum materials, highly anisotropic materials, and ultra-wide bandgap materials.
- **Evolving methodology of ellipsometry:** Showcasing the advances in instrumentation.
- **Analytical methods in ellipsometry:** Addresses data selection, mathematical models and integration of artificial intelligence.

#### **EL1: Spectroscopic Ellipsometry Oral Session**

##### **Invited Speakers:**

*Thomas Germer, NIST*

*Max Junda, Covalent Metrology*

*Morten Kildemo, Norwegian Uni. of Sci. and Tech, Norway*

*Andrei Sirenko, New Jersey Institute of Technology*

*Chris Sturm, University Leipzig, Germany*

#### **EL2: Spectroscopic Ellipsometry Poster Session**

**SURFACE SCIENCE (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 with emphasis in heterogeneously-catalyzed reactions. We aim to understand the wide range of processes taking place on surfaces and at interfaces, together with a full characterization of those systems, to finally improve the process by building upon this critical knowledge. This year a wide range of topics will be covered from surface chemistry with water and in liquids, to reactions on alloy surfaces, nanoparticles, and oxide, chalcogenide and 2D materials surfaces. We showcase advances on Operando/in-situ reaction conditions and on-surface synthesis. We will host the Morton M. Traum Award to honor research presented by graduate students in the Surface Science Division. This year, we will hold a special session entitled "Contributions from surface science to catalysis" to honor Bob Madix career and a short symposium with late breaking discoveries.

Areas of Interest: Surface Science is seeking abstracts in the following areas of interest:

- **Mechanisms at surfaces and interfaces**
- **Dynamic processes at surfaces**
- **Surface science of reduced dimensional materials**
- **Bridging gaps**
- **Photo/Electrochemistry**
- **Liquid-solid interfaces**
- **Oxide and chalcogenide surfaces/interfaces and their reactivity**
- **ALD for catalysis**
- **On surface synthesis**
- **Single atom catalysis**
- **Memorial session in honor of Prof. Bob Madix (all invited)**
- **Late breaking discoveries**

#### **SS1: Surface Science Oral Session**

##### **Invited Speakers:**

*David Bergsman, University of Washington, "High-Throughput Screening of Molecular Layer Deposition Processes for EUV Photolithography"*

*Fanglin Che, UMass Lowell*

*Athanasios Dimoulas, NCSR, University of Athens, Greece*

*Michael Janik, Penn State University*

*Oleg Kononov, ESRF, Grenoble, France*

*Joerg Libuda, Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Germany, "Selectivity Control by Ionic Liquid Layers: From Surface Science to the Electrified Interface"*

*Magali Lingenfelder, EPFL, Switzerland*

*Marcelo Mariscal, University of Cordoba, Argentina, "Atomistic Simulations on the Triple-Phase Boundary in Proton-Exchange Membrane Fuel Cells"*

*Jörg Meyer, Leiden University, Netherlands, "Accurate Dynamical Modelling of Vibrationally Enhanced N<sub>2</sub> Dissociation on Ru(0001) - Implications (Not Only) for Plasma Catalysis"*

*Maria Luiza Miranda Rocco, Federal University of Rio de Janeiro, Brazil*

*John Morris, Virginia Tech*

*Talat Rahman, University of Central Florida*

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

*Roberto Salvarezza, INIFTA, UNLP, Argentina*

*Michael Trenary*, University of Illinois at Chicago, "Infrared Spectroscopy Studies of Surface Chemical Reactions on Single Atom Alloys"

*Jeroen van Bokhoven*, ETH Zurich, Switzerland

*Jason Weaver*, University of Florida, "Surface Chemistry and Catalysis of IrO<sub>2</sub>(110)"

*Francisco Zaera*, UC Riverside, "The use of Atomic Layer Deposition (ALD) for the Preparation of Catalysts with Well-defined Metal/Mixed-Oxide Interfaces"

*Junfa Zhu*, USTC, China

## **SS2: Surface Science Poster Session**

**THIN FILMS (TF):** The Thin Film Division is soliciting abstracts that describe recent advances in the processing, structure, properties, and applications of thin films. Abstracts spanning from fundamental science to scale-up and commercialization are all welcomed.

Areas of Interest: For AVS 70, TF is particularly seeking abstracts that fall under four broad thematic areas:

**1. Atomic Scale Processing for Thin Film Formation and Patterning (Part of Atomic Scale Processing Mini-Symposium):** These sessions will highlight current advances in atomic-scale processes including energy-enhanced atomic layer deposition (ALD), thermally-driven atomic layer etching (ALE), area-selective ALD processing and patterning (ASD), and the integration of deposition with etching. These sessions will be integrated with the Atomic Scale Processing Mini-Symposium.

**2. Thin Film Processing for Microelectronics and Advanced Packaging :** These sessions will bring together academic, government, and industrial researchers to address current challenges and opportunities in thin film processing for microelectronics and advanced packaging technologies, including CVD and ALD processes for the BEOL and advanced packaging applications and recent progress in the deposition processes for ferroelectrics and other functional materials for microelectronics and packaging.

**3. Vapor Deposition and Infiltration of Organic, Polymeric, and Hybrid Materials :** This session will coalesce experts in the vapor deposition of organic, polymeric, and organic-inorganic hybrid materials including 2D and 3D frameworks using processes like molecular layer deposition (MLD), initiated chemical vapor deposition (iCVD), vapor infiltration (VPI, SIS, and ALI) and other related techniques to discuss recent advances in processing science, structure-property relations, and material applications.

**4. Emerging Applications of Thin Films: Energy, Sustainable Systems, and Extreme Environments :** These sessions will address the use of thin film technologies outside of microelectronics including their use for energy generation and storage (e.g., photovoltaics and batteries), sustainable systems (e.g., membranes for chemical separations), and in extreme environment (e.g., space).

## **Harper Award**

All graduate student participants are encouraged to submit an application for the Harper Award along with their abstract. In addition to giving their session talk, the four Harper Award finalists will compete in a special session giving interactive "TED-Style Talks" for the top prize: <https://avs.org/awards/division-group-student-awards/thin-film-division-james-harper-award/>

## **Special Session: Remembering Dr. Paul Holloway**

The Thin Films Division will also hold a special session celebrating Dr. Paul Holloway's contributions to thin film science and characterization and the broader scientific community over the last 50 years. Technical papers are solicited from former students and trainees, collaborators, and friends of Prof. Holloway to celebrate his contributions to the AVS and the field of thin films. Following the technical sessions, a reception will be held in Paul's honor to highlight both Paul's personal history and impact within the AVS. Tributes and toasts will honor his devotion to education and mentoring.

## **TF1: Thin Films Oral Session**

### **Invited Speakers:**

*Nicolas Boscher*, Luxembourg Institute of Science and Technology (LIST), Luxembourg

*Kyeongjae Cho*, University of Texas at Dallas, "Interlayer Engineering of Heterostructure Thermal Boundary Resistance of Power Device Heat Spreader"

*Adriana Creatore*, Eindhoven University of Technology, Netherlands

*Nari Jeon*, Chungnam National University, Republic of Korea

*Ken Lau*, Rowan University

*Ebony Mays*, Micron, "Unlocking the Atomic Canvas: Applications and Challenges of Area Selective Deposition in Next Generation Memory Devices"

*Austin Minnich*, California Institute of Technology

*Miyoshi Nobuya*, Hitachi High Technologies America Inc., "Highly Selective and Isotropic Atomic Layer Etching Using Dry Chemical Removal"

*Paul Ragogna*, University of Western Ontario, Canada

*Bonggeun Shong*, Hongik University, Republic of Korea, "Atomistic Simulations on the Fundamental Aspects of Atomic Layer Processing (ALP)"

*Tobias Wenger*, Jet Propulsion Laboratory, "Nanoscale Metasurface Fabrication for UV- and Visible-Light Applications"

*Charles Winter*, Wayne State University



## **TF2: Thin Films Special Session: Remembering Dr. Paul Holloway**

### **Invited Speakers:**

*Adrie Mackus*, Eindhoven University of Technology, Netherlands

*Philip Rack*, University of Tennessee Knoxville, "From Luminescent Materials to Fundamental Electron-Solid Interactions: How Professor Holloway Made an Indelible Impression on My Career"

*Loren Rieth*, West Virginia University

*Hendrik Swart*, University of the Free State, South Africa, "Stability Of Phosphor Thin Films During Cathodoluminescence and Upconversion"

*Matthias Young*, University of Missouri, "Growing Polymers Molecule by Molecule Through Vapor Deposition"

*Junjie Zhao*, Zhejiang University, China, "Tuning Surface Radical Species for Area-Selective Initiated Chemical Vapor Deposition"

## **TF3: Thin Films Poster Session**

**UNDERGRADUATE POSTER SESSION (UN):** AVS 70 will host its fourth annual undergraduate poster session, open to any undergraduate conducting research on an AVS-related topic. 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 travel assistance may be available. Cash awards will be given for the top poster presentations!

**Areas of Interest: The Undergraduate Poster Session is seeking abstracts related to any and of the AVS 70 Division, Group, Focus topics, and Mini Symposia. All are welcome!**

### **UN1: Undergraduate Poster Session**

**VACUUM TECHNOLOGY (VT):** The Vacuum Technology Division (VTD) provides a community to share ideas and novel approaches to advancing vacuum science and technology. We are soliciting abstracts in a broad range of topics relating to the science and engineering involved in achieving, maintaining, analyzing, and measuring vacuum wherever it is required. Our contributors come from industry, national laboratory, and academic and their presentations range from novel methods and devices for measuring gas composition, as well as outgassing of materials, large vacuum systems, vacuum technology for semiconductor and aerospace applications. We strive to grow in areas like vacuum applications for Quantum Science and Sustainable Energy production. VT hosts the Ask the Experts (ATE) booth during exhibit hours: an informal forum—staffed by vacuum experts—where conference attendees may ask questions, discuss their work and gather ideas for innovative solutions.

Areas of Interest: Vacuum Technology is seeking abstracts in the following broad range of topics relating to the science and engineering involved in achieving, maintaining, analyzing, and measuring vacuum wherever it is required:

- **Measurement, Partial Pressure, and Gas Analysis**
- **Leaks, Flows, and Material Outgassing**
- **Novel Vacuum Instrumentation**
- **Accelerators and Large Vacuum Systems**
- **Aerospace Research and Applications**
- **Energy / sustainability**
- **Fusion energy**
- **Quantum Science**
- **Semiconductor**
- **Sustainable Energy Production**
- **History**

## **VT1: Vacuum Technology Oral Session**

### **Invited Speakers:**

*Henk Jan Bulten*, NWO-i Nikhef, Netherlands

*Sophie Davies*, United Kingdom Atomic Energy Authority, UK

*Jorge Andres Diaz*, Inficon

*Moritz Eder*, TU Wien, Austria, "Photochemistry and Photocatalysis of Alcohols – Vacuum Technology for Sustainable Chemistry"

*Alex Kato*, IonQ Quantum

*Kurt Lesker*, Kurt J. Lesker, "Advancements Through the Ages: The Evolution of Vacuum Technology"

*Brendan Quinlan*, ORNL

*Timothy Swinney*, MKS Instruments, Inc., Pressure and Vacuum Measurement Group

## **VT2: Vacuum Technology Poster Session**

## **SPECIAL SESSIONS & EVENTS**

**AVS 70 PLENARY LECTURE:** Marla Dowell, Director, CHIPS R&D Metrology Program, NIST Boulder Laboratory will present the Plenary Lecture on Monday, November 4, 2024, 5:30-6:30 p.m. and followed by the AVS 70 Welcome Mixer.

**AVS QUANTUM SCIENCE WORKSHOP (ALL-INVITED SESSION) (AQS):** Industry around quantum materials and quantum information science is currently evolving rapidly with focus on synthesis and device fabrication, algorithm and library development, and exploration of early applications of quantum computing, sensing, storage, network, amongst others. In addition to technological and scientific advancement on a fundamental level, this requires rapid training of a particularly skilled workforce at the intersection of these fields. While this is true for many interdisciplinary fields, there is a risk that the gap that needs to be bridged is particularly large between fundamentals fields of quantum mechanics, math, computer science, and domain science. In this all-invited session, we will have speakers from academia, industry, national labs, and funding agencies to describe their perspective on the state of the art and to outline challenges. We envision the discussion of concrete strategies to address these challenges and brainstorming on what is most needed immediately to shape the near-term future of the workforce that will support quantum industry. This Workshop will be followed by a number of QS mini-symposium sessions throughout the week.

### **AQS1: AVS Quantum Science (AQS) Workshop All-Invited Oral Session**

#### **Invited Speakers:**

*Government: Tomasz Durakiewicz, National Science Foundation*

*Non-Profit: Jonathan Felbinger, SRI / QED-C*

*Quantum/Short Course Organizer: Tim Gessert, Gessert Consulting, LLC*

*Industry: Josh Mutus, Rigetti Computing*

*Academia: Chris Palmstrøm, University of California, Santa Barbara*

*National Lab: Kathy-Anne Soderberg, Air Force Research Laboratory*

This workshop will be followed by QS scientific sessions throughout the week.

### **BIOMATERIALS PLENARY (ALL-INVITED SESSION) (BP)**

The Biomaterials Interfaces program kicks off with the now traditional Biomaterials Plenary Session. This year we are pleased to have presentations from three prominent scientists.

### **BP1: Biomaterials Plenary Invited Oral Session (ALL-INVITED)**

*Joelle Frechette, University of California, Berkeley, "Interfacial Bonding in Underwater Adhesion"*

*Joachim Spatz, Max Planck Institute, Germany, "Physics of Soft Matter"*

*Jon Wilker, Purdue University, "Adhesives at the Beach"*

**NANOSCALE SCIENCE AND TECHNOLOGY PLENARY SESSION (ALL-INVITED) (NSP):** The Nanoscale Science and Technology Division starts the week with a plenary session featuring a talk from the Nanotechnology Recognition Award winner. Following this talk, we will have our Early Career and Graduate Student competitions. Please join us for these engaging talks on nanoscale science and technology and for lively discussion during a reception, immediately after the competitions.

### **NSP1: Nanoscale Science and Technology Plenary Session (ALL-INVITED)**

**EXHIBITOR TECHNOLOGY SPOTLIGHT SESSIONS (EW):** The Exhibitor Technology Sessions will take place in the stage area of the exhibit hall during the technical session breaks on Tuesday and Wednesday. These sessions are free and open to all registered AVS 70 attendees. This is your opportunity to learn about new products, research techniques and services offered by AVS exhibitors. Each session is followed by a brief Q&A session making it a truly interactive learning experience. After the sessions, you may visit the presenting exhibitors at their booths to further discuss any points that you would like to receive more details on. Come learn how new technology can benefit your research efforts!

### **EW1: Exhibitor Technology Spotlight Sessions**

**UNDERGRADUATE POSTER SESSION (UN):** AVS 70 will host its fourth annual undergraduate poster session, open to any undergraduate conducting research on an AVS-related topic. 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 travel assistance may be available. Cash awards will be given for the top poster presentations!

**Areas of Interest: The Undergraduate Poster Session is seeking abstracts related to any and of the AVS 70 Division, Group, Focus topics, and Mini Symposia. All are welcome!**

### **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 (November 5-7, 2024). Please contact [exhibits@avs.org](mailto:exhibits@avs.org) for additional information. You may also review our website [www.avs.org](http://www.avs.org).

**AVS LATE BREAKING ABSTRACT SUBMISSIONS:** 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 late July for either (1) an individual 15-minute oral presentation, or (2) a poster presentation. Our Call for Late Breaking Abstracts will launch in late July with a September 5, 2024 deadline. Submissions will be used to fill holes in the program, and they must be submitted via the AVS website by Thursday, September 5, 2024. Notification of acceptance/rejection will be made soon thereafter. Please check the [AVS 70 website](http://www.avs.org) for details and submission guidelines in late 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. Symposium Sponsor logos will appear on the AVS website, in the Technical/Exhibitor Program, on signage and slide shows at the Symposium. The earlier AVS Symposium Sponsorships ensure the greatest exposure. To learn more about Sponsorship opportunities, please contact Jeannette DeGennaro at 212-248-0200 ext. 229 or [jeannette@avs.org](mailto:jeannette@avs.org) or Yvonne Towse at 212-248-0200 ext. 222 or [yvonne@avs.org](mailto:yvonne@avs.org).

**ONLINE ABSTRACT SUBMISSION ONLY:** [www.avskonferences.org](http://www.avskonferences.org)

**Deadline: 11:59 p.m. ET, Monday, May 13, 2024**

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

**Instructions may be found at the web site above.**

**\*\*\* A presenter may present ONE ORAL AND ONE POSTER at the Symposium\*\*\***

**AVS 70 Changes:**

Contributed oral presentations are 15 minutes and invited talks are 30 minutes.

All submitting authors should review the areas of interest for which their desired topic is seeking abstracts and then submit their abstract to an oral or poster session. Presenters may submit two different abstracts at AVS 70 – an oral and a poster.

**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 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](mailto: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, 2024, and should be submitted through the AVS online award submission site. Nomination information is available on [www.avs.org](http://www.avs.org) or through Angela Klink (212-248-0200, ext. 221 or [angela@avs.org](mailto: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](http://www.avs.org) or through Angela Klink (212-248-0200, ext. 221 or [angela@avs.org](mailto:angela@avs.org)) Applicants should use the AVS online award submission site. **The deadline is May 13, 2024.**

**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 students who meet the following criteria: 1)

you must be the presenter of an accepted Symposium abstract, 2) you must be a full-time 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 July 2024) and the student should apply for the grant by responding to the invitation email. The application deadline is Tuesday, September 3, 2024. Should your application be approved, you will receive an e-mail notification by Thursday, September 12, 2024. Grants will be given on a random basis until the 2024 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**

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 2024 AVS International Symposium registration at the student rate. Students who win more than one award in a given year at the International Symposium will receive an award amount that is capped at \$2250. The winner will also be asked to submit an abstract to an ASSD or ASSD co-sponsored session in 2025.. Students wishing to participate in the competition should complete the application on the awards submission site and **submit an abstract by May 13, 2024.**

**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. Markus Valtiner, [valtiner@iap.tuwien.ac.at](mailto:valtiner@iap.tuwien.ac.at)

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** is 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 (except for former winners) 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 13, 2024.**

**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 13, 2024.**

**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 an MN-sponsored session. Both graduate and undergraduate students are eligible. All students presenting at our 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(s) submitting an abstract to the MN session. The number of student awardee(s) will be determined at the discretion of MN Awards Committee. 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 13, 2024**.

**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 Nanoscale 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 13, 2024**. 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!!! The NSTD Awards Committee will select all finalists, and they will be informed in September 2024. All finalists must present a five-minute talk (with additional time for questions) at the NSTD Sunday plenary session for the awards competition. 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, 2023 were Quantum Design, Attocube, Heidelberg Instruments, RHK Technology, SPECS-TII.

**The Plasma Science and Technology Division Student Poster Prize** recognizes recognizes poster presentations submitted to PSTD at the annual AVS International Symposium. The winning poster presentation is characterized by the presenter's excellence in research, clarity of the delivery, and depth of knowledge, in response to the examination of the judges. **Eligibility and how to apply:** The PSTD Student Poster Prize is given to a student presenter whose poster is accepted by the PSTD division at the annual AVS International Symposium. Candidates for the award must be a registered graduate or undergraduate student in an accredited academic institution at the time of the presentation, a member of the AVS and the PSTD, and first author on the poster presentation. The finalists of PSTD's Coburn and Winters Award are not eligible for the poster award. All accepted student poster presenters who meet these criteria will be automatically entered into this competition. **Selection process:** The Poster Prize winner(s) will be selected by a group of judges appointed by the PSTD Executive Committee and based on the following criteria: Scientific merit and originality; Quality of the poster content; Clarity and engagement of the presentation; Response to questions and depth of knowledge. The winner of the PSTD Student Poster Prize will receive a cash prize and a certificate. **Winner announcement and award ceremony:** The winner of the PSTD Student Poster Prize will be announced during the PSTD Annual Business Meeting at the AVS International Symposium, or at a time determined by the Executive Committee. The award certificate will be mailed to the recipient.

**The Spectroscopic Ellipsometry Technical Group** presents multiple awards annually at the International Symposium: student poster/presentation award and student travel award. These awards are made possible by financial support from J.A. Woollam Co., Inc. Student Poster/Presentation Award is given at the annual AVS International Symposium and Exhibition. All student participants, both poster and oral, participating in a Spectroscopic Ellipsometry Technical 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 Spectroscopic Ellipsometry Technical poster session for judging. The Award consists of a certificate and a \$500 cash prize. Multiple awards are anticipated. Student Travel Award: is available for the 2024 AVS International Symposium and Exhibition. Any graduate and undergraduate students who have an accepted abstract AND will be presenting in a Spectroscopic Ellipsometry Technical session at the International Symposium. All accepted abstracts with a student as presenting author are automatically considered. Multiple awards are anticipated.

**John Coburn and Harold Winters Student Merit Award** 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. **Eligibility and how to apply:** 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. **Selection Process:** A maximum of six (6) Student Merit Award finalists will be selected by the PSTD Awards Committee on the basis of technical/scientific merit and originality of research. Each Merit Award finalist will receive a cash award 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 finalists

based on the quality of both the research and oral presentation. The overall winner will receive an additional cash prize and certificate. **Winner announcement and award ceremony:** The winner(s) of the Coburn & Winters Award will be announced during the PSTD Annual Business Meeting at the AVS International Symposium, or at a time determined by the Executive Committee. The award certificate will be presented to the recipient. All materials should be submitted through the award submission site and must be received on or before **May 13, 2024**.

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 on 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 13, 2024.**

**Thin Film Division James Harper Award Graduate Student Award:** The Thin Film 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 13, 2024.**

**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),” 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 13, 2024**. 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](mailto: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](mailto:julia.s@nist.gov)). **Deadline is May 13, 2024.**

**The 2D Materials Group** is pleased to announce the annual student poster award with an aim at providing a platform for young scientists to interact and present their research work to a large audience from diverse fields. 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 13, 2024**. **Eligibility and how to apply:** The 2D Materials Student Poster Prize is given to a student presenter whose poster is accepted by the 2D Materials Group to present their research at the annual AVS International Symposium. Candidates for the award must be a registered graduate (or an undergraduate) student in an accredited academic institution at the time of the presentation, a member of AVS and the 2D Materials Group, and first author on the poster presentation. All accepted student poster presenters who meet these criteria will be automatically entered into this competition. **Selection Process:** The Poster Prize winner(s) will be selected by a group of judges appointed by the 2D Materials Executive Committee and based on the following criteria: Scientific merit and originality; Quality of the poster content; Clarity and engagement of the presentation; Response to questions

and depth of knowledge. **Winner announcement and award ceremony:** The winner(s) of the 2D Materials Group Student Poster Prize will be announced during the poster session at the AVS International Symposium, or at a time determined by the Executive Committee. The award certificate and cash prizes will be presented to the recipient.

**The Spectroscopic Ellipsometry Technical Group** presents multiple awards annually at the International Symposium: student poster/presentation award and student travel award. These awards are made possible by financial support from J.A. Woollam Co., Inc. Student Poster/Presentation Award is given at the annual AVS International Symposium and Exhibition. All student participants, both poster and oral, participating in a Spectroscopic Ellipsometry Technical 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 Spectroscopic Ellipsometry Technical poster session for judging. The Award consists of a certificate and a \$500 cash prize. Multiple awards are anticipated. Student Travel Award: is available for the 2024 AVS International Symposium and Exhibition. Any graduate and undergraduate students who have an accepted abstract AND will be presenting in a Spectroscopic Ellipsometry Technical session at the International Symposium. All accepted abstracts with a student as presenting author are automatically considered. Multiple awards are anticipated.

### **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, 2024.** 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](mailto: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 SE program at the AVS International Symposium. PhD students or engineers/researchers from industry or academia up to 5 years after PhD graduation, who will be members of the ASED of AVS, are eligible. Members of the ASED AVS Program Committee and a member of the ASED award committee will judge all nominations and make the selection of the winner, based on the submitted documents. The committee may conduct on-line interviews with the nominees in the selection process. The winner will be announced at least two months prior to the symposium. The winner will receive a certificate, \$500 prize after presenting his/her work at the symposium and up to \$300 travel expenses. **Nomination Procedures:** 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 for AVS International Symposium. Late or incomplete applications will not be evaluated. 1) Recommendation letter from the Nominator; 2) Abstract submitted to the ASED program of the AVS International Symposium; both oral and poster presentations are eligible; 3) 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; (3) 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. **Nomination Submission and Deadline:** The same as the Abstract Submission Deadline (the year of the AVS Symposium) May 13, 2024. 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](mailto:asedawards@avs.org)) such that it is received by the Abstract Submission Deadline May 13, 2024.. Late or incomplete application packages will not be evaluated.

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. Submitted applications will be considered for 2 consecutive years as long as requirements still apply. Nominators are encouraged to resubmit updated application material in the following year. Application materials should be sent by email to: Markus Valtiner, [valtiner@iap.tuwien.ac.at](mailto:valtiner@iap.tuwien.ac.at) by the deadline date: May 13, 2024.

**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 [empd.awards@avs.org](mailto:empd.awards@avs.org).

**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) up to five years after PhD graduation who do not hold a permanent position at the time of the application, are eligible. Candidates 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](mailto:markus.donath@uni-muenster.de)) by **October 1, 2024**.

**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 Nanoscale 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 and 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, Deep Jariwala ([dmi@seas.upenn.edu](mailto:dmi@seas.upenn.edu)), as a single PDF file. For consideration, **the application must be sent by 11:59 PM CDT, July 20, 2024**. Please mention the AVS NSTD Award in the title of your email. 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 highlights work performed after the Ph.D.; thus, research conducted toward a doctorate will not be considered. Applications from industry, national laboratories, and academic institutions are encouraged. The NSTD Awards Committee will select all Early Career award finalists, and they will be informed in September 2024. All finalists must present a five-minute talk (with additional time for questions) at the NSTD Sunday plenary session for the awards competition. The winner will be selected based on the quality of the talk, the responses to subsequent questions, and the level of the research. The NSTD Early Career 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 2023 were Quantum Design, Attocube, Heidelberg Instruments, RHK Technology, SPECS-TII.

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 2025, and the deadline is July 20, 2024. The nomination material should include a nominating letter, biographical material, and three supporting letters, which should be emailed as a single pdf file to Deep Jariwala ([dmi@seas.upenn.edu](mailto:dmi@seas.upenn.edu)). The Award will be presented at the AVS International Symposium. Conference registration will be waived for the award winner. This award is made possible by financial support from NSTD's sponsors, 2023 were Quantum Design, Attocube, Heidelberg Instruments, RHK Technology, SPECS-TII.

The **Plasma Science & Technology Division** is pleased to solicit nominations for the Plasma Prize. The Plasma Prize 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: A nominating letter citing the contributions and any involvement in the AVS community by the nominee; 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: Mingmei Wang ([mmeiwcb@gmail.com](mailto:mmeiwcb@gmail.com)). **Nomination deadline: May 13, 2024.**

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 Mingmei Wang ([mmeiwcbe@gmail.com](mailto:mmeiwcbe@gmail.com)). **Nomination deadline: May 13, 2024.**

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. 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 Devika Choudhury [dchoudhury.avs@gmail.com](mailto:dchoudhury.avs@gmail.com). **Deadline: May 13, 2024.**

**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 will 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. This award was created in 2015 by the New Mexico Chapter of AVS to honor its founders and their many contributions. The AVS New Mexico Chapter 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 to Devika Choudhury [dchoudhury.avs@gmail.com](mailto:dchoudhury.avs@gmail.com) by **July 22, 2024**.

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 two criteria: The nominee is not older than thirty-eight (38) years of age during 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. 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](mailto:julia.s@nist.gov)). **Deadline: May 13, 2024.**

**Theodore E. Madey Award:** AVS, in cooperation with the Polish Vacuum Society (PVS), is pleased to solicit nominations for the 2025 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. 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 2025 award should be sent by email to: Angela Klink, AVS Member Services Administrator, [angela@avs.org](mailto:angela@avs.org) by March 31, 2024.**