AVS 66TH INTERNATIONAL SYMPOSIUM & EXHIBITION

SYMPOSIUM: OCT. 20-25, 2019 | EXHIBIT: OCT. 22-24, 2019

Greater Columbus Convention Center, Columbus, Ohio

TECHNICAL & EXHIBITOR PROGRAM



EXHIBIT HOURS:

Tuesday, October 22:	*10:00 a.m. - 5:00 p.m.*
Wednesday, October 23:	*10:00 a.m. - 4:30 p.m.*
Thursday, October 24:	*10:00 a.m. - 2:30 p.m.*

Start using the AVS 66 App

To login, please enter your Registration ID* and Last Name to access messaging, enable the synchronization of notes, favorites, and scheduled items between devices and the online planner.

*Your Registration ID can be found on your AVS 66 Confirmation/Receipt near the barcode

CELEBRATING 30 YEARS OF ENGINEERING SOLUTIONS FOR SURFACE AND MATERIALS SCIENCE

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COMPACT AUGER ANALYZERS

The **microCMA** adds surface-sensitive Auger analysis to your existing chamber. The complete package includes the 3 kV cylindrical mirror analyzer, controller, and operation/analysis software.



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The **UVB-100** and **miniZ** provide ultraviolet light for a low-temperature vacuum chamber bakeout. The **IRB-600** uses infrared for maximum heating.

The new **BC-3 Bakeout Controller** provides temperature-regulated control of IR emitters and heater tape.

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The **9103 USB Picoammeter** is an industry-standard programmable measurement system, controlled by RBD's PC software or your own application. It is now available in high-voltage and high-speed configurations.



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The **IG2** sputter ion gun system is the perfect solution for cost-effective ion beam etching and sputter cleaning. Our **High-Performance Systems** provide precise raster sputtering.

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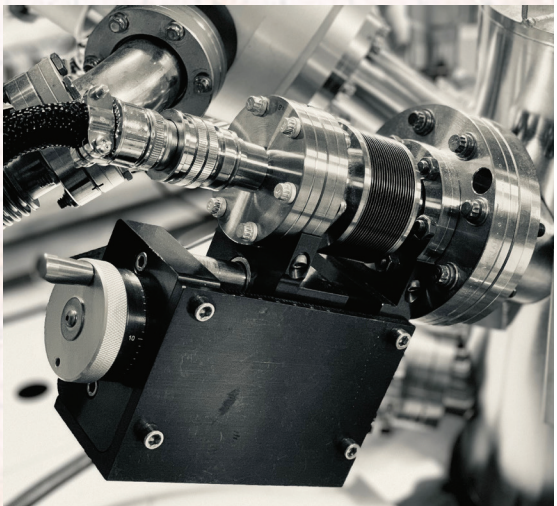

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Greetings

On behalf of the whole AVS community, we welcome you to the AVS 66th International Symposium and Exhibition (AVS 66) in vibrant and fun Columbus, Ohio. 2019 is the 500th Anniversary of the death of Leonardo da Vinci. This Anniversary reminds to all of us the endless curiosity of a unique engineer and scientist; da Vinci has inspired the AVS 66 Program Committee to set up several new, scientifically exciting sessions.

This year's Symposium features the theme "Shaping our Future: Materials, Technologies & Processes for Energy Transition." We have secured our Plenary Talk from Dr. Nathan S. Lewis, who is George L. Argyros Professor of Chemistry, California Institute of Technology. He will discuss the "Roles of Surface and Materials Science in the Direct Production of Fuels from Sunlight." In addition, several of our Divisions, Groups and Focus Topics have successfully captured the Symposium theme across more than twenty sessions. We are confident that you will gain new insights and knowledge as you enjoy these thematic sessions!

In addition to the traditional areas covered by our Divisions and Groups, and long-standing Focus Topics, AVS 66 will feature new Focus Topics: Fundamental Aspects of Material Degradation; Complex Oxides: Fundamental Properties and Applications; New Challenges to Reproducible Data and Analysis; Atomic Scale Processing (AP); Materials and Processes for Quantum Information, Computing and Science (QS). Specifically, the AP Focus Topic is the result of a joint effort, primarily by the Plasma Science and Technology and Thin Films Divisions, to highlight ongoing work in areas pertaining to the processing of materials with atomic scale precision, employing techniques such as Atomic Layer Deposition, Selective Deposition, and Atomic Layer Etching. The QS Focus Topic, instead, works in synergy with the new initiative of the *AVS Quantum Science* Journal, to reach into a breadth of research areas through the foundations of quantum science.

In addition, the Plasma Science and Technology Division will feature the all-invited session "Commemorating the Career of John Coburn," while the Electronic Materials and Photonics Division will host the "Nikolaus Dietz Memorial Session: Wide and Ultra-wide Band Gap Materials and Devices."

The AVS is aware of the challenges facing scientists in troubled parts of the world and, we will host three lectures of scholars affiliated with Scholars at Risk and "Scholar Rescue Fund" Association, to raise awareness in our community on the topic of science and human rights.

We will also celebrate our AVS Awardees: Scott A. Chambers, Medard W. Welch Award winner; Gottlieb Oehrlein, John A. Thornton Memorial Award winner; and Stephanie Law, Peter Mark Memorial Award winner.

The result is an exciting program that has ~150 sessions, ~1,100 talks and ~275 invited speakers complemented by several flash poster presentations and lively discussion during the poster sessions on Tuesday and Thursday evenings (which include various poster presentation prizes). You will also be able to visit our extensive equipment and product exhibition, where the latest technology that enables cutting-edge research will be displayed.

Whether this is your first time at the AVS Symposium and Exhibition or you are returning, we invite you to participate also to the many networking, professional development and recruitment events, as well as to the several engagement activities and talks organized by the AVS Member Center. We are happy to offer next to the traditional 5k run, as well as (new to the AVS), two Yoga flow sessions planned early in the morning. Thank you for participating in AVS 66 and being part of the AVS community!

Finally, we extend special thanks to all the dedicated volunteers and to the exceptional AVS Staff who worked long hours to create this exciting, world-class technical program and exhibition.

ENJOY THE WEEK!



Mariadriana Creatore
2019 Program Chair



Dan Killelea
2019 Program Vice-Chair

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Wi-Fi Login

Wi-Fi is available throughout the Exhibit Hall in the Convention Center.

SSID: AVS
Password: columbus

Credentials are case sensitive

SYMPOSIUM

Greater Columbus Conv. Center
400 North High Street
Columbus, Ohio 43215

HQ HOTEL

Hilton Columbus Downtown
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Columbus OH 43215

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SYMPOSIUM REGISTRATION HOURS

Sun.	2:00 p.m. to 6:00 p.m.	Wed.	7:30 a.m. to 5:00 p.m.
Mon.	7:30 a.m. to 5:00 p.m.	Thurs.	7:30 a.m. to 5:00 p.m.
Tues.	7:00 a.m. to 5:00 p.m.	Fri.	7:30 a.m. to 10:00 a.m.

SYMPOSIUM REGISTRATION FEES

	Pre-registration (Pre-Paid)	Registration (On-Site)
Member***	$735.00	$ 890.00
Non-Member**	$880.00	$1035.00
Student Member*** *	$245.00	$ 295.00
Student Non-Member** *	$295.00	$ 355.00
Early Career Member*** *	$370.00	$ 445.00
Early Career Non-Member** *	$450.00	$ 525.00
Technical Specialist Member	$350.00	$ 415.00
Technical Specialist Non-Mem	$410.00	$ 475.00
One Day	$435.00	$ 530.00
Two Day	$750.00	$ 935.00
Exhibits Only	FREE	FREE

Pre-registration deadline: September 30, 2019
AVS tax ID Number: 04-2392373

*A bonafide full-time university student must present student I.D. Part-time students don't qualify for a student rate. If your highest degree is within 5 years, you may register as an Early Career.

**Non-member registration includes a complimentary 2020 AVS membership – stop by the AVS Member Center – Room A111-112.

***Full Week, Student, Early Career & Technical Specialist member registration fee INCLUDES your 2020 membership renewal dues. For more information stop by the AVS Member Center – Room A111-112.

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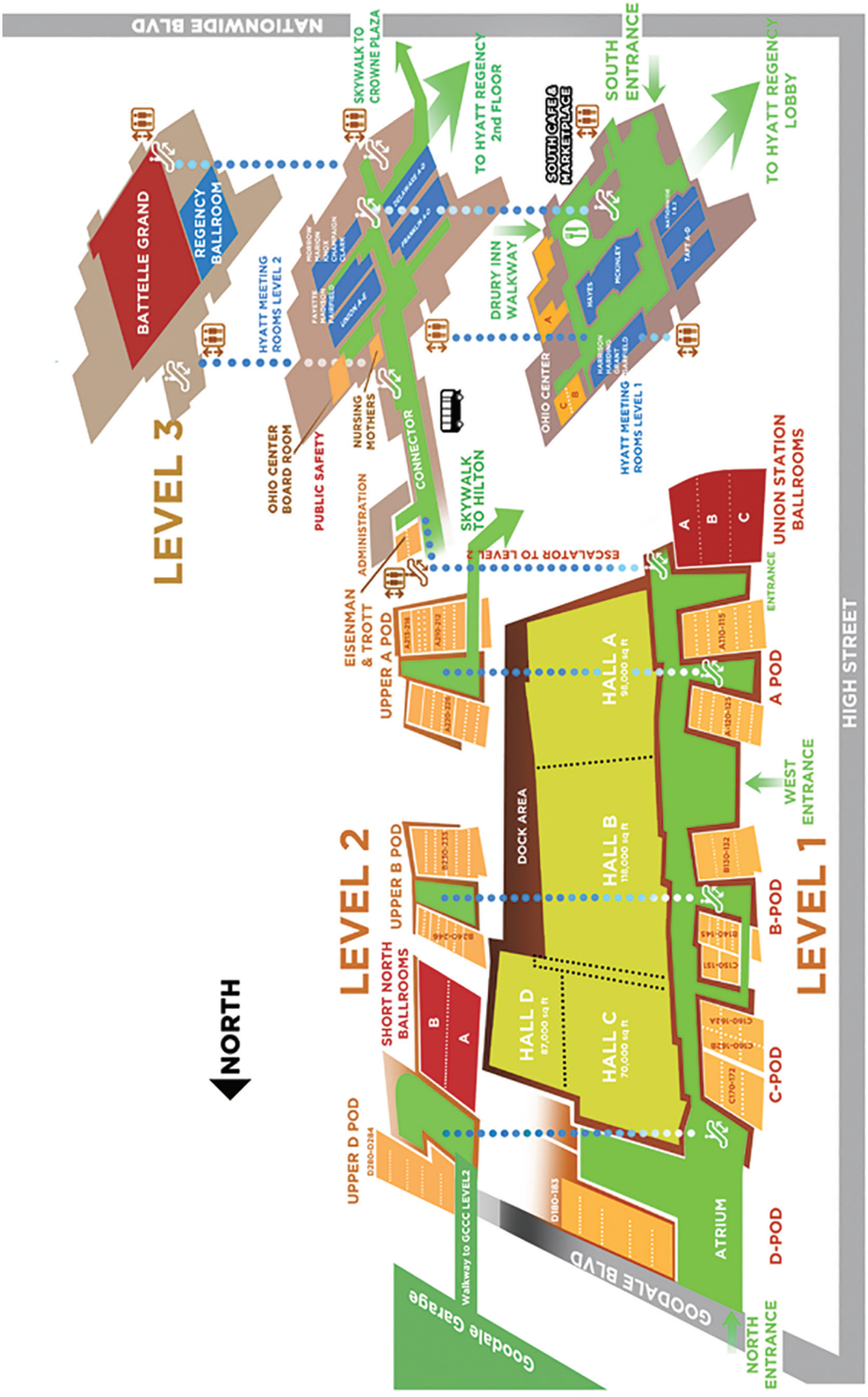
OFFICE LOCATIONS

AVS Publications	Booth #626
AVS Store	Booth #734
Presenters Preview Room	Room A113
Staff Office & Press Room	Room A110
Member Center	Room A111-112
Program Office	Room A110

Registration Area – Lobby
Exhibitor – Symposium – A110 Concourse

GREATER COLUMBUS CONVENTION CENTER



Download the AVS Events & Activities App

That Provides Year-round Access to AVS Publications, Technical Library, and Professional Development Activities and Contains Several AVS sponsored Conferences Event Apps

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- Find what you are looking for
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- Synchronize across your devices
- Access the conference program, schedule, or animated maps without WiFi
- Vote for your Favorite Poster in the PSTD Student Poster Award Competition

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AVS 66

Get Your Game On... Play the AVS 66 Scavenger Hunt Today!



Login in using your reg ID and last name, check out the Hunt rules and task list. Complete as many tasks as possible throughout the week for the chance to earn points and

WIN GREAT PRIZES!

Be sure to **CHECK THE LEADERBOARD** near the Member Center throughout the week to see how you are stacking up against the competition...

Program Overview

Room /Time	A120-121	A122-123	A124-125	A210	A211	A212	A213	A214	A215
SuA	BP-SuA: Bios Interfaces Plenary (ALL INVITED SESSION)								
MoM	BI+AS+NS-MoM: Biofab, Bioanal, Biosen, Diagn, Biolubric & Wear	TF+EM+MI+MN+OX+PS-MoM: Funct TF: Ferro, Multiferro, & Mag Matls	TF-MoM: Thin Films for Electrochem and Energy Storage	MN-MoM: MEMS, Bio, & MEMS for En: Proc, Materials, and Devices I	AS+BI+RA-MoM: QSA I /Reproducibility Issues in Quant XPS	HC+SS-MoM: Util of Theor Mods, Mach Learn, Art Int Het-Cat React	VT-MoM: Pumping, Outgassing, leaks, & Vac Pres Meas	AP+2D+EM+PS+TF-MoM: Area Selective Dep and Selective-Area Patterning	AC+LS+MI-MoM: Mag, Comp, Super, & Elect Cor in Act & Rare Earths
MoA	BI+AS-MoA: Cutting Edge Bio: Bio-Nano, Bio-Energy, 3D Bio	TF+SE-MoA: HiPIMS and Reactive HiPIMS for Novel Thin Films	TF+2D+AP+EL+SS-MoA: ALD and CVD: Nuc, Surf React, Mech, and Kinetics	MN-MoA: Microfab Syst for Gas Chroma & Nanomech Mass Sensing	RA+AS+NS+SS-MoA: QSA II/Big Data, Theory and Reproducibility	TL+2D+HC+SS-MoA: Surf React Mech in Energy Conversion (ALL INVITED)	VT-MoA: Gas Dynamics, Surf. Sci. for Accel., & Ultra-Clean Vac Systems	EM+PS+TF-MoA: New Devices & Matls for Logic and Memory	AC-MoA: Early Career Scientists
TuM	BI+AS-TuM: Characterization of Biological and Biomaterial Surfaces	TF+EM+MI-TuM: TF for Microelec, Phot, & Optoelect Applications	TF+AP-TuM: ALD and CVD: Precursors and Process Development	MN-TuM: MEMS, Bio, & MEMS for En: Proc, Materials, and Devices II	AS+BI+RA-TuM: QSA III/Other Surface Analysis Methods	TL+MS+VT-TuM: Implic of Implem: Mkg En Trans a Reality (ALL INVITED)	VT-TuM: Accelerators and Large Vacuum Systems	EM+2D+AP+NS+PS-TuM: New Devices & Matls for Electronics and Photonics	AC+AS+LS-TuM: Chemistry and Physics of the Actinides and Rare Earths
TuL									
TuA	BI+AS-TuA: Biomolecules and Biophysics and Interfaces & Flash Session	TF-TuA: Emerging Applications for Thin Films	TF+PS-TuA: Epitaxial Thin Films	MN+QS-TuA: Devices for Quantum Info and Quantum Nanomechanics	AS+BI+CA+LS-TuA: Beyond Traditional Surface Analysis		VT-TuA: Advanced Applications of Vacuum Technology	EM+OX+TF-TuA: N. Dietz Mem Sess: Wide & Ultra- Band Gap Matls & Devices	AC+AS+LS-TuA: Forensics, Science and Processing for Nuclear Energy
TuP									
WeM	BI+AS-WeM: Microbes and Fouling at Surfaces	TF1-WeM: Vapor Dep of Functional Polymer TF and Composites	RA+AS+CA+PS+TF-WeM: Repro in Sci & Eng, Incl Matls & Energy Systems	MI+2D-WeM: Emerg Multi-funct Mag Matls I & Magneto-caloric Matls		EL+AS+EM+TF-WeM: Optical Characterization of TF and Nanostructures	HC+2D+SS-WeM: Exotic Nanostructured Surf for Hetero-Cat Reactions	EM+2D+AS+MI+MN+NS+TF-WeM: Nano-struct/ Nanocha of Elec Phot Dev	
WeA	CA+NS+SS+VT-WeA: Chem Anal Imaging of Liquid/Vapor/ Solid Int I	TF+EM-WeA: Emerg TF Matls: Ultra-wide Band & Phase Change Materials	RA+AS+BI-WeA: Address Repro Challenges using Multi-Tech Approach	MI+2D-WeA: Emerging Multifunctional Magnetic Materials II	AS+CA+LS-WeA: Operando Char Tech for In situ Surf Analysis of Energy Devices	EL+EM-WeA: Spectroscopic Ellip: Novel App & Theoretical Approaches	HC+OX+SS-WeA: Metal-Support Int Driving Hetero-Catalyzed React	EM+2D+NS+TF-WeA: THEME Session: Elect & Phot for a Low-Carbon Future	SE+AS+TF-WeA: Nanostructured Thin Films and Coatings
ThM	CA+2D+AS+BI+NS-ThM: Chem Anal & Imaging of Liquid/Vap/ Solid Inter II	TF+EM+NS+SS-ThM: Thin Films for Energy Harvesting and Conversion	LS+ThM: Oper Meth for Unr Fund Mech in Dev Towards Renew En LS+HC+SS-ThM:	MI+2D+AS+EM-ThM: Novel Mag Matls & Dev Con for En eff Info Proc & Storage`	AS-ThM: Adv in Depth Profiling, Imaging and Time-resolved Analysis	DM+BI+SS-ThM: Matl Stabilities & Tech for Degradation Protection	HC+2D+SS-ThM: Nanoscale Surf Structure in Het-Catalyzed Reactions	EM+AP+MS+NS+TF-ThM: Adv Processes for Interconnects and Devices	SE+PS-ThM: Plasma-assisted Surf Mod and Deposition Processes
ThA	CA+NS+SS+VT-ThA: Progress in Inst & Methods for Spectro-mic of Interfaces	TF+SS-ThA: Met Halide Perov, Otr Org/Inorg Hybrid Thin Films	TF+AS+EL+PS+RA-ThA: Char of Thin Film Processes and Properties	LS+AC+HC+SS-ThA: Em Meth w/ Coh Light So LS+AC+NS-ThA: Phot Sci Imag...	AS-ThA: Role of Surfaces and Int in Energy Matls & Industrial Problems	DM1+ThA: Low Foul Int & Env Deg DM2+- ThA: Fund of Cat Deg: Diss, Oxid & Sint	HC+SS+TL-ThA: Re Paths & Add Chal for En Prod in 21st Cent/ Het Cat Awards		EL-ThA: Spect Ellip Late News SE-ThA: New Chall & Opps in Surf Engineering
ThP									
FrM							HC+SS-FrM: Catalysis at Complex Interfaces		2D-FrM: 2D Late News Session SE+AS+SS-FrM: Trib: From Nano to Macro-scale

Program Overview

A216	A220-221	A222	A226	B130	B131	B231-232	Hall A	Union Station B
2D+EM+MI+NS-MoM: Prop of 2D Matls incl Elec, Mag, Mech, Opt, & Therm Prop I				PS2-MoM: Plasma Modeling	PS1+SE-MoM: Atmospheric-Pressure Plasmas	QS+EM+MN+NS-MoM: High Coherence Qubits for Quantum Computing		
2D+AP+EM+MI+NS+PS+TF-MoA: 2D Materials Growth and Fabrication	SS+HC-MoA: CO2, CO, Water, and Small Molecule Chemistry at Surfaces		2D+AP+EM+MI+MN+NS+PS+TF-MoA: Nano incl. Heter & Pattern of 2D Matls	PS+AS+EM+SS+TF-MoA: Plasma-Surface Interactions	PS1-MoA: Plasma-Liquid Interactions, Medicine, and Agriculture	QS+EM+MN+NS+VT-MoA: Systems and Devices for Quantum Computing		
2D+AS+MI+NS-TuM: 2D Matls Char including Microscopy and Spectroscopy	SS+2D+HC-TuM: Atom Manip and Synthesis/Oxide Surface Reactions & Flash Session		2D+EM+MI+MN+NS+QS-TuM: Novel Quantum Phenomena	PS-TuM: Plasma Diagnostics and Sources I	PS+EM-TuM: Advanced FEOL	QS-TuM: AVS Quantum Science (ALL INVITED SESSION)	EW-TuMB: Exhibitor Technology Spotlight I	
							EW-TuL: Exhibitor Technology Spotlight Workshop II	
2D+EM+MI+NS-TuA: Prop of 2D Matls incl Elec, Mag, Mechl, Opt, & Therm Prop II	OX+EM+HC+MI+NS+SS+TF-TuA: Complex Oxides: Cats, Diel Prop &Memory Apps	NS-TuA: Recent Advances in Nanoscale Probing and Fabrication	TL+AS+SS+TF-TuA: Brks & Chall in App Matl En Trans (ALL INV/ Panel Discussion)	AP+EL+MS+PS+SS+TF-TuA: Adv Met & Charact to enable Atomic Layer Processing	PS+EM-TuA: Advanced BEOL/ Inter Etching and Adv Memory and Patterning	QS+2D+EM+MN+NS-TuA: Materials for Quantum Sciences	EW-TuAB: Exhibitor Technology Spotlight III	
								POSTER SESSIONS: 2D, BI, MN, OX, PS, SS, VT
2D+AS+MI+NS-WeM: 2D Materials Charact by SPM and Spectroscopy	OX+EM+MI+SS-WeM: Elect and Mag Prop of Complex Oxide Surf and Int	NS-WeM: Optics and Scattering on the Nanoscale	2D+EM+MI+MN+NS+QS-WeM: Novel 2D Materials	AP+BI+PS+TF-WeM: Surf React Anal and Emerg Apps of Atomic Scale Processing	PS+EM-WeM: Plasma Proc of Matls for Energy TF2-WeM: TF Late News Sess	QS+2D+EM+MN+NS+VT-WeM: Material Systems and Applications for QS		
2D+EM+MN+NS-WeA: 2D Device Physics and Applications	SS+AS+HC+OX-WeA: Reactions at Alloy Surfaces and Single Atom Catalysis	NS+2D+AS-WeA: Probing and Mod Surf and Intl Chemistry at the Nanoscale	MS-WeA: Science and Tech for Manuf: Solid State Batt (ALL INVITED SESS)	PS-WeA: Commem the Career of John Coburn (ALL INVITED)		HI+AS+CA-WeA: Advanced Ion Microscopy and Surface Analysis Applications		
2D+EM+MI+NS+QS+SS-ThM: Dopants, Defects, and Interfaces in 2D Materials	SS+AS+HC+TL-ThM: Surface Science of Energy Conversion and Storage	NS+2D+QS-ThM: Direct Atomic Fab by Elect and Particle Beams & Flash Session	MS+EM+QS-ThM: Sci and Tech for Manuf: Neuro & Quantum Comp (ALL INVITED)	AP+PS+TF-ThM: Thermal Atomic Layer Etching	PS-ThM: Plasma Diagnostics and Sources II	HI+NS-ThM: Novel Beam Induced Material Engineering and Nano-Patterning		
2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA: Surf Chem, Funct, Bio, En & Sensor Apps	SS+2D+AP+AS+OX+SE-ThA: Dynam at Surf/Reac and Imaging of Oxide Surfaces	NS-ThA: SPM for Functional Characterization	5:20 pm How To Lead by Inspiration	PS+2D+EM+SS+TF-ThA: Plasma-Enhanced Atomic Layer Etching	PS+SS-ThA: Plasma Conv and Enhanced Catalysis for Chem Synthesis	HI+NS-ThA: Emerging Ion Sources, Optics, and Applications		
								POSTER SESSIONS: AP, AS, CA, EL, EM, HC, HI, LS, MI, MS, NS, SE, TF
TF-FrM: Theory and Characterization of Thin Film Properties	SS+HC+PS-FrM: Planetary, Ambient, and Operando Environments	NS+AS-FrM: Electron-Beam Promoted Nanoscience	CA+AS+NS+SE+SS-FrM: Novel Apps and Approaches in Interfacial Analysis	PS+2D+SE+TF-FrM: Plasma Dep and Plasma-Enhanced Atomic Layer Deposition				

DIVISION, GROUP, & FOCUS TOPIC CHAIRS & CHAMPIONS



Robert Franz
Advanced Surface Engineering (SE)



Kateryna Artyushkova
Applied Surface Science (AS)



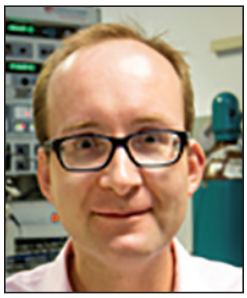
Dan Graham
Biomaterial Interfaces & Bio Plenary (BI/BP)



Jessica Hilton
Electronic Materials & Photonics (EM)



Valeria Lauter
Magnetic Interfaces & Nanostructures (MI)



Sergei V. Kalinin
Nanometer-scale Science & Technology (NS)



Mohan Sankaran
Plasma Science & Technology (PS)



Petra Reinke
Surface Science (SS)



Virginia (Ginger) Wheeler
Thin Films (TF)



Jacob Ricker
Vacuum Technology (VT)



Rob Davis
MEMS & NEMS (MN)



Bridget Rogers
Manufacturing Science & Technology (MS)





Ivan Oleynik and Daniel Gunlycke
2D Materials



Ashleigh Baber
Fundamental Discoveries in Heterogeneous Catalysis (HC)





David Shuh and Jim Tobin
Actinides and Rare Earths (AC)





Rick Livengood and Olga Ovchinnikova
Advanced Ion Microscopy (HI)



Tino Hofmann
Spectroscopic Ellipsometry (EL)

DIVISION, GROUP, & FOCUS TOPIC CHAIRS & CHAMPIONS







German Castro, Maya Kiskinova, Jessica McChesney, Olivier Renault
Frontiers of New Light Sources Applied to Materials, Interfaces and Processing (LS)

Eric Joseph
Atomic Scale Processing (AP)







Xiao Ying Yu, Stephen Nonnenmann, Andrei A. Kolmakov
Chemical Analysis and Imaging at Interfaces (CA)

Vivek Adiga, Rachael Myers-Ward
Materials and Processes for Quantum Science (QS)







Jeffry Kelber, Sam Tenney
Complex Oxides: Fundamental Properties and Applications (OX)

Don Baer, Ian Gilmore
New Challenges to Reproducible Data and Analysis (RA)

Markus Valtiner
Fundamental Aspects of Material Degradation (DM)







Gareth Parkinson
Fundamental Aspects of Material Degradation (DM)

Devika Choudhury, Rachael Farber, Natalie Seitzman, Sarah Zaccarine
Energy Transition Leaders (TL)

2019 PROGRAM COMMITTEE

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Xia, Jing, University of California Irvine

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Co-Chair: Tobin, James G., Univ. of Wisconsin-Oshkosh
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Durakiewicz, Tomasz, National Science Foundation
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Havela, Ladislav, Charles Univ., Prague, Czech Republic
Nelson, Art, Lawrence Livermore National Laboratory
Petit, Leon, Daresbury Laboratory, UK
Tereshina-Chitrova, Evgeniya, Institute of Physics, Academy of Sciences of the Czech Republic

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Gölzhäuser, Armin, Bielefeld University, Germany
Hlawacek, Gregor, Helmholtz Zentrum Dresden-Rossendorf, Germany
Notte, John A., Carl Zeiss Microscopy, LLC
Ogawa, Shinichi, National Institute of Advanced Industrial Science and Technology (AIST)
Tan, Shida, Intel Corporation

Advanced Surface Engineering
Chair: Franz, Robert, Montanuniversität Leoben, Austria
Klemberg-Sapieha, Jolanta, Ecole Polytechnique de Montreal, Canada
Kodambaka, Suneel, Univ. of California, Los Angeles
Lin, Jianliang, Southwest Research Institute
Mangolini, Filippo, University of Texas at Austin
Panjan, Matjaz, Jozef Stefan Institute, Slovenia
Voevodin, Andrey, University of North Texas

Applied Surface Science
Chair: Artyushkova, Kateryna, Physical Electronics
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Engelhard, Mark, Pacific Northwest National Lab.
Fisher, Gregory L., Physical Electronics
Gaskell, Karen, University of Maryland, College Park
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Biomaterial Interfaces
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Jarvis, Karyn, Swinburne University of Technology
O'Connell, Deborah, University of York, UK
Theilacker, Bill, Medtronic
Valtiner, Markus, Vienna Univ. of Technology, Austria
Weidner, Tobias, Aarhus University, Denmark

Biomaterials Plenary Session
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Howell, Caitlin, University of Maine
O'Connell, Deborah, University of York, UK
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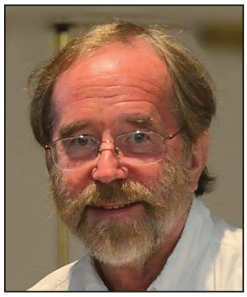

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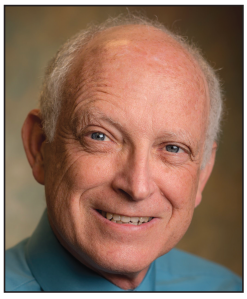

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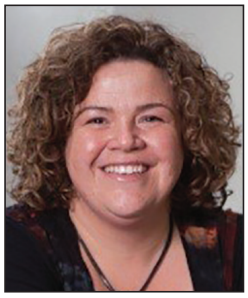

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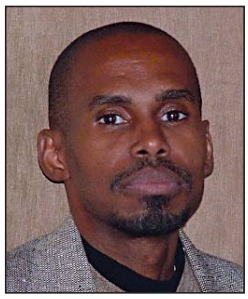

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Journal of Vacuum Science & Technology A & B

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FLASH NETWORKING SESSIONS

SURFACE SCIENCE DIVISION

Tuesday, October 22, 2019, 12:00 – 12:20 pm, Room A220-221

12:00 pm	**SS-TuP1** Mechanistic Studies of Thermal Dry Etching of Cobalt and Iron Thin Films, **MAHSA KONH**, A.V. TEPLYAKOV, University of Delaware
12:03 pm	**SS-TuP5** Self-Catalyzed Gas-Phase Cycloaddition on "Clickable" Nanostructured CuO Surface, **CHUAN HE**, A.V. TEPLYAKOV, University of Delaware
12:06 pm	**SS-TuP12** State-Resolved Dissociative Chemisorption Dynamics with RAIRS Product Detection, **LAURIN JOSEPH**, S. SHEPARDSON-FUNGAIRINO, A.L. UTZ, Tufts University
12:09 pm	**SS-TuP13** The Two-faced Role of Steps in the Isotopic Scrambling of Hydrogen on Pt, **RICHARD VAN LENT**, L.B.F. JUURLINK, Leiden University, Netherlands
12:12 pm	**SS-TuP14** It's Not just the Defects - How Terrace Symmetry Impacts H_2O Adsorption at Ag Step Edges, S.V. AURAS, **LUDO JUURLINK**, Leiden University, Netherlands
12:15 pm	**SS-TuP17** Common Errors in XPS Peak Fitting, **GEORGE H. MAJOR**, Brigham Young University; C. EASTON, CSIRO Manufacturing; W. SKINNER, Future Industries Institute; D.R. BAER, Pacific Northwest National Laboratory; M.R. LINFORD, Brigham Young University
12:18 pm	**SS-TuP20** STM/S Study of Domain Walls and Atomic Defects on the Surface of Iron-based Superconductors, **ZHUOZHI GE**, Q. ZOU, M. FU, L. SANJEEWA, A. SEFAT, Z. GAI, Oak Ridge National Laboratory
6:30 pm	**SURFACE SCIENCE POSTER SESSION, TUESDAY, OCTOBER 22nd, 6:30-8:30 PM, UNION STATION B**

BIOMATERIAL INTERFACES DIVISION,

Tuesday, October 22, 2019, 6:00 pm-6:20 pm, Room A120-121

6:03 pm	**BI-TuP1** Combining Geometry of Folded Paper with Liquid-Infused Polymer Surfaces to Concentrate and Localize Complex Solutions, **DANIEL REGAN**, C. LILLY, A. WEIGANG, L. WHITE, E. LECLAIR, C. HOWELL, University of Maine
6:06 pm	**BI-TuP2** Photoinduced Amphiphilic Zwitterionic Carboxybetaine Polymer Coatings with Marine Antifouling Properties, **FLORIAN VICTOR KOSCHITZKI**, A. ROSENHAHN, Ruhr-University Bochum, Germany
6:09 pm	**BI-TuP3** Peptide sequences with Ultra-Low Nonspecific Protein Adsorption and Resistance Against Marine Biofouling, **CINDY DENISE BEYER**, M. REBACK, Ruhr-University Bochum, Germany; J.A. FINLAY, Newcastle University, UK; S. GOPAL, Ruhr-University Bochum, Germany; A.S. CLARE, Newcastle University, UK; L. SCHÄFER, N. METZLER-NOLTE, A. ROSENHAHN, Ruhr-University Bochum, Germany
6:12 pm	**BI-TuP4** The Effect of Surface Charge and Film Hydration on the Antifouling Performance of Polyelectrolyte Multilayers, **THUVARAKHAN GNANASAMPANTHAN**, Ruhr Univ. Bochum, Germany; A. ROSENHAHN, Ruhr-Univ. Bochum, Germany
6:15 pm	**BI-TuP6** Blood Compatible Coating using Tethered Heparin to Reduce Coagulation in Microfluidic Devices, **RYAN FAASE**, W. PRUSINSKI, KS. SCHILKE, A. HIGGINS, J.E. BAIO, Oregon State University
6:18 pm	**BI-TuP7** Analysing the Sequestration of Pro-inflammatory Chemokines into Immuno-modulating Hydrogels using ToF SIMS, **NICHOLAS DENNISON**, R. ZIMMERMANN, M. NITSCHKE, V. MAGNO, U. FREUDENBERG, C. WERNER, Leibniz Institute of Polymer Research Dresden, Germany
6:30 pm	**BIOMATERIAL INTERFACES POSTER SESSION, TUESDAY, OCTOBER 22nd, 6:30-8:30 PM, UNION STATION B**

NANOMETER-SCALE SCIENCE & TECHNOLOGY

Thursday, October 24, 2019, 12:00-12:20 pm, Room A222

12:00 pm	**NS-ThP4** A Nanoscopic View of Photo-induced Charge Transfer in Organic Nano-crystalline Heterojunctions, **QIAN ZHANG**, S.R. COHEN, B. RYBTCHINSKI, Weizmann Institute of Science, Israel
12:05 pm	**NS-ThP5** Ferroic-ionic Interaction in Hybrid Organic Inorganic Perovskites, **YONGTAO LIU**, L. COLLINS, A.V. IEVLEV, A. BELIANINOV, Oak Ridge National Laboratory; M. AHMADI, University of Tennessee Knoxville; S. JESSE, S.V. KALININ, Oak Ridge National Laboratory; B. HU, University of Tennessee Knoxville; O.S. OVCHINNIKOVA, Oak Ridge National Laboratory
12:10 pm	**NS-ThP6** Processing of Nanoscale Lamellae in Bulk Al-Cu Eutectic Samples Through Selective Laser Melting, **JONATHAN SKELTON**, J.A. FLORO, J.M. FITZ-GERALD, University of Virginia
12:15 pm	**NS-ThP8** Understanding Tip-induced Nanoscale Wear for Tomographic Atomic Force Microscopy, **UMBERTO CELANO**, IMEC, Belgium; X. HU, University of California-Merced; L. WOUTERS, K. PAREDIS, T. HATSCHEL, P.A.W. VAN DER HEIDE, IMEC, Belgium; A. MARTINI, University of California-Merced
6:30 pm	**NANOMETER-SCALE SCI. & TECH. POSTER SESSION, THURSDAY, OCTOBER 24th, 6:30-8:30 PM, UNION STATION B**



The AVS Member Center will showcase membership benefits and professional development activities, including career related topics, and provide networking opportunities to all attendees throughout the week. It will be a place where attendees can stop in at any time to participate in our scheduled events, ask questions about how to access your membership benefits, or have a place to meet with other attendees. Coffee will be available in the morning for 2019 members to grab before a session. Be sure to stop by.

Location: Greater Columbus Convention Center, Room A111-112

Member Center Agenda 2019

Monday

7:00 am	**Member Lounge –** FREE Coffee* for 2019 Members
9:00 am	**Diversity and Inclusion –** "Inclusion and Diversity at the Workplace: Your Suggestions for Best Practices"
12:15 pm	**Professional Development –** "Welcome to AVS Overview" Lunch*
3:00 pm	**Professional Development –** Speed Networking for Young Professionals

Tuesday

7:00 am	**Member Lounge –** FREE Coffee* for 2019 Members
10:00 am	**Professional Development –** "Modern Job Searching Process"
12:15 pm	**Professional Development –** Job Information Forum and Lunch*
2:00 pm	**Professional Development –** "Modern Resumes and CVs"
3:30 pm	**Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)

Wednesday

7:00 am	**Member Lounge –** FREE Coffee* for 2019 Members
9:00 am	**Professional Development –** One hour with the National Academies: From Manufacturing Innovation to Quantum Computing
10:00 am	**Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)
12:30 pm	**Professional Development –** "Keeping Current and Connected" Lunch*
2:30 pm	**Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)

Thursday

7:00 am	**Member Lounge –** FREE Coffee* for 2019 Members
12:30 pm	**Professional Development –** Writers Workshop and Lunch*
3:00 pm	**Professional Development –** "XPS for the Non-analyst: Curve Fitting the Good, the Bad and the Awful"

**While Supplies Last*

***Times for these sessions are limited and are granted on a first-come, first serve basis while onsite at the AVS Symposium. A sign-up sheet will be available in the Member Center.*

Professional Development

Monday

12:15 p.m. **Professional Development –** "Welcome to AVS Overview" Lunch* (Room A111-112)

Moderator: Charles R. "Chip", Jr., Naval Research Lab

Wonder about the Mission and Vision of AVS?
Want to know how to get involved?
Would you like to hear from AVS members and leaders?

Then, come learn about the benefits and opportunities of YOUR newest Professional Society! This "Welcome to AVS!" event will introduce you to the mission, vision and organization of AVS as well as highlight its major activities

- Publications Editor-in-Chief: Eray Aydil
- Symposia and Conferences Chair: Jim Fitz-Gerald
- Education Chair: Tim Gessert
- Membership Chair: Dave Surman
- Chapters, Divisions and Groups Chair: Vin Smentkowski
- Professional Development Chair: Bridget Rogers

Come hear about the benefits now available to you as an AVS member – both at the symposium this week and throughout the whole year! Meet with key leaders in AVS and find out how you can get involved!

Welcome! We're really glad you're here and we want you to stay!

3:00 p.m. **Professional Development –** Speed Networking for Young Professionals (Room A111-112)

Moderator: Angela Klink, AVS Member Services Administrator

First time attending an AVS event?
Need to polish up your elevator speech?

Come join us for this fun and fast-paced networking event designed to provide you with a unique and fun opportunity to share your goals for this symposium and get to know your fellow conference attendees. During this session, you will move from table to table and discuss your technical and personal interests. After the initial meet and greet, you will have the opportunity to network with those who have similar interests or career paths. The speed networking dynamic this creates also helps attendees, including introverts, break the ice more easily. Don't miss out on this chance to make new contacts and turn it into a lasting connection.

MyAVS Stories

Would you like to share your AVS story with us? Stop by the Member Center to record your message that relates to your experience at an AVS event or to tell an inspiring tale that is relevant to the AVS membership.



Tuesday

10:00 am **Professional Development –** "Modern Job Searching Process" (Room A111-112)

Moderator: Dr. Lisa Balbes, Balbes Consultants, LLC

Finding a new job or career can seem overwhelming, but this workshop will help you take control of your professional destiny. Learn how to turn your education, experience, and skills into compelling draws for potential employers. The presenter will discuss all aspects of job searching, from online job boards to Instagram to interviews. Tips for successful interviewing will also be provided, including how to answer behavioral-based questions; how to tackle video interviews; and how to effectively negotiate job offers. Join us to gain valuable insight into this essential topic!

12:15 p.m. Job Information Forum and Lunch* (Room A111-112)

Moderator: Susan Burkett, The University of Alabama

Come have lunch and learn about several different career paths open to the AVS community. Panelists from a wide variety of science-based careers will provide an overview of what they do, how they got to where they are, their tips for success, and much more. Time will be reserved to enable the panelists to answer questions from the audience.

Panelists:
Stefan Zollner, Department Head, Dept. of Physics, New Mexico State University
Virginia Wheeler, Materials Research Engineer, US Naval Research Lab
Jessica Hilton, Consultant
Ben Schmidt, Staff Scientist, Physical Electronics

2:00 pm **Professional Development –** "Modern Resumes and CVs" (Room A111-112)

Moderator: Dr. Lisa Balbes, Balbes Consultants, LLC

Do you know the difference between a resume and a CV? Do you know which to use when applying for which type of job? (Hint: For a government position, the answer is neither!) This workshop will review current best practices and trends for writing both resumes and CVs, highlighting their similarities and differences as well as which information to include AND omit in each. Don't miss what surely will be a lively discussion on this crucial component of any job search!

3:30 pm **Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)

Hosted by: Dr. Lisa Balbes, Balbes Consultants, LLC

Need advice on how to handle a tricky situation at work? Wondering how to move up the career ladder or negotiate a salary increase? Or are you attending the career fair, and want to get an expert opinion on your current resume or CV? What about practicing some interview questions with a real interviewer? Any career-related question you have can be discussed in a one-on-one, 15-minute session with our career expert** who will provide personalized career advice on the subject(s) of your choosing.

***Times for these sessions are limited and are granted on a first-come, first serve basis while onsite at the AVS Symposium. A sign-up sheet will be available in the Member Center.*

Wednesday

9:00 am **Professional Development –** One hour with the National Academies: From Manufacturing Innovation to Quantum Computing (Room A111-112)

Moderator: Erik Svedberg, The National Academies of Sciences, Engineering, and Medicine

Join us for a one hour event where the National Materials and Manufacturing Board, hosted by the MSTG, will recap two recent workshops held in D.C. and look at the DoD's long-term participation in the Manufacturing Innovation Institutes that were initiated in 2012 with the national accelerator for additive manufacturing (AM) and 3D printing (3DP), America Makes. We will also discuss the Domestic Manufacturing Capabilities for Quantum-Enabled Systems and their Emerging Needs and ongoing studies.

10:00 am **Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)

Hosted by: Dr. Lisa Balbes, Balbes Consultants, LLC

Need advice on how to handle a tricky situation at work? Wondering how to move up the career ladder or negotiate a salary increase? Or are you attending the career fair, and want to get an expert opinion on your current resume or CV? What about practicing some interview questions with a real interviewer? Any career-related question you have can be discussed in a one-on-one, 15-minute session with our career expert** who will provide personalized career advice on the subject(s) of your choosing.

***Times for these sessions are limited and are granted on a first-come, first serve basis while onsite at the AVS Symposium. A sign-up sheet will be available in the Member Center.*

12:30 pm **Professional Development –** "Keeping Current and Connected" Lunch* (Room A111-112)

Moderator: Dr. Lisa Balbes, Balbes Consultants, LLC

This session will include up-to-the-minute tips and tricks for making the best professional use of social media. For example, did you know that most employers will conduct a social media background check before making an offer of employment? How should you prepare? What online resources can you use to advance your career? How can you get the most out of professional tools like LinkedIn? And how can you use your online brand to enhance your offline interactions? Come find out!

2:30 pm **Professional Development –** SIGN UP:** "One-on-One Career Expert Advice" (Career Center Booth #146)

Hosted by: Dr. Lisa Balbes, Balbes Consultants, LLC

Need advice on how to handle a tricky situation at work? Wondering how to move up the career ladder or negotiate a salary increase? Or are you attending the career fair, and want to get an expert opinion on your current resume or CV? What about practicing some interview questions with a real interviewer? Any career-related question you have can be discussed in a one-on-one, 15-minute session with our career expert** who will provide personalized career advice on the subject(s) of your choosing.

***Times for these sessions are limited and are granted on a first-come, first serve basis while onsite at the AVS Symposium. A sign-up sheet will be available in the Member Center.*

Thursday

12:30 pm **Professional Development –** Writers Workshop and Lunch* (Room A111-112)

Moderator: Charles R. "Chip" Eddy, Jr., Naval Research Laboratory

Have lunch with editors of AVS journals to learn how the technical publication process works, what they look for in a quality submission, and hear their suggestions on getting published. Time will be reserved to answer all your questions.

Panelists:
Eray Aydil, AVS Editor-in-Chief
Sally McArthur, Editor, *Biointerphases*
Philippe Bouyer, Editor, *AVS Quantum Science*

3:00 pm **Professional Development –** "XPS for the Non-Analyst: Curve Fitting the Good, the Bad and the Awful" (Room A111-112)

Moderator: Kateryna Artyushkova, Physical Electronics

Surface characterization methods, such as XPS, are becoming more commonly used in multidisciplinary environments where researchers use information from multiple technologies, but are not experts in all of them. Fitting of XPS spectra is often used to extract chemical and compositional information. Unfortunately published papers increasingly appear with the data inappropriately fit and/or reported in multiple ways. This session is targeted to the XPS non-expert and will provide examples of what many novice users are getting wrong and advice on both appropriate fitting of spectra and also the reporting of how XPS data has been. One objective of the workshop is to enable you to identify the "bad" data that appears in the literature.

Panelists:
Matt Linford, Brigham Young University
Peter Sherwood, University of Washington
Jeff Terry, Illinois Institute of Technology

Diversity and Inclusion

Monday

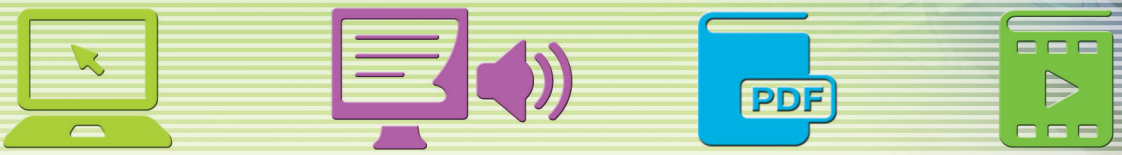
9:00 am **Diversity and Inclusion –** "Inclusion and Diversity at the Workplace: Your Suggestions for Best Practices" (Room A111-112)

Moderator: Talat Rahman, University of Central Florida

Attend this highly interactive one-hour session to hear from various speakers on how diversity and inclusion is in the workplace. We will start with a speaker who will lead the discussion on this topic and then we will break off into round tables with a speaker at each table to facilitate a 20 minute discussion. Afterward each table will present their suggestions followed by a group discussion. Speakers and table participants include:

- Pat Thiel, Iowa State University
- Stefan Zollner, New Mexico State University
- Mauro Sardela, University of Illinois
- Talat Rahman, University of Central Florida
- Sean Jones, NSF
- Lynnette Madsen, National Science Foundation
- Erica Douglas, Sandia National Labs

AVS Technical Library



The AVS Technical Library provides members with complimentary online access to technical and educational resources in the fields related to materials, processing, and interfaces:

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Login at **www.avs.org**

Stop by the AVS Member Center in Room A111-112
to learn more about the AVS Technical Library portal.

How Members Use the Technical Library...

"Presentations on Demand provides the ability to view talks I could not attend at the symposium, it also allows me to go back and capture details I missed. Colleagues who were not able to attend the symposium are viewing the presentations at their convenience!"
–Vincent S. Smentkowski, General Electric GRC

"As a Professor, I find this a great way to share cutting edge research on a variety of topics with both students and colleagues on the fly. Given the use of electronic classrooms today, this has been a seamless partnership to a live lecture experience. The quality of the talks and the ability to tailor your selection, when you want to view it is a great feature."
–James Fitz-Gerald, Univ. of Virginia

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Start the year off with an act of mentorship by gifting your student an AVS 2020 Membership. For $40 you'll be giving your student a **FULL year of AVS Benefits.** AVS Membership will build your students network with their peers as well as professionals in the field.

Your gift includes key resources that can quickly help them transition into the professional world:

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- Discount on **AVS Short Courses and Webinars**
- **FREE Subscription to Physics Today** magazine either by mail or digital copy
- Exclusive **Registration discount** to the **AVS 67th International Symposium** in Denver, Colorado
- Access to the **Career Resources** including **internship**, **job postings**, recorded **webinars** and **career advice**

Sign up today at **https://www.avs.org/Membership**



ICMCTF

47th International Conference on Metallurgical Coatings and Thin Films

April 26-May 1, 2020, Town & Country Hotel and Convention Center, San Diego, CA, USA

Sponsored by the AVS Advanced Surface Engineering Division: http://www2.avs.org/conferences/icmctf

CONFERENCE OVERVIEW

The International Conference on Metallurgical Coatings and Thin Films (ICMCTF) is the premier international conference in the field of **thin film deposition, characterization**, and **advanced surface engineering** promoting global exchange of ideas and information among scientists, technologists, and manufacturers. The Conference includes more than 80 high-profile invited speakers, in over 50 sessions, across 13 technical and topical symposia, several featured **lectures**, as well as focused **topic sessions, short courses**, an **equipment exhibition**, an **awards** program, and daily **social networking events**.

Technical Symposia

- A - Coatings for Use at High Temperatures
- B - Hard Coatings and Vapor Deposition Technologies
- C - Fundamentals and Technology of Multifunctional Materials and Devices
- D - Coatings for Biomedical and Healthcare Applications
- E - Tribology and Mechanical Behavior of Coatings and Engineered Surfaces
- F - New Horizons in Coatings and Thin Films
- G - Surface Engineering - Applied Research and Industrial Applications
- H - Advanced Characterization Techniques for Coatings, Thin Films, and Small Volumes

Topical Symposia

- TS1 - Anti- and De-icing Surface Engineering
- TS2 - New Horizons in Boron-Containing Coatings: Modelling, Synthesis and Applications
- TS3 - In-Silico Design of Novel Materials by Quantum Mechanics and Classical Methods jointly sponsored by ICMCTF and AQS
- TS4 - Photocatalytic and Superhydrophilic Surfaces
- TS5 - Thin Films on Polymer Substrates: Flexible Electronics and Beyond

PLENARY LECTURE



▶ **April 27, 2020, 8:00 a.m.**

"Organic Bioelectronics – Nature Connected"

- Magnus Berggren, Laboratory of Organic Electronics, ITN, Linköping University, Norrköping, Sweden

EXHIBITORS KEYNOTE LECTURE (EX)



▶ **Tuesday, April 28, 2020, 11:00 a.m.**

"Carbon based Coatings in Industrial Scale for Sustainable Surface Solutions"

- Dr. Jörg Vetter, Oerlikon, Germany

Special Interest Talks

"Materials Discoveries at Extreme Conditions: A Path Towards New Advanced Materials"
- Igor Abrikosov, Linköping University, IFM, Sweden

"Design, Metallurgy & Manufacturing Technologies of Targets for Hard Coating & Tribological Applications"
- Peter Polcik, Plansee Composite Materials GmbH, Germany

"Plasma Aspects in the Deposition of Advanced Coatings"
- André Anders, Leibniz Institute of Surface Engineering, Germany

Upcoming Deadlines

- ▶ **Manuscript Submission: March 20, 2020**
- ▶ **Pre-Registration: March 20, 2020**
  (Deadline is March 20th to be in the Program Book)
- ▶ **Early Registration: March 20, 2020**
  (Presenting authors must register by March 20th to remain in the Program Book)

General Chair:
Christopher Muratore
University of Dayton
cmuratore1@udayton.edu

Program Chair:
Grzegorz (Greg) Greczynski
Linkoping University
grzegorz.greczynski@liu.se

Conference Management:
Yvonne Towse
Della Miller
Jeannette DeGennaro
Heather Korff
icmctf@icmctf.org



AVS 39th Annual 5K Run

Wednesday, October 23, 2019

Columbus, Ohio • AVS 66

When: Wednesday, October 23, 2019, 6:30 AM., North Bank Park Pavilion area.

Registration: $30 ($45 onsite) entry fee includes run t-shirt, race number, and awards. Register online before September 30 or on-site using the conference registration computers. Run registration will close at 2 PM on Tuesday, October 22. Stop by the Run Registration Booth in the Greater Columbus Convention Center by 5:00 PM Tuesday, October 22 to pick up your materials and schedule.

Details and Awards: This year's race will start and end at North Bank Park and will run along the Scioto River. North Bank Park is within walking distance (about 1 mile) of the Greater Columbus Convention Center. With your entry fee you will receive a run t-shirt, race number, and awards. Speedy Sneakers Racing will professionally time this year's race. Overall male, female, team, and male/female age group awards will be distributed at the Run Registration area on Wednesday at following the morning sessions. Please attend this brief ceremony, as you are very likely to win something.

Don't forget to put together a team to compete in our **CORPORATE RACE AND DIVISIONS AND GROUPS RACE**

Each team representing a corporate entity (university, unemployed, research organization, manufacturer, etc.) or Division/Group must have three team members to qualify. Times are handicapped by age and sex.

To enter your team, please e-mail your roster, team name, and affiliation to the Run Director before noon on Tuesday, October 22—make sure each team member has registered for the run.

Run Director:
Bridget Rogers, bridget_rogers@avs.org



AVS Onsite Training Offers

- **Customized** course program that includes only those topics most valuable to your group
- **Convenient** course scheduling that lets you decide when and where your courses will be presented
- **Cost-effective and convenient training** by eliminating attendee travel expenses and individual attendee course fees. Taught at a location you choose.
- **Technical experts** selected for their knowledge of the subject, proven teaching ability, and communication skills in:

Vacuum and Equipment Technology - vacuum and processing equipment design, operation, and maintenance

Materials and Interface Characterization - chemical, physical, and electrical characterization of films, surfaces, particles, and interfaces

Materials Processing - materials processing, modification, and integration

www.avs.org

Contact us for details at
heather@avs.org
530-896-0477



AVS 66 Career Center and Job Fair

Looking for qualified candidates to interview and fill positions?
Looking for an employer who needs your skills and qualifications?



Check out the AVS Career Center and Job Fair
Exhibit Hall – Booth #146
https://www.avs.org/Symposium/Career-Center

Sunday	**Oct. 20**	**2:00 p.m. – 6:00 p.m.**	**Career Center Registration Area (Submit Job Openings/Résumés)**
Monday	**Oct. 21**	**7:30 a.m. – 5:00 p.m.**	**Career Center Registration Area (Submit Job Openings/Résumés)**
Tuesday	**Oct. 22**	**10:00 a.m. – 5:00 p.m.**	**Exhibit Hall, Booth #146 – Job Fair Open (One-on-One Career Expert Advice**)**
Wednesday	**Oct. 23**	**10:00 a.m. – 4:30 p.m**	**Exhibit Hall, Booth #146 – Job Fair Open (One-on-One Career Expert Advice**)**
Thursday	**Oct. 24**	**10:00 a.m. – 2:30 p.m.**	**Exhibit Hall, Booth #146 – Job Fair Open**
Friday	**Oct. 25**	**7:30 a.m. – 10:00 a.m.**	**Career Center Registration Area**

ONSITE SIGN-UP REQUIRED AT AVS MEMBER CENTER (Room A111-112)

EMPLOYERS		**JOB SEEKERS**
Post Job Openings	↔	**Submit Résumé/CV**
Review Résumés	↔	**Review Job Openings**
Interview Onsite	↔	**Interview Onsite**

NEW! The AVS Member Center will have special career related sessions on “Modern Job Searching Process” and “Modern Résumés and CVs” hosted by Lisa Balbes, Career Consultant, Balbes Consultants, LLC. Stop by and get some helpful tips. Any career-related question you have can be discussed in a one-on-one, 15-minute session with our career expert. Additional sessions are available, visit Room A111-112.

SPECIAL SESSIONS/WORKSHOPS

Biomaterial Interfaces Division Plenary Session and Reception

Sunday, October 20, 2019, 3:00–6:00 p.m., Room A120-121 Greater Columbus Convention Center

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

Thin Film Division TED-Talk Competition for the James Harper Award (Student-Oriented Event)

Monday, October 21, 2019, 7:30 p.m., Room A122-123 Greater Columbus Convention Center

This special session is an opportunity for the graduate student finalists for the Thin Film Division's Harper Award to present their work along the lines of a TED-talk, with 15 minute presentations. A panel of TFD members, in the role of execs and potential employers, will judge and critique these talks in real time for both content as well as presentation quality and originality. Following the talks, the Harper Award winner for the best overall presentation will be announced. This unique session is open to all students who are authors on an abstract presented in a TFD sponsored or TFD co-sponsored session. Hor d'ouvres and drinks will be provided.

2019 Harper Award Finalists:

1. Shashank Balasubramanyam, *Eindhoven University of Technology*
2. Bryan Voigt, *University of Minnesota*
3. RyanSheil, *University of California Los Angeles*
4. Konner Holden, *Oregon State University*

How to Lead By Inspiration

Thursday October 24, 2019, 5:20 p.m., Room A226 Greater Columbus Convention Center

The AVS 66 Symposium will host a panel discussion on the theme "How to Lead by Inspiration." The panelists are AVS members who have been (and still are!) inspiring leaders for several younger scientists and engineers because of their unique combination of great science and coaching skills. We invite all of you, graduate students, postdoc researchers, junior faculty members and research engineers, to attend this panel discussion to find out how to make an impact, as a young scientist or engineer, in your own field.

ASTM-E42/ASSD Joint Workshop: "What do we know about what we don't know? – A panel discussion."

Tuesday, October 22, 2019, 8:00 p.m., Bellows E, Hilton Columbus Downtown Hotel

Introduction
C.R. Brundle, *C R Brundle & Assoc*

"The Analysis Problem and Its Assumptions"
Alberto Hererra-Gomez, *CINESTAV*

"Uncertainties and Their Effect on Assumptions"

Panel Moderator:
Kateryna Artyushkova

Panelists:
C.R. Brundle
Mark Engelhard
Michaeleen Pacholski
Sally McArthur

Accompanying each specimen for analysis are many pieces of relevant information, not all of which may be relayed to the analyst, so assumptions must be made to enable analysis of a specimen when important details are lacking. While experience and exposure may help to develop insight into the types of issues possible in various analyses, the process of building a solid understanding of where information on a specimen is limited or missing can help guide the analyst toward making assumptions that are inclusive of the right information, and (hopefully) exclusive of wrong information.

The results from experimental analysis become one part of a mosaic that describes the physical and chemical state of the specimen. Part of understanding this mosaic includes understanding the limits of the techniques being use and this mosaic expands when multiple disciplines overlap in modern materials development, particularly in the expanding bio- and nano-environments. Many details of sample preparation, handling and general history, as well as data analysis approaches, now become very relevant when dealing with nanoparticles, nanostructured surfaces, and advanced bio-coatings. This panel discussion will focus on expanding the analyst's toolkit, enabling the unknown pieces of relevant information from a sample to be taken into account, as well as the "known" information that is presented with the sample.

Surface Science Morton M. Traum Presentation

Thursday, October 24, 2019, 12:20 p.m., Room A220-221, Greater Columbus Convention Center

The Tuesday Evening Poster Session features presentations by the Mort Traum Student Award Finalists. The Morton M. Traum Surface Science Student Award will be presented for the best student poster presented in the poster session sponsored or jointly sponsored by the Surface Science (SS) Division at the AVS International Symposia. The 2019 winner will be announced in the Traum Student Award Ceremony.

AVS 66 SPONSORS

AVS would like to acknowledge the following companies who have generously provided support for AVS 66 events.























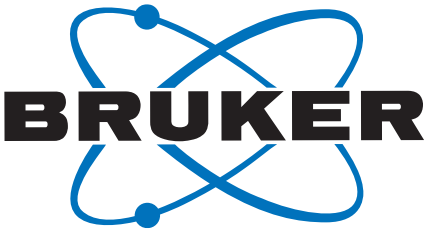















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- **Mack Vacuum Technologies, Inc.**
- **MDC Vacuum Products, LLC**
- **Nor-Cal Products**
- **Nordiko Technical Services Limited**
- **Optiforms, Inc.**
- **Pfeiffer Vacuum Technology**
- **Physical Electronics**
- **Plasmaterials Inc.**
- **Plasma-Therm**
- **Precision Plus Vacuum Parts**
- **Process Materials Inc.**
- **Provac Sales, Inc.**
- **Quantum Innovations, Inc.**
- **R.D. Mathis Company**
- **RBD Instruments, Inc.**
- **Reynard Corporation**
- **RF VII Inc.**
- **SPECS Surface Nano Analysis GmbH**
- **SPI Supplies**
- **Staib Instruments, Inc.**
- **Sumitomo (SHI) Cryogenics of America, Inc.**
- **Super Conductor Materials Inc.**
- **SynSysCo**
- **Thermo Fisher Scientific**
- **UC Components Inc.**
- **XEI Scientific, Inc.**

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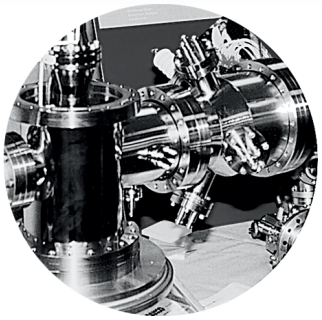
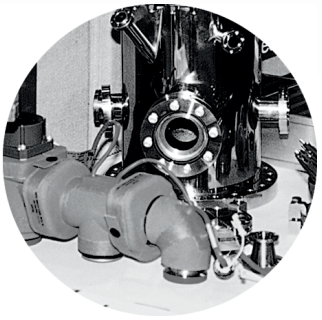




AVS AWARD WINNERS

MEDARD W. WELCH AWARDEES

1970 Erwin W. Mueller
1971 Gottfried K. Wehner
1972 Kenneth C.D. Hickman
1973 Lawrence A. Harris
1974 Homer D. Hagstrum
1975 Paul A. Redhead
1976 Leslie Holland
1977 Charles B. Duke
1978 Georg H. Hass
1979 Gert Ehrlich
1981 Harrison E. Farnsworth
1983 H.H. Wieder
1984 William S. Spicer
1985 Theodore E. Madey
1986 Harald Ibach
1987 Mark J. Cardillo
1988 Peter Sigmund
1989 Robert Gomer
1990 Jerry M. Woodall
1991 Max Lagally
1992 Ernst Bauer
1993 George Comsa
1994 John Yates, Jr.
1995 Gerhard Ertl
1996 Peter J. Feibelman
1997 Phaedon Avouris
1998 David E. Aspnes
1999 John H. Weaver
2000 D. Phillip Woodruff
2001 E. Ward Plummer
2002 Buddy Ratner
2003 Matthias Scheffler
2004 Rudolf M. Tromp
2005 Charles S. Fadley
2006 John C. Hemminger
2007 Jerry Tersoff
2008 Miquel Salmeron
2009 Robert J. Hamers
2010 Mark J. Kushner
2011 Wilson Ho
2012 Yves Chabal
2013 Chris G. Van de Walle
2014 Patricia A. Thiel
2015 Charles T. Campbell
2016 Maki Kawai
2017 Hans-Peter Steinrück
2018 David Castner
2019 Scott A. Chambers

GAEDE-LANGMUIR AWARDEES

1978 Pierre V. Auger
1980 Daniel Alpert
1982 Alfred H. Sommer
1984 Alfred Benninghoven
1986 Rointan F. Bunshah
1988 Alfred Y. Cho
1988 John R. Arthur, Jr.
1990 Francois M. d'Heurle
1992 Russell D. Young
1994 Robert J. Celotta
1994 Daniel T. Pierce
1996 Gerald J. Lapeyre
1998 Paul D. Palmberg
2000 Gary W. Rubloff
2002 Cristoforo Benvenuti
2004 Kunio Takayanagi
2006 Leonard J. Brillson
2008 Daniel Auerbach
2010 Gerald Lucovsky
2012 Dietrich Menzel
2014 Hans-Joachim Freund
2016 Paul S. Bagus
2018 Michael Grunze

ALBERT NERKEN AWARDEES

1985 John L. Vossen
1986 Donald J. Santeler
1987 Marsbed Hablanian
1988 Stanley L. Milora
1989 Charles D. Wagner
1989 Martin P. Seah
1990 J. Peter Hobson
1991 Harold R. Kaufman
1992 Paolo della Porta
1993 John O'Hanlon
1994 Hajime Ishimaru
1995 Donald Mattox
1996 William R. Wheeler
1997 John C. Helmer
1998 Peter J. Clarke
1999 Paul Holloway
2000 John T. Grant
2001 Cedric Powell
2002 David J. Harra
2003 Peter B. Barna
2004 Johan K. Fremerey
2005 Christopher R. Brundle
2006 Siegfried Hofmann
2007 Richard J. Colton
2008 Seizo Morita
2009 Donald R. Baer
2010 Fan Ren
2011 John E. Rowe
2012 Sven Tougaard
2013 Howard A. Padmore
2014 Gary E. McGuire
2014 Olga A. Shenderova

JOHN A. THORNTON MEMORIAL AWARDEES AND LECTURES

1989 Eric Kay
1990 Maurice Francombe
1991 Joseph E. Greene
1992 Thomas R. Anthony
1993 John W. Coburn
1993 Harold F. Winters
1994 David Hoffman
1995 Jan-Eric Sundgren
1997 James M.E. Harper
1999 Timothy Coutts
2001 Samuel D. Bader
2003 William D. Sproul
2005 Stan Veprek
2007 Stephen J. Pearton
2009 Frances A. Houle
2011 Vincent M. Donnelly
2013 Ivan Petrov
2015 Alfred Grill
2017 Steven George
2019 Gottlieb Oehrlein

PETER MARK AWARDEES

1980 Christopher R. Brundle
1981 Lawrence L. Kazmerski
1982 Charles M. Magee
1983 D. James Chadi
1984 Barbara J. Garrison
1985 Franz J. Himpsel
1986 Richard A. Gottscho
1987 Raymond T. Tung
1988 Jerry D. Tersoff
1989 Randall M. Feenstra
1990 Stephen M. Rossnagel
1991 William J. Kaiser
1993 Robert Hamers
1994 Marjorie Olmstead
1995 Emily Carter
1996 Brian E. Bent
1997 Brian Swartzentruber
1998 David G. Cahill
1999 Eray S. Aydil
2000 Stacey F. Bent
2001 Eli Rotenberg
2002 Rachel S. Goldman
2003 Charles H. Ahn
2004 Kathryn W. Guarini
2005 Jane P. Chang
2006 Mark C. Hersam
2007 W.M.M. Kessels
2008 Sergei Kalinin
2009 Beatriz Roldan Cuenya
2010 Arutiun Ehiasarian
2011 Mohan Sankaran
2012 E. Charles H. Sykes
2013 Daniel Gunlycke
2014 Joshua Zide
2015 Petro Maksymovych
2017 Markus Valtiner
2018 Peter Bruggeman
2019 Stephanie Law

AVS AWARD WINNERS

HONORARY MEMBERSHIP

1959 Rudy A. Koehler
1963 Benjamin B. Dayton
1981 Leonard C. Beavis
1981 N. Rey Whetten
1982 Charles B. Duke
1984 J. Roger Young
1985 Kai Siegbahn
1986 Manfred S. Kaminsky
1988 Jack H. Singleton
1991 John W. Coburn
1991 J. Lyn Provo
1992 Marsbed Hablanian
1996 Howard Patton
1997 Paul Holloway
1997 William D. Westwood
1999 Donna Bakale Sherwin
1999 James S. Murday
2000 Lawrence L. Kazmerski
2001 Robert Willis
2003 H. Frederick Dylla
2003 Gary E. McGuire
2004 Arthur O. Fuente, Jr.
2004 J.W. Rogers, Jr.
2005 Gerald Lucovsky
2006 Alvin Czanderna
2007 Paula J. Grunthaner
2008 Eric Kay
2009 Rudolf Ludeke
2009 William D. Sproul
2011 Robert A. Childs
2012 Cedric Powell
2013 David Castner
2013 Stephen M. Rossnagel
2014 John N. Russell, Jr.
2016 Dawn Bonnell

JOHN L. VOSSEN MEMORIAL AWARDEES

1997 Robert Shaner
1998 Hasan Fakhruddin
1999 Chris Ann Slye
2000 Charles J. Miltenberger
2001 Paul Lulai
2002 Toni L. Evans
2004 Jacqueline G. Kane

GEORGE T. HANYO AWARDEES

1997 Mark Engelhard
1998 David A. Lubelski
1999 Robert A. Childs
2001 John E. Bultman
2003 Ernest A. Sammann
2004 Richard E. Muller
2006 Jeffrey D. Kelley
2010 Arthur W. Ellis
2011 Jonathan Koch
2012 Percy Zahl
2013 Steven R. Blankenship
2014 Ewald E. Chaban
2015 Marc D. Landry
2016 Stanley B. Christman
2017 Mark C. Reuter

DOROTHY M. AND EARL S. HOFFMAN AWARDEES

2003 Kenneth Bratland (Univ. of Illinois at Urbana-Champaign)
2004 Michael Filler (Stanford University)
2005 Michael Zellner (University of Delaware)
2006 Xingyi Deng (Harvard University)
2007 Thomas Mullen (Pennsylvania State University)
2008 Gregory Rutter (Georgia Institute of Technology)
2009 Juan Carlos Rodriguez-Reyes (University of Delaware)
2010 Esther Amstad (ETH Zurich, Switzerland)
2011 Kangkang Wang(Ohio University)
2012 Davide Sangiovanni (Linkoping University)
2013 Zhu Liang (University of Illinois at Chicago)
2014 Jingjing Qiu (University of Florida)
2015 Jiayu Wan (University of Maryland, College Park)
2016 Andrew Mannix (Northwestern University)
2017 Xiaolong Liu (Northwestern University)
2018 Ryan Hackler (Northwestern University)

NELLIE YEOH WHETTEN AWARDEES

1990 Jani C. Ingram (University of Arizona)
1991 Lucia Markert (University of Illinois)
1992 Hope Michelson (IBM Almaden Research Center)
1993 Laura Tedder (University of California, San Diego)
1994 Monica Katiyar (University of Illinois)
1995 Cynthia Kelchner (Iowa State University)
1996 Tracey E. Caldwell (University of California, Davis)
1997 Catherine Labelle (Massachusetts Institute of Technology)
1998 Jennifer S. Hovis (University of Wisconsin)
1999 Nerissa Taylor (University of Illinois)
2000 Jennifer E. Gerbi (University of Illinois)
2001 Tanhong Cai (Iowa State University)
2002 Lyudmila Goncharova (Rutgers University)
2003 Meredith L. Anderson (Carnegie Mellon University)
2004 Wensha Yang (University of Wisconsin, Madison)
2005 Natalia Farkas (University of Akron)
2006 Jessica Hilton (University of Minnesota)
2007 Andrea Munro (University of Washington)
2008 Brittany Nelson-Cheeseman (University of California, Berkeley)
2009 Sarah Bishop (University of California, San Diego)
2010 Xiaoyu Wang (University of Wisconsin, Madison)
2011 Sondra Hellstrom (Stanford University)
2012 Nour Nijem (University of Texas, Dallas)
2013 Indira Seshadri (Rensselaer Polytechnic Institute)
2014 Jiechang Hou (University of Pennsylvania)
2015 Leeya Engel (Tel Aviv University)
2016 Debalaya Sarker (Indian Institute of Technology)
2017 Rachael Farber (Loyola University Chicago)
2018 Ann Lii-Rosales (Iowa State University)

AVS RUSSELL AND SIGURD VARIAN AWARDEES

1983 J.S. Villarubia (Cornell University)
1984 Kenneth T.Y. Kung (MIT)
1985 Anne L. Testoni (Northwestern University)
1986 Jingguang G. Chen (University of Pittsburgh)
1987 Joanne R. Levine (Northwestern University)
1988 Christopher E. Aumann (University of Wisconsin)
1989 Brian S. Swartzentruber (University of Wisconsin)
1990 Guangquan Lu (University of California, San Diego)
1991 Michael Flatte (University of California, Santa Barbara)
1992 Rex Ramsier (University of Pittsburgh)
1993 Daniel Kelly (University of California, Santa Barbara)
1994 Britt Turkot (University of Illinois)
1995 Robert Carpick (University of California, Berkeley)
1996 Kevin Robbie (University of Alberta)
1997 Kimberly S. Turner (Cornell University)
1998 John S. Lewis, III (University of Florida)
1999 Sanjit Singh Dang (University of Illinois, Chicago)
2000 Michelle L. Steen (Colorado State University)
2001 Jianwei Dong (University of Minnesota)
2002 Wei Tan (University of Illinois)
2003 John R. Kitchin (University of Delaware)
2004 Vassil Antonov (Univ. of Illinois at Urbana-Champaign)
2005 Liam Pingree (Northwestern University)
2006 Gregory Ten Eyck (Rensselaer Polytechnic Institute)
2007 H. Lee Mosbacker (Ohio State University)
2008 Erik Wallen (Linkoping University)
2009 Sudhakar Shet (New Jersey Institute of Technology/NREL)
2010 Christine Tan (Cornell University)
2011 David A. Siegel (University of California, Berkeley)
2012 April Jewell (Tufts University)
2013 Jason Kawasaki (University of California, Santa Barbara)
2014 Deep Jariwala (Northwestern University)
2015 Andrada-Oana Mandru (Ohio University)
2016 Thomas Winkler (University of Maryland, College Park)
2017 Tania E. Sandoval (Stanford University)
2018 William DeBenedetti (Cornell University)

Awards Ceremony & Reception

AVS 66th Annual Awards

Celebrate with AVS awardees
in Battelle North in the
Greater Columbus Convention Center,
Columbus, Ohio

Wednesday, October 23, 2019
at 6:30 p.m.

AVS AWARDS

AWARDS CEREMONY & RECEPTION

The AVS Awards Ceremony will be held on Wednesday, October 23, 2019, at 6:30 p.m. in the Greater Columbus Convention Center to be followed immediately by an Awards Reception. This year AVS honors the following awardees:

Scott A. Chambers, Medard W. Welch Award

Gottlieb Oehrlein, John A. Thornton Award

Stephanie Law, Peter Mark Memorial Award

The newly elected AVS Fellows

The 2019 AVS National Student Award Finalists

MEDARD W. WELCH AWARD

The Medard W. Welch Award was established in 1969 to commemorate the pioneering efforts of M.W. Welch in founding and supporting AVS. It is presented to recognize and encourage outstanding research in the fields of interest to AVS. The award consists of a cash award, a medal, a plaque, and an honorary lectureship at a regular session of the International Symposium.



SCOTT A. CHAMBERS

Medard W. Welch Award Lecture:
"Defect-Mediated Coupling of Builtin Potentials at Buried Interfaces Involving Epitaxial Complex Oxides"

Wednesday, 9:20 am, Room A220-221

Scott A. Chambers, Pacific Northwest National Laboratory "for pioneering contributions to understanding the origin and influence of heterogeneities, defects, and disorder in complex oxide epitaxial films and heterostructures"

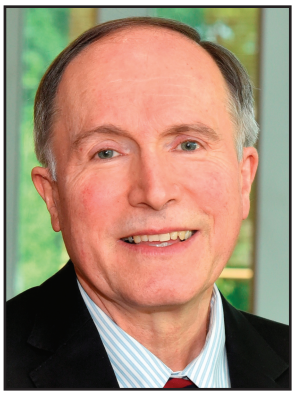
Dr. Scott A. Chambers is a Laboratory Fellow and Lead Principal Investigator for the oxide epitaxial growth effort in the Physical and Computational Sciences Directorate at Pacific Northwest National Laboratory. He received his A.B. in chemistry/chemical physics from the University of California at San Diego and his Ph.D. in physical chemistry from Oregon State University. His doctoral thesis focused on x-ray photoelectron spectroscopy of small molecules in the gas phase. He then taught chemistry and physics for eight years at George Fox University in Newberg, Oregon and at Bethel University in St. Paul, Minnesota. During these years he developed active undergraduate-oriented research programs aimed at understanding atomistic and electronic structures for single crystal surfaces in ultrahigh vacuum with and without ultrathin adlayers.

Dr. Chambers then moved to industry and for five years was a staff scientist at the Boeing High Technology Center in Seattle. While there he conducted fundamental research on interfacial phenomena involving epitaxial films of Group IV and Group III-V semiconductors, as well as intermetallic compounds. This work focused on controlling structure and electronic properties at interfaces of these dissimilar materials via epitaxial stabilization, using molecular beam epitaxy (MBE) as the deposition method of choice.

In 1992, Dr. Chambers moved to Pacific Northwest National Laboratory to initiate an effort in oxide heteroepitaxy in the newly conceived Environmental Molecular Sciences Laboratory. He and his group designed and procured several epitaxial growth chambers configured to deposit high-purity films of binary and complex oxides for a variety of scientific purposes. These include designer oxide mineral surfaces for fundamental surface and interface science investigations, as well as heterostructures involving complex oxides and conventional semiconductors for understanding the relationships between atomistic structure/composition and electronic, optical, magnetic and photochemical properties. A consistent theme in his research has been understanding the roles that defects play in influencing and even driving functional properties. To this end, he has employed a diverse set of analytical techniques in order to definitively characterize these complex systems. His goal has consistently been to develop defensible structure-composition-property relationships based on actual, as opposed to idealized, properties of epitaxial films and interfaces. Over the past decade, he has also extensively employed first-principles quantum mechanical calculations in his efforts. In 2004, he received the E.W. Mueller Award for outstanding achievements in surface science from the Laboratory for Surface Studies at the University of Wisconsin at Milwaukee. Dr. Chambers is a Fellow of the AVS, the APS and the AAAS. He has authored or co-authored ~300 peer-reviewed journal publications and ~20 invited review articles and book chapters. He has served the AVS as chair of the Pacific Northwest Section, as a member of the Executive Committees of the Electronic Materials and Processing Division and the Magnetic Interfaces and Nanostructures Division, and as a judge for M. M. Traum Student Competition of the Surface Science Division.

JOHN A. THORNTON MEMORIAL AWARD AND LECTURE

The John A. Thornton Memorial Award and Lecture was established in 1989 as a memorial to Dr. John A. Thornton for his devotion to science, his singular contributions to the generation and study of thin films, his effectiveness as an educator, and his unfailing humility, which won him the uncommon esteem and affections of his colleagues. It is presented to recognize outstanding research or technological innovation in the areas of interest to AVS, with emphasis on the fields of thin films, plasma processing, and related topics. The award is conferred biennially. It consists of a cash award, a plaque, and an honorary lectureship at a regular session of the International Symposium.



GOTTLIEB OEHRLEIN

John A. Thornton Memorial Award Lecture:
"Low Temperature Plasma-Materials Interactions: Foundations of Nanofabrication And Emerging Novel Applications At Atmospheric Pressure"

Monday 4:00 pm, Room B130

Gottlieb Oehrlein, University of Maryland "for groundbreaking contributions to the fundamental understanding of plasma-surface interactions enabling micro- and nanofabrication, using plasma-assisted techniques, including plasma based atomic layer etching"

Gottlieb Oehrlein is a professor in the Department of Materials Science and Engineering and the Institute for Research in Electronics and Applied Physics at the University of Maryland, College Park. He received a Vordiplom in Physics from Würzburg University, Germany (1976), and a Ph.D. in Physics from the State University of New York (SUNY), Albany

(1981). For his PhD research on defects in solid state materials he received the SUNY Chancellor's Distinguished Dissertation Award. He then joined IBM's Research Division, Yorktown Heights, N.Y., as a Research Staff Member where he worked on Plasma Science and Technology. In 1993 he returned as a Professor of Physics to his Alma Mater State University of New York, Albany. In 2000 he moved to the University of Maryland.

Dr. Oehrlein is best known for his work on the use of non-equilibrium plasma for advanced materials processing, in particular for his contributions to the understanding/control of plasma-surface interactions (PSI) and advancement of plasma etching methods. Groundbreaking insights on plasma-solid reactions were obtained by developing and applying novel real-time and in-situ plasma-surface interaction characterization methodologies and combining them with incident/outgoing particle characterization methods for critical plasma processes/materials. The scientific understanding obtained enabled systematic advancements of plasma materials processing, including the first experimental demonstration of atomic layer etching (ALE) of SiO_2 by the Oehrlein group. These PSI research methodologies are also the basis of the Oehrlein group's work on plasma material interactions using atmospheric pressure plasma sources for modification of organic materials, biomolecules, foods, control of microorganisms, and catalysts to produce renewable fuels.

Dr. Oehrlein has coauthored more than 300 publications with ~12000 citations and H index of 60. He served numerous times as member of the Executive Committee of the AVS Plasma Science and Technology Division, taught a professional course "High-Density Plasma Processing of Electronic Materials" for AVS from 1995–2002, and served as Associate Editor, J. Vacuum Science and Technology. Dr. Oehrlein helped establish the SPIE Advanced Lithography conference "Advanced Etch Technology for Nanopatterning" in 2012, and co-chaired (2012, 2013) and chaired (2014) this meeting. Dr. Oehrlein also served as the co-chair of the 2019 International ALE Workshop. He is a Fellow of AVS (1998), International Union of Pure and Applied Chemistry (2000), and International Plasma Chemistry Society (2017). He received the Electronics Division Award of the Electrochemical Society (1992), the IBM Faculty Award in 2002 and 2010, the Plasma Prize of the Plasma Science and Technology Division of AVS (2005), and will receive the DPS Nishizawa Award (2019).

PETER MARK MEMORIAL AWARD

The Peter Mark Memorial Award was established in 1979 in memory of Dr. Peter Mark who served as Editor of the *Journal of Vacuum Science and Technology* from 1975 to 1979. The award is presented to a young scientist or engineer (35 years of age or under) for outstanding theoretical or experimental work, at least part of which must have been published in an AVS Journal. The award consists of a cash award, a plaque, and an honorary lectureship at a regular session of the International Symposium.



STEPHANIE LAW

Peter Mark Memorial Award Lecture:
"Molecular Beam Epitaxial Growth of Novel Plasmonic Materials: Heavily-doped Semiconductors and Topological Insulators"

Wednesday 11:00 am, Room B131

Stephanie Law, University of Delaware, "for the epitaxy of novel materials and heterostructures for optics in the far-infrared and terahertz spectral ranges"

Dr. Stephanie Law is currently the Clare Boothe Luce Assistant Professor of Materials Science and Engineering at the University of Delaware and co-director of the UD Materials Growth Facility, a user facility that supplies films grown by molecular beam epitaxy to the scientific community. Stephanie obtained her B.S. in Physics from Iowa State University in 2006 and her Ph.D. in Physics from the University of Illinois at Urbana-Champaign in 2012. After receiving her Ph.D., she was a postdoctoral researcher in the Electrical and Computer Engineering department at UIUC before moving to UD in 2014.

Stephanie's research focuses on the growth of new optical materials and heterostructures for applications in the infrared and terahertz spectral range. She primarily works with materials grown by molecular beam epitaxy, including III-V semiconductors and chalcogenide-based topological insulators. Her research group has shown that heavily-doped III-V materials make excellent infrared plasmonic and hyperbolic metamaterial components, has succeeded in reducing the trivial carrier density in topological insulator films, and has demonstrated ultra-high mode indices in topological insulator plasmonic structures in the terahertz spectral range. Future applications of these materials include sub-diffraction focusing of light, extreme light confinement, chemical sensing, and radiative decay engineering. She has published over thirty papers, four of which were selected as Editor's Picks or Most Read Articles. She has given over thirty invited talks and seminars. Her research has been recognized by several awards including the 2016 North American Molecular Beam Epitaxy Young Investigator Award and a 2017 Department of Energy Early Career Award.

Stephanie is highly active in the scientific community. She has served on the organizing committee for five different conferences and was the lead organizer for the 2017 "Novel Materials and Architectures for Plasmonics: From the Ultraviolet to the Terahertz" Materials Research Society symposium and the van der Waals epitaxy workshop at the 2018 North American Molecular Beam Epitaxy conference. She is currently the Program Chair for the 2019 North American Molecular Beam Epitaxy Conference.

AVS GRADUATE STUDENT AWARDS

2019 NATIONAL STUDENT AWARD FINALISTS

There are five (5) top-level named Graduate Student Awards and three (3) Graduate Research Awards, described below. The recipients of these awards are determined after a general competition with all the graduate research applicants and a presentation to the Awards Committee at the International Symposium.

The finalists are:

Michael Dzara, Colorado School of Mines
Ross Edel, University of Chicago
Thilini Ekanayaka, University of Nebraska Lincoln
Yongtao Liu, University of Tennessee Knoxville
Jonathan Meyers, University of North Carolina Chapel Hill
Dipna Patel, Tufts University
Koichi Tanaka, UCLA
Rebecca Thompson, University of Chicago

RUSSELL AND SIGURD VARIAN AWARD

The Russell and Sigurd Varian Award was established in 1982 to commemorate the pioneering work of Russell and Sigurd Varian. It is presented to recognize and encourage excellence in graduate studies in the sciences and technologies of interest to AVS. The award is supported by Varian, Inc. It consists of a cash award, a certificate, and reimbursed travel support to attend the International Symposium.

NELLIE YEOH WHETTEN AWARD

The Nellie Yeoh Whetten Award was established in 1989, in the spirit of Nellie Yeoh Whetten, to recognize and encourage excellence by women in graduate studies in the sciences and technologies of interest to AVS. A fund to support the award was established by Timothy J. Whetten, friends and family of Nellie Yeoh Whetten, and AVS. The award consists of a cash award, a certificate, and reimbursed travel support to attend the International Symposium.

DOROTHY M. AND EARL S. HOFFMAN AWARD

The Dorothy M. and Earl S. Hoffman Award was established in 2002 to recognize and encourage excellence in graduate studies in the sciences and technologies of interest to AVS. It is funded by a bequest from Dorothy M. Hoffman, who was president of AVS in 1974 and held other positions of responsibility in the Society. The award consists of a cash award, a certificate, and reimbursed travel support to attend the International Symposium.

DOROTHY M. AND EARL S. HOFFMAN SCHOLARSHIPS

The Dorothy M. and Earl S. Hoffman Scholarships were established in 2002 to recognize and encourage excellence in graduate studies in the sciences and technologies of interest to AVS. They are funded by a bequest from Dorothy M. Hoffman. The scholarships consist of a cash award, a certificate, and reimbursed travel support to attend the International Symposium.

GRADUATE RESEARCH AWARDS

The Graduate Research Awards were established in 1984 to recognize and encourage excellence in graduate studies in the sciences and technologies of interest to AVS. Each consists of a cash award, a certificate, and reimbursed travel support to attend the International Symposium.

AVS FELLOWS

The membership level designated "Fellow of the Society" was established in 1993 to recognize members who have made sustained and outstanding scientific and technical contributions in areas of interest to AVS. These contributions can be in research, engineering, technical advancement, academic education or managerial leadership. This is a prestigious membership level to which members are elected. AVS Fellows receive a certificate.

2019 AVS FELLOWS

John Conley, Oregon State University
Arutiun Ehiasarian, Sheffield-Hallam University, United Kingdom
James Fedchak, NIST
Armin Gölzhäuser, Universität Bielefeld, Germany
Erwin Kessels, Eindhoven University of Technology, The Netherlands
Ludvik Martinu, École Polytechnique de Montreal, Canada
Anthony Muscat, University of Arizona
Ivan Oleynik, University of South Florida
Axel Rosenhahn, Ruhr-University Bochum, Germany
Darrell Schlom, Cornell University
Erik B. Svedberg, The National Academies: National Materials and Manufacturing Board
Miguel Jose Yacaman, University of Texas at San Antonio

DIVISION AWARDS

Morton M. Traum Surface Science Division Student Award

The Surface Science Student Award was initiated in 1981. Morton M. Traum, then chair of the Surface Science Division, was the prime motivator in establishing the award. After Mort's untimely death on 1 December 1982, the Executive Committee of the Surface Science Division renamed the award in his memory. The Morton M. Traum Surface Science Division Student Award is presented annually for the best student paper based on work leading to a Ph.D thesis. The papers are judged on technical content and quality of presentation.

The 2019 winner will be announced in the Traum Student Award Ceremony, to be held on Thursday, October 24 at 12:30 pm in Room A220-221 of the Greater Columbus Convention Center.

Past Winners:

1981	Eric Stuve	1991	David Peale	2001	Jeppe Vang Lauritsen	2011	David Siegel
1982	Steven Gates	1992	Chaochin Su	2002	Seth B. Darling	2012	April Jewell
1983	Ann Smith	1993	Anna Swan	2003	Marcel A. Wall	2013	Xiaofeng Feng
1984	Hans Gossman	1994	Bert M. Müller	2004	Emrah Ozensoy	2014	Feng Zhang
1985	Duane Outka	1995	Frank Zimmermann	2005	Jan Haubrich	2015	Holly Walen
1986	Greg Sitz	1996	Joseph Carpinelli	2006	Petro Maksymovych	2016	Andrew Therrien
1987	Michael Henderson	1997	Barry Stipe	2007	Bogdan Diaconescu	2017	Rachael Farber
1988	Jeff Hanson	1998	Alexander Bogicevic	2008	Jeibin Sun	2018	Eric High
1989	Yunong (Neal) Yang	1999	Jongin Hahn	2009	Qing Hua		
1990	Benjamin Wiegand	2000	Anders Carlsson	2010	Heather Tierney		

John Coburn and Harold Winters Student Award in Plasma Science and Technology

In 1994, the Plasma Science and Technology Division established the Coburn and Winters Award in honor of John Coburn and Harold Winters. Coburn and Winters have made pioneering contributions to the field of plasma science, especially in plasma processing and plasma surface interactions. Their work has provided inspiration for countless students entering the field of plasma science and enhanced the experiences of students by both example and mentorship.

The 2019 Coburn-Winters Award winner will be announced on Thursday, October 24 at 12:20 pm in Room B131 of the Greater Columbus Convention Center.

Past Winners:

1994	Bruce Kellerman	2001	Nicholas Fuller	2008	Emile Despiau-Pujo	2014	Paul Rumbach
1995	Not Given	2002	Lin Sha	2009	Yang Yang	2015	Hu Li
1996	Jane Chang	2003	Jan Benedikt	2010	Bhavin Jariwala	2016	Souvik Ghosh
1997	Mikhail Malyshev	2004	Jun Belen	2011	Harald B. Profijt	2017	Hyun-Jwon Roh
1998	Catherine Labelle	2005	Joseph Végh	2012	Joe Lee	2018	Tahsin Faraz
1999	Erwin Kessels	2006	Lin Xu	2013	Rohan Chaukulkar		
2000	Siva Kanakasabapathy	2007	Joydeep Guha	2014	Bastien Bruneau		

Leo M. Falicov Student Award

The Leo M. Falicov Student Award has been established in memory of Prof. Leo M. Falicov to recognize outstanding research performed by a graduate student in areas of interest to the Magnetic Interfaces and Nanostructures Division. Finalists will be selected on the basis of abstract submission, and will each receive an award upon attending the AVS 66th International Symposium and Exhibition and presenting their paper in an oral session. The Best Student Paper Award winner will be selected on the basis of the oral presentation, considering quality of research and clarity of presentation.

Past Winners:

1999	W.H. Rippard	2005	Jessica Hilton	2010	Kangkang Wang	2015	Andrada-Oana Mandru
2000	R.D. Portugal	2006	Randy Dumas	2011	Juan Colon-Santana	2017	Oren Ben Dor
2001	D.B. Schultz	2007	David Wisbey	2012	Chloe Baldasseroni	2018	Kevin Fitzell
2002	E.L. Biizdaca	2007	John Strachan	2013	Jason Kawasaki		
2003	Tiffany Kaspar	2008	Zhuhua Cai	2013	Kaida Yang		
2004	Maria Torija	2009	Wei Han	2014	Henry Wortelen		

DIVISION AWARDS

Paul H. Holloway Young Investigator Award

The Thin Film Division is pleased to announce Dr. Adrie J.M. Mackus, Eindhoven University of Technology, as the 2019 awardee of the Paul H. Holloway Young Investigator Award. Dr. Mackus has been given this award for his groundbreaking research on Area-Selective ALD and his contributions to the fundamental understanding of ALD and ALE surface reactions and their application to nano-patterning and nano-integration.

This award is named after Professor Paul H. Holloway of the University of Florida who has a distinguished and continuing career of scholarship and service to AVS. The nominee is a young scientist or engineer who has contributed outstanding theoretical and/or experimental work in an area important to the Thin Film Division of AVS. The nominee's Ph.D. or equivalent degree must have been earned less than 7 years prior to January 1 of the award year. The award consists of a cash prize, a certificate citing the accomplishment of the recipient, and an honorary lecture at one of the TFD sessions at the International Symposium.

Past Winners:

2009 Suneel Kodambaka, UCLA
2010 O. Martin Ntwaaborwa, Univ. of the Free State, South Africa
2011 Sumit Agarwal, Colorado School of Mines
2012 Franklin Tao, University of Notre Dame
2013 Per Eklund, Linköping University
2014 Andrea Illiberi, Dutch Inst for Applied Scientifc Res (TNO)
2015 Cunjian Yu, University of Houston
2016 Neil Dasgupta, University of Michigan
2017 Bharat Jalan, University of Minnesota
2018 Jason Kawasaki, University of Wisconsin

Nanometer-scale Science and Technology Division Awards Competition for Graduate Students and Postdocs

The Nanometer-scale Science and Technology Division (NSTD) Graduate Student and Postdoctoral Awards bring recognition to outstanding work by early-career scientists giving oral presentations in NSTD sessions at AVS International Symposia. In addition to presenting their work in the standard NSTD sessions, finalists also make brief presentations at the NSTD Awards Competition. This public special event is held at noon on Wednesday of the symposium in the same room as the standard NSTD sessions. The winners will be selected based on the quality of the talk, the responses to questions, and the level of the research. Winners in the graduate student and postdoctoral categories are announced at the close of the competition.

Past Winners:

2002 Jeremy Steinshinder
2003 Cheol-Soo Yang
2004 Qiguang Li
2005 Kiu-Yuen Tse
2006 Tracie Colburn
2006 Dirk Weber
2007 Jacob Palmer
2008 Qing Hua Wang
2009 Mehmet Baykara
2010 Farzad Behafarid
2011 Justice Alaboson
2012 David Reid
2013 Cédric Barroo
2014 Deep Jariwala
2015 Wei Bao
2016 Alma Perez-Perinno
2017 Xiaolong Liu
2018 Omur Erdinc Dagdeviren

Nanotechnology Recognition Award

The Nanotechnology Recognition Award recognizes members of NSTD for outstanding scientific and technical contributions in the science of nanometer-scale structures, technology transfer involving nanometer-scale structures, and/or the promotion and dissemination of knowledge and development in these areas. The Award will be presented before the recipient's talk at the AVS International Symposium. The 2019 Awardee is Paul Weiss, UCLA.

Past Winners:

2001 Nancy Burnham, Worcester Polytechnic Institute
2004 Harold Craighead, Cornell University
2009 Joseph Stroscio, NIST
2010 Roland Wiesendanger, University of Hamburg
2011 Phaedon Avouris, IBM Yorktown Heights
2012 Fleming Besenbacher, Aarhus University
2013 Joseph Lyding, University of Illinois
2014 Dawn A. Bonnell, University of Pennsylvania
2015 Meyya Meyyapan, NASA Ames Research Center
2016 Ricardo Garcia, CSIC
2017 Mark Hersam, Northwestern University
2018 Chennupati Jagadish, Australian National University

DIVISION AWARDS

Peter M. A. Sherwood Mid-Career Professional Award in Applied Surface Science

The AVS Applied Surface Science Division (ASSD) established the Peter M. A. Sherwood Mid-Career Professional Award in 2014 in honor of the distinctive legacy and ongoing contributions of Prof. Dr. Peter M. A. Sherwood in academic, government and industrial capacities. The award recognizes and promotes mid-career professionals who demonstrate sustained and outstanding contributions related to education, research, development and engineering in an area of interest to the ASSD. The award is comprised of a cash gift and a plaque. The awardee will give a featured lecture at the AVS International Symposium where the award will be announced and presented.

Past Winners:

2014 Prof. Dr. Lara Gamble, University of Washington
2016 Dr. Gregory L. Fisher, Physical Electronics, Inc.
2017 Dr. Felix Kollmer, IonTOF GmbH
2018 Dr. Zihua Zhu, Pacific Northwest National Laboratory

Applied Surface Science Division Student Award

The Applied Surface Science Division (ASSD) Award recognizes outstanding work by students who present their research as an oral presentation or poster in an ASSD or ASSD-sponsored session at the AVS International Symposium. Up to three award finalists are chosen from the applicants. The award finalists present a "capsule" presentation to the judges during the Tuesday night ASSD Business Meeting, to be held on Tuesday, October 22, 2019, at 7:30 pm in the King Room of the Hilton Columbus Downtown, where the award winners are announced at the conclusion of the competition. The winner is selected based upon presentation skills, scientific merit and originality of their work. Up to three awards are presented that each consist of a cash prize and certificate. In addition the student that wins the best presentation award will be reimbursed for the meeting registration at the student rate for the following year's AVS meeting, and ASSD will ask the award winner to submit an abstract to an ASSD or ASSD-sponsored session.

Past Winners (1st Place):

1987 Leticia Quinones
1988 Gregory Stauf
1989 Mathew G. Blain
1990 Jerry L. Hunter, Jr.
1991 Mary Elizabeth Napier
1992 Gerald Magera
1993 Lee Rumaner
1994 Peiter Gunter
1995 Camille Kassis
1996 Sudipta Seal
1997 Jim Zhao
1998 Mark D. Mowery
1999 Chris Moffitt
2000 Berndt Gotsmann
2001 Saravanapriyan Sriraman
2002 Yuki Yoshida
2003 Mingyao Zhu
2004 Xin Zhao
2005 Chi-Ying Lee
2006 Hiral Ajmera
2007 Sirnegeda Techane
2008 Joseph Baio
2009 Michelle Sestak
2010 Daniel Schmidt
2011 Stefan Schöche
2012 William Roach
2013 Tevis Jacobs
2014 Eng Wen Ong
2015 Alex Pearse
2016 Gopalakrishnan Ramalingam
2017 Jin Li
2018 Maiglid Moreno

TFD Distinguished Technologist Award

The Thin Film Division is quite pleased to announce that Josh Whaley from Sandia National Laboratories has been chosen as the 2019 awardee of the Distinguished Technologist Award.

This award was established to recognize individuals who have provided exceptional technical support for thin film research or related development activities, without whose support many advancements in thin film research would not be possible. Nominees must have provided significant technical support to a laboratory research or development program in an area of interest to the Thin Film Division. Nominations are expect to come from an active AVS member. This award was created and endowed in 2015 by the New Mexico Chapter of AVS to honor its founders and their many contributions. The award consists of a cash prize, travel support for the AVS international symposium, and a plaque citing the accomplishments of the recipient.

Past Winners:

2015 Catherine Sobczak, Sandia National Labs
2016 Michael Lopez, Sandia National Labs
2017 Janneke Zeebregts, Eindhoven University of Technology
2018 Chris Tasker, Oregon State University
2019 Josh Whaley, Sandia National Laboratories

AVS Student Activities

Did you know that 25% of AVS membership is comprised of students? You represent the future of AVS and we encourage you to take advantage of the following opportunities and services:

Student Chapters

Meet future colleagues and employers and form friendships while sharing common interests in a range of science and technology topics during various chapter activities.

Student Awards

Apply for both a **National and Divisional Level Award.** National Student Awards include **five top-level awards and multiple Graduate Research Awards.** All AVS National Student Awards are presented during the Awards Ceremony at the International Symposium and **include travel support as well as a cash award**.

Career Services

Connect with the finest job seekers and companies in physics, engineering, vacuum science, and technology using the **AVS Online Career Center** which partners with the Physics Today, American Association of Physics Teachers, American Physical Society, and IEEE Computer Society.

Attend our annual **Onsite Career Center/Mini Job Fair** at the AVS International Symposium and Exhibition and **meet with potential employers and gain interviewing skills during the conference.**

Short Courses

Broaden your knowledge and develop new job skills by attending an **AVS Short Course.** Courses offer basic and advanced training in vacuum, materials, processing, and interfaces.

AVS Publications and Technical Libraries

Delve into our **four journals that cover a variety of materials, processing, and interfaces topics**—access is easy using the online **AVS Publications Digital Library** or **iAVS.**

No time to attend a talk? Discover our newest benefit in the **AVS Technical Library, Presentations on Demand** featuring recorded talks from AVS Symposia. The Technical Library also provides access to books, monographs, and other scientific resource materials.

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LEARN MORE:

Exhibitor Technology Spotlight Session, Exhibit Hall:

Tuesday, October 22nd @4pm

Or Stop by Booth 627

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Not Intended for New Mexico residents

EXHIBIT HALL EVENTS



The AVS 66 Exhibits provides you with the opptorunity to visit the companies who offer the products and services which are utilized in your laboratory. Come learn about the most innovative technology and services available in the industry. Technology Spotlight Sessions take place during session breaks and will showcase new products and services.

EXHIBIT HALL SPECIAL ATTRACTIONS & EVENTS

Ask The Experts - ***Hosted by the AVS Vacuum Technology Division***

AVS Career Center

Exhibitor Technology Spotlight Sessions

AVS Store

Free Morning Coffee • Lunch • Afternoon Refreshments

Art Zone Display & Competition

Daily Raffle Drawings

Grand Prize Raffle Drawing

New Mobile Phone Charging Lounge

Free Caricatures

Foosball Tournament

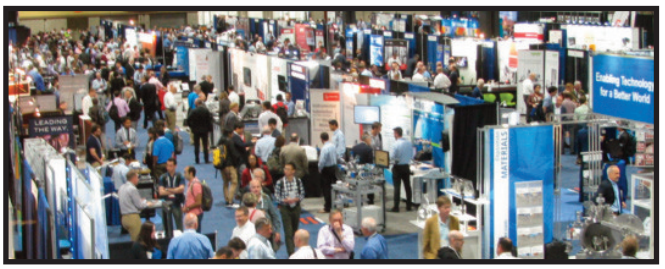
Networking Events

Media, Journals & Publishers

EXHIBIT HALL SCHEDULE

Oct. 22	**Tuesday**	**10am - 5:00pm**
Oct. 23	**Wednesday**	**10am - 4:30pm**
Oct. 24	**Thursday**	**10am - 2:30pm**

Exhibitors displaying their latest products



Media, Editors & Publications





Foosball Tournament



Art Zone/Contest

EXHIBIT FINALE

THURSDAY, OCTOBER 24

EVENTS:

- **Lunch & Refreshments**
- **Art Contest Prize Winners**
- **Raffle Drawings**
- **Grand Prize Rafle Drawing**
- **Foosball Championship**
- **Caricatures**

FREE EXHIBIT HALL ENTRY !!!

EXHIBITING COMPANIES

Bold listings reflect our Sponsors and Corporate Members

Booth	Company
616	AccuStrata
522	AdValue Technology LLC
427	AGC Plasma Technology Solutions
627	**AIP Publishing**
511	AJA International, Inc.
508	American Institute of Physics
203	Amuneal Mfg Corporation
501	ANCORP
407	Anderson Dahlen
625	Association of Vacuum Equipment Manufacturers
533	Atlas Technologies
512	Automated Bonding Technology
634	AVS - Ask The Experts Vacuum Technology Division
202	AVS Art Zone / Contest
146	AVS Career Center
138	AVS Charging Lounge for Mobile Phones
152	AVS Exhibitor Technology Sessions
635	AVS Foosball Tournament
733	AVS Future Sites
734	AVS Membership & Logo Items
626	AVS Publications
735	AVS Raffle Zone
221	AVS Special Events Booth
333	BellowsTech, LLC
400	BriskHeat Corporation
717	**Bruker Nano Surfaces**
306	Cosmotec, Inc.
614	CS Clean Solutions, Inc.
414	**Duniway Stockroom Corp.**
723	Ebara Technologies, Inc.
510	Edwards Vacuum
720	Extrel CMS
436	Ferrovac GmbH
702	Film Sense
633	**Gamma Vacuum**
411	HeatWave Labs Inc.
413	Heidelberg Instruments, Inc.
310	Hiden Analytical, Inc.
800	Hine Automation
710	Horiba Scientific
528	Huntington Labs
311	**HVA, LLC**
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423	Inland Vacuum Industries, Inc.
714	InstruTech, Inc.
244	Intel Corporation
406	**ION-TOF USA**
300	**J.A. Woollam**
801	**Joseph Oat Corporation**
421	Kashiyama-USA Inc.
607	Kaufman & Robinson, Inc.
201	**Kimball Physics Inc.**
713	KITZ SCT AMERICA
701	Kratos Analytical, Inc.
612	k-Space Associates, Inc.
601	**Kurt J. Lesker Company**
520	Kyungwon Tech Co., Ltd.
409	LDS Vacuum Products, Inc.
412	Luxel Corp.
301	MeiVac, Inc.
303	Micro Photonics
709	Midwest Vacuum Inc.
600	**MKS Instruments**
424	MODION®
715	National Institute of Standards and Technology
632	Nel Hydrogen
329	Nextron Corporation
307	Nonsequitur Technologies
623	Nor-Cal Products, Inc.
315	OkyayTech
506	Osaka Vacuum USA, Inc.
729	Park Systems, Inc.
621	Pfeiffer Vacuum Technology, Inc.
707	PHPK Technologies
500	**Physical Electronics**
716	Precision Plus Vacuum Parts
507	Princeton Scientific Corp
200	PVD Products
606	**R.D. Mathis Company**
313	Raith America, Inc.
513	RASIRC
524	**RF VII Inc.**
321	**SAES Group**
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205	Vacuum Volume, LLC
732	VAT Group
516	Veeco Instruments
145	View, Inc.
706	Von Ardenne
316	Williamsburg Scientific Instruments
410	Yugyokuen Ceramics Co., Ltd.

EXHIBITOR TECHNOLOGY SPOTLIGHT SESSIONS

Stage Area of Exhibit Hall (Booth 152) • Greater Columbus Convention Center

20-minute interactive presentations scheduled during the technical session breaks in the Stage Area of the exhibit hall. Gain insight to the latest products and services offered by the exhibitors that benefit everyone including technicians, engineers and scientists as well as fellow manufacturers.

FREE ADMISSION

TUESDAY, OCTOBER 22

10:20am Von Ardenne
Addressing the Challenges for Economic & Efficiency Improvements for Thin Film Production
Presenter: Corinne D'Ambrosio

12:20pm Thermo Fisher Scientific
New Developments from Thermo Fisher Scientific
Presenter: Timothy Nunney

12:40pm Specs Surface Nano Analysis GmbH
New Trends in Photoelectron Spectroscopy:
Momentum Resolved Photoelectron Spectroscopy,
Spin-resolved ARPES, Small Spot and Hard X-ray XPS
Presenter: Thomas Stempel Pereira

1:00pm Ion Tof
Latest Trends and Instrumentation for TOF-SIMS
Presenter: Nathan Havercroft

1:20pm Staib
Efficiency Improvements for Thin Film Production
Presenter: Eric Dombrowski

1:40 Kratos Analytical
50 Years of XPS
Presenter: Christopher Blomfield

2:00pm Physical Electronics
What's New at Phi ?
Presenter: John Newman

4:00pm AIPP/AVS
eSpectra: The Data Analysis Resource for You, or for Your Customers
Presenter: Jessica Hoy

ASK THE EXPERTS !!!!!!

Troubleshooting Mysteries? Contamination Problems?
System Configuration Questions? Just want to make your vacuum better?

What's the best gauge for the 1e-10 Torr range ?	How do I detect a Virtual Leak ?	What is my RGA telling me?	How do I control/eliminate water outgassing?

Are you having problems with troubleshooting, process control? Maybe all our years of experience, successes and failures can help point you in the right direction or spark an idea! An unbiased, open forum with the desire to solve vacuum related issues. Come chat with us at Booth 634.

Who are we? We are volunteers from the AVS Vacuum Technology Division and our goals are to understand the intricacies of vacuum technology and to help you solve problems.

PUT US TO THE TEST !

Whether you're new to vacuum technology or have 30 years of experience, stop by the Ask the Experts booth to discuss your vacuum concerns... maybe you can even provide us with some new tips and suggestions or maybe you would like join our team of experts!!

Come challenge our experts and receive a UL Listed Power Bank (while supplies last) and join the A.T.E. raffle for an iPad!



Ask The Experts - Exhibit Hall Booth 634

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Exhibit Hall • Booth 634

SYMPOSIUM PLENARY LECTURE

"Roles of Surface and Materials Science in the Direct Production of Fuels from Sunlight"

Monday, October 21, 2019, 5:30–6:30 PM,

Battelle North, Greater Columbus Convention Center



Dr. Nathan S. Lewis

George L. Argyros Professor of Chemistry, California Institute of Technology

We are developing an artificial photosynthetic system that will utilize sunlight and water as the inputs and produce hydrogen and oxygen as the outputs. We are taking a modular, parallel development approach in which three distinct primary components-the photoanode, the photocathode, and the product-separating but ion-conducting membrane-are fabricated and optimized separately before assembly into a complete water-splitting system. The design principles incorporate two separate, photosensitive semiconductor/liquid junctions that will collectively generate the 1.7–1.9 V at open circuit necessary to support both the oxidation of H_2O (or OH^-) and the reduction of H^+ (or H_2O). The photoanode and photocathode will consist of rod-like semiconductor components, with attached heterogeneous multi-electron transfer catalysts, which are needed to drive the oxidation or reduction reactions at low overpotentials.

The high aspect-ratio semiconductor rod electrode architecture allows for the use of low cost, earth abundant materials without sacrificing energy conversion efficiency due to the orthogonalization of light absorption and charge-carrier collection. Additionally, the high surface-area design of the rod-based semiconductor array electrode inherently lowers the flux of charge carriers over the rod array surface relative to the projected geometric surface of the photoelectrode, thus lowering the photocurrent density at the solid/liquid junction and thereby relaxing the demands on the activity (and cost) of any electrocatalysts. A flexible composite polymer film will allow for electron and ion conduction between the photoanode and photocathode while simultaneously preventing mixing of the gaseous products. Separate polymeric materials will be used to make electrical contact between the anode and cathode, and also to provide structural support. Interspersed patches of an ion conducting polymer will maintain charge balance between the two half-cells.

Dr. Nathan Lewis, George L. Argyros Professor of Chemistry, has been on the faculty at California Institute of Technology since 1988 and has served as Professor since 1991. He has also served as Principal Investigator of the Beckman Institute Molecular Materials Resource Center at Caltech since 1992. He was on the faculty at Stanford, as Assistant Professor from 1981 to 1985, and as tenured Associate Professor from 1986 to 1988. Dr. Lewis received his Ph.D. in Chemistry from the Massachusetts Institute of Technology.

Dr. Lewis has been an Alfred P. Sloan Fellow, a Camille and Henry Dreyfus Teacher-Scholar, and a Presidential Young Investigator. He received the Fresenius Award in 1990, the ACS Award in Pure Chemistry in 1991, the Orton Memorial Lecture award in 2003, the Princeton Environmental Award in 2003, the Michael Faraday Medal of the Royal Society of Electrochemistry in 2008, and was elected to the National Academy of Inventors' 2017 class of fellows. From 2009 to 2019 he served as Editor-in-Chief of *Energy & Environmental Science*. He has published over 500 papers and has supervised approximately 100 graduate students and postdoctoral associates.

His research interests include artificial photosynthesis and electronic noses. Lewis has been active in the solar fuels, solar chemical field, for over 40 years. Details of these research topics focus on light-induced electron transfer reactions, both at surfaces and in transition metal complexes, surface chemistry and photochemistry of semiconductor/liquid interfaces, novel uses of conducting organic polymers and polymer/conductor composites, and development of sensor arrays that use pattern recognition algorithms to identify odorants, mimicking the mammalian olfaction process.

Brief summaries of each program theme are provided below. Symposium presenters represent the best and brightest from academia, industry, & government research labs around the world. Start filling your week's schedule with must-see, career enhancing sessions.

2D MATERIALS FOCUS TOPIC (2D):

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

ACTINIDES AND RARE EARTHS FOCUS TOPIC (AC):

Actinides and rare earths exhibit many unique and diverse physical, chemical and magnetic properties resulting in large part from the complexity of their 5f and 4f electronic structure. The Actinide and Rare Earth Sessions focus on the chemistry, physics and materials science of f–electron materials. Emphasis will be placed upon the 4f/5f electronic and magnetic structure, surface science, thin film properties, and applications to energy–related issues. The role of fundamental f–electron science in resolving technical challenges posed by actinide materials will be stressed, particularly with regard to energy applications, including energy generation, novel nuclear fuels, and structural materials. Both basic and applied experimental approaches, including synchrotron–radiation-based and neutron–based investigations, as well as theoretical modeling computational simulations, will be featured, with the aim of explaining the observed behavior in these complex materials. Of particular importance are the issues important to nuclear energy and security, including fuel synthesis, oxidation, corrosion, intermixing, stability in extreme environments, prediction of properties via bench-marked simulations, separation science, and forensics. Specific sessions will be devoted to a continued, focused emphasis on the advances in the theory and measurements of core-level spectroscopies for the study of actinides and rare earths. This Focus Topic will also address advances in chemistry/materials sciences for environmental management and will promote the participation of early career scientists.

ATOMIC SCALE PROCESSING FOCUS TOPIC (AP):

The AVS66 program will feature for the first time, the Atomic Scale Processing Focus Topic. This focus topic will provide a unique forum to expand the scope of atomic layer deposition (ALD) and atomic layer etching (ALE) processes towards understanding the fundamentals needed to achieve true atomic scale precision as well as synergistic efforts across multiple AVS divisions and groups to generate novel characterization methods to advance the field of processing at the atomic scale. The Focus Topic begins on Monday morning with a session on Area Selective Deposition and Selective-Area Patterning, highlighted with invited talks from Prof. Gregory Parsons from NC State and Prof. Sumit Agarwal from Colorado School of Mines. The program continues on Tuesday afternoon with a session on Advancing Metrology and Characterization to enable Atomic Layer Processing featuring multiple invited talks from Dr. James Hilfiker, J.A. Woollam, Dr. Jeff Elam, Argonne National Laboratory, and Dr. Andrew Antonelli, Nanometrics. The program then continues on both Wednesday morning and Thursday morning with sessions on Surface Reaction Analysis and Emerging Applications of Atomic Scale Processing and Thermal Atomic Layer Etching, respectively as well as the poster session on Thursday evening. In addition, there are numerous sessions on ALD and ALE featured throughout the week in sessions led by the Thin Films Division, the Plasma Science and Technology Division, the Electronic Materials and Photonics Division and the 2D Materials Focus Topic.

APPLIED SURFACE SCIENCE DIVISION (AS):

The ASSD is the premier gathering place for the global community of surface analysts providing a forum for research in the preparation, characterization, modification, and utilization of surfaces and interfaces in practical applications. ASSD promotes the development of accurate and practical methods to understand real interfaces. Our contributors will present fundamental research workalong with cutting-edge applied studies in nanoscience, materials for energy conversion, semiconductor processing, polymers, biotechnology, and more.

This year, ASSD partners with the Focus Topic on New Challenges to Reproducible Data and Analysis to address issues of reproducibility in Surface Analytical techniques. Session on Reproducibility issues in Quantitative XPS (AS+BI+RA-MoM) will discuss the challenges related to calibration, energy referencing, the accuracy of quantification, errors in peak fitting, and others. Three other sessions addressing reproducibility challenges will discuss other surface analysis methods (AS+BI+RA-TuM), data treatment and modeling (RA+AS+NS+SS-MoA) and a combination of multiple techniques (RA+AS+BI-WeA).

ASSD strives to grow in new areas of applied surface analysis. Invited talks covering techniques beyond traditional surface analysis will include such techniques as Atom Probe Tomography and Hard X-ray XPS. With this year's focus on energy transitions, the ASSD program includes a session on Operando technique for energy devices (AS+CA+LS-WeA) and the role of surfaces in energy and industrial programs (AS-ThA).

BIOMATERIAL INTERFACES DIVISION (BI):

The 2019 AVS program from the Biomaterials Interfaces Division presents an interdisciplinary forum for the discussion of fundamental aspects of bio-interface science and engineering. The BI program brings together recent advances made in materials science and molecular biology with sophisticated surface and interface analysis methods along with theoretical and modeling approaches for biological systems. Focus areas for this year include: Biofabrication, Bioanalytics, Biosensors, Diagnostics, Biolubrication and Wear; Cutting edge Bio: Bio-Nano, Bio-Engery, 3D Bio; Characterization of Biological and Biomaterial Surfaces; Biomolecules and Biophysics and Interfaces; Microbes and Fouling at Surfaces; and of course our highly interactive BID Poster session, including a Flash Poster session Tuesday afternoon before the main poster session. We therefore invite submissions of Flash/Poster Presentations, which will be followed by awards for the best student Flash/Poster contributions.

BIOMATERIALS PLENARY SESSION (BP):

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

CHEMICAL ANALYSIS AND IMAGING INTERFACES FOCUS TOPIC (CA):

Chemical and physical processes occurring at surfaces and interfaces, including gas-liquid, solid-liquid, and gas-solid interface are important in many applications and do represent grand scientific and engineering challenges. This Focus Topic aims to provide a platform

to the latest developments of emerging techniques and scientific understanding using in situ/ex situ/non situ/operando imaging, spectroscopy and microscopy to investigate challenging surfaces and interfaces. The contributions cover applications in biology, catalysis, energy conversion and storage, environment, and material science.

FUNDAMENTAL ASPECTS OF MATERIAL DEGRADATION FOCUS TOPIC (DM):

Degradation is an inevitable process with major implications for materials applications, process safety, and efficiency in areas such as catalysis, biomaterial performance, biofouling of ship hulls, and the corrosion of structural and additively manufactured materials.

This Focus Topic will promote interdisciplinary discussion, highlight common problems, and encourage the development of a molecular level understanding of degradation processes.

As invited speaker Philipp Marcus, who pioneered atomic scale imaging of corrosive processes, will highlight the recent progress in atomic-scale characterisation of solid/liquid interfaces and understanding of initial degrading mechanism of metals in oxidizing/liquid environments. In addition, Gerry Frankel will give an overview on corrosion science of high-entropy alloys, which are a fascinating class of emerging complex materials, for which surface processes are not well studied at all. Biofouling prevention, material stabilities and technology for degradation protection for bio- and biomedical materials will be discussed in a simulation-focussed session with Paul Molino as invited speaker.Finally, Serhiy Cherevko will provide insight on stability of electrocatalyst under operating conditions during electrocatalytic processing with ICP-MS coupled scanning flow cells. In this session catalyst degradation, dissolution reactions, oxidation and sintering will be discussed in detail by contributing speakers.

SPECTROSCOPIC ELLIPSOMETRY FOCUS TOPIC (EL):

The Focus Topic on Spectroscopic Ellipsometry integrates themes ranging from classical material science and thin film characterization to nanometer scale science and novel optical sensing concepts. We will host two oral sessions dedicated to traditional applications of spectroscopic ellipsometry in optical materials and thin film characterization as well as new and emerging topics. The first session will focus on classical research topics of ellipsometry as for instance optical coatings and inorganic as well as organic thin film characterization. Furthermore, presentations on the ellipsometric investigation of novel optical and electronic materials and materials with subwavelength structures will be included. In the second oral session we will host presentations on novel experimental and theoretical approaches. This topic will also include spectroscopic ellipsometry for the characterization of energy materials in response to the AVS 66 topic "Shaping our future: Materials, technologies and processes for the energy transition." As highlight, the best student paper, which is selected based on the quality of the research, its presentation, and the discussion during the symposium, will be awarded with the Spectroscopic Ellipsometry Focus Topic student award. A poster session will be also hosted.

ELECTRONIC MATERIALS AND PHOTONICS DIVISION (EM):

The Electronic Materials and Photonics Division encompasses presentations in any aspect of the science and engineering of materials, interfaces, and processing that advance electronic, photonic, and optoelectronic device technologies. Sessions planned for AVS 66 include materials, processes, and devices for advanced logic, memory, and interconnect applications. Methods to enable new device topologies and simplify process flows such as selective area patterning, deposition, and etching will also be highlighted. In honor of our late colleague Prof. Nikolaus Dietz, a long-time EMPD committee member and AVS contributor, we have organized a special session covering the materials growth, characterization, and fabrication of wide and ultra-wide band gap devices. Consistent with the energy theme of AVS 66, we have devoted a session to the electronics and photonics needed to enable renewable energy generation, storage, and transmission. Topics include low-power electronics, power electronics, photovoltaics, and thermoelectrics. We are also holding a session covering the latest advances in electronic and photonic nanostructure synthesis, assembly, and properties, as well as the techniques required for their characterization on the nanoscale. As in past years, we will offer multiple graduate student poster awards as well as post-doc travel awards to help create a forum in which younger scientists can present their work and develop relationships for the future.

FUNDAMENTAL DISCOVERIES IN HETEROGENEOUS CATALYSIS FOCUS TOPIC (HC):

The Fundamental Discoveries in Heterogeneous Catalysis (HC) focus topic highlights recent advances in the understanding of the atomic and molecular basis for heterogeneously-catalyzed reactions on solid surfaces. This will be the fourth time the HC Focus Topic has been organized. This year, HC is coordinated with the Surface Science (SS) Division, and the 2D Materials (2D) and Energy Transition (TL) Focus Topics. Emphasis will be on facilitating dialogue between surface science-based and applied communities studying heterogeneously-catalyzed systems. In addition to previous session topics including theoretical models, nanoscale structures, gas-surface dynamics, and other novel studies of active surfaces, several new areas will be explored. New sessions will focus on machine learning and artificial intelligence, building catalysts inspired by nature, exotic surfaces, and as well as challenges for energy production in line with the Symposium theme on energy transition. HC will highlight connections among theoretical and experimental approaches with the goal of revealing key details of the fundamental chemistry and physics underlying heterogeneous catalysis. Of particular interest are developments in chemical understanding, atomic-level details, and predictive models of reactions catalyzed by metal surfaces.

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

AVS 66 Advanced Ion Microscopy & Ion Beam Nano-Engineering focus topic targets research in focused ion beam technology and applications. This includes microscopy, metrology, direct-write lithography, nano-machining, and nano-engineering applications. Emphasis is on applying novel ion beam technologies to enable scaling, supplementing, or replacing existing techniques historically used in semiconductors, life sciences, and other nano-microscopy applications. This year's focus topic will feature the following four areas: Advanced Ion Microscopy and Surface Analysis, featuring talks in He ion microscopy (HIM), Ne & Cs SIMS, neutral beam imaging, and other novel ion beam imaging - analysis applications; Novel Beam Induced Material Engineering & Nano-Patterning; Emerging Ion Source, Optics, and Applications, featuring talks on advances in GFIS, Cold Beams, and LMIS source technology.

FRONTIERS OF NEW LIGHT SOURCES APPLIED TO MATERIALS, INTERFACES, AND PROCESSING FOCUS TOPIC (LS):

The increasing need for energy coupled with growing concerns about climate change is one of the greatest challenges of our society. Renewable energy is one of the solutions to replace fossil fuels,

but sustainability imposes combination with efficient conversion and storage. Notwithstanding the vast R&D activities the technology has not reached the maturity to comprise the high-conversion and high-power range due to the fact that successful operation of solar cells and batteries is determined by numerous physical, chemical, electrical and thermal processes, occurring over wide spatial and temporal ranges. One of the most promising guides for solving technology problems is to understand the evolving device properties via in-situ and operando analyses and here the synchrotron and FEL-based methods have become indispensable tools to provide rational guidelines for technological breakthroughs. New insights into the governing processes that are crucial for development of engineering strategies for the next generation energy devices have been attained via operando synchrotron and FEL-based methods and will be presented by the selected speakers in the LS sessions on Thursday, October 24.

MAGNETIC INTERFACES AND NANOSTRUCTURES DIVISION (MI):

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

MEMS AND NEMS GROUP (MN):

The MEMS and NEMS Technology Group (MN) program will highlight recent advances in the broad areas of micro/nanoelectromechanical systems (MEMS/NEMS), especially latest fundamental studies of novel materials, processes, devices, and emerging functions and applications of MEMS/NEMS, in various areas. This AVS66 MN program will include a focus on sensing, communication, and energy. Specific highlights for AVS66 will be microscale gas chromatography and microfabrication technologies for quantum computing. Our program will include resonant low-dimensional materials and parametric and nonlinear MEMS/NEMS resonators which create intriguing possibilities of integrating these devices with existing fluidic, electronic and optical on-chip networks. The program continues to embrace latest progresses in optical MEMS/ NEMS, micro/nano-photonics, optomechanics, quantum MEMS/ NEMS, resonant systems, CMOS-MEMS, mesoscopic dynamics and dissipation processes, inertial sensors, harsh-environment transducers, 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 for biosensing, bio-inspired microsystems, wearable and wireless healthcare.

MANUFACTURING SCIENCE AND TECHNOLOGY GROUP (MS):

The MSTG sessions bring together invited speakers to highlight the challenges needing to be addressed for successful manufacturing of next generation devices and technologies. Our sessions are meant to generate synergy among scientists and engineers working across the spectrum of these technologies, including basic science research, metrology, processing, and development, to encourage everyone to keep these manufacturing challenges in mind as they move the technologies forward. This year we are highlighting the areas of Solid State Battery Manufacturing, as contribution to the Symposium theme on energy transition, and Quantum and Neuromorphic Computing Manufacturing.

NANOMETER-SCALE SCIENCE AND TECHNOLOGY DIVISION (NS):

This Division explores the science and technology that emerges when material is shrunk to the nanoscale. Researchers from around the globe will present their work on topics such as nanoscale devices and quantum systems exploiting nanoscale design and characterization. The role of nanomaterials in novel devices and constructs is highlighted, particularly their surface chemistry, energetics, mechanics, and imagery. Specific emphasis will be made on the the key connections between nanoscale physical and chemical phenomena induced in confined volumes as probed and manipulated by scanning probe tips, electromagnetic radiation, electrons and ions, as well as approaches to harness these phenomena for nanoscale and atom-by-atom fabrication. The NS program particularly promotes novel physical phenomena emerging in these nanosystems, and their applications for quantum information systems, sensing, and other applications.

COMPLEX OXIDES: FUNDAMENTAL PROPERTIES AND APPLICATIONS FOCUS TOPIC (OX):

Complex oxides—including perovskites but also other oxides such as alumino-silicates, with two or more non-oxygen elements —are of rapidly emerging interest in current CMOS technology (memory, dielectrics), advanced electronics and spintronics, and in catalysis. These materials present novel challenges regarding deposition and growth (e.g., pulsed laser deposition vs. sputter deposition vs. MBE vs. ALD), and present exciting surface and interface phenomena—including the formation of two-dimensional electron gases at surfaces or interfaces, interfacial spin-spin interactions, all-oxide heterostructures for electronics/spintronics, and novel catalysts and photocatalysts. Contributions will be presented in both fundamental aspects and applications, with emphasis on Electronic and Magnetic Properties; Dielectric Properties and Memory Applications; Catalysis, including photocatalysis, heterogeneous catalysis and electrocatalysis, in line with the Symposium theme on energy transition.

PLASMA SCIENCE AND TECHNOLOGY DIVISION (PS):

The 2019 Plasma Science & Technology program highlights state-of-the-art advances in plasma research, ranging from fundamental studies of plasma physics and chemistry to new applications. The latest achievements in plasma modeling, plasma-surface interactions, plasma diagnostics, atmospheric-pressure plasmas, plasma-liquid interactions, and plasma catalysis will be presented. Other areas will include plasma-enhanced atomic layer etching and atomic layer deposition which will have synergy with the Atomic Scale Processing Focus Topic. There will also be a special session honoring the contributions and legacy of John Coburn from IBM and two special

award lectures by Prof. Jane Chang from UCLA who received the 2018 Plasma Prize, and Prof. Gottlieb Oehrlein from University of Maryland who is receiving the 2019 John A. Thornton Memorial Award.

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

Materials and Processes for Quantum Information, Computing and Science will cover topics which interface micro-fabrication, surface science with quantum information, computing and science. It will cover all devices, materials and systems that enable quantum information processing. These will include but not limited to, NV centers, Ion traps, single photon amplifiers, multiplexers, and advances in cryogenic systems, vacuum technology and microwave to optical conversion schemes etc. Specific sessions will highlight the recent advances and challenges in quantum science and information processing, achieving higher coherence qubits and SiC, diamond and related materials for quantum information sciences. A special session will be dedicated to the new AVS/AIPP joint journal *AVS Quantum Science (AQS)* with invited talks by four *AQS* Editors with an overview of their research areas and their vision for the *Journal*.

NEW CHALLENGES TO REPRODUCIBLE DATA AND ANALYSIS FOCUS TOPIC (RA):

Reproducibility, replication and repeatability challenges are appearing in new and traditional ways in most areas of modern science. In a 2018 AVS survey, 65% of those responding indicated that they had seen or experienced significant reproducibility issues. Reproducibility challenges have many sources including the increasing demands of complex research, requiring use of multiple experimental and computational research methods, and issues associated with large amounts of data of multiple types. The Focus Topic on New Challenges to Reproducible Data and Analysis, in partnership and coordination with several AVS Divisions, explores sources and impacts of reproducibility challenges and ways to address them. Overviews of reproducibility and replication challenges will be presented by invited speakers including a summary of a National Academies study on reproducibility (Dianne Chong, Boeing retired), assessing reproducibility in material chemistry (David Shall, Georgia Tech) and reproducibility in fundamental and applied science (George Crabtree, Argonne National Lab). Some of the newer challenges and opportunities related to reproducibility and replication are associated with large amounts of data (and data types) and modeling. Invited talks related to big and complex data will be addressed by Anne Plant (NIST), Steve Wiley (PNNL) and Ilke Arslan (Argonne National Lab) while Wolfgang Werner (Vienna University of Technology) will apply modeling to analysis of nanoparticles. In many situations, the use of combined or multi-technique methods can help address reproducibility challenges as described in invited talks by Thomas Beebe (University of Delaware), Sally McArthur (Swinburne University of Technology) and Caterina Minelli (National Physical Laboratory). As XPS is the mostly widely used method of surface analysis, with many novice users, reproducibility issues are appearing in the XPS literature. The Reproducibility focus topic has partnered with AS by presenting contributions on Reproducibility Issues in Quantitative XPS.

ADVANCED SURFACE ENGINEERING DIVISION (SE):

The program of the Advanced Surface Engineering Division (SE) focuses on all topics related to engineering the properties and functionalities of surfaces of all kinds. Both fundamental scientific and application-oriented contributions presenting experimental and/or theoretical and computational results are included. The session "Plasma-assisted Surface Modification and Deposition Processes" presents contributions aimed at understanding or further developing techniques and processes to alter the appearance of surfaces or to synthesise thin films and coatings on surfaces of interest. Topics related to analysis and characterisation of such modified surfaces are covered by the session "Nanostructured Thin Films and Coatings". This includes also contributions on new and advanced characterisation techniques in order to reveal further details. As thin films and coatings are frequently exposed to different environmental impacts, the session "Tribology: from Nano to Macroscale" will present fundamental aspects of friction and wear of contacting surfaces as well as the development of coatings to protect the underlying surface from environmental influences. Last but not least the session "New Challenges and Opportunities in Surface Engineering" serves as a forum to gather new ideas and developments in the field and to show its broadness. The main focus is on topics and contributions that show how surface engineering can assist to solve present-day and future problems. All invited lectures review and highlight the state-of-the-art and latest findings in the respective topic. Academic, industry and national laboratory scientists, technicians and especially junior researchers and PhD students from various disciplines and all countries contribute to our diverse and interesting technical program including four oral sessions and one poster session.

SURFACE SCIENCE DIVISION (SS):

The Surface Science Division provides a forum for cutting edge and foundational research that involves solid surfaces and interfaces including gas-solid and liquid-solid interactions. We aim to understand the wide range of processes, which play out on surfaces and at interfaces. This knowledge is critical to improve catalysts, find ways to limit corrosion, and even peek into the chemical processes at planetary surfaces. This year we include a special session on "Surface Science in Energy Conversion and Storage" – one of the pressing concerns if our time. This session showcases this years AVS Symposium theme on energy transition. Surface science has close ties with other divisions such as heterogeneous catalysis, and the focus topics on materials degradation, and 2D materials. This close relations are seen in the program and encourage participants to explore science outside of their immediate sphere of interest. This year's sessions extend from surface chemistries with carbon dioxide and water to reactions on alloy surfaces, single atom catalysis, and reactions with oxides. We showcase advances in intra-molecule imaging, and promote experiments under "real life conditions", which are now feasible owing to advances in measurement techniques. We will host the Morton M. Traum award to honor research presented by students in the Surface Science Division.

THIN FILMS DIVISION (TF):

The Thin Film Division offers several core oral sessions, with outstanding invited speakers, and one poster session covering the broad scope of thin film topics including various deposition processes (ALD, CVD, PVD, MBE, PLD, sputtering, etc), characterization of structure-property-performance relationships, and applications enabled by thin film technologies. There are two sessions dedicated to ALD and CVD thin films, including precursors for ALD and CVD and nucleation, surface reactions, mechanisms and kinetics. This includes understanding ALD for 3D particles versus 2D wafers as is the topic of Ruud van Ommen (Delft Univeristy).New this year to thin films is a session on HiPIMS deposition for novel thin films. Specifically to address this year's symposium theme on energy transition we have two sessions comprising of thin films for energy harvesting, conversion, electrochemistry and storage. This includes

an invited talk from Wyatt Tenhaff (Univ. Rochester) on "Enabling energy dense lithium batteries using thin film technology." Additionally, we have thin film sessions on electronics and optoelectronics applications as well as new emerging applications. We offer sessions on in-situ diagnostics and theory/modelling to understand the fundamental science of thin films and a characterization session to exploit advancements in techniques to analyze thin film properties. To address the emerging materials in thin films, we are offering sessions on metal halide perovskites and other organic/inorganic hybrid films and interfaces, functional films like ferroelectric and multiferroics, functional polymers and composites, neuromorphic and phase change materials, novel wide bandgap and ultrawide bandgap materials, and epitaxial films. Thin Film Division also encourages the graduate student involvement as noted by several high quality talks throughout the sessions including Bryan Voigt's (Univ. of Minnesota) presentation on p-type pyrite (FeS2) as a potential low-cost earth abundant thin film solar absorber. Again this year, we will host a student-focused session to highlight the Harper Award candidates in which the student finalists will present their work in an interactive "TEDTalk" type of forum.

ENERGY TRANSITION FOCUS TOPIC (TL):

The Energy Transition (TL) Focus Topic is being introduced in the AVS Symposium for the first time in 2019, entirely organized by young investigators (students and post-docs) within AVS. This FT aims to highlight the breakthroughs and state-of-the-art advances in the field of energy transition. Aligned with the symposium theme of "Shaping our future: Materials, technologies, and processes for energy transition," this FT will feature invited contributions from eminent leaders in the field of energy transition and a panel discussion surrounding the ideas and innovations within the field. Our sessions will focus on fundamental discoveries in heterogeneous catalysis, advancements in applied surface and interface science, innovations in materials development, and implementations of these new technologies within living labs. To demonstrate the collaborative efforts of the AVS divisions and focus topics on addressing matters that relate to energy transitions, the sessions will be supported by the Heterogeneous Catalysis FT, Surface Science Division, Applied Surface Science, Manufacturing Science & Technology, Thin Films, and Vacuum Technology divisions. We are delighted that this FT will spotlight the innovative and collaborative work being conducted by distinguished leaders in the community and researchers who are at the beginning of their careers in interfacial science to address critical energy concerns.

VACUUM TECHNOLOGY DIVISION (VT):

The Vacuum Technology Division (VTD) provides a forum for research in achieving, maintaining, measuring, and analyzing vacuum across a wide range of pressures, gas compositions and applications. The 2019 VT program topics include: Vacuum Measurement; Vacuum Pumping, Outgassing, and leaks; Gas Dynamics and Modeling; Accelerators and Large Vacuum Systems; Advanced Applications in Vacuum Technology. The VTD Poster session Tuesday evening features the VT Student Poster Competition, where students of any discipline are invited to share their innovative solutions to vacuum equipment challenges. Student presenter awards will also be given for the best oral presentations.

Code of Conduct for AVS Meetings

It is the policy of the American Vacuum Society (AVS) that all participants, including attendees, vendors, AVS staff, volunteers, and all other stakeholders at AVS meetings will conduct themselves in a professional manner that is welcoming to all participants and free from any form of discrimination, harassment, or retaliation. Participants will treat each other with respect and consideration to create a collegial, inclusive, and professional environment at AVS Meetings. Creating a supportive environment to enable scientific disclosure at AVS meetings is the responsibility of all participants.

Participants will avoid any inappropriate actions or statements based on individual characteristics such as race, color, national origin, religion, sex, disability, age, citizenship status, genetic information, sexual orientation, gender identity or expression, or any other characteristic protected by law. Disruptive or harassing behavior of any kind will not be tolerated. Harassment includes but is not limited to inappropriate or intimidating behavior and language, unwelcome jokes or comments, unwanted touching or attention, offensive images, photography without permission, and stalking.

Violations of this code of conduct policy should be reported to Nomi Schmuckler, AIP Senior Director of Human Resources, 1-301-209-3017 or nschmuckler@aip.org. Following an investigation, if appropriate, sanctions may range from verbal warning, to ejection from the meeting without refund, to notifying appropriate authorities. Retaliation for complaints of inappropriate conduct will not be tolerated. If a participant observes inappropriate comments or actions and personal intervention seems appropriate and safe, they should be considerate of all parties before intervening.

SESSION OVERVIEW

Advanced Surface Engineering Division

Wed.	PM	Room A215	Nanostructured Thin Films and Coatings
Thu.	AM	Room A215	Plasma-assisted Surface Modification and Deposition Processes
Thu.	PM	Room A215	New Challenges and Opportunities in Surface Engineering
Thu.	PM	Union Station AB	Advanced Surface Engineering Poster Session
Fri.	AM	Room A215	Tribology: From Nano to Macro-scale

Applied Surface Science Division

Mon.	AM	Room A211	Quantitative Surface Analysis I/ Reproducibility Issues in Quantitative XPS
Tue.	AM	Room A211	Quantitative Surface Analysis III/Other Surface Analysis Methods
Tue.	PM	Room A211	Beyond Traditional Surface Analysis
Wed.	PM	Room A211	Operando Characterization Techniques for In situ Surface Analysis of Energy Devices
Thu.	AM	Room A211	Advances in Depth Profiling, Imaging and Time-resolved Analysis
Thu.	PM	Room A211	Role of Surfaces and Interfaces in Energy Material and Industrial Problems
Thu.	PM	Union Station AB	Applied Surface Science Poster Session

Biomaterial Interfaces Division

Mon.	AM	Room A120-121	Biofabrication, Bioanalytics, Biosensors, Diagnostics, Biolubrication and Wear
Mon.	PM	Room A120-121	Cutting Edge Bio: Bio-Nano, Bio-Energy, 3D Bio
Tue.	AM	Room A120-121	Characterization of Biological and Biomaterial Surfaces
Tue.	PM	Room A120-121	Biomolecules and Biophysics and Interfaces & Flash Session
Tue.	PM	Union Station AB	Biomaterial Interfaces Posters/Flash Session
Wed.	AM	Room A120-121	Microbes and Fouling at Surfaces

Biomaterials Plenary Session

Sun.	PM	Room A120-121	Biomaterials Interfaces Plenary (ALL INVITED SESSION)

Electronic Materials and Photonics Division

Mon.	PM	Room A214	New Devices and Materials for Logic and Memory
Tue.	AM	Room A214	New Devices and Materials for Electronics and Photonics
Tue.	PM	Room A214	Nikolaus Dietz Memorial Session: Wide and Ultra-wide Band Gap Materials and Devices
Wed.	AM	Room A214	Nanostructures and Nanocharacterization of Electronic and Photonic Devices
Wed.	PM	Room A214	THEME Session: Electronics and Photonics for a Low-Carbon Future
Thu.	AM	Room A214	Advanced Processes for Interconnects and Devices
Thu.	PM	Union Station AB	Electronic Materials and Photonics Poster Session

Magnetic Interfaces and Nanostructures Division

Wed.	AM	Room A210	Emerging Multifunctional Magnetic Materials I and Magnetocaloric Materials
Wed.	PM	Room A210	Emerging Multifunctional Magnetic Materials II
Thu.	AM	Room A210	Novel Magnetic Materials and Device Concept for Energy efficient Information Processing and Storage
Thu.	PM	Union Station AB	Magnetic Interfaces and Nanostructures Poster Session

Manufacturing Science and Technology Group

Wed.	PM	Room A226	Science and Technology for Manufacturing: Solid State Batteries (ALL INVITED SESSION)
Thu.	AM	Room A226	Science and Technology for Manufacturing: Neuromorphic and Quantum Computing (ALL INVITED SESSION)
Thu.	PM	Union Station AB	Manufacturing Science and Technology Poster Session

MEMS and NEMS Group

Mon.	AM	Room A210	MEMS, BioMEMS, and MEMS for Energy: Processes, Materials, and Devices I
Mon.	PM	Room A210	Microfabricated Systems for Gas Chromatography and Nanomechanical Mass Sensing
Tue.	AM	Room A210	MEMS, BioMEMS, and MEMS for Energy: Processes, Materials, and Devices II
Tue.	PM	Room A210	Devices for Quantum Information and Quantum Nanomechanics
Tue.	PM	Union Station AB	MEMS and NEMS Poster Session

Nanometer-scale Science and Technology Division

Tue.	PM	Room A222	Recent Advances in Nanoscale Probing and Fabrication
Wed.	AM	Room A222	Optics and Scattering on the Nanoscale
Wed.	PM	Room A222	Probing and Modifying Surface and Interfacial Chemistry at the Nanoscale
Thu.	AM	Room A222	Direct Atomic Fabrication by Electron and Particle Beams & Flash Session
Thu.	PM	Room A222	SPM for Functional Characterization
Thu.	PM	Union Station AB	Nanometer-scale Science and Technology Poster Session
Fri.	AM	Room A222	Electron-Beam Promoted Nanoscience

Plasma Science and Technology Division

Mon.	AM	Room B131	Atmospheric-Pressure Plasmas
Mon.	AM	Room B130	Plasma Modeling
Mon.	PM	Room B130	Plasma-Surface Interactions
Mon.	PM	Room B131	Plasma-Liquid Interactions, Medicine, and Agriculture
Tue.	AM	Room B131	Advanced FEOL
Tue.	AM	Room B130	Plasma Diagnostics and Sources I
Tue.	PM	Room B131	Advanced BEOL/Interconnect Etching and Advanced Memory and Patterning
Tue.	PM	Union Station AB	Plasma Science and Technology Poster Session
Wed.	AM	Room B131	Plasma Processing of Materials for Energy
Wed.	PM	Room B130	Commemorating the Career of John Coburn (ALL INVITED SESSION)

SESSION OVERVIEW

Thu.	AM	Room B131	Plasma Diagnostics and Sources II
Thu.	PM	Room B130	Plasma-Enhanced Atomic Layer Etching
Thu.	PM	Room B131	Plasma Conversion and Enhanced Catalysis for Chemical Synthesis
Fri.	AM	Room B130	Plasma Deposition and Plasma-Enhanced Atomic Layer Deposition

Surface Science Division

Mon.	PM	Room A220-221	CO_2, CO, Water, and Small Molecule Chemistry at Surfaces
Tue.	AM	Room A220-221	Atom Manipulation and Synthesis/ Oxide Surface Reactions & Flash Session
Tue.	PM	Union Station AB	Surface Science Poster Session
Wed.	PM	Room A220-221	Reactions at Alloy Surfaces and Single Atom Catalysis
Thu.	AM	Room A220-221	Surface Science of Energy Conversion and Storage
Thu.	PM	Room A220-221	Dynamics at Surfaces/Reactions and Imaging of Oxide Surfaces
Fri.	AM	Room A220-221	Planetary, Ambient, and Operando Environments

Thin Films Division

Mon.	AM	Room A122-123	Functional Thin Films: Ferroelectric, Multiferroics, and Magnetic Materials
Mon.	AM	Room A124-125	Thin Films for Electrochemistry and Energy Storage
Mon.	PM	Room A124-125	ALD and CVD: Nucleation, Surface Reactions, Mechanisms, and Kinetics
Mon.	PM	Room A122-123	HiPIMS and Reactive HiPIMS for Novel Thin Films
Tue.	AM	Room A124-125	ALD and CVD: Precursors and Process Development
Tue.	AM	Room A122-123	Thin Films for Microelectronics, Photonics, and Optoelectronic Applications
Tue.	PM	Room A124-125	Epitaxial Thin Films
Tue.	PM	Room A122-123	Emerging Applications for Thin Films
Wed.	AM	Room A122-123	Vapor Deposition of Functional Polymer Thin Films and Composites
Wed.	AM	Room B131	Thin Film Late News Session
Wed.	PM	Room A122-123	Emerging Thin Film Materials: Ultra-wide Bandgap and Phase Change Materials
Thu.	AM	Room A122-123	Thin Films for Energy Harvesting and Conversion
Thu.	PM	Room A124-125	Characterization of Thin Film Processes and Properties
Thu.	PM	Room A122-123	Metal Halide Perovskites, Other Organic/Inorganic Hybrid Thin Films & Flash Session
Thu.	PM	Union Station AB	Thin Films Poster Session
Fri.	AM	Room A216	Theory and Characterization of Thin Film Properties

Vacuum Technology Division

Mon.	AM	Room A213	Pumping, Outgassing, leaks, and Vacuum Pressure Measurement
Mon.	PM	Room A213	Gas Dynamics, Surface Science for Accelerators, and Ultra-Clean Vacuum Systems
Tue.	AM	Room A213	Accelerators and Large Vacuum Systems
Tue.	PM	Room A213	Advanced Applications of Vacuum Technology
Tue.	PM	Union Station AB	Vacuum Technology Poster Session

Exhibitor Technology Spotlight Workshops

Tue.	L	Room Hall A	Exhibitor Technology Spotlight I
Tue.	PM	Room Hall A	Exhibitor Technology Spotlight Workshop II

2D Materials Focus Topic

Mon.	AM	Room A216	Properties of 2D Materials including Electronic, Magnetic, Mechanical, Optical, and Thermal Properties I
Mon.	PM	Room A226	Nanostructures including Heterostructures and Patterning of 2D Materials
Mon.	PM	Room A216	2D Materials Growth and Fabrication
Tue.	AM	Room A216	2D Materials Characterization including Microscopy and Spectroscopy
Tue.	AM	Room A226	Novel Quantum Phenomena
Tue.	PM	Room A216	Properties of 2D Materials including Electronic, Magnetic, Mechanical, Optical, and Thermal Properties II
Tue.	PM	Union Station AB	2D Poster Session
Wed.	AM	Room A216	2D Materials Characterization by Scanning Probe Microscopy and Spectroscopy
Wed.	AM	Room A226	Novel 2D Materials
Wed.	PM	Room A216	2D Device Physics and Applications
Thu.	AM	Room A216	Dopants, Defects, and Interfaces in 2D Materials
Thu.	PM	Room A216	Surface Chemistry, Functionalization, Bio, Energy and Sensor Applications
Fri.	AM	Room A215	2D Late News Session

Actinides and Rare Earths Focus Topic

Mon.	AM	Room A215	Magnetism, Complexity, Superconductivity, and Electron Correlations in the Actinides and Rare Earths
Mon.	PM	Room A215	Early Career Scientists
Tue.	AM	Room A215	Chemistry and Physics of the Actinides and Rare Earths
Tue.	PM	Room A215	Forensics, Science and Processing for Nuclear Energy

Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic

Wed.	PM	Room B231-232	Advanced Ion Microscopy and Surface Analysis Applications
Thu.	AM	Room B231-232	Novel Beam Induced Material Engineering and Nano-Patterning
Thu.	PM	Room B231-232	Emerging Ion Sources, Optics, and Applications & Flash Session
Thu.	PM	Union Station AB	Advanced Ion Microscopy Poster Session

Atomic Scale Processing Focus Topic

Mon.	AM	Room A214	Area Selective Deposition and Selective-Area Patterning
Tue.	PM	Room B130	Advancing Metrology and Characterization to enable Atomic Layer Processing
Wed.	AM	Room B130	Surface Reaction Analysis and Emerging Applications of Atomic Scale Processing

Thu.	AM	Room B130	Thermal Atomic Layer Etching
Thu.	PM	Union Station AB	Atomic Scale Processing Poster Session

Chemical Analysis and Imaging Interfaces Focus Topic

Wed.	PM	Room A120-121	Chemical Analysis and Imaging of Liquid/Vapor/Solid Interfaces I
Thu.	AM	Room A120-121	Chemical Analysis and Imaging of Liquid/Vapor/Solid Interfaces II
Thu.	PM	Room A120-121	Progress in Instrumentation and Methods for Spectro-microscopy of Interfaces
Thu.	PM	Union Station AB	Chemical Analysis and Imaging at Interfaces Poster Session
Fri.	AM	Room A226	Novel Applications and Approaches in Interfacial Analysis

Complex Oxides: Fundamental Properties and Applications Focus Topic

Tue.	PM	Room A220-221	Complex Oxides: Catalysis, Dielectric Properties and Memory Applications
Tue.	PM	Union Station AB	Complex Oxides: Fundamental Properties and Applications Poster Session
Wed.	AM	Room A220-221	Electronic and Magnetic Properties of Complex Oxide Surfaces and Interfaces

Energy Transition Focus Topic

Mon.	PM	Room A212	Surface Reaction Mechanisms in Energy Conversion (ALL INVITED SESSION)
Tue.	AM	Room A212	Implications of Implementation: Making Energy Transition a Reality (ALL INVITED SESSION)
Tue.	PM	Room A226	Breakthroughs and Challenges in Applied Materials for Energy Transition (ALL INVITED SESSION) & Panel Discussion

Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic

Thu.	AM	Room A124-125	Operando Methods for Unraveling Fundamental Mechanisms in Devices Towards Renewable Energies
Thu.	AM	Room A124-125	Frontiers of Time-resolved Techniques for Energy & Catalysis Highlight Session
Thu.	PM	Room A210	Emerging Methods with New Coherent Light Sources
Thu.	PM	Room A210	Photon Science for Imaging Materials from the Meso- to the Nanoscale
Thu.	PM	Union Station AB	Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Poster Session

Fundamental Aspects of Material Degradation Focus Topic

Thu.	AM	Room A212	Material Stabilities and Technology for Degradation Protection
Thu.	PM	Room A212	Low Fouling Interfaces and Environmental Degradation
Thu.	PM	Room A212	Fundamentals of Catalyst Degradation: Dissolution, Oxidation and Sintering

Fundamental Discoveries in Heterogeneous Catalysis Focus Topic

Mon.	AM	Room A212	Utilization of Theoretical Models, Machine Learning, and Artificial Intelligence for Heterogeneously-Catalyzed Reactions
Wed.	AM	Room A213	Exotic Nanostructured Surfaces for Heterogeneously-Catalyzed Reactions
Wed.	PM	Room A213	Metal-Support Interactions Driving Heterogeneously-Catalyzed Reactions
Thu.	AM	Room A213	Nanoscale Surface Structure in Heterogeneously-Catalyzed Reactions
Thu.	PM	Room A213	Reaction Pathways and Addressing Challenges for Energy Production in the 21st Century & Heterogeneous Catalysis Graduate Student Award Presentation
Thu.	PM	Union Station AB	Fundamental Discoveries in Heterogeneous Catalysis Poster Session
Fri.	AM	Room A213	Catalysis at Complex Interfaces

Materials and Processes for Quantum Information, Computing and Science Focus Topic

Mon.	AM	Room B231-232	High Coherence Qubits for Quantum Computing
Mon.	PM	Room B231-232	Systems and Devices for Quantum Computing
Tue.	AM	Room B231-232	AVS Quantum Science (ALL INVITED SESSION)
Tue.	PM	Room B231-232	Materials for Quantum Sciences
Wed.	AM	Room B231-232	Material Systems and Applications for Quantum Sciences

New Challenges to Reproducible Data and Analysis Focus Topic

Mon.	PM	Room A211	Quantitative Surface Analysis II/Big Data, Theory and Reproducibility
Wed.	AM	Room A124-125	Reproducibility in Science and Engineering, including materials and energy systems
Wed.	PM	Room A124-125	Addressing Reproducibility Challenges using Multi-Technique Approaches

Spectroscopic Ellipsometry Focus Topic

Wed.	AM	Room A212	Optical Characterization of Thin Films and Nanostructures
Wed.	PM	Room A212	Spectroscopic Ellipsometry: Novel Applications and Theoretical Approaches
Thu.	PM	Room A215	Spectroscopic Ellipsometry Late News Session
Thu.	PM	Union Station AB	Spectroscopic Ellipsometry Focus Topic Poster Session

SSS
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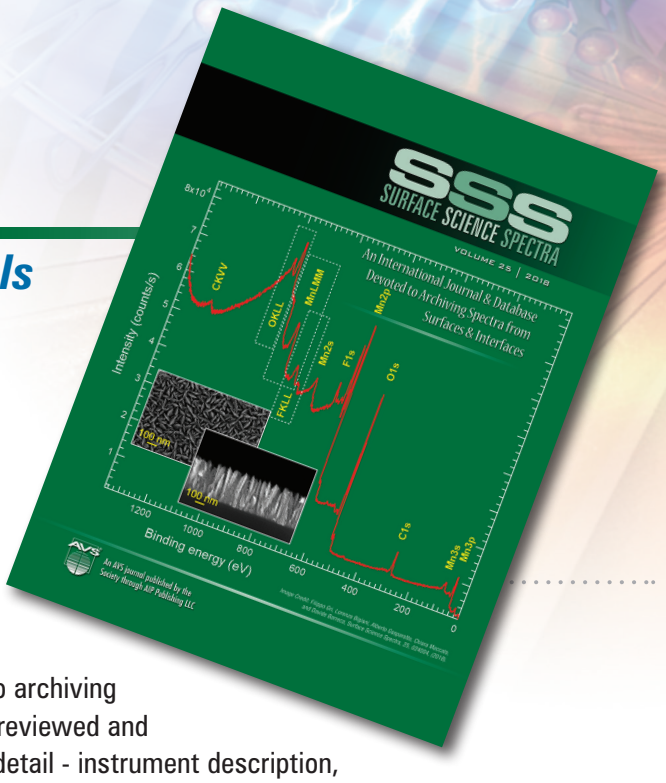
Journal and Database for Individuals or Analytical Laboratories

- **Reference Spectra**
- **Spectra from Technological Materials**
- **Comparison Spectra from Well-Defined Materials**



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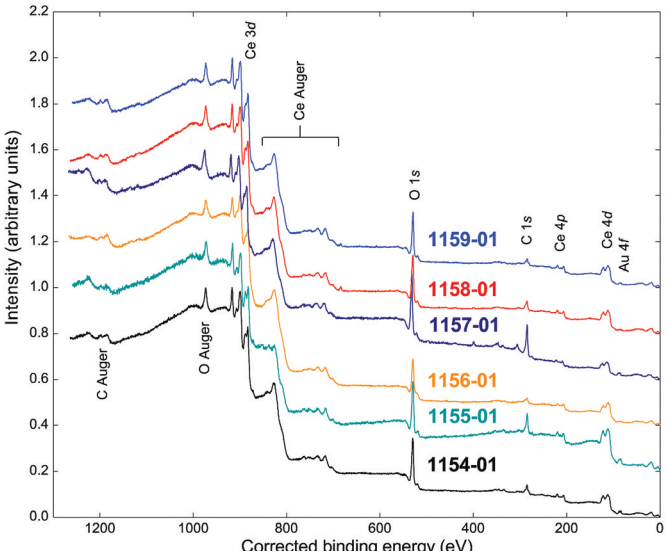

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JVSTA

Journal of Vacuum Science & Technology A



www.jvsta.org

Understanding properties of thin films, interfaces and surfaces at a fundamental level and using this understanding to advance the state-of-the-art in various technological applications defines the scope of the *Journal of Vacuum Science and Technology A*. This journal is devoted to publishing articles of original research, letters, and review articles.

Website Features Editor's Picks, Recent, and Most Read

Topics include but are not limited to:

- 2D Materials
- Applied and fundamental surface science
- Atomic layer deposition
- Atomic layer etching
- Electronic and photonic materials and thin films
- Magnetic thin films and interfaces
- Materials and thin films for energy conversion and storage
- Photovoltaics including thin-film solar cells and organic and hybrid solar cells
- Plasma science and technology including plasma surface interactions, plasma diagnostics, plasma deposition, and plasma etching
- Surface Engineering
- Thin film deposition, etching, properties and characterization

JVST A Special Topic Collections Annual Features:

- Atomic Layer Deposition
- Atomic Layer Etching

Editor-in-Chief: Eray S. Aydil, New York University

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JVSTB

Journal of Vacuum Science & Technology B



www.jvstb.org

The *Journal of Vacuum Science and Technology B* is devoted to publishing articles of original research, letters, and review articles on microelectronics and nanometer structures and devices. The emphasis is on processing, measurement and phenomena associated with micrometer and nanometer structures and devices. Processing may include vacuum processing, plasma processing and microlithography among others, while measurement refers to a wide range of materials and device characterization methods for understanding the physics and chemistry of submicron and nanometer structures and devices.

Website Features Editor's Picks, Recent, and Most Read

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- Electronic and optoelectronic devices and processing
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- Group IV semiconductor microelectronics
- Lithography
- Microelectromechanical and nanoelectromechanical systems and devices (MEMS & NEMS)
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- Plasmonics
- Spintronics and magnetic devices
- Vacuum nanoelectronics
- Vacuum measurement, science, and technology

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Recent and Upcoming In Focus Collections

- Quartz Crystal Microbalance in Biological Surface Science & Soft Matter
- SIMS-22
- Early Career Investigators
- PacSurf 2018
- Women in Biointerface Science
- 25 Years of NESAC/Bio

Editor: Dr. Sally L. McArthur, Swinburne University of Technology and CSIRO Manufacturing

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Technical Program
April 20 - April 23
Education Program
April 18 - April 23
Technology Exhibit
April 21 - April 22

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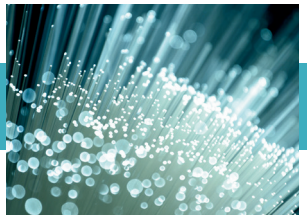

Conference Theme: Communication 2030

It's all about communication. Our desire to communicate more, with increased content and at faster speed, drives the development of new infrastructure and device technologies. Many if not all of these advances are enabled by thin film technology. The Symposium will spotlight advanced communication technologies that will support the explosion in data communication anticipated in the new decade.

These alternative communication strategies include:

- 5G wireless networks and devices
- Driverless everything
- Flexible electronics
- New semiconductor architectures
- Wireless sensor platforms
- Intelligent data infrastructure
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- Embedded systems
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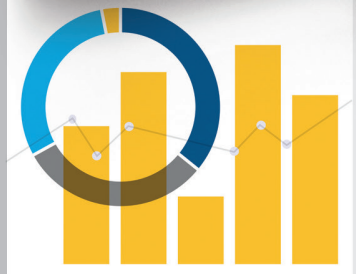

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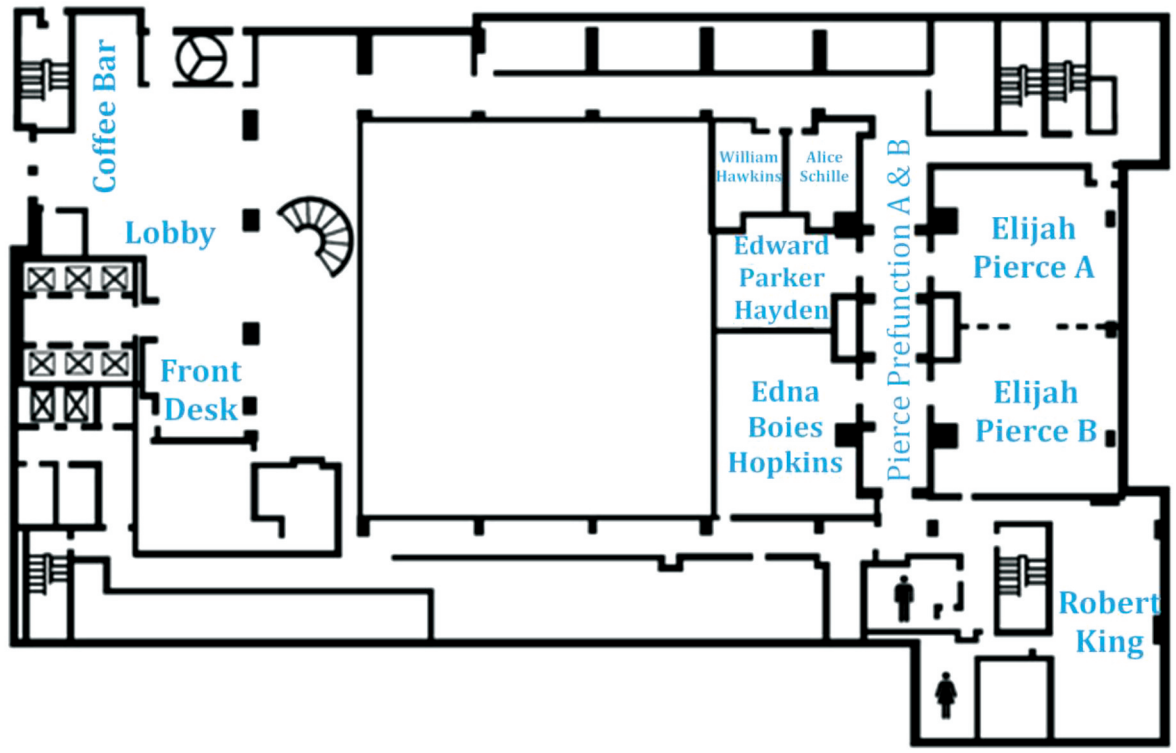

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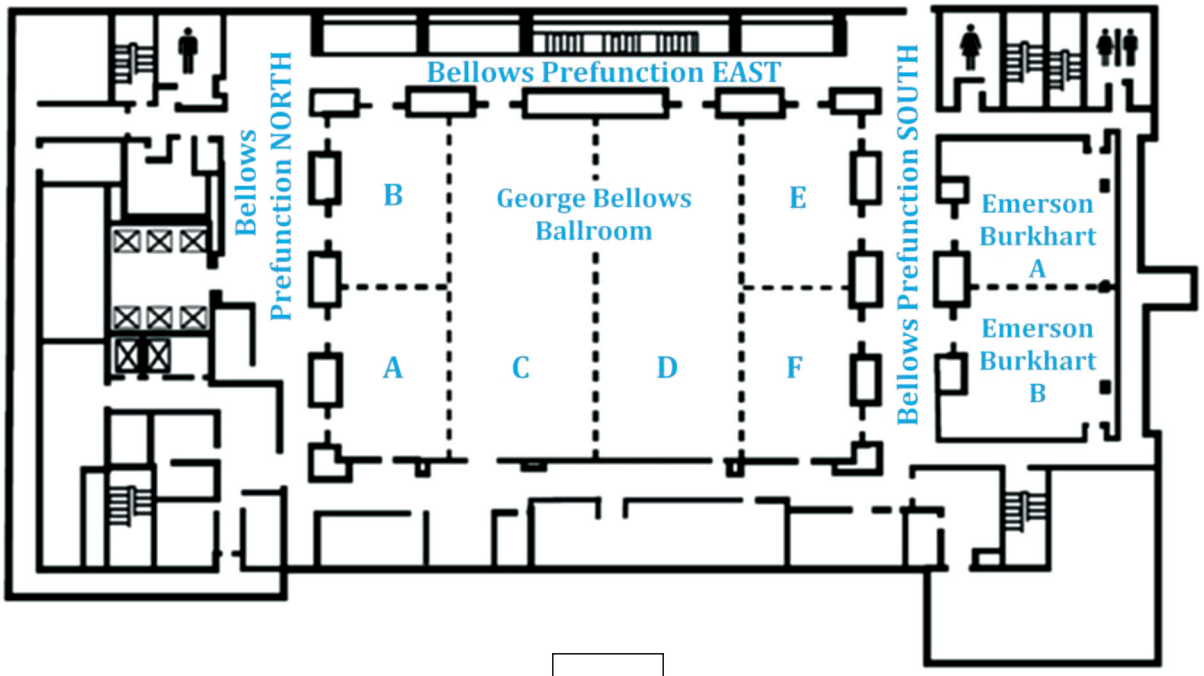


MEETINGS AND SPECIAL EVENTS

SATURDAY, OCTOBER 19, 2019

2:00 p.m.	Educational Materials & Outreach Committee Meeting	Schille Boardroom (H)
6:30 p.m.	Education Committee Dinner	TBD (Offsite)

SUNDAY, OCTOBER 20, 2019

8:00 a.m.	AVS Board of Directors' Meeting Executive Session (Closed Session-Board Only)	King (H)
9:00 a.m.	AVS Board of Directors' Meeting	King (H)
12:40 p.m.	AVS Board of Directors' Lunch	Pierce A (H)
3:00 p.m.	Biomaterials Plenary Session and Reception	A120-121 (CC)
3:00 p.m.	*JVST* Associate Editors' Meeting	Bellows E (H)
5:30 p.m.	ASTM E-42 Business Meeting	Bellows F (H)
6:00 p.m.	Science Educators' Workshop Teachers' Reception	Pierce A (H)
6:00 p.m.	Vacuum Technology Division Executive Committee Meeting and Dinner	Hayden (H)
7:00 p.m.	International Dignitaries & Chapter Chairs Reception (Invitation Only)	Pierce B (H)
7:00 p.m.	Short Course Executive Committee Meeting and Dinner	Burkhart B (H)

MONDAY, OCTOBER 21, 2019

6:00 a.m.	AVS Yoga	Pierce A
7:00 a.m.	Professional Leadership Committee Meeting and Breakfast	Gallerie Bistro -Lamp (H)
8:00 a.m.	Science Educators' Workshop	B234-235 (C)
9:00 a.m.	AVS Member Center: Diversity and Inclusion-"Inclusion and Diversity at the Workplace: Your Suggestions for Best Practices"	A111-112 (CC)
12:00 p.m.	AVS Quantum Science Associate Editors' Meeting and Lunch	Hopkins (H)
12:00 p.m.	Science Educators' Workshop Lunch	B233 (CC)
12:15 p.m.	2020 AVS Program Committee Meeting and Lunch	Pierce B (H)
12:15 p.m.	AVS Member Center: Professional Development-"Welcome to AVS Overview" Lunch*	A111-112 (CC)
12:15 p.m.	Recommended Practices Committee Meeting and Lunch	Hayden (H)
3:00 p.m.	AVS Member Center: Professional Development-Speed Networking for Young Professionals	A111-112 (CC)
4:00 p.m.	John Thornton Award Lecture: "Low Temperature Plasma-Materials Interactions: Foundations of Nanofabrication And Emerging Novel Applications At Atmospheric Pressure," Gottlieb Oehrlein, University of Maryland	B130 (CC)
4:00 p.m.	Publications Committee Meeting	Hopkins (H)
5:30 p.m.	Plenary Lecture: Nathan S. Lewis, George L. Argyros Prof. of Chemistry, California Institute of Technology, "Roles of Surface and Materials Science in the Direct Production of Fuels from Sunlight"	Battelle North (CC)
6:30 p.m.	Biointer*phases* Reception (Invitation Only)	Eleven at Hyde Park (Offsite)
6:30 p.m.	Welcome Mixer	Union Station B (CC)
7:00 p.m.	Applied Surface Science Division Executive Committee Meeting and Dinner	Hayden (H)
7:30 p.m.	Thin Film Division Panel Discussion of Student Opportunities and the Thin Film Division Harper Award TED-Talk Competition	A122-123 (CC
7:45 p.m.	Publications Committee Meeting and Dinner (Invitation Only)	Black Point Restaurant (Offsite)
7:00 a.m.-9:00 a.m.	*Member Lounge – Free Coffee* for 2019 Members*	*A111-112 (CC)*
8:30 a.m.-5:00 p.m.	*Short Course Program*	*Various Rooms (CC)*

TUESDAY, OCTOBER 22, 2019

6:00 a.m.	AVS Yoga	Pierce A
7:00 a.m.	AVS Membership Committee Meeting and Breakfast	Gallerie Bistro -Lamp (H)
7:30 a.m.	Awards Committee Meeting and Lunch	Hayden (H)
8:00 a.m.	Advanced Surface Engineering Division Business Meeting	Hopkins (H)
8:15 a.m.	Advanced Surface Engineering Division Executive Committee Meeting (Lunch Offsite)	Hopkins (H)
8:00 a.m.	Science Educators' Workshop	B234-235 (CC)
10:00 a.m.	AVS Member Center: Professional Development-"Modern Job Searching Process"	A111-112 (CC)
10:00 a.m.	Session Coffee Break*	Hall A (CC)
12:00 p.m.	Science Educators' Workshop Lunch	B233 (CC)
12:15 p.m.	AVS Member Center: Professional Development-Job Information Forum and Lunch*	A111-112 (CC)
12:20 p.m.	Exhibit Hall Lunch*	Hall A (CC)
12:30 p.m.	Chapters, Divisions, and Groups Meeting and Lunch (Invitation Only)	Pierce AB (H)
12:30 p.m.	Manufacturing Science and Technology Group Committee Meeting and Lunch	Gallerie Bistro - Lamp (H)
2:00 p.m.	AVS Member Center: Professional Development-"Modern Resumes and CVs"	A111-112 (CC)
2:20 p.m.	Nikolaus Dietz Memorial Session: Wide and Ultra-wide Band Gap Materials and Devices	A214 (CC)
3:30 p.m.	AVS Career Center: Professional Development-"One-on-One Career Expert Advice" (Advanced Sign Up Required in the Member Center Room A111-112)	Hall A, Booth #146 (CC)
3:40 p.m.	Session Refreshment Break*	Hall A (CC)
6:20 p.m.	Biomaterial Interfaces Division Business Meeting	A120-121 (CC)
6:25 p.m.	Electronic Materials and Photonics Division Business Meeting	A214 (CC)
6:25 p.m.	Magnetic Interfaces and Nanostructures Division Business Meeting	A210 (CC)
6:25 p.m.	Nanometer-scale Science and Technology Division Business Meeting	A222 (CC)
6:25 p.m.	Plasma Science and Technology Division Business Meeting and 2019 Plasma Prize Award Announcement	B131 (CC)
6:25 p.m.	Surface Science Division Business Meeting	A220-221 (CC)
6:25 p.m.	Thin Film Division Business Meeting	A122-123 (CC)

CC = Greater Columbus Convention Center
H = Hilton Columbus Downtown

= New Attendee Networking Events
* = While Supplies Last

MEETINGS AND SPECIAL EVENTS

	6:25 p.m.	Vacuum Technology Division Business Meeting	A213 (CC)
	6:30 p.m.	Poster Session and Refreshments	Union Station B (CC)
	7:00 p.m.	MEMS and NEMS Technical Group Executive Committee Meeting and Dinner	Hayden (H)
	7:00 p.m.	Nanometer-scale Science and Technology Division Executive Committee Meeting and Dinner	Bellows E (H)
	7:15 p.m.	Magnetic Interfaces and Nanostructures Division Executive Committee Meeting and Dinner	Hopkins (H)
	7:30 p.m.	Applied Surface Science Division Business Meeting	King (H)
	7:30 p.m.	Plasma Science and Technology Division Executive Committee Meeting and Dinner	Pierce A (H)
	7:30 p.m.	Surface Science Division Executive Committee Meeting and Dinner	Private Dining Room (H)
	7:30 p.m.	Thin Film Division Executive Committee Meeting and Dinner	Pierce B (H)
	7:45 p.m.	Biomaterial Interfaces Division Executive Committee Meeting and Dinner	Burkhart A (H)
	7:45 p.m.	Electronic Materials and Photonics Division Executive Committee Meeting and Dinner	Burkhart B (H)
	8:00 p.m.	ASTM E-42 and Applied Surface Science Division Joint Workshop: "What Do We Know About What We Don't Know? - A Panel Discussion"	King (H)
	7:00 a.m.-9:00 a.m.	*Member Lounge – Free Coffee* for 2019 Members*	*A111-112 (CC)*
	8:30 a.m.-5:00 p.m.	*Short Course Program*	*Various Rooms (CC)*
	10:00 a.m.-5:00 p.m.	*Equipment Exhibition*	*Hall A (CC)*

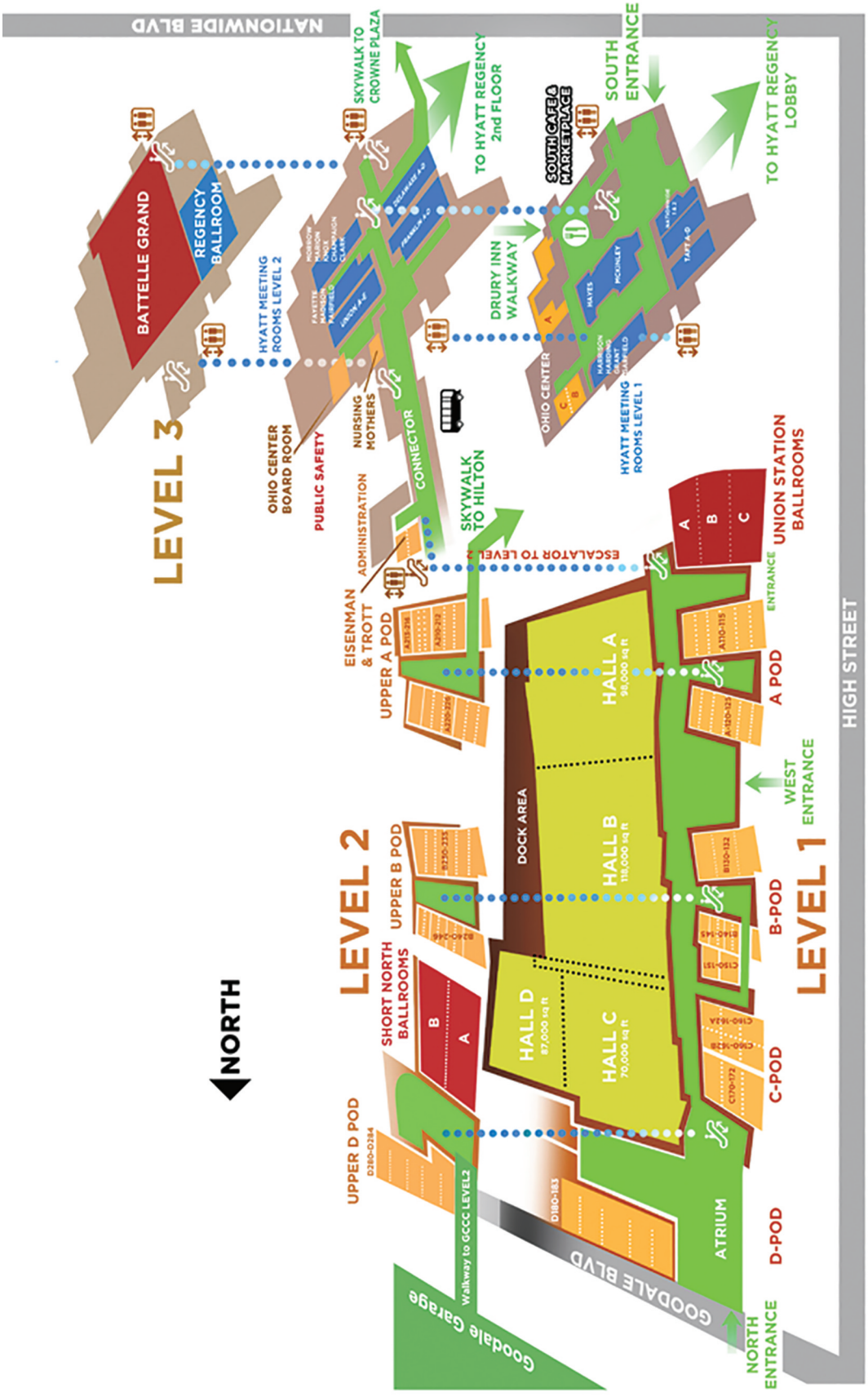
WEDNESDAY, OCTOBER 23, 2019

	6:15 a.m.	39th Annual AVS Run (Register at Run Booth before Wednesday in the Convention Center)	TBD
	7:00 a.m.	AVS Strategic Planning Committee Meeting and Breakfast	Pierce A (H)
	7:30 a.m.	AVS Diversity & Inclusion Committee Breakfast	Gallerie Bistro - Lamp (H)
	9:00 a.m.	AVS Member Center: Professional Development-"One Hour with the National Academies: From Manufacturing Innovation"	A111-112 (CC)
	9:20 a.m.	Medard W. Welch Award Lecture: "Defect-Mediated Coupling of Built-in Potentials at Buried Interfaces Involving Epitaxial Complex Oxides," Scott A. Chambers, Pacific Northwest National Laboratory	A220-221 (CC)
	10:00 a.m.	AVS Career Center: Professional Development-"One-on-One Career Expert Advice" (Advanced Sign Up Required in the Member Center Room A111-112)	Hall A, Booth #146 (CC)
	10:00 a.m.	Session Coffee Break*	Hall A (CC)
	11:00 a.m.	Peter Mark Memorial Award: "Molecular Beam Epitaxial Growth of Novel Plasmonic Materials: Heavily-doped Semiconductors and Topological Insulators," Stephanie Law, University of Delaware	B131 (CC)
	12:20 p.m.	Exhibit Hall Lunch*	Hall A (CC)
	12:20 p.m.	Nanometer-scale Science and Technology Division Graduate Student and Postdoc Award Competition	A222 (CC)
	12:20 p.m.	Plasma Science and Technology Division Coburn and Winters Adjudication Session (Closed Session)	B131 (CC)
	12:30 p.m.	AVS Member Center: Professional Development-"Keeping Current and Connected Lunch"*	A111-112 (CC)
	12:30 p.m.	Governance Committee Meeting and Lunch	Gallerie Bistro - Lamp (H)
	12:30 p.m.	PacSurf Committee Meeting and Lunch	Gallerie Bistro -Fireplace (H)
	1:00 p.m.	Biointer*phases* Strategic Planning Meeting	Schille Boardroom (H)
	2:20 p.m.	Plasma Science and Technology Division: Commemorating the Career of John Coburn	B130 (CC)
	2:30 p.m.	AVS Career Center: Professional Development-"One-on-One Career Expert Advice" (Advanced Sign Up Required in the Member Center Room A111-112)	Hall A, Booth #146 (CC)
	3:40 p.m.	Session Refreshment Break*	Hall A (CC)
	4:30 p.m.	E&M Reception (Invitation Only)	Hall A (CC)
	6:30 p.m.	AVS Awards Ceremony and Reception	Battelle North (CC)
	7:00 a.m.-9:00 a.m.	*Member Lounge – Free Coffee* for 2019 Members*	*A111-112 (CC)*
	8:30 a.m.-5:00 p.m.	*Short Course Program*	*Various Rooms (CC)*
	10:00 a.m.-4:30 p.m.	*Equipment Exhibition*	*Hall A (CC)*

THURSDAY, OCTOBER 24, 2019

	10:00 a.m.	Session Coffee Break*	Hall A (CC)
	12:20 p.m.	Exhibit Hall Lunch*/Finale	Hall A (CC)
	12:20 p.m.	Plasma Science and Technology Division Coburn and Winters Award Ceremony	B131 (CC)
	12:20 p.m.	Surface Science Division Mort Traum Awards Ceremony	A220-221 (CC)
	12:30 p.m.	2020 AVS Program Committee Chairs' Meeting and Lunch	Pierce B (H)
	12:30 p.m.	AVS Member Center: Professional Development-"Writers Workshop and Lunch"*	A111-112 (CC)
	12:30 p.m.	AVS Business Meeting	A120-121 (CC)
	3:00 p.m.	AVS Member Center: Professional Development-"XPS for the Non-analyst: Curve Fitting the Good, the Bad and the Awful"	A111-112 (CC)
	3:30 p.m.	History Committee Meeting	Hayden (H)
	5:20 p.m.	How to Lead By Inspiration Session	A226 (CC)
	5:40 p.m.	Heterogeneous Catalysis Graduate Student Presentation	A213 (CC)
	6:30 p.m.	2019/2020 Program Committee Reception and Dinner	Pierce AB (H)
	6:30 p.m.	Poster Session and Refreshments	Union Station B (CC)
	7:00 p.m.	*Surface Science Spectra* Editorial Board Dinner	King (H)
	7:00 a.m.-9:00 a.m.	*Member Lounge – Free Coffee* for 2019 Members*	*A111-112 (CC)*
	8:30 a.m.-5:00 p.m.	*Short Course Program*	*Various Rooms (CC)*
	10:00 a.m.-2:30 p.m.	*Equipment Exhibition*	*Hall A (CC)*

GREATER COLUMBUS CONVENTION CENTER



Program Key

AVS 66 SYMPOSIUM TOPICS

2D 2D Materials
AC Actinides and Rare Earths Focus Topic
AP Atomic Scale Processing Focus Topic
AS Applied Surface Science Division
BI Biomaterial Interfaces Division
BP Biomaterials Plenary Session
CA Chemical Analysis and Imaging Interfaces Focus Topic
DM Fundamental Aspects of Material Degradation Focus Topic
EL Spectroscopic Ellipsometry Focus Topic
EM Electronic Materials and Photonics Division
EW Exhibitor Technology Spotlight Workshops
HC Fundamental Discoveries in Heterogeneous Catalysis Focus Topic
HI Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic
LS Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic
MI Magnetic Interfaces and Nanostructures Division
MN MEMS and NEMS Group
MS Manufacturing Science and Technology Group
NS Nanometer-scale Science and Technology Division
OX Complex Oxides: Fundamental Properties and Applications Focus Topic
PS Plasma Science and Technology Division
QS Materials and Processes for Quantum Information, Computing and Science Focus Topic
RA New Challenges to Reproducible Data and Analysis Focus Topic
SE Advanced Surface Engineering Division
SS Surface Science Division
TF Thin Films Division
TL Energy Transition Focus Topic
VT Vacuum Technology Division

KEY TO SESSION/ABSTRACT NUMBERS

Sessions sponsored by multiple topics are labeled with all acronyms (e.g. **AC+EM+SS**),
then a number to indicate simultaneous sessions sponsored by the same topic(s) (e.g. SS**1**, SS**2**),
then a dash followed by the first two characters of the day of the week:
Monday, **Tu**esday, **We**dnesday, **Th**ursday, **Fr**iday,
then a single letter for **M**orning, **A**fternoon, **P**oster,
and finally a number indicating the starting time slot for the paper.
Example: SS1-MoM9 (Surface Science, Monday morning, 11:00 am).

Program Overview

Room /Time	A120-121	A122-123	A124-125	A210	A211	A212	A213	A214	A215
SuA	BP-SuA: Bios Interfaces Plenary (ALL INVITED SESSION)								
MoM	BI+AS+NS-MoM: Biofab, Bioanal, Biosen, Diagn, Biolubric & Wear	TF+EM+MI+MN+OX+PS-MoM: Funct TF: Ferro, Multiferro, & Mag Matls	TF-MoM: Thin Films for Electrochem and Energy Storage	MN-MoM: MEMS, Bio, & MEMS for En: Proc, Materials, and Devices I	AS+BI+RA-MoM: QSA I /Reproducibility Issues in Quant XPS	HC+SS-MoM: Util of Theor Mods, Mach Learn, Art Int Het-Cat React	VT-MoM: Pumping, Outgassing, leaks, & Vac Pres Meas	AP+2D+EM+PS+TF-MoM: Area Selective Dep and Selective-Area Patterning	AC+LS+MI-MoM: Mag, Comp, Super, & Elect Cor in Act & Rare Earths
MoA	BI+AS-MoA: Cutting Edge Bio: Bio-Nano, Bio-Energy, 3D Bio	TF+SE-MoA: HiPIMS and Reactive HiPIMS for Novel Thin Films	TF+2D+AP+EL+SS-MoA: ALD and CVD: Nuc, Surf React, Mech, and Kinetics	MN-MoA: Microfab Syst for Gas Chroma & Nanomech Mass Sensing	RA+AS+NS+SS-MoA: QSA II/Big Data, Theory and Reproducibility	TL+2D+HC+SS-MoA: Surf React Mech in Energy Conversion (ALL INVITED)	VT-MoA: Gas Dynamics, Surf. Sci. for Accel., & Ultra-Clean Vac Systems	EM+PS+TF-MoA: New Devices & Matls for Logic and Memory	AC-MoA: Early Career Scientists
TuM	BI+AS-TuM: Characterization of Biological and Biomaterial Surfaces	TF+EM+MI-TuM: TF for Microelec, Phot, & Optoelect Applications	TF+AP-TuM: ALD and CVD: Precursors and Process Development	MN-TuM: MEMS, Bio, & MEMS for En: Proc, Materials, and Devices II	AS+BI+RA-TuM: QSA III/Other Surface Analysis Methods	TL+MS+VT-TuM: Implic of Implem: Mkg En Trans a Reality (ALL INVITED)	VT-TuM: Accelerators and Large Vacuum Systems	EM+2D+AP+NS+PS-TuM: New Devices & Matls for Electronics and Photonics	AC+AS+LS-TuM: Chemistry and Physics of the Actinides and Rare Earths
TuL									
TuA	BI+AS-TuA: Biomolecules and Biophysics and Interfaces & Flash Session	TF-TuA: Emerging Applications for Thin Films	TF+PS-TuA: Epitaxial Thin Films	MN+QS-TuA: Devices for Quantum Info and Quantum Nanomechanics	AS+BI+CA+LS-TuA: Beyond Traditional Surface Analysis		VT-TuA: Advanced Applications of Vacuum Technology	EM+OX+TF-TuA: N. Dietz Mem Sess: Wide & Ultra- Band Gap Matls & Devices	AC+AS+LS-TuA: Forensics, Science and Processing for Nuclear Energy
TuP									
WeM	BI+AS-WeM: Microbes and Fouling at Surfaces	TF1-WeM: Vapor Dep of Functional Polymer TF and Composites	RA+AS+CA+PS+TF-WeM: Repro in Sci & Eng, Incl Matls & Energy Systems	MI+2D-WeM: Emerg Multi-funct Mag Matls I & Magneto-caloric Matls		EL+AS+EM+TF-WeM: Optical Characterization of TF and Nanostructures	HC+2D+SS-WeM: Exotic Nanostructured Surf for Hetero-Cat Reactions	EM+2D+AS+MI+MN+NS+TF-WeM: Nano-struct/ Nanocha of Elec Phot Dev	
WeA	CA+NS+SS+VT-WeA: Chem Anal Imaging of Liquid/Vapor/ Solid Int I	TF+EM-WeA: Emerg TF Matls: Ultra-wide Band & Phase Change Materials	RA+AS+BI-WeA: Address Repro Challenges using Multi-Tech Approach	MI+2D-WeA: Emerging Multifunctional Magnetic Materials II	AS+CA+LS-WeA: Operando Char Tech for In situ Surf Analysis of Energy Devices	EL+EM-WeA: Spectroscopic Ellip: Novel App & Theoretical Approaches	HC+OX+SS-WeA: Metal-Support Int Driving Hetero-Catalyzed React	EM+2D+NS+TF-WeA: THEME Session: Elect & Phot for a Low-Carbon Future	SE+AS+TF-WeA: Nanostructured Thin Films and Coatings
ThM	CA+2D+AS+BI+NS-ThM: Chem Anal & Imaging of Liquid/Vap/ Solid Inter II	TF+EM+NS+SS-ThM: Thin Films for Energy Harvesting and Conversion	LS+ThM: Oper Meth for Unr Fund Mech in Dev Towards Renew En LS+HC+SS-ThM:	MI+2D+AS+EM-ThM: Novel Mag Matls & Dev Con for En eff Info Proc & Storage`	AS-ThM: Adv in Depth Profiling, Imaging and Time-resolved Analysis	DM+BI+SS-ThM: Matl Stabilities & Tech for Degradation Protection	HC+2D+SS-ThM: Nanoscale Surf Structure in Het-Catalyzed Reactions	EM+AP+MS+NS+TF-ThM: Adv Processes for Interconnects and Devices	SE+PS-ThM: Plasma-assisted Surf Mod and Deposition Processes
ThA	CA+NS+SS+VT-ThA: Progress in Inst & Methods for Spectro-mic of Interfaces	TF+SS-ThA: Met Halide Perov, Otr Org/Inorg Hybrid Thin Films	TF+AS+EL+PS+RA-ThA: Char of Thin Film Processes and Properties	LS+AC+HC+SS-ThA: Em Meth w/ Coh Light So LS+AC+NS-ThA: Phot Sci Imag...	AS-ThA: Role of Surfaces and Int in Energy Matls & Industrial Problems	DM1+ThA: Low Foul Int & Env Deg DM2+- ThA: Fund of Cat Deg: Diss, Oxid & Sint	HC+SS+TL-ThA: Re Paths & Add Chal for En Prod in 21st Cent/ Het Cat Awards		EL-ThA: Spect Ellip Late News SE-ThA: New Chall & Opps in Surf Engineering
ThP									
FrM							HC+SS-FrM: Catalysis at Complex Interfaces		2D-FrM: 2D Late News Session SE+AS+SS-FrM: Trib: From Nano to Macro-scale

Program Overview

A216	A220-221	A222	A226	B130	B131	B231-232	Hall A	Union Station B
2D+EM+MI+NS-MoM: Prop of 2D Matls incl Elec, Mag, Mech, Opt, & Therm Prop I				PS2-MoM: Plasma Modeling	PS1+SE-MoM: Atmospheric-Pressure Plasmas	QS+EM+MN+NS-MoM: High Coherence Qubits for Quantum Computing		
2D+AP+EM+MI+NS+PS+TF-MoA: 2D Materials Growth and Fabrication	SS+HC-MoA: CO2, CO, Water, and Small Molecule Chemistry at Surfaces		2D+AP+EM+MI+MN+NS+PS+TF-MoA: Nano incl. Heter & Pattern of 2D Matls	PS+AS+EM+SS+TF-MoA: Plasma-Surface Interactions	PS1-MoA: Plasma-Liquid Interactions, Medicine, and Agriculture	QS+EM+MN+NS+VT-MoA: Systems and Devices for Quantum Computing		
2D+AS+MI+NS-TuM: 2D Matls Char including Microscopy and Spectroscopy	SS+2D+HC-TuM: Atom Manip and Synthesis/Oxide Surface Reactions & Flash Session		2D+EM+MI+MN+NS+QS-TuM: Novel Quantum Phenomena	PS-TuM: Plasma Diagnostics and Sources I	PS+EM-TuM: Advanced FEOL	QS-TuM: AVS Quantum Science (ALL INVITED SESSION)	EW-TuMB: Exhibitor Technology Spotlight I	
							EW-TuL: Exhibitor Technology Spotlight Workshop II	
2D+EM+MI+NS-TuA: Prop of 2D Matls incl Elec, Mag, Mechl, Opt, & Therm Prop II	OX+EM+HC+MI+NS+SS+TF-TuA: Complex Oxides: Cats, Diel Prop &Memory Apps	NS-TuA: Recent Advances in Nanoscale Probing and Fabrication	TL+AS+SS+TF-TuA: Brks & Chall in App Matl En Trans (ALL INV/ Panel Discussion)	AP+EL+MS+PS+SS+TF-TuA: Adv Met & Charact to enable Atomic Layer Processing	PS+EM-TuA: Advanced BEOL/ Inter Etching and Adv Memory and Patterning	QS+2D+EM+MN+NS-TuA: Materials for Quantum Sciences	EW-TuAB: Exhibitor Technology Spotlight III	
								POSTER SESSIONS: 2D, BI, MN, OX, PS, SS, VT
2D+AS+MI+NS-WeM: 2D Materials Charact by SPM and Spectroscopy	OX+EM+MI+SS-WeM: Elect and Mag Prop of Complex Oxide Surf and Int	NS-WeM: Optics and Scattering on the Nanoscale	2D+EM+MI+MN+NS+QS-WeM: Novel 2D Materials	AP+BI+PS+TF-WeM: Surf React Anal and Emerg Apps of Atomic Scale Processing	PS+EM-WeM: Plasma Proc of Matls for Energy TF2-WeM: TF Late News Sess	QS+2D+EM+MN+NS+VT-WeM: Material Systems and Applications for QS		
2D+EM+MN+NS-WeA: 2D Device Physics and Applications	SS+AS+HC+OX-WeA: Reactions at Alloy Surfaces and Single Atom Catalysis	NS+2D+AS-WeA: Probing and Mod Surf and Intl Chemistry at the Nanoscale	MS-WeA: Science and Tech for Manuf: Solid State Batt (ALL INVITED SESS)	PS-WeA: Commem the Career of John Coburn (ALL INVITED)		HI+AS+CA-WeA: Advanced Ion Microscopy and Surface Analysis Applications		
2D+EM+MI+NS+QS+SS-ThM: Dopants, Defects, and Interfaces in 2D Materials	SS+AS+HC+TL-ThM: Surface Science of Energy Conversion and Storage	NS+2D+QS-ThM: Direct Atomic Fab by Elect and Particle Beams & Flash Session	MS+EM+QS-ThM: Sci and Tech for Manuf: Neuro & Quantum Comp (ALL INVITED)	AP+PS+TF-ThM: Thermal Atomic Layer Etching	PS-ThM: Plasma Diagnostics and Sources II	HI+NS-ThM: Novel Beam Induced Material Engineering and Nano-Patterning		
2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA: Surf Chem, Funct, Bio, En & Sensor Apps	SS+2D+AP+AS+OX+SE-ThA: Dynam at Surf/Reac and Imaging of Oxide Surfaces	NS-ThA: SPM for Functional Characterization	5:20 pm How To Lead by Inspiration	PS+2D+EM+SS+TF-ThA: Plasma-Enhanced Atomic Layer Etching	PS+SS-ThA: Plasma Conv and Enhanced Catalysis for Chem Synthesis	HI+NS-ThA: Emerging Ion Sources, Optics, and Applications		
								POSTER SESSIONS: AP, AS, CA, EL, EM, HC, HI, LS, MI, MS, NS, SE, TF
TF-FrM: Theory and Characterization of Thin Film Properties	SS+HC+PS-FrM: Planetary, Ambient, and Operando Environments	NS+AS-FrM: Electron-Beam Promoted Nanoscience	CA+AS+NS+SE+SS-FrM: Novel Apps and Approaches in Interfacial Analysis	PS+2D+SE+TF-FrM: Plasma Dep and Plasma-Enhanced Atomic Layer Deposition				

Anticipated Schedule Sunday, October 20, 2019

Anticipated Schedule Sunday Lunch, October 20

When _____

Where _____

With _____

Anticipated Schedule Sunday Afternoon, October 20

1:00 PM _____

1:20 PM _____

1:40 PM _____

2:00 PM _____

2:20 PM _____

2:40 PM _____

3:00 PM _____

3:20 PM _____

3:40 PM _____

Special Events Sunday

8:00 AM	AVS Board of Directors' Executive Session (CLOSED SESSION)/King-Hilton (by invitation)
9:00 AM	AVS Board of Directors' Meeting/King-Hilton
3:00 PM	JVST Associate Editors' Meeting/Bellows E-Hilton (by invitation)
5:30 PM	ASTM E-42 Business Meeting/Bellows F-Hilton
6:00 PM	Science Educators' Workshop Teachers' Reception/Pierce A-Hilton (by invitation)
6:00 PM	Vacuum Technology Division Executive Committee Meeting & Dinner/Hayden-Hilton (by invitation)
7:00 PM	International Dignitaries & Chapter Chairs Reception/Pierce B-Hilton (by invitation)
7:00 PM	Short Course Executive Committee Meeting/Burkhart B-Hilton (by invitation)

Sunday Afternoon, October 20, 2019

Biomaterials Plenary Session
Room A120-121 - Session BP-SuA
Biomaterials Interfaces Plenary (ALL INVITED SESSION)
Moderator: Caitlin Howell, University of Maine

3:00pm	**INVITED: BP-SuA1** Microbial Electron Conduits: Adventures at the Biotic-Abiotic Interface, ***Mohamed El-Naggar,*** University of Southern California	
3:20pm	Invited talk continues.	
3:40pm	**INVITED: BP-SuA3** Conductive Biofilms As Living Electronic Materials, ***Sarah Glaven,*** U.S. Naval Research Laboratory; *L. Bird, E. Onderko,* National Research Council; *D. Phillips, R. Mickol,* American Society for Engineering Education; *A. Malanoski, M. Yates, B. Eddie,* U.S. Naval Research Laboratory	
4:00pm	Invited talk continues.	
4:20pm		
4:40pm		
5:00pm		
5:20pm		
5:40pm		

Anticipated Schedule Monday, October 21, 2019

Anticipated Schedule Monday Morning, October 21

8:20 AM _____

8:40 AM _____

9:00 AM _____

9:20 AM _____

9:40 AM _____

10:00 AM _____

10:20 AM _____

10:40 AM _____

11:00 AM _____

11:20 AM _____

11:40 AM _____

12:00 PM _____

Anticipated Schedule Monday Lunch, October 21

When _____

Where _____

With _____

Anticipated Schedule Monday Afternoon, October 21

1:00 PM _____

1:20 PM _____

1:40 PM _____

2:00 PM _____

2:20 PM _____

2:40 PM _____

3:00 PM _____

3:20 PM _____

3:40 PM _____

4:00 PM _____

4:20 PM _____

4:40 PM _____

5:00 PM _____

Special Events Monday

6:00 AM	AVS Yoga--Pre-Registration Required/Pierce A-Hilton
7:00 AM	Member Center: Free Coffee for 2019 AVS Members/A111-112
7:00 AM	Professional Leadership Committee Meeting & Breakfast/Gallerie Bistro-Lamp-Hilton (by invitation)
8:00 AM	Science Educators' Workshop/B234-235 (by invitation)
8:30 AM	Short Course Programs—Various Rooms (See Registration Desk)
9:00 AM	AVS Member Center: "Inclusion and Diversity at the Workplace: Your Suggestions for Best Practices"/ A111-112
12:00 PM	AVS Quantum Science Associate Editors' Meeting & Lunch/Hopkins-Hilton (by invitation)
12:15 PM	2020 AVS Program Committee Meeting and Lunch/Pierce B-Hilton (by invitation)
12:15 PM	AVS Member Center: "Welcome to AVS Overview & Lunch*"/A111-112
12:15 PM	Recommended Practices Committee Meeting & Lunch/Hayden-Hilton (by invitation)
3:00 PM	AVS Member Center: "Speed Networking for Young Professionals"/A111-112
4:00 PM	Publications Committee Meeting/Hopkins-Hilton (by invitation)
5:30 PM	Plenary Lecture: Nathan S. Lewis, George L. Argyros Prof. of Chemistry, California Institute of Technology, "Roles of Surface and Materials Science in the Direct Production of Fuels from Sunlight"/Battelle North
6:30 PM	Biointerphases Reception/Eleven at Hyde Park-Offsite (by invitation)
6:30 PM	Welcome Mixer/Union Station B
7:00 PM	ASSD Executive Committee Meeting & Dinner/Hayden-Hilton (by invitation)
7:15 PM	MIND Executive Committee Meeting and Dinner/Hopkins-Hilton (by invitation)
7:30 PM	Thin Film Division/Harper Award TED-Talk Competition/A122-123
7:45 PM	Publications Committee Meeting & Dinner/Black Point Restaurant-Offsite (by invitation)

	2D Materials **Room A216 - Session 2D+EM+MI+NS-MoM** **Properties of 2D Materials including Electronic, Magnetic, Mechanical, Optical, and Thermal Properties I** **Moderator:** Sanghoon Bae, Massachusetts Institute of Technology	**Actinides and Rare Earths Focus Topic** **Room A215 - Session AC+LS+MI-MoM** **Magnetism, Complexity, Superconductivity, and Electron Correlations in the Actinides and Rare Earths** **Moderators:** Krzysztof Gofryk, Idaho National Laboratory, Ladislav Havela, Charles University, Prague, Czech Republic
8:20am	**2D+EM+MI+NS-MoM1** Extreme Fatigue Life of Graphene, ***Teng Cui***, *S. Mukherjee, P.M. Sudeep, G. Colas, J. Tam,* University of Toronto, Canada*; P.M. Ajayan,* Rice University*; C.V. Singh, Y. Sun, T. Filleter,* University of Toronto, Canada	**INVITED: AC+LS+MI-MoM1** Possible Structural Quantum Phase Transition in UCr2Si2 Accessed Through Cr → Ru Chemical Substitution, ***Ryan Baumbach***, Florida State Universityy
8:40am	**2D+EM+MI+NS-MoM2** Epitaxial Growth and Thermal Degradation of Monolayer MoS_2 on $SrTiO_3$ Single Crystal Substrates, ***Peiyu Chen***, *W. Xu, Y. Gao, P. Holdway, J.H. Warner, M.R. Castell,* University of Oxford, UK	Invited talk continues.
9:00am	**2D+EM+MI+NS-MoM3** 3D Printed and Injection Molded Polymer Matrix Composites with 2D Layered Materials, ***Sangram Mazumder***, University of North Texas*; J.A. Catalan,* University of Texas at El Paso*; N. Hnatchuk, I. Chen,* University of North Texas*; P. Perez,* University of Texas at El Paso*; W. Brostow, A.B. Kaul,* University of North Texas	**INVITED: AC+LS+MI-MoM3** Dynamic Spin Transport in Antiferromagnetic Insulators: Angular Dependent Spin Pumping in $Y_3Fe_5O_{12}$/NiO/Pt Trilayers, ***Fengyuan Yang***, The Ohio State University
9:20am	**2D+EM+MI+NS-MoM4** Semiconducting WS_2 and h-BN Inks for Printing Optically-active Nanodevices, ***Jay A. Desai***, University of Texas at El Paso*; S. Mazumder, A.B. Kaul,* University of North Texas	Invited talk continues.
9:40am	**2D+EM+MI+NS-MoM5** Transparent PEDOT:PSS Based Electro-Chromic/Thermal Devices With Excellent Durability For Applications In Smart Electronics, ***Hossein Sojoudi***, *S.K. Nemani,* University of Toledo	**INVITED: AC+LS+MI-MoM5** Pressure Studies of Strongly Correlated Phases in Rare Earth Compounds, ***Rena Zieve***, University of California, Davis
10:00am	**2D+EM+MI+NS-MoM6** Edge Dominated Graphene/h-BN Lateral Hybrid Nanostructures for Electronic and Spintronic Applications, ***Gour P. Das***, IIT Kharagpur India, India	Invited talk continues.
10:20am	**BREAK**	**BREAK**
10:40am	**INVITED: 2D+EM+MI+NS-MoM8** Engineering Interfaces in the Atomically-Thin Limit, ***Deep Jariwala***, University of Pennsylvania	**AC+LS+MI-MoM8** Fermi Surface Reconstructions and Transport Properties in Heavy-fermion Materials, ***Gertrud Zwicknagl***, Institut f. Mathemat. Physics, TU Braunschweig, Germany
11:00am	Invited talk continues.	**AC+LS+MI-MoM9** Direct Measurement the 5 $f_{5/2}$ and 5 $f_{7/2}$ Unoccupied Density of States of UO_2, ***James G. Tobin***, University of Wisconsin-Oshkosh*; S. Nowak,* SLAC National Accelerator Laboratory*; C.H. Booth,* Lawrence Berkeley National Laboratory*; E.D. Bauer,* Los Alamos National Laboratory*; S.W. Yu,* Lawrence Livermore National Laboratory*; R. Alonso-Mori, T. Kroll, D. Nordlund, T.C. Weng, D. Sokaras,* SLAC National Accelerator Laboratory
11:20am	**2D+EM+MI+NS-MoM10** Ultrasoft Slip-mediated Bending in Few-layer Graphene, ***Jaehyung Yu***, *E. Han, E. Annevelink, J. Son, E. Ertekin, P.Y. Huang, A.M. van der Zande,* University of Illinois at Urbana-Champaign	**AC+LS+MI-MoM10** Optimizing the Magnetic Performance of Tetragonal $ReFe_{12-x}M_x$ Phases by First Principles Computational Simulations, ***Heike Christine Herper***, *O.Y. Vekilova, P. Thunström, O. Eriksson,* Uppsala University, Sweden
11:40am	**2D+EM+MI+NS-MoM11** Experimental Study on Vanadium Oxides Films by Sputtering, ***Chuan Li***, National Yang Ming University, Taiwan, Republic of China*; J.H. Hsieh,* Ming Chi University of Technology, Taiwan, Republic of China*; C. Su,* National Yang Ming University, Taiwan, Republic of China	**AC+LS+MI-MoM11** Optical Excitation Effect on Magnetodielectric and Photodielectric Properties of Rare Earth doped ZnO:Na Nanoparticles, ***Mohammed Bsatee***, *F.P.N. Inbanathan,* Ohio University*; R. Martínez,* University of Puerto Rico*; H. Huhtinen,* University of Turku, Finland*; R. Palai,* University of Puerto Rico

Monday Morning, October 21, 2019

	Atomic Scale Processing Focus Topic **Room A214 - Session AP+2D+EM+PS+TF-MoM** **Area Selective Deposition and Selective-Area Patterning** **Moderators:** Satoshi Hamaguchi, Osaka University, Japan, Eric A. Joseph, IBM T.J. Watson Research Center	**Applied Surface Science Division** **Room A211 - Session AS+BI+RA-MoM** **Quantitative Surface Analysis I/Reproducibility Issues in Quantitative XPS** **Moderators:** Donald Baer, Pacific Northwest National Laboratory, Mark Engelhard, Pacific Northwest National Laboratory
8:20am		**INVITED: AS+BI+RA-MoM1** Improving Accuracy in Quantitation by XPS: Standards, Cross-sections, Satellite Structure, ***C. Richard Brundle,*** C.R.Brundle & Associates*; P.S. Bagus,* University of North Texas*; B.V. Crist,* XPS International LLC
8:40am	**AP+2D+EM+PS+TF-MoM2** Surface Pre-functionalization of SiN_x and SiO_2 to Enhance Selectivity in Plasma–Assisted Atomic Layer Etching, ***Ryan Gasvoda,*** Colorado School of Mines*; Z. Zhang, S. Wang, E.A. Hudson,* Lam Research Corporation*; S. Agarwal,* Colorado School of Mines	Invited talk continues.
9:00am	**AP+2D+EM+PS+TF-MoM3** Area-selective Atmospheric-pressure Spatial ALD of SiO_2 using Interleaved Back-etch steps Yielding Selectivity > 10 nm, *A. Mameli,* Holst Centre / TNO, The Netherlands*; F. Roozeboom,* ***Paul Poodt,*** Holst Centre / TNO, The Netherlands, Netherlands	**AS+BI+RA-MoM3** A Rigorous Approach to the Calculation of the Uncertainties in XPS Analysis, *A. Herrera-Gomez,* CINVESTAV-Unidad Queretaro, México*;* ***Orlando Cortazar-Martinez,*** CINVESTAV-Unidad Queretaro, Mexico
9:20am	**AP+2D+EM+PS+TF-MoM4** Mechanisms of Precursor Blocking during Area-selective Atomic Layer Deposition using Inhibitors in ABC-type Cycles, *M.J.M. Merkx,* Eindhoven University of Technology, The Netherlands*; D.M. Hausmann,* Lam Research Corporation*; W.M.M. Kessels,* Eindhoven University of Technology, The Netherlands, Netherlands*; T.E. Sandoval,* Universidad Técnica Federico Santa María, Chile*;* ***Adrie Mackus***[1]*,* Eindhoven University of Technology, The Netherlands, Nederland	**AS+BI+RA-MoM4** Gross Errors in XPS Peak Fitting, ***Matthew Linford****, V. Jain, G.H. Major,* Brigham Young University
9:40am	**INVITED: AP+2D+EM+PS+TF-MoM5** Area-Selective Deposition of TiO_2 using Isothermal Integrated Atomic Layer Deposition and Atomic Layer Etching in a Single Reaction Chamber, ***Gregory Parsons****, S.K. Song, H. Saare,* North Carolina State University	**AS+BI+RA-MoM5** Improved Energy Referencing in XPS, ***Hagai Cohen,*** Weizmann Institute of Science, Israel
10:00am	Invited talk continues.	**AS+BI+RA-MoM6** How to Avoid Errors in the Interpretation of XPS Data?, ***Andreas Thissen****, P. Dietrich,* SPECS Surface Nano Analysis GmbH, Germany*; W.E.S. Unger,* Bundesanstalt für Materialforschung und -prüfung - Berlin (Germany), Germany
10:20am	**BREAK**	**BREAK**
10:40am	**AP+2D+EM+PS+TF-MoM8** Area-Selective Atomic Layer Deposition of Metal Oxides on an Inhibitor-Functionalized SiO_2 Surface, ***Wanxing Xu,*** Colorado School of Mines*; P.C. Lemaire, K. Sharma, D.M. Hausmann,* Lam Research Corporation*; S. Agarwal,* Colorado School of Mines	**AS+BI+RA-MoM8** Misinterpretations in the Spectroscopic Analysis of Heterogeneous Materials and Defected Structures, ***Lisa Swartz****, K. Artyushkova, J.E. Mann, B.W. Schmidt, J.G. Newman,* Physical Electronics
11:00am	**AP+2D+EM+PS+TF-MoM9** Area-selective Deposition Achieved in a Continuous Process using Competitive Adsorption, ***Taewon Suh****, Y. Yang, K.U. Lao, R.A. DiStasio, Jr., J.R. Engstrom,* Cornell University	**AS+BI+RA-MoM9** Current Issues and Solutions for Reliable, Robust and Reproducible XPS Spectral Acquisition and Data Reporting, *J.D.P. Counsell, C.J. Blomfield,* Kratos Analytical Limited, UK*;* ***Christopher Moffitt,*** Kratos Analytical Limited*; N. Gerrard, S.J. Coultas,* Kratos Analytical Limited, UK
11:20am	**INVITED: AP+2D+EM+PS+TF-MoM10** Surface Chemistry during Plasma-Assisted ALE: What Can We Learn from ALD?, ***Sumit Agarwal,*** Colorado School of Mines	**AS+BI+RA-MoM10** Intensity Calibration and Sensitivity Factors for XPS Instruments with Monochromatic Ag Lα and Al Kα Sources, *A. Shard,* National Physical Laboratory, UK*; J.D.P. Counsell,* ***Christopher J. Blomfield,*** Kratos Analytical Limited, UK*; D.J.H. Cant,* National Physical Laboratory, UK*; E.F. Smith,* University of Nottingham, UK*; P. Navabpour,* Teer Coatings Ltd, UK
11:40am	Invited talk continues.	**AS+BI+RA-MoM11** Reporting XPS Measurements and How Can We Do Better to Minimize Reproducibility Problems, ***Karen Gaskell,*** University of Maryland, College Park

[1] **Paul Holloway Award Winner**

	Biomaterial Interfaces Division **Room A120-121 - Session BI+AS+NS-MoM** **Biofabrication, Bioanalytics, Biosensors, Diagnostics, Biolubrication and Wear** **Moderators:** Joe Baio, Oregon State University, Caitlin Howell, University of Maine	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Room A212 - Session HC+SS-MoM** **Utilization of Theoretical Models, Machine Learning, and Artificial Intelligence for Heterogeneously-Catalyzed Reactions** **Moderators:** Liney Arnadottir, Oregon State University, Sharani Roy, University of Tennessee Knoxville
8:20am	**BI+AS+NS-MoM1** Bio-inspired Peptide-polymer Hybrid Mucin Analogues: Applications in Osteoarthritis and Kidney Stone Disease, ***Daniel L. French****, L.A. Navarro, S. Zauscher,* Duke University	
8:40am	**BI+AS+NS-MoM2** Investigation of the Mechanical and Dielectric Properties of Bone Scaffolds, ***Kimberly Cook-Chennault****,* Rutgers University	**HC+SS-MoM2** Theoretical Study of Acetic Acid Decomposition on Pd (111) using Density Functional Theory, ***Kingsley Chukwu****, L. Arnadottir,* Oregon State University
9:00am	**INVITED: BI+AS+NS-MoM3** Bioelectronics with Graphene and Graphene-Based Hybrid-Nanomaterials – From Transparent to Fuzzy Interfaces, ***Tzahi Cohen-Karni****,* Carnegie Mellon University	**INVITED: HC+SS-MoM3** Towards a Chemically Accurate Description of Reactions of Molecules with Transition Metal Surfaces, ***Geert-Jan Kroes****,* Leiden University, Netherlands
9:20am	Invited talk continues.	Invited talk continues.
9:40am	**BI+AS+NS-MoM5** Experimental Observation of Multiple Plasmon Induced Transparency and Fano Resonance in Titanium Nitride Based Devices, *J.D. Asencios,* ***Arturo Talledo****, R.A. Moro, C.A. Luyo,* Facultad De Ciencias Universidad Nacional De Ingeniería, Perú	**HC+SS-MoM5** The Apparent Activation Energy for Complex Mechanisms: A Simple Relationship via Degrees of Rate Control, ***Zhongtian Mao***[12]***,*** *C.T. Campbell,* University of Washington
10:00am	**BI+AS+NS-MoM6** Breaking the Mass Resolution Limit of Shear Wave Resonators in Liquid through Integrated Microfluidic Channels, *Z. Parlak, S. Zhao, D.L. French,* ***Stefan Zauscher****,* Duke University	**HC+SS-MoM6** First-Principles Kinetic Monte Carlo Simulation of CO Oxidation on PdO(101): Role of Oxygen Vacancies, ***Minkyu Kim****, A. Asthagiri,* The Ohio State University
10:20am	**BREAK**	**BREAK**
10:40am	**INVITED: BI+AS+NS-MoM8** Designing Anti-Fouling Lubricious Surfaces Based on Modular Approaches, *T. Galhenage, C. Khatri, A. Vena, A. Labak, T. Banks, G. Tremelling,* ***Philseok Kim****,* Adaptive Surface Technologies, Inc.	**HC+SS-MoM8** Accelerating *ab initio* Simulations using Surrogate Machine Learning Models, ***Jose A. Garrido Torres****, P.C. Jennings, M.H. Hansen,* Stanford University*; T. Bligaard,* SLAC National Accelerator Laboratory
11:00am	Invited talk continues.	**HC+SS-MoM9** Integrating Materials Databases and Autonomous Workflows for the Discovery of New Heterogeneous Catalysts, ***Kirsten Winther****, T. Bligaard,* SLAC National Accelerator Laboratory
11:20am	**BI+AS+NS-MoM10** All Inkjet Printed Biosensor for Easy and Rapid Detection of Immunoglobulin G (IgG) Protein, ***Ridwan Fayaz Hossain****, A.B. Kaul,* University of North Texas	**INVITED: HC+SS-MoM10** Knowledge-Based Approaches in Catalysis and Energy Modelling, ***Karsten Reuter****,* Technical University of Munich, Germany
11:40am	**BI+AS+NS-MoM11** Biosensing Applications of Silver Nanorods Array Fabricated by Glancing Angle Deposition (GLAD), ***Shashank Gahlaut****,* Indian Institute of Technology Delhi, India	Invited talk continues.

[1] **Morton S. Traum Award Finalist**

[2] **Heterogeneous Catalysis Graduate Student Presentation Award Finalist**

	MEMS and NEMS Group **Room A210 - Session MN-MoM** **MEMS, BioMEMS, and MEMS for Energy: Processes, Materials, and Devices I** **Moderators:** B. Robert Ilic, National Institute for Science and Technology (NIST), Zenghui Wang, Case Western Reserve University	**Plasma Science and Technology Division** **Room B131 - Session PS1+SE-MoM** **Atmospheric-Pressure Plasmas** **Moderators:** Michael Gordon, University of California at Santa Barbara, François Reniers, Université Libre de Bruxelles, Belgium
8:20am	**INVITED: MN-MoM1** Terahertz Optomechanical Meta-atoms, ***Yanko Todorov,*** Université de Paris, France	**INVITED: PS1+SE-MoM1** On the Versatility of Atmospheric Non-equilibrium Plasmas: Material Synthesis, Packaging Sanitation and Oncological Applications, ***Matteo Gherardi,*** *V. Colombo, F. Barletta, A. Bisag, C. Bucci, F. Capelli, R. Laurita,* Alma Mater Studiorum-University of Bologna, Italy*; E. Mezzofanti,* AlmaPlasma srl*; T. Gallingani,* Alma Mater Studiorum-University of Bologna, Italy, Italia*; G. Girolimetti, S. Coluccelli, L. Amato, G. Gasparre,* S.Orsola-Malpighi Hospital, Bologna, Italy*; M. Perrone,* S. Orsola-Malpighi Hospital, Bologna, Italy*; A.M. Porcelli,* Alma Mater Studiorum- University of Bologna, Italy*; P. De Iaco,* S. Orsola-Malpighi Hospital, Bologna, Italy
8:40am	Invited talk continues.	Invited talk continues.
9:00am	**MN-MoM3** On-chip Silicon Photonics Radiation Sensors, ***Nikolai Klimov,*** *Z. Ahmed, R. Fitzgerald, L.T. Cumberland, I.M. Pazos, R.E. Tosh,* National Institute of Standards and Technology (NIST)	**PS1+SE-MoM3** Spectroscopic Characterization of a Multi-pins Plasma System, *M. Gulan, R. Muddiman,* ***Vladimir Milosavljevic,*** Technological University Dublin, Ireland
9:20am	**MN-MoM4** Synthesis and Characterization of Nanoscale 3 dimensional Plasmonic Architectures, ***Grace Pakeltis,*** *E. Mutunga,* University of Tennessee Knoxville*; Z. Hu, D. Masiello,* University of Washington*; J.C. Idrobo,* Oak Ridge National Laboratory*; H. Plank,* Graz University of Technology, Austria*; J.D. Fowlkes,* Oak Ridge National Laboratory*; P.D. Rack,* University of Tennessee Knoxville	**PS1+SE-MoM4** Breaching Debye Law by Coupling of Y2O3 Vapor Carrying Focused Atmospheric ICP Beam Penetrating Showernead's Holes with Opposite CCP Discharge during Chemical Corrosion Barrier Coating in Open Air, ***Yuri Glukhoy,*** Nanocoating Plasma Systems Inc
9:40am	**MN-MoM5** 2D Raman Imaging and Characterization of Surface Acoustic Waves on GaAs Substrates, ***Brian Douglas Rummel,*** *G. Heileman,* University of New Mexico*; M.D. Henry,* Sandia National Laboratories*; S.M. Han,* University of New Mexico	**PS1+SE-MoM5** Streamers Effects in Cold Atmospheric Plasma Applications: Coatings, Gas Conversion, Surface Chemistries, *A. Ozkan, J. Mertens,* ***François Reniers,*** Université Libre de Bruxelles, Belgium
10:00am	**MN-MoM6** Impacts of Stress and Dissipation in van der Waals Interfaces on 2D Material Nanoelectromechanical Systems, ***SunPhil Kim,*** *A.M. van der Zande,* University of Illinois at Urbana-Champaign	**PS1+SE-MoM6** Improved Water Intrusion Resistance on Adhesive Bonded Metals using Atmospheric CVD SiO_2 Barrier Coatings, ***Zachary Jeckell,*** *D. Patel, T. Choi, M. Schmid, L. Bónová, D.E. Barlaz, D.N. Ruzic,* University of Illinois at Urbana-Champaign*; I.A. Shchelkanov, B.E. Jurczyk,* Starfire Industries LLC
10:20am	**BREAK**	**BREAK**
10:40am	**INVITED: MN-MoM8** Nanomechanical Sensing for the Life Sciences, ***Montserrat Calleja,*** IMN-CSIC, Spain	**PS1+SE-MoM8** OES Imaging and Double Langmuir Probe Studies of Flow-through, Supersonic Microplasma Jet Sources, *K.E. Mackie,* ***Michael Gordon,*** University of California at Santa Barbara
11:00am	Invited talk continues.	**PS1+SE-MoM9** Time-resolved Optical Emission Spectroscopy of an Atmospheric Pressure Plasma Jet – Surface Interaction, ***Michael Johnson,*** *D.R. Boris, Tz.B. Petrova, S.G. Walton,* U.S. Naval Research Laboratory
11:20am	**MN-MoM10** Neutral Mass Spectrometry of Metallic Nanoparticles with Optomechanical Resonators, ***Marc Sansa,*** *M. Defoort, M. Hermouet, L. Banniard, A. Fafin, M. Gely,* Université Grenoble Alpes, CEA, LETI, France*; I. Favero,* Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Sud, Université Paris-Saclay, France*; G. Jourdan,* Université Grenoble Alpes, CEA, LETI, France*; A. Brenac,* Université Grenoble Alpes, CEA, CNRS, Grenoble INP, INAC-Spintec, France*; S. Hentz,* Université Grenoble Alpes, CEA, LETI, France	**INVITED: PS1+SE-MoM10** Atmospheric-Pressure Plasmas As Ionization Sources For Atomic, Molecular, And Biological Mass Spectrometry, ***Jacob Shelley,*** *S. Badal, C. Walton, G. MacLean,* Rensselaer Polytechnic Institute*; I. Ayodeji,* University of South Florida*; G. Chan,* Lawrence Berkeley National Laboratory*; T. Evans-Nguyen,* University of South Florida
11:40am	**MN-MoM11** Mass Calibration of Nanomechanical Resonators from Electrical Measurements for Mass Spectrometry Applications, ***Bogdan Vysotskyi,*** CEA/LETI-University Grenoble Alpes, France*; SH. Lai,* CEA/IRIG-University Grenoble Alpes, France*; M. Defoort, M. Sansa,* CEA/LETI-University Grenoble Alpes, France*; K. Clement,* CEA/IRIG-University Grenoble Alpes, France*; M. Gely,* CEA/LETI-University Grenoble Alpes, France*; C. Masselon,* CEA/IRIG-University Grenoble Alpes, France*; S. Hentz,* CEA/LETI-University Grenoble Alpes, France	Invited talk continues.

	Plasma Science and Technology Division **Room B130 - Session PS2-MoM** **Plasma Modeling** **Moderators:** Mingmei Wang, TEL Technology Center, America, LLC, Nathan Marchack, IBM T.J. Watson Research Center	**Materials and Processes for Quantum Information, Computing and Science Focus Topic** **Room B231-232 - Session QS+EM+MN+NS-MoM** **High Coherence Qubits for Quantum Computing** **Moderators:** Vivekananda Adiga, IBM, T.J. Watson Research Center, Martina Esposito, Oxford University, UK
8:20am	**PS2-MoM1** Computational Modeling of Capacitively Coupled Plasmas at Moderate Pressures in gases of Argon, Helium and Nitrogen, ***Wei Tian,*** Applied Materials*; D. Peterson, S.C. Shannon,* North Carolina State University*; S. Rauf,* Applied Materials	**QS+EM+MN+NS-MoM1** Measurement of a Two-Level-System Dipole Distribution in a Nanoscale Aluminum Oxide Barrier, ***Chih-Chiao Hung,*** *N. Foroozani, K. Osborn,* University of Maryland
8:40am	**PS2-MoM2** Relation between Atomic Interaction Parameters of a Surface Material and its Physical Sputtering Yield; How to Predict the Etching Rate based on the Surface Material Properties, ***Nicolas Mauchamp,*** *M. Isobe, S. Hamaguchi,* Osaka University, Japan	**QS+EM+MN+NS-MoM2** Mapping Quantum Systems to Quantum Computers using Symmetry, ***Daniel Gunlycke,*** *S. Fischer, C.S. Hellberg, S. Policastro, S. Tafur,* U.S. Naval Research Laboratory
9:00am	**INVITED: PS2-MoM3** Investigation on the Uniformity Control of the Electron and the Ion Kinetics in a Capacitively Coupled Plasma Reactor using a Parallelized Particle-in-Cell Simulation, ***Hae June Lee,*** Pusan National University, Republic of Korea*; H.J. Kim,* Dong A Uiversity, Republic of Korea*; J.S. Kim,* Tokyo Electron Technology Solutions Limited, Japan	**INVITED: QS+EM+MN+NS-MoM3** History of Superconducting Qubit Coherence and the Current Challenges, ***Hanhee Paik,*** IBM T.J. Watson Research Center
9:20am	Invited talk continues.	Invited talk continues.
9:40am	**PS2-MoM5** Capacitively Coupled Plasma Uniformity Improvement Using Phase and Amplitude Control of Electrode Potential, ***Xiaopu Li,*** *K. Bera, S. Rauf,* Applied Materials	**INVITED: QS+EM+MN+NS-MoM5** Loss and Decoherence Benchmarking of Superconducting Transmon Qubits, ***Jonas Bylander,*** Chalmers University of Technology, Sweden
10:00am	**PS2-MoM6** Kinetic Modeling of Non-Equilibrium Plasmas for Modern Applications, ***Igor Kaganovich,*** *A. Khrabrov, A. Powis,* Princeton Plasma Physics Laboratory	Invited talk continues.
10:20am	**BREAK**	**BREAK**
10:40am	**PS2-MoM8** Automated Reduction of Plasma Chemistry Sets, ***Sebastian Mohr,*** Quantemol Ltd., UK*; M. Hanicinec,* University College London, UK*; A. Dzarasova,* Quantemol Ltd., UK*; J. Tennyson,* University College London, UK	**INVITED: QS+EM+MN+NS-MoM8** Towards PAMBE Grown Nitride Superconductors for Epitaxial Josephson Junctions and Quantum Circuits, ***Christopher Richardson,*** *A. Alexander, C. Weddle,* Laboratory for Physical Sciences*; M. Olszta, B. Arey,* Pacific Northwest National Laboratory
11:00am	**PS2-MoM9** Prediction of Etch Rates for New Materials by Machine Learning - Case Study for Physical Sputtering, ***Kazumasa Ikuse,*** Osaka University, Japan*; H. Kino,* National Institute for Materials Science (NIMS), Japan*; S. Hamaguchi,* Osaka University, Japan	Invited talk continues.
11:20am	**PS2-MoM10** Maskless and Contactless Patterned Silicon Deposition using a Localized PECVD Process, ***Ronan Leal,*** *B. Bruneau, P. Bulkin, T. Novikova, F. Silva,* LPICM, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris, France*; N. Habka,* TOTAL GRP - New Energies, France*; E.V. Johnson,* LPICM, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris, France	**QS+EM+MN+NS-MoM10** Josephson Junction Metrology for Superconducting Quantum Device Design, ***Ruichen Zhao,*** *M. Bal, J.L. Long, R.E. Lake, X. Wu, C. Rae McRae, H.-S. Ku, H. Wang, D.P. Pappas,* National Institute of Standards and Technology (NIST)
11:40am		**QS+EM+MN+NS-MoM11** Superconducting Metamaterial Resonator Spectrum and Interaction with Qubit, ***Haozhi Wang,*** *S. Indrajeet, M.D. Hutchings, M. LaHaye, B.L.T. Plourde,* Syracuse University*; B. Taketani, F. Wilhelm,* Saarland University

	Thin Films Division **Room A122-123 - Session TF+EM+MI+MN+OX+PS-MoM** **Functional Thin Films: Ferroelectric, Multiferroics, and Magnetic Materials** **Moderators:** Christophe Vallee, LTM, Univ. Grenoble Alpes, CEA-LETI, France, Jessica Kachian, Intel Corporation	**Thin Films Division** **Room A124-125 - Session TF-MoM** **Thin Films for Electrochemistry and Energy Storage** **Moderators:** Parag Banerjee, University of Central Florida, Jason Avila, U.S. Naval Research Laboratory
8:20am	**INVITED: TF+EM+MI+MN+OX+PS-MoM1** A Room-Temperature Magnetoelectric Multiferroic made by Thin Film Alchemy, *D.G. Schlom,* ***Megan Holtz,*** Cornell University	**INVITED: TF-MoM1** Enabling Energy Dense Lithium Batteries Using Thin Film Technology, ***Wyatt Tenhaeff,*** University of Rochester
8:40am	Invited talk continues.	Invited talk continues.
9:00am	**TF+EM+MI+MN+OX+PS-MoM3** Magnetic Losses in FeGa/NiFe/Al_2O_3 Laminates for Strain-Mediated Multiferroic Micro-Antenna Applications, ***Kevin Fitzell,*** *A. Acosta, C.R. Rementer, D.J. Schneider, Z. Yao,* University of California, Los Angeles; *C. Dong,* Northeastern University; *M.E. Jamer, D. Gopman, J. Borchers, B. Kirby,* National Institute of Standards and Technology (NIST); *N. Sun,* Northeastern University; *Y. Wang, G.P. Carman, J.P. Chang,* University of California, Los Angeles	**TF-MoM3** Molecular Layer Deposition of Organic Li-containing Thin Film for Li Ion Solid-state Batteries, ***Haotian Wang,*** University of Maryland, College Park
9:20am	**TF+EM+MI+MN+OX+PS-MoM4** Multiferroic Gd-substituted HfO_2Thin Films, ***John Hayden,*** *F. Scurti, J. Schwartz, J.-P. Maria,* Pennsylvania State University	**TF-MoM4** Organic/Inorganic Solid Electrolytes and Electrode Coatings for 3D Lithium-ion Microbatteries, ***Ryan Sheil***[1], *J. Lau,* University of California, Los Angeles; *K. Jungjohann,* Sandia National Laboratories; *J. Yoo,* Los Alamos National Laboratory; *B. Dunn, J.P. Chang,* University of California, Los Angeles
9:40am	**TF+EM+MI+MN+OX+PS-MoM5** Epitaxial Growth of Antiferromagnetic NiO Films by Off-axis Sputtering for Spintronic Devices, *A. Churikova, G.S.D. Beach,* Massachusetts Institute of Technology; ***Larry Scipioni,*** *A. Shepard, J. Greer, T. Newhouse-Illige,* PVD Products, Inc.	**TF-MoM5** Structural Rearrangement in $Li_xV_2O_5$ Thin Films, a Cathode Material for All-solid-state Batteries, ***Angelique Jarry,*** University of Maryland, College Park; *N. Pronin, M. Walker,* The Ohio State University; *J. Ballard,* University of Maryland; *D. Stewart,* University of Maryland, College Park; *L.J. Brillson,* The Ohio State University; *G.W. Rubloff,* University of Maryland, College Park
10:00am	**TF+EM+MI+MN+OX+PS-MoM6** Structural and Magnetic Properties of CoPd Alloys for Non-Volatile Memory Applications, *S. Gupta, J.B. Abugri, B.D. Clark,* University of Alabama; *P. Komninou,* Aristotle University of Thessaloniki; ***Sujan Budhathoki,*** *A.J. Hauser, P.B. Visscher,* University of Alabama	**TF-MoM6** Atomic Layer Deposition and Performance of Sodium and Potassium Electrolytes for Conformal Solid State Batteries, ***Blake Nuwayhid,*** *A. Jarry, G.W. Rubloff, K. Gregorczyk,* University of Maryland, College Park
10:20am	**BREAK**	**BREAK**
10:40am	**INVITED: TF+EM+MI+MN+OX+PS-MoM8** Size Effects of the Electromechanical Response in Ferroic Thin Films: Phase Transitions to the Rescue, ***Nazanin Bassiri-Gharb,*** Georgia Institute of Technology	**INVITED: TF-MoM8** ALD as Tool for Bottom-up Synthesis of Catalyst Powders, ***Frank Rosowski,*** BASF Se, Germany
11:00am	Invited talk continues.	Invited talk continues.
11:20am	**TF+EM+MI+MN+OX+PS-MoM10** Ferroelectrics Meet Ionics in the Land of van der Waals, *S. Neumayer,* Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; *J. Brehm,* Vanderbilt University; *M.A. McGuire,* Oak Ridge National Laboratory; *M.A. Susner,* Air Force Research Laboratory; *E. Eliseev,* National Academy of Sciences of Ukraine; *S. Jesse, S.V. Kalinin,* Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; *A.N. Morozovska,* National Academy of Sciences of Ukraine; *S. Pantelides,* Vanderbilt University; *N. Balke,* ***Petro Maksymovych,*** Center for Nanophase Materials Sciences, Oak Ridge National Laboratory	**TF-MoM10** Strategies for the Stabilization of Metal Anodes for Li and Na Metal Batteries, ***Yang Zhao***[2], *X. Sun,* University of Western Ontario, Canada
11:40am	**TF+EM+MI+MN+OX+PS-MoM11** Adsorption-controlled Epitaxial Growth of the Hyperferroelectric Candidate LiZnSb on GaSb (111), *D. Du, P. Strohbeen,* University of Wisconsin - Madison; *H. Paik,* Cornell University; *C. Zhang, P. Voyles,* ***Jason Kawasaki,*** University of Wisconsin - Madison	**TF-MoM11** Competition Between Incorporation and Desorption of Nitrogen in Plasma-Enhanced Atomic Layer Deposition of Cobalt and Cobalt Nitride Catalysts, ***Gerben van Straaten,*** Eindhoven University of Technology, The Netherlands, Netherlands; *H.O.A. Fredriksson,* Syngaschem BV, Netherlands; *R. Deckers,* Eindhoven University of Technology, Netherlands; *M.F.J. Vos,* Eindhoven University of Technology, The Netherlands, Netherlands; *K.-J. Weststrate,* Syngaschem BV, Netherlands; *W.M.M. Kessels,* Eindhoven University of Technology, The Netherlands, Netherlands; *M. Creatore,* Eindhoven University of Technology, Netherlands

[1] **TFD James Harper Award Finalist**

[2] **Late-Abstract Energy Transition Symposium Theme Award**

Vacuum Technology Division
Room A213 - Session VT-MoM
Pumping, Outgassing, leaks, and Vacuum Pressure Measurement
Moderators: Scott Heinbuch, MKS Granville-Phillips Division, Longmont, Giulia Lanza, SLAC National Accelerator Laboratory

8:20am	**VT-MoM1** Operational Experiences of Compact Non-Evaporable Getter Pumps in CHESS-U and CBETA, ***Yulin Li***, *Y. Lushtak, L. Ying,* Cornell University	
8:40am	**VT-MoM2** Al_2O_3 Coated Stainless Steel Vacuum Chamber and Parts, ***Martin Wüest***, *Y. Kuzminykh, G. Mata Osoro, W. Fuchs, J. Gabathuler, L. Ospelt,* INFICON Ltd., Liechtenstein	
9:00am	**VT-MoM3** Comparative Outgassing Study of Identical Vacuum Chambers, ***James Fedchak***, National Institute of Sandards and Technology (NIST)	
9:20am	**VT-MoM4** The NIST VAcuum LEaks System (VALES): a new system for the primary and comparison calibration of small gas flows., ***Julia Scherschligt***, *J.A. Fedchak, R. Vest,* National Institute of Sandards and Technology (NIST)	
9:40am	**VT-MoM5** Creating a Controlled Gas Environment for Lifetime Testing of EUV Optics, ***Timo Huijser***, *M. van Putten, M.J. van der Lans,* TNO, Netherlands	
10:00am	**VT-MoM6** Sampling System Design to Predict Mixture Composition at a Quadrupole Mass Spectrometer Ion Source, ***Robert Ellefson***, REVac Consulting	
10:20am	**BREAK**	
10:40am	**INVITED: VT-MoM8** Quantum Pressure Standard in the range 200 Pa to 20 kPa using Superconducting Microwave Cavity, ***Laurent Pitre***, LNE Cnam-LCM, France; *P. Gambette,* LNE-Cnam LCM, France; *R.M. Gavioso, D.M. Ripa,* INRiM, Italy; *M.D. Plimmer,* LNE-Cnam LCM, France	
11:00am	Invited talk continues.	
11:20am	**VT-MoM10** Progress Toward Primary Pressure Measurements based on Refractive Index, ***Kevin Douglass***, *J.E. Ricker*, *J. Hendricks,* National Institute of Standards and Technology (NIST)	
11:40am	**VT-MoM11** Application of Porous Conductance Element for High Vacuum Gauge Calibration, ***Martin-Viktor Johansson***, Aix Marseille University, France; *M.P. Wüest,* INFICON Ltd., Liechtenstein; *P. Perrier,* Aix Marseille University, France; *I. Graur,* Aix-Marseille University, France	

	2D Materials **Room A226 - Session 2D+AP+EM+MI+MN+NS+PS+TF-MoA** **Nanostructures including Heterostructures and Patterning of 2D Materials** **Moderator:** Deep Jariwala, University of Pennsylvania	**2D Materials** **Room A216 - Session 2D+AP+EM+MI+NS+PS+TF-MoA** **2D Materials Growth and Fabrication** **Moderator:** Sarah Haigh, University of Manchester, UK
1:40pm	**INVITED: 2D+AP+EM+MI+MN+NS+PS+TF-MoA1** Tailoring and Patterning 2D Material Interfaces Through Chemical Functionalization, ***Arend van der Zande,*** University of Illinois at Urbana-Champaign	**2D+AP+EM+MI+NS+PS+TF-MoA1** Two-dimensional Non-layered Indium Sulfide for Electronic and Optical Applications, ***Jian Zhen Ou,*** *A. Jannat, K. Xu,* RMIT University, Australia
2:00pm	Invited talk continues.	**2D+AP+EM+MI+NS+PS+TF-MoA2** Synthesis of High Quality Monolayer Transition Metal Dichalcogenides using Direct Liquid Injection, ***Kathleen M. McCreary,*** *E.D. Cobas, A.T. Hanbicki, M.R. Rosenberger, H.-J. Chuang, B.T. Jonker,* U.S. Naval Research Laboratory
2:20pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA3** Dual-Route Hydrogenation of the Graphene/Ni Interface, ***Rosanna Larciprete,*** CNR-Institute for Complex Systems, Roma, Italy; *D. Lizzit,* Elettra - Sincrotrone Trieste, Trieste, Italy; *M.I. Trioni,* CNR-Institute of Molecular Science and Technologies, Milano, Italy; *P. Lacovig, L. Bignardi, S. Lizzit,* Elettra - Sincrotrone Trieste, Trieste, Italy; *R. Martinazzo,* Università degli Studi di Milano, Milano, Italy	**INVITED: 2D+AP+EM+MI+NS+PS+TF-MoA3** Understanding and Controlling the Growth of 2D Materials with Non-Equilibrium Methods and in situ Diagnostics, ***David Geohegan,*** *Y-C. Lin, Y. Yu,* Oak Ridge National Laboratory; *C. Liu, G. Duscher,* University of Tennessee Knoxville; *A. Strasser,* University of Texas at Dallas; *A.A. Puretzky,* Oak Ridge National Laboratory; *K. Wang,* Intel Corporation, USA; *M. Yoon, C.M. Rouleau,* Oak Ridge National Laboratory; *S. Canulescu,* DTU Nanolab, Technical University of Denmark; *P.D. Rack,* University of Tennessee Knoxville; *L. Liang, W. Zhang, H. Cai, Y. Gu, G. Eres, K. Xiao,* Oak Ridge National Laboratory
2:40pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA4** Assembly of Arrays of Predefined Monolayer Features into vdW Heterostructure by a Continuous Exfoliate-align-Release Process, ***Vu Nguyen,*** *H. Taylor,* University of California at Berkeley	Invited talk continues.
3:00pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA5** van der Waals Heterojunction Photothermoelectric Effect in MoS_2/Graphene Monolayers, ***Yunqiu Kelly Luo,*** The Ohio State University; *T. Zhou,* University at Buffalo, State University of New York; *M. Newburger,* The Ohio State Univesity; *R. Bailey-Crandell, I. Lyalin,* The Ohio State University; *M. Neupane,* U.S. Army Research Laboratory; *A. Matos-Abiague,* Wayne State University; *I. Zutic,* University at Buffalo, State University of New York; *R. Kawakami,* The Ohio State University	**2D+AP+EM+MI+NS+PS+TF-MoA5** Area-Selective Atomic Layer Deposition of 2D WS_2 Nanolayers, ***Shashank Balasubramanyam***[1], Eindhoven University of Technology, The Netherlands, Noord Brabant; *M.J.M. Merkx,* Eindhoven University of Technology, The Netherlands; *W.M.M. Kessels,* Eindhoven University of Technology, The Netherlands, Netherlands; *A.J.M. Mackus,* Eindhoven University of Technology, The Netherlands, Nederland; *A.A. Bol,* Eindhoven University of Technology, The Netherlands, Netherlands
3:20pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA6** Formation of Edge-bonded MoS_2-graphene Nanoribbons by On-surface Synthesis, ***Mark Haastrup,*** *M. Mammen, J. Rodríguez-Fernández, J.V. Lauritsen,* Aarhus University, Denmark	**2D+AP+EM+MI+NS+PS+TF-MoA6** Growth Behavior of Hexagonal Boron Nitride on Cu-Ni Binary Alloys, ***Karthik Sridhara,*** Texas A&M University; *J.A. Wollmershauser,* U.S. Naval Research Laboratory; *L.O. Nyakiti,* Texas A&M University; *B.N. Feigelson,* U.S. Naval Research Laboratory
3:40pm	**BREAK**	**BREAK**
4:00pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA8** The Effects of Metal-modification and Two Dimensional (2D) Lamellar Structure on Catalytic Performance of MFI Zeolite for Ethylene Conversion into Liquid Aromatics, ***Laleh Emdadi,*** *L. Mahoney, D. Tran, I. Lee,* US Army Research Laboratory	**2D+AP+EM+MI+NS+PS+TF-MoA8** Chemical Deposition of Vanadium Disulfide on Silicon for Optoelectronic Applications, ***Mathias Fraccaroli,*** *R. Gassilloud, S. Cadot,* CEA-LETI, France; *B. Pelissier,* LTM, Univ. Grenoble Alpes, CNRS, France; *C. Vallée,* LTM, Univ. Grenoble Alpes, CEA-LETI, France; *A. Sylvestre,* G2Elab, Univ. Grenoble Alpes, France
4:20pm	**2D+AP+EM+MI+MN+NS+PS+TF-MoA9** Structural Stability of Graphene Nanoflakes:From the View Point of Aromaticity, *M. Ushirozako, H. Matsuyama, A. Akaishi,* ***Jun Nakamura,*** The University of Electro-Communications (UEC-Tokyo), Japan	**2D+AP+EM+MI+NS+PS+TF-MoA9** Controlled Growth of Transition Metal Dichalcogenide Monolayers for Applications in Nanoelectronic and Nanophotonic Devices, *A. George, C. Neumann, D. Kaiser, R. Mupparapu,* Friedrich Schiller University Jena, Germany; *U. Hübner,* Leibniz Institute of Photonic Technology, Jena, Germany; *Z. Tang, A. Winter, I. Staude,* ***Andrey Turchanin,*** Friedrich Schiller University Jena, Germany
4:40pm	**INVITED: 2D+AP+EM+MI+MN+NS+PS+TF-MoA10** Wafer-scale 2D-3D Mixed Heterostructures Enabled by Remote Epitaxy through Graphene, ***Jeehwan Kim,*** Massachusetts Institute of Technology	**2D+AP+EM+MI+NS+PS+TF-MoA10** Atomic Layer Deposition of BN as a Novel Capping Barrier for B_2O_3, ***Aparna Pilli,*** *J. Jones, J.A. Kelber,* University of North Texas; *A. LaVoie, F. Pasquale,* Lam Research Corporation
5:00pm	Invited talk continues.	**2D+AP+EM+MI+NS+PS+TF-MoA11** Atomic Layer Deposition of SiO_2 on Group VIII Metals: Towards Formation of a 2D Dielectric, *T. Suh, R. Yalisove,* ***James Engstrom,*** Cornell University

[1] **TFD James Harper Award Finalist**

Monday Afternoon, October 21, 2019

	Actinides and Rare Earths Focus Topic **Room A215 - Session AC-MoA** **Early Career Scientists** **Moderators:** Art Nelson, Lawrence Livermore National Laboratory, David Shuh, Lawrence Berkeley National Laboratory, Evgeniya Tereshina-Chitrova, Charles University, Czech Republic	**Biomaterial Interfaces Division** **Room A120-121 - Session BI+AS-MoA** **Cutting Edge Bio: Bio-Nano, Bio-Energy, 3D Bio** **Moderators:** Heather Canavan, University of New Mexico, Jordan Lerach, ImaBiotech Corp.
1:40pm	**INVITED: AC-MoA1** Advanced Characterization of Nuclear Fuels, ***Lingfeng He****, T. Yao,* Idaho National Laboratory*; V. Chauhan,* The Ohio State University*; A. Sen,* Purdue University*; Z. Hua, M. Bachhav,* Idaho National Laboratory*; M. Khafizov,* The Ohio State University*; J. Wharry,* Purdue University*; M. Mann,* Air Force Research Laboratory*; T. Wiss,* European Commission, Joint Research Centre (JRC)*; J. Gan, D. Hurley,* Idaho National Laboratory	**INVITED: BI+AS-MoA1** Emulsion-templated Asymmetric Vesicles, ***Laura Arriaga****,* University of Madrid, Spain
2:00pm	Invited talk continues.	Invited talk continues.
2:20pm	**INVITED: AC-MoA3** The Influence of Relative Humidity on the Oxidation of δ-Pu, ***Scott Donald****, J. Stanford, A.J. Nelson, B.W. McLean,* Lawrence Livermore National Laboratory	**BI+AS-MoA3** Antimicrobial Cyclic Peptide Polymer Nanopores, ***Kenan Fears****, L. Estrella,* US Naval Research Laboratory
2:40pm	Invited talk continues.	**BI+AS-MoA4** ToF-SIMS Analysis of the Distribution of *p*-Hydroxybenzoate in Wood, ***Robyn E. Goacher****,* Niagara University*; Y. Mottiar,* University of British Columbia, Canada
3:00pm	**AC-MoA5** Magnetization and Transport Properties of Delta Phase Uranium, ***Xiaxin Ding****, N. Poudel, T. Yao, J. Harp, K. Gofryk,* Idaho National Laboratory	**INVITED: BI+AS-MoA5** Feeling the Force; Probing the Cues that Influence Stem Cell Behaviour, ***Stephanie Allen****,* School of Pharmacy, The University of Nottingham, UK
3:20pm	**AC-MoA6** Using Fused Filament Fabrication to Develop Customized Materials which Attenuate Ionizing Radiation, ***Zachary Brounstein****, E. Murphy, J.H. Dumont, S.J. Talley, K.S. Lee, A. Labouriau,* Los Alamos National Laboratory	Invited talk continues.
3:40pm	**BREAK**	**BREAK**
4:00pm	**AC-MoA8** Thermodynamic and Thermal Transport Properties of Thorium Dioxide single crystals, ***Narayan Poudel****, X. Ding,* Idaho National Laboratory*; J. Mann,* Air Force Research Laboratory*; K. Gofryk,* Idaho National Laboratory	
4:20pm	**AC-MoA9** Magnetic Nanoparticles for Biomedical Applications, ***Iliana Medina-Ramirez****, A. Diaz de Leon Olmos,* Universidad Autonoma de Aguascalientes, Mexico*; J.A. Zapien,* City University of Hong Kong	**BI+AS-MoA9** Angstrom-Resolved Characterization of Electrochemical Interfaces in Real Time during Polarization, ***Markus Valtiner****,* Vienna University of Technology, Austria
4:40pm		**INVITED: BI+AS-MoA10** New Electrochemical Methods for Probing Metalloenzymes, ***Alison Parkin****,* University of York, UK
5:00pm		Invited talk continues.

	Electronic Materials and Photonics Division **Room A214 - Session EM+PS+TF-MoA** **New Devices and Materials for Logic and Memory** **Moderators:** Rehan Kapadia, University of Southern California, Nicholas Strandwitz, Lehigh University	**MEMS and NEMS Group** **Room A210 - Session MN-MoA** **Microfabricated Systems for Gas Chromatography and Nanomechanical Mass Sensing** **Moderators:** Robert Davis, Brigham Young University, Christian Zorman, Case Western Reserve University
1:40pm	**EM+PS+TF-MoA1** Short-term Plasticity to Long-term Plasticity Transition Mimicked by High Mobility InP FETs with TiO_2 Trapping Layer, ***Jun Tao***, *R. Kapadia,* University of Southern California	**INVITED: MN-MoA1** Micromachined Silicon Micro-pillar Arrays for Liquid and Gas Chromatography, ***Gert Desmet***, Vrije Universiteit Brussel, Belgium
2:00pm	**EM+PS+TF-MoA2** Magnetic Domain Wall Devices for Artificial Neural Network, ***Saima Siddiqui***, *S. Dutta, A. Tang, L. Liu, M. Baldo, C. Ross,* MIT	Invited talk continues.
2:20pm	**INVITED: EM+PS+TF-MoA3** Ferroelectric Devices for Non-von Neumann Computing, *Z. Wang,* ***Asif Khan***, Georgia Institute of Technology	**INVITED: MN-MoA3** An Integrated Passive µPreconcentrator with Progressively-Heated µInjector for µGC, *R. Hower, C. Zhan, M. Akbar, N. Nuñovero, J. Wang, J. Potkay,* ***Edward Zellers***, University of Michigan
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**EM+PS+TF-MoA5** Ultrafast Measurement of Nanoseconds Polarization Switching in Ferroelectric Hafnium Zirconium Oxide, ***Mengwei Si***, *P. Ye,* Purdue University	**MN-MoA5** Developments and Challenges in Full-range Microchip Gas Chromatography, ***Abhijit Ghosh***, Honeywell UOP, Des Plaines, IL, USA.; *M.L. Lee,* Brigham Young University
3:20pm	**EM+PS+TF-MoA6** Interfacial Charge Engineering in Ferroelectric-Gated Mott Transistors, *XG. Chen, Y. Hao, L. Zhang,* ***Xia Hong***, University of Nebraska-Lincoln	**MN-MoA6** Fabrication of Thermally Isolated micro-Column for Gas Chromatography, ***James Harkness***, *H. Davis, A.C. Davis, R.C. Davis, B.D. Jensen, R.R. Vanfleet,* Brigham Young University
3:40pm	**BREAK**	**BREAK**
4:00pm	**EM+PS+TF-MoA8** The Interface of Transition Metal Dichalcogenides and Ferroelectric Oxides, ***Maria Gabriela Sales***, *S. Jaszewski, S. Fields, R. Christopher, N. Shukla, J. Ihlefeld, S. McDonnell,* University of Virginia	**MN-MoA8** Control of Surface Geometry and Chemistry to enable integration of Microfabricated Structures into High Performance Microscale Gas Chromatography Systems, ***Henry Davis***, *D. McKenna, J. Harkness, D. Kane, R.R. Vanfleet, R.C. Davis,* Brigham Young University
4:20pm	**EM+PS+TF-MoA9** Electronic and Thermal Properties of 2D Materials, ***Connor McClellan***, *E. Yalon, K. Smithe, C. English, S. Vaziri, C. Bailey, A. Sood, M. Chen, E. Pop,* Stanford University	**INVITED: MN-MoA9** Constructive Utilization of Nonlinear Dynamics in MEMS/NEMS, ***Hanna Cho***, The Ohio State University
4:40pm	**INVITED: EM+PS+TF-MoA10** Electronics in Flatland, ***Sanjay Banerjee***, University of Texas at Austin	Invited talk continues.
5:00pm	Invited talk continues.	**MN-MoA11** Frequency Stabilization in a MEMS Oscillator Via Tunable Internal Resonance, ***Jun Yu***, *H. Cho,* The Ohio State University

Monday Afternoon, October 21, 2019

	Plasma Science and Technology Division **Room B130 - Session PS+AS+EM+SS+TF-MoA** **Plasma-Surface Interactions** **Moderators:** Sebastian Engelmann, IBM T.J. Watson Research Center, Sumit Agarwal, Colorado School of Mines	**Plasma Science and Technology Division** **Room B131 - Session PS1-MoA** **Plasma-Liquid Interactions, Medicine, and Agriculture** **Moderators:** Kazunori Koga, Kyushu University, Japan, Deborah O'Connell, University of York, UK
1:40pm	**PS+AS+EM+SS+TF-MoA1** Cleaning Chamber Walls after ITO Plasma Etching Process, ***Salma Younesy***, *C. Petit-Etienne,* LTM/CNRS, France; *S. Barnola,* CEA-LETI, France; *P. Gouraud,* ST Microelectronics, France; *G. Cunge,* LTM/CNRS, France	**INVITED: PS1-MoA1** Peroxynitric acid ($HOONO_2$) Chemistry in Plasma-treated Water for Effective and Safety Disinfection, ***Katsuhisa Kitano***, Osaka University, Japan; *S. Ikawa, Y. Nakashima,* Osaka Research Institute of Industrial Science and Technology, Japan; *T. Yokoyama,* Osaka University, Japan; *A. Tani,* Kobe University, Japan
2:00pm	**PS+AS+EM+SS+TF-MoA2** Plasma Resistance of Sintered Yttrium Oxyfluoride (YOF) with Various Y, O, and F Composition Ratios, ***Tetsuya Goto***, *Y. Shiba, A. Teramoto,* Tohoku University, Japan; *Y. Kishi,* Nippon Yttrium Co., Ltd, Japan; *S. Sugawa,* Tohoku University, Japan	Invited talk continues.
2:20pm	**INVITED: PS+AS+EM+SS+TF-MoA3** Understanding Atomic Layer Etching: Thermodynamics, Kinetics and Surface Chemistry, ***Jane P. Chang***[1], University of California, Los Angeles	**PS1-MoA3** Impact of Solution Properties on Plasma Formation in DC Plasma Electrolysis, ***Hernan E. Delgado***[2], *D.M. Bartels, P. Rumbach, D.B. Go,* University of Notre Dame
2:40pm	Invited talk continues.	**INVITED: PS1-MoA4** Plasma Reactive Species Formation in Liquids, ***Sylwia Ptasinska***, University of Notre Dame
3:00pm	**PS+AS+EM+SS+TF-MoA5** Comparison of Silicon Surface Chemistry between Photo-Assisted Etching and Ion-Assisted Etching, ***Emilia Hirsch***, *L. Du, V.M. Donnelly, D.J. Economou,* University of Houston	Invited talk continues.
3:20pm	**PS+AS+EM+SS+TF-MoA6** Chemical Reaction Probabilities in the Etching of Si by Fluorine Atoms Produced in a Mixture of NF_3/SF_6 Plasma, ***Priyanka Arora***[2], *T. Nguyen,* University of Houston; *S. Nam,* Samsung Electronic Company, Republic of Korea; *V.M. Donnelly,* University of Houston	**PS1-MoA6** In-flight Synthesis and Online Characterization of Silver Nanoparticles from Aerosol Droplets Reacting in a Non-thermal Plasma, ***Tommaso Gallingani***, Alma Mater Studiorum-University of Bologna, Italy, Italia; *N.H. Abuyazid,* Case Western Reserve University; *M. Gherardi, V. Colombo,* Alma Mater Studiorum-University of Bologna, Italy; *C.J. Hogan,* University of Minnesota, Minneapolis; *R.M. Sankaran,* Case Western Reserve University
3:40pm	**BREAK**	**BREAK**
4:00pm	**INVITED: PS+AS+EM+SS+TF-MoA8** John Thornton Memorial Award Lecture: Low Temperature Plasma-Materials Interactions: Foundations of Nanofabrication And Emerging Novel Applications At Atmospheric Pressure, ***Gottlieb S. Oehrlein***[3], University of Maryland, College Park	**INVITED: PS1-MoA8** Plasma-assisted Fabrication and Functionalization of Materials for Applications at the Nano-biointerface, ***Cristina Satriano***, University of Catania, Italy
4:20pm	Invited talk continues.	Invited talk continues.
4:40pm	**PS+AS+EM+SS+TF-MoA10** Determining Surface Recombination Probabilities during Plasma-enhanced ALD using Lateral High Aspect Ratio Structures, ***Karsten Arts***, Eindhoven University of Technology, The Netherlands, Netherlands; *M. Utriainen,* VTT Technical Research Centre of Finland, Finland; *R.L. Puurunen,* Aalto University School of Chemical Engineering, Finland; *W.M.M. Kessels,* Eindhoven University of Technology, The Netherlands, Netherlands; *H.C.M. Knoops,* Eindhoven University of Technology, The Netherlands	**INVITED: PS1-MoA10** Cold Plasma Jets, Liquids and Biomaterials for Bone Cancer Therapy, ***Cristina Canal***, Universitat Politècnica de Catalunya, Spain
5:00pm	**PS+AS+EM+SS+TF-MoA11** Study of Plasma-Photoresist Interactions for Atomic Layer Etching Processes, ***Adam Pranda***[2], *K.-Y. Lin, G.S. Oehrlein,* University of Maryland, College Park	Invited talk continues.

[1] **PSTD Plasma Prize Winner**

[2] **Coburn & Winters Student Award Finalist**

[3] **John A. Thornton Memorial Award Winner**

	Materials and Processes for Quantum Information, Computing and Science Focus Topic **Room B231-232 - Session QS+EM+MN+NS+VT-MoA** **Systems and Devices for Quantum Computing** **Moderators:** Jonas Bylander, Chalmers University of Technology, Sweden, Ruichen Zhao, National Institute of Standards and Technology	**New Challenges to Reproducible Data and Analysis Focus Topic** **Room A211 - Session RA+AS+NS+SS-MoA** **Quantitative Surface Analysis II/Big Data, Theory and Reproducibility** **Moderators:** Kateryna Artyushkova, Physical Electronics, Donald Baer, Pacific Northwest National Laboratory
1:40pm	**QS+EM+MN+NS+VT-MoA1** DEMUXYZ Gate Using Single Microwave Drive Line for Multiple Qubits, ***Matteo Mariantoni,*** University of Waterloo, Canada; *C.T. Earnest,* University atof Waterloo, Canada; *J.H. Béjanin,* Unversity of Waterloo, Canada	**INVITED: RA+AS+NS+SS-MoA1** A Data-Centric View of Reproducibility, ***Anne Plant,*** National Institute of Standards and Technology (NIST); *J. Elliott,* NIST; *R. Hanisch,* National Institute of Standards and Technology (NIST)
2:00pm	**QS+EM+MN+NS+VT-MoA2** Structural and Electronic Characterization of a Novel Si/SiGe Heterostructure for Quantum Computing, ***Thomas McJunkin,*** *E.R. MacQuarrie, S.F. Neyens, B. Thorgrimsson, J. Corrigan, J.P. Dodson, D.E. Savage, M.G. Lagally, R. Joynt, M. Friesen, S.N. Coppersmith, M.A. Eriksson,* University of Wisconsin - Madison	Invited talk continues.
2:20pm	**INVITED: QS+EM+MN+NS+VT-MoA3** Efficient Quantum Computation using Problem-specific Quantum Hardware and Algorithms, ***Stefan Filipp,*** IBM Research - Zurich, Switzerland	**INVITED: RA+AS+NS+SS-MoA3** Enhancing Data Reliability, Accessibility and Sharing using Stealthy Approaches for Metadata Capture, ***Steven Wiley,*** Pacific Northwest National Laboratory
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**INVITED: QS+EM+MN+NS+VT-MoA5** Reconfigurable Magnetic Textures for Quantum Information Applications, ***Alex Matos-Abiague,*** Wayne State University	**INVITED: RA+AS+NS+SS-MoA5** From Electrons to X-rays: Tackling Big Data Problems through AI, ***Mathew Cherukara,*** *Y. Liu, M.V. Holt, H. Liu, T.E. Gage, J.G. Wen, I. Arslan,* Argonne National Laboratory
3:20pm	Invited talk continues.	Invited talk continues.
3:40pm	**BREAK**	**BREAK**
4:00pm	**INVITED: QS+EM+MN+NS+VT-MoA8** Coaxial Multilayer Superconducting Circuits for Quantum Computing, ***Peter Leek,*** University of Oxford, UK	**INVITED: RA+AS+NS+SS-MoA8** Quantifying Shell Thicknesses of Core-Shell Nanoparticles by means of X-ray Photoelectron Spectroscopy, ***Wolfgang Werner,*** Vienna University of Technology, Austria
4:20pm	Invited talk continues.	Invited talk continues.
4:40pm	**QS+EM+MN+NS+VT-MoA10** Josephson Parametric Amplifiers based on Micron Scale Overlap Junctions (O-JPA), ***Mustafa Bal,*** *J.L. Long, R. Zhao, H. Wang,* National Institute of Standards and Technology (NIST); *C.R. McRae,* National Institute of Standards and Technology (NIST) and University of Colorado Boulder; *R.E. Lake, X. Wu, H.-S. Ku, D.P. Pappas,* National Institute of Standards and Technology (NIST)	**RA+AS+NS+SS-MoA10** Modeling the Inelastic Background in X-ray Photoemission Spectra for Finite Thickness Films, ***Alberto Herrera-Gomez,*** CINVESTAV-Unidad Queretaro, México
5:00pm	**QS+EM+MN+NS+VT-MoA11** Development and Characterization of a Flux-pumped Josephson Parametric Amplifier, ***Martina Esposito,*** University of Oxford, UK	**RA+AS+NS+SS-MoA11** R2R(Raw-to-Repository) Characterization Data Conversion for Reproducible and Repeatable Measurements, ***Mineharu Suzuki,*** *H. Nagao, H. Shinotsuka,* National Institute for Materials Science (NIMS), Japan; *K. Watanabe,* ULVAC-PHI Inc., Japan; *A. Sasaki,* Rigaku Corp., Japan; *A. Matsuda, K. Kimoto, H. Yoshikawa,* National Institute for Materials Science (NIMS), Japan

	Surface Science Division **Room A220-221 - Session SS+HC-MoA** **CO2, CO, Water, and Small Molecule Chemistry at Surfaces** **Moderators:** Donna Chen, University of South Carolina, Omur E. Dagdeviren, Yale University	**Thin Films Division** **Room A124-125 - Session TF+2D+AP+EL+SS-MoA** **ALD and CVD: Nucleation, Surface Reactions, Mechanisms, and Kinetics** **Moderators:** Adrie Mackus, Eindhoven University of Technology, The Netherlands, Qing Peng, University of Alabama
1:40pm	**INVITED: SS+HC-MoA1** Calculations of the Electrochemical Reduction of CO2 and the Competing Hydrogen Evolution Reaction, ***Hannes Jónsson,*** University of Iceland, Iceland	**INVITED: TF+2D+AP+EL+SS-MoA1** ALD on Particles: What is Different from Wafers?, ***Ruud van Ommen,*** Delft University of Technology, Netherlands
2:00pm	Invited talk continues.	Invited talk continues.
2:20pm	**SS+HC-MoA3** CO_2 Adsorption on the O-Cu(100) Surface Studied by STM and DFT, *S.J. Tjung, Q. Zhang, J.J. Repicky, S. Yuk,* The Ohio State University*; X. Nie,* Dalian University of Technology*;* ***Seth Shields,*** The Ohio State University*; N. Santagata,* University of Memphis*; A. Asthagiri, J.A. Gupta,* The Ohio State University	**TF+2D+AP+EL+SS-MoA3** Insights into Particle ALD Peculiarities from In- and Ex-Situ Characterization, ***Benjamin Greenberg,*** American Society for Engineering Education*; J.A. Wollmershauser, B. Feygelson,* U.S. Naval Research Laboratory
2:40pm	**SS+HC-MoA4** Employing Carbon Monoxide and Carbon Dioxide Plasmas to Improve the Gas Sensing Performance of Tin(IV) Oxide, ***Kimberly Hiyoto,*** *E.R. Fisher,* Colorado State University	**TF+2D+AP+EL+SS-MoA4** Impact of Medium Energy Ions on HfO2 Nucleation Mechanisms on Si, SiO2,TiN Substrates in PEALD Processes Investigated by In situ Ellipsometry, Optical Emission Spectroscopy, AFM and XPS Analyses, ***Marceline Bonvalot,*** *S. belahcen, A. Bsiesy, C. Vallée,* LTM, Univ. Grenoble Alpes, CEA-LETI, France
3:00pm	**INVITED: SS+HC-MoA5** The Role of Steps in the Dissociation of CO_2 on Cu, ***Johan Gustafson,*** *B. Hagman,* Lund University, Sweden*; A. Posada-Borbón, A. Schaefer,* Chalmers University of Technology, Sweden*; M. Shipilin,* Stockholm University, Sweden*; C. Zhang,* Lund University, Sweden*; L.R. Merte,* Malmö University, Sweden*; A. Hellman,* Chalmers University of Technology, Sweden*; E. Lundgren,* Lund University, Sweden*; H. Grönbeck,* Chalmers University of Technology, Sweden	**TF+2D+AP+EL+SS-MoA5** Controlling the Nucleation of CVD Cobalt Films on SiO_2 : Combining an Amido-based Nucleation Promotor with an Amine-based Growth Inhibitor to Afford Atomically-smooth Surfaces, ***Zhejun Zhang,*** *G.S. Girolami, J.R. Abelson,* University of Illinois at Urbana-Champaign
3:20pm	Invited talk continues.	**TF+2D+AP+EL+SS-MoA6** Plasma-assisted Atomic Layer Epitaxy of Indium Aluminum Nitride Studied Using *in situ* Grazing Incidence Small-angle X-ray Scattering, ***Jeffrey M. Woodward,*** ASEE (residing at US Naval Research Laboratory)*; S.G. Rosenberg,* American Society for Engineering Education (residing at US Naval Research Laboratory)*; S.D. Johnson, N. Nepal,* U.S. Naval Research Laboratory*; Z.R. Robinson,* SUNY Brockport*; K.F. Ludwig,* Boston University*; C.R. Eddy,* U.S. Naval Research Laboratory
3:40pm	**BREAK**	**BREAK**
4:00pm	**SS+HC-MoA8** Surface Temperature Dependence of Methane Dissociation on Ni(997), ***Daniel Tinney,*** *E.A. High, L. Joseph, A.L. Utz,* Tufts University	**INVITED: TF+2D+AP+EL+SS-MoA8** Real-time Monitoring of the Surface Chemistry of Atomic Layer Deposition by Ambient Pressure X-ray Photoelectron Spectroscopy, ***Joachim Schnadt,*** *P. Shayesteh,* Lund University, Sweden*; R. Tsyshevskiy,* University of Maryland*; J.-J. Jean-Jacques, F. Bournel,* Sorbonne Université, France*; R. Timm,* Lund University, Sweden*; A.R. Head,* Brookhaven National Laboratory*; G. D'Acunto, F. Rehman, S. Chaudhary,* Lund University, Sweden*; R. Sánchez-de-Armas,* Uppsala University, Sweden*; F. Rochet,* Sorbonne Université, France*; B. Brena,* Uppsala University, Sweden*; A. Mikkelsen, S. Urpelainen, A. Troian, S. Yngman, J. Knudsen,* Lund University, Sweden
4:20pm	**SS+HC-MoA9** Promotion and Inhibition of Methane Dissociation by Carbon on Ni Single Crystal Surfaces, ***Arthur Utz,*** *E.A. High, D.G. Tinney,* Tufts University	Invited talk continues.
4:40pm	**SS+HC-MoA10** Two-Dimensional Polymorphism as a Result of Non-Equilibrium Self-Assembly, ***Angela Silski***[1]*, J. Petersen,* University of Notre Dame*; R.D. Brown,* Clarkson University*; S.A. Kandel,* University of Notre Dame	**TF+2D+AP+EL+SS-MoA10** Kinetics during TMA-H_2O ALD: The Possible Role of Cooperative Surface Reactions, ***Brent Sperling,*** *B. Kalanyan, J.E. Maslar,* National Institute of Standards and Technology (NIST)
5:00pm		**TF+2D+AP+EL+SS-MoA11** Atomic Layer Deposition of Metal Sulfides: Growth and Surface Chemistry, ***Xinwei Wang,*** Shenzhen Graduate School, Peking University, China

[1] **Morton S. Traum Award Finalist**

	Thin Films Division **Room A122-123 - Session TF+SE-MoA** **HiPIMS and Reactive HiPIMS for Novel Thin Films** **Moderators:** Joe Becker, Kurt J. Lesker Company, Megan Holtz, Cornell University	**Energy Transition Focus Topic** **Room A212 - Session TL+2D+HC+SS-MoA** **Surface Reaction Mechanisms in Energy Conversion (ALL INVITED SESSION)** **Moderators:** Marie Turano, Loyola University Chicago, Sarah Zaccarine, Colorado School of Mines
1:40pm	**TF+SE-MoA1** The Influence of the Magnetic Field on the Deposition Rate and Ionized Flux Fraction in the HiPIMS Discharge, *H. Hajihoseini,* University of Iceland, Iceland*; M. Cada, Z. Hubicka,* Academy of Sciences of the Czech Republic, Czech Republic*; S. Unaldi,* LPGP Université Paris-Sud, France*; M.A. Raadu, N. Brenning,* KTH Royal Institute of Technology, Sweden*;* ***Jon Tomas Gudmundsson,*** University of Iceland, Iceland*; D. Lundin,* LPGP Université Paris-Sud, France	**INVITED: TL+2D+HC+SS-MoA1** Selective Photo-driven Organic Reactions on the Surfaces of Colloidal Quantum Dots, *Y. Jiang, K. McClelland, C. Rogers,* ***Emily Weiss,*** Northwestern University
2:00pm	**TF+SE-MoA2** HIPIMS and Magnetron Sputtering of Niobium for use in Josephson Junctions, ***George Major****, M.R. Linford,* Brigham Young University	Invited talk continues.
2:20pm	**INVITED: TF+SE-MoA3** Thin Film Crystal Growth of Oxides, Nitrides and Carbindes using High Impulse Magnetron Sputtering, ***Jon-Paul Maria,*** The Pennsylvania State University	**INVITED: TL+2D+HC+SS-MoA3** Single-Atom Alloy Catalysts: Born in a Vacuum, Tested in Reactors, and Understood In Silico, ***Charles Sykes,*** Tufts University
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**TF+SE-MoA5** Reactive Bipolar High Power Impulse Magnetron Sputtering (B-HiPIMS) for Deposition of High Entropy Carbides, ***Trent Borman****, M.D. Hossain, J.-P. Maria,* The Pennsylvania State University	**INVITED: TL+2D+HC+SS-MoA5** Understanding Fundamental Energy Conversion Mechanisms: How Surface Science Can Help, ***Ulrike Diebold,*** Institute of Applied Physics, TU Wien, Austria
3:20pm	**TF+SE-MoA6** High Density Titanium Oxide and Silicon Oxide Films Deposited by Current-Controlled High Power Impulse Magnetron Sputtering, ***Arutiun P. Ehiasarian****, P.Eh. Hovsepian, D.A. Loch,* Sheffield Hallam University, UK	Invited talk continues.
3:40pm	**BREAK**	**BREAK**
4:00pm	**TF+SE-MoA8** Epitaxial Growth and Surface Morphology of Thin Film GaN via HiPIMS, ***Kevin Ferri,*** *E. Runnerstrom,* Pennsylvania State University*; A. Klump, Z. Sitar, R. Collazo,* North Carolina State University*; J.-P. Maria,* The Pennsylvania State University	**INVITED: TL+2D+HC+SS-MoA8** Atomically-defined Model Interfaces in Energy-related Catalysis, Electrochemistry, and Photoelectrochemistry, ***Jörg Libuda,*** University Erlangen-Nuremberg, Germany
4:20pm	**TF+SE-MoA9** Reactive HiPIMS Deposition of a Thick Cu:CuCNx Multilayered Nano-composite Coating Material for Improving Machining Process Performance in Rough Turning, ***Md.Masud-Ur Rashid****, C.M. Nicolescu,* KTH Royal Institute of Technology, Plasmatrix Materials AB, Sweden*; A. Archenti,* KTH Royal Institute of Technology, Sweden*; G. Shuai,* KTH Royal Institute of Technology*; R. Tomkowski,* KTH Royal Institute of Technology, Sweden	Invited talk continues.
4:40pm	**TF+SE-MoA10** The Residual Stress Control in Hard Metal Films by Energetic Deposition, ***Y.G. Li****, Y.Z. Qu, Z.T. Jiang, M.K. Lei,* Dalian University of Technology, China	**INVITED: TL+2D+HC+SS-MoA10** Controlling Ultrafast Photochemical Reactions in Photocatalysis, ***Annemarie Huijser,*** University of Twente,The Netherlands, The Netherlands
5:00pm	**TF+SE-MoA11** Advanced HIPIMS Coatings Through Kick Pulse Technology, ***Jason Hrebik,*** Kurt J. Lesker Company	Invited talk continues.

Vacuum Technology Division
Room A213 - Session VT-MoA
Gas Dynamics, Surface Science for Accelerators, and Ultra-Clean Vacuum Systems
Moderators: Jason Carter, Argonne National Laboratory, James Fedchak, National Institute of Sandards and Technology (NIST)

1:40pm	**INVITED: VT-MoA1** Advancement in Transient Flow Simulations: Applications to Channel and Porous Media Conductance Modeling, ***Irina Graur Martin,*** Aix Marseille University, France	
2:00pm	Invited talk continues.	
2:20pm	**VT-MoA3** A Multiphysics Simulation Tool for Storage Ring Vacuum System Design and Optimization, ***Nicholas Goldring***, *Z. Wu, D.L. Bruhwiler, B. Nash,* RadiaSoft LLC*; J. Carter, J.E. Lerch, K.J. Suthar,* Argonne National Laboratory*; R. Nagler,* RadiaSoft LLC*; P. Den Hartog,* Argonne National Laboratory	
2:40pm	**VT-MoA4** Vacuum System Design and Modeling for the Jefferson Lab Electron Ion Collider Interaction Region, ***Marcy Stutzman,*** Jefferson Lab	
3:00pm	**VT-MoA5** Photocathode Growth and Diagnostic Systems for LCLS-II, ***Xianghong Liu****, T. Vecchione, B. Dunham,* SLAC National Accelerator Laboratory	
3:20pm	**VT-MoA6** Characterization of NbTiN Thin Film Structures, ***David Beverstock****, A.-M. Valente-Feliciano,* Jefferson Lab*; V.N. Smolyaninova,* Towson University*; M.J. Kelley,* The College of William and Mary	
3:40pm	**BREAK**	
4:00pm	**INVITED: VT-MoA8** Future Laser Interferometer Gravitational Wave Observatories and their Vacuum Requirements, ***Chandra Romel,*** California Institute of Technology*; R.F.M. Weiss,* Massachusetts Institute of Technology*; M. Zucker,* California Institute of Technology*; H.F. Dylla,* American Institute of Physics	
4:20pm	Invited talk continues.	
4:40pm	**VT-MoA10** Status Update on the New Space Calibration Facility at TNO, ***Freek Molkenboer****, R. Jansen, F.P.G. Driessen, T.S. Luijkx,* TNO, The Netherlands	
5:00pm	**VT-MoA11** Advancements in Monitoring and Operating Thermal Vacuum Environmental Test Chambers for Next-Generation Space Exploration Hardware, ***Maxwell Martin****, A.T. Wong, W.A. Hoey, J.M. Alred, P.A. Boeder, C.E. Soares,* Jet Propulsion Laboratory, California Institute of Technology	

Anticipated Schedule Tuesday, October 22, 2019

Anticipated Schedule Tuesday Morning, October 22

8:00 AM _____
8:20 AM _____
8:40 AM _____
9:00 AM _____
9:20 AM _____
9:40 AM _____
10:00 AM _____
10:20 AM _____
10:40 AM _____
11:00 AM _____
11:20 AM _____
11:40 AM _____
12:00 PM _____

Anticipated Schedule Tuesday Lunch, October 22

When _____
Where _____
With _____

Anticipated Schedule Tuesday Afternoon, October 22

1:00 PM _____
1:20 PM _____
1:40 PM _____
2:00 PM _____
2:20 PM _____
2:40 PM _____
3:00 PM _____
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4:20 PM _____
4:40 PM _____
5:00 PM _____
5:20 PM _____
5:40 PM _____
6:00 PM _____

Special Events Tuesday

6:00 AM	AVS Yoga--Pre-Registration Required/Pierce A-Hilton
7:00 AM	Member Center: Free Coffee for 2019 AVS Members/A111-112
7:00 AM	Membership Committee Meeting & Breakfast/Gallerie Bistro-Lamp-Hilton (by invitation)
7:30 AM	Awards Committee Meeting and Lunch/Hayden-Hilton (by invitation)
8:00 AM	ASED Business Meeting/Hopkins-Hilton
8:00 AM	Science Educators' Workshop/B234-235 (by invitation)
8:15 AM	ASED Executive Committee Meeting & Lunch/Hopkins-Hilton (by invitation)
8:30 AM	Short Course Programs—Various Rooms (See Registration Desk)
10:00 AM	AVS Member Center: "Modern Job Searching Process"/A111-112
10:00 AM	Session Coffee Break/Hall A
11:40 AM	Surface Science Flash Session/A220-221
12:15 PM	AVS Member Center: Job Information Forum and Lunch/A111-112
12:20 PM	Exhibit Hall Lunch/Hall A
12:30 PM	Chapters, Divisions, and Groups Meeting and Lunch/Pierce AB-Hilton (by invitation)
12:30 PM	MSTG Technical Group Executive Committee Meeting and Lunch/Gallerie Bistro-Lamp-Hilton (by invitation)
2:00 PM	Member Center: Modern Resumes and CVs/A111-112
3:30 PM	AVS Career Center: SIGN UP:**One-on-One Career Expert Advice at the Career Center (Booth #146) -- Pre-Registration Required in Member Center, A111-112/Hall A (by invitation)
3:40 PM	Session Refreshment Break/Hall A
5:20 PM	Transition Energy Leaders Panel Discussion/A226
5:40 PM	Biomaterial Interfaces Flash Session/A120-121
6:20 PM	BID Business Meeting/A120-121
6:25 PM	EMPD Business Meeting/A214
6:25 PM	MIND Business Meeting/A210
6:25 PM	NSTD Business Meeting/A222
6:25 PM	PSTD Business Meeting & 2019 Plasma Prize Award Announcement/B131
6:25 PM	SSD Business Meeting/A220-221
6:25 PM	TFD Business Meeting/A122-123
6:25 PM	VTD Business Meeting/A213
6:30 PM	Tuesday Poster Session & Refreshments/Union Station AB
7:00 PM	MEMS/NEMS Executive Committee Meeting and Dinner/Hayden-Hilton (by invitation)
7:00 PM	NSTD Executive Committee Meeting and Dinner/Bellows E-Hilton (by invitation)
7:30 PM	ASSD Business Meeting/King-Hilton
7:30 PM	PSTD Executive Committee Meeting and Dinner/Pierce A-Hilton (by invitation)
7:30 PM	SSD Executive Committee Meeting and Dinner/Private Dining Room-Hilton (by invitation)
7:30 PM	TFD Executive Committee Meeting and Dinner/Pierce B-Hilton (by invitation)
7:45 PM	BID Executive Committee Meeting and Dinner/Burkhart A-Hilton (by invitation)
7:45 PM	EMPD Executive Committee Meeting and Dinner/Burkhart B-Hilton (by invitation)
8:00 PM	ASTM E-42 and Applied Surface Science Joint Workshop: "What Do We Know About What We Don't Know? - A Panel Discussion/King-Hilton

	2D Materials **Room A216 - Session 2D+AS+MI+NS-TuM** **2D Materials Characterization including Microscopy and Spectroscopy** **Moderator:** David Geohegan, Oak Ridge National Laboratory	**2D Materials** **Room A226 - Session 2D+EM+MI+MN+NS+QS-TuM** **Novel Quantum Phenomena** **Moderator:** Arend van der Zande, University of Illinois at Urbana-Champaign
8:00am	**2D+AS+MI+NS-TuM1** Near-field Infrared Spectroscopy of Single Layer $MnPS_3$, ***Sabine Neal,*** University of Tennessee Knoxville; *H-S. Kim,* Rutgers University; *K.A. Smith, A.V. Haglund, D.G. Mandrus,* University of Tennessee Knoxville; *H.A. Bechtel,* Advanced Light Source, Lawrence Berkeley National Laboratory; *G.L. Carr,* National Synchrtoron Light Source II, Brookhaven National Lab; *K. Haule, D. Vanderbilt,* Rutgers University; *J.L. Musfeldt,* University of Tennessee Knoxville	**INVITED: 2D+EM+MI+MN+NS+QS-TuM1** Charge Density-Wave States in Single-Layer Transition-Metal Dichalcogenides, ***Phil King,*** University of St Andrews, UK
8:20am	**2D+AS+MI+NS-TuM2** Multi-parameter Analysis of Genesis and Evolution of Secondary Electrons produced in the Low Energy Regime, ***Alessandra Bellissimo,*** ETH Zürich, Switzerland; *G.M. Pierantozzi,* CNR - Istituto Officine Materiali, Italy; *A. Ruocco, G. Stefani,* Università degli Studi Roma Tre, Italy; *O. Ridzel, V. Astašauskas, W.S.M. Werner,* Technische Universität Wien, Austria; *M. Taborelli,* CERN, Switzerland; *G. Bertolini, U. Ramsperger,* ETH Zürich, Switzerland; *O. Gürlü,* ETH Zürich, Switzerland, Turkey; *D. Pescia,* ETH Zürich, Switzerland	Invited talk continues.
8:40am	**INVITED: 2D+AS+MI+NS-TuM3** Probing Point Defects, Folds and Interfaces in 2D Material Heterostructures using Scanning Transmission Electron Microscopy, ***Sarah Haigh,*** University of Manchester, UK	**2D+EM+MI+MN+NS+QS-TuM3** Sublattice Symmetry Breaking and Kondo-effect Enhancement in Strained Graphene, *D.Z. Zhai,* Ohio University; *K.I. Ingersent,* University of Florida; *S. Ulloa,* ***Nancy Sandler,*** Ohio University
9:00am	Invited talk continues.	**2D+EM+MI+MN+NS+QS-TuM4** Indirect Transition and Opposite Circular Polarization of Interlayer Exciton in a MoSe2 WSe2 van der Waals Heterostructure, ***Hsun-Jen Chuang,*** *A.T. Hanbicki, M.R. Rosenberger, C.S. Hellberg, S.V. Sivaram, K.M. McCreary, I.I. Mazin, B.T. Jonker,* U.S. Naval Research Laboratory
9:20am	**2D+AS+MI+NS-TuM5** Low-Energy Electron Induced Disordering and Decomposition of Self-assembled Monolayers on Au(111), ***Jodi Grzeskowiak***[1], University at Albany - SUNY; *C.A. Ventrice, Jr.,* SUNY Polytechnic Institute	**2D+EM+MI+MN+NS+QS-TuM5** Integrating 2D Magnet 1T-$MnSe_2$ with Topological Insulator Bi_2Se_3, ***Tiancong Zhu,*** The Ohio State University; *D. O'Hara,* University of California, Riverside; *J.J. Repicky, S. Yu, M. Zhu, B.A. Noesges, T. Liu, M. Brenner, L.J. Brillson, J. Hwang, F.Y. Yang, J.A. Gupta, R. Kawakami,* The Ohio State University
9:40am	**2D+AS+MI+NS-TuM6** Continuous Silicene, Silicene Ribbons and Surface Reconstructions on h-$MoSi_2$, ***Anna Costine,*** *C. Volders,* University of Virginia; *M. Fu,* Oak Ridge National Laboratory; *P. Reinke,* University of Virginia	**2D+EM+MI+MN+NS+QS-TuM6** Effect of Exchange-correlation Functional and Structural Constraints on the Transition Temperature of Two- Dimensional Ferroelectrics, ***Shiva P. Poudel,*** *J. Villanova, B. Miller, A. Pandit, S. Barraza-Lopez,* University of Arkansas, Fayetteville
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**2D+AS+MI+NS-TuM10** Epitaxial Growth and Characterization of Single-Orientation Single-Layer Transition Metal Dichalcogenides on Au(111), *L. Bignardi,* University of Trieste, Italy; ***Daniel Lizzit,*** Elettra - Sincrotrone Trieste, Trieste, Italy; *B. Harsh, E. Travaglia,* Department of Physics, University of Trieste, Italy; *C.E. Sanders,* iNANO, Aarhus University, Denmark, UK; *M. Dendzik,* Aarhus University, Denmark, Germany; *P. Lacovig,* Elettra-Sincrotrone Trieste, Italy; *M. Michiardi,* iNANO, Aarhus University, Denmark, Canada; *M. Bianchi,* Aarhus University, Denmark; *R. Larciprete,* CNR-Institute for Complex Systems, Roma, Italy; *J.I. Flege, J. Falta,* University of Bremen, Germany; *P.K. Das,* Abdus Salam International Centre for Theoretical Physics, Trieste, Italy; *J. Fujii, I. Vobornik,* IOM-CNR, Laboratorio TASC, Trieste, Italy; *M. Ewert, L. Buß,* University of Bremen, Germany; *A. Baraldi,* University of Trieste, Italy; *P. Hofmann,* Aarhus University, Denmark; *S. Lizzit,* Elettra - Sincrotrone Trieste, Trieste, Italy	**2D+EM+MI+MN+NS+QS-TuM10** Sign-change Pairing Symmetry in Single Layer FeSe/$SrTiO_3$ Film, ***Huimin Zhang,*** West Virginia University; *Z. Ge, M. Weinert,* University of Wisconsin; *L.L. Li,* West Virginia University
11:20am	**2D+AS+MI+NS-TuM11** Surface Reactivity of MoS_2 by ambient pressure X-ray Photoelectron Spectroscopy, ***Rafik Addou,*** *D. Dardzinsky, G.S. Herman,* Oregon State University	**2D+EM+MI+MN+NS+QS-TuM11** High Temperature Superconductivity in Epitaxial Single Layer $FeTe_{1-x}Se_x$/STO(001), ***Qiang Zou,*** *Z. Ge, C. Yan, H. Zhang, L.L. Li,* West Virginia University
11:40am	**2D+AS+MI+NS-TuM12** Surface Characterization of 2D Materials and their 3D Analogues using XPS, ***Jonathan Counsell,*** *S.J. Coultas, C.J. Blomfield, N. Gerrard,* Kratos Analytical Limited, UK; *C. Moffitt,* Kratos Analytical Limited; *A.J. Roberts,* Kratos Analytical Limited, UK	**INVITED: 2D+EM+MI+MN+NS+QS-TuM12** The Observation of Majorana Zero Mode and Conductance Plateau in an Iron-based Superconductor, ***Hong-Jun Gao,*** Institute of Physics, Chinese Academy of Sciences, China
12:00pm	**2D+AS+MI+NS-TuM13** Characterization of Catalytic Active Sites on the Surface of MoS2 2-D Materials, ***Miguel Jose Yacaman,*** University of Texas at San Antonio; *T. Zepeda, S. Fuentes Moyado,* CNyN UNAM Ensenada, Mexico	Invited talk continues.

[1] **ASSD Student Award Finalist**

	Actinides and Rare Earths Focus Topic **Room A215 - Session AC+AS+LS-TuM** **Chemistry and Physics of the Actinides and Rare Earths** **Moderators:** Melissa Denecke, IAEA, Austria, James G. Tobin, University of Wisconsin-Oshkosh	**Applied Surface Science Division** **Room A211 - Session AS+BI+RA-TuM** **Quantitative Surface Analysis III/Other Surface Analysis Methods** **Moderators:** Karen Gaskell, University of Maryland, College Park
8:00am	**INVITED: AC+AS+LS-TuM1** Study of the Early Actinide Oxides and Fluorides – Systematics of the Electronic Structure, ***Thomas Gouder***, *R. Eloirdi, R. Caciuffo,* European Commission - Joint Research Centre, Germany	**INVITED: AS+BI+RA-TuM1** Oxygen Energy Filtering and Relative Sensitivity Factor Considerations for Making U and Pu Measurements by LG-SIMS, ***Todd Williamson***, Los Alamos National Laboratory
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**INVITED: AC+AS+LS-TuM3** Broadening of the XPS Spectra of U Oxides, ***Paul S. Bagus***, University of North Texas; *C.J. Nelin,* Consultant	**AS+BI+RA-TuM3** Utilizing Large Geometry Secondary Ion Mass Spectrometry for Age-Dating of Individual Uranium Particles, ***Christopher Szakal***, *D.S. Simons, J.D. Fassett,* National Institute of Standards and Technology (NIST); *A.J. Fahey,* Corning Inc.
9:00am	Invited talk continues.	**AS+BI+RA-TuM4** Peak Shape Analysis in TOF SIMS: Best Practices and Limiting Precision in Accounting for Detector Saturation, ***Lev Gelb***, *A.V. Walker,* University of Texas at Dallas
9:20am	**INVITED: AC+AS+LS-TuM5** Multiscale Characterization of Lanthanide and Actinide Nanoparticles Embedded in Porous Materials, ***Stefan Minasian***, *S. Alayoglu, S. Aloni,* Lawrence Berkeley National Laboratory; *J. Arnold,* University of California at Berkeley; *E. Batista,* Los Alamos National Laboratory; *A. Braun, C.H. Booth, A. Herve,* Lawrence Berkeley National Laboratory; *Y. Liu,* University of California at Berkeley; *L. Moreau,* Lawrence Berkeley National Laboratory; *T. Lohrey, J. Long, M. Straub, S. Robin, D. Russo,* University of California at Berkeley; *D.K. Shuh,* Lawrence Berkeley National Laboratory; *J. Su, P. Yang, X. Zhang,* Los Alamos National Laboratory	**AS+BI+RA-TuM5** Electronic Structure and Band Gaps of Industrially Relevant Materials Investigated by Photoelectron Spectroscopy and REELS (Reflection Electron Energy Loss Spectroscopy), ***Paul Mack***, *T.S. Nunney,* Thermo Fisher Scientific, UK; *H.M. Meyer III,* Oak Ridge National Laboratory
9:40am	Invited talk continues.	**AS+BI+RA-TuM6** Practical References for Low Energy Ion Scattering by Ca and F, *S. Průsa, T. Šikola,* Brno University of Technology, Czech Republic; ***Hidde Brongersma***, IONTOF Technologies GmbH, Germany/Eindhoven University of Technology, Eindhoven, The Netherlands, Germany
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**AC+AS+LS-TuM10** Multiple Forms of Uranium Hydrides and their Electronic Properties, ***Ladislav Havela***, *V. Buturlim, E. Chitrova, O. Koloskova, P. Minarik, M. Cieslar, M. Dopita, L. Horak, M. Divis, I. Turek,* Charles University, Prague, Czech Republic; *D. Legut,* VSB-Technical University of Ostrava, Czech Republic; *T. Gouder,* European Commission - Joint Research Centre, Germany	**AS+BI+RA-TuM10** Extreme-Ultraviolet-Assisted Atom Probe Tomography, ***Norman Sanford***, *L. Miaja Avila,* National Institute of Standards and Technology (NIST); *P. Blanchard,* National Institute of Sandards and Technology (NIST); *D.R. Diercks, B. Gorman,* Colorado School of Mines; *A. Chiaramonti,* National Institute of Sandards and Technology (NIST)
11:20am	**AC+AS+LS-TuM11** Hafnium L-Edge X-ray Absorption Near Edge Structure Spectra Reveals Crystal Field Splitting, ***David Shuh***, *D. Caulder,* Lawrence Berkeley National Laboratory; *L. Davis,* Pacific Northwest National Laboratory; *M. Mara,* University of California at Berkeley; *C.H. Booth,* Lawrence Berkeley National Laboratory; *J. Darab, J. Icenhower, D. Strachan,* Pacific Northwest National Laboratory	**AS+BI+RA-TuM11** A Multi-Technique Approach for Complete Thin Film Characterisation, ***Sarah Coultas***, *J.D.P. Counsell, N. Gerrard, C.J. Blomfield,* Kratos Analytical Limited, UK; *C. Moffitt,* Kratos Analytical Limited; *T. Conard,* IMEC, Belgium
11:40am	**AC+AS+LS-TuM12** Electrical Resistivity in Uranium-based Thin Films, ***Evgeniya Tereshina-Chitrova***, *L. Havela, M. Paukov, M. Dopita, L. Horak, M. Cieslar,* Charles University, Prague, Czech Republic; *Z. Soban,* Institute of Physics, Academy of Sciences of the Czech Republic, Czech Republic; *T. Gouder, F. Huber, A. Seibert,* Joint Research Center, European Commission, Germany	**AS+BI+RA-TuM12** Polymeric Barrier Coatings for Silicone Elastomer against Diffusion of Isocyanate in Vacuum Casting Processes, ***Martin Wortmann***, *R. Petkau,* Bielefeld University of Applied Sciences, Germany; *N. Frese,* Bielefeld University, Germany; *E. Moritzer,* Paderborn University, Germany; *A. Gölzhäuser,* Bielefeld University, Germany; *B. Hüsgen,* Bielefeld University of Applied Sciences, Germany
12:00pm		**AS+BI+RA-TuM13** pARXPS Study of GeSbTe Surface Oxidation, ***Ludovic Goffart***, ST Microelectronics/LTM/CEA-LETI, France; *C. Vallée,* Laboratoire des Technologies de la Microélectronique (LTM), France; *B. Pelissier,* LTM, Univ. Grenoble Alpes, CEA-LETI, France; *J-P. Reynard, D. Benoit,* ST Microelectronics, France; *G. Navarro,* CEA-LETI, France

	Biomaterial Interfaces Division **Room A120-121 - Session BI+AS-TuM** **Characterization of Biological and Biomaterial Surfaces** **Moderators:** Karyn Jarvis, Swinburne University of Technology, Sally McArthur, Swinburne University of Technology	**Electronic Materials and Photonics Division** **Room A214 - Session EM+2D+AP+NS+PS-TuM** **New Devices and Materials for Electronics and Photonics** **Moderators:** Sean W. King, Intel Corporation, Michelle M. Paquette, University of Missouri-Kansas City
8:00am	**BI+AS-TuM1** Characterizing Protein Fiber Structures in Solution with Vibrational Sum-Frequency Scattering Spectroscopy, ***David G. Castner***, *P.K. Johansson,* University of Washington	**INVITED: EM+2D+AP+NS+PS-TuM1** Performance Modeling and Design for Spintronic Logic and Memory Devices, ***Azad Naeemi***, Georgia Institute of Technology
8:20am	**BI+AS-TuM2** Near-Ambient Pressure XPS Surface Characterisation of Bacteria and Biofilms - Model Systems and Sample Preparation, ***Marit Kjaervik***, Bundesanstalt für Materialforschung und -prüfung, Germany; *P. Dietrich, A. Thissen,* SPECS Surface Nano Analysis GmbH, Germany; *K. Schwibbert, W.E.S. Unger,* Bundesanstalt für Materialforschung und -prüfung, Germany	Invited talk continues.
8:40am	**BI+AS-TuM3** ToF-SIMS Imaging of Plant seed Interactions with Plant-growth Promoting Bacteria, ***Yuchen Zhang***, *X.-Y. Yu,* Pacific Northwest National Laboratory	**EM+2D+AP+NS+PS-TuM3** High Yield, Low Variability HfO_2 1T1R Cells Fabricated in 65nm CMOS, ***Jubin Hazra***, *M.L. Liehr, K. Beckmann, N.C. Cady,* SUNY Polytechnic Institute
9:00am	**BI+AS-TuM4** Visualization of Signaling Molecules in Brain Tissue by Multimodal Imaging with Matrix Assisted Laser Desorption/Ionization Mass Spectrometry and Time-of-Flight Secondary Ion Mass Spectrometry, ***Matthias Lorenz***, *S.T. King, N. Borodinov, C.A. Steed, J. Chae, A.V. Ievlev, O.S. Ovchinnikova,* Oak Ridge National Laboratory	**EM+2D+AP+NS+PS-TuM4** Heat Transfer Proximity Effects in Resistive Memory Crossbar Arrays, ***Marius Orlowski***, *M.S. Al-Mamun,* Virginia Tech
9:20am	**BI+AS-TuM5** *In situ* Observation of Triacylglycerol (C39:0) and Acylceramide (C17) Colocalization in Lipid Droplets of Apoptotic Cells using ToF-SIMS, ***Shohini Sen-Britain***, *N. Li, G.E. Atilla-Gokcumen, J.A. Gardella Jr.,* State University of New York, Buffalo	**EM+2D+AP+NS+PS-TuM5** High Performance Memristive Action in Methylammonium Bismuth Iodide([MA]3Bi2I9) Films, *P. Cheng,* Vanderbilt University; *G. Luo,* Washington University in St. Louis; *Z. Gao,* University of Central Florida; *A. Thind, R. Mishra,* Washington University in St. Louis; ***Parag Banerjee***, University of Central Florida
9:40am	**BI+AS-TuM6** Customizing Decellularized Biopolymer Matrices to Serve as Cell-instructive Microenvironments: A ToF-SIMS Study, ***Valentina Magno***, *M. Nitschke, R. Zimmermann, N.R. Dennison,* Leibniz Institute of Polymer Research Dresden, Germany; *C. Werner,* Leibniz Institute of Polymer Research Dresden, Germany, Deutschland, Germany	**EM+2D+AP+NS+PS-TuM6** Mechanism of Chalcogen Passivation of GaAs Surfaces, ***Takayuki Suga***, *S. Goto,* UEC-Tokyo, Japan; *A. Ohtake,* NIMS, Japan; *J.N. Nakamura,* UEC-Tokyo, Japan
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**INVITED: BI+AS-TuM10** Hierarchical Changes in Protein Structure: from Surface Influence to Cell Control, ***Sapun Parekh***, University of Texas at Austin	**INVITED: EM+2D+AP+NS+PS-TuM10** Combining 2D and 1D Atomic Scale Tailored Nanowire Surfaces for Novel Electronics and Photonics, ***Anders Mikkelsen***, Lund University, Sweden
11:20am	Invited talk continues.	Invited talk continues.
11:40am	**BI+AS-TuM12** The Role of Cr-N phases Prepared by Plasma Processes on 316L Stainless Steel and the Potential Use in Biocompatible Systems, ***Diana Galeano-Osorio***, *S. Vargas-Giraldo, C. Castano,* Virginia Commonwealth University	**EM+2D+AP+NS+PS-TuM12** Nanoflower Decorated GaN and AlGaN/GaN based Catalyst-free CO Sensors, ***Monu Mishra***, *G. Gupta,* National Physical Laboratory, India
12:00pm	**BI+AS-TuM13** Direct Interspecies Electron Transfer (DIET) in Syntrophic Microbes, ***Cuiyun Yang***, *X.-Y. Yu,* Pacific Northwest National Laboratory	**EM+2D+AP+NS+PS-TuM13** Surface Transfer Doping of Diamond by Complex Metal Oxides for Power Electronics: A Combined Experimental and Simulation Study, ***Vihar Georgiev***, *A.J. Moran, A. McGhee,* University of Glasgow, UK

Tuesday Morning, October 22, 2019

	MEMS and NEMS Group Room A210 - Session MN-TuM MEMS, BioMEMS, and MEMS for Energy: Processes, Materials, and Devices II **Moderators:** Robert Davis, Brigham Young University, Zenghui Wang, Case Western Reserve University	Plasma Science and Technology Division Room B131 - Session PS+EM-TuM Advanced FEOL **Moderator:** Alok Ranjan, TEL Technology Center, America, LLC
8:00am	**INVITED: MN-TuM1** Near-Zero Power Integrated Microsystems for the IoT, ***Matteo Rinaldi,*** Northeastern University	**INVITED: PS+EM-TuM1** Investigation on Plasma Etch Technology Enabling Si/SiGe MOSFET Process Integration, ***Yohei Ishii,*** Hitachi High Technologies America Inc.*; Y.-J. Lee, W.-F. Wu,* Taiwan Semiconductor Research Institute, Taiwan, Republic of China*; R. Sugano,* Hitachi, Ltd., Japan*; K. Maeda,* Hitachi High Technologies America Inc.*; H. Ishimura,* Hitachi High-Technologies Taiwan Corp., Taiwan, Republic of China*; M. Miura,* Hitachi High Technologies, Japan
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**MN-TuM3** Development of Inorganic Metal Salt Inks for Printable Sensor Applications, *Y. Sui,* Case Western Reserve University*; A. Hess-Dunning,* Louis Stokes Cleveland VA Medical Center*; R.M. Sankaran,* ***Christian Zorman,*** Case Western Reserve University	**PS+EM-TuM3** Etching of Sub-10 nm Half-pitch High Chi Block Copolymers for Directed Self-Assembly (DSA) Application, ***Maria Gabriela Gusmão Cacho,*** *P. Pimenta-Barros, K. Benotmane, A. Gharbi, M. Argoud,* CEA-LETI, France*; C. Navarro,* Arkema France, France*; K. Sakavuyi,* Brewer Science Inc.*; R. Tiron, N. Possémé, S. Barnola,* CEA-LETI, France
9:00am	**MN-TuM4** Void-Free Copper Electrodeposition in Full Wafer Thickness Through-Silicon Vias with 10:1 Aspect Ratios, ***Rebecca Schmitt,*** *L. Menk, C. Sadler, E. Baca, A.E. Hollowell,* Sandia National Laboratories	**PS+EM-TuM4** Mechanism of Highly Selective SiCN Etchings Using NF_3/Ar-based Gases, ***Miyako Matsui,*** Hitachi Ltd., Japan*; K. Kuwahara,* Hitachi High-Technologies Corp., Japan
9:20am	**MN-TuM5** Ion-Conducting Materials and Devices for Cold Atom Microsystems, ***Christopher Roper,*** HRL Laboratories, LLC*; S. Kang,* NIST*; R.P. Mott, A.V. Mis,* HRL Laboratories, LLC*; E.A. Donley, J. Kitching,* NIST	**PS+EM-TuM5** Impact of Plasma Process on Source/Drain Epitaxy Film, ***Yun Han,*** *B. Messer, M. Sapel, H. Kim, Y. Shi, M. Wang, Y. Trickett, K. Maekawa,* TEL Technology Center, America, LLC*; K. Taniguchi, S. Morikita,* Tokyo Electron Miyagi Ltd., Japan*; A. Metz, P. Biolsi,* TEL Technology Center, America, LLC
9:40am	**MN-TuM6** Determining the Material Properties of Carbon Nanotube Structures Through Cantilever Resonances, ***Richard Cass,*** Brigham Young University*; E. Eion Hindsman-Curry,* University of Alabama*; R. Vanfleet, R.C. Davis, D.D. Allred, B. Anderson, R.R. Vanfleet,* Brigham Young University	**PS+EM-TuM6** CCP Dry Clean Process Development Using Quadrupole Mass Spectrometer and Optical Emission Spectroscopy, ***Harutyun Melikyan,*** *A.D. Martinez, S.C. Pandey, M. Koltonski, G. Sandhu,* Micron Technology
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**MN-TuM10** Nanoporous Titanium Nitride Electrodes for Biosensing, ***Mark Ming-Cheng Cheng,*** *G. Chen,* Wayne State University	**PS+EM-TuM10** Surface Reaction of Atomic Hydrogen with SiGe Surface Compared with Si Through Ab-initio Calculations, ***Ryoko Sugano,*** Hitachi, Ltd., Japan*; Y. Ishii, K. Maeda,* Hitachi High Technologies America Inc.*; M. Miura, K. Kuwahara,* Hitachi High Technologies, Japan
11:20am	**MN-TuM11** Toward a Simple Process for Fabricating Multi-channel Neural Probes on Optical Fiber Substrates, ***Md Ashiqur Khan,*** *M. Gheewala, V.S. Jonnalagadda, T.A. Tisa, M. Rao, A. Awale, P. Motwani, N.S. Randhawa, H. Sajedi, W.-C. Shih, J.C. Wolfe,* University of Houston*; J.A. Dani,* University of Pennsylvania*; P. Mauger,* No Matching Affiliation	**PS+EM-TuM11** Nanopantography with Reusable Membrane-based Electrostatic Lens Arrays, ***Ryan Sawadichai,*** *Y.-M. Chen, P. Basu, V.M. Donnelly, P. Ruchhoeft, D.J. Economou,* University of Houston
11:40am	**MN-TuM12** A Low-Temperature Packaging Process for Mechanically-Adaptive Neural Interfaces for Microfluidic-Aided Drug Delivery, *E. Szabo, L. Greenwood,* Case Western Reserve University*;* ***Allison Hess-Dunning,*** Louis Stokes Cleveland VA Medical Center	
12:00pm	**MN-TuM13** Vascular Graft Pressure-Flow Monitoring Using Nanocomposite Carbon Black/PDMS Based Strain Sensors, ***Hao Chong,*** Case Western Reserve University*; S.J.A. Majerus,* Louis Stokes Cleveland VA Medical Center*; J. Liu, C.A. Zorman,* Case Western Reserve University	

	Plasma Science and Technology Division Room B130 - Session PS-TuM Plasma Diagnostics and Sources I **Moderators:** Tetsuya Tatsumi, Sony Semiconductor Solutions Corporation, Geun Young Yeom, Sungkyunkwan University, Republic of Korea	Materials and Processes for Quantum Information, Computing and Science Focus Topic Room B231-232 - Session QS-TuM AVS Quantum Science (ALL INVITED SESSION) **Moderators:** Eray Aydil, New York University, Ivan Petrov, University of Illinois at Urbana-Champaign
8:00am	**PS-TuM1** Optimizing Power Delivery in a Pulsed Inductively Coupled Plasma Using Set-Point Impedance Match and Frequency Tuning, ***Chenhui Qu***, University of Michigan; *J. Brandon, C. Smith, S.C. Shannon,* North Carolina State University; *D. Coumou, S. White,* MKS Instruments; *M.J. Kushner,* University of Michigan	**INVITED: QS-TuM1** Quantum Technologies from Cold Atoms to Matter-waves, ***Philippe Bouyer***, CNRS, France
8:20am	**PS-TuM2** Compact Surface Wave Plasma Source, *G.A. Panici,* ***David Ruzic***, *D. Qerimi, D.E. Barlaz,* University of Illinois at Urbana-Champaign; *B.E. Jurczyk,* Starfire Industries LLC	Invited talk continues.
8:40am	**INVITED: PS-TuM3** Overview of Linear Plasma Sources as Applied to Ribbon ion and Plasma Beam Processing of Scanned Substrates, ***Peter Kurunczi***, Applied Materials, Varian Semiconductor Equipment	**INVITED: QS-TuM3** Generating Maximal Entanglement Between Spectrally Distinct Solid-state Emitters, *D. Hurst,* University of Sheffield, UK; *K. Joanesarson,* University of Sheffield, UK, Tech. University of Denmark; *J. Iles-Smith,* University of Sheffield, UK; *J. Mork,* University of Denmark; ***Pieter Kok***, University of Sheffield, UK
9:00am	Invited talk continues.	Invited talk continues.
9:20am	**PS-TuM5** Online Diagnostics of Non-Thermal Plasma Nanoparticle-Laden Systems by Ion Mobility Spectrometry, ***Xiaoshuang Chen***, *S. Ghosh, D. Buckley,* University of Minnesota, Minneapolis; *R.M. Sankaran,* Case Western Reserve University; *T. Seto,* Kanazawa University, Japan; *U.R. Kortshagen, C.J. Hogan,* University of Minnesota, Minneapolis	**INVITED: QS-TuM5** From Quantum Atom Optics to Living Cells with Sculpted Light, ***Halina Rubinsztein-Dunlop***, *T. Neely, G. Gauthier, T. Bell, A. Pritchard, K. Goddard-Lee, A. Stilgo, I. Favre-Bulle, S. Zhang, T. Nieminen, I. Lenton,* University of Queensland, Australia
9:40am	**PS-TuM6** Experiment-Model Comparisons in Capacitively Coupled Plasmas at Moderate Pressures for Argon, Helium and Nitrogen, ***David J. Peterson***, North Carolina State University; *T. Koh, T.C. Chua, W. Tian, K. Bera, S. Rauf, P.A. Kraus,* Applied Materials, Inc.; *S.C. Shannon,* North Carolina State University	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**PS-TuM10** Optical and Mass Spectrometric Measurements of O_2 and NF_3 Dissociation in a Low Frequency, High Density, Remote Plasma, ***Hanyang Li***, *Y. Zhou, V.M. Donnelly,* University of Houston; *J. Chiu, X. Chen,* MKS Plasma & Reactive Gas Solutions	**INVITED: QS-TuM10** Spin-helical Particles: An Enabling Platform for Quantum Matter and Quantum Technologies, ***Yong P. Chen***, Purdue University
11:20am	**PS-TuM11** A Combined Experimental and Modeling Study of Reactive Vapor-nanoparticle-plasma Interactions in a Dusty Atmospheric-pressure Plasma, ***Nabiel Abuyazid***, Case Western Reserve University; *X. Chen,* University of Minnesota, Minneapolis; *D. Mariotti, P. Maguire,* University of Ulster, UK; *C.J. Hogan,* University of Minnesota, Minneapolis; *R.M. Sankaran,* Case Western Reserve University	Invited talk continues.
11:40am		
12:00pm		

Tuesday Morning, October 22, 2019

	Surface Science Division **Room A220-221 - Session SS+2D+HC-TuM** **Atom Manipulation and Synthesis/Oxide Surface Reactions & Flash Session** **Moderators:** Liney Arnadottir, Oregon State University, Stephen McDonnell, University of Virginia, Martin Setvin, TU Wien, Austria	**Thin Films Division** **Room A124-125 - Session TF+AP-TuM** **ALD and CVD: Precursors and Process Development** **Moderators:** Paul Poodt, Holst Centre / TNO, The Netherlands Erwin Kessels, Eindhoven University of Technology, The Netherlands,
8:00am	**SS+2D+HC-TuM1** Angstrom Scale Chemical Analysis of Metal Supported *Trans*- and *Cis*-Regioisomers by Ultrahigh Vacuum Tip-Enhanced Raman Mapping, *S. Mahapatra, J. Schultz, L. Li,* ***Nan Jiang,*** University of Illinois at Chicago	**INVITED: TF+AP-TuM1** Mechanism-Based Precursor Design for CVD of Metal Oxides and Sulfides, ***Lisa McElwee-White,*** University of Florida
8:20am	**SS+2D+HC-TuM2** Theoretical Modeling of Metal Release from Complex Oxide Surfaces, ***Sara Mason,*** University of Iowa	Invited talk continues.
8:40am	**INVITED: SS+2D+HC-TuM3** On-surface Synthesis by Atom Manipulation Studied with Atomic Force Microscopy, ***Leo Gross,*** IBM Research - Zurich, Switzerland	**TF+AP-TuM3** Improved Control of Atomic Scale Processing: Characterization and Optimization of Precursor Mass Delivery Utilizing a Novel Thermal Sensor, ***Daniel Alvarez,*** *J. Spiegelman, C. Ramos, Z. Shamsi,* RASIRC
9:00am	Invited talk continues.	**TF+AP-TuM4** Effect of Co-Reactant on the Atomic Layer Deposition of Copper Oxide, ***Jason Avila,*** *N. Nepal, V.D. Wheeler,* U.S. Naval Research Laboratory
9:20am	**SS+2D+HC-TuM5** The Large Effect of Solvents on Heats of Adsorption versus Gas Phase Explained with a Simple Bond-additivity Model: A Case Study with Phenol on Pt(111) in Water, ***Charles T. Campbell,*** University of Washington; *N. Singh,* University of Michigan; *J.R. Rumptz,* University of Washington	**TF+AP-TuM5** Electron Enhanced Atomic Layer Deposition (EE-ALD) of Cobalt Films and Development of New Hollow Cathode Plasma Electron Source, ***Zachary Sobell,*** CU Boulder; *A.S. Cavanagh, S.M. George,* University of Colorado at Boulder
9:40am	**SS+2D+HC-TuM6** Atomic-Scale Growth Mechanisms of Niobium Hydrides on Hydrogen Infused Nb(100), ***Rachael Farber,*** *D.R. Veit, S.J. Sibener,* The University of Chicago	**TF+AP-TuM6** Surface Science Studies of GaN Substrates Subjected to Plasma-Assisted Atomic Level Processes, ***Samantha G. Rosenberg,*** American Society for Engineering Education (residing at U.S. Naval Research Laboratory); *D.J. Pennachio, E.C. Young, Y.H. Chang, H.S. Inbar,* University of California at Santa Barbara; *J.M. Woodward,* U.S. Naval Research Laboratory; *Z.R. Robinson,* SUNY Brockport; *J. Grzeskowiak,* University at Albany - SUNY; *C.A. Ventrice, Jr.,* SUNY Polytechnic Institute; *C.J. Palmstrøm,* University of California at Santa Barbara; *C.R. Eddy, Jr.,* U.S. Naval Research Laboratory
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**SS+2D+HC-TuM10** Water induced restructuring of Vanadium oxide clusters, ***Kræn Christoffer Adamsen,*** *J.V. Lauritsen, S. Chiriki, B. Hammer,* Aarhus University, Denmark	**TF+AP-TuM10** Reaction Pathways in Photolytic CVD of Platinum on Organic Thin Films, ***Bryan G. Salazar,*** University of Texas at Dallas; *H. Liu, L. McElwee-White,* University of Florida; *A.V. Walker,* University of Texas at Dallas
11:20am	**SS+2D+HC-TuM11** Hydrogenation of Titanium Doxide with Low-energy Hydrogen Ions and Atomic Hydrogen, *N. Nagatsuka, Y. Ohashi,* Institute of Industrial Science, The University of Tokyo, Japan; *M. Fujimoto, M. Matsumoto,* Tokyo Gakugei University, Japan; ***Katsuyuki Fukutani,*** Institute of Industrial Science, The University of Tokyo, Japan	**TF+AP-TuM11** Process Development and Mechanism Analysis of Low Temperature ALD TiN with $TiCl_4$/Monomethylhydrazine, ***Taiki Kato,*** *Z. Ni, M. Matsukuma, H. Nakamura, Y. Ideno, Y. Serizawa,* Tokyo Electron Technology Solutions Limited, Japan
11:40am	**SS+2D+HC-TuM12** Direct Observation of Atomic Exchange during Surface Self-diffusion, ***Matthew Koppa,*** *P.R. Schwoebel, D.H. Dunlap,* University of New Mexico	**TF+AP-TuM12** Atomic Layer Deposition of Aluminum, Hafnium and Zirconium Oxyfluoride Films with Tunable Stoichiometry, ***Neha Mahuli,*** *J.M. Wallas, S.M. George,* University of Colorado at Boulder
12:00pm	**SSD FLASH SESSION**: **MAHSA KONH** (SS-TUP1); **CHUAN HE,** (SS-TUP5); **LAURIN JOSEPH**, (SS-TUP12); **RICHARD VAN LENT**, (SS-TUP13); **LUDO JUURLINK,** (SS-TUP14); **GEORGE H. MAJOR,** (SS-TUP17); **ZHUOZHI GE,** (SS-TUP20)	**TF+AP-TuM13** ALD on Thermally and Chemically Treated Fused Silica and Glass Surfaces, ***Tahereh Gholian Avval,*** *G. Hodges, V. Carver, M.R. Linford,* Brigham Young University

	Thin Films Division **Room A122-123 - Session TF+EM+MI-TuM** **Thin Films for Microelectronics, Photonics, and Optoelectronic Applications** **Moderators:** John F. Conley, Jr., Oregon State University, Halil Akyildiz, Uludag University, Turkey	**Energy Transition Focus Topic** **Room A212 - Session TL+MS+VT-TuM** **Implications of Implementation: Making Energy Transition a Reality (ALL INVITED SESSION)** **Moderators:** Margaret Fitzgerald, Colorado School of Mines, Natalie Seitzman, Colorado School of Mines
8:00am	**INVITED: TF+EM+MI-TuM1** Monolithic Integration of III-Vs on Si for Electronic and Photonic Applications, *P. Staudinger, S. Mauthe, N. Vico Trivino, N. Sousa, C. Convertino, Y. Baumgartner, P. Tiwari, H. Schmid,* ***Kirsten Moselund,*** IBM Research Zurich, Switzerland	**INVITED: TL+MS+VT-TuM1** The Energy Transition: Science and Technology Development Aspects, ***Richard M.C.M. van de Sanden,*** DIFFER, Eindhoven University, The Netherlands, Netherlands
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**TF+EM+MI-TuM3** A Scheme for Better Future Technology by developing AlGaN based Highly Responsive Photosensing Devices, ***Neha Aggarwal,*** *S. Krishna, L. Goswami, G. Gupta,* CSIR-National Physical Laboratory, India	**INVITED: TL+MS+VT-TuM3** Electrochemical CO2 Reduction Across Scales: From Fundamental Mechanisms to Practical Applications, ***Wilson Smith,*** Delft University of Technology The Netherlands, The Netherlands
9:00am	**TF+EM+MI-TuM4** Correlating the Optical Property Evolution in the Au-Ni Binary Thin Films: From Metastable Solid Solution to Phase Separated Alloy, ***Robyn Collette,*** *Y. Wu, P.D. Rack,* University of Tennessee Knoxville	Invited talk continues.
9:20am	**TF+EM+MI-TuM5** Integration of Electro-optically Active $BaTiO_3$ and $Ba_xSr_{1-x}TiO_3$ with Buffered Si (001) by Chemical Methods, ***John G. Ekerdt,*** *B.I. Edmondson, E. Lin,* University of Texas at Austin; *S. Kwon,* University of Texas at Dallas; *A.A. Demkov,* University of Texas at Austin; *M.J. Kim,* University of Texas at Dallas	**INVITED: TL+MS+VT-TuM5** Perspectives on the Research and Development of Nanomaterials for Hydrogen Production, ***Marcelo Carmo,*** Forschungszentrum Jülich, Germany
9:40am	**TF+EM+MI-TuM6** Nonlinear Optical Properties of TiO_2-based ALD Thin Films, ***Theodosia Gougousi,*** *R. Kuis, I. Basaldua, P. Burkins, J.A. Kropp, A.M. Johnson,* University of Maryland, Baltimore County	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**
11:00am	**TF+EM+MI-TuM10** Atomic Layer Deposition on Hexagonal Ge and SiGe Nanowires for Surface Passivation, ***Willem-Jan Berghuis,*** Department of Applied Physics, Eindhoven University of Technology, Postbus 513, 5600 MB Eindhoven, The Netherlands; *W.M.M. Kessels,* Eindhoven University of Technology, The Netherlands, Netherlands; *J.E.M. Haverkort, E.P.A.M. Bakkers, A. Dijkstra, E.M.T. Fadaly, M.A. Verheijen,* Eindhoven University of Technology, The Netherlands	**TL+MS+VT-TuM10** Impacts and Adaptation Strategies in Ethiopia, ***Aschale Dagnachew Siyoum,*** Xavier University of Louisiana
11:20am	**TF+EM+MI-TuM11** Oxidation Studies of Silicon Germanium (SiGe) using In-Situ Steam Generated (ISSG) and Plasma Enhanced Atomic Layer Deposited (PEALD) Oxides, ***Yi Song,*** *S. Siddiqui, C. Durfee, A. Pana, J. Li, M. Belyansky, S. Naczas, E.P. Stuckert, L. Jiang, J. Demarest, V. Basker, D. Guo, H. Bu,* IBM Research Division, Albany, NY	**INVITED: TL+MS+VT-TuM11** Developing and Scaling Up the Manufacturing of Thin Film Materials for the Future of Energy Production, Storage, and Reduction, ***Ken Nauman,*** Von Ardenne North America
11:40am	**TF+EM+MI-TuM12** Precision Defect Engineering of Metal/Insulator/Metal (MIM) Diodes using Localized ALD Transition Metal Impurities in Al_2O_3 Tunnel Barriers, ***Konner Holden***[1], *Y. Qi, J.F. Conley, Jr.,* Oregon State University	Invited talk continues.
12:00pm	**TF+EM+MI-TuM13** Improvement in the Electrical Characteristics of a-ZTO based TFTs *via* Microwave Assisted Annealing of Channel Layer, ***Sunil Uprety,*** *M.P. Khanal, H. Lee, S. Sarwar,* Auburn University; *A. Subramanian,* Stony Brook University; *E. Hassani, T.S. Oh, X. Zhang,* Auburn University; *C.Y. Nam,* Brookhaven National Laboratory; *M. Park,* Auburn University	

[1] **TFD James Harper Award Finalist**

Vacuum Technology Division
Room A213 - Session VT-TuM
Accelerators and Large Vacuum Systems
Moderators: Yulin Li, Cornell University,
Marcy Stutzman, Jefferson Lab

8:00am	**INVITED: VT-TuM1** Vacuum Operation and Future Upgrade of the LHC Accelerator Complex, ***Giuseppe Bregliozzi,*** CERN, Switzerland	
8:20am	Invited talk continues.	
8:40am	**VT-TuM3** Final Design into Production for the APS-Upgrade Storage Ring Vacuum System, ***Jason Carter,*** Argonne National Laboratory	
9:00am	**VT-TuM4** The Design of the Advanced Photon Source Upgrade (APSU) Insertion Device (ID) Straight Section Vacuum Systems, ***Jason Lerch,*** *M.E. Szubert, E. Anliker, T. Bender,* Argonne National Laboratory	
9:20am	**VT-TuM5** The Vacuum Commissioning and Simulation of Non-Evaporable Getter Dominated Cornell High Energy Synchrotron Source Upgrade., ***Yevgeniy Lushtak,*** *Y. Li, X. Liu,* Cornell University	
9:40am	**VT-TuM6** Advanced Light Source Upgrade Vacuum Controls and Instrumentation Design, ***Sol Omolayo,*** Lawrence Berkeley Lab, University of California, Berkeley	
10:00am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	
10:20am		
10:40am		
11:00am	**INVITED: VT-TuM10** Vacuum Electronics Community Pioneers Additive Manufacturing of Copper, ***Diana Gamzina,*** SLAC National Accelerator Laboratory; *T. Horn, C. Ledford,* North Carolina State University; *C. Nantista,* SLAC National Accelerator Laboratory; *P. Frigola,* Radiabeam	
11:20am	Invited talk continues.	
11:40am	**VT-TuM12** Particle-Free Manufacturing and Installation for LCLS-II Vacuum Systems, ***Arnela Gamzina,*** SLAC National Accelerator Laboratory	
12:00pm	**VT-TuM13** Development of Remote Handleable Axially Decoupled Radiation Resistant Vacuum Seal, ***Geoff Hodgson,*** TRIUMF, Canada	

Exhibitor Technology Spotlight Workshops
Room Hall A, Booth #152 - Session EW-TuMB
Exhibitor Technology Spotlight Workshop I
Moderator: Christopher Moffitt, Kratos Analytical Limited

10:00am	**BREAK - Complimentary Coffee in Exhibit Hall – Technology Spotlight Sessions in Booth #152, Exhibit Hall A**	
10:20am	**EW-TuMB2** Addressing the Challenges for Economic & Efficiency Improvements for Thin Film Production, ***Anna Corinne D'Ambrosio***, VON ARDENNE North America, Inc.	
10:40am		
11:00am		

Tuesday Lunch, October 22, 2019

Exhibitor Technology Spotlight Workshops
Room Hall A, Booth #152 - Session EW-TuL
Exhibitor Technology Spotlight Workshop II
Moderator: Christopher Moffitt, Kratos Analytical Limited

12:00pm	**FREE LUNCH IN EXHIBIT HALL (See Registration Tickets —while supplies last)**	
12:20pm	**EW-TuL2** New Developments from Thermo Fisher Scientific, ***Timothy Nunney***, *P. Mack, R.E. Simpson, A. Bushell,* Thermo Fisher Scientific, UK	
12:40pm	**EW-TuL3** New Trends in Photoelectron Spectroscopy: Momentum Resolved Photoelectron Spectroscopy, Spin-resolved ARPES, Small Spot and Hard X-ray XPS, *A. Thissen,* SPECS Surface Nano Analysis GmbH, Germany; ***Thomas Stempel Pereira***, SPECS Surface Nano Analysis GmbH	
1:00pm	**EW-TuL4** Latest Trends and Instrumentation for TOF-SIMS, ***Nathan Havercroft***, IONTOF USA, Inc.	
1:20pm	**EW-TuL5** New Versatile and Compact In Situ AugerProbe from Staib Instruments for REELS & Auger Analyses in Growth Environments Even Under Higher Pressures, ***Eric Dombrowski***, Staib Instruments, Inc.	
1:40pm	**EW-TuL6** Kratos Analytical – 50 Years of XPS, ***Christopher Blomfield***, Kratos Analytical Limited, UK	
2:00pm	**EW-TuL7** What's New at PHI, *K. Artyushkova, J.E. Mann, B.W. Schmidt, L. Swartz,* ***John Newman***, Physical Electronics	

	2D Materials **Room A216 - Session 2D+EM+MI+NS-TuA** **Properties of 2D Materials including Electronic, Magnetic, Mechanical, Optical, and Thermal Properties II** **Moderator:** Roland Wiesendanger, University of Hamburg, Germany	**Actinides and Rare Earths Focus Topic** **Room A215 - Session AC+AS+LS-TuA** **Forensics, Science and Processing for Nuclear Energy** **Moderators:** Paul S. Bagus, University of North Texas, Tomasz Durakiewicz, National Science Foundation, David Geeson, AWE, UK
2:20pm	**2D+EM+MI+NS-TuA1** Boundary Conditions for a Continuum Model of Lateral Interfaces in Transition Metal Dichalcogenides, ***Kaelyn Ferris,*** Ohio University	**INVITED: AC+AS+LS-TuA1** Helium Implantation Studies in Metals and Ceramics for Nuclear Energy Applications, Microstructure and Properties, ***Peter Hosemann,*** *M. Balooch, S. Stevenson, A. Scott,* University of California, Berkeley*; Y. Yang,* Lawrence Berkeley Lab, University of California, Berkeley
2:40pm	**2D+EM+MI+NS-TuA2** Resolving the Structural and Electronic Properties of Graphene/Ge(110), ***Luca Camilli,*** Technical University of Denmark, Denmark*; M. Galbiati,* Technical University of Denmark*; L. Persichetti, M. De Seta,* Università degli Studi Roma Tre, Italy*; F. Fabbri,* Italian Institute of Technology, Italy*; A. Scaparro,* Università degli Studi Roma Tre, Italy*; A. Notargiacomo,* Centro Nazionale di Ricerca, Italy*; V. Miseikis, C. Coletti,* Italian Institute of Technology, Italy*; L. Di Gaspare,* Università degli Studi Roma Tre, Italy	Invited talk continues.
3:00pm	**2D+EM+MI+NS-TuA3** Array of Strain Induced Quantum Dots in Graphene, ***Md Tareq Mahmud,*** *N. Sandler,* Ohio University	**INVITED: AC+AS+LS-TuA3** Origin of Element Selectivity during Solvent Extraction of Rare Earths: Studies of Model Interfaces using Synchrotron Radiation, *M. Miller, Y. Liang, H. Li, M. Chu, S. Yoo,* Northwestern University*; W. Bu,* University of Chicago*; M. Olvera de la Cruz,* ***Pulak Dutta,*** Northwestern University
3:20pm	**2D+EM+MI+NS-TuA4** Ultrafast Spin and Charge Dynamics in Monolayer WSe_2-Graphene Heterostructure Devices, ***Michael Newburger,*** *Y.K. Luo,* The Ohio State University*; K.M. McCreary,* U.S. Naval Research Laboratory*; I. Martin, E. McCormick,* The Ohio State University*; B.T. Jonker,* U.S. Naval Research Laboratory*; R. Kawakami,* The Ohio State University	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall -** **Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall -** **Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**2D+EM+MI+NS-TuA7** Spatially Selective Enhancement of Photoluminescence in MoS by Exciton-Mediated Adsorption and Defect Passivation, ***Saujan V. Sivaram,*** *A.T. Hanbicki, M.R. Rosenberger, G. Jernigan, H.-J. Chuang, K.M. McCreary, B.T. Jonker,* U.S. Naval Research Laboratory	**INVITED: AC+AS+LS-TuA7** Analysis of Aged of Uranium Particles via X-ray Xpectromicroscopy, ***Andrew Duffin,*** *J. Ward,* Pacific Northwest National Laboratory
4:40pm	**2D+EM+MI+NS-TuA8** Strained Graphene in the Quantum Hall Regime: Valley Splitting and Extra Conducting Channels, ***Daiara Faria,*** Ohio University / Universidade do Estado do Rio de Janeiro*; C. León,* Brigham Young University*; L. Lima,* Universidade Rural do Rio de Janeiro, Brazil*; A. Latgé,* Universidade Federal Fluminense, Brazil*; N. Sandler,* Ohio University	Invited talk continues.
5:00pm	**INVITED: 2D+EM+MI+NS-TuA9** Unraveling the Novel Quantum Phenomena in Two-dimensional Materials using Transport and Photoemission Spectroscopy, ***Jyoti Katoch,*** Carnegie Mellon University	**INVITED: AC+AS+LS-TuA9** Heat Transfer and Phase Stability of Early Actinides and Actinide Compounds, ***Dominik Legut,*** *L. Kývala, U.D. Wdowik, G. Jaglo, P. Piekarz,* Technical University of Ostrava, Ostrava, Czechia*; L. Havela,* Charles University, Prague, Czechia
5:20pm	Invited talk continues.	Invited talk continues.
5:40pm	**2D+EM+MI+NS-TuA11** Electronic Properties and Charge Density Wave Transition in Single-layer VSe_2, ***Kien Nguyen-Cong,*** *P. Neto, M. Batzill, I.I. Oleynik,* University of South Florida	**AC+AS+LS-TuA11** Reactivity of Potential TRISO Fuel Barrier Layers (SiC and ZrN) with H_2O Probed with Ambient Pressure Photoelectron Spectroscopy, ***Jeff Terry,*** *M. Warren,* Illinois Institute of Technology*; R. Addou, G.S. Herman,* Oregon State University
6:00pm	**2D+EM+MI+NS-TuA12** Tunable Band Gap and Thermal Conductivity Measurements of Monolayer $MoSe_2$ by S Incorporation, ***Shyama Rath,*** *V. Singh,* University of Delhi, India	

Tuesday Afternoon, October 22, 2019

	Atomic Scale Processing Focus Topic **Room B130 - Session AP+EL+MS+PS+SS+TF-TuA** **Advancing Metrology and Characterization to enable Atomic Layer Processing** **Moderators:** Eric A. Joseph, IBM T.J. Watson Research Center, Jessica Kachian, Intel Corporation	**Applied Surface Science Division** **Room A211 - Session AS+BI+CA+LS-TuA** **Beyond Traditional Surface Analysis** **Moderators:** Michaeleen Pacholski, The Dow Chemical Company, Xiao-Ying Yu, Pacific Northwest National Laboratory
2:20pm	**INVITED: AP+EL+MS+PS+SS+TF-TuA1** In Situ Ellipsometry Characterization Of Atomic Layer Processes: A Review, ***James Hilfiker,*** *G.K. Pribil, J. VanDerslice,* J.A. Woollam Co., Inc.	**INVITED: AS+BI+CA+LS-TuA1** Nanotechnology as a Driver for Going Beyond Traditional Surface Analysis, ***Olivier Renault,*** CEA-LETI, France
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**INVITED: AP+EL+MS+PS+SS+TF-TuA3** Elucidating the Mechanisms for Atomic Layer Growth through In Situ Studies, ***Jeffrey Elam,*** Argonne National Laboratory	**AS+BI+CA+LS-TuA3** Core Levels Sub-shell Photo-ionization Cross-sections of Au, Ag, Cu in the Hard X-ray Photon Energy Range of 7-26 keV, ***Germán Rafael Castro,*** *J. Rubio Zuazo,* Spanich CRG BM25-SpLine Beamline at the ESRF, France
3:20pm	Invited talk continues.	**AS+BI+CA+LS-TuA4** Interfacial Photochemistry of Pyruvic Acid in Atmospheric Chemistry, ***Yanjie Shen,*** *Y. Fu,* Pacific Northwest National Laboratory; *X.H. Yao,* Ocean University of China; *Z.H. Zhu,* Pacific Northwest National Laboratory; *X.-Y. Yu,* Earth and Biological Sciences Directorate
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall -** **Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall -** **Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**INVITED: AP+EL+MS+PS+SS+TF-TuA7** Surface, Interface, or Film: A Discussion of the Metrology of ALD Materials in Semiconductor Applications, ***G. Andrew Antonelli,*** *N. Keller,* Nanometrics	**INVITED: AS+BI+CA+LS-TuA7** Nanoscale Tomographic Mapping the Liquid-Solid Interface with Cryo-APT, ***Daniel Perea,*** *D.K. Schreiber, J.E. Evans, V. Ryan,* Pacific Northwest National Laboratory
4:40pm	Invited talk continues.	Invited talk continues.
5:00pm	**AP+EL+MS+PS+SS+TF-TuA9** In Line and Ex Situ Metrology and Characterization to Enable Area Selective Deposition, ***Christophe Vallee,*** *M. Bonvalot, B. Pelissier, J-H. Tortai, S. David, S. belahcen, V. Pesce, M. Jaffal, A. Bsiesy,* LTM, Univ. Grenoble Alpes, CEA-LETI, France; *R. Gassilloud, N. Posseme,* CEA-LETI, France; *T. Grehl, P. Bruner,* IONTOF GmbH, Germany; *A. Uedono,* University of Tsukuba, Japan	**AS+BI+CA+LS-TuA9** Characterization of Electronic Materials using Low Energy Inverse Photoemission Spectroscopy, ***Benjamin Schmidt,*** *J.G. Newman, J.E. Mann, K. Artyushkova, L. Swartz,* Physical Electronics; *M. Terashima, T. Miyayama,* ULVAC-PHI Inc., Japan
5:20pm	**INVITED: AP+EL+MS+PS+SS+TF-TuA10** Recent Progress in Thin Film Conformality Analysis with Microscopic Lateral High-aspect-ratio Test Structures, ***Riikka Puurunen,*** Aalto University, Finland	**AS+BI+CA+LS-TuA10** Deconvolution of Atom Probe Tomography on Nanomaterials for Renewable Energy, ***Margaret Fitzgerald,*** *M.J. Dzara, D.R. Diercks,* Colorado School of Mines; *N. Leick, S.T. Christensen,* National Renewable Energy Laboratory; *T. Gennett, S. Pylypenko,* Colorado School of Mines
5:40pm	Invited talk continues.	**AS+BI+CA+LS-TuA11** Mass Spectrometric Investigation of Ion Solvation in Liquids, a Comparison of *in situ* Liquid SIMS to Regular ESI-MS, ***Yanyan Zhang,*** Institute of Chemistry, Chinese Academy of Sciences, China; *D.R. Baer, Z.H. Zhu,* Pacific Northwest National Laboratory
6:00pm	**AP+EL+MS+PS+SS+TF-TuA12** *In operando*XPS Study on Atomic Layer Etching of Fe and Co Using $Cl_2$and Acetylacetone or Hexafluoroacetylacetone, ***Zijian Wang,*** *O. Melton, D. Angel, B. Yuan, R.L. Opila,* University of Delaware	**AS+BI+CA+LS-TuA12** Characterizing the Thickness and Physical Properties of Nearly Ideal Zirconium Oxide Surfaces Using Ellipsometry, ESCA, Profilometry and FIB, ***Edward Gillman,*** Naval Nuclear Laboratory

	Biomaterial Interfaces Division **Room A120-121 - Session BI+AS-TuA** **Biomolecules and Biophysics and Interfaces & Flash Session** **Moderators:** Markus Valtiner, Vienna University of Technology, Austria, Tobias Weidner, Aarhus University, Denmark	**Electronic Materials and Photonics Division** **Room A214 - Session EM+OX+TF-TuA** **Nikolaus Dietz Memorial Session: Wide and Ultra-wide Band Gap Materials and Devices** **Moderators:** Seth King, University of Wisconsin - La Crosse, David Aspnes, North Carolina State University
2:20pm	**BI+AS-TuA1** Electrochemical Surface Reactivity of Catechol Derivatives: Competitive Adsorption and Ion Effects, ***Laila Moreno Ostertag***, *L.L.E. Mears, D. Dworschak, M. Valtiner,* Vienna University of Technology, Austria	**INVITED: EM+OX+TF-TuA1** Nitride-Based Semiconducting Materials: A Long Pathway to Advanced Nuclear Detection Capabilities, ***Vincent Woods***, *L. Hubbard,* Pacific Northwest National Laboratory*; Z. Sitar,* North Carolina State University*; A.Y. Kozhanov,* Georgia State University
2:40pm	**BI+AS-TuA2** Direct Observation of Lysozyme Interaction with a Curved Lipid Membrane Surface by Sum Frequency Scattering Vibrational Spectroscopy, ***Thaddeus Golbek***, Aarhus University, Denmark, Denmark*; H.I. Okur, S. Kulik, J. Dedic, S. Roke,* École Polytechnique Fédérale de Lausanne (EPFL), Switzerland*; T. Weidner,* Aarhus University, Denmark	Invited talk continues.
3:00pm	**INVITED: BI+AS-TuA3** Iron Speciation at Aqueous Surfaces, ***Heather Allen***, Ohio State University	**EM+OX+TF-TuA3** New Mg-based Ternary Nitrides for Wide Band Gap Device Applications, *K.R. York, R.A. Makin III,* ***Steven Durbin***, Western Michigan University*; R.J. Reeves,* University of Canterbury, New Zealand*; N. Senabulya, R. Clarke,* University of Michigan
3:20pm	Invited talk continues.	**EM+OX+TF-TuA4** Low Temperature Growth of InN by Atomic Layer Epitaxy, ***Charles R. Eddy, Jr.***, U.S. Naval Research Laboratory*; S.G. Rosenberg, J.M. Woodward,* American Society for Engineering Education (residing at U.S. Naval Research Laboratory)*; K.F. Ludwig,* Boston University*; N. Nepal,* U.S. Naval Research Laboratory
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**BI+AS-TuA7** Identifying the Molecular Mechanisms that Mediate Cell Membrane Repair by Sum Frequency Generation Spectroscopy, *T.W. Golbek,* Oregon State University*; S.J. Roeters, T. Weidner,* Aarhus University, Denmark*; C.P. Johnson,* ***Joe Baio***, Oregon State University	**EM+OX+TF-TuA7** Stochiometry- and Orientation-Dependent Native Point Defects of MOCVD-Grown $ZnGeN_2$ Films, ***Micah Haseman***, *D. Ramdin, R. Karim,* The Ohio State University*; D. Jayatunga,* Case Western Reserve University*; H. Zhao,* The Ohio State University*; K. Kash,* Case Western Reserve University*; L.J. Brillson,* The Ohio State University
4:40pm	**BI+AS-TuA8** Fishing Manganese out from Cellulose: Impact of Coupling Desferrioxamine B to Stainless Steel Beads on the Circular Economy of Paper and Pulp Industry, ***Jeff Wilkesman***[1], Mannheim University of Applied Sciences, Germany*; K. Mörtter, I. Sommer, P.M. Kunz,* Mannheim University of Applied Sciences, Deutschland	**EM+OX+TF-TuA8** Low-temperature Growth of Wide Bandgap Nitride and Oxide Thin Films via Plasma-assisted Atomic Layer Deposition: Influence of rf-plasma Source and Plasma Power, ***Necmi Biyikli***, *S. Ilhom, A. Mohammad, D. Shukla,* University of Connecticut
5:00pm	**BI+AS-TuA9** The Hybrid Nano-biointerfaces Between Gold, Graphene Oxide and Angiogenin for Wound Repair, ***Diego La Mendola***, University of Pisa, Italy*; L.M. Cucci, G. Villaggio, C. Satriano,* University of Catania, Italy	**INVITED: EM+OX+TF-TuA9** Wide Bandgap Dilute Magnetic Semiconductors for Room Temperature Spintronic Applications, *V.G. Saravade, A. Ghods,* Missouri University of Science and Technology, Rolla, MO, USA*; N. Ben Sedrine,* Universidade de Aveiro, Portugal*; C. Zhou,* ***Ian Ferguson***, Missouri University of Science and Technology
5:20pm	**BI+AS-TuA10** Improved Antibacterial Sandwich system for Urological Purposes, ***Sara Bröskamp***, *G. Franz,* Munich University of Applied Sciences, Germany*; D. Jocham,* University Hospital of Schleswig-Holstein, Germany	Invited talk continues.
5:40pm	**BI+AS-TuA11** Quantitative Characterization of Piezoelectric Property in Biological System via Piezoresponse Force Microscopy, ***Jinha Kwon***, *D.G. Kim, H. Cho,* The Ohio State University	**EM+OX+TF-TuA11** Processing and Characterization of Schottky and Ohmic contacts on (100) β-Ga_2O_3, ***Luke Lyle***, *K. Jiang, E. Favela, D. Moody, T. Lin, P. Chung,* Carnegie Mellon University*; K. Das,* North Carolina State University*; Z. Galazka, A. Popp, G. Wagner,* Leibniz-Institut für Kristallzüchtung, Germany*; L.M. Porter,* Carnegie Mellon University
6:00pm	**BID FLASH SESSION: DANIEL REGAN**, (BI-TuP1); **FLORIAN VICTOR KOSCHITZKI** (BI-TuP2); **CINDY DENISE BEYER,** (BI-TuP3); **THUVARAKHAN GNANASAMPANTHAN**, (BI-TuP4); **RYAN FAASE**, (BI-TuP6); **NICHOLAS DENNISON**, (BI-TuP7)	**EM+OX+TF-TuA12** III-Nitrides: Enabling Applications with Wide to Ultra-Wide Bandgap Materials and Devices, ***Erica Douglas***, *A.G. Baca, B.A. Klein, A.A. Allerman, A.M. Armstrong, A. Colon, C.A. Stephenson, R.J. Kaplar,* Sandia National Laboratories

[1] **Scholars At Risk**

	MEMS and NEMS Group **Room A210 - Session MN+QS-TuA** **Devices for Quantum Information and Quantum Nanomechanics** **Moderators:** Sebastian Hentz, CEA-LETI, France, Matthew Jordan, Sandia National Laboratories	**Nanometer-scale Science and Technology Division** **Room A222 - Session NS-TuA** **Recent Advances in Nanoscale Probing and Fabrication** **Moderator:** Jay Mody, GlobalFoundries Inc
2:20pm	**INVITED: MN+QS-TuA1** Fabrication Challenges in Quantum Optomechanics, ***Simon Groeblacher,*** Delft University of Technology, The Netherlands, Netherlands	
2:40pm	Invited talk continues.	
3:00pm	**INVITED: MN+QS-TuA3** Floquet Dynamics and Time Symmetry Breaking in Arrays of Driven Nanoresonators, ***Mark Dykman,*** Michigan State University	
3:20pm	Invited talk continues.	
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**INVITED: MN+QS-TuA7** Engineering Quantum Signal Transduction in Atomic Layer 2D Devices, ***Philip Feng,*** Case Western Reserve University	**NS-TuA7** Electrical, Photovoltaic, and Nano-Optical Characterization of TMD Lateral Heterostructures, ***Marudachalam Shanmugasundaram,*** HORIBA Scientific; *A. Elias, M. Terrones,* The Pennsylvania State University; *H. Terrones,* Rensselaer Polytechnic Institute
4:40pm	Invited talk continues.	**NS-TuA8** Development of Near-Field Electrospinning for 3D Nanofabrication for tissue engineering applications, ***Alex Nagle,*** University of Wollongong, Australia
5:00pm	**INVITED: MN+QS-TuA9** Superconducting Resonators as Diagnostics for Qubit Fabrication, ***Rupert Lewis,*** Sandia National Laboratories	**NS-TuA9** The Fundamentals of Silica Nanoparticle-based Hydrophilic Antifouling Coating, ***Dan Yang,*** University of wollongong, Australia; *P.J. Molino,* University of Wollongong, Australia; *M. Higgins,* University of Wollongong
5:20pm	Invited talk continues.	**NS-TuA10** The Effects of Atomic-Scale Strain Relaxation on the Electronic Properties of Monolayer MoS_2, ***Daniel Trainer,*** *Y. Zhang,* Argonne National Laboratory; *F. Bobba,* University of Salerno, Italy; *X. Xi,* Temple University; *S-W. Hla,* Argonne National Laboratory; *M. Iavarone,* Temple University
5:40pm	**INVITED: MN+QS-TuA11** Surface Ion Trap Device Fabrication for Experiments in Quantum Information Science, ***Matthew Blain,*** Sandia National Laboratories	**NS-TuA11** Probing the Viscoelastic Properties of Polymer Composites with AFM-based Dynamic Mechanical Analysis, *B. Pittenger, S. Osechinskiy, J. Thornton, S. Loire,* ***Thomas Mueller,*** Bruker Corporation
6:00pm	Invited talk continues.	

	Complex Oxides: Fundamental Properties and Applications Focus Topic **Room A220-221 - Session OX+EM+HC+MI+NS+SS+TF-TuA** **Complex Oxides: Catalysis, Dielectric Properties and Memory Applications** **Moderators:** Alexander Demkov, University of Texas at Austin, Jeffry Kelber, University of North Texas	**Plasma Science and Technology Division** **Room B131 - Session PS+EM-TuA** **Advanced BEOL/Interconnect Etching and Advanced Memory and Patterning** **Moderators:** Hisataka Hayashi, Toshiba Memory Corporation, Kenji Maeda, Hitachi High Technologies America Inc.
2:20pm	**INVITED: OX+EM+HC+MI+NS+SS+TF-TuA1** Novel Multiferroic and Ferroelectric Ferrite Thin Films, ***Peter A. Dowben***, *C. Binek, X. Xu,* University of Nebraska-Lincoln	**INVITED: PS+EM-TuA1** BEOL Etch Challenges and Solutions for Advanced Process Nodes, ***Angélique Raley***, *K. Lutker-Lee, X. Sun, Y.-T. Lu, Q. Lou, N. Joy, M. Edley,* TEL Technology Center, America, LLC*; K. Taniguchi, M. Honda,* TEL Miyagi Limited, Japan*; P.E. Biolsi,* TEL Technology Center, America, LLC
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**INVITED: OX+EM+HC+MI+NS+SS+TF-TuA3** Potential Applications and Challenges for Complex Oxides in Advanced Memory and Computing Applications, ***Sebastian Engelmann***, *T. Ando, V. Narayanan,* IBM T.J. Watson Research Center	**PS+EM-TuA3** Enabling Fully Aligned Via for Advanced BEOL Nodes Scaling -Etch and Film Co-optimization, ***Xinghua Sun***, *A. Raley,* TEL Technology Center, America, LLC*; J. Lee, J.C. Arnold,* IBM Research Division, Albany, NY*; K. Taniguchi,* TEL Miyagi Limited, Japan*; M. Edley, K. Lutker-Lee,* TEL Technology Center, America, LLC*; D. O'Meara,* Tokyo Electron America, Inc.*; K. Tapily, Y.-T. Lu, P.E. Biolsi,* TEL Technology Center, America, LLC
3:20pm	Invited talk continues.	**PS+EM-TuA4** Non-selective Silicon Oxide and Nitride Etch in Oxygen/Nitrogen-containing Fluorocarbon Plasmas, ***Yu-Hao Tsai***, *D. Zhang, Y. Han, J. Baillargeon, Y. Shi, H. Kim, M. Wang,* TEL Technology Center, America, LLC*; T. Yokoyama, M. Iwata, Y. Kihara, M. Honda, W. Sakamoto,* Tokyo Electron Miyagi Ltd., Japan*; A. Mosden, A. Metz, P.E. Biolsi,* TEL Technology Center, America, LLC
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**INVITED: OX+EM+HC+MI+NS+SS+TF-TuA7** Epitaxial Design of Complex Oxides for Catalysis and Electrocatalysis, ***Yingge Du***, Pacific Northwest National Laboratory	**INVITED: PS+EM-TuA7** Challenges in High-aspect-ratio Hole Etching for 3D Flash Memory, ***Mitsuhiro Omura***, *J. Hashimoto, T. Adachi, Y. Kondo, M. Ishikawa, J. Abe, I. Sakai, H. Hayashi,* Toshiba Memory Corporation, Japan
4:40pm	Invited talk continues.	Invited talk continues.
5:00pm	**OX+EM+HC+MI+NS+SS+TF-TuA9** Manipulate the Electronic Structures of Complex (Ni, Co) Oxides by Hole Doping for Oxygen Evolution Reaction, ***Kelvin Zhang***, Xiamen University, China	**PS+EM-TuA9** Plasma Processing of Phase Change Materials, ***Ernest Chen***, *N.D. Altieri,* University of California, Los Angeles*; C.M. Neumann, S.W. Fong, H.-S.P. Wong,* Stanford University*; M. Shen, T.B. Lill,* Lam Research Corporation*; J.P. Chang,* University of California, Los Angeles
5:20pm	**OX+EM+HC+MI+NS+SS+TF-TuA10** Vanadia/Tungsten Oxide on Anatase TiO2(101): a Model Catalyst Study by STM and XPS, ***Tao Xu***, *J.V. Lauritsen, K.C. Adamsen,* Aarhus University, Denmark*; S. Wendt,* iNANO, Aarhus University, Denmark	**INVITED: PS+EM-TuA10** Meeting the Challenges in Patterning Phase Change Material for Next Generation Memory Devices, ***Meihua Shen***, *L. Thorsten, J. Hoang, S. Chiou, D. Qian, A. Routzahn, J.K. Chen, A. Dulkin, J. Sims, A. McKerrow, R. Dylewicz,* Lam Research Corporation
5:40pm	**OX+EM+HC+MI+NS+SS+TF-TuA11** Observation of Memory Effect and Fractal Surface in $SrRuO_3$ Epitaxial Thin Films, ***Ratnakar Palai***, University of Puerto Rico*; H. Huhtinen,* University of Turku, Finland	Invited talk continues.
6:00pm	**OX+EM+HC+MI+NS+SS+TF-TuA12** *In situ* Auger Electron Spectroscopy of Complex Oxide Thin Film Surfaces Grown by Pulsed Laser Deposition, ***Thomas Orvis***, *M. Surendran, Y. Liu, A. Cunniff, J. Ravichandran,* University of Southern California	**PS+EM-TuA12** Utilizing Photosensitive Polymers to Estimate UV Radiation Exposures in Different Plasma Chamber Configurations, ***Luxherta Buzi***, *M.P. Sagianis, S.U. Engelmann,* IBM T.J. Watson Research Center

Tuesday Afternoon, October 22, 2019

	Materials and Processes for Quantum Information, Computing and Science Focus Topic **Room B231-232 - Session QS+2D+EM+MN+NS-TuA** **Materials for Quantum Sciences** **Moderators:** Matthew R. Rosenberger, U.S. Naval Research Laboratory, Robert Walko, The Ohio State University	**Thin Films Division** **Room A124-125 - Session TF+PS-TuA** **Epitaxial Thin Films** **Moderator:** Robert Grubbs, Micron Technology
2:20pm	**QS+2D+EM+MN+NS-TuA1** Electrically Detected Electron Nuclear Double Resonance Study of Defects in 4H-SiC Bipolar Junction Transistors, ***Ryan Waskiewicz****, B.R. Manning, D.J. McCrory, P.M. Lenahan,* Pennsylvania State University	**TF+PS-TuA1** In-situ Epitaxy of Ultrathin Ni Ferrite Films Studied by Surface Sensitive Time-resolved High Energy X-ray Diffraction, ***Joachim Wollschläger****, M. Hoppe, T. Pohlmann,* University Osnabrück, Germany*; F. Bertram,* DESY, Hamburg, Germany
2:40pm	**QS+2D+EM+MN+NS-TuA2** Scanning Tunneling Microscopy Studies of Er Adatoms on GaAs (110), ***Rebekah Smith****, A. Benjamin, J.A. Gupta,* The Ohio State University	**TF+PS-TuA2** Van der Waals Layer Promoted Heteroepitaxy in Sputter-deposited Transition-metal Carbide and Sulfide Thin Films, ***Koichi Tanaka***[1]*, P. Arias, M.E. Liao, Y. Wang, H. Zaid, A. Aleman,* University of California, Los Angeles*; K. Hojo,* Nagoya University, Japan*; A. Deshpande, M.S. Goorsky, S. Kodambaka,* University of California, Los Angeles
3:00pm	**INVITED: QS+2D+EM+MN+NS-TuA3** Defect-based Quantum Systems in Hexagonal Boron Nitride, ***Trong Toan Tran****,* University of Technology Sydney, Australia	**INVITED: TF+PS-TuA3** Molecular Beam Epitaxy Applied to Tensile-Strained Quantum Dots for Quantum Optics and Band-Structure Engineering, ***Paul Simmonds****,* Boise State University
3:20pm	Invited talk continues.	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**QS+2D+EM+MN+NS-TuA7** Specific Placement of V_{Si} in 4H-SiC for Quantum Technologies using Li^+ Implantation*, S.P. Pavunny,* ***Rachael L. Myers-Ward****, D.K. Gaskill,* U.S. Naval Research Laboratory*; E.S. Bielejec,* Sandia National Laboratories*; H.B. Banks, A.L. Yeats,* U.S. Naval Research Laboratory*; M.T. DeJarld,* Raytheon*; S.G. Carter,* U.S. Naval Research Laboratory	
4:40pm	**QS+2D+EM+MN+NS-TuA8** Silicon Vacancy Point Defect in High-quality Nanobeam Photonic Crystal Cavities in 4H Silicon Carbide, ***Mena Gadalla****, X. Zhang, A.S. Greenspon,* Harvard University*; D.O. Bracher,* Harvard GSAS*; R.K. Defo, E. Hu*, Harvard University	
5:00pm	**QS+2D+EM+MN+NS-TuA9** Tailoring the Heterogeneities in 2D Materials by Controlled Synthesis and Processing, ***Kai Xiao****, X. Li, K. Wang, A. Oyedele, M. Yoon, S. Xia, M. Mahjouri-Samani, C.M. Rouleau, A.A. Puretzky, L. Liang, R.R. Unocic, D. Geohegan,* Oak Ridge National Laboratory	**TF+PS-TuA9** Low-temperature Homoepitaxial Growth of N-type Superlattices for Ultrastable, Ultrafast X-Ray and Charged Particle Detectors, ***April Jewell****,* Jet Propulsion Laboratory, California Institute of Technology*; M.E. Hoenk,* Jet Propulsion Laboratory*; Q. Looker, M.O. Sanchez, B.D. Tierney,* Sandia National Laboratories*; A.G. Carver,* Jet Propulsion Laboratory*; S. Nikzad,* Jet Propulsion Laboratory, California Institute of Technology
5:20pm	**QS+2D+EM+MN+NS-TuA10** Epitaxial Al Films for Plasmonic and Quantum Computing Applications, ***Ka Ming Law****, S. Budhathoki, S. Ranjit, F. Martin, A.J. Hauser,* The University of Alabama	**TF+PS-TuA10** Epitaxial Growth of Ultrathin Molybedenum Nitrides on Ru(0001) and Ag(100), ***Asim Khaniya****, M. Sajid, A. Kara, W.E. Kaden,* University of Central Florida
5:40pm	**QS+2D+EM+MN+NS-TuA11** 2019 AVS Mid-Atlantic Student Awardee Talk: Minimizing Coulomb Oscillation Linewidth on Silicon Quantum Dots, ***Yanxue Hong***[2]*, A.N. Ramanayaka, M.D. Stewart, Jr., X.Q. Wang, R.V. Kashid, P. Namboodiri, R.M. Silver, J.M. Pomeroy,* National Institute of Standards and Technology (NIST)	**TF+PS-TuA11** Using Time and Temperature of the Purge Step to Control Crystallinity, Phase Assemblage, and Epitaxy in Atomic Layer Deposited (ALD) Thin Films, ***Mark Losego****, B.D. Piercy, R.J. Petrie,* Georgia Institute of Technology
6:00pm	**QS+2D+EM+MN+NS-TuA12** Micro-magnetic Simulations of Correlated Switching in Touching Nano-magnetic Elements, ***Tejumade Durowade****, V. Metlushko,* University of Illinois at Chicago	**TF+PS-TuA12** The Role of Template Layers in Heteroepitaxial ALD Growth of Crystalline La_2O_3 on GaN(0001), ***Pei-Yu Chen****, T. Hadamek,* University of Texas at Austin*; S. Kwon,* University of Texas at Dallas*; F. Al-Quaiti, A. Posadas,* University of Texas at Austin*; M.J. Kim,* University of Texas at Dallas*; A.A. Demkov, J.G. Ekerdt,* University of Texas at Austin

[1] **National Student Award Finalist**

[2] **AVS Mid-Atlantic Student Awardee**

Tuesday Afternoon, October 22, 2019

	Thin Films Division **Room A122-123 - Session TF-TuA** **Emerging Applications for Thin Films** **Moderators:** Emily McGuinness, Georgia Institute of Technology, Jesse Jur, North Carolina State University	**Energy Transition Focus Topic** **Room A226 - Session TL+AS+SS+TF-TuA** **Breakthroughs and Challenges in Applied Materials for Energy Transition (ALL INVITED SESSION) & Panel Discussion** **Moderators:** Jason Avila, U.S. Naval Research Laboratory, Devika Choudhury, Argonne National Laboratory
2:20pm	**INVITED: TF-TuA1** Flexible Hybrid Electronics Process Maturation using Printed Inks, ***John D. Williams,*** The Boeing Company	**INVITED: TL+AS+SS+TF-TuA1** Interface Science and Engineering for Energy-Water Systems, ***Seth Darling,*** Argonne National Laboratory
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**TF-TuA3** Large-Area Atmospheric Pressure Spatial ALD for Flexible OLED Display Applications, *C. Frijters, J. Smeltink,* ***Huib Heezen,*** *P. Poodt,* SALDtech B.V., Netherlands	**INVITED: TL+AS+SS+TF-TuA3** Atomic Dynamics of Noble Metal Surface in Gases Revealed by Time Resolved Environmental Transmission Electron Microscopy, ***Seiji Takeda,*** *N. Kamiuchi, R. Aso, H. Yoshida, T. Tamaoka,* Osaka University, Japan
3:20pm	**TF-TuA4** Printed Polymer Heat Sinks for High-Power, Flexible Electronics, ***Katherine Burzynski,*** University of Dayton; *N.R. Glavin, E.M. Heckman,* Air Force Research Laboratory; *C. Muratore,* University of Dayton	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**
4:20pm	**TF-TuA7** Selective Deposition by Fast-ALD of Transparent Conductive Metal Oxides for Application in Organic (opto)electronic Devices, *M. Granados, D. Munoz-Rojas,* LMGP, France; *c. fontelaye, G. Nonglaton,* ***Tony Maindron,*** CEA-LETI, France	**TL+AS+SS+TF-TuA7** Totally Organic and Organic-Inorganic Hybrid Batteries, ***Burak Esat***[1], Fatih University, Turkey, Rutgers University; *S. Bahceci, S. Akay,* Fatih University, Turkey; *A. Momchilov,* Bulgarian Academy of Science, Bulgaria
4:40pm	**TF-TuA8** Photocatalytic Antibacterial Activity of ALD Thin Films on Fibrous Materials, ***Halil Akyildiz,*** *S. Diler,* Uludag University, Turkey	**INVITED: TL+AS+SS+TF-TuA8** Electrochemical Strategies for Designing Interfaces of Battery Materials, ***Betar Gallant,*** Massachusetts Institute of Technology
5:00pm	**TF-TuA9** A Kinetic and Thermodynamic Study of Aromatic Compounds Interacting with Metal-Organic Framework Thin Films, *J. Shankwitz, D. Speed, D. Sinanan,* ***Greg Szulczewski,*** University of Alabama	Invited talk continues.
5:20pm	**TF-TuA10** Carbon's Role in Reducing Alumina's Resistivity Through Catalytic Carbon Nanotube Growth, ***Berg Dodson,*** *R.C. Davis, R.R. Vanfleet,* Brigham Young University	
5:40pm	**TF-TuA11** Ferroelectricity in Hafnia-Zirconia based Thin Films: Characterization and Applications, ***Vineetha Mukundan,*** SUNY Polytechnic Institute; *S. Consiglio, D.H. Triyoso, K. Tapily, R.D. Clark, G.J. Leusink,* TEL Technology Center, America, LLC; *J.H. Hazra, K. Beckmann, N.C. Cady, A.C. Diebold,* SUNY Polytechnic Institute, Albany	
6:00pm	**TF-TuA12** Atomic Layer Deposition-enabled Formation of Laser-Induced Graphene for Charged Membrane Applications, ***David Bergsman,*** *B.A. Getachew, J.C. Grossman,* Massachusetts Institute of Technology	

[1] **Scholar Rescue Fund Fellow**

Vacuum Technology Division
Room A213 - Session VT-TuA
Advanced Applications of Vacuum Technology
Moderators: Julia Scherschligt, National Institute of Sandards and Technology (NIST), Alan Van Drie, TAE Technologies

2:20pm	**INVITED: VT-TuA1** Single Atom and Single Electron Transistors for Quantum Technologies, ***Richard Silver***, *X.Q. Wang, R.V. Kashid, J. Wyrick, P. Namboodiri, K. Liu, M.D. Stewart, G. Bryant,* National Institute of Standards and Technology (NIST)	
2:40pm	Invited talk continues.	
3:00pm	**VT-TuA3** Turbomolecular Pump for Achieving Ultra-high Vacuum in a High-power Proton Accelerator Vacuum System, ***Junichiro Kamiya***, *M. Kinsho,* Japan Atomic Energy Agency, Japan*; N. Ogiwara,* KEK, Japan*; M. Sakurai, T. Mabuchi,* Osaka Vacuum, Ltd., Japan*; K. Wada,* Tokyo Electronics Co., Ltd., Japan	
3:20pm	**VT-TuA4** US Contributions to ITER Vacuum Auxiliary System, ***Charles Smith***, Us Iter	
3:40pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	
4:00pm		
4:20pm	**INVITED: VT-TuA7** Importance of Advanced Vacuum Technology to the Present Thin Film Photovoltaics Industry, ***Timothy Gessert***, Gessert Consulting, LLC	
4:40pm	Invited talk continues.	
5:00pm	**INVITED: VT-TuA9** Enabling Hydrogen as an Energy Carrier through Analytical Electron Microscopy, ***David Cullen***, *K. More,* Oak Ridge National Laboratory	
5:20pm	Invited talk continues.	
5:40pm	**INVITED: VT-TuA11** Defect Manipulation to Control Energy Processes in Electronic Materials, ***Leonard Brillson***, The Ohio State University	
6:00pm	Invited talk continues.	

Exhibitor Technology Spotlight Workshops
Room Hall A, Booth #152 - Session EW-TuAB
Exhibitor Technology Spotlight III
Moderator: Christopher Moffitt, Kratos Analytical Limited

3:40pm	**BREAK - Complimentary Refreshments in Exhibit Hall - Technology Spotlight Sessions in Booth #152, Exhibit Hall**	
4:00pm	**EW-TuAB2** eSpectra: The Data Analysis Resource for You, or for Your Customers, ***Jessica Hoy,*** AIPP/AVS	

2D Materials
Room Union Station B - Session 2D-TuP
2D Poster Session
6:30pm

2D-TuP1 Enhancement of Solid Solubility in 2D Alloys by Selective Orbital Coupling, ***Bing Huang***, Beijing Computational Science Research Center, China

2D-TuP2 Black Phosphorus and Endohedral-Graphene Hybrids for Novel Optoelectronic Devices, *M. Min,* ***Srishti Chugh***, *A.B. Kaul,* University of North Texas

2D-TuP3 Nitrogen-Doped Graphene on Cu(111): Edge-Guided Doping Process and Doping-Induced Variation of Local Work Function, *J. Neilson, H. Chinkezian, H. Phirke, A. Osei-Twumasi,* California State University, Northridge; *Y. Li,* Peking University, China; *C. Chichiri,* California State University, Northridge; *J. Cho,* Myongji University, Korea; *K. Palotás,* Hungarian Academy of Sciences, Hungary; *L. Gan,* Peking University, China; *S.J. Garrett, K.C. Lau,* California State University, Northridge; ***Li Gao***, California State University Northridge

2D-TuP4 Vibrational Progression of a Single Hydrocarbon Molecule on Graphene and Hexagonal Boron Nitride, ***Alexander Mehler***, *N. Néel, J. Halle,* Technische Universität Ilmenau, Germany; *M.L. Bocquet,* École normale supérieure, PSL University, Sorbonne Université, CNRS, France; *J. Kröger,* Technische Universität Ilmenau, Germany

2D-TuP5 Synthesis of Layered PdS_2 Film and Homo-junction Device Fabrication, *C.-A. Jong,* TSRI/NARL, Taiwan, Republic of China; *Y. Yang,* NTNU, Taiwan, Republic of China; *M.-H. Le,* NTHU, Taiwan, Republic of China; *P.-S. Chen,* MUST, Taiwan, Republic of China; ***Chien-Bao Lin***, *P.-K. Chiu, C.-N. Hsiao,* TIRI/NARL, Taiwan, Republic of China

2D-TuP6 NanoESCA III: Momentum Microscopy on 2D Materials, ***Marten Patt***, Scienta Omicron GmbH, Germany; *N. Weber, M. Escher, T.-J. Kuehn, M. Merkel,* FOCUS GmbH, Germany

2D-TuP7 Shifting of Electronic States of Meso-tetrakis(pentafluorophenyl) Porphyrin Self-assembled Monolayers Due to Internal Molecular Structure, ***Jose Ortiz-Garcia***, *M. Wolf, M. Guberman-Pfeffer, J. Gascon, D. Thuita, C. Brückner, R.C. Quardokus,* University of Connecticut

2D-TuP8 Reproducibility and Replicability in Science and Engineering: A Report by the National Academies, ***Jennifer Heimberg***, National Academies of Sciences, Engineering, and Medicine

2D-TuP9 Structural and Electronic Properties of Native Point Defects in $MoTe_2$, ***Ziling Deng***, *S.M. Mueller, W. Windl, J.A. Gupta,* The Ohio State University

2D-TuP10 A Role of Au Atoms on Oxidized Black Phosphorus; Study using Scanning Photoelectron Microscopy, *D. Kim, H. Choi,* ***Jaeyoon Baik***, Pohang Accelerator Laboratory, Republic of Korea

2D-TuP11 Growth and Electrical, Nano-Optical Characterization of semiconducting MoS_2/WS_2 in-plane Heterostructures, ***Sourav Garg***, *P.K. Kung, S.M. Kim,* The University of Alabama; *A. Krayev,* Horiba Scientific, Novato

2D-TuP12 Identifying Key Parameters for the Uniformity of Nanopatterning on 2D Highly Oriented Pyrolytic Graphite Layers, ***James Su***, Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan, Republic of China

Biomaterial Interfaces Division
Room Union Station B - Session BI-TuP
Biomaterial Interfaces Posters/Flash Session
6:30pm

BI-TuP1 Combining Geometry of Folded Paper with Liquid-Infused Polymer Surfaces to Concentrate and Localize Complex Solutions, ***Daniel Regan***, *C. Lilly, A. Weigang, L. White, E. LeClair, C. Howell,* University of Maine

BI-TuP2 Photoinduced Amphiphilic Zwitterionic Carboxybetaine Polymer Coatings with Marine Antifouling Properties, ***Florian Victor Koschitzki***, *A. Rosenhahn,* Ruhr-University Bochum, Germany

BI-TuP3 Peptide sequences with Ultra-Low Nonspecific Protein Adsorption and Resistance Against Marine Biofouling, ***Cindy Denise Beyer***, *M. Reback,* Ruhr-University Bochum, Germany; *J.A. Finlay,* Newcastle University, UK; *S. Gopal,* Ruhr-University Bochum, Germany; *A.S. Clare,* Newcastle University, UK; *L. Schäfer, N. Metzler-Nolte, A. Rosenhahn,* Ruhr-University Bochum, Germany

BI-TuP4 The Effect of Surface Charge and Film Hydration on the Antifouling Performance of Polyelectrolyte Multilayers, ***Thuvarakhan Gnanasampanthan***, Ruhr University Bochum, Germany; *A. Rosenhahn,* Ruhr-University Bochum, Germany

BI-TuP5 Mass Spectrometric Determination of Active Adsorption sites of soil organic Carbon on Clay Mineral Surface, ***Zihua Zhu***, *L. Huang,* Pacific Northwest National Laboratory; *W. Liu,* China University of Geosciences, Wuhan

BI-TuP6 Blood Compatible Coating using Tethered Heparin to Reduce Coagulation in Microfluidic Devices, ***Ryan Faase***, *W. Prusinski, KS. Schilke, A. Higgins, J.E. Baio,* Oregon State University

BI-TuP7 Analysing the Sequestration of Pro-inflammatory Chemokines into Immuno-modulating Hydrogels using ToF SIMS, ***Nicholas Dennison***, *R. Zimmermann, M. Nitschke, V. Magno, U. Freudenberg, C. Werner,* Leibniz Institute of Polymer Research Dresden, Germany

MEMS and NEMS Group
Room Union Station B - Session MN-TuP
MEMS and NEMS Poster Session
6:30pm

MN-TuP1 Multimodal & Multifunctional Soft Sensors for Electronic Textiles, ***Ashish Kapoor***, *T.K. Ghosh, A. Bozkurt,* North Carolina State University

Complex Oxides: Fundamental Properties and Applications Focus Topic
Room Union Station B - Session OX-TuP
Complex Oxides: Fundamental Properties and Applications Poster Session
6:30pm

OX-TuP1 Electrical and Structural Properties of p-type Transparent Conducting $La_{2/3}Sr_{1/3}VO_3$ Thin Films Grown Using RF Sputtering Deposition, *D.H. Jung, Y.J. Oh, H.S. So,* ***Hosun Lee***, Kyung Hee University, Republic of Korea

OX-TuP2 van der Waals Heterostructures of Graphene and β-Ga_2O_3 Nanoflake for Enhancement Mode MESFETs and Logic Applications, ***Janghyuk Kim***, *J.H. Kim,* Korea University, Republic of Korea

OX-TuP3 Structure and Reactitvity of a Magnetite-Terminated Hematite Surface with Oxygen Adatoms Formed by Self-Oxidation, ***Constantin Walenta***, *F. Xu, W. Chen, C.R. O'Connor, C.M. Friend,* Harvard University

Plasma Science and Technology Division
Room Union Station B - Session PS-TuP
Plasma Science and Technology Poster Session
6:30pm

PS-TuP2 Low-temperature Atmospheric Plasma Deposition of Photocatalytic Doped Anatase TiO_2 Coatings on Polymer Substrates, *K. Baba, M. Quesada-Gonzalez, S. Bulou, P. Choquet,* ***Nicolas Boscher***, Luxembourg Institute of Science and Technology, Luxembourg

PS-TuP3 Radical Nitriding of Silicon Surface Promoted by Surface Plasmon Resonance of Gold Nanoparticle Catalyst, ***Machiko Miyake***, *T. Kitajima, T. Nakano,* National Defense Academy, Japan

PS-TuP4 Development and Characterization of a Small-Scale Helical Dielectric Barrier Discharge for Studying Plasma-Surface Interactions, ***Nazli Turan***, *P.M. Barboun, W.F. Schneider, J.C. Hicks, D.B. Go,* University of Notre Dame

PS-TuP5 Characteristics of Magnetized High Density Plasma and its Applications, ***Jung-Hyung Kim***, *H.C. Lee, D.J. Seong,* Korea Research Institute of Standards and Science, Republic of Korea

PS-TuP6 The Effect of Ionic Strength on the Absorption Spectrum of Plasma-Injected Solvated Electrons, ***Daniel Martin***, *H.E. Delgado, D.M. Bartels, P. Rumbach, D.B. Go,* University of Notre Dame

PS-TuP7 Inductively Coupled Plasma Reactive Ion Etching of Copper Thin Film using Organic Chemicals and Alcohols, ***Moon Hwan Cha***, *E.T. Lim, J.S. Ryu, C.W. Chung,* Inha University, Republic of Korea

PS-TuP8 High Resolution Quadrupole Mass Spectrometry Analysis for Fusion Reactor and Plasma Facing Materials, *G. Thier,* ***Brian Regel***, *L. Kephart,* Extrel CMS

PS-TuP9 Controlled Layer-by-Layer Etching of Copper Thin Films, ***Eun Taek Lim***, *J.S. Ryu, M.H. Cha, C.W. Chung,* Inha University, Republic of Korea

PS-TuP10 Effects of Bias on Quasi-Atomic Layer Etching of Silicon Dioxide by Cyclic Ar/C_4F_8/O_2 and Ar Plasmas, ***Xifeng Wang***, University of Michigan; *M. Wang, A. Mosden, P.E. Biolsi,* TEL Technology Center, America, LLC; *M.J. Kushner,* University of Michigan

PS-TuP11 Electron Beam Generated Produced Plasmas Produced in Oxygen: Measurements and Simulations, ***Scott Walton***, *D.R. Boris,* U.S. Naval Research Laboratory; *S. Rauf,* Applied Materials, Inc.

PS-TuP12 Silicon Micro-Channel Definition Via ICP Plasma Etching Process Using Different Hard Masks, *H.S. Alvarez, J.A. Diniz, C.S. Ruiz, A.R. Silva, F.H. Cioldin,* UNICAMP, Brazil; ***Valter S.N. Junior,*** USP - EESC, Brazil

PS-TuP13 Corrosion Barrier Coatings for Aerospace Materials Deposited by Atmospheric Pressure CVD, ***Dhruval Patel***, *Z. Jeckell, T. Choi, D.E. Barlaz, L. Bonova, D.V. Krogstad, D.N. Ruzic,* University of Illinois at Urbana-Champaign; *S. Chaudhuri,* University of Illinois at Chicago

PS-TuP14 Atmospheric Pressure Plasma: An Alternative Tool for the Synthesis of Efficient Photocatalytic Materials, ***Amal Sebastian***, University of Notre Dame

PS-TuP15 Synthesis of Functional Polydopamine using Atmospheric Pressure Plasmas, ***Yun Jong Jang***, *M.K. Mun, J.E. Kim, D.W. Kim, G.Y. Yeom,* Sungkyunkwan University, Republic of Korea

PS-TuP16 Effect of C_x(x=4~7)F_8 on the Etch Properties in Inductively Coupled Plasmas, ***Hyun Woo Tak***, *D.I. Sung, Y.J. Shin, D.W. Kim, G.Y. Yeom,* Sungkyunkwan University, Republic of Korea

PS-TuP17 Effect of Surface Charge Accumulation on Ion Current Distribution in Radio-frequency Magnetron Discharges, ***Bocong Zheng***, *K.L. Wang, T. Schuelke,* Fraunhofer USA; *Q.H. Fan,* Michigan State University

PS-TuP18 The Research of a Oxide Thin Films to be Etched Process Under Cryogenic Conditions, ***Sang-Beom Han***, Samsung Electronic Company, Republic of Korea

PS-TuP19 Plasma Etching High Aspect Ratio Carbon Nanotube Structures for a Neural Probe, ***Spencer Roberts***, *G. Chen,* Brigham Young University

PS-TuP20 NO_x Fixation by Atmospheric Pressure N_2/O_2 Filamentary DBD Plasma over Water: Physicochemical Mechanisms of Plasma-Liquid interactions, ***Nepal Roy***, *C. Pattyn,* Université libre de Bruxelles, Belgium; *A. Remy, N. Maira, F. Reniers,* Université Libre de Bruxelles, Belgium

PS-TuP21 Simulation Study of Capacitively Coupled Radio Frequency Silane/Hydrogen Plasma Discharges - Effect of Tailored Voltage Waveforms, *S.W. Huang,* ***Keh-Chyang Leou***, National Tsing Hua University, Taiwan, Republic of China

Surface Science Division
Room Union Station B - Session SS-TuP
Surface Science Poster Session, 6:30pm

SS-TuP1 Mechanistic Studies of Thermal Dry Etching of Cobalt and Iron Thin Films, ***Mahsa Konh***, *A.V. Teplyakov,* University of Delaware

SS-TuP2 Reaction of ZnO Nanomaterial with a Mixture of Gas-phase Prop-2-ynoic acid and Acetic Acid to Control Surface Coverage of Reactive Functional Groups, ***Dhamelyz Silva-Quinones***, *A.V. Teplyakov,* University of Delaware

SS-TuP3 Platinum Deposition onto OH-terminated Si (100) and Boron-impregnated Si (100) Substrates, ***Sana Rani***, *C. Byron, A.V. Teplyakov,* University of Delaware

SS-TuP4 Barium Adsorption and De-wetting on W(112), ***Michael Mroz***, Ohio University; *S.A. Tenney, C. Eads,* Brookhaven National Laboratory; *E. Kordesch,* Ohio University

SS-TuP5 Self-Catalyzed Gas-Phase Cycloaddition on "Clickable" Nanostructured CuO Surface, ***Chuan He***, *A.V. Teplyakov,* University of Delaware

SS-TuP6 XPS Study of the Gas Cluster Ion Beam Sputtering of PTFE and Oxygen-treated PTFE, ***Bing Luo***, University of Minnesota

SS-TuP7 Ultra-high Resolution Imaging of Polymers using Atomic Force Microscopy: Structure and Property at Nanoscale, *V.V. Korolkov,* Oxford Instruments-Asylum Research; *A. Summerfield,* University of Manchester, UK; *A. Murphy, D. Amabilino,* University of Nottingham, UK; *P.H. Beton,* The University of Nottingham, UK; *M. Kocun,* ***Roger Proksch***, Oxford Instruments-Asylum Research

SS-TuP9 Determining the Surface Electrical Potential at the Air/Water Interface, ***Tehseen Adel***, *S. Baumler, H.C. Allen,* The Ohio State University

SS-TuP10 Surface Photovoltage Studies of UV-driven Hydrophilic Flipping in Polysulfone Thin Films, ***John Reeks***, *N. Posinski,* Texas Christian University; *T. Haun,* Home School High School Student; *H. Hilton,* Texas Christian University; *A. Dorward,* Washington and Lee University; *E. Bormashenko,* Ariel University, Israel; *Y.M. Strzhemechny,* Texas Christian University

SS-TuP11 Tuning Spontaneous Supramolecular Assembly *via* Manipulation of Intermolecular Forces and Growth Environment, ***Ryan Brown***, Clarkson University

SS-TuP12 State-Resolved Dissociative Chemisorption Dynamics with RAIRS Product Detection, ***Laurin Joseph***, *S. Shepardson-Fungairino, A.L. Utz,* Tufts University

SS-TuP13 The Two-faced Role of Steps in the Isotopic Scrambling of Hydrogen on Pt, ***Richard van Lent***, *L.B.F. Juurlink,* Leiden University, Netherlands

SS-TuP14 It's Not just the Defects - How Terrace Symmetry Impacts H_2O Adsorption at Ag Step Edges, *S.V. Auras,* ***Ludo Juurlink***, Leiden University, Netherlands

SS-TuP15 Hydration Lubrication Between Hydrophobic and Hydrophilic Surfaces, ***Nir Kampf***, *I. Rosenhek-Goldian, W. Lin, J. Klein,* Weizmann Institute of Science, Israel

SS-TuP17 Common Errors in XPS Peak Fitting, ***George H. Major***, Brigham Young University; *C. Easton,* CSIRO Manufacturing; *W. Skinner,* Future Industries Institute; *D.R. Baer,* Pacific Northwest National Laboratory; *M.R. Linford,* Brigham Young University

SS-TuP18 Exploring the Extent of Hydrogen/Deuterium Exchange on Au(111) between Molecularly-bound Surface Species, ***Hasan Kaleem***, *E. Maxwell, M. DePonte, J. Baker, M. Gillum, D.T. Boyle, A.E. Baber,* James Madison University

SS-TuP19 First–Principles Study of on-surface and Sub-surface Oxygen in Rh(111), ***Kate Fanning***, *W. Walkosz,* Lake Forest College; *J. Garcia, H. Iddir,* Argonne National Laboratory; *D.R. Killelea,* Loyola University Chicago

SS-TuP20 STM/S Study of Domain Walls and Atomic Defects on the Surface of Iron-based Superconductors, ***Zhuozhi Ge***, *Q. Zou, M. Fu, L. Sanjeewa, A. Sefat, Z. Gai,* Oak Ridge National Laboratory

MORT TRAUM FINALISTS

HC+SS+TL-ThA10 (SS-TuP21) Fundamental Insights into Hydrocarbon Conversion Mechanisms in Lewis and Brønsted Acid Zeolites using Temporal Analysis of Products, ***Hari Thirumalai***[1], *J.D. Rimer, L.C. Grabow,* University of Houston

SS+AS+HC+OX-WeA3 (SS-TuP22) Surface Reactivity of PtAg and PdAg: From Single-Atom Alloys to Supported Nanoparticles, ***Dipna Patel***[23], Tufts University; *C.R. O'Connor, R.J. Madix, C.M. Friend,* Harvard University; *E.C.H. Sykes,* Tufts University

SS+AS+HC+OX-WeA9 (SS-TuP23) Coordination Defines Reactivity of a Model Single-atom Catalyst: $Ir_1/Fe_3O_4(001)$, ***Zdenek Jakub***[1], *J. Hulva, M. Meier, U. Diebold, G.S. Parkinson,* TU Wien, Austria

SS+HC-MoA10 (SS-TuP24) Two-Dimensional Polymorphism as a Result of Non-Equilibrium Self-Assembly, ***Angela Silski***[4], *J. Petersen,* University of Notre Dame; *R.D. Brown,* Clarkson University; *S.A. Kandel,* University of Notre Dame

SS+2D+AP+AS+OX+SE-ThA1 (SS-TuP25) Adsorption, Reaction, and Diffusion of Energetic Reagents on Morphologically Diverse Thin Films, ***Rebecca Thompson***[56], *M.R. Brann, S.J. Sibener,* The University of Chicago

HC+SS-MoM5 (SS-TuP26) The Apparent Activation Energy for Complex Mechanisms: A Simple Relationship via Degrees of Rate Control, ***Zhongtian Mao***[78], *C.T. Campbell,* University of Washington

[1] **Morton S. Traum Award Finalist**
[2] **Morton S. Traum Award Finalist**
[3] **National Student Award Finalist**
[4] **Morton S. Traum Award Finalist**
[5] **Morton S. Traum Award Finalist**
[6] **National Student Award Finalist**
[7] **Morton S. Traum Award Finalist**
[8] **Heterogeneous Catalysis Graduate Student Presentation Award Finalist**

Vacuum Technology Division
Room Union Station B - Session VT-TuP
Vacuum Technology Poster Session
6:30pm

VT-TuP1 Dynamic High Pressure Technique for Surface Analysis of Gas Sensors in Quasi-operating Condition, ***Taku Suzuki***, *Y. Adachi, I. Sakaguchi,* National Institute for Materials Science (NIMS), Japan

VT-TuP2 Fundamental Study for Practical Applications of Ti-Zr-V NEG Coating to General Vacuum Systems, ***Makoto Okano***, *A. Niwata, S. Kitamura,* JEOL Ltd., Japan; *Y. Tanimoto, X. Jin, M. Yamamoto, T. Honda,* High Energy Accelerator Research Organization (KEK), Tsukuba, Japan

VT-TuP3 Fabrication and Characterization of a Variable Conductance Vacuum Valve to Control Pressure Level for a High Vacuum System, ***Han Wook Song***, *S.Y. Woo,* Korea Research Institute of Standards and Science, Republic of Korea

VT-TuP4 Hellum Gas Transmission Rate of Elastomer Seal with a Back-up Ring Seal, ***Masaharu Miki,*** EM Technical Lab Inc., Japan; *S. Nowatari, H. Hanada,* IIDA Co., Ltd, Japan

VT-TuP5 Improved NEG Sputter Deposition System, ***Philip Adderley***, *M.L. Stutzman,* Jefferson Lab

VT-TuP7 Quantitative Gas Analysis with Quadrupole Mass Spectrometers - Comparison and Limitations, ***Gregory Thier***, *L. Kephart,* Extrel CMS; *T. Whitmore,* Henniker Scientific

VT-TuP8 Recent Developments of Home-made UHV SPM Systems and their Applications, ***Qing Huan***, *Z.B. Wu, R.S. Ma, G. He, Z.Y. Gao, L.H. Bao, J. Yuan, K. Jin, H.-J. Gao,* Institute of Physics CAS, China

VT-TuP9 An Experimentally Backed Modeling of NEG Pump Operation During Saturation, ***Derek Hammar***, Coe College; *Y. Lushtak,* Cornell University

VT-TuP10 3D printed Mini-Channel Plates – Vacuum Compatibility and Detector Performance, ***Maram Alnahhas***, *J.F. Moore,* Robot Nose Corporation

Special Events Wednesday

6:15 AM	AVS 39th Annual 5 km Run (Register at the 5 km Booth before Wednesday)/TBD-Offsite
7:00 AM	Member Center: Free Coffee for 2019 AVS Members/A111-112
7:00 AM	Strategic Planning Committee Meeting & Breakfast/Pierce A-Hilton (by invitation)
7:30 AM	AVS Diversity & Inclusion Committee Meeting & Breakfast/Gallerie Bistro-Lamp-Hilton (by invitation)
8:30 AM	Short Course Programs—Various Rooms (See Registration Desk)
9:00 AM	AVS Member Center: "One Hour with the National Academies: From Manufacturing Innovation to Quantum Consulting"/A111-112
10:00 AM	AVS Career Center: "One-on-One Career Expert Advice -- Pre-Registration Required in Member Center, A111-112/Hall A
10:00 AM	Session Coffee Break/Hall A
12:20 PM	Exhibit Hall Lunch/Hall A
12:20 PM	NSTD Graduate Student and Postdoc Award Competitions/A222
12:20 PM	PSTD Coburn and Winters Adjudication Session (Closed Session)/B131 (by invitation)
12:30 PM	AVS Member Center: "Keeping Current and Connected Lunch"/A111-112
12:30 PM	Governance Committee Meeting and Lunch/Gallerie Bistro-Lamp-Hilton (by invitation)
12:30 PM	PacSurf Committee Meeting & Lunch/Gallerie Bistro - Fireplace-Hilton (by invitation)
1:00 PM	Biointerphases Strategic Planning Meeting/Schille Boardroom-Hilton (by invitation)
2:30 PM	AVS Career Center: SIGN UP:**One-on-One Career Expert Advice at the Career Center (Booth #146) -- Pre-Registration Required in Member Center, A111-112/Hall A
3:40 PM	Session Refreshment Break/Hall A
4:30 PM	Exhibitors & Manufacturers' Reception (Invitation Only)/Hall A (by invitation)
6:30 PM	AVS Awards Ceremony & Reception/Battelle North

Wednesday Morning, October 23, 2019

	Biomaterial Interfaces Division **Room A120-121 - Session BI+AS-WeM** **Microbes and Fouling at Surfaces** **Moderators:** David G. Castner, University of Washington, Kenan Fears, U.S. Naval Research Laboratory	**Thin Films Division** **Room A122-123 - Session TF1-WeM** **Vapor Deposition of Functional Polymer Thin Films and Composites** **Moderators:** Adrienne Stiff-Roberts, Duke University, John (Jack) Lyons, U.S. Naval Research Laboratory
8:00am	**BI+AS-WeM1** Hydrophilic Polysaccharides as Building Blocks for Marine Fouling-release Coatings, ***Axel Rosenhahn***, *V. Jakobi, X. Cao, W. Yu, T. Gnanasampanthan, R. Wanka, J. Schwarze, J. Koc,* Ruhr-University Bochum, Germany; *M. Grunze,* Heidelberg University, Germany; *J.A. Finlay, A.S. Clare,* Newcastle University, UK; *K.Z. Hunsucker, G.E. Swain,* Florida Institute of Technology	**INVITED: TF1-WeM1** Durable Surface Energy Control with Initiated Chemical Vapor Deposited (iCVD) Polymers, ***Karen Gleason***, Massachusetts Institute of Technology
8:20am	**BI+AS-WeM2** A Microfluidic Assay to Test the Adhesion of the Marine Bacterium *Cobetia Marina* Under Dynamic Shear Conditions, ***Jana Schwarze***, *K.A. Nolte, R. Wanka, V. Jakobi, A. Rosenhahn,* Ruhr-University Bochum, Germany	Invited talk continues.
8:40am	**INVITED: BI+AS-WeM3** Biofilm Mechanics as a Mechanism for Survival on Surfaces from Medical Device to Ship Hulls, ***Paul Stoodley***, Ohio State University	**TF1-WeM3** Initiated Chemical Vapor Deposition of poly(N-vinylcaprolactam)-based Cross-linked Smart Hydrogel Thin Films with Tunable Temperature-responsive Swelling Behavior, ***Fabian Muralter***, *A. Perrotta, A.M. Coclite,* Graz University of Technology, Austria
9:00am	Invited talk continues.	**TF1-WeM4** Enhancing the Key Properties of CVD Polymer Thin Films for Device Fabrication, ***Xiaoxue Wang***, The Ohio State University; *K.K. Gleason,* Massachusetts Institute of Technology
9:20am	**BI+AS-WeM5** Dendritic Polyglycerols as Fouling-release Coatings Against Marine Hard- and Soft Fouler, ***Robin Wanka***, Ruhr-University Bochum, Germany; *N. Aldred, J.A. Finlay,* Newcastle University, UK; *K.A. Nolte, J. Koc,* Ruhr-University Bochum, Germany; *H. Gardner, K.Z. Hunsucker, G.E. Swain,* Florida Institute of Technology; *C. Anderson, A.S. Clare,* Newcastle University, UK; *A. Rosenhahn,* Ruhr-University Bochum, Germany	**TF1-WeM5** Conductive Directly Fused Poly (Porphyrin) Coatings by an Oxidative Chemical Vapour Deposition Approach, ***Kamal Baba***, *G. Bangasi, G. Frache, D. El Assad, J. Desport,* Luxembourg Institute of Science and Technology, Luxembourg; *K. Heinze,* Johannes Gutenberg University of Mainz, Germany; *N.D. Boscher,* Luxembourg Institute of Science and Technology, Luxembourg
9:40am	**BI+AS-WeM6** Nano- and Microscale ZnO with Controllable Abundance of Surface Polarity as a Platform to Study Antibacterial Action., *J.M. Reeks, B. Thach,* Texas Christian University; *W. Moss,* Texas State University; *R. Maheshwari,* Texas Academy of Mathematics and Science; *I. Ali, S.M. McGillivray,* ***Yuri Strzhemechny***, Texas Christian University	**TF1-WeM6** Molecular Design and Vapor Phase Synthesis of Crown-Ether-Based Thin Film Materials, ***Darrin Liau***, *G.W. Rubloff, S.B. Lee, K. Gregorczyk,* University of Maryland, College Park
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**BI+AS-WeM10** Patterning Bacteria at Interfaces with Bio-Inspired Vascularized Polymers, *K. Marquis, B. Chasse,* ***Caitlin Howell***, University of Maine	**TF1-WeM10** Chemical Insolubility of Vapor Phase Infiltrated Poly(methyl methacrylate) / AlOx Hybrid Materials, ***Emily McGuinness***, *C.Z. Leng, M.D. Losego,* Georgia Institute of Technology
11:20am	**BI+AS-WeM11** Chemical Imaging of Root-Microbe Interactions, ***Vaithiyalingam Shutthanandan***, *A. Martinez, R. Boiteau,* Pacific Northwest National Laboratory	**TF1-WeM11** Atomic and Molecular Layer Deposition of Hybrid Mo-thiolate Thin Films, ***Jingwei Shi***, *C. MacIsaac, L. Zeng, S.F. Bent,* Stanford University
11:40am	**BI+AS-WeM12** Biocompatible Silver Nanoparticles-loaded Chitosan Membranes with Antibacterial Activity Produced by Directed Liquid-Plasma Nanosynthesis, ***Camilo Jaramillo***, *A.F. Civantos, A. Mesa, J.P. Allain,* University of Illinois at Urbana-Champaign	**TF1-WeM12** Electroactive Thin Films of Conjugated Polymers: Energy Conversion and Storage, ***Shayan Kaviani***, *E. Tavakoli, S. Nejati,* University of Nebraska-Lincoln
12:00pm	**BI+AS-WeM13** Multifunctional 2D MoS 2 -Based Nanoplatform for Multimodal Synergistic Inactivation of Superbugs, ***Paresh Ray***, Jackson State University	**TF1-WeM13** Promotion of Crystalline Polyfluorene Domains in Thin Films Deposited by RIR-MAPLE, ***Spencer Ferguson***, *B. Zhang, A.D. Stiff-Roberts,* Duke University

Wednesday Morning, October 23, 2019

	New Challenges to Reproducible Data and Analysis Focus Topic Room A124-125 - Session RA+AS+CA+PS+TF-WeM Reproducibility in Science and Engineering, Including Materials and Energy Systems **Moderators:** Karen Gaskell, Univ. of Maryland, College Park, Svitlana Pylypenko, Colorado School of Mines	Magnetic Interfaces and Nanostructures Division Room A210 - Session MI+2D-WeM Emerging Multifunctional Magnetic Materials I and Magnetocaloric Materials **Moderator:** Greg Szulczewski, University of Alabama
8:00am	**INVITED: RA+AS+CA+PS+TF-WeM1** Reproducibility and Replicability in Science and Engineering: a Report by the National Academies, ***Dianne Chong***, Boeing Research and Technology (Retired)	**MI+2D-WeM1** Spin-dependent Electron Reflection at Materials with Strong Spin-orbit Interaction, ***Markus Donath***, *C. Angrick, A. Reimann, C. Datzer, A. Blob,* Muenster University, Germany; *J. Braun,* LMU München,, Germany; *H. Ebert,* LMU München, Germany
8:20am	Invited talk continues.	**MI+2D-WeM2** Competitive and Cooperative Electronic States in $Ba(Fe_{1-x}T_x)_2As_2$, *Q. Zou, M. Fu, Z. Wu, L. Li, A.-P. Li, D.S. Parker, A. Safat,* ***Zheng Gai***, Oak Ridge National Laboratory
8:40am	**INVITED: RA+AS+CA+PS+TF-WeM3** Directly Assessing Reproducibility in Materials Chemistry Research Using Literature Meta-analysis, ***David Sholl***, Georgia Institute of Technology	**INVITED: MI+2D-WeM3** Microscopic Origin of High Temperature Magnetism in Multiferroic Superlattices $(LuFeO_3)_m/(LuFe_2O_4)_1$, ***Janice Musfeldt***, *S. Fan, K.A. Smith,* University of Tennessee Knoxville; *H. Das, A.F. Rebola,* Cornell University; *B.S. Holinsworth,* University of Tennessee Knoxville; *J.A. Mundy,* University of California at Berkeley; *C. Brooks, M. Holtz,* Cornell University; *R. Ramesh,* University of California at Berkeley; *D.A. Muller, D.G. Schlom, C.J. Fennie,* Cornell University; *S.A. McGill,* National High Magnetic Field Laboratory
9:00am	Invited talk continues.	Invited talk continues.
9:20am	**INVITED: RA+AS+CA+PS+TF-WeM5** Reproducibility in Fundamental and Applied Science, ***George Crabtree***, Argonne National Laboratory, University of Illinois at Chicago	**INVITED: MI+2D-WeM5** Hidden Local Spin-polarized Electronic States investigated by Spin- and Angle-resolved Photoelectron Spectroscopy, ***Taichi Okuda***, Hiroshima University, Japan
9:40am	Invited talk continues.	Invited talk continues.
10:00am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
10:20am		
10:40am		
11:00am	**RA+AS+CA+PS+TF-WeM10** Representativeness of a TEM image for Revealing New Phenomenon in Energy Storage Materials, ***Chongmin Wang***, Pacific Norththwest National Laboratory; *D.R. Baer,* Pacific Northwest National Laboratory	**INVITED: MI+2D-WeM10** Compositional Tuning of Magnetic Exchange Interactions and Interpretation of the Pressure Dependence of the Magnetic Curie Temperature in High Entropy Alloys., ***Michael Mchenry***, Carnegie Mellon University
11:20am	**RA+AS+CA+PS+TF-WeM11** Reproducibility Issues when Developing Catalysts for Fuel Cell Applications, *M.J. Dzara, S.F. Zaccarine,* Colorado School of Mines; *K. Artyushkova,* Physical Electronics and University of New Mexico; ***Svitlana Pylypenko***, Colorado School of Mines	Invited talk continues.
11:40am	**INVITED: RA+AS+CA+PS+TF-WeM12** Challenges in Multimodal Spectroscopic Analysis of Energy Storage Materials, ***Vijayakumar Murugesan***, Pacific Norththwest National Laboratory; *K.T. Mueller,* Joint Center for Energy Storage Research (JCESR)	**MI+2D-WeM12** Epitaxy of Novel $Co_{1.5}Ti_{0.5}FeGe$ Heusler Alloy Thin Films, ***Shambhu KC***[1], *R. Mahat, T.J. Evans, S. Budhathoki, G.J. Mankey, A. Gupta, P. LeClair,* The University of Alabama
12:00pm	Invited talk continues.	**MI+2D-WeM13** Spin Transport in NiO Measured with Ferromagnetic Resonance, *G.J. Mankey, T.J. Evans, S. KC,* ***Arjun Sapkota***, *T. Mewes,* The University of Alabama

[1] **Falicov Student Award Finalist**

	Spectroscopic Ellipsometry Focus Topic **Room A212 - Session EL+AS+EM+TF-WeM** **Optical Characterization of Thin Films and Nanostructures** **Moderators:** Eva Bittrich, Leibniz Institute of Polymer Research Dresden, Tino Hofmann, University of North Carolina at Charlotte	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Room A213 - Session HC+2D+SS-WeM** **Exotic Nanostructured Surfaces for Heterogeneously-Catalyzed Reactions** **Moderators:** Ashleigh Baber, James Madison University, Erin Iski, University of Tulsa
8:00am	**EL+AS+EM+TF-WeM1** Enhanced Strong Near Band Edge Emission from Lanthanide Doped Sputter Deposited ZnO, *C.L. Heng,* Beijing Institute of Technology, China*; W. Xiang, T. Wang,* Beijing Institutete of Technology, China*; W.Y. Su,* Beijing Institute of Technology, China*; P.G. Yin,* Beihang University, China*;* ***Terje G Finstad****,* University of Oslo, Norway	
8:20am	**EL+AS+EM+TF-WeM2** Ellipsometry Study of PLD based Temperature Controlled Thin Film Depositions of CdSe on ITO Substrates*,* ***Flavia Inbanathan****,* Ohio University*; M. Ebdah,* King Saud University, Kingdom of Saudi Arabia*; P. Kumar,* Gurukula Kangri Vishwavidyalaya, India*; K. Dasari,* Texas State University*; R.S. Katiyar,* University of Puerto Rico*; W.M. Jadwisienczak,* Ohio University	**HC+2D+SS-WeM2** Selective Alkane Chemistry on IrO_2(110) Surfaces*,* ***Aravind Asthagiri****, M. Kim,* The Ohio State University*; J.F. Weaver,* University of Florida
8:40am	**INVITED: EL+AS+EM+TF-WeM3** The Application of Mueller Matrix Spectroscopic Ellipsometry to Scatterometry Measurement of Feature Dimension and Shape for Integrated Circuit Structures*,* ***Alain C. Diebold****,* SUNY Polytechnic Institute	**INVITED: HC+2D+SS-WeM3** Design of Nanostructured Catalysts for Better Performance*,* ***Francisco Zaera****,* University of California, Riverside
9:00am	Invited talk continues.	Invited talk continues.
9:20am	**EL+AS+EM+TF-WeM5** Optical Constants and Thickness of Ultrathin Thermally Evaporated Iron Films*,* ***Nick Allen****, D.S. Shah, R.R. Vanfleet, M.R. Linford, R.C. Davis,* Brigham Young University	**HC+2D+SS-WeM5** Characterization of a Pd/Ag(111) Single Atom Alloy Surface Using CO as a Probing Molecule for H_2 Dissociation*,* ***Mark Muir****, M. Trenary,* University of Illinois at Chicago
9:40am	**EL+AS+EM+TF-WeM6** Birefringent Photonic Crystals for Polarization-discriminatingInfrared Focal Plane Arrays*,* ***Marc Lata****, Y. Li, S. Park, M.J. McLamb, T. Hofmann,* University of North Carolina at Charlotte	**HC+2D+SS-WeM6** Propyne Hydrogenation over a Pd/Cu(111) Single Atom Alloy Catalyst Studied with Infrared Spectroscopy*,* ***Mohammed Abdel-Rahman****, M. Trenary,* University of Illinois at Chicago
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**EL+AS+EM+TF-WeM10** Relevance of hidden Valleys in the Dequenching of Room-temperature-emitting Ge Layers*, T. Sakamoto, Y. Yasutake,* University of Tokyo, Japan*; J. Kanasaki,* Osaka City University, Japan*;* ***Susumu Fukatsu****,* University of Tokyo, Japan	**INVITED: HC+2D+SS-WeM10** "Single-Atom" Catalysis: How Structure Influences Reactivity*,* ***Gareth S. Parkinson****,* TU Wien, Austria
11:20am	**INVITED: EL+AS+EM+TF-WeM11** Spectroscopic Ellipsometry on Organic Thin Films - From in-situ Bio-sensing to Active Layers for Organic Solar Cells*,* ***Eva Bittrich****, P. Uhlmann, K.-J. Eichhorn,* Leibniz Institute of Polymer Research Dresden, Germany*; M. Schubert,* University of Nebraska-Lincoln, Linköping University, Sweden, Leibniz Institute of Polymer Research Dresden, Germany*; M. Levichkova, K. Walzer,* Heliatek GmbH, Germany	Invited talk continues.
11:40am	Invited talk continues.	**HC+2D+SS-WeM12** Oxidation Reactions on Rh(111)*,* ***Marie Turano****, G. Hildebrandt,* Loyola University Chicago*; R.G. Farber,* The University of Chicago*; D.R. Killelea,* Loyola University Chicago
12:00pm	**EL+AS+EM+TF-WeM13** Optical Dielectric Function of Si(bzimpy)2 – A Hexacoordinate Silicon Pincer Complex Determined by Spectroscopic Ellipsometry*,* ***Yanzeng Li****, M. Kocherga, S. Park, M. Lata, M.J. McLamb, G.D. Boreman, T.A. Schmedake, T. Hofmann,* University of North Carolina at Charlotte	**HC+2D+SS-WeM13** Adsorption and Motion of Atomic Oxygen on the Surface and Subsurface of Ag(111) and Ag(110)*, S.B. Isbill, C.J. Mize, L.D. Crosby,* ***Sharani Roy****,* University of Tennessee Knoxville

	Electronic Materials and Photonics Division **Room A214 - Session EM+2D+AS+MI+MN+NS+TF-WeM** **Nanostructures and Nanocharacterization of Electronic and Photonic Devices** **Moderators:** Sang M. Han, University of New Mexico, Jason Kawasaki, University of Wisconsin - Madison	**2D Materials** **Room A216 - Session 2D+AS+MI+NS-WeM** **2D Materials Characterization by Scanning Probe Microscopy and Spectroscopy** **Moderator:** Adina Luican-Mayer, University of Ottawa, Canada
8:00am	**EM+2D+AS+MI+MN+NS+TF-WeM1** Photonic Thermal Conduction in Semiconductor Nanowires, *E.J. Tervo, M.E. Gustafson, Z.M. Zhang, B.A. Cola,* ***Michael A. Filler,*** Georgia Institute of Technology	**2D+AS+MI+NS-WeM1** Plasmon Induced Excitation of Doublet Emission at the Single Molecule Level, ***Alberto Martin-Jimenez,*** *K. Lauwaet,* IMDEA Nanoscience, Spain*; P. Merino, J.I. Martinez,* ICMM-CSIC, Spain*; R. Miranda, R. Otero,* IMDEA Nanoscience, Spain
8:20am	**EM+2D+AS+MI+MN+NS+TF-WeM2** Electric Field-Induced Defect Migration and Dielectric Breakdown in ZnO Nanowires, ***Hantian Gao,*** *M. Haseman,* Department of Physics, The Ohio State University*; H. von Wenckstern, M. Grundmann,* Universität Leipzig, Felix-Bloch-Institut für Festkörperphysik*; L.J. Brillson,* The Ohio State University	**2D+AS+MI+NS-WeM2** Silicene like Domains on $IrSi_3$ Crystallites, ***Nuri Oncel,*** *D. Cakir, F. Fatima, D. Nicholls,* University of North Dakota
8:40am	**EM+2D+AS+MI+MN+NS+TF-WeM3** Characterization of SiGe/Si Multilayer FIN Structures using X-Ray Diffraction Reciprocal Space Maps, ***Roopa Gowda,*** *M. Korde,* SUNY Polytechnic Institute*; M. Wormington,* Jordan Valley Semiconductors Inc.*; A.C. Diebold,* SUNY Polytechnic Institute	**INVITED: 2D+AS+MI+NS-WeM3** Interfacial and Topological Superconductivity in 2D Layers Studied by Spin-Resolved Scanning Tunneling Spectroscopy, ***Roland Wiesendanger,*** University of Hamburg, Germany
9:00am	**EM+2D+AS+MI+MN+NS+TF-WeM4** Nanoscale Depth and Lithiation Dependence of V_2O_5 Band Structure by Cathodoluminescence Spectroscopy, ***Mitchell Walker,*** *N. Pronin,* The Ohio State University*; A. Jarry, J. Ballard, G.W. Rubloff,* University of Maryland, College Park*; L.J. Brillson,* The Ohio State University	Invited talk continues.
9:20am	**INVITED: EM+2D+AS+MI+MN+NS+TF-WeM5** Electron Microscopy of Quantum Materials: From Learning Physics to Atomic Manipulation, ***Sergei Kalinin,*** Oak Ridge National Laboratory	**2D+AS+MI+NS-WeM5** Geometric Imaging of Borophene Polymorphs, ***Xiaolong Liu,*** Northwestern University*; L. Wang,* Rice University*; S. Li, M. Rahn,* Northwestern University*; B. Yakobson,* Rice University*; M.C. Hersam,* Northwestern University
9:40am	Invited talk continues.	**2D+AS+MI+NS-WeM6** Atomic Manipulation of Defects in the Layered Semiconductor 2H-$MoTe_2$, ***Sara Mueller,*** *S. Deng,* The Ohio State University*; B. St. Laurent,* University of New Hampshire*; Y. Wang, W. Windl,* The Ohio State University*; S. Hollen,* University of New Hampshire*; J.A. Gupta,* The Ohio State University
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**EM+2D+AS+MI+MN+NS+TF-WeM10** Hot Electron Emission from Waveguide Integrated Graphene, ***Ragib Ahsan,*** *F.R. Rezaeifar, H.U. Chae, R. Kapadia,* University of Southern California	**2D+AS+MI+NS-WeM10** Scanning Tunneling Microscopy and Spectroscopy of a Heterotriangulene-based 2D Polymer, ***Zachery Enderson,*** *H. Murali, R. Dasari, T.C. Parker, S.R. Marder, H. Li, Q. Dai, S. Thomas, J.-L. Brédas, P.N. First,* Georgia Institute of Technology
11:20am	**EM+2D+AS+MI+MN+NS+TF-WeM11** Imaging Candidate Nanoelectronic Materials with Photoemission Electron Microscopy (PEEM), ***Sujitra Pookpanratana,*** *S.W. Robey,* National Institute of Standards and Technology (NIST)*; T. Ohta,* Sandia National Laboratories	**2D+AS+MI+NS-WeM11** Scanning Tunneling Microscopy Investigations of Molecules Adsrobed on Semiconducting Graphene Nanoribbons, ***Sineth Premarathna,*** *K.Z. Latt, S.-W. Hla,* Ohio University
11:40am	**EM+2D+AS+MI+MN+NS+TF-WeM12** Comparison of Features for Au and Ir Adsorbed on the Ge (110) Surface, ***Shirley Chiang,*** University of California, Davis*; R.K. Xie, H.Z. Xing,* Donghua University, China*; T.S. Rahman,* University of Central Florida*; C.Y. Fong,* University of California, Davis	**2D+AS+MI+NS-WeM12** Molecular Flexure and Atom Trapping with Sexiphenyl Molecules by Scanning Tunneling Microscope Manipulation, *Y. Zhang,* ***Shaoze Wang,*** *K.-F. Braun, S.-W. Hla,* Ohio University
12:00pm	**EM+2D+AS+MI+MN+NS+TF-WeM13** Reference Materials for Localization Microscopy, *C.R. Copeland, R.G. Dixson, L.C.C. Elliott, B.R. Ilic,* National Institute for Science and Technology (NIST)*; D. Kozak, K.-T. Liao,* FDA, National Institute for Science and Technology (NIST)*; J.A. Liddle,* NIST Center for Nanoscale Science and Technology*; A.C. Madison,* National Institute for Science and Technology (NIST)*; J.-H. Myung,* FDA*; A. Pintar,* ***Samuel Stavis,*** National Institute for Science and Technology (NIST)	**2D+AS+MI+NS-WeM13** Localized Strain Effects in Spin-Polarized Density of States for 2D-MnGaN – a Room Temperature Ferromagnetic Monolayer, *Y. Ma,* Ohio University*; K. Meng,* The Ohio State University*; D. Hunt, MA. Barral, V. Ferrari,* CAC-CNEA, Argentina*; F.Y. Yang,* The Ohio State University*;* ***Arthur Smith,*** Ohio University

Wednesday Morning, October 23, 2019

	Complex Oxides: Fundamental Properties and Applications Focus Topic **Room A220-221 - Session OX+EM+MI+SS-WeM** **Electronic and Magnetic Properties of Complex Oxide Surfaces and Interfaces** **Moderators:** Yingge Du, Pacific Northwest National Laboratory, Vincent Smentkowski, GE-Research	**Nanometer-scale Science and Technology Division** **Room A222 - Session NS-WeM** **Optics and Scattering on the Nanoscale** **Moderators:** Alex Belianinov, Oak Ridge National Laboratory, Nancy Burnham, Worcester Polytechnic Institute
8:00am	**OX+EM+MI+SS-WeM1** Charge Transfer in Lanthanum Ferrite-Strontium Nickelate Superlattices, ***Le Wang***, *Z. Yang, M.E. Bowden,* Pacific Northwest National Laboratory*; J.W. Freeland,* Argonne National Laboratory*; Y. Du, S.A. Chambers,* Pacific Northwest National Laboratory	**INVITED: NS-WeM1** Semiconductor Nanowires for Optoelectronics Applications, ***Chennupati Jagadish***[1], Australian National University, Australia
8:20am	**OX+EM+MI+SS-WeM2** Self-healing Growth of $LaNiO_3$ on Mixed-terminated $(LaAlO_3)_{0.3}$-$(Sr_2AlTaO_6)_{0.7}$, ***Friederike Wrobel***, *H. Hong, S. Cook, T.K. Andersen, D. Hong, C. Liu, A. Bhattacharya, D.D. Fong,* Argonne National Laboratory	Invited talk continues.
8:40am	**INVITED: OX+EM+MI+SS-WeM3** Optoelectronics with Oxides and Oxide Heterostructures, ***Alexander Demkov***, University of Texas at Austin	**NS-WeM3** Photonic-Plasmonic Fiber Probe for Nanoscale Chemical Imaging, *B. Birmingham, K. Minn, B. Ko, H. Lee,* ***Zhenrong Zhang***, Baylor University
9:00am	Invited talk continues.	**NS-WeM4** Nanoscale Infrared Confinement Using Surface Phonon Polaritons, ***Vanessa Breslin***, *A.B. Grafton,* National Research Council Postdoctoral Fellow*; D.C. Ratchford, A.J. Giles, K.P. Fears, C.R. So, D.S. Katzer, C.T. Ellis, J.G. Tischler,* U.S. Naval Research Laboratory*; J.D. Caldwell,* Vanderbilt University*; A.D. Dunkelberger, J.C. Owrutsky,* U.S. Naval Research Laboratory
9:20am	**INVITED: OX+EM+MI+SS-WeM5** Medard W. Welch Award Lecture: Defect-Mediated Coupling of Built-in Potentials at Buried Interfaces Involving Epitaxial Complex Oxides, ***Scott. A Chambers***[2], Pacific Northwest National Laboratory	**INVITED: NS-WeM5** Actuating and Probing a Single-molecule Switch at Femtosecond Timescales, *D. Peller, L.Z. Kastner, T. Buchner, C. Roelcke, F. Albrecht, R. Huber,* ***Jascha Repp***, University of Regensburg, Germany
9:40am	Invited talk continues.	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**OX+EM+MI+SS-WeM10** Spin Transport Studies on Epitaxial Ultrathin $SrIrO_3$ Films Grown using Pulsed Laser Deposition (PLD), ***M S Ramachandra Rao***, Indian Institute of Technology, India*; K. Sethupathi, T. Suraj, S. Suresh,* Indian Institute of Technology Madras, India	**INVITED: NS-WeM10** Nanoscale Structural Imaging through Bragg Diffraction Microscopy, ***Martin Holt***, Argonne National Laboratory
11:20am	**OX+EM+MI+SS-WeM11** Structural and Dielectric Characterization of Epitaxial Entropy-Stabilized Oxide Thin Films, ***George Kotsonis***, *J.-P. Maria,* Pennsylvania State University	Invited talk continues.
11:40am	**OX+EM+MI+SS-WeM12** Oxygen Vacancy-Mediated Epitaxy: $TiO_2(111)/Al_2O_3(0001)$ and Ferromagnetic $Cr_2O_3(0001)/TiO_2(111)$, *C. Ladewig, F. Anwar,* ***Jeffry Kelber***, University of North Texas*; S.Q.A. Shah, P.A. Dowben,* University of Nebraska-Lincoln	**NS-WeM12** First Launch of XTIP - The World's First User Program for the Combination of Scanning Tunneling Microscopy with Synchrotron Radiation, ***Volker Rose***, *N. Shirato, D. Rosenmann, M. Fisher, S-W. Hla,* Argonne National Laboratory
12:00pm	**OX+EM+MI+SS-WeM13** Incorporation of Ti into Epitaxial Films of Magnetite, ***Tiffany Kaspar***, *S.R. Spurgeon, D.K. Schreiber, S.D. Taylor, M.E. Bowden, S.A. Chambers,* Pacific Northwest National Laboratory	**NS-WeM13** Application of Scanning Tunneling Microscopy and Tip-Enhanced Raman Spectroscopy to the Study of Intermolecular and Molecule-Substrate Interactions, ***Jeremy Schultz***[3], *N. Jiang,* University of Illinois at Chicago

[1] **NSTD Recognition Award**
[2] **Medard W. Welch Award Winner**
[3] **NSTD Graduate Student Award Finalist**

Wednesday Morning, October 23, 2019

	2D Materials Room A226 - Session 2D+EM+MI+MN+NS+QS-WeM Novel 2D Materials **Moderator:** Phil King, University of St Andrews	Atomic Scale Processing Focus Topic Room B130 - Session AP+BI+PS+TF-WeM Surface Reaction Analysis and Emerging Applications of Atomic Scale Processing **Moderator:** Eric A. Joseph, IBM T.J. Watson Research Center
8:00am	**INVITED: 2D+EM+MI+MN+NS+QS-WeM1** A Safari Through Thousands of Layered Materials Guided by Data Science Techniques, ***Evan Reed***, *G. Cheon,* Stanford University	**INVITED: AP+BI+PS+TF-WeM1** Open Spaces in Al_2O_3 Film Deposited on Widegap Semiconductors Probed by Monoenergetic Positron Beams, ***Akira Uedono***, University of Tsukuba, Japan; *T. Nabatame,* NIMS, Japan; *W. Egger, T. Koschine,* Universität der Bundeswehr München, Germany; *C. Hugenschmidt, M. Dickmann,* Technische Universität München, Germany; *M. Sumiya,* NIMS, Japan; *S. Ishibashi,* AIST, Japan
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**2D+EM+MI+MN+NS+QS-WeM3** 2D Ferroelectric Semiconductor α-In_2Se_3 for Non-Volatile Memory Applications, *M. Si,* ***Peide Ye***, Purdue University	**AP+BI+PS+TF-WeM3** Surface Reaction Analyses of Atomic-layer Etching by Controlled Beam Experiments, ***Kazuhiro Karahashi***, *T. Ito, S. Hamaguchi,* Osaka University, Japan
9:00am	**2D+EM+MI+MN+NS+QS-WeM4** *Ab initio* Informed Theory of Axis-dependent Conduction Polarity in Goniopolar Materials, ***Yaxian Wang***, *B. He, M.Q. Arguilla, N.D. Cultrara, M.R. Scudder, J.E. Goldberger, J.P. Heremans, W. Windl,* The Ohio State University	**AP+BI+PS+TF-WeM4** Surface Reaction Analysis of Fluorine-based Reactive Ion Etching (RIE) and Atomic Layer Etching (ALE) by Molecular Dynamics (MD) Simulation, ***Erin Joy Tinacba***, *M. Isobe, K. Karahashi, S. Hamaguchi,* Osaka University, Japan
9:20am	**2D+EM+MI+MN+NS+QS-WeM5** In-Plane Mechanical Properties and Strain Engineering of 2D Hybrid Organic-Inorganic Perovskites, ***Qing Tu***, *I. Spanopoulos, S. Hao, C. Wolverton, M. Kanatzidis, G. Shekhawat, V. Dravid,* Northwestern University	**AP+BI+PS+TF-WeM5** Analysis of Metal Surface during Atomic Layer Etching with Gas Cluster Ion Beam and Organic Acid, ***Noriaki Toyoda***, *K. Uematsu,* University of Hyogo, Japan
9:40am	**2D+EM+MI+MN+NS+QS-WeM6** Collective Electronic States of Epitaxial Monolayer 1T-$NbSe_2$, ***Zhuozhi Ge***, University of Wisconsin; *H. Zhang, L. Liu, C. Yan,* West Virginia University; *M. Weinert,* University of Wisconsin; *L.L. Li,* West Virginia University	**AP+BI+PS+TF-WeM6** In-situ Characterization of Growth Kinetics of Piezoelectric Films Grown by Atomic Layer Deposition Utilizing an Ultra-high Purity Process Environment, ***Nicholas Strnad***, General Technical Services, LLC; *D.M. Potrepka,* U.S. Army Research Laboratory; *N. O'Toole, G.B. Rayner,* Kurt J. Lesker Company; *J.S. Pulskamp,* U.S. Army Research Laboratory
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**2D+EM+MI+MN+NS+QS-WeM10** Magnetic Interfaces of MnSe2 Monolayer, ***Tomas Rojas***, *S. Ulloa,* Ohio University	**INVITED: AP+BI+PS+TF-WeM10** Nanoscale Surface Modification of Medical Devices using Accelerated Neutral Atom Beam Technology, ***Dmitry Shashkov***, *J. Khoury, B. Phok,* Exogenesis Corp.
11:20am	**2D+EM+MI+MN+NS+QS-WeM11** Orbital Design of Topological Insulators from Two-dimensional Semiconductors, ***Shixuan Du***, Institute of Physics, Chinese Academy of Sciences, China	Invited talk continues.
11:40am	**INVITED: 2D+EM+MI+MN+NS+QS-WeM12** Rotationally Controlled van der Waals Heterostructures of 2D Materials, ***Emanuel Tutuc***, *K. Kim, G.W. Burg, H.C.P. Movva,* The University of Texas at Austin	**AP+BI+PS+TF-WeM12** Chemically Enhanced Patterning of Nickel for Next Generation EUV Mask, ***Xia (Gary) Sang***, *E. Chen,* University of California, Los Angeles; *T. Tronic, C. Choi,* Intel Corporation; *J.P. Chang,* University of California, Los Angeles
12:00pm	Invited talk continues.	**AP+BI+PS+TF-WeM13** Surface Reactions of Low Energy Electrons and Ions with Organometallic Precursors and their Relevance to Charged Particle Deposition Processes, ***Rachel Thorman***, Johns Hopkins University; *E. Bilgilisoy,* FAU Erlangen-Nürnberg, Germany; *S. Matsuda, L. McElwee-White,* University of Florida; *D. Fairbrother,* Johns Hopkins University

Room B131

8:00am	**INVITED: PS+EM-WeM1** Plasma Processes for High Efficiency Multi-Junction Solar Cells Fabrication, ***Maxime Darnon***, *M. Volatier, P. Albert, M. de Lafontaine, P. St-Pierre, G. Hamon,* LN2, CNRS / Université de Sherbrooke, 3IT, Canada; *C. Petit-Etienne, G. Gay, E. Pargon,* LTM, CNRS / Université Grenoble Alpes, France; *V. Aimez, S. Fafard, A. Jaouad,* LN2, CNRS / Université de Sherbrooke, 3IT, Canada	**Plasma Science and Technology Division** **Session PS+EM-WeM** **Plasma Processing of Materials for Energy** **Moderators:** Ankur Agarwal, KLA-Tencor, Saravanapriyan Sriraman, LAM Research
8:20am	Invited talk continues.	
8:40am	**PS+EM-WeM3** Combinatorial Synthesis of Ternary Oxides by Reactive Sputtering for CdTe Solar Cells, ***Yegor Samoilenko***, *G. Yeung, C.A. Wolden,* Colorado School of Mines	
9:00am	**PS+EM-WeM4** Potential Applications of TiN-based Plasmonic Nanoparticles: From Plasmon-induced Chemistry to Photothermal Absorption, *A. Alvarez Barragan, C. Berrospe Rodriguez,* ***Lorenzo Mangolini***, University of California, Riverside	
9:20am	**PS+EM-WeM5** Plasma-induced Strain in MoS_2 Films for the Electrochemical Hydrogen Evolution Reaction, *T. Liu, X. Liu,* ***Souvik Bhattacharya***, Case Western Reserve University; *Z. Ye, R. He,* Texas Tech University; *X.P.A. Gao, R. Akolkar, R.M. Sankaran,* Case Western Reserve University	
9:40am	**PS+EM-WeM6** Comparison of Pulsed and Continuous Wave Argon Plasmas for the Synthesis of Vertical Graphene Nanosheets, ***Zoe Mann***, *E.R. Fisher,* Colorado State University	
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	
11:00am	**INVITED: TF2-WeM10** Peter Mark Memorial Award Lecture: Molecular Beam Epitaxial Growth of Novel Plasmonic Materials: Heavily-doped Semiconductors and Topological Insulators, ***Stephanie Law***[1], University of Delaware	**Thin Films Division** **Session TF2-WeM** **Thin Film Late News Session** **Moderator:** Virginia Wheeler, U.S. Naval Research Laboratory
11:20am	Invited talk continues.	
11:40am	**TF2-WeM12** Impact of Interface Quality on the Strength of Volume Plasmon Polaritons in Hyperbolic Metamaterials, ***Patrick Sohr***, *D. Wei,* University of Delaware; *S. Tomasulo, M.K. Yakes,* U.S. Naval Research Laboratory; *S. Law,* University of Delaware	
12:00pm	**TF2-WeM13** Transparent Microelectrode Arrays made by Ion Beam Assisted Deposition for Neuronal Cell *in vitro* Recordings, ***Tomi Ryynänen***, Tampere University, Finland; *R. Mzezewa, E. Meriläinen, T. Hyvärinen, J. Lekkala, S. Narkilahti, P. Kallio,* Tampere University	

[1] **Peter Mark Memorial Award Winner**

Room B231-232

Materials and Processes for Quantum Information, Computing and Science Focus Topic
Session QS+2D+EM+MN+NS+VT-WeM
Material Systems and Applications for Quantum Sciences
Moderators:
Mena Gadalla, Harvard University,
Kai Xiao, Oak Ridge National Laboratory

8:00am	**QS+2D+EM+MN+NS+VT-WeM1** Quantum Information at the Molecular Foundry - An Overview of New Toolsets for QIS Research, ***Adam Schwartzberg***, *S. Cabrini, D.F. Ogletree, A. Weber-Bargioni,* Lawrence Berkeley National Laboratory (LBNL)
8:20am	**QS+2D+EM+MN+NS+VT-WeM2** Quantum Vacuum Metrology to Advance Quantum Science Capabilities, ***Jay Hendricks***, *J.E. Ricker, K.O. Douglass,* National Institute of Standards and Technology (NIST); *J.A. Fedchak, J. Scherschligt,* National Institute of Sandards and Technology (NIST)
8:40am	**INVITED: QS+2D+EM+MN+NS+VT-WeM3** Quantum Control of Spins in Silicon Carbide with Photons and Phonons, ***David Awschalom***, *S.J. Whiteley, G. Wolfowicz, K.C. Miao,* University of Chicago
9:00am	Invited talk continues.
9:20am	**QS+2D+EM+MN+NS+VT-WeM5** Tunable Control over InSb(110) Surface Conductance Utilizing Charged Defects, ***Robert Walko***, *S.M. Mueller, S. Gant, J.J. Repicky, S.J. Tjung, E. Lang, E. Fuller, K. Werner,* The Ohio State University; *F. Bergmann,* Bergmann Messgeraete Entwicklung; *E. Chowdhury, J.A. Gupta,* The Ohio State University
9:40am	**QS+2D+EM+MN+NS+VT-WeM6** Quantum Calligraphy: Writing Single-Photon Emitters in a Two-Dimensional Materials Platform, ***Matthew R. Rosenberger***, U.S. Naval Research Laboratory; *C.K. Dass,* Air Force Research Laboratory; *H.-J. Chuang, S.V. Sivaram, K.M. McCreary,* U.S. Naval Research Laboratory; *J.R. Hendrickson,* Air Force Research Laboratory; *B.T. Jonker,* U.S. Naval Research Laboratory
10:00am	**BREAK - Complimentary Coffee in Exhibit Hall A**
10:20am	
10:40am	
11:00am	**INVITED: QS+2D+EM+MN+NS+VT-WeM10** Challenges in Topological and Quantum Materials, ***David Alan Tennant***, Oak Ridge National Laboratory
11:20am	Invited talk continues.
11:40am	**QS+2D+EM+MN+NS+VT-WeM12** Rare Earth Silicon Photonics Engineering for Quantum Applications, *A. Nandi, X. Jiang, D. Pak,* Purdue University; *D.N. Perry, E.S. Bielejec,* Sandia National Laboratories; *Y. Xuan,* ***Mahdi Hosseini***, Purdue University
12:00pm	

Wednesday Afternoon, October 23, 2019

	2D Materials **Room A216 - Session 2D+EM+MN+NS-WeA** **2D Device Physics and Applications** **Moderator:** Ivan Oleynik, University of South Florida	**Applied Surface Science Division** **Room A211 - Session AS+CA+LS-WeA** **Operando Characterization Techniques for In situ Surface Analysis of Energy Devices** **Moderator:** Svitlana Pylypenko, Colorado School of Mines
2:20pm	**INVITED: 2D+EM+MN+NS-WeA1** Monolayer Electronics and Optoelectronics - Advances, Opportunities and Challenges, ***Ali Javey,*** University of California at Berkeley	**INVITED: AS+CA+LS-WeA1** Probing the Electronic Structure of Electrocatalysts and the Formation of Reaction Intermediates, ***Kelsey Stoerzinger,*** Oregon State University
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**2D+EM+MN+NS-WeA3** Investigation on Graphene Band-gap Engineering for Graphene Transistors Applications, ***Benfdila Arezki,*** University M. Mammeri Tizi-Ouzou, Algeria	**AS+CA+LS-WeA3** Surface Characterization of Battery Electrode/Electrolyte Materials Using XPS and ToF-SIMS, ***Elisa Harrison****, S. Peczonczyk, S. Simko,* Ford Motor Company*; K. Wujcik,* Blue Current*; A. Sharafi, A. Drews,* Ford Motor Company
3:20pm	**2D+EM+MN+NS-WeA4** Fully Inkjet Printed, High Photo-responsive, 2D WSe_2-Graphene Based Flexible Photodetector*, R.F. Hossain, A.B. Kaul,* ***Avra Bandyopadhyay,*** University of North Texas	**AS+CA+LS-WeA4** In Operando Molecular Imaging of Microbes as an Electrode, ***Xiao-Ying Yu,*** Pacific Northwest National Laboratory
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**2D+EM+MN+NS-WeA7** Chemical Vapor Sensing with Transition Metal Dichalcogenides via Photoluminescence Modulation, ***Aubrey T. Hanbicki,*** *P.M. Campbell, S.V. Sivaram,* U.S. Naval Research Laboratory*; A.J. Kusterbeck,* Nova Research, Inc.*; V.K. Nguyen, R.A. McGill, K.M. McCreary, B.T. Jonker, E.D. Cobas, F.K. Perkins,* U.S. Naval Research Laboratory*; A.L. Friedman,* Laboratory for Physical Sciences	**INVITED: AS+CA+LS-WeA7** Operando-XPS Investigation of Low-Volatile Liquids and Their Interfaces using Lab-Based Instruments, ***Sefik Suzer,*** Bilkent University, Turkey
4:40pm	**2D+EM+MN+NS-WeA8** Effective and Robust Graphene Immunoligical Sensors Functionalized through Non-covalent Ninding of Antibody-Conjugated Tripodal Compound*, A. Hugo,* CEA-LETI, France*; C. Sun,* Northwestern University*; M. Kumar,* CEA-LETI, France*; R. Othmen, J. Renard, V. Bouchiat,* CNRS-Institut Néel, France*; J. Mann,* Northwestern University*; J.M. Parpia, H.G. Craighead,* Cornell University*; P. Mailley,* CEA-LETI, France*; W.R. Dichtel,* Northwestern University*;* ***Thomas ALAVA****,* CEA-LETI, France	Invited talk continues.
5:00pm	**INVITED: 2D+EM+MN+NS-WeA9** Electronic Properties of Ultra-Thin Na_3Bi: A Platform for a Topological Transistor, ***Mark Edmonds,*** Monash University, Australia	**AS+CA+LS-WeA9** Decoupling Surface and Interface Evolution in Polymer Electrolyte Membrane Systems Through In Situ X-Ray Photoelectron Spectroscopy, ***Michael Dzara[1,2]****,* Colorado School of Mines*; K. Artyushkova,* Physical Electronics*; H. Eskandari, K. Karan,* University of Calgary, Canada*; K.C. Neyerlin,* National Renewable Energy Laboratory*; S. Pylypenko,* Colorado School of Mines
5:20pm	Invited talk continues.	**AS+CA+LS-WeA10** Low Temperature Scanning Tunneling Microscopy and Spectroscopy of Semiconductor Nanowire Device Surfaces, ***Yen-Po Liu****, Y. Liu, S.F. Mousavi, L. Sodergren, F. Lindelöw, S. Lehmann, K.A. Dick Thelander, E. Lind, R. Timm, A. Mikkelsen,* Lund University, Sweden
5:40pm	**2D+EM+MN+NS-WeA11** Transparent Conductive Oxides in Contact with 2-D Materials, ***Ravindra Mehta****, A.S. Bandyopadhyay, A.B. Kaul,* University of North Texas	**AS+CA+LS-WeA11** In-situ X-ray Photoelectron Spectroscopic Study of III-V Semiconductor/H_2O Interfaces under Light Illumination, ***Pitambar Sapkota****, S. Ptasinska,* University of Notre Dame
6:00pm	**2D+EM+MN+NS-WeA12** Negative Fermi-level Pinning Effect Induced by Graphene Interlayer in Metal/Graphene/Semiconductor Junction*, H.H. Yoon, W. Song,* Ulsan National Institute of Science and Technology (UNIST), Republic of Korea*; S. Jung,* SK Hynix, Republic of Korea*; J. Kim,* Ulsan National Institute of Science and Technology (UNIST)*; K. Mo, G. Choi, H.Y. Jeong, J.H. Lee,* ***Kibog Park****,* Ulsan National Institute of Science and Technology (UNIST), Republic of Korea	

[1] **National Student Award Finalist**
[2] **ASSD Student Award Finalist**

	Chemical Analysis and Imaging Interfaces Focus Topic **Room A120-121 - Session CA+NS+SS+VT-WeA** **Chemical Analysis and Imaging of Liquid/Vapor/Solid Interfaces I** **Moderators:** Juan Yao, Pacific Northwest National Laboratory, Andrei Kolmakov, National Institute of Sandards and Technology (NIST)	**Spectroscopic Ellipsometry Focus Topic** **Room A212 - Session EL+EM-WeA** **Spectroscopic Ellipsometry: Novel Applications and Theoretical Approaches** **Moderators:** Vanya Darakchieva, Linkoping University, Sweden, Nikolas Podraza, University of Toledo
2:20pm	**INVITED: CA+NS+SS+VT-WeA1** Chemical Analysis and Imaging of Environmental Interfaces, ***Vicki Grassian,*** University of Californfornia at San Diego	**EL+EM-WeA1** Optical Hall Effect in the Multi-valley Semiconductor Te-doped GaSb, ***Farzin Abadizaman****, C. Emminger,* New Mexico State University*; S. Knight,* University of Nebraska-Lincoln*; M. Schubert,* University of Nebraska-Lincoln, Linköping University, Sweden, Leibniz Institute of Polymer Research Dresden, Germany*; S. Zollner,* New Mexico State University
2:40pm	Invited talk continues.	**EL+EM-WeA2** Study of the Temperature-dependent Optical Constants of Noble Metals based on High Temperature Spectroscopic Ellipsometry, ***Jiamin Liu****, H. Jiang, S.Y. Liu,* Huazhong University of Science and Technology, China
3:00pm	**INVITED: CA+NS+SS+VT-WeA3** Liquid/Vapor Interfaces Investigated with Photoelectron Spectroscopy, ***Hendrik Bluhm,*** Fritz Haber Institute of the MPG, Germany	**EL+EM-WeA3** Optical Monitor for the Attitude Tracking using Polarimetry, ***Song Zhang****, H.G. Gu, H. Jiang, S.Y. Liu,* Huazhong University of Science and Technology, China
3:20pm	Invited talk continues.	**EL+EM-WeA4** New Progress on the Channeled Spectroscopic Ellipsometry and its Applications, ***Gai Chin,*** ULVAC Inc., Japan
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**CA+NS+SS+VT-WeA7** Methanol Hydration Studied by Liquid μ-jet XPS and DFT Simulations, ***Jordi Fraxedas,*** Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Spain*; E. Pellegrin, V. Perez-Dieste, C. Escudero,* CELLS-ALBA, Spain*; P. Rejmak,* Institute of Physics PAS, Poland*; N. Gonzalez, A. Fontsere, J. Prat, S. Ferrer,* CELLS-ALBA, Spain	**INVITED: EL+EM-WeA7** The Physics of Low Symmetry Metal Oxides: Applications of Ellipsometry, ***Alyssa Mock,*** U.S. Naval Research Laboratory*; S. Knight, M. Hilfiker,* University of Nebraska-Lincoln*; V. Darakchieva, A. Papamichail,* Linkoping University, Sweden*; R. Korlacki,* University of Nebraska-Lincoln*; M.J. Tadjer,* U.S. Naval Research Laboratory*; Z. Galazka, G. Wagner,* Leibniz-Institut für Kristallzüchtung, Germany*; N. Blumenschein,* North Carolina State University*; A. Kuramata,* Novel Crystal Technology, Inc., Japan*; K. Goto, H. Murakami, Y. Kumagai,* Tokyo University of Agriculture and Technology, Japan*; M. Higashiwaki,* National Institute of Information and Communications Technology, Japan*; A. Mauze, Y. Zhang, J.S. Speck,* University of California Santa Barbara*; M. Schubert,* University of Nebraska-Lincoln, Linköping University, Sweden, Leibniz Institute of Polymer Research Dresden, Germany
4:40pm	**CA+NS+SS+VT-WeA8** Survey of Ionic Liquid Interfaces under Vacuum and Ambient Conditions: An XPS Perspective, ***Yehia Khalifa,*** Ohio State University*; A. Broderick, J.T. Newberg,* University of Delaware*; Y. Zhang, E. Maginn,* University of Notre Dame	Invited talk continues.
5:00pm	**CA+NS+SS+VT-WeA9** Ambient Pressure XPS Study of Gallium-Indium Eutectic (EGaIn) Surface under Oxygen and Water Vapor, ***Meng Jia****, J.T. Newberg,* University of Delaware	**EL+EM-WeA9** Terahertz Dielectric Anisotropy in Randomly Distributed, Spatially Coherent Polymethacrylate Microwire Arrays Fabricated by Stereolithography, ***Serang Park,*** University of North Carolina at Charlotte*; Y. Li,* University Of North Carolina at Charlotte*; S. Lee,* Harris Corp.*; S. Schöche, C.M. Herzinger,* J.A. Woollam Co., Inc.*; T. Hofmann,* University Of North Carolina at Charlotte
5:20pm	**CA+NS+SS+VT-WeA10** Laboratory-based Hard X-ray Photoelectron System for the study of Interfaces, *S. Eriksson,* Scienta Omicron*;* ***Henrik Bergersen,*** Scienta Omicron, Sweden	**EL+EM-WeA10** Ultrafast Dynamics of Ge, InP and Si Proved by Time-Resolved Ellipsometry, ***Shirly Espinoza****, S. Richter, M. Rebarz,* Institute of Physics, Academy of Sciences of the Czech Republic, Czechia*; O. Herrfurth, R. Schmidt,* Universität Leipzig, Felix-Bloch-Institut für Festkörperphysik, Germany*; J. Andreasson,* Institute of Physics, Academy of Sciences of the Czech Republic, Czechia*; S. Zollner,* New Mexico State University
5:40pm		**EL+EM-WeA11** Optical Properties of Organic-Inorganic Lead Halide Perovskite Thin Films for Photovoltaics, ***Biwas Subedi****, M.M. Junda, K. Ghimire, N.J. Podraza,* University of Toledo
6:00pm		**EL+EM-WeA12** Optical Constants of Ni at 300 K from 0.03 to 6.0 eV, ***Stefan Zollner****, F. Abadizaman,* New Mexico State University

Wednesday Afternoon, October 23, 2019

	Electronic Materials and Photonics Division **Room A214 - Session EM+2D+NS+TF-WeA** **THEME Session: Electronics and Photonics for a Low-Carbon Future** **Moderators:** Michael A. Filler, Georgia Institute of Technology, Stephen McDonnell, University of Virginia	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Room A213 - Session HC+OX+SS-WeA** **Metal-Support Interactions Driving Heterogeneously-Catalyzed Reactions** **Moderators:** Aravind Asthagiri, The Ohio State University, Jason Weaver, University of Florida
2:20pm	**INVITED: EM+2D+NS+TF-WeA1** Uncovering the Materials Paradigm for Solar Absorbers through In situ Imaging and Characterization, ***Mariana Bertoni,*** Arizona State University	**HC+OX+SS-WeA1** Yittria-stabilized Zirconia (YSZ) Supports for Low Temperature Ammonia Synthesis, *Z. Zhang, S. Livingston,* Colorado School of Mines*; L. Fitzgerald,* University College Dublin*; J.D. Way,* ***Colin Wolden,*** Colorado School of Mines
2:40pm	Invited talk continues.	**HC+OX+SS-WeA2** Operando PTRF-XAFS Technique for 3D Structure Determination of Active Metal Sites on a Model Catalyst Surface under Working Conditions, ***Satoru Takakusagi****, L. Bang, D. Kido, Y. Sato, K. Asakura,* Hokkaido University, Japan
3:00pm	**INVITED: EM+2D+NS+TF-WeA3** Atomic Layer Deposition's Potential in Sustainability, ***Karen Buechler,*** ALD NanoSolutions	**INVITED: HC+OX+SS-WeA3** Understanding and Tuning Catalytic Materials Using Nanocrystal Precursors, ***Matteo Cargnello,*** Stanford University
3:20pm	Invited talk continues.	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**EM+2D+NS+TF-WeA7** Challenges in Materials and Processing to Implementation of Energy Efficient SiC Technology, ***Mei-Chien Lu,*** Monte Rosa Technology	**HC+OX+SS-WeA7** CO_2 Hydrogenation on Supported Zirconium Oxide Clusters, ***Yilin Ma***[1]***,*** Stony Brook University*; M.G. White,* Brookhaven National Laboratory
4:40pm	**EM+2D+NS+TF-WeA8** High Efficiency of Hot Electron Transfer at a Metal-Insulator-Semiconductor to Electrolyte Interface, ***Hyun Uk Chae****, R. Ahsan, Q. Lin, R. Kapadia,* University of Southern California	**HC+OX+SS-WeA8** Tuning Surface Hydrophobicity to Enhance Reaction Rate of the Lewis Acid Zeolite Nano Sn Beta for Alcohol Ring Opening of Epoxides, ***Nicholas Brunelli****, A.P. Spanos, A. Parulkar, N. Deshpande,* The Ohio State University
5:00pm	**INVITED: EM+2D+NS+TF-WeA9** Integrated Photocathodes for Solar Driven Conversion of Carbon Dioxide to value-added Products*, J.W. Ager,* Lawrence Berkeley Lab, University of California, Berkeley*;* ***Guru Gurudayal,*** PPG	**INVITED: HC+OX+SS-WeA9** Understanding Metal-Metal and Metal-Support Interactions in Bimetallic Catalysts, ***Donna Chen,*** Univeristy of South Carolina*; S. Farzandh, D.M. Shakya, A.J. Brandt, T.D. Maddumapatabandi,* University of South Carolina
5:20pm	Invited talk continues.	Invited talk continues.
5:40pm	**EM+2D+NS+TF-WeA11** Modeling of Optical Scattering in White Beetle Scales, ***Seung Ho Lee****, S.M. Han, S.E. Han,* University of New Mexico	
6:00pm	**EM+2D+NS+TF-WeA12** Boosting the Performance of WO_3/n-Si for Photo-electrochemical Water Splitting: From the Role of Si to Interface Engineering, ***Yihui Zhao,*** Electrochemical Materials and Interfaces (EMI), Dutch Institute for Fundamental Energy Research (DIFFER), The Netherlands*; A. Bieberle-Hütter,* Electrochemical Materials and Interfaces (EMI), Dutch Institute for Fundamental Energy Research (DIFFER),The Netherlands, The Netherlands*; G. Brocks,* Center for Computational Energy Research, Department of Applied Physics, Eindhoven University of Technology; Computational Materials Science, Faculty of Science and Technology and MESA+ Institute for Nanotechnology, University of Twente, The Netherlands*; H. Genuit,* Dutch Institute for Fundamental Energy Research (DIFFER), The Netherlands*; R. Lavrijsen,* Physics of Nanostructures and Center for NanoMaterials (cNM), Department of Applied Physics, Eindhoven University of Technology, The Netherlands	

[1] **Heterogeneous Catalysis Graduate Student Presentation Award Finalist**

	Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic **Room B231-232 - Session HI+AS+CA-WeA** **Advanced Ion Microscopy and Surface Analysis Applications** **Moderators:** Richard Livengood, Intel Corporation, USA, Armin Gölzhäuser, Bielefeld University, Germany	**Magnetic Interfaces and Nanostructures Division** **Room A210 - Session MI+2D-WeA** **Emerging Multifunctional Magnetic Materials II** **Moderators:** Valeria Lauter, Oak Ridge National Laboratory, Axel Hoffmann, Technical University of Berlin
2:20pm	**INVITED: HI+AS+CA-WeA1** Analytical Capabilities on FIB Instruments using SIMS: Applications, Current Developments and Prospects, ***Tom Wirtz,*** Luxembourg Institute of Science and Technology, Luxembourg*; J.-N. Audinot,* Luxembourg Institute of Science and Technology, Luxembourg, Luxembourg*; J. Lovric, O. De Castro,* Luxembourg Institute of Science and Technology, Luxembourg	**INVITED: MI+2D-WeA1** Field and Current Control of the Electrical Conductivity of an Artificial Two-Dimensional Honeycomb Lattice, ***Deepak Singh,*** University of Missouri
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**HI+AS+CA-WeA3** Correlated Materials Characterization via Multimodal Chemical Imaging using HIM-SIMS, *A. Belianinov,* Oak Ridge National Laboratory*; S. Kim,* Pusan National University, South Korea*; A. Trofimov,* ***Olga S. Ovchinnikova,*** Oak Ridge National Laboratory	**INVITED: MI+2D-WeA3** Emergence and Dynamics of Magnetic Order in Metamagnetic Nanostructures, ***Vojtech Uhlir,*** CEITEC BUT, Brno University of Technology, Czech Republic
3:20pm	**HI+AS+CA-WeA4** Compositional Characterization of Biogenic Nanoparticles using the ORION NanoFab with SIMS, ***Christelle Guillermier,*** *F. Khanom,* Carl Zeiss PCS, Inc.*; D. Medina,* Northeastern University*; J.-N. Audinot,* Luxembourg Institute of Science and Technology, Luxembourg	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**INVITED: HI+AS+CA-WeA7** Effects of Ion Irradiation on Two-Dimensional Targets: What is Different from Bulk Materials, ***Arkady V. Krasheninnikov,*** Helmholtz-Zentrum Dresden-Rossendorf, Germany	**MI+2D-WeA7** Time Dependence in $La_{0.7}Sr_{0.3}MnO_3$ Thin Films with Magnetic Competition, ***Mikel B. Holcomb,*** *R.B. Trappen, N.M. Mottaghi, S.F. Yousefi, G. Cabrera, G. Bhandari, M.S.S. Seehra,* West Virginia University
4:40pm	Invited talk continues.	**INVITED: MI+2D-WeA8** Optically Induced Magnetization through Spin States at Perovskite/Ferromagnetic Interface Revealed by Neutron Magnetoreflectivity Studies, ***Bin Hu,*** University of Tennessee Knoxville
5:00pm	**HI+AS+CA-WeA9** Effects of He Ion Irradiation on Gold Nanoclusters: a Molecular Dynamics Study, ***Sadegh Ghaderzadeh,*** *M. Ghorbani-Asl, S. Kretschmer, G. Hlawacek,* Helmholtz-Zentrum Dresden Rossendorf, Germany*; A.V. Krasheninnikov,* Helmholtz-Zentrum Dresden-Rossendorf, Germany	Invited talk continues.
5:20pm	**HI+AS+CA-WeA10** Low Damage Imaging of Polymers with the Helium Ion Microscope, ***Doug Wei,*** Carl Zeiss, RMS, Inc.*; J.A. Notte,* Carl Zeiss PCS, Inc.*; A. Stratulat,* Carl Zeiss Microscopy, Ltd., UK	**MI+2D-WeA10** Effect of Interlayer and Underlayers on the Microstructure and Magnetic Softness in FeGa-based Ferromagnetic Composites, ***Adrian Acosta,*** *K. Fitzell,* University of California, Los Angeles*; C. Dong,* Northeastern University*; M. Zurbuchen, N.X.S. Sun, J.P. Chang,* University of California, Los Angeles
5:40pm	**HI+AS+CA-WeA11** Imaging of Biological Cells with Helium-Ion Microscopy, ***Natalie Frese,*** *A. Beyer, C. Kaltschmidt, B. Kaltschmidt,* Bielefeld University, Germany*; A. Thomas,* Institute for Metallic Materials Dresden, Germany*; W. Parak,* University of Hamburg, Germany*; A. Gölzhäuser,* Bielefeld University, Germany	**MI+2D-WeA11** Tunable Spin-polarized Edge Effects in Transition Metal Dichalcogenides on FM and AFM Substrates, *N. Cortes,* Universidad Tecnica Federico Santa Maria, Chile*;* ***Oscar Avalos-Ovando,*** Ohio University*; L. Rosales, P. Orellana,* Universidad Tecnica Federico Santa Maria, Chile*; S. Ulloa,* Ohio University
6:00pm	**HI+AS+CA-WeA12** Channeling in the Helium Ion Microscope, ***Hussein Hijazi,*** *C. Feldman, R. Thorpe, M. Li, T. Gustafsson,* Rutgers University*; D. Barbacci, A. Schultz,* Ionwerks	**MI+2D-WeA12** Magnetocaloric Properties of Thin Film $La_{0.7}Sr_{0.3}MnO_3$: Magnetic Field Dependence and Effects of Superparamagnetism, ***Navid Mottaghi***[1]*, M.S.S. Seehra, C.-Y. Huang, S. Kumari, S. Yousefi Sarraf, G. Cabrera, G. Bhandari, R.B. Trappen, M.B. Holcomb,* West Virginia University

[1] **Falicov Student Award Finalist**

	Manufacturing Science and Technology Group **Room A226 - Session MS-WeA** **Science and Technology for Manufacturing: Solid State Batteries (ALL INVITED SESSION)** **Moderators:** Kelsy Hatzell, Vanderbilt University, Gary Rubloff, University of Maryland, College Park	**Nanometer-scale Science and Technology Division** **Room A222 - Session NS+2D+AS-WeA** **Probing and Modifying Surface and Interfacial Chemistry at the Nanoscale** **Moderators:** Phillip First, Georgia Institute of Technology, Adina Luican-Mayer, University of Ottawa, Canada
2:20pm	**INVITED: MS-WeA1** The Importance of Modifying the Nothing Within 3D Electrode Architectures for Solid-State Energy Storage, ***Debra Rolison***, *M.B. Sassin, C.N. Chervin, J.F. Parker, J. Long,* U.S. Naval Research Laboratory	**NS+2D+AS-WeA1** Bitumen's Microstructures are Correlated with its Bulk Thermal and Rheological Properties, *x. Yu,* Worcester Polytechnic Institute*; S. Granados-Focil,* Clark University*; M. Tao,* ***Nancy Burnham***, Worcester Polytechnic Institute
2:40pm	Invited talk continues.	**NS+2D+AS-WeA2** Energetics and Statistical Mechanical Analysis of Complexation on Metal Surfaces, *J. Lee, J.W. Evans, T.L. Windus, P.A. Thiel,* ***Da-Jiang Liu***, Ames Laboratory and Iowa State University
3:00pm	**INVITED: MS-WeA3** Precision 3D Solid State Battery Architectures: Science, Challenges and Manufacturing Opportunity, ***Sang Bok Lee Lee***, *G.W. Rubloff,* University of Maryland, College Park	**INVITED: NS+2D+AS-WeA3** Adding the Chemical Dimension to Lithography at All Scales: Enabling Cellular Therapies & Other Adventures in Biology and Medicine, ***Paul S. Weiss***[1], University of California, Los Angeles
3:20pm	Invited talk continues.	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**INVITED: MS-WeA7** Understanding the Electronic and Mechanical Properties of High Energy Density Anodes on 3D Structures, ***Amy Prieto***, *J. Ma, M.C. Schulze,* Colorado State University	**NS+2D+AS-WeA7** STM Directed Synthesis of Armchair Graphene Nanoribbons and Their Oxidation, *C. Ma,* Oak Ridge National Laboratory*; Z. Xiao,* North Carolina State University*; A.A. Puretzky,* ***Arthur Baddorf***, Oak Ridge National Laboratory*; W. Lu,* North Carolina State University*; K. Hong,* Oak Ridge National Laboratory*; J. Bernholc,* North Carolina State University*; A.-P. Li,* Oak Ridge National Laboratory
4:40pm	Invited talk continues.	**NS+2D+AS-WeA8** Carbon-based Two-dimensional Materials from Surface-catalyzed Reactions of Small Molecules, *M. Wolf, C.R. Gerber,* ***Rebecca Quardokus***, University of Connecticut
5:00pm	**INVITED: MS-WeA9** Enabling High Cycle Life Alkali Metal Anodes through Imposed Thermal Gradients, *R.W. Atkinson III,* EXCET, Inc.*; R. Carter,* ***Corey Love***, U.S. Naval Research Laboratory	**INVITED: NS+2D+AS-WeA9** Bottom-up Fabrication of 2D Molecular Networks via On-surface Reactions, ***Sabine Maier***, University of Erlangen-Nürnberg, Germany
5:20pm	Invited talk continues.	Invited talk continues.
5:40pm		**NS+2D+AS-WeA11** Determining the Jahn-Teller Stabilization Energy of Surface Vacancies on Si(111)-√3 x √3:B, ***Daejin Eom***, Korea Research Institute of Standards and Science, Republic of Korea*; C.-Y. Moon,* Korea Research Institute of Standards and Science*; J.-Y. Koo,* Korea Research Institute of Standards and Science, Republic of Korea
6:00pm		**NS+2D+AS-WeA12** Influence of the Substrate on Self-Assembly: Terphenyl Monolayers investigated by NC-AFM and FM-KPFM, ***Niklas Biere***[2], Experimental Biophysics & Applied Nanoscience, University of Bielefeld, Germany*; S. Koch, P. Stohmann, Y. Yang, A. Gölzhäuser,* Physics of Supramolecular Systems and Surfaces, University of Bielefeld, Germany*; D. Anselmetti,* Experimental Biophysics & Applied Nanoscience, University of Bielefeld, Germany

[1] **NSTD Recognition Award**

[2] **NSTD Graduate Student Award Finalist**

Wednesday Afternoon, October 23, 2019

	Plasma Science and Technology Division **Room B130 - Session PS-WeA** **Commemorating the Career of John Coburn (ALL INVITED SESSION)** **Moderators:** David Graves, University of California at Berkeley, R. Mohan Sankaran, Case Western Reserve University	**New Challenges to Reproducible Data and Analysis Focus Topic** **Room A124-125 - Session RA+AS+BI-WeA** **Addressing Reproducibility Challenges using Multi-Technique Approaches** **Moderators:** Tony Ohlhausen, Sandia National Laboratory, Vincent Smentkowski, GE-Research
2:20pm	**PS-WeA1** INVITED TALK: A Tribute to John W. Coburn, ***David Graves,*** University of California at Berkeley	**RA+AS+BI-WeA1** Responding to New and Old Challenges to Data, Analysis and Scientific Study Reproducibility, ***Donald Baer,*** Pacific Northwest National Laboratory*; I.S. Gilmore,* National Physical Laboratory, UK
2:40pm	**PS-WeA2** INVITED TALK: Interfacial Chemistry in Highly Reactive Systems, ***Frances Houle,*** Lawrence Berkeley National Laboratory	**RA+AS+BI-WeA2** Achieving Reproducible Data: Examples from Surface Analysis in Semiconductor Technology, ***Thierry Conard****, P.A.W. van der Heide, A. Vanleenhove, C. Zborowski, W. Vandervorst,* IMEC, Belgium
3:00pm	**PS-WeA3** INVITED TALK: Rare Gas Actinometry Turns Thirty Nine and is Still Finding Applications, ***Vincent M. Donnelly,*** University of Houston	**INVITED: RA+AS+BI-WeA3** New Challenges in Analytical Reproducibility Illustrated with Old and New Case Studies, ***Thomas Beebe Jr,*** University of Delaware
3:20pm	**PS-WeA4** INVITED TALK: A Leader In Etching (ALE): How John Coburn Paved the way for Atomic Layer Etching, ***Jane P. Chang,*** University of California, Los Angeles	Invited talk continues.
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**PS-WeA7** INVITED TALK: Materials Processing Using Low Temperature Plasma Surface Interactions: Examples of the Influence of John Coburn, ***Gottlieb S. Oehrlein,*** University of Maryland, College Park	**INVITED: RA+AS+BI-WeA7** Challenges and Approaches to Addressing Reproducibility in Biointerface Science and Engineering, ***Sally McArthur,*** Swinburne University of Technology and CSIRO. Australia, Australia
4:40pm	**PS-WeA8** INVITED TALK: A Brief Overview on Molecular Dynamics Simulations of Plasma-surface Interaction in Reactive Ion Etching, ***Emilie Despiau-Pujo,*** LTM, Univ. Grenoble Alpes, CNRS, France	Invited talk continues.
5:00pm	**PS-WeA9** INVITED TALK: Plasma ALD – A Discussion of Mechanisms*, K. Arts, V. Vandalon,* Eindhoven University of Technology, The Netherlands, Netherlands*; H.C.M. Knoops,* Eindhoven University of Technology, The Netherlands*;* ***Erwin Kessels,*** Eindhoven University of Technology, The Netherlands, Netherlands	**INVITED: RA+AS+BI-WeA9** Complementary Measurements of Colloidal Nanoparticles and their Coatings by In-situ and Vacuum-based Methods, ***Caterina Minelli,*** National Physical Laboratory, UK
5:20pm	**PS-WeA10** INVITED TALK: RF Plasmas for Material Etching, Deposition, and Surface Modification, ***Dennis Hess,*** Georgia Institute of Technology	Invited talk continues.
5:40pm		**RA+AS+BI-WeA11** Multiple Technique Analysis of Perovskite Materials used in Battery and Fuel Cell Components, ***Robin Simpson****, P. Mack, T.S. Nunney,* Thermo Fisher Scientific, UK
6:00pm		**RA+AS+BI-WeA12** Mapping Local Physical Properties by Combining ToF-SIMS Analysis with Advanced Scanning Probe Microscopy, ***Maiglid Andreina Moreno Villavicencio****, N. Chevalier, J.-P. Barnes,* CEA-LETI, France*; P. Kermagoret, F. Lorut,* ST Microelectronics, France*; B. Gautier,* Université de Lyon, France

Wednesday Afternoon, October 23, 2019

	Advanced Surface Engineering Division **Room A215 - Session SE+AS+TF-WeA** **Nanostructured Thin Films and Coatings** **Moderators:** Mehran Golizadeh, Montanuniversität Leoben, Austria, Suneel Kodambaka, University of California, Los Angeles	**Surface Science Division** **Room A220-221 - Session SS+AS+HC+OX-WeA** **Reactions at Alloy Surfaces and Single Atom Catalysis** **Moderators:** Erin Iski, University of Tulsa, Bruce E. Koel, Princeton University
2:20pm	**SE+AS+TF-WeA1** Structural and Optical Properties of Pulsed-Laser Deposited β-Ga_2O_3 Thin Films, ***Mallesham Bandi***, *V. Zade, R.V. Chintalapalle,* University of Texas at El Paso	**INVITED: SS+AS+HC+OX-WeA1** Correlating Structure and Function for Nanoparticle Catalysts, ***Graeme Henkelman***, University of Texas at Austin
2:40pm	**SE+AS+TF-WeA2** Structural, Electrical, and Optical Properties of Mo-Ga Alloy Thin Films, ***Nivedita Lalitha Raveendran***, *R.V. Chintalapalle,* University of Texas at El Paso	Invited talk continues.
3:00pm	**SE+AS+TF-WeA3** Metallic Glass: From Coating to First-Ever Nanotube Arrays, ***Jinn P. Chu***, National Taiwan University of Science and Technology, Taiwan, Republic of China	**SS+AS+HC+OX-WeA3** Surface Reactivity of PtAg and PdAg: From Single-Atom Alloys to Supported Nanoparticles, ***Dipna Patel***[2], Tufts University; *C.R. O'Connor, R.J. Madix, C.M. Friend,* Harvard University; *E.C.H. Sykes,* Tufts University
3:20pm	**SE+AS+TF-WeA4** Tin Oxide Nanoaggregate Fragmentation and Restructuring during Supersonic Impaction based Thin Film Deposition Processes, ***Souvik Ghosh***, *X. Chen, C. Li, B. Olson, C.J. Hogan,* University of Minnesota, Minneapolis	**SS+AS+HC+OX-WeA4** Single-site Catalysts by Metal-ligand Complexation at Surfaces: From Model Systems in Vacuum to High-pressure Catalysis on Oxide Supports, ***Steven L. Tait***, Indiana University
3:40pm 4:00pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	**BREAK - Complimentary Refreshments in Exhibit Hall A**
4:20pm	**INVITED: SE+AS+TF-WeA7** From Gas-ion to Metal-ion-controlled Irradiation: A Paradigm Shift in the Thin Film Growth by Magnetron Sputtering, ***Grzegorz Greczynski***, Linköping University, Sweden; *I. Petrov, J.E. Greene,* University of Illinois at Urbana-Champaign; *L. Hultman,* Linköping University, Sweden	**INVITED: SS+AS+HC+OX-WeA7** Controlling the Local Coordination and Reactivity of Oxide-supported Atomically Dispersed Pt-group Species, ***Phillip Christopher***, University of California at Santa Barbara
4:40pm	Invited talk continues.	Invited talk continues.
5:00pm	**SE+AS+TF-WeA9** Atomic Layer Deposition of Silver Thin Film on Polydimethylsiloxane (PDMS), ***Sarah Hashemi Astaneh***, *C. Sukotjo, C.G. Takoudis,* University of Illinois at Chicago	**SS+AS+HC+OX-WeA9** Coordination Defines Reactivity of a Model Single-atom Catalyst: $Ir_1/Fe_3O_4(001)$, ***Zdenek Jakub***[1], *J. Hulva, M. Meier, U. Diebold, G.S. Parkinson,* TU Wien, Austria
5:20pm	**SE+AS+TF-WeA10** Fabrication of 2D Photonic Crystals using Block Copolymer Lithography on Flexible Substrates and Fibers for Wearable Technology, ***Wade Ingram***, *R. Spontak, J.S. Jur,* North Carolina State University	**SS+AS+HC+OX-WeA10** Capturing the Early Stages of Oxidation on Low-Index Ni and Ni-Cr Surfaces, ***William H. Blades***, *P. Reinke,* University of Virginia
5:40pm	**SE+AS+TF-WeA11** Use of an Einzel Lens to Enhance Electrohydrodynamic Printing Technology, ***Matthew Strohmayer***[3], *A. Dhall, P. Ramesh, N. Tokranova, C.A. Ventrice, Jr.,* SUNY Polytechnic Institute	**SS+AS+HC+OX-WeA11** Evolution of Steady-state Material Properties during Catalysis: Oxidative Coupling of Methanol over Nanoporous $Ag_{0.03}Au_{0.97}$, ***Matthijs van Spronsen***, Lawrence Berkeley National Laboratory; *B. Zugic,* Harvard University; *M.B. Salmeron,* Lawrence Berkeley National Laboratory; *C.M. Friend,* Harvard University
6:00pm		**SS+AS+HC+OX-WeA12** Reduction and Oxidation of Transition Metal Oxides: From Tailoring the Surface and Interface Properties to the New Crystalline Phases Formation, ***Dominik Wrana***, Jagiellonian University, Poland; *C. Rodenbücher,* Forschungszentrum Jülich GmbH, Germany; *K. Cieślik, B.R. Jany,* Jagiellonian University, Poland; *K. Szot,* Forschungszentrum Jülich GmbH, Germany; *F. Krok,* Jagiellonian University, Poland

[1] **Morton S. Traum Award Finalist**
[2] **National Student Award Finalist**
[3] **ASSD Student Award Finalist**

Thin Films Division
Room A122-123 - Session TF+EM-WeA
Emerging Thin Film Materials: Ultra-wide Bandgap and Phase Change Materials
Moderators: Cary Pint, Vanderbilt University, Brent Sperling, National Institute of Standards and Technology (NIST), Jin-Seong Park, Hanyang University, Korea

2:20pm	**TF+EM-WeA1** MOCVD Growth and Characterization of $ZnGeN_2$-GaN Alloy Films, ***Benthara Hewage Dinushi Jayatunga***, *K. Kash,* Case Western Reserve University*; M.D. Reza, H. Zhao,* The Ohio State University*; O. Ohanaka, R. Lalk,* Case Western Reserve University*; M. Zhu, J. Hwang,* The Ohio State University	
2:40pm	**TF+EM-WeA2** Device Quality β-Ga2O3 and Related Alloys by MOCVD, ***Andrei Osinsky***, *F. Alema,* Agnitron Technology, Inc.*; Y. Zhang, A. Mauze, J.S. Speck,* University of California, Santa Barbara*; P. Mukhopadhyay, W. Schoenfeld,* University of Central Florida	
3:00pm	**INVITED: TF+EM-WeA3** Development of the β-$(Al_xGa_{1-x})_2O_3$/β-Ga_2O_3 (010) Heterostructures by Plasma-assisted Molecular Beam Epitaxy, ***James Speck,*** University of California at Santa Barbara	
3:20pm	Invited talk continues.	
3:40pm	**BREAK - Complimentary Refreshments in Exhibit Hall A**	
4:00pm		
4:20pm	**INVITED: TF+EM-WeA7** Phase-Change Memory: A Quest from Material Engineering Towards the Device Performances, ***Guillaume Bourgeois***, *G. Navarro, M.C. Cyrille, J. Garrione, C. Sabbione, M. Bernard, E. Nolot, E. Nowak,* CEA-LETI, France	
4:40pm	Invited talk continues.	
5:00pm	**TF+EM-WeA9** Neuromorphic Materials and Architectures for Dynamic Learning and Edge Processing Applications, ***Angel Yanguas-Gil,*** Argonne National Laboratory	
5:20pm	**TF+EM-WeA10** Atomic Layer Deposited VO_2 Thin Films Towards Modulated Infrared Optoelectronic Devices, ***Virginia Wheeler***, *C.T. Ellis, M. Currie, J.R. Avila, M.A. Meeker, A.J. Giles,* U.S. Naval Research Laboratory*; J.D. Caldwell,* Vanderbilt University*; J.G. Tischler,* U.S. Naval Research Laboratory	
5:40pm	**TF+EM-WeA11** Deposition Process for Vanadium Dioxide Thin Films for RF Applications, ***Mark Lust***, *S. Chen, N. Ghalichechian,* The Ohio State University	
6:00pm	**TF+EM-WeA12** Low Power, Microwave Solid State Oscillators Based on Phase Change Materials, ***Yang Liu***, *Z. Du, B. Zhao, H. Wang, J. Ravichandran,* University of Southern California	

Anticipated Schedule Thursday, October 24, 2019

Anticipated Schedule Thursday Morning, October 24

8:00 AM _____

8:20 AM _____

8:40 AM _____

9:00 AM _____

9:20 AM _____

9:40 AM _____

10:00 AM _____

10:20 AM _____

10:40 AM _____

11:00 AM _____

11:20 AM _____

11:40 AM _____

12:00 PM _____

Anticipated Schedule Thursday Lunch, October 24

When _____

Where _____

With _____

Anticipated Schedule Thursday Afternoon, October 24

1:00 PM _____

1:20 PM _____

1:40 PM _____

2:00 PM _____

2:20 PM _____

2:40 PM _____

3:00 PM _____

3:20 PM _____

3:40 PM _____

4:00 PM _____

4:20 PM _____

4:40 PM _____

5:00 PM _____

5:20 PM _____

5:40 PM _____

Special Events Thursday

7:00 AM	Member Center: Free Coffee for 2019 AVS Members/A111-112
8:30 AM	Short Course Programs—Various Rooms (See Registration Desk)
10:00 AM	Session Coffee Break/Hall A
12:00 PM	Nanometer-scale Science & Technology Flash Session/A222
12:20 PM	Exhibit Finale & Refreshments/Hall A
12:20 PM	PSTD Coburn and Winters Award Ceremony/B131
12:20 PM	Surface Science Division Mort Traum Awards Ceremony/A220-221
12:30 PM	2020 Program Committee Chairs' Meeting & Lunch/Pierce B-Hilton (by invitation)
12:30 PM	AVS Business Meeting/A120-121
12:30 PM	AVS Member Center: " Writers Workshop and Lunch"/A111-112
3:00 PM	AVS Member Center: "XPS for the Non-Analyst: Curve Fitting the Good, the Bad, and the Awful" /A111-112
3:30 PM	History Committee Meeting/Hayden-Hilton (by invitation)
5:00 PM	Advanced Ion Microscopy and Ion Beam Nano-engineering Flash Session/B231-232
5:20 PM	How to Lead by Inspiration/A226
5:40 PM	Heterogeneous Catalysis Graduate Student Presentation/A213
5:40 PM	Thin Films Flash Session/A122-123
6:30 PM	2019/2020 Program Committee Reception and Dinner/Pierce AB-Hilton (by invitation)
6:30 PM	Thursday Poster Session & Refreshments/Hall A
7:00 PM	SSS Editorial Board Dinner/King-Hilton (by invitation)

Thursday Morning, October 24, 2019

	Chemical Analysis and Imaging Interfaces Focus Topic **Room A120-121 - Session CA+2D+AS+BI+NS-ThM** **Chemical Analysis and Imaging of Liquid/Vapor/Solid Interfaces II** **Moderators:** Utkur Mirsaidov, National University of Singapore, Xiao-Ying Yu, Pacific Northwest National Laboratory	**Thin Films Division** **Room A122-123 - Session TF+EM+NS+SS-ThM** **Thin Films for Energy Harvesting and Conversion** **Moderators:** Siamak Nejati, University of Nebraska-Lincoln, Xinwei Wang, Shenzhen Graduate School, Peking University
8:00am	**INVITED: CA+2D+AS+BI+NS-ThM1** From Surfaces to Solid-Gas and Solid-liquid Interfaces: Ambient Pressure XPS and Beyond, ***Miquel B. Salmeron,*** Lawrence Berkeley Lab, University of California, Berkeley	**INVITED: TF+EM+NS+SS-ThM1** Redesigning Batteries into Efficient Energy Harvesters and Sensors for Wearable Applications, ***Cary Pint,*** Vanderbilt University
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**CA+2D+AS+BI+NS-ThM3** Probing Solid-liquid Interfaces with Tender X-rays, ***Zbynek Novotny,*** *N. Comini, B. Tobler,* University of Zuerich, Switzerland*; D. Aegerter, E. Fabbri,* Paul Sherrer Institute, Switzerland*; U. Maier,* Ferrovac GmbH, Switzerland*; L. Artiglia, J. Raabe, T. Huthwelker,* Paul Sherrer Institute, Switzerland*; J. Osterwalder,* University of Zuerich, Switzerland	**TF+EM+NS+SS-ThM3** Engineering Effective Back Contact Barrier by interfacial $MoSe_2$ defect states for CZTSe: nanolayer Ge solar cells., ***Sanghyun Lee,*** Indiana State University
9:00am	**CA+2D+AS+BI+NS-ThM4** X-ray Photoelectron Spectroscopy Insight into X-ray Induced Radiolysis at Heterogenous Liquid Electrolyte Interface, ***Christopher Arble,*** National Institute of Standards and Technology (NIST)*; H. Guo,* Southeast University, China*; E. Strelcov, B. Hoskins,* National Institute of Standards and Technology (NIST)*; M. Amati, P. Zeller, L. Gregoratti,* Elettra-Sincrotrone Trieste, Italy*; A. Kolmakov,* National Institute of Standards and Technology (NIST)	**TF+EM+NS+SS-ThM4** Development of Low-Cost, Crack-Tolerant Metallization Using Screen Printing for Increased Durability of Silicon Solar Cell Modules, *O.K. Abudayyeh,* Osazda Energy*; A. Chavez,* University of New Mexico*; J. Chavez,* Osazda Energy*; **Sang M. Han,*** University of New Mexico*; F. Zimbardi, B. Rounsaville, V. Upadhyaya, A. Rohatgi,* Georgia Institute of Technology*; B. McDanold, T. Silverman,* National Renewable Energy Laboratory
9:20am	**INVITED: CA+2D+AS+BI+NS-ThM5** Theoretical Investigation of Reactivity at Complex Solid-Liquid Interfaces*, R. Rousseau,* ***Manh Nguyen,*** Pacific Northwest National Laboratory	**TF+EM+NS+SS-ThM5** Fabrication of Optical Test Structures for Enhanced Absorption in Thin Multi-junction Solar Cells, ***Erin Cleveland,*** *N.A. Kotulak, S. Tomasulo, P. Jenkins,* U.S. Naval Research Laboratory*; A. Mellor, P. Pearce,* Imperial College London, UK*; N.J. Ekins-Daukes,* University of New South Wales, Australia*; M.K. Yakes,* U.S. Naval Research Laboratory
9:40am	Invited talk continues.	**TF+EM+NS+SS-ThM6** Phosphorus as a *p*-Dopant in Pyrite FeS_2, a Potential Low-cost earth-abundant Thin Film Solar Absorber, ***Bryan Voigt***[1]*, W. Moore, D. Ray, M. Manno,* University of Minnesota, Minneapolis*; J.D. Jeremiason,* Gustavus Adolphus College*; L. Gagliardi, E.S. Aydil, C. Leighton,* University of Minnesota, Minneapolis
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**CA+2D+AS+BI+NS-ThM10** In-situ/Operando Soft X-ray Spectroscopy for Interfacial Characterization of Energy Materials and Devices*, Y.-S. Liu, X. Feng,* ***Jinghua Guo,*** Lawrence Berkeley National Laboratory	**TF+EM+NS+SS-ThM10** Relaxor-ferroelectric Thin Films for Energy Harvesting from Low-grade Waste-heat, ***Amrit Sharma****, B. Xiao, S.K. Pradhan, M.J. Bahoura,* Norfolk State University
11:20am	**CA+2D+AS+BI+NS-ThM11** The Importance of Amino Acid Adsorption on Polymer Surfaces in *P. Aeruginosa* Biofilm Formation, ***Olutoba Sanni,*** University of Nottingham, UK	**TF+EM+NS+SS-ThM11** Thermal Treatment Effects on the Thermoelectric Devices from Sn/Sn+SnO_2 Thin Films, ***Satilmis Budak****, E. McGhee, Z. Xiao, E. Barnes, R. Norwood,* Alabama A&M University
11:40am		**TF+EM+NS+SS-ThM12** Thermoelectric Properties of Efficient Thermoelectric Devices from Sb/Sb+SnO_2 Thin Films, ***Eshirdanya McGhee****, S. Budak, Z. Xiao, N. Caver, B. McNeal,* Alabama A&M University
12:00pm		**TF+EM+NS+SS-ThM13** 3D Printed Triboelectric Nanogenerator*, I. Fattah, E. Utterback,* ***Naga Srinivas Korivi****, V. Rangari,* Tuskegee University

[1] **TFD James Harper Award Finalist**

	Room A124-125	
8:00am	**INVITED: LS+AS+SS-ThM1** X-Ray Insight into Fuel Cell Catalysis: Operando Studies of Model Surfaces and Working Devices, ***Jakub Drnec***, *I. Martens,* European Synchrotron Radiation Facility, France*; T. Fuchs,* University of Kiel, Germany*; T. Wiegmann,* European Synchrotron Radiation Facility, Germany*; A. Vamvakeros,* Finden Ltd., UK*; R. Chattot,* European Synchrotron Radiation Facility, France*; O.M. Magnussen,* University of Kiel, Germany	**Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic Session LS+AS+SS-ThM** **Operando Methods for Unraveling Fundamental Mechanisms in Devices Towards Renewable Energies** **Moderator:** Olivier Renault, CEA-LETI, France
8:20am	Invited talk continues.	
8:40am	**LS+AS+SS-ThM3** Multi-scale Operando X-ray Tomography of Solid-state Li Battery Electrolytes at Elevated Temperatures and Pressures, ***Natalie Seitzman***, Colorado School of Mines*; J. Nelson Weker,* SLAC National Accelerator Laboratory*; M. Al-Jassim,* National Renewable Energy Laboratory*; S. Pylypenko,* Colorado School of Mines	
9:00am	**LS+AS+SS-ThM4** Correlating the Atomic and Electronic Structure in the Formation 2DEGs in Complex Oxides, ***Jessica McChesney***, *X. Yan, F. Wrobel, H. Hong, D.D. Fong,* Argonne National Laboratory	
9:20am	**INVITED: LS+AS+SS-ThM5** Uncover the Mystery of Oxygen Chemistry in Batteries through High-Efficiency mRIXS and Theory, ***Wanli Yang***, Lawrence Berkeley National Laboratory	
9:40am	Invited talk continues.	
10:00am	**BREAK - Complimentary Coffee in Exhibit Hall A**	
10:20am		
10:40am		
11:00am	**LS+HC+SS-ThM10** How to Probe Solid/Liquid Interfaces using Standing-wave Photoemission?, ***Slavomir Nemsak***, Lawrence Berkeley National Laboratory*; H. Bluhm,* Fritz Haber Institute, Germany*; C.S. Fadley,* University of California, Davis	**Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic Session LS+HC+SS-ThM** **Frontiers of Time-resolved Techniques for Energy & Catalysis Highlight Session** **Moderator:** Jessica McChesney, Argonne National Laboratory
11:20am	**LS+HC+SS-ThM11** *In situ* Spectroscopy of Synthesis of Next-Generation Cathodes for Batteries, ***Feng Wang***, Brookhaven National Laboratory	
11:40am	**INVITED: LS+HC+SS-ThM12** Structural Heterogeneity and Dynamics of 2D Materials Studied by Full-field X-ray Diffraction Microscopy and Ultrafast Surface X-ray Diffraction, ***Haidan Wen***, Argonne National Laboratory	
12:00pm	Invited talk continues.	

Thursday Morning, October 24, 2019

	Magnetic Interfaces and Nanostructures Division Room A210 - Session MI+2D+AS+EM-ThM Novel Magnetic Materials and Device Concept for Energy efficient Information Processing and Storage **Moderators:** Mikel B. Holcomb, West Virginia University, Markus Donath, Westfälische Wilhelms-Universität Münster, Germany	Applied Surface Science Division Room A211 - Session AS-ThM Advances in Depth Profiling, Imaging and Time-resolved Analysis **Moderators:** Carl A. Ventrice, Jr., SUNY Polytechnic Institute
8:00am	**INVITED: MI+2D+AS+EM-ThM1** Using Novel Magnonic Device Concepts for Efficient Information Processing, ***Burkard Hillebrands***, Technical University Kaiserslautern, Germany	**INVITED: AS-ThM1** What Really Lies Beneath the AVS Surface? Depth Profiling Can Help Provide the Answer, ***Fred Stevie***, *C. Zhou, R. Garcia,* North Carolina State University
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**MI+2D+AS+EM-ThM3** Spin-Polarized Scanning Tunneling Microscopy of <10 nm Skyrmions in SrIrO3/SrRuO3 Bilayers, ***Joseph Corbett***, *J. Rowland, A. Ahmed, J.J. Repicky,* The Ohio State University; *K. Meng,* The Ohio State Univesity; *F.Y. Yang, M. Randeria, J.A. Gupta,* The Ohio State University	**AS-ThM3** TOF-SIMS Tandem MS Imaging of (Sub-)Monolayer Coatings for Device Processing, ***David M. Carr***, *G.L. Fisher,* Physical Electronics
9:00am	**INVITED: MI+2D+AS+EM-ThM4** Relieving YIG from its Substrate Constraints - YIG Resonators on Various Crystalline Substrate Materials, ***Georg Schmidt***, Martin-Luther-Universität Halle-Wittenberg, Germany	**AS-ThM4** TOF-SIMS at the Edge, ***Alan Spool***, *D. Bilich,* Western Digital Corporation
9:20am	Invited talk continues.	**AS-ThM5** Variation of SIMS Secondary Ion Yield of Si and Mg Dopants in GaN Grown by MOCVD, ***M. K. Indika Senevirathna***, Clark Atlanta University; *A.Y. Kozhanov, M. Vernon, G.B. Cross,* Georgia State University; *G. Cooke,* Hiden Analytical Ltd, UK; *M.D. Williams,* Clark Atlanta University
9:40am	**MI+2D+AS+EM-ThM6** Magnetic Textures in Chiral Magnet MnGe Observed with SP-STM, ***Jacob Repicky***, *J.P. Corbett, T. Liu, R. Bennett, A. Ahmed,* The Ohio State University; *J. Guerrero-Sanchez,* National Autonomous University of Mexico; *R. Kawakami, J.A. Gupta,* The Ohio State University	
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**INVITED: MI+2D+AS+EM-ThM10** Dzyaloshinskii-Moriya Interaction in Magnetic Multilayers, ***Hans Nembach***, National Institute of Sandards and Technology (NIST)	**AS-ThM10** Probing the Surface Structure of Au-Pt Core-Shell Nanoparticles, *C. Engelbrekt,* ***Ich Tran***, *M. Law,* University of California, Irvine
11:20am	Invited talk continues.	**AS-ThM11** Correlating Multiple Data Streams for Valence State Identification in Transition Metal Oxide during XPS Depth Profiling, ***Zhenzhong Yang***, *C. Wang, M.H. Engelhard, Z.H. Zhu, Y. Du,* Pacific Northwest National Laboratory
11:40am	**INVITED: MI+2D+AS+EM-ThM12** Transport in Goniopolar and (pxn) Metals, ***Joseph Heremans***, *B. He, L. Zheng, Y. Wang, M.Q. Arguilla, N.D. Cultrara, M.R. Scudder, J.E. Goldberger, W. Windl,* The Ohio State University	**AS-ThM12** Using Atom Probe Tomography for Three-dimensional Visualization of Sb Segregation in InAs/InAsSb Superlattices, ***Nicole Kotulak***, *J.A. Nolde, M.E. Twigg, K.E. Knipling,* U.S. Naval Research Laboratory; *D. Lubyshev, J.M. Fastenau, A.W.K. Liu,* IQE Inc.; *E. Aifer,* U.S. Naval Research Laboratory
12:00pm	Invited talk continues.	**AS-ThM13** Multi-technique Surface Analysis of Graphenes, ***Kateryna Artyushkova***, Physical Electronics and University of New Mexico; *B.W. Schmidt, J.E. Mann, A.A. Ellsworth, J.G. Newman,* Physical Electronics

Thursday Morning, October 24, 2019

	Fundamental Aspects of Material Degradation Focus Topic **Room A212 - Session DM+BI+SS-ThM** **Material Stabilities and Technology for Degradation Protection** **Moderators:** Markus Valtiner, Vienna University of Technology, Austria, Gareth S. Parkinson, TU Wien, Austria	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Room A213 - Session HC+2D+SS-ThM** **Nanoscale Surface Structure in Heterogeneously-Catalyzed Reactions** **Moderators:** Rebecca Fushimi, Idaho National Laboratory, Eric High, Tufts University
8:00am	**DM+BI+SS-ThM1** Extremely Thin Protective Oxide Layer for Reflective Silver Thin Films, ***Midori Kawamura**, E. Kudo, Y. Sasaki, T. Kiba, Y. Abe, K.H. Kim,* Kitami Institute of Technology, Japan*; H. Murotani,* Tokai University, Japan	
8:20am	**DM+BI+SS-ThM2** Influence of the Electric Double Layer on Degradation of Materials, ***Dominik Dworschak**, M. Valtiner,* Vienna University of Technology, Austria	**HC+2D+SS-ThM2** Low-temperature Investigation of Propylene on TiO_2/Au(111), *M. Gillum, M. DePonte, J. Wilke, E. Maxwell, V. Lam, D. Schlosser,* ***Ashleigh Baber**,* James Madison University
8:40am	**INVITED: DM+BI+SS-ThM3** Key Issues for the Stability of Protective Surface Oxides, ***Philippe Marcus**,* CNRS - Chimie ParisTech, France	**INVITED: HC+2D+SS-ThM3** Structure and Reactivity of Supported Oxide and Metal Nanoparticles, ***Geoff Thornton**,* University College London, UK
9:00am	Invited talk continues.	Invited talk continues.
9:20am	**DM+BI+SS-ThM5** Controlling and Observing Localized Dealloying Corrosion and Dissolution via Lateral Modification of Surfactant Inhibitor Layers, *S. Neupane,* Hasselt University, Belgium*;* ***Frank Uwe Renner**,* IMEC vzw. Division IMOMEC, Belgium	**HC+2D+SS-ThM5** Catalysis by Well-defined Oxide Nanostructures: From Atomic-scale Properties to Rational Design, ***Fan Yang**,* Dalian Institute of Chemical Physics, China
9:40am	**DM+BI+SS-ThM6** *In Situ* Characterization of Interactions at Polymer/Metal Oxide Interfaces Under Aqueous Conditions by a Spectro-electrochemical Approach, ***Sven Pletincx**,* Vrije Universiteit Brussel, Belgium*; L.-L. Fockaert, J.M.C. Mol,* Delft University of Technology, Netherlands*; H. Terryn, T. Hauffman,* Vrije Universiteit Brussel, Belgium	**HC+2D+SS-ThM6** Structural and Chemical Effects of Cesium on the Cu(111) and Cu_xO/Cu(111) Surface, ***Rebecca Hamlyn**[1],* Stony Brook University*; M. Mahapatra,* Brookhaven National Laboratory*; I. Orozco,* Stony Brook University*; M.G. White, S. Senanayake, J.A. Rodriguez,* Brookhaven National Laboratory
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**INVITED: DM+BI+SS-ThM10** Design of Corrosion Resistant High Entropy Alloys, ***Gerald Frankel**, C.D. Taylor, W. Windl,* The Ohio State University*; J.R. Scully,* University of Virginia*; J. Locke,* The Ohio State University*; P. Lu,* Questek Innovations	**INVITED: HC+2D+SS-ThM10** Mythbusting: From Single Crystals in UHV to Catalytic Reactors*, R.J. Madix,* ***Christian Reece**,* Harvard University
11:20am	Invited talk continues.	Invited talk continues.
11:40am	**DM+BI+SS-ThM12** Determination of Hydrogen in High Strength Steels using Scanning Kelvin Probe Force Microscopy, ***Ines Traxler**, G. Schimo-Aichhorn,* CEST Competence Centre for Electrochemical Surface Technology, Austria*; A. Muhr, G. Luckeneder, H. Duchaczek, K.-H. Stellnberger,* voestalpine Stahl GmbH, Austria*; D. Rudomilova, T. Prosek,* University of Chemistry and Technology Prague, Czech Republic*; B. Lutzer,* CEST Competence Centre for Electrochemical Surface Technology, Austria*; D. Stifter, S. Hild,* Johannes Kepler University Linz, Austria	**HC+2D+SS-ThM12** Cooperativity Between Pd and AgO_x Phases on Ag(111), *V. Mehar, M. Yu,* ***Jason Weaver**,* University of Florida
12:00pm	**DM+BI+SS-ThM13** Reflection Mode Interferometry for studying interfacial processes, ***Kai Schwenzfeier**, P. Bilotto, M. Lengauer, C. Merola, H.-W. Cheng, M. Valtiner,* TU Wien, Austria	**HC+2D+SS-ThM13** Migration Across Metal/Metal Oxide Interfaces: Enhancing the Reactivity of Ag Oxide with H_2 by the Presence of Pd/Pd Oxide, ***Christopher O'Connor**[1], M.A. van Spronsen, E. Muramoto, T. Egle, R.J. Madix, C.M. Friend,* Harvard University

[1] **Heterogeneous Catalysis Graduate Student Presentation Award Finalist**

	Electronic Materials and Photonics Division **Room A214 - Session EM+AP+MS+NS+TF-ThM** **Advanced Processes for Interconnects and Devices** **Moderators:** Andy Antonelli, Nanometrics, Bryan Wiggins, Intel Corporation	**Advanced Surface Engineering Division** **Room A215 - Session SE+PS-ThM** **Plasma-assisted Surface Modification and Deposition Processes** **Moderators:** Robert Franz, Montanuniversität Leoben, Austria, Jianliang Lin, Southwest Research Institute
8:00am	**EM+AP+MS+NS+TF-ThM1** High-density Plasma for Soft Etching of Noble Metals, ***Gerhard Franz***, *V. Sushkov,* Munich University of Applied Sciences, Germany; *W. Oberhausen, R. Meyer,* Technische Universität München, Germany	**SE+PS-ThM1** Core/Shell Particles using a Plasma-based Reactors, ***Santiago Vargas-Giraldo***, *D. Galeano-Osorio, C. Castano,* Virginia Commonwealth University
8:20am	**EM+AP+MS+NS+TF-ThM2** Crystalline InP Growth and Device Fabrication Directly on Amorphous Dielectrics at Temperatures below 400°C for Future 3D Integrated Circuits, ***Debarghya Sarkar***, *Y. Xu, S. Weng, R. Kapadia,* University of Southern California	**SE+PS-ThM2** Formation Mechanisms of Converted Layer During Erosion of Composite Al-Cr Arc Cathodes, ***Mehran Golizadeh***, *F. Mendez Martin, B. Rashkova,* Montanuniversität Leoben, Austria; *S. Kolozsvári,* Plansee Composite Materials GmbH, Lechbruck am See, Germany; *R. Franz,* Montanuniversität Leoben, Austria
8:40am	**INVITED: EM+AP+MS+NS+TF-ThM3** The Role and Requirements of Selective Deposition in Advanced Patterning, ***Charles Wallace***, Intel Corporation	**SE+PS-ThM3** Self-organization of Plasma in RF Magnetron Sputtering, ***Matjaz Panjan***, Jozef Stefan Institute, Slovenia
9:00am	Invited talk continues.	**SE+PS-ThM4** Study of High Power Pulsed Magnetron Sputtering Discharge with Positive Bias on the Target after the Main Pulse, ***Ivan Shchelkanov***, *T.J. Houlahan, J. McLain, I.F. Haehnlein, B.E. Jurczyk, R. Stubbers,* Starfire Industries LLC; *D.E. Barlaz, D.N. Ruzic,* University of Illinois at Urbana-Champaign
9:20am	**EM+AP+MS+NS+TF-ThM5** Graphene-Template Assisted Selective Epitaxy (G-TASE) of Group IV Semiconductors, ***M. Arslan Shehzad***, *A. T. Mohabir, M.A. Filler,* Georgia Institute of Technology	**INVITED: SE+PS-ThM5** Innovative PVD Strategies for the Design of Novel TiO_2-based Photoanode Utilized in Dye-sensitized Solar Cells, ***Rony Snyders***, University of Mons, Belgium
9:40am	**EM+AP+MS+NS+TF-ThM6** Resistivity and Surface Scattering Specularity at (0001) Ru/dielectric Interfaces, *S.S. Ezzat,* University of Central Florida; *P.D. Mani,* View Dynamic Glass, Inc.; *A. Khaniya, W.E. Kaden,* University of Central Florida; *D. Gall,* Rensselaer Polytechnic Institute; *K. Barmak,* Columbia University; ***Kevin Coffey***, University of Central Florida	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**INVITED: EM+AP+MS+NS+TF-ThM10** Electrochemical Atomic Layer Deposition and Etching of Metals for Atomically-Precise Fabrication of Semiconductor Interconnects, *Y. Gong, K. Venkatraman,* ***Rohan Akolkar***, Case Western Reserve University	**SE+PS-ThM10** Enhancing the Far Ultra-Violet Optical Properties of Aluminum Mirrors with a Single Step Approach to Oxide Removal and Fluorine Passivation, ***David Boris***, U.S. Naval Research Laboratory; *A.C. Kozen, S.G. Rosenberg,* American Society for Engineering Education (residing at U.S. Naval Research Laboratory); *J. del Hoyo, J.G. Richardson, M.A. Quijada,* NASA Goddard Spaceflight Center; *S.G. Walton,* U.S. Naval Research Laboratory
11:20am	Invited talk continues.	**SE+PS-ThM11** Improving the Crystallinity of Inorganic Coatings Synthesized by Atmospheric Plasma using a New Device for Heating the Substrate, ***Antoine Remy***, *M.S. Fall, F. Reniers,* Université Libre de Bruxelles, Belgium
11:40am	**EM+AP+MS+NS+TF-ThM12** Mechanical Properties of Patterned low-κ Films Measured by Brillouin Light Scattering, ***Jon Zizka***, *H. Wijesinghe,* The Ohio State University; *S.W. King, H.J. Yoo,* Intel Corporation, USA; *R. Sooryakumar,* The Ohio State University	**SE+PS-ThM12** Improved Nitride Formation on Titanium Substrates by Femtosecond Laser Processing with Secondary Plasma, ***Jeremy Mettler***, *D.E. Barlaz,* University of Illinois at Urbana-Champaign; *B.E. Jurczyk,* Starfire Industries LLC; *D.N. Ruzic,* University of Illinois at Urbana-Champaign
12:00pm	**EM+AP+MS+NS+TF-ThM13** Wafer-Scale Fabrication of Carbon-Based Electronic Devices, ***Zhigang Xiao***, *J. Kimbrough, J. Cooper, K. Hartage, Q. Yuan,* Alabama A&M University	**SE+PS-ThM13** Characterizing the Spatially Dependent Properties of Plasma Polymerized Acrylic Acid Films, ***Karyn Jarvis***, *S.L. McArthur,* Swinburne University of Technology, Australia

Thursday Morning, October 24, 2019

	2D Materials Room A216 - Session 2D+EM+MI+NS+QS+SS-ThM Dopants, Defects, and Interfaces in 2D Materials **Moderator:** Evan Reed, Stanford University	Surface Science Division Room A220-221 - Session SS+AS+HC+TL-ThM Surface Science of Energy Conversion and Storage **Moderators:** Steven L. Tait, Indiana University, Francisco Zaera, University of California, Riverside
8:00am	**INVITED: 2D+EM+MI+NS+QS+SS-ThM1** Interfacial Engineering of Chemically Reactive Two-Dimensional Materials, ***Mark Hersam***, Northwestern University	**INVITED: SS+AS+HC+TL-ThM1** Chemical and Electrochemical Stability of Perovskite Oxide Surfaces in Energy Conversion: Mechanisms and Improvements, ***Bilge Yildiz***, Massachusetts Institute of Technology
8:20am	Invited talk continues.	Invited talk continues.
8:40am	**2D+EM+MI+NS+QS+SS-ThM3** Effects of Mn Doping on the Surface Electronic Band Structure and Bulk Magnetic Properties of ZnS and CdS Quantum Dot Thin Films, ***Thilini K. Ekanayaka***[1], *G. Gurung,* University of Nebraska-Lincoln; *G. Rimal,* Rutgers University; *S. Horoz,* Siirt University, Turkey; *J. Tang, T. Chien,* University of Wyoming; *T. Paudel, A.J. Yost,* University of Nebraska-Lincoln	**SS+AS+HC+TL-ThM3** Mechanism of Oxygen Reduction Reaction on Nitrogen-doped Carbon Catalysts, ***Junji Nakamura***, University of Tsukuba, Japan
9:00am	**2D+EM+MI+NS+QS+SS-ThM4** Interaction of Molecular O_2 with Organolead Halide Nanorods by Single-Particle Fluorescence Microscopy, ***Juvinch Vicente***, *J. Chen,* Ohio University	**SS+AS+HC+TL-ThM4** Copper Corrosion Inhibition Investigated on the Molecular Scale Using APXPS, ***Bo-Hong Liu***, Lawrence Berkeley National Laboratory; *O. Karslıoğlu,* Lawrence Berkeley Nationa lLaboratory; *M.B. Salmeron, S. Nemšák,* Lawrence Berkeley National Laboratory; *H. Bluhm,* Fritz Haber Institute of the Max Planck Society, Germany
9:20am	**2D+EM+MI+NS+QS+SS-ThM5** Complementary Growth of 2D Transition Metal Dichalcogenide Semiconductors on Metal Oxide Interfaces, *T.E. Wickramasinghe,* ***Gregory Jensen***, *R. Thorat,* Nanoscale and Quantum Phenomena Institute; *S.H. Aleithan,* Nanoscale and Quantum Phenomena Institute, Saudi Arabia; *S. Khadka, E. Stinaff,* Nanoscale and Quantum Phenomena Institute	**INVITED: SS+AS+HC+TL-ThM5** Analysis and Deliberate Modification of Electrochemical Interfaces, ***Esther Takeuchi***, *K. Takeuchi, A. Marschilok,* Stony Brook University
9:40am	**2D+EM+MI+NS+QS+SS-ThM6** Kagome-type Lattice Instability and Insulator-metal Transition in an Alkali-doped Mott Insulator on Si(111), ***Tyler Smith***, *H. Weitering,* University of Tennessee Knoxville	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**2D+EM+MI+NS+QS+SS-ThM10** Chemical Migration and Dipole Formation at TMD/TI Interfaces, ***Brenton Noesges***, *T. Zhu,* The Ohio State University; *D. O'Hara,* University of California, Riverside; *R. Kawakami, L.J. Brillson,* The Ohio State University	**SS+AS+HC+TL-ThM10** An Investigation on Active Sites of La_2O_3 Catalyst for OCM Reaction: A Combined Study of *in situ* XRD, XPS and Online MS, ***Yong Yang***, *C. Guan, E.I. Vovk, Z. Liu, X. Zhou, J.P.H. Liu, Y. Pang,* ShanghaiTech University, China
11:20am	**2D+EM+MI+NS+QS+SS-ThM11** Atomically Resolved Electronic Properties of Defects in the in-plane Anisotropic Lattice of ReS_2, ***Adina Luican-Mayer***, University of Ottawa, Canada	**SS+AS+HC+TL-ThM11** Interaction of Amino Acids on Au(111) as Studied with EC-STM: From Islands to Magic Fingers, *J.A. Phillips, K.P. Boyd, I. Baljak, L.K. Harville,* ***Erin Iski***, University of Tulsa
11:40am	**2D+EM+MI+NS+QS+SS-ThM12** Charge Diminishing at the Si-SiO_2 System and its Influence on the Interface Properties, ***Daniel Kropman***, *viktor. Seeman,* Tartu University, Estonia; *A. Medvids, P. Onufrievs,* Riga Technical University, Latvia	**SS+AS+HC+TL-ThM12** Deposition and Structure of MoO_3 Clusters on Anatase TiO_2 (101), ***Nassar Doudin***, *Z. Dohnálek,* Pacific Northwest National Laboratory
12:00pm	**2D+EM+MI+NS+QS+SS-ThM13** Size-independent "Squeezed" Shape of Metal Clusters Embedded Beneath Layered Materials, *A. Lii-Rosales,* Ames Laboratory and Iowa State University; *S. Julien, K.-T. Wan,* Northeastern University; *Y. Han,* Ames Laboratory and Iowa State University; *K.C. Lai,* Iowa State University; *M.C. Tringides, J.W. Evans,* ***Patricia A. Thiel***, Ames Laboratory and Iowa State University	**SS+AS+HC+TL-ThM13** Ionic Conducting Nanostructures Tailored on Porous Mixed Conduction Composite Electrodes for Enhancement of Oxygen Reduction Reaction, ***Jong-Eun Hong***, *D.W. Joh, S.G. Kim, H.A. Ishfaq,* Korea Institute of Energy Research, Republic of Korea; *C.H. Jung, J.H. Park,* DGIST, Republic of Korea; *S.B. Lee, H.S. Kim, T.H. Lim, S.J. Park, R.H. Song,* Korea Institute of Energy Research, Republic of Korea; *K.T. Lee,* DGIST, Republic of Korea

[1] **National Student Award Finalist**

Thursday Morning, October 24, 2019

	Nanometer-scale Science and Technology Division **Room A222 - Session NS+2D+QS-ThM** **Direct Atomic Fabrication by Electron and Particle Beams & Flash Session** **Moderators:** Canhui Wang, National Institute of Standards and Technology (NIST), Xiaolong Liu, Northwestern University	**Manufacturing Science and Technology Group** **Room A226 - Session MS+EM+QS-ThM** **Science and Technology for Manufacturing: Neuromorphic and Quantum Computing (ALL INVITED SESSION)** **Moderators:** Nathaniel C. Cady, SUNY Polytechnic Institute, Albany, Alain C. Diebold, SUNY Polytechnic Institute, Albany
8:00am	**NS+2D+QS-ThM1** Multiprobe Scanning Tunneling Microscopy and Spectroscopy: Atomic-level Understanding of Quantum Transport in Functional Systems, ***Marek Kolmer***[1], *W. Ko, A.-P. Li,* Oak Ridge National Laboratory	
8:20am	**INVITED: NS+2D+QS-ThM2** Light and Heavy Ions from New Non-classical Liquid Metal Ion Sources for Advanced Nanofabrication, ***Paul Mazarov***, RAITH GmbH, Germany*; T. Richter, L. Bruchhaus, R. Jede,* Raith GmbH*; Y. Yu, J.E. Sanabia,* Raith America*; L. Bischoff,* Helmholtz Zentrum Dresden-Rossendorf, Germany*; J. Gierak,* CNRS—Université Paris-Sud, France	
8:40am	Invited talk continues.	**INVITED: MS+EM+QS-ThM3** Materials and Fabrication Challenges for Neuromorphic and Quantum Computing Devices, *S. Olson, C. Hobbs, H. Chong, J. Nalaskowski, H. Stamper, J. Mucci, B. Martinick, M. Zhu, K. Beckmann, I. Wells, C. Johnson, V. Kaushik, T. Murray, S. Novak, S. Bennett, M. Rodgers, C. Borst, N.C. Cady, M. Liehr,* ***Satyavolu Papa Rao***, SUNY Polytechnic Institute
9:00am	**INVITED: NS+2D+QS-ThM4** Visualizing the Interplay between Spatial and Magnetic Confinement in Graphene Quantum Dots, ***Joseph Stroscio***, National Institute of Standards and Technology (NIST)	Invited talk continues.
9:20am	Invited talk continues.	**INVITED: MS+EM+QS-ThM5** IBM Q: Quantum Computing in the 21st Century, ***Robert Sutor***, IBM Research
9:40am	**NS+2D+QS-ThM6** Using Controlled Manipulation of Molecules to Trace Potential Energy Surfaces of Adsorbed Molecules, *O.E. Dagdeviren, C. Zhou,* Yale University*; M. Todorovic,* Aalto University, Finland*;* ***Eric Altman****, U.D. Schwarz,* Yale University	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**NS+2D+QS-ThM10** Direct Writing of Functional Heterostructures in Atomically Precise Single Graphene Nanoribbons, ***Chuanxu Ma***, Oak Ridge National Laboratory*; Z. Xiao,* North Carolina State University*; J. Huang, L. Liang,* Oak Ridge National Laboratory*; W. Lu,* North Carolina State University*; K. Hong, B.G. Sumpter,* Oak Ridge National Laboratory*; J. Bernholc,* North Carolina State University*; A.-P. Li,* Oak Ridge National Laboratory	**INVITED: MS+EM+QS-ThM10** Quantum Information Science at AFRL, ***Michael Hayduk***, Air Force Research Laboratory
11:20am	**NS+2D+QS-ThM11** Effects of Helium and Neon Processing on 2D Material Properties, ***Alex Belianinov***, Oak Ridge National Laboratory*; S. Kim,* Pusan National University, South Korea*; V. Iberi, S. Jesse, O.S. Ovchinnikova,* Oak Ridge National Laboratory	Invited talk continues.
11:40am	**NS+2D+QS-ThM12** Operating Molecular Propeller in Quantum Regime with Directional Control*, Y. Zhang,* ***Tolulope Ajayi***, Ohio University*; J.P. Calupitan,* Université de Toulouse, France*; R. Tumbleson,* Ohio University*; G. Erbland, C. kammerer,* CEMES-CNRS, France*; S. Wang,* Ohio University*; L. Curtiss, A. Ngo,* Argonne National Laboratory*; G. Rapenne,* NAIST, Japan*; S.-W. Hla,* Ohio University	**INVITED: MS+EM+QS-ThM12** Neuromorphic Computing: From Emerging Devices to Neuromorphic System-on-a-Chip, ***Vishal Saxena***, University of Idaho
12:00pm	**NSTD FLASH SESSION:** **QIAN ZHANG**, (NS-ThP4); **YONGTAO LIU,** (NS-ThP5); **JONATHAN SKELTON,** (NS-ThP6); **UMBERTO CELANO,** (NS-ThP8)	Invited talk continues.

[1] **NSTD Early Career Award Finalist**

Thursday Morning, October 24, 2019

	Atomic Scale Processing Focus Topic **Room B130 - Session AP+PS+TF-ThM** **Thermal Atomic Layer Etching** **Moderators:** Eric A. Joseph, IBM T.J. Watson Research Center, Harutyun Melikyan, Micron Technology	**Plasma Science and Technology Division** **Room B131 - Session PS-ThM** **Plasma Diagnostics and Sources II** **Moderators:** Geun Young Yeom, Sungkyunkwan University, Republic of Korea, Wei Tan, Applied Materials
8:00am	**INVITED: AP+PS+TF-ThM1** A Challenge for Selective Atomic Layer Etching of Non-volatile Materials Using Organometalic Complex, ***Yoshihide Yamaguchi,*** *S. Fujisaki, K. Shinoda,* Hitachi, Japan*; H. Kobayashi, K. Kawamura, M. Izawa,* Hitachi High Technologies, Japan	**PS-ThM1** Measurement of Plasma Neutral Densities in a Very High Frequency Ar/NH_3 Plasma with a Line-of-sight Threshold Ionization Mass Spectrometry, ***Jianping Zhao,*** *P.L.G. Ventzek, C. Schlechte, M. Burtner,* Tokyo Electron America, Inc.*; D. Li, J.G. Ekerdt,* The University of Texas at Austin*; T. Iwao, K. Ishibashi,* Tokyo Electron Technology Solutions Limited, Japan
8:20am	Invited talk continues.	**PS-ThM2** Radical Probe System for In-Situ Measurements of Hydrogen, Oxygen and Nitrogen Radical Densities, ***Dren Qerimi,*** *G.A. Panici, A.J. Jain,* University of Illinois at Urbana-Champaign*; J.W. Wagner,* Colorado State University*; D.N. Ruzic,* University of Illinois at Urbana-Champaign
8:40am	**AP+PS+TF-ThM3** Characterization of Isotropic Thermal ALE of Oxide Films and Nanometer-Size Structures, ***Andreas Fischer,*** *A. Routzahn, T.B. Lill,* Lam Research Corporation	**PS-ThM3** Post Charge Separation Grid Ion Flux Evaluation in Inductive Coupled Plasma Source Downstream Asher, ***Luke Zhang,*** *S. Ma,* Mattson Technology, Inc.
9:00am	**AP+PS+TF-ThM4** Advanced Selective Chemical Dry Etch for Oxide and Si-based Material, ***Li-Hung Chen,*** *T. Kato, K. Nakahata, K. Takeya,* Tokyo Electron Technology Solutions Limited, Japan	**PS-ThM4** Development of a Novel Langmuir Probe for the Investigation of Dusty Non-thermal Plasmas, ***Austin Woodard***[1]*, L. Mangolini, K. Shojaei, C. Berrospe,* University of California, Riverside
9:20am	**AP+PS+TF-ThM5** Mechanisms of Thermal Atomic Layer Etching (ALE) of Metal by Deprotonation and Complex Formation of Hexafluoroacetylacetone (hfacH), ***Abdulrahman Basher***[1]*, I. Hamada,* Osaka University, Japan*; M. Krstic,* Karlsruhe Institute of Technology (KIT), Germany*; M. Isobe, T. Ito,* Osaka University, Japan*; K. Fink,* Karlsruhe Institute of Technology (KIT), Germany*; K. Karahashi, Y. Morikawa,* Osaka University, Japan*; W. Wenzel,* Karlsruhe Institute of Technology (KIT), Germany*; S. Hamaguchi,* Osaka University, Japan	**INVITED: PS-ThM5** Historical Review of Microwave Plasma Diagnostics using Plasma Cutoff Phenomenon, ***Shin-Jae You,*** *S.J. Kim,* Chungnam National University, Republic of Korea*; Dw. Kim,* KIMM, Republic of Korea
9:40am	**AP+PS+TF-ThM6** Thermal Atomic Layer Etching of Amorphous and Crystalline Al_2O_3 Films, ***Jessica A. Murdzek,*** *S.M. George,* University of Colorado at Boulder	Invited talk continues.
10:00am 10:20am 10:40am	**BREAK - Complimentary Coffee in Exhibit Hall A**	**BREAK - Complimentary Coffee in Exhibit Hall A**
11:00am	**AP+PS+TF-ThM10** Thermal Atomic Layer Etching (ALE) of Germanium-Rich SiGe Films, ***Aziz Abdulagatov,*** *S.M. George,* University of Colorado at Boulder	**PS-ThM10** Characterization of Inductive Coupled Plasma Source RF Power Pulsing for Advanced Surface Treatment Applications, ***Shawming Ma,*** *L. Zhang, D. Kohl,* Mattson Technology, Inc.
11:20am	**AP+PS+TF-ThM11** Thermal Atomic Layer Etching of GaN and Ga_2O_3 Using Sequential Fluorination and Ligand-Exchange Reactions, ***Nicholas Johnson,*** *Y. Lee, S.M. George,* University of Colorado at Boulder	**PS-ThM11** In-situ Measurement of Deposited Tilm Thickness and Electron Density by Double Curling Probe, ***Daisuke Ogawa,*** Chubu University, Japan*; Y. Sakiyama,* Lam Research Corporation*; K. Nakamura,* Chubu University, Japan*; H. Sugai,* Nagoya Industrial Science Research Institute, Japan
11:40am	**INVITED: AP+PS+TF-ThM12** Mechanistic Insights into Thermal Dry Atomic Layer Processing of Metals, ***Andrew Teplyakov,*** University of Delaware	**PS-ThM12** Study of Selective PECVD of Silicon on Silicon Nitride and Aluminum Oxide, ***Ghewa Akiki,*** *E.V. Johnson, P. Bulkin,* LPICM, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris, France*; D. Daineka,* LPICM, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris
12:00pm	Invited talk continues.	

[1] **Coburn & Winters Student Award Finalist**

Room B231-232

Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic
Session HI+NS-ThM
Novel Beam Induced Material Engineering and Nano-Patterning
Moderators:
Olga S. Ovchinnikova, Oak Ridge National Laboratory, Shinichi Ogawa, National Institute of Advanced Industrial Science and Technology (AIST)

8:00am	**INVITED: HI+NS-ThM1** Tuning out-of-plane Piezoelectricity in 2D Materials using Ion Beams, ***Yunseok Kim,*** Sungkyunkwan University, Republic of Korea
8:20am	Invited talk continues.
8:40am	**INVITED: HI+NS-ThM3** Defect Engineering of Ferroelectric Thin Films – Leveraging Ion Beams for Improved Function, ***Lane Martin,*** University of California at Berkeley
9:00am	Invited talk continues.
9:20am	**HI+NS-ThM5** Exploring Proximity Effects and Large Depth of Field in Helium Ion Beam Lithography: Large-area Dense Patterns and Tilted Surface Exposure, ***Ranveig Flatabø,*** Univeristy of Bergen, Norway*; A. Agarwal,* Massachusetts Institute of Technology*; R. Hobbs,* Trinity College Dublin*; M. M. Greve,* Univeristy of Bergen*; B. Holst,* Univeristy of Bergen, Norway*; K.K. Berggren,* Massachusetts Institute of Technology
9:40am	**HI+NS-ThM6** Fabrication of Plasmonic Nanostructures by Helium-Ion Milling, ***André Beyer,*** *M. Westphal,* Bielefeld University, Germany*; S. Stephan,* Oldenburg University, Germany*; D. Emmrich, H. Vieker,* Bielefeld University, Germany*; K. Chen,* Jinan University, Guangzhou, China*; G. Razinskas, H. Gross, B. Hecht,* Würzburg University, Germany*; M. Silies,* Oldenburg University, Germany*; A. Gölzhäuser,* Bielefeld University, Germany
10:00am	**BREAK - Complimentary Coffee in Exhibit Hall A**
10:20am	
10:40am	
11:00am	**INVITED: HI+NS-ThM10** Towards Atomically Precise Carbon Quantum Electronic Devices, *J.L. Swett,* University of Oxford, UK*; O. Dyck, S. Jesse,* Oak Ridge National Laboratory*; **Jan Mol,*** Queen Mary University of London, UK
11:20am	Invited talk continues.
11:40am	**HI+NS-ThM12** Fabrication of High-Q nanofiber Bragg Cavity Using a Helium Ion Microscope, ***Hideaki Takashima,*** Kyoto university, Japan*; A. Fukuda, H. Maruya, T. Tashima,* Kyoto University, Japan*; A. Schell,* Central European Institute of Technology, Czech Republic*; S. Takeuchi,* Kyoto University, Japan
12:00pm	**HI+NS-ThM13** Time of Flight Secondary Ion Mass Spectrometry in the Helium Ion Microscope for Battery Materials and Other Nanoscale Problems, *N. Klingner,* Helmholtz Zentrum Dresden-Rossendorf, Germany*; **Gregor Hlawacek,*** Helmholtz-Zentrum Dresden Rossendorf, Germany*; L.J. Wheatcroft, B.J. Inkson,* University of Sheffield, UK*; R. Heller,* Helmholtz Zentrum Dresden-Rossendorf, Germany

	Chemical Analysis and Imaging Interfaces Focus Topic **Room A120-121 - Session CA+NS+SS+VT-ThA** **Progress in Instrumentation and Methods for Spectro-microscopy of Interfaces** **Moderators:** Jinghua Guo, Lawrence Berkeley National Laboratory, Andrei Kolmakov, National Institute of Standards and Technology (NIST)	**Thin Films Division** **Room A122-123 - Session TF+SS-ThA** **Metal Halide Perovskites, Other Organic/Inorganic Hybrid Thin Films** **Moderators:** Mark Losego, Georgia Institute of Technology, Greg Szulczewski, University of Alabama
2:20pm	**INVITED: CA+NS+SS+VT-ThA1** Helium and Neon Ion Beams for the Imaging and Analysis of Interfaces, ***John A. Notte***, *C. Guillermier, F. Khanom, B. Lewis,* Carl Zeiss PCS, Inc.	**INVITED: TF+SS-ThA1** Tailoring Electrode-electrolyte Interfaces in Lithium-ion Batteries using Molecularly Engineered Functional Polymers, ***Laisuo Su***, Carnegie Mellon University; *J. Weaver,* National Institute of Standards and Technology (NIST); *M. Groenenboom,* National Institute of Sandards and Technology (NIST); *B.R. Jayan,* Carnegie Mellon University
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**INVITED: CA+NS+SS+VT-ThA3** Interfacial Studies using Ambient Pressure XPS, ***Paul Dietrich***, *A. Thissen,* SPECS Surface Nano Analysis GmbH, Germany	**TF+SS-ThA3** Chemoselective Adsorption of Alkyne-functionalized Cyclooctynes for the Formation of Si/organic Interfaces, *C. Laenger,* ***Julian Heep***, Justus-Liebig-University, Giessen, Germany; *P. Nikodemiak, T. Bohamud,* Philipps-University, Marburg, Germany; *P. Kirsten,* Justus-Liebig-University, Giessen, Germany; *U. Hoefer, U. Koert,* Philipps-University, Marburg, Germany; *M. Duerr,* Justus-Liebig-University, Giessen, Germany
3:20pm	Invited talk continues.	**TF+SS-ThA4** Durability of Property Changes in Polyester Fabrics Infused with Inorganics via Vapor Phase Infiltration, ***Kira Pyronneau***, *E.K. McGuinness, M.D. Losego,* Georgia Institute of Technology
3:40pm	**BREAK**	**BREAK**
4:00pm	**INVITED: CA+NS+SS+VT-ThA6** Operando Spectroscopy and Microscopy of the Electrode-Electrolyte Interface in Batteries, ***Feng Wang***, Brookhaven National Laboratory	**INVITED: TF+SS-ThA6** Materials Synthesis and Device Fabrication for Novel Inorganic Perovskites, ***Mingzhen Liu***, UESTC, China
4:20pm	Invited talk continues.	Invited talk continues.
4:40pm	**CA+NS+SS+VT-ThA8** Ultrasensitive Combined Tip- and Antenna-Enhanced Infrared Nanoscopy of Protein Complexes, *B.T. O'Callahan,* Pacific Northwest National Laboratory; *M. Hentschel,* University of Stuttgart, Germany; *M.B. Raschke,* University of Colorado Boulder; *P.Z. El-Khoury,* Pacific Northwest National Laboratory; ***Scott Lea***, Pacific Northwest National Laboratory	**TF+SS-ThA8** Carrier-Gas Assisted Vapor Deposition of Metal Halide Perovskite Thin Films, ***Catherine Clark***, University of Minnesota; *E.S. Aydil,* New York University; *R.J. Holmes,* University of Minnesota
5:00pm	**CA+NS+SS+VT-ThA9** Imaging and Processing in Liquid Gel Solutions with Focused Electron and X-ray Beams, *T. Gupta,* National Institute of Standards and Technology (NIST); *P. Zeller, M. Amati, L. Gregoratti,* Elettra - Sincrotrone Trieste, Trieste, Italy; ***Andrei Kolmakov***, National Institute of Standards and Technology (NIST)	**TF+SS-ThA9** Synthesis and Optical Properties of Organo-halide 2D Perovskites, ***Misook Min***, *A.B. Kaul,* University of North Texas
5:20pm	**INVITED: CA+NS+SS+VT-ThA10** In Situ TEM Visualization of Solution-based Nanofabrication Processes: Chemical Wet-etching and Capillary Forces, ***Utkur Mirsaidov***, National University of Singapore, Singapore	**TF+SS-ThA10** Encapsulation of Perovskite Nanocrystal Solids using Metal Oxides - A Closer Look into Optical Properties, ***Riya Bose***, *Y. Zheng, T. Guo, Y. Garstein, A.V. Malko,* University of Texas at Dallas
5:40pm	Invited talk continues.	**TF+SS-ThA11** Self-Limited Surface Reaction between Trimethyl Aluminum and Formamidinium Lead Iodide Perovskite, ***Qing Peng***, *X. Yu, H. Yan,* University of Alabama

Room A124-125

Thin Films Division
Session TF+AS+EL+PS+RA-ThA
Characterization of Thin Film Processes and Properties
Moderators:
Richard Vanfleet, Brigham Young University,
Virginia Wheeler, U.S. Naval Research Laboratory

2:20pm	**INVITED: TF+AS+EL+PS+RA-ThA1** Phase Separation in III-V Semiconductor Thin Films, ***Mark Twigg,*** *N.A. Mahadik, N.A. Kotulak, S. Tomasulo, M.K. Yakes,* U.S. Naval Research Laboratory
2:40pm	Invited talk continues.
3:00pm	**TF+AS+EL+PS+RA-ThA3** In-Situ Spectroscopic Monitoring of Methylamine-Induced Hybrid Perovskite Phase Transitions, ***Jonathan Meyers***[1], *L.Y. Serafin, J.F. Cahoon,* University of North Carolina at Chapel Hill
3:20pm	**TF+AS+EL+PS+RA-ThA4** Angle-Resolved HAXPES Analysis of Al_xO_y and Cu_xO_y Layers formed by Metal Salt Diffusion into a poly 2-vinylpyridine (P2vP) Polymer Layer, ***Pierre Mani,*** Universidad Autonoma de Ciudad Juarez, México*; M. Snelgrove,* Dublin City University, Ireland*; J.P. Rueff,* Synchrotron SOLEIL, France*; R. Lundy,* Trinity College Dublin, Ireland*; J. Bogan, R. O´Connor,* Dublin City University, Ireland*; J.L. Enríquez,* Universidad Autonoma de Ciudad Juarez, México*; M. Morris,* Trinity College Dublin, Ireland*; G. Hughes,* Dublin City University, Ireland
3:40pm	**BREAK**
4:00pm	**INVITED: TF+AS+EL+PS+RA-ThA6** Obtaining Smooth Surfaces and Measuring Surface Roughness, ***Steven M. George,*** University of Colorado at Boulder
4:20pm	Invited talk continues.
4:40pm	**TF+AS+EL+PS+RA-ThA8** Characterizing Ultra-thin Layer Growth and Area Selective Deposition using High Resolution Low Energy Ion Scattering (LEIS), ***Thomas Grehl,*** IONTOF GmbH, Germany*; P. Brüner,* ION-TOF GmbH, Germany*; V. Pesce, B. Pelissier, R. Gassilloud, C. Vallée,* Laboratoire des Technologies de la Microélectronique (LTM), France
5:00pm	**TF+AS+EL+PS+RA-ThA9** Real-Time Monitoring of Aluminum Oxidation Through Wide Band Gap MgF_2 Layers for Protection of Space Mirrors, *B.I. Johnson, T.G. Avval, G. Hodges, K. Membreno, D.D. Allred,* ***Matthew Linford,*** Brigham Young University
5:20pm	**INVITED: TF+AS+EL+PS+RA-ThA10** Visualization of Ultrafast Charge Motion in Thin Films via THz Emission Spectroscopy, ***Aaron Lindenberg,*** Stanford University
5:40pm	Invited talk continues.

[1] **National Student Award Finalist**

	Room A210	
2:20pm	**INVITED: LS+AC+NS-ThA1** Triplet Dynamics in Photovoltaic Materials Measured with Time Resolved X-Ray Spectroscopies, *R. Costantini,* University of Trieste*; R. Faber,* Technical University of Denmark*; A. Cossaro, A. Verdini, L. Floreano,* CNR - Istituto Officine Materiali*; C. Haettig,* Ruhr-University Bochum, Germany*; A. Morgante,* University of Trieste, Italy*; S. Coriani,* Technical University of Denmark*;* ***Martina Dell'Angela****,* CNR - Istituto Officine Materiali, Italy	**Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic Session LS+AC+NS-ThA** **Photon Science for Imaging Materials from the Meso- to the Nanoscale** **Moderator:** Maya Kiskinova, Elettra-Sincrotrone Trieste, Italy
2:40pm	Invited talk continues.	
3:00pm	**INVITED: LS+AC+NS-ThA3** Synchrotron X-Ray Tomography to Understand Structure and Physical Transformations in Solid State Batteries, ***Kelsy Hatzell****, M.B. Dixit,* Vanderbilt University	
3:20pm	Invited talk continues.	
3:40pm	**BREAK**	
4:00pm	**LS+AC+HC+SS-ThA6** Resolving X-ray Based Spectroscopies in the Sub-nanometer Regime: Enabling Atomic Scale Insights into CO Adsorption on Thin Film Surfaces, ***Heath Kersell****, B. Eren, C.H. Wu,* Lawrence Berkeley National Laboratory*; I. Waluyo, A. Hunt,* Brookhaven National Laboratory*; G.A. Somorjai, M.B. Salmeron,* Lawrence Berkeley National Laboratory	**Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic Session LS+AC+HC+SS-ThA** **Emerging Methods with New Coherent Light Sources** **Moderator:** Germán Rafael Castro, Spanich CRG BM25-SpLine Beamline at the ESRF
4:20pm	**LS+AC+HC+SS-ThA7** Imaging with XPS: Advanced Characterization for Advanced Materials and Devices, ***Tatyana Bendikov****, H. Kaslasi, E. Sanders, E. Joselevich, D. Cahen,* Weizmann Institute of Science, Israel	
4:40pm	**INVITED: LS+AC+HC+SS-ThA8** Time-Resolved Photoemission with Free-Electron Lasers, ***Kai Rossnagel****,* CAU Kiel / DESY, Germany	
5:00pm	Invited talk continues.	
5:20pm	**INVITED: LS+AC+HC+SS-ThA10** Ultrafast Magnetization Dynamics on the Nanoscale, ***Bastian Pfau****,* Max Born Institute, Germany	
5:40pm	Invited talk continues.	

Room A211

Applied Surface Science Division
Session AS-ThA
Role of Surfaces and Interfaces in Energy Material and Industrial Problems
Moderators:
David M. Carr, Physical Electronics,
Alan Spool, Western Digital Corporation

2:20pm	**INVITED: AS-ThA1** Characterization of Glass and Durable Optical Surfaces and Their Modes of Failure, ***Albert Fahey****, D. Baker, T. Dimond,* Corning Inc.
2:40pm	Invited talk continues.
3:00pm	**AS-ThA3** Determination of Liquid Laundry Additives Across Fabric Surfaces, ***Michael Clark, Jr.****, A. Peera, S. Donovan, R. Pulukkody,* The Dow Chemical Company
3:20pm	**AS-ThA4** Depth Profiling of Silicones with GCIB, Do They Behave like Organic or Inorganic Molecules?, ***Michaeleen Pacholski****, M.B. Clark, Jr., P.R. Vlasak, C. McMillan,* The Dow Chemical Company
3:40pm	**BREAK**
4:00pm	**AS-ThA6** Active Control of Interfacial Chemistry for Thin Film Solar Cells, ***Alexandra Koziel****, K.A. Montiel, L.G. Wilson, J.L.W. Carter, I.T. Martin,* Case Western Reserve University
4:20pm	**INVITED: AS-ThA7** Solar Energy From a Big-Picture Perspective to Nanoscale Insights via TOF-SIMS, ***Steven Harvey****,* National Renewable Energy Laboratory
4:40pm	Invited talk continues.
5:00pm	**AS-ThA9** Investigation of Surface and Bulk Properties of Extended Surface PtNi and PtNiCo Catalysts, ***Sarah Zaccarine****,* Colorado School of Mines*; W.W. McNeary,* CU Boulder*; S. Shulda, S.A. Mauger, K. Hurst,* National Renewable Energy Laboratory*; A.W. Weimer,* CU Boulder*; S.M. Alia, B.S. Pivovar,* National Renewable Energy Laboratory*; S. Pylypenko,* Colorado School of Mines
5:20pm	**INVITED: AS-ThA10** Interfaces in Electrodeposited Li-Ion Battery Electrodes, ***Paul Braun****,* University of Illinois at Urbana-Champaign
5:40pm	Invited talk continues.

Room A212

2:20pm	**INVITED: DM1+BI+SS-ThA1** Utilizing Experimental and MD Simulation Approaches in the Understanding and Design of Low Fouling Interfaces, ***Paul Molino***, University of Wollongong, Australia	**Fundamental Aspects of Material Degradation Focus Topic** **Session DM1+BI+SS-ThA** **Low Fouling Interfaces and Environmental Degradation** **Moderator:** Axel Rosenhahn, Ruhr-University Bochum, Germany
2:40pm	Invited talk continues.	
3:00pm	**DM1+BI+SS-ThA3** Study of Environmental Exposure Effects on Pristine and DC Magnetron Sputtering Metallic Coated 3D Printed Polymers, *D. Mihut,* ***Arash Afshar****, P. Chen,* Mercer University	
3:20pm	**DM1+BI+SS-ThA4** Reaction Mechanism of Chloride-induced Depassivation of Oxide Films: a Density Functional Theory Study, *Q. Pang, H. DorMohammadi, K. Oware Sarfo, P.V. Murkute, Y. Zhang, O.B. Isgor, J.D. Tucker,* ***Líney Árnadóttir,*** Oregon State University	
3:40pm	**BREAK**	
4:00pm	**INVITED: DM2+BI+SS-ThA6** Stability Challenges in Electrocatalysis, ***Serhiy Cherevko***, Forschungszentrum Jülich GmbH, Germany	**Fundamental Aspects of Material Degradation Focus Topic** **Session DM2+BI+SS-ThA** **Fundamentals of Catalyst Degradation: Dissolution, Oxidation and Sintering** **Moderator:** Gareth S. Parkinson, TU Wien, Austria
4:20pm	Invited talk continues.	
4:40pm	**DM2+BI+SS-ThA8** Self-limited Growth of an Oxyhydroxide Phase at the Fe_3O_4(001) Surface in Liquid and Ambient Pressure Water, ***Florian Kraushofer****,* TU Wien, Austria*; F. Mirabella,* TU Wien, Austria, Germany*; J. Xu, J. Pavelec, J. Balajka, M. Müllner, N. Resch, Z. Jakub, J. Hulva, M. Meier, M. Schmid, U. Diebold, G.S. Parkinson,* TU Wien, Austria	
5:00pm	**DM2+BI+SS-ThA9** The Impact of W on the Early Stages of Oxide Evolution for Ni-Cr Alloys, ***Cameron Volders****, V.A. Avincola,* University of Virginia*; I. Waluyo,* Brookhaven National Laboratory*; J. Perepezko,* University of Wisconsin - Madison*; P. Reinke,* University of Virginia	
5:20pm	**DM2+BI+SS-ThA10** The Stability of Platinum in Non-aqueous Media, *J. Ranninger, S. Wachs, J. Möller, K. Mayrhofer,* ***Balázs Berkes****,* Forschungszentrum Jülich GmbH, Germany	
5:40pm	**DM2+BI+SS-ThA11** Stabilizing Transparent Conductive Oxides as a Route to Long-Lived Thin Film Photovoltaics: A Case Study in CIGS, *N.C. Kovach,* Colorado School of Mines*; R. Matthews, E.B. Pentzer,* Case Western Reserve University*; L. Mansfield,* National Renewable Energy Laboratory*; T.J. Peshek,* NASA Glenn Research Center*;* ***Ina Martin****,* Case Western Reserve University	

	Room A213	
2:20pm	**HC+SS+TL-ThA1** High Resolution XPS to Identify C_xH_y Surface Species on a Cobalt Model Catalyst: New Experimental Evidence for the Importance of Alkylidynes as Growth Intermediates in Fischer-Trospch Synthesis, ***Kees-Jan Weststrate,*** Syngaschem BV, Netherlands; *D. Sharma, D. Garcia Rodriguez, M.A. Gleeson,* DIFFER, Eindhoven University, The Netherlands, Netherlands; *H.O.A. Fredriksson, H.J.W. Niemantsverdriet,* Syngaschem BV, Netherlands	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Session HC+SS+TL-ThA** **Reaction Pathways and Addressing Challenges for Energy Production in the 21st Century & Heterogeneous Catalysis Graduate Student Award Presentation** **Moderators:** Sanjaya Senanayake, Brookhaven National Laboratory, Arthur Utz, Tufts University
2:40pm	**HC+SS+TL-ThA2** Beam Reflectivity Measurements of Carbon Dissolution on Nickel Single Crystal Catalysts, ***Eric High,*** *D.G. Tinney, A.L. Utz,* Tufts University	
3:00pm	**INVITED: HC+SS+TL-ThA3** Fundamental Research Opportunities to Advance Energy Technologies, ***Bruce Garrett,*** Department of Energy	
3:20pm	Invited talk continues.	
3:40pm	**BREAK**	
4:00pm	**HC+SS+TL-ThA6** Oxidation and Redox-Mediated Transformation of a Tb2O3 Thin Film from the Cubic Fluorite to Bixbyite Structure, ***Christopher Lee,*** *J.F. Weaver,* University of Florida	
4:20pm	**HC+SS+TL-ThA7** Discrimination of Surface Storage and Mechanistic Pathways Using Dynamic Pulse Response Experiments, *Y. Wang, M.R. Kunz,* Idaho National Laboratory; *G. Yablonsky,* Washington University in Saint Louis; ***Rebecca Fushimi,*** Idaho National Laboratory	
4:40pm	**INVITED: HC+SS+TL-ThA8** Nuclearity Effects in Supported Zinc and Gallium Catalysts for Alkane Dehydrogenation, ***Susannah Scott,*** University of California at Santa Barbara	
5:00pm	Invited talk continues.	
5:20pm	**HC+SS+TL-ThA10** Fundamental Insights into Hydrocarbon Conversion Mechanisms in Lewis and Brønsted Acid Zeolites using Temporal Analysis of Products, ***Hari Thirumalai***[1], *J.D. Rimer, L.C. Grabow,* University of Houston	
5:40pm		

[1] **Morton S. Traum Award Finalist**

	Room A215	
2:20pm	**INVITED: SE-ThA1** Evaluating Electro-Mechanical Reliability using In-Situ Methods*, M.J. Cordill, O. Glushko,* Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria*; **Patrice Kreiml**,* Montanuniversitaet Leoben Erich Schmid Institute for Materials Science, Austria	**Advanced Surface Engineering Division** **Session SE-ThA** **New Challenges and Opportunities in Surface Engineering** **Moderators:** Jolanta Klemberg-Sapieha, Polytechnique Montreal, Matjaz Panjan, Jozef Stefan Institute, Slovenia
2:40pm	Invited talk continues.	
3:00pm	**INVITED: SE-ThA3** Surface Engineering for Bearing Applications: Present Status and (Near)-Future Needs*, **Esteban Broitman**,* SKF - RTD - Research & Technology Development Center, Netherlands	
3:20pm	Invited talk continues.	
3:40pm	**BREAK**	
4:00pm	**SE-ThA6** *In situ* Scanning Electron Microscopy based Uniaxial Compression of sub-micrometer-size NbC(100) Single-crystalline Pillars*, A. Aleman, K. Tanaka, H. Zaid, J.-M. Yang, **Suneel Kodambaka**,* University of California, Los Angeles	
4:20pm	**SE-ThA7** Thermal Stability of MoNbTaVW High Entropy Alloys Thin Films Deposited by Cathodic Arc*, A. Xia, **Robert Franz**,* Montanuniversität Leoben, Austria	
4:40pm	**SE-ThA8** Erosion Resistant Coatings Inside Narrow Tubes to Protect Aircraft Engine Components*, A. Kilicaslan, O. Zabeida, E. Bousser, L. Martinu, **Jolanta Klemberg-Sapieha**,* Polytechnique Montreal, Canada	
5:00pm	**EL-ThA9** Far-infrared Dielectric Functions of $Hg_{1-x}Cd_xSe$ Thin Films Determined via Ellipsometry and Reflectivity*, **Frank Peiris**, J. Lyons,* Kenyon College*; G. Brill,* U.S. Army Research Laboratory	**Spectroscopic Ellipsometry Focus Topic** **Session EL-ThA** **Spectroscopic Ellipsometry Late News Session** **Moderator:** Tino Hofmann, University of North Carolina at Charlotte
5:20pm	**EL-ThA10** Tunable Giant Circular Dichroism in Spatially-coherent Si-Au/Ag Nano-plasmonic Chiral Heterostructures*, **Ufuk Kilic**, M. Hilfiker,* University of Nebraska-Lincoln*; R. Feder,* The Fraunhofer Institute for Microstructure of Materials and Systems (IMWS), Germany*; R. Korlacki, E. Schubert, C. Argyropoulos, M. Schubert,* University of Nebraska-Lincoln	
5:40pm	**EL-ThA11** Numerical Ellipsometry: Methods for Selecting Measurements and Techniques for Advanced Analysis Applied to β -Gallium Oxide*, **Frank Urban**,* Florida International University*; D. Barton,* retired*; M. Schubert,* University of Nebraska-Lincoln	

	2D Materials **Room A216 - Session 2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA** **Surface Chemistry, Functionalization, Bio, Energy and Sensor Applications** **Moderator:** Mark Edmonds, Monash University, Australia	**Surface Science Division** **Room A220-221 - Session SS+2D+AP+AS+OX+SE-ThA** **Dynamics at Surfaces/Reactions and Imaging of Oxide Surfaces** **Moderators:** Irene Groot, Leiden University, The Netherlands, William E. Kaden, University of Central Florida
2:20pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA1** Molecular Layers on Nanoporous Gold Electrodes, ***Elizabeth Landis***, College of the Holy Cross	**SS+2D+AP+AS+OX+SE-ThA1** Adsorption, Reaction, and Diffusion of Energetic Reagents on Morphologically Diverse Thin Films, ***Rebecca Thompson***[12], *M.R. Brann, S.J. Sibener,* The University of Chicago
2:40pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA2** Thermotropic Liquid Crystal (5CB) on Two-dimensional Materials, ***Paul Brown***, American Society for Engineering Education*; S. Fischer, J. Kołacz, C.M. Spillmann, D. Gunlycke,* U.S. Naval Research Laboratory	**SS+2D+AP+AS+OX+SE-ThA2** Oxidation of Semiconductors and Semimetals by Supersonic Beams of O_2 with Scanning Tunneling Microscopy Visualization, ***Ross Edel***[2]*, T. Grabnic, B. Wiggins, S.J. Sibener,* The University of Chicago
3:00pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA3** Is it Possible to Achieve Intra-molecular Resolution with Ambient AFM?, ***Vladimir Korolkov***, Oxford Instruments-Asylum Research*; S.C. Chulkov, M. Watkins,* University of Lincoln, UK*; P.H. Beton,* The University of Nottingham, UK	**INVITED: SS+2D+AP+AS+OX+SE-ThA3** Studying Molecule-Surface Interactions using Rotational Orientation Control of Ground-State Molecular Beams, ***Gil Alexandrowicz***, Swansea University, UK
3:20pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA4** Tailoring Surface Properties via Functionalized Hydrofluorinated Graphene Compounds, ***Jangyup Son***, University of Illinois at Urbana-Champaign*; N. Buzov,* University of California at Santa Barbara*; S. Chen,* University of Illinois at Urbana-Champaign*; D. Sung,* Sejong University, Republic of Korea*; H. Ryu,* Seoul National University, Republic of Korea*; J. Kwon,* Yonsei University, Republic of Korea*; S. Kim, J. Xu,* University of Illinois at Urbana-Champaign*; S. Hong,* Sejong University, Republic of Korea*; W. King,* University of Illinois at Urbana-Champaign*; G.H. Lee,* Seoul National University, Republic of Korea*; A.M. van der Zande,* University of Illinois at Urbana-Champaign	Invited talk continues.
3:40pm	**BREAK**	**BREAK**
4:00pm		**SS+2D+AP+AS+OX+SE-ThA6** Diffusion of (100)-epitaxially Supported 3D fcc Nanoclusters: Complex Size-dependence on the Nanoscale, ***King Chun Lai***, *J.W. Evans,* Iowa State University
4:20pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA7** Towards Higher Alcohol Synthesis from Syngas on 2D material-based catalysts: A First-Principles Study*, ***Tao Jiang***, *D. Le, T.S. Rahman,* University of Central Florida	**SS+2D+AP+AS+OX+SE-ThA7** Oxide Surface Formation on Rh Nanoparticle during O_2 Exposures Observed by Atom Probe Microscopy, ***Sten Lambeets***, Pacific Northwest National Laboratory*; T. Visart de Bocarmé,* Université Libre de Bruxelles, Belgium*; N. Kruse,* Washington State University*; D.E. Perea,* Pacific Northwest National Laboratory
4:40pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA8** Proton Conductivity Properties of Electrospun Chitosan Nanofibers, ***Woo-Kyung Lee***, *J.J. Pietron, D.A. Kidwell, J.T. Robinson, C.L. McGann, S.P. Mulvaney,* U.S. Naval Research Laboratory	**INVITED: SS+2D+AP+AS+OX+SE-ThA8** Noncontact AFM on Oxide Surfaces: Challenges and Opportunities, ***Martin Setvin***, TU Wien, Austria
5:00pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA9** Sensor for Breath and Skin Diagnostics, ***Pelagia I Gouma***, The Ohio State University	Invited talk continues.
5:20pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA10** Symmetry Controlled Ddsorption of Diodobenzene on MoS_2, ***Zahra Hooshmand***, University of Central Florida*; P. Evans, P.A. Dowben,* University of Nebraska - Lincoln*; T.S. Rahman,* University of Central Florida	**SS+2D+AP+AS+OX+SE-ThA10** Edge-Enhanced Oxygen Evolution Reactivity at Au-Supported, Ultrathin Fe2O3 Electrocatalysts, ***Xingyi Deng***, *D. Kauffman, D.C. Sorescu,* National Energy Technology Laboratory
5:40pm	**2D+AS+BI+HC+MN+NS+PS+SS+TL-ThA11** Mechanistic Understanding of the CO Hydrogenation Reaction on Defect Engineered 2D-TaS_2 and 2D-MoS_2 Catalysts, ***Mihai Vaida***, University of Central Florida	**SS+2D+AP+AS+OX+SE-ThA11** Adsorption and Reaction of Methanol on the Magnetite Fe_3O_4(001) Surface, ***Matthew Marcinkowski***, Pacific Northwest National Laboratory*; K.C. Adamsen,* Aarhus University, Denmark*; N. Doudin, Y. Yang Wang, R.S. Smith, B.D. Kay, Z. Dohnalek,* Pacific Northwest National Laboratory

[1] **Morton S. Traum Award Finalist**

[2] **National Student Award Finalist**

Thursday Afternoon, October 24, 2019

	Nanometer-scale Science and Technology Division Room A222 - Session NS-ThA SPM for Functional Characterization **Moderators:** Volker Rose, Argonne National Laboratory, Renu Sharma, National Institute of Standards and Technology (NIST)	Plasma Science and Technology Division Room B130 - Session PS+2D+EM+SS+TF-ThA Plasma-Enhanced Atomic Layer Etching **Moderators:** Steven Vitale, MIT Lincoln Laboratory, Mingmei Wang, TEL Technology Center, America, LLC
2:20pm	**INVITED: NS-ThA1** Interatomic Force Laws That Evade Dynamic Measurement, ***John Sader,*** University of Melbourne, Australia	**INVITED: PS+2D+EM+SS+TF-ThA1** Atomic Layer Etch: Real World Utilization of an Idealized Solution, ***Peter Biolsi,*** TEL Technology Center, America, LLC
2:40pm	Invited talk continues.	Invited talk continues.
3:00pm	**INVITED: NS-ThA3** Intermittent Contact Resonance Atomic Force Microscopy (icr-Afm) for Nanoscale Mechanical Property Characterization, ***Gheorghe Stan,*** National Institute of Standards and Technology	**PS+2D+EM+SS+TF-ThA3** Mechanism of SiN Etching Rate Fluctuation in Atomic Layer Etching, ***Akiko Hirata****, M. Fukasawa, K. Kugimiya, K. Nagaoka,* Sony Semiconductor Solutions Corporation, Japan*; K. Karahashi, S. Hamaguchi,* Osaka University, Japan
3:20pm	Invited talk continues.	**PS+2D+EM+SS+TF-ThA4** Effect of Polymerization on Ar+ Bombardment Modification of SiO_2 and Si_3N_4 Substrates: Molecular Dynamics Simulation Study, ***Hojin Kim****, Y. Shi, Y.-H. Tsai, D. Zhang, Y. Han,* TEL Technology Center, America, LLC*; K. Taniguchi,* TEL Miyagi Limited, Japan*; S. Morikita,* TEL Miyagi Limited*; M. Wang, A. Mosden, A. Metz, P.E. Biolsi,* TEL Technology Center, America, LLC
3:40pm	**BREAK**	**BREAK**
4:00pm	**NS-ThA6** Novel Approaches Towards Cantilevers for Functional Multiparametric AFM Characterization, ***Georg Ernest Fantner****, N. Hosseini, M. Neuenschwander, B. Ghadiani,* École Polytechnique Fédéral de Lausanne, Switzerland	**INVITED: PS+2D+EM+SS+TF-ThA6** Advanced Cyclic Plasma Etch Approaches for Metal Patterning: Synergy and Surface Modification Effects, ***Nathan Marchack****,* IBM T.J. Watson Research Center*; K. Hernandez,* University of Texas at Dallas*; J. Innocent-Dolor, M.J.P. Hopstaken, S.U. Engelmann,* IBM T.J. Watson Research Center
4:20pm	**NS-ThA7** Fluid Handling using Scanning Probe Lithography for Nanocombinatorics, *V. Saygin, N. Alsharif,* ***Keith A. Brown,*** Boston University	Invited talk continues.
4:40pm	**NS-ThA8** Accuracy of Tip-sample Interaction Measurements Using Dynamic Atomic Force Microscopy Techniques, *O.E. Dagdeviren,* ***Udo D. Schwarz,*** Yale University	**PS+2D+EM+SS+TF-ThA8** Surface Modification and Stability of Plasma-assisted Atomic-layer Etching (ALE) of Si based Materials; Analysis by Molecular Dynamics (MD) Simulation, ***Satoshi Hamaguchi****, M. Isobe, E.J.C. Tinacba, S. Shigeno, Y. Okada, T. Ito, K. Karahashi,* Osaka University, Japan
5:00pm	**NS-ThA9** Utilizing AFM to Study the Effect *of* Malaria-derived EVs on the Mechanical and Morphological Properties of Red Blood Cells, ***Irit Rosenhek-Goldian****, E. Dekel, Y. Ohana, S. Maihib, S.R. Cohen, N. Regev-Rudzkib,* Weizmann Institute of Science, Israel	**INVITED: PS+2D+EM+SS+TF-ThA9** Innovative Future Etch Technology by Atomic-order Control, ***Yoshihide Kihara****, T. Katsunuma, S. Kumakura, T. Hisamatsu, M. Honda,* Tokyo Electron Miyagi Ltd., Japan
5:20pm	**INVITED: NS-ThA10** Silicon Oxide for RRAM Application: The SPM Analysis Approach, ***Adnan Mehonic****, M. Buckwell, W.H. Ng, A.J. Kenyon,* University College London, UK	Invited talk continues.
5:40pm	Invited talk continues.	

	Plasma Science and Technology Division **Room B131 - Session PS+SS-ThA** **Plasma Conversion and Enhanced Catalysis for Chemical Synthesis** **Moderator:** R. Mohan Sankaran, Case Western Reserve University	**Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic** **Room B231-232 - Session HI+NS-ThA** **Emerging Ion Sources, Optics, and Applications** **Moderators:** Gregor Hlawacek, Helmholtz-Zentrum Dresden Rossendorf, Germany, Shida Tan, Intel Corporation
2:20pm	**PS+SS-ThA1** Rate Limiting Factors of Low Pressure Plasma-catalytic CO_2 Methanation Process, ***Kazunori Koga**, A. Yamamoto, K. Kamataki, N. Itagaki, M. Shiratani,* Kyushu University, Japan	**INVITED: HI+NS-ThA1** Cold Atom Ion Sources, ***Jabez McClelland**, J.R. Gardner, W.R. McGehee,* National Institute of Standards and Technology (NIST)*; A. Schwarzkopf, B.J. Knuffman, A.V. Steele,* zeroK NanoTech Corp.
2:40pm	**PS+SS-ThA2** Radical Nitriding of Graphene Promoted by Surface Plasmon Resonance of Gold Nanoparticle Catalyst, ***Takeshi Kitajima**, T. Nakano,* National Defense Academy, Japan	Invited talk continues.
3:00pm	**INVITED: PS+SS-ThA3** Plasma-assisted Catalysis: Exploring the Effects of Plasma Stimulation on Catalyst Performance, ***Jason C. Hicks**,* University of Notre Dame	**HI+NS-ThA3** Silicon Lithiation by Direct-writing with a Focused Li^+-ion Beam, *W.R. McGehee,* ***Evgheni Strelcov**, V. Oleshko, C. Soles, N.B. Zhitenev, J.J. McClelland,* National Institute of Standards and Technology (NIST)
3:20pm	Invited talk continues.	**HI+NS-ThA4** A New FIB for Deterministic Single Ion Implantation, ***Nathan Cassidy**,* UK National Ion Beam Centre, University of Surrey, UK*; D. Cox,* Advanced Technology Institute, University of Surrey, UK*; R. Webb,* UK National Ion Beam Centre, University of Surrey, UK*; B. Murdin,* Advanced Technology Institute, University of Surrey, UK*; B. Blenkinsopp, I. Brown,* Ionoptika Ltd., UK*; R. Curry,* The Photon Science Institute, University of Manchester, UK
3:40pm	**BREAK**	**BREAK**
4:00pm	**PS+SS-ThA6** A Plasma-aerosol Droplet Reactor for the Synthesis of Ammonia from Nitrogen and Water, ***Joseph Toth**, D.J. Lacks, J. Renner, R.M. Sankaran,* Case Western Reserve University	**INVITED: HI+NS-ThA6** Technology and Applications of a Plasma Ion Source with User-selectable Ion Species, ***Gregory Schwind**, S.M. Kellogg, J. Stiller, M. Doud, C. Rue, B. Van Leer,* Thermo Fisher Scientific
4:20pm	**PS+SS-ThA7** Plasma-assisted Nitrogen Fixation by Water: Development and Evaluation of Hybrid Membrane Based Plasma-Electrochemical Reactor*, R. Sharma,* ***Richard M.C.M. van de Sanden**, H. Patel, V. Kyriakou, U. Mushtaq,* Dutch Institute for Fundamental Energy, Netherlands*; A. Pandiyan,* Dutch Institute for Fundamental Energy*; S. Welzel, M.N. Tsampas,* Dutch Institute for Fundamental Energy, Netherlands	Invited talk continues.
4:40pm	**INVITED: PS+SS-ThA8** Plasma-Assisted Ammonia Synthesis in Hybrid Plasma-Catalysis DBD Reactors*, Z. Chen, X. Yang, Y. Ju, S. Sundaresan,* ***Bruce E. Koel**,* Princeton University	**HI+NS-ThA8** Neutral Helium Microscopy, ***Bodil Holst**,* University of Bergen, Norway
5:00pm	Invited talk continues.	**HI+NS-ThA9** GaBiLi Liquid Metal Alloy Ion Sources for Advanced Nanofabrication*, P. Mazarov,* RAITH GmbH, Germany*; T. Richter, L. Bruchhaus, W. Pilz, R. Jede,* Raith GmbH, Germany*;* ***Yang Yu**, R.M. Schmid, J.E. Sanabia,* Raith America, Inc.*; L. Bischoff,* Helmholtz Zentrum Dresden-Rossendorf, Germany*; G. Hlawacek,* Helmholtz-Zentrum Dresden Rossendorf, Germany
5:20pm	**PS+SS-ThA10** Efforts towards Plasma-assisted Catalysis: Elucidating Gas-phase Energetics, Kinetics, and Surface Interactions, ***Angela Hanna**, E.R. Fisher,* Colorado State University	**HI+NS-ThA10** Focused Ion Beams in Biology: How the Helium Ion Microscope and FIB/SEMs Help Reveal Nature's Tiniest Structures, ***Annalena Wolff**,* Central Analytical Research Facility, Institute for Future Environments, Queensland University of Technology (QUT), Brisbane QLD 4000, Australia*; N. Klingner,* Helmholtz Zentrum Dresden-Rossendorf, Germany*; W. Thompson,* HeelionicsLLC*; Y. Zhou,* Queensland University of Technology (QUT), Australia*; J. Lin,* Affiliated Stomatological Hospital of Xiamen Medical College, China*; Y. Peng,* CSIRO Manufacturing, Australia*; J. Ramshaw,* St. Vincent's Hospital, University of Melbourne, Australia*; Y. Xiao,* The Australia-China Centre for Tissue Engineering and Regenerative Medicine (ACCTERM), Queensland University of Technology, Australia
5:40pm		

Atomic Scale Processing Focus Topic
Room Union Station B - Session AP-ThP
Atomic Scale Processing Poster Session
6:30pm

AP-ThP1 Atomic Resolution Characterization of Atomic Layer Etching Normally-off AlGaN/GaN Hetrostructure Device by Using Aberration-corrected STEM, ***Chien-Nan Hsiao***, Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan, Republic of China; *C.P. Lin, C.C. Chen, M.H. Chan, W.-C. Chen, F.Z. Chen,* National Applied Research Laboratories, Taiwan, Republic of China

AP-ThP2 Programmable Radical-Assisted Sputtering Enabling Designed Deposition Processes with Atomic Layer Accuracy, ***Hideo Isshiki***, *Y. Tanaka,* The University of Electro-Communications, Japan; *S. Saisho,* Shincron Co. LTD., Japan

Applied Surface Science Division
Room Union Station B - Session AS-ThP
Applied Surface Science Poster Session
6:30pm

AS-ThP1 Hydrogen Generation Eases Safety and Infrastructure Requirements for Efficient and Productive Vacuum Deposition Processes, ***David Wolff***, Nel Hydrogen

AS-ThP2 Progress in Understanding SIMS Spectra from Silicones, ***Paul Vlasak***, *M.L. Pacholski,* The Dow Chemical Company

AS-ThP3 Silicon Wet Etching Using NH4OH Solution For Texturing of Silicon Micro-Channels, ***José Alexandre Diniz***, *A.R. Silva,* UNICAMP, Brazil

AS-ThP4 Ionic Liquids: Advanced Oil Additives for Lubricating Case-Hardened Titanium Alloys (OD-Ti64), ***Harry Meyer III***, *H. Duan, W. Li, C. Kumara, Y. Jin, H. Luo, J. Qu,* Oak Ridge National Laboratory

AS-ThP5 Controlling Surfaced-catalyzed Coupling of Aryl Halides for Preparation of Two-dimensional Covalent Networks, ***Margaret Wolf***, *C.R. Gerber, R.C. Quardokus,* University of Connecticut

AS-ThP6 Characterization of Mineral Associated Organic Matter in Alkaline Soil, ***Mark Engelhard***, *R. Kukkadapu, T. Varga, R. Boiteau, L. Kovarik, J. Cliff, M. Wirth, A. Dohnalkova, C. Smallwood, D.E. Perea, J. Moran, K. Hofmockel,* Pacific Northwest National Laboratory

AS-ThP7 Atomic Structure Simulation of Nitrogen Supersaturated Austenitic Stainless Steel, ***Honglong Che***, *M.K. Lei,* Dalian University of Technology, China

AS-ThP8 Determination of the Number of Layers of a 2D Material by Angle-Resolved Photoelectron Spectroscopy, *P. Tyagi,* University at Albany - SUNY; ***Carl A. Ventrice, Jr.***, SUNY Polytechnic Institute

AS-ThP10 Probing the Electrical Double Layer by *in situ* X-ray Photoelectron Spectroscopy through a Carbon Nanotube-Strengthened Graphene Window, *P. Wang,* ***Yunfeng Li***, *L.N. Wang, J. Klos, Z.W. Peng, N. Kim,* University of Maryland, College Park; *H. Bluhm,* Lawrence Berkeley National Laboratory; *K.J. Gaskell, S.B. Lee, B. Eichhorn, Y.H. Wang,* University of Maryland, College Park

AS-ThP11 Antibacterial Performance of Electrically Activated Conductive Water Filter Papers, ***Dorina Mihut***, *A. Afshar, L. Lackey,* Mercer University

AS-ThP12 Biocompatible and Robust Non-wetting Surface Inspired by Three Natural Organisms: Lotus Leaf, Mussel, and Sandcastle Worm, ***Kiduk Han***, POSTECH, Republic of Korea; *T.Y. Park,* POSTEC, Republic of Korea; *H.J. Cha, K. Yong,* POSTECH, Republic of Korea

AS-ThP13 In-situ ToF-SIMS Analysis of FIB Prepared Li Ion Battery Anodes, ***Vincent Smentkowski***, *R. Hart, H. Cao,* GE-Research; *F. Kollmer, J. Zakel, H. Arlinghaus,* IONTOF GmbH, Germany

AS-ThP14 Characterization of Surface-Immobilized Aptamers for Electrochemical Biosensing, ***Ramya Vishnubhotla***, National Institute of Sandards and Technology (NIST); *S.M. Robinson, J.P. Giddens,* University of Maryland, College Park; *S. Semancik,* National Institute of Standards and Technology (NIST)

Chemical Analysis and Imaging Interfaces Focus Topic
Room Union Station B - Session CA-ThP
Chemical Analysis and Imaging at Interfaces Poster Session
6:30pm

CA-ThP1 Probing Solid-liquid Interfaces with Tender X-rays, ***Nicolò Comini***, *Z. Novotny, B. Tobler,* University of Zuerich, Switzerland; *D. Aegerter, E. Fabbri,* Paul Sherrer Institute, Switzerland; *U. Maier,* Ferrovac GmbH, Switzerland; *L. Artiglia, J. Raabe, T. Huthwelker,* Paul Sherrer Institute, Switzerland; *J. Osterwalder,* University of Zuerich, Switzerland

CA-ThP2 Using AES, EDS, and FIB to Detect, Identify, and Image Buried Metallic Particles, ***Ashley Ellsworth***, *D. Paul, J.G. Newman,* Physical Electronics

CA-ThP3 Secondary Ion Mass Spectrometry Designed for Ultra-sensitive Molecular Analysis of Solids and Liquids, ***Stanislav Verkhoturov***, *D.S. Verkhoturov, E.A. Schweikert,* Texas A&M University

Spectroscopic Ellipsometry Focus Topic
Room Union Station B - Session EL-ThP
Spectroscopic Ellipsometry Focus Topic Poster Session
Moderator: Tino Hofmann, University of North Carolina at Charlotte
6:30pm

EL-ThP1 Teaching Ellipsometry to Undergraduates, ***John Woollam***, University of Nebraska-Lincoln

Electronic Materials and Photonics Division
Room Union Station B - Session EM-ThP
Electronic Materials and Photonics Poster Session
6:30pm

EM-ThP1 Synthesis and Characterization of Fluorenone Derivatives as Organic Semiconductors for Organic Thin-Film Transistors, ***Sung Yong Seo***, *J.H. Jeong, K.T. Lim, B.C. Choi, Y. Yun, M.H. Son, G. Kim,* Pukyong National University, Republic of Korea

EM-ThP2 Beryllium Oxide Band Alignment with Wide Bandgap Semiconductors, ***Donghyi Koh***, *S. Banerjee,* University of Texas at Austin; *J. Brockman, M. Kuhn, S.W. King,* Intel Corporation

EM-ThP3 Thermal Conductivity of Nano-porous Low-k Dielectrics, ***Hari Harikrishna***, *S. Huxtable,* Virginia Tech; *S.W. King,* Intel Corporation

EM-ThP4 Characterization of Textile Yarn Coated with Polypyrrole/Carbon Black Electronic Material, *R. Villaneuva,* ***Deepak Ganta***, *C. Guzman,* TAMIU

EM-ThP5 Optical and Nonlinear Optical Properties of (1-x)Pb($Mg_{1/3}Nb_{2/3}$)O_3-x$PbTiO_3$ Thin Films Grown by Pulsed Laser Deposition, ***Da-Ren Liu***, Taiwan Instrument Research Institute, Taiwan, Republic of Korea

EM-ThP6 Toward Selective Deposition of Boron Carbide Layers, ***Raja Sekhar Bale***, *R. Thapa, L. Dorsett, S. Wagner, D. Bailey, A.N. Caruso,* University of Missouri-Kansas City; *J.D. Bielefeld, S.W. King,* Intel Corporation; *M.M. Paquette,* University of Missouri-Kansas City

EM-ThP7 The Effect of Processing Conditions on the Growth of Transition Metal Dichalcogenides by Molecular Beam Epitaxy, ***Peter Litwin***, *S. McDonnell,* University of Virginia

EM-ThP8 Co-sputtered and Rapid Thermal Annealed ZnS:Cu Thin Films for Photovoltaic Applications, *Y.-K. Jun,* EM Co., Inc., Republic of Korea; ***Sakal Pech***, *M.H. Yoo, G.-B. Cho, N.-H. Kim,* Chosun University, Republic of Korea

EM-ThP9 Biomimetic Electrospun Polyethylene Fabrics for Effective Radiative Cooling Under Sunlight, ***Bokyung Park***, *S.M. Han, S.E. Han,* University of New Mexico

EM-ThP10 Suppression of the Spectral Weight ofTopological Surface States on the Nanoscale via Local Symmetry BreakingviaLocal Symmetry Breaking, ***Omur E. Dagdeviren***, *S. Mandal, K. Zou, C. Zhou, S. Simon, S. Albright, X. Zhu, S. Ismail-Beigi, F.J. Walker, C. Ahn, U.D. Schwarz, E.I. Altman,* Yale University

EM-ThP11 Optical and Electrical Properties of Layer-by-layered and Mixed ZnS/CdS Structures with a Decrease in Cd-content by Co-sputtering Method, *S. Pech,* Chosun University, Republic of Korea; *Y.-K. Jun,* EM Co., Inc., Republic of Korea; ***Geum-Bae Cho***, *N.H. Kim,* Chosun University, Republic of Korea

EM-ThP12 Design and Simulation of a Leaf-like Antenna on Thin Kapton Sustrate for the 915MHz Frequency, ***Felipe Frazatto***, *L.T. Manera, L.S. Perissinotto,* UNICAMP, Brazil

EM-ThP13 Examining the Compositional Uniformity of GaAsNBi Alloys using Atom Probe Tomography, ***Jared W. Mitchell***, *C.M. Greenhill, T.Y. Jen, R.S. Goldman,* University of Michigan, Ann Arbor

EM-ThP14 Silicon Nanowire P-N Junction Photovoltaic Device, ***Michael Small***, *S.D. Collins, R.L. Smith,* University of Maine

EM-ThP18 Incredibly Simple Synthesis of a Zinc Oxide / Graphene Hybrid Nano Material, ***Daniel Little***, Ohio Dominican University; *J. Pfund, A. McLain, S. Lantvit, S.T. King,* University of Wisconsin - La Crosse

Fundamental Discoveries in Heterogeneous Catalysis Focus Topic
Room Union Station B - Session HC-ThP
Fundamental Discoveries in Heterogeneous Catalysis Poster Session
6:30pm

HC-ThP1 The Role of Boron in Supported Platinum Dry Reforming Catalysts, ***Carly Byron***, *S. Bai, A.V. Teplyakov,* University of Delaware

HC-ThP2 Spectroscopic Characterization of Ethylidyne formed from Acetylene on Pd(111), ***Ravi Ranjan***, *M. Trenary,* University of Illinois at Chicago

HC-ThP3 XPS, TOF-SIMS, and AES Analysis of Fresh and Aged Alumina-Supported Silver Catalysts, ***John Newman***, *D.M. Carr, D. Paul, L. Swartz,* Physical Electronics; *M. Di Mare, W. Suchanek,* Scientific Design Company, Inc.

HC-ThP4 Infrared Spectroscopy of Carbon Dioxide Hydrogenation over the Cu(111) and Pd/Cu(111) Single Atom Alloy Surfaces under Ambient Pressure Conditions, ***Arephin Islam***, *M. Trenary,* University of Illinois at Chicago

HC-ThP5 Morphology of an Oxide Formed on Au(111) at High Temperatures under Ambient Pressure Conditions, ***Jordon Baker***, *H. Kaleem, E. Maxwell, A.E. Baber,* James Madison University

HC-ThP6 Machine-Learning Enabled Search for The Next-Generation Catalyst for Hydrogen Evolution Reaction, ***Sichen Wei***, *S.J. Baek, K. Reyes, F. Yao,* University at Buffalo

HC-ThP7 Intermolecular Interactions of Small Alcohols on Au(111), ***Eric Maxwell***, *J. Baker, H. Kaleem, A.E. Baber,* James Madison University

Advanced Ion Microscopy and Ion Beam Nano-engineering Focus Topic
Room Union Station B - Session HI-ThP
Advanced Ion Microscopy Poster Session
6:30pm

HI-ThP1 Fabrication of a Single Atom Ir/W(111) Tip by a Simple Sputtering Method, ***Kwang-Il Kim***, University of Science and Technology, Republic of Korea; *J.H. Hwang,* Chungbuk National University, Republic of Korea; *T. Ogawa,* Korea Research Institute of Standards and Science, Republic of Korea; *B. Cho,* Korea Research Institute of Standards and Science (KRISS), Republic of Korea; *I.-Y. Park,* Korea Research Institute of Standards and Science, Republic of Korea

HI-ThP2 Morphology Modification of Si Nanopillars under Ion Irradiation at Elevated Temperatures, ***Xiaomo Xu***, *K.-H. Heinig,* Helmholtz Zentrum Dresden-Rossendorf, Germany; *W. Möller,* Helmholtz-Zentrum Dresden-Rossendorf, Germany; *H.-J. Engelmann, N. Klingner,* Helmholtz Zentrum Dresden-Rossendorf, Germany; *A. Gharbi, R. Tiron,* CEA-LETI, France; *J. von Borany,* Helmholtz Zentrum Dresden-Rossendorf, Germany; *G. Hlawacek,* Helmholtz-Zentrum Dresden Rossendorf, Germany

Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Focus Topic
Room Union Station B - Session LS-ThP
Frontiers of New Light Sources Applied to Materials, Interfaces, and Processing Poster Session
6:30pm

LS-ThP2 Observing Formation of Detonation Nanodiamond at Sub-Microsecond Timescales at the Advanced Photon Source, ***Trevor Willey***, *J.A. Hammons, M. Bagge-Hansen, M.H. Nielsen, L.M. Lauderbach, R. Hodgin, W. Shaw, W. Bassett, E. Stavrou, S. Bastea, L. Fried, L. Leininger,* Lawrence Livermore National Laboratory

Magnetic Interfaces and Nanostructures Division
Room Union Station B - Session MI-ThP
Magnetic Interfaces and Nanostructures Poster Session
6:30pm

MI-ThP1 Room Temperature Skyrmion in Alternative Layer Molecular Beam Epitaxial Grown B20 Fe-rich $Fe_{1.2}Ge$ Films, ***Tao Liu***, *R. Bennett, S. Chen, A. Ahmed, R. Kawakami,* The Ohio State University

MI-ThP2 Investigation of Exchange Bias in $L1_0$- MnGa/ θ-MnN/MgO Bilayers, ***Sneha Upadhyay***, Ohio University; *K. Meng, F.Y. Yang,* The Ohio State University; *D. Ingram, A.R. Smith,* Ohio University

MI-ThP3 Investigating a Possible Kondo Resonance for Iron-induced Islands on Chromium Nitride (001), *K. Alam, Y. Ma,* ***Shyam Chauhan***, *S.R. Upadhyay, A.R. Smith,* Ohio University

MI-ThP5 Characteristics of a Single Molecule Magnet on Graphene: A DFT Study, ***Rainier Berkley***, *Z. Hooshmand, T.S. Rahman,* University of Central Florida

MI-ThP6 Molecular Conductivity Switching via Voltage Controlled Spin Crossover at a Ferroelectric Interface, ***Aaron Mosey***, Indiana University-Purdue University Indianapolis; *G. Hao,* University of Nebraska-Lincoln; *A.T. N'Diaye,* Lawrence Berkeley National Laboratory; *A.S. Dale,* Indiana University-Purdue University Indianapolis; *U. Manna,* Illinois State University; *P.A. Dowben,* University of Nebraska-Lincoln; *R. Cheng,* Indiana University-Purdue University Indianapolis

Manufacturing Science and Technology Group
Room Union Station B - Session MS-ThP
Manufacturing Science and Technology Poster Session
6:30pm

MS-ThP1 Evaluation of Mechanical Properties of Infill Structures Change during 3D Modeling, ***Seita Ogawa***, *A. Matsumuro,* Aichi Institute of Technology, Japan

MS-ThP2 Development of Innovative CNT/Extra Super Duralumin Composite Materials, ***Chihiro Fujiwara***, Aichi institute of Technology; *A. Matsumuro,* Aichi Institute of Technology, Japan

MS-ThP3 Development of Composite Resin Materials with High Dispersion Cellulose Nanofibers, ***Naoki Iwanaga***, *A. Matsumuro,* Aichi Institute of Technology, Japan; *K. Osawa,* Aichi Institute of Technology, Japn, Japan

MS-ThP4 Improvement of Laminated Interface Strength of Printed Objects by FDM 3D Printer, ***Li Song***, Aichi institute of technology, Japan

MS-ThP5 Investigation of Multi-Level ReRAM in 65nm CMOS for Logic-in-Memory Applications, ***Sarah Rafiq***, *K. Beckmann, J.H. Hazra, M.L. Liehr,* SUNY Polytechnic Institute; *S.K. Jha,* University of Central Florida; *N.C. Cady,* SUNY Polytechnic Institute

MS-ThP6 III-V NanoWires for Junctionless Transistors Fabricated by Focused Ion Beam (FIB) System with Silicon Nitride Passivation, ***Cássio Almeida***, University of Campinas, Brazil; *P.L. Souza,* PUC-Rio, Brazil; *M.P. Pires,* Federal University of Rio de Janeiro, Brazil; *J.A. Diniz,* University of Campinas, Brazil

MS-ThP7 The Development of High Efficiency X-ray Tube with Carbon Nanotube Yarn based-cold Cathode, ***Hyun Suk Kim***, *C.H. Lee,* Wonkwang University, Korea

MS-ThP8 High Aspect Ratio Carbon Nanotube Optical Collimator, ***Tyler Westover***, *R.C. Davis, R.R. Vanfleet,* Brigham Young University

MS-ThP9 Development of a Fabrication Process for Integrated inductors on Flexible Substrate, ***Wilson Freitas***, State University of Campinas, Brasil; *M.H. Oliveira Piazzetta,* Brazilian Nanotechnology National Laboratory, Brazil; *L.T. Manera,* UNICAMP, Brazil; *A.L. Gobbi,* Brazilian Nanotechnology National Laboratory, Brazil

Nanometer-scale Science and Technology Division
Room Union Station B - Session NS-ThP
Nanometer-scale Science and Technology Poster Session
6:30pm

NS-ThP1 Probing Intermolecular and Molecule-Substrate Interactions at Angstrom Scale by Ultrahigh Vacuum Tip-Enhanced Raman Spectroscopy, ***Sayantan Mahapatra***, *J. Schultz, N. Jiang,* University of Illinois at Chicago

NS-ThP2 Cobalt Nanoparticles Supported on Multiwalled Carbon Nanotubes for Catalysts in Hydrogen Generation , ***Brian Price***, Christopher Newport University

NS-ThP3 Advanced Hybrid Metrology for Measuring Pattern Fidelity for Nano Technology--Combining Massive metrology using Full Contour based Data Extraction and Analysis, ***Allen H. Rasafar***, GLOBALFOUNDRIES Inc.

NS-ThP4 A Nanoscopic View of Photo-induced Charge Transfer in Organic Nano-crystalline Heterojunctions, ***Qian Zhang***, *S.R. Cohen, B. Rybtchinski,* Weizmann Institute of Science, Israel

NS-ThP5 Ferroic-ionic Interaction in Hybrid Organic Inorganic Perovskites, ***Yongtao Liu***[12], *L. Collins, A.V. Ievlev, A. Belianinov,* Oak Ridge National Laboratory; *M. Ahmadi,* University of Tennessee Knoxville; *S. Jesse, S.V. Kalinin,* Oak Ridge National Laboratory; *B. Hu,* University of Tennessee Knoxville; *O.S. Ovchinnikova,* Oak Ridge National Laboratory

NS-ThP6 Processing of Nanoscale Lamellae in Bulk Al-Cu Eutectic Samples Through Selective Laser Melting, ***Jonathan Skelton***, *J.A. Floro, J.M. Fitz-Gerald,* University of Virginia

NS-ThP7 Precision Nanometer-scale Scanning Probe Microscopy Data Recalculation for Diamond Tool Cutting Edge Structures, *J.Y. Su,* ***Nian-Nan Chu***, *C.-N. Hsiao,* Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan, Republic of China

NS-ThP8 Understanding Tip-induced Nanoscale Wear for Tomographic Atomic Force Microscopy, ***Umberto Celano***, IMEC, Belgium; *X. Hu,* University of California-Merced; *L. Wouters, K. Paredis, T. Hatschel, P.A.W. van der Heide,* IMEC, Belgium; *A. Martini,* University of California-Merced

Advanced Surface Engineering Division
Room Union Station B - Session SE-ThP
Advanced Surface Engineering Poster Session
6:30pm

SE-ThP2 Plasma and Heat Treatment Response of Carborane Self-Assembled Monolayer on Copper, ***Rupak Thapa***, *L. Dorsett, S. Malik, R. Bale, S. Wagner, D. Bailey, A.N. Caruso,* University of Missouri-Kansas City; *J.D. Bielefeld, S.W. King,* Intel Corporation; *M.M. Paquette,* University of Missouri-Kansas City

Thin Films Division
Room Union Station B - Session TF-ThP
Thin Films Poster Session
6:30pm

TF-ThP1 Oxygen Partial Pressure Dependence of Structural and Photoluminescence Properties in Eu^{3+} doped Tantalum based Double-perovskite Thin Film, ***Jung Hyun Jeong***, *J.H. Oh, B.C. Choi, J.H. Kim, S.Y. Seo,* Pukyong National University, Republic of Korea; *K. Jang,* Changwon National University, Republic of Korea

TF-ThP2 Influence of the Crystal Structure on Photoluminescence Properties of Dy^{3+} and Pr^{3+} Doped Rare-earth Oxyorthosilicates (R_2SiO_5) (R = La, Gd, Y) Thin Film Phosphors, *S.N. Ogugua, H.C. Swart,* University of the Free State, South Africa; ***O. Martin Ntwaeaborwa***, University of the Witwatersrand, South Africa

TF-ThP4 Fabrication of IrO_2/Pt Composite Films by Pulsed-dc Magnetron Sputtering and Plasma-enhanced Atomic Layer Deposition, ***Chao-Te Lee***, *Y.-H. Yu, W.-H. Cho,* Taiwan Instrument Research Institute, Taiwan; *W.-C. Chen,* Taiwan Instrument Research Institute, Taiwan, Taiwan, Republic of China; *H.-P. Chen,* Taiwan Instrument Research Institute, Taiwan

TF-ThP5 The Effect of Deposition Parameters on the Optical and Electrical Properties of MoO_3/Ag/Mo/ MoO_3 Films by Reactive rf Magnetron Sputtering, *C.-T. Lee,* Taiwan Instrument Research Institute, Taiwan; ***Wei-Chun Chen***, Taiwan Instrument Research Institute, Taiwan, Taiwan, Republic of China; *H.-P. Chen,* Taiwan Instrument Research Institute, Taiwan; *C.-C. Jaing,* Minghsin University of Science and Technology, Japan

TF-ThP6 Effect of Sintering Conditions on Characteristic of $BaFe_2(PO_4)_2$ and Ceramic Target Production for Thin Films, ***Jung Hwan Kim***, *B.S. Jung, J.H. Jeong, S.Y. Seo,* Pukyong National University, Republic of Korea; *K. Jang,* Changwon National University, Republic of Korea

TF-ThP7 Development of Thin Film of Ferric Hydroxide Dispersed in Polymer Matrix Doped with Ethylenediamine, *S.H. Fernandes,* ***Leandro Tiago Manera***, *H.J. Ceragioli,* UNICAMP, Brazil

TF-ThP8 Dual-temperature Atomic Layer Deposition of HfO_2/Al_2O_3 on $In_{0.53}Ga_{0.47}As$, ***Changmin Lee***, *S. Choi, Y. An, W. Lee, W. Oh, D. Eom, J. Lee, H. Kim,* Sungkyunkwan University, Republic of Korea

TF-ThP9 Conformal CVD of $Hf_{1-x}V_xB_2$ from Two Precursors: Control of Composition *x* in Deep Trenches, ***Kinsey Canova***, *G.S. Girolami, J.R. Abelson,* University of Illinois at Urbana-Champaign

TF-ThP10 Catalyst-enhanced Chemical Vapor Deposition of Titanium-doped MgB_2 Thin Films, ***Xiaoqing Chu***, *Y. Yang, C. Caroff, G.S. Girolami, J.R. Abelson,* University of Illinois at Urbana-Champaign

TF-ThP11 Computational Simulation of Novel Pyroelectric Infrared Detectors and Their Integration with Silicon, *A. Batra,* ***George Taylor***, *J. Sampson,* Alabama A&M University

TF-ThP12 Kinetically Stabilized Growth of InN by MEPA-MOCVD, ***G. Brendan Cross***, *Z. Ahmad,* Georgia State University; *D. Seidlitz,* Technische Universität Berlin, Germany; *M. Vernon, A.Y. Kozhanov,* Georgia State University

TF-ThP13 Structure Characterization of PECVD a-SiCN:H Thin Films: Toward Machine Learning Algorithms for Modeling of Complex Disordered Solids, ***Sai Siva Kumar Pinnepalli***, *C. Burkett,* University of Missouri-Kansas City; *J. Hwang,* Ohio State University; *O. Oyler, M.M. Paquette,* University of Missouri-Kansas City

TF-ThP14 Growth of Hafnium Oxide and Zirconium Oxide for the Fabrication of Electronic Devices Using Plasma-Enhanced Atomic Layer Deposition, ***Samuel Banks***, *K. Bell, S. Chance III, B. Rodgers, Z. Xiao,* Alabama A&M University

TF-ThP15 Nanoscale Multilayered Thin-Film Thermoelectric Materials and Devices, ***Joevonte Kimbrough***, *A. Glenn, A. Henderson, S. Budak, Z. Xiao,* Alabama A&M University

TF-ThP16 Microstructural Evolution in Sputter-deposited 316L Stainless Steel / Si (100) Thin Films, ***Christopher Bansah***, *C.V. Solomon,* Youngstown State University

TF-ThP18 Characterization of Fluorine-doped SiO_2 Films Deposited by Magnetron Sputtering, ***Bohuei Liao***, Taiwan Instrument Research Institute; *C.-N. Hsiao,* Taiwan Instrument Research Institute, Taiwan, Republic of China

TF-ThP19 MOCVD Growth and Characterization of Wide Bandgap $ZnGeN_2$ Thin Films, ***Md Rezaul Karim***, The Ohio State University; *B.H.D. Jayatunga,* Case Western Reserve University; *Z. Feng, M. Zhu, J. Hwang,* The Ohio State University; *K. Kash,* Case Western Reserve University; *H. Zhao,* The Ohio State University

TF-ThP20 Low Temperature Charging Dynamics of Ionic Liquid and Its Gating Effect on $FeSe_{0.5}Te_{0.5}$ Superconducting Films, ***Cheng Zhang***, University of Tennessee Knoxville; *W. Zhao, S. Bi,* Huazhong University of Science and Technology, China; *C.M. Rouleau, J.D. Fowlkes,* Oak Ridge National Laboratory; *W.L. Boldman,* University of Tennessee Knoxville; *G. Gu, Q. Li,* Brookhaven National Laboratory; *G. Feng,* Huazhong University of Science and Technology; *P.D. Rack,* University of Tennessee Knoxville

TF-ThP21 Design and Characterization of Nanomaterials using PREVAC's Research Platforms, ***Lukasz Walczak***, PREVAC sp. z o.o., Poland

TF-ThP22 Deposition of the Porous Film on the Reactive Liquid Substrate via Metal-organic Precursors, ***Haoming Yan***, *Q. Peng,* University of Alabama

TF-ThP24 The Evolution of Atomic Layer Processing as a Field: Atomic Layer Etching,and its Connections with Atomic Layer Deposition, ***Elsa Alvaro***, Northwestern University; *A. Yanguas-Gil,* Argonne National Laboratory

TF-ThP25 Electrical Properties of In_2O_3 Thin-film Transistors under Vacuum and Inert Environments, ***Keisuke Nakamura***, *K. Sasaki, Y. Shibata, K. Oe, S. Aikawa,* Kogakuin University, Japan

TF-ThP26 Toward Ultra-fast Switching Speed Electrochromic Supercapacitor, ***Weimin Jiao***, *S.C. Wei, C.R. Chang, F. Yao,* University at Buffalo

TF-ThP27 Growth and Structure of Cr-doped ZnO Thin Films, ***Gabrielle Pasternak***, Washington and Jefferson College; *A. Gardill,* Lawrence University; *S.E. Chamberlin,* Washington and Jefferson College

[1] **National Student Award Finalist**

[2] **NSTD Graduate Student Award Finalist**

TF-ThP28 Developing an Approach to Improve the Beta-phase in Ferroelectric PVDF-HFP Thin Films, ***Ashley S. Dale***, *A. Mosey, J. Soruco, R. Cheng*, Indiana University Purdue University Indianapolis

TF-ThP29 Ternary Thin Film Alloys for Varistor Application, ***Ajit Dhamdhere***, *S.J. Rathi, N. Mukherjee, N. Heo, S.Y. Lee, J. Mack, B. Nie,* Eugenus, Inc.

TF-ThP30 Plasma Study and Fretting Corrosion of Zr/ZrN/CNx Multilayers Deposited by HIPIMS on Ti6Al4V, ***Martín Flores***, *L.M. Flores, J. Perez, M.F. Flores, O. Jimenez,* Universidad de Guadalajara, Mexico

TF-ThP31 Size Dependent Strengthening in High Strength Nanotwinned Al/Ti Multilayers, ***Yifan Zhang***, *S. Xue, Q. Li, J. Li, J. Ding, T.J. Niu, R.Z. Su, H. Wang, X. Zhang,* Purdue University

Anticipated Schedule Friday, October 25, 2019

Anticipated Schedule Friday Morning, October 25

8:20 AM _____

8:40 AM _____

9:00 AM _____

9:20 AM _____

9:40 AM _____

10:00 AM _____

10:20 AM _____

10:40 AM _____

11:00 AM _____

11:20 AM _____

11:40 AM _____

12:00 PM _____

Anticipated Schedule Friday Lunch, October 25

When _____

Where _____

With _____

NOTES

	Room A213	
8:20am	**HC+SS-FrM1** Pd Nanoparticles on Alumina Nanofibers by Electrospinning for Heterogeneous Catalysis, ***Miguel Angel Rodriguez Olguin***, *M. Enes da Silva, J. Faria, A. Susarrey Arce, H. Gardeniers,* University of Twente, Netherlands	**Fundamental Discoveries in Heterogeneous Catalysis Focus Topic** **Session HC+SS-FrM** **Catalysis at Complex Interfaces** **Moderators:** Elizabeth Landis, College of the Holy Cros, Fan Yang, Dalian Institute of Chemical Physics, China
8:40am	**HC+SS-FrM2** Multi-Layered TiO_2 Nanofibrous Structures Decorated with Catalytic Nanoparticles for Photoelectrocatalytic Applications, ***Cristian Deenen***, *C. Eyövge, A. Susarrey-Arce, H. Gardeniers,* University of Twente, Netherlands	
9:00am	**INVITED: HC+SS-FrM3** Water Oxidation Reaction in Natural Photosynthesis, *J. Yano,* ***Kyle Sutherlin***, Lawrence Berkeley National Laboratory	
9:20am	Invited talk continues.	
9:40am	**HC+SS-FrM5** Synthesis and Characterization of Carbon-supported PdCu Nanoparticles for the Water Electrolysis in Acid Medium, ***Jonder Morais***, *D.W. Lima, M.V. Castegnaro, M.C.M. Alves,* Universidade Federal do Rio Grande do Sul, Brazil	
10:00am	**HC+SS-FrM6** Nanoscale Spectromicroscopy and Chemical Activity of Bilayer Silicate Films on Pd(100) and Pd(111), ***Samuel Tenney***, *C. Eads,* Brookhaven National Laboratory*; L.O. Mark,* University of Colorado at Boulder*; V. Lee,* University of North Texas*; M. Wang*, Brookhaven National Laboratory*; J.W. Medlin,* University of Colorado at Boulder*; J.A. Kelber,* University of North Texas*; D.J. Stacchiola,* Brookhaven National Laboratory	
10:20am	**INVITED: HC+SS-FrM7** Formation and Properties of Mirror Twin Grain Boundary Networks in Molybdenum Dichalcogenides, ***Matthias Batzill***, University of South Florida	
10:40am	Invited talk continues.	
11:00am	**HC+SS-FrM9** Selectable Catalytic Reduction of Carbon Dioxide to Formic Acid or Methanol over Defect Hexagonal Boron Nitride*, *K.L. Chagoya, T. Jiang, D.J. Nash, D. Le,* ***Talat S. Rahman***, *R.G. Blair,* University of Central Florida	
11:20am		
11:40am		
12:00pm		

Room A215

Advanced Surface Engineering Division
Session SE+AS+SS-FrM
Tribology: From Nano to Macro-scale
Moderators:
Robert Franz, Montanuniversität Leoben, Austria

8:20am **INVITED: SE+AS+SS-FrM1** The Scaling of Tribological Effects from Nano- to Macro-scale, ***Peter Lee,*** Southwest Research Institute

8:40am Invited talk continues.

9:00am **SE+AS+SS-FrM3** Nanotribology of Graphene in Organic Solvents, ***Prathima Nalam,*** *B. Sattari Baboukani,* University at Buffalo, State University of New York*; Z. Ye,* Miami University

9:20am **SE+AS+SS-FrM4** Measuring Atomicscale Surface Friction of a Molecular Vehicle on Au(111), *K.Z. Latt,* ***Sanjoy Sarkar,*** *K. Kottur, M. Raeis,* Ohio University*; A. Ngo,* Argonne National Laboratory*; R. Tumbleson, Y. Zhang, E. Masson, S.-W. Hla,* Ohio University

9:40am **INVITED: SE+AS+SS-FrM5** The Use of the Nanocomposite Concept in Hard Coatings for Improving the Frictional Performance, ***Albano Cavaleiro,*** University of Coimbra, Portugal

10:00am Invited talk continues.

10:20am **SE+AS+SS-FrM7** Development of Ultra-thick CrAlAgN Coatings by HiPIMS for Self-lubrication at Elevated Temperatures, ***Jianliang Lin,*** Southwest Research Institute*; X. Zhang,* Southeast University, China

2D Materials
Session 2D-FrM
2D Late News Session
Moderators:
Daniel Gunlycke, U.S. Naval Research Laboratory,
Ivan Oleynik, University of South Florida

10:40am **2D-FrM8** Mechanistic Insights into a Modified ALD Process to Achieve Crystalline MoS_2 Thin Films, ***Nathaniel Richey,*** *L. Zeng, M. Yasheng, J. Shi, I. Oh, S.F. Bent,* Stanford University

11:00am **2D-FrM9** The Electronic Properties of Quasi-One-Dimensional TiS_3 and ZrS_3, ***Simeon Gilbert,*** University of Nebraska-Lincoln*; H. Yi,* Synchrotron SOLEIL*; A. Lipatov, T. Komesu,* University of Nebraska-Lincoln*; A.J. Yost,* Oklahoma State University*; A. Sinitskii,* University of Nebraska-Lincoln*; J. Avila,* Synchrotron SOLEIL, France*; M.C. Asensio,* Madrid Institute of Materials Science*; P.A. Dowben,* University of Nebraska-Lincoln

11:20am

11:40am **2D-FrM11** Definition of CVD Graphene Micro Ribbons with Lithography and Oxygen Plasma Ashing, ***Fernando Cesar Rufino,*** *A.M. Pascon,* UNICAMP, Brazil*; D.R.G. Larrudé,* Mackenzie Presbyterian University, Brazil*; L. Espindola, F.H. Cioldin, J.A. Diniz,* UNICAMP, Brazil

12:00pm **2D-FrM12** Reactivity of Metal Contacts with Monolayer Tungsten Disulfide, ***Ama Agyapong,*** *K.A. Cooley, S.E. Mohney,* The Pennsylvania State University

	Thin Films Division **Room A216 - Session TF-FrM** **Theory and Characterization of Thin Film Properties** **Moderators:** Angel Yanguas-Gil, Argonne National Laboratory, Gerben van Straaten, Eindhoven University of Technology, The Netherlands	**Surface Science Division** **Room A220-221 - Session SS+HC+PS-FrM** **Planetary, Ambient, and Operando Environments** **Moderators:** Catherine Dukes, University of Virginia, Petra Reinke, University of Virginia
8:20am	**INVITED: TF-FrM1** Incorporation Mechanisms and Electronic Properties of Impurities in Wide-Band-Gap Semiconductors, ***John (Jack) Lyons***, *S.C. Erwin,* U.S. Naval Research Laboratory	**INVITED: SS+HC+PS-FrM1** Seeing is Believing: Atomic-scale Imaging of Catalysts under Reaction Conditions, ***Irene Groot***, Leiden University, The Netherlands, Netherlands
8:40am	Invited talk continues.	Invited talk continues.
9:00am	**TF-FrM3** Review and Demonstration of Feature Scale Simulations, ***Paul Moroz***, TEL Technology Center, America, LLC	**SS+HC+PS-FrM3** *Operando* NAP-XPS and NAP-STM Investigation of CO Oxidation on CoO Nanoislands on Noble Metal Surfaces, ***Jonathan Rodríguez-Fernández***, *Z. Sun, E. Rattigan,* Aarhus University, Denmark; *C. Martín, E. Carrasco,* IMDEA Nanoscience, Spain; *E. Pellegrin, C. Escudero,* ALBA Synchrotron Light Source, Spain; *D. Ecija,* IMDEA Nanoscience, Spain; *J.V. Lauritsen,* Aarhus University, Denmark
9:20am	**TF-FrM4** Process Optimization in Atomic Layer Deposition Using Machine Learning, *A. Yanguas-Gil, S. Letourneau, A.U. Mane,* ***Noah Paulson***, *A.N. Lancaster, J.W. Elam,* Argonne National Laboratory	**SS+HC+PS-FrM4** Reaction of 2-Propanol on SnO_2(110) Studied with Ambient-Pressure X-ray Photoelectron Spectroscopy, *J.T. Diulus, R. Addou,* ***Gregory Herman***, Oregon State University
9:40am	**TF-FrM5** Electroless Deposition of Cobalt Metal on a Palladium Layer on an Amine-modified Surface, *A. Ng,* ***Anthony Muscat***, University of Arizona	**SS+HC+PS-FrM5** Chemical Speciation and Structural Evolution of Rhodium and Silver Surfaces with High Oxygen Coverages, ***Daniel Killelea***, *M.E. Turano,* Loyola University Chicago; *R.G. Farber, K.D. Gibson, S.J. Sibener,* The University of Chicago; *W. Walkosz,* Lake Forest College; *R.A. Rosenberg,* Argonne National Laboratory
10:00am	**TF-FrM6** The Origins of Condensation-Driven Degradation of Hydrophobic Thin Films, ***Jingcheng Ma***, *N.M. Miljkovic,* University of Illinois at Urbana-Champaign	**INVITED: SS+HC+PS-FrM6** Molecular Processes on Icy Surfaces in the Interstellar Medium and the Outer Solar System, ***Edith Fayolle***, *R. Hodyss, P. Johnson,* Jet Propulsion Laboratory, California Institute of Technology; *K. Oberg,* Harvard University; *J-H. Fillion, M. Bertin,* Sorbonne Université
10:20am	**TF-FrM7** Structural and Electrical Properties of Sputtered HEA Thin Films of CrFeCoNiCu and their Oxidation Studies, ***Jeyanthinath Mayandi***, SMN, Department of Physics,University of Oslo, Norway; *M. Stange, E. Sagvolden, M.F. Sunding, Ø. Dahl,* SINTEF Materials and Chemistry, Norway; *M. Schrade,* SINTEF, Materials and Chemistry, Norway; *J. Deuermeier, E.Fortunato. Fortunato,* Universidade Nova de Lisboa, Portugal; *O.M.Løvvik. Løvvik, S. Diplas,* SINTEF Materials and Chemistry, Norway and University of Oslo, Norway; *P.A. Carvalho,* SINTEF Materials and Chemistry, Norway and Universidade de Lisboa, Portugal; *T.G. Finstad,* SMN, Department of Physics, University of Oslo, Norway	Invited talk continues.
10:40am	**TF-FrM8** Observation of Topological Hall and Curie Temperature above Room Temperature in Strain-engineered FeGe Thin Films, ***Adam Hauser***, *S. Budhathoki, K. Law, S. Ranjit, A. Sapkota,* The University of Alabama; *A. Thind, R. Mishra,* Washington University in St. Louis; *D. Heiman,* Northeastern University; *M.E. Jamer,* United States Naval Acadamy; *A. Borisevich,* Oak Ridge National Laboratory; *T. Mewes,* The University of Alabama; *J. Gallagher,* U.S. Naval Research Laboratory	**SS+HC+PS-FrM8** Bilayer Silicates as Models for Space-weather-mediated Water-cycling Processes at the Interface of Airless Bodies, *B. Dhar,* ***William E. Kaden***, University of Central Florida
11:00am	**TF-FrM9** Infrared Absorption Oscillator Strength Factors in SiNx Thin Films, ***Sara DiGregorio***, *S. Habermehl,* Sandia National Laboratories	**SS+HC+PS-FrM9** Unraveling the Evolution of the Solid-Electrolyte Interphase Layer at Li-Metal Anodes, ***Venkateshkumar Prabhakaran***, *S. Roy, G.E. Johnson,* Pacific Northwest National Laboratory, Joint Center for Energy Storage Research; *M.H. Engelhard, V. Shutthanandan, A. Martinez, S. Thevuthasan,* Pacific Northwest National Laboratory; *K.T. Mueller, V. Murugesan,* Pacific Northwest National Laboratory, Joint Center for Energy Storage Research
11:20am	**TF-FrM10** Computer Aided Molecular Design of novel precursor materials for Atomic Layer Deposition, ***Mina Shahmohammadi***, University of Illinois at Chicago; *R. Mukherjee,* Vishwamitra Research Institute; *C.G. Takoudis,* University of Illinois at Chicago; *U.M. Diwekar,* Vishwamitra Research Institute	
11:40am	**TF-FrM11** The Use of Molecular Oxygen for a Low Cost and Low Temperature ALD of Amorphous Titania, ***Harshdeep S. Bhatia***, *C.G. Takoudis,* University of Illinois at Chicago	
12:00pm	**TF-FrM12** Ultra-High Purity Process Capability for High-Performance Atomic layer Deposition, ***Noel O'Toole***, *G.B. Rayner, Jr.,* Kurt J. Lesker Company; *N.A. Strnad,* General Technical Services, LLC; *D.M. Potrepka,* U.S. Army Research Laboratory	

Friday Morning, October 25, 2019

	Nanometer-scale Science and Technology Division Room A222 - Session NS+AS-FrM Electron-Beam Promoted Nanoscience **Moderators:** Omur E. Dagdeviren, Yale University, Qing Tu, Northwestern University	Chemical Analysis and Imaging Interfaces Focus Topic Room A226 - Session CA+AS+NS+SE+SS-FrM Novel Applications and Approaches in Interfacial Analysis **Moderators:** Paul Dietrich, SPECS Surface Nano Analysis GmbH, Germany, Jeong Young Park, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea
8:20am	**INVITED: NS+AS-FrM1** Vibrational Spectroscopy in the Electron Microscope, ***Ondrej Krivanek***, *N. Dellby, CE. Meyer, A. Mitelberger, T.C. Lovejoy,* Nion Co.	**INVITED: CA+AS+NS+SE+SS-FrM1** Chemical Reactions on Bimetal Surfaces with Operando Surface Techniques, ***Jeong Young Park***, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea
8:40am	Invited talk continues.	Invited talk continues.
9:00am	**INVITED: NS+AS-FrM3** In-situ Electron Microscopy of Localized Surface Plasmon Initiated Reactions, ***Canhui Wang***, *W.-C. Yang, A. Bruma,* UMD/NIST; *R. Sharma,* National Institute of Sandards and Technology (NIST)	**CA+AS+NS+SE+SS-FrM3** Principal Component Analysis to Reveal Camouflaged Information in Spectromicroscopy of (complex) Oxides, ***David Mueller***, *M. Giesen,* Forschungszentrum Juelich GmbH, Germany; *D. Stadler,* University of Cologne, Germany; *T. Duchon, F. Gunkel, V. Feyer,* Forschungszentrum Juelich GmbH, Germany; *S. Mathur,* University of Cologne, Germany; *C.M. Schneider,* Forschungszentrum Juelich GmbH, Germany
9:20am	Invited talk continues.	**INVITED: CA+AS+NS+SE+SS-FrM4** *In situ* Electron Microscopy of Catalysts with Atomic Resolution under Atmospheric Pressure, ***Xiaoqing Pan***, University of California Irvine
9:40am	**INVITED: NS+AS-FrM5** Nanoscale Manipulation of Redox of Ag by Electron Beam, ***Jianguo Wen***, *H.P. Sheng,* Argonne National Laboratory; *J.B. Wang,* Wuhan University, China	Invited talk continues.
10:00am	Invited talk continues.	**CA+AS+NS+SE+SS-FrM6** Exposing Buried Interfaces in Thin Film Photovoltaics through Thermo-mechanical Cleaving, ***Deborah McGott***, Colorado School of Mines; *C.L. Perkins, W.K. Metzger,* National Renewable Energy Laboratory; *C.A. Wolden,* Colorado School of Mines; *M.O. Reese,* National Renewable Energy Laboratory
10:20am	**INVITED: NS+AS-FrM7** Dynamics of Material Surfaces and Interfaces – The Good, the Bad and the Electron Beam, ***Jakob Birkedal Wagner***, DTU Nanolab, Technical University of Denmark, Denmark	**CA+AS+NS+SE+SS-FrM7** Switchable Dopants on Percolation Networks of 2D Materials for Chemiresistive Sensing Applications in Aqueous Environments, ***Peter Kruse***, McMaster University, Canada
10:40am	Invited talk continues.	**CA+AS+NS+SE+SS-FrM8** Analysis Of Radioactive Materials In Liquid Using In Situ Sem And Tof-Sims, ***Jennifer Yao***, *X.-Y. Yu, Z.H. Zhu, E.C. Buck,* Pacific Northwest National Laboratory
11:00am	**NS+AS-FrM9** Atomic-Scale Mechanism of Unidirectional Oxide Growth, ***Xianhu Sun***, *W. Zhu, D. Wu,* SUNY Binghamton University; *Z. Liu,* University of Pittsburgh; *X. Chen, L. Yuan,* SUNY Binghamton University; *G. Wang,* University of Pittsburgh; *R. Sharma,* National Institute of Standards and Technology (NIST); *G. Zhou,* SUNY Binghamton University	**CA+AS+NS+SE+SS-FrM9** Interactions between Synthetic Bilgewater Emulsion and Biofilms, ***Jiyoung Son***, Earth and Biological Sciences Directorate; *J. Yao,* Earth & Biological Sciences Directorate; *X.-Y. Yu,* Pacific Northwest National Laboratory
11:20am	**NS+AS-FrM10** Application of Electron-beam-excited Localized Surface Plasmon Resonance to Provide Guidelines for Plasmonic Catalysts, ***Wei-Chang Yang***[1], *C. Wang, L.A. Fredin, H.J. Lezec, R. Sharma,* National Institute of Standards and Technology (NIST)	**CA+AS+NS+SE+SS-FrM10** Mechanistic Insights into the Study of γ -Al_2O_3 Surface and its Interface with Pt, ***Kofi Oware Sarfo***, *A.C.L. Clauser, M.K. Santala, L. Árnadóttir,* Oregon State University
11:40am		**INVITED: CA+AS+NS+SE+SS-FrM11** Artificial Intelligence--An Autonomous TEM for In-situ Studies, ***Huolin Xin***, University of California Irvine
12:00pm		Invited talk continues.

[1] **NSTD Early Career Award Finalist**

Room B130

Plasma Science and Technology Division
Session PS+2D+SE+TF-FrM
Plasma Deposition and Plasma-Enhanced Atomic Layer Deposition
Moderators:
Scott Walton, U.S. Naval Research Laboratory,
David Boris, U.S. Naval Research Laboratory

8:20am	**INVITED: PS+2D+SE+TF-FrM1** Plasma-based Synthesis of 2D Materials for Devices on Flexible Substrates, *N.R. Glavin,* Air Force Research Laboratory; ***Christopher Muratore,*** Department of Chemical and Materials Engineering, University of Dayton
8:40am	Invited talk continues.
9:00am	**PS+2D+SE+TF-FrM3** Homogeneous Ternary Oxides of Aluminum with Silicon, Molybdenum, and Niobium by Plasma Enhanced ALD by Sequential Precursor Pulses, ***Steven Vitale,*** MIT Lincoln Laboratory
9:20am	**PS+2D+SE+TF-FrM4** Piezoelectric Response of ZnO Thin Films Grown by Plasma-Enhanced Atomic Layer Deposition, ***Julian Pilz,*** *T. Abu Ali,* Graz University of Technology, Austria; *P. Schäffner, B. Stadlober,* Joanneum Research Forschungsgesellschaft mbH, Austria; *A.M. Coclite,* Graz University of Technology, Austria
9:40am	
10:00am	**PS+2D+SE+TF-FrM6** Plasma-enhanced Molecular Layer Deposition of Boron Carbide from Carboranes, ***Michelle M. Paquette,*** *R. Thapa, L. Dorsett, R. Bale, S. Malik, D. Bailey, A.N. Caruso,* University of Missouri-Kansas City; *J.D. Bielefeld, S.W. King,* Intel Corporation
10:20am	**PS+2D+SE+TF-FrM7** Gas Phase Kinetics Optimization Study for Scaling-up Atmospheric Pressure Plasma Enhanced Spatial ALD, ***Yves Creyghton,*** Holst Centre / TNO, The Netherlands, Netherlands
10:40am	**INVITED: PS+2D+SE+TF-FrM8** Taking Plasma ALD to the Next Level: From Fundamental Understanding to Selective 3D Processing, *T.F. Faraz, K. Arts,* Eindhoven University of Technology, The Netherlands, Netherlands; *L. Martini, R. Engeln, H.C.M. Knoops,* Eindhoven University of Technology, The Netherlands; ***Erwin Kessels,*** Eindhoven University of Technology, The Netherlands, Netherlands
11:00am	Invited talk continues.
11:20am	**PS+2D+SE+TF-FrM10** Computational Investigation of Plasma Enhanced ALD of SiO_2, *C. Qu,* University of Michigan; *P. Agarwal, Y. Sakiyama, A. LaVoie,* Lam Research Corporation; ***Mark J. Kushner,*** University of Michigan
11:40am	**PS+2D+SE+TF-FrM11** Analyzing Self-limiting Surface Reaction Mechanisms of Metal Alkyl Precursors and Nitrogen Plasma Species: Real-time In-situ Ellipsometric Monitoring of III-nitride Plasma-ALD Processes, ***Ali Okyay,*** OkyayTech Inc., Turkey; *A. Mohammad, D. Shukla, S. Ilhom,* University of Connecticut; *B. Johs,* Film Sense LLC; *B.G. Willis, N. Biyikli,* University of Connecticut
12:00pm	**PS+2D+SE+TF-FrM12** Tribological Properties of Plasma Enhanced Atomic Layer Deposition TiMoN with Substrate Bias, ***Mark Sowa,*** Veeco ALD; *A.C. Kozen,* University of Maryland; *N.C. Strandwitz, T.F. Babuska, B.A. Krick,* Lehigh University

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AVS 66
EXHIBIT PROGRAM



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EXHIBIT HALL EVENTS

Welcome to the AVS International Symposium and Exhibition! The Symposium will address cutting-edge issues associated with materials, processing and interfaces in the research and manufacturing communities.

Visit the exhibits where you will find an extensive display of tools, equipment, services and consulting for film deposition, surface and interface measurements and analysis, materials, chemicals, supplies, vacuum production & measurement and related instrumentation for surface, interface and film measurements as well as professional literature and publications.
Exhibit Entry is FREE !



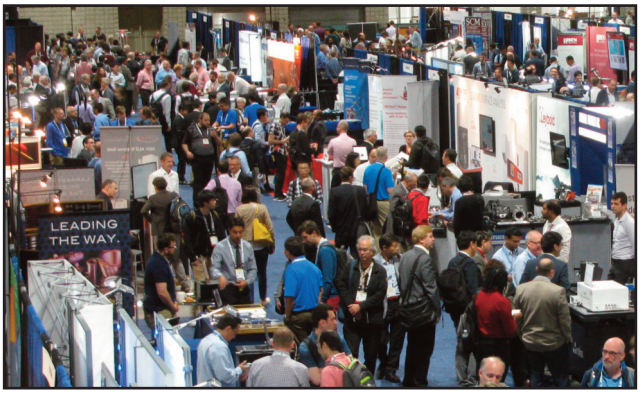

EXHIBIT HALL ATTRACTIONS & EVENTS

140 Exhibitors Showcasing their Latest Technology

Ask The Experts - *Hosted by the AVS Vacuum Technology Division*

AVS Career Center

Exhibitor Technology Spotlight Sessions

AVS Store: Gifts & Souvenirs

Free Morning Coffee • Lunch • Afternoon Refreshments

Art Zone Display & Competition

Daily Raffle Drawings

Grand Prize Raffle Drawing

New Mobile Phone Charging Lounge

Free Caricatures

Foosball Tournament

Journals, Media & Publishers

Competitions & Networking Events

2019 Exhibit Schedule

Oct. 22	Tuesday	10am - 5:00pm
Oct. 23	Wednesday	10am - 4:30pm
Oct. 24	Thursday	10am - 2:30pm

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Special Events & Attractions

Welcome Mixer - Monday 6:30pm - 8:30pm

Greater Columbus Convention Center - Union B



Monday, October 21 6:30 - 8:30

NETWORKING at its best! The Welcome Mixer offers food and refreshments and the opportunity to casually interface with fellow AVS attendees and exhibitors from around the world. Everyone is welcome at the Mixer! The mixer will be located in the Greater Columbus Convention Center in the **Union B Ballroom on Monday night 6:30 - 8:30 p.m**.

Ask The Experts (ATE) BOOTH 634

Hosted by the AVS Vacuum Technology Division. An unbiased, open forum staffed by experts in various aspects of vacuum technology to discuss and help solve vacuum related issues. Challenge our experts and receive a free souvenir while supplies last!!



Sponsored by: SAES Getters & Kimball Physics

Career Center BOOTH 146

Make the right connections at AVS. Post job openings or search available positions. The AVS Career Center provides the opportunity for attendees and exhibitors to find a perfect match.

Interview Rooms Available





9th Annual Foosball Tournament

Join the competition in Booth 635. Great Prizes!! Sign up begins at Tuesday morning, October 22 in the Exhibit Hall at booth 635. Hosted and Sponsored by Gamma Vacuum.





Daily Raffle Prizes

Find your daily raffle tickets in your registration kit. Enter your tickets into the raffle drum in **Booth 735** in the Exhibit Hall Tuesday, Wednesday & Thursday mornings. Come back in the afternoons to see if you are a winner! The **Grand Prize Raffle** drawing will take place on Thursday during the Exhibit Finale. Make sure you get your ticket stamped at the R.D. Mathis booth before you drop your ticket in the drum! Great prizes including Fit-Bits, BlueTooth Speakers, Head Phones; Amazon Echo and so much more!

Charging Lounge *NEW* BOOTH 138



New charging lounge... A place to relax and charge your mobile phone securily. New cell phone charging lockers. Set your own code and take a walk around the exhibit hall show floor or sit and relax while your phone charges. **Generously sponsored by Agilent, Vacuum Products Division**

Special Events & Attractions

Caricaturists — BOOTH 221



Visit the Special Events booth for your FREE AVS-66 Souvenir. Our caricature artists will be available during all Exhibit Hall hours. You will find your ticket in your registration kit. Ticket must be validated by our generous sponsor MKS.

AVS Store — BOOTH 734

Membership Information - learn about the many advantages of AVS Membership, also browse through Educational Materials and AVS logo items.

- **Videos**
- **Books**
- **Monographs**
- **Membership Services**
- **AVS Logo Items**



Art Zone/Contest — BOOTH 202

See graphic designs in the form of art from fellow AVS attendees who will compete in our annual art contest. Take a look at this amazing display and don't forget to vote! Prizes will be announced at the Exhibit Finale on Thursday. **CASH PRIZES !!!**



Exhibitor Technology Spotlight Sessions — BOOTH 152

Keep up with the latest technology! Exhibitors showcase new products, services and applications. Sessions are scheduled during the technical session breaks in the stage area in the exhibit hall.



Exhibitor Technology Spotlight Sessions

Need to charge your cell phone ?

Stop by the new Charging Lounge in the exhibit hall.
You will find comfortable seating and secure charging lockers for your convenience!

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Super Conductor Materials Inc
SynSysCo
Thermo Fisher Scientific
UC Components Inc
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Bold listings reflect our Sponsors and Corporate Members

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522	AdValue Technology LLC
427	AGC Plasma Technology Solutions
627	**AIP Publishing**
511	AJA International, Inc.
508	American Institute of Physics
203	Amuneal Mfg Corporation
501	ANCORP
407	Anderson Dahlen
625	Association of Vacuum Equipment Manufacturers
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221	AVS Special Events Booth
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400	BriskHeat Corporation
717	**Bruker Nano Surfaces**
306	Cosmotec, Inc.
614	CS Clean Solutions, Inc.
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723	Ebara Technologies, Inc.
510	Edwards Vacuum
720	Extrel CMS
436	Ferrovac GmbH
702	Film Sense
633	**Gamma Vacuum**
411	HeatWave Labs Inc.
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310	Hiden Analytical, Inc.
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409	LDS Vacuum Products, Inc.
412	Luxel Corp.
301	MeiVac, Inc.
303	Micro Photonics
709	Midwest Vacuum Inc.
600	**MKS Instruments**
424	MODION®
715	National Institute of Standards and Technology
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329	Nextron Corporation
307	Nonsequitur Technologies
623	Nor-Cal Products, Inc.
315	OkyayTech
506	Osaka Vacuum USA, Inc.
729	Park Systems, Inc.
621	Pfeiffer Vacuum Technology, Inc.
707	PHPK Technologies
500	**Physical Electronics**
716	Precision Plus Vacuum Parts
507	Princeton Scientific Corp
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606	**R.D. Mathis Company**
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513	RASIRC
524	**RF VII Inc.**
321	**SAES Group**
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611	**ScientaOmicron, Inc.**
314	Scion Plasma LLC
532	Semicore Equipment, Inc.
712	Shimadzu Industrial Equipment
615	Sigma Surface Science
515	SINGULUS TECHNOLOGIES AG
704	Solberg Manufacturing, Inc.
309	Solid Sealing Technology, Inc.
401	**SPECS-TII, Inc.**
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537	Tech-X Corporation
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616	The Digivac Company
420	Thermo Fisher Scientific
700	**UC Components**
434	United Mineral and Chemical Corp.
415	Vacuum Research Corporation
205	Vacuum Volume, LLC
732	VAT Group
516	Veeco Instruments
145	View, Inc.
706	Von Ardenne
316	Williamsburg Scientific Instruments
410	Yugyokuen Ceramics Co., Ltd.

Exhibit Hall Floor Plan

Greater Columbus Convention Center



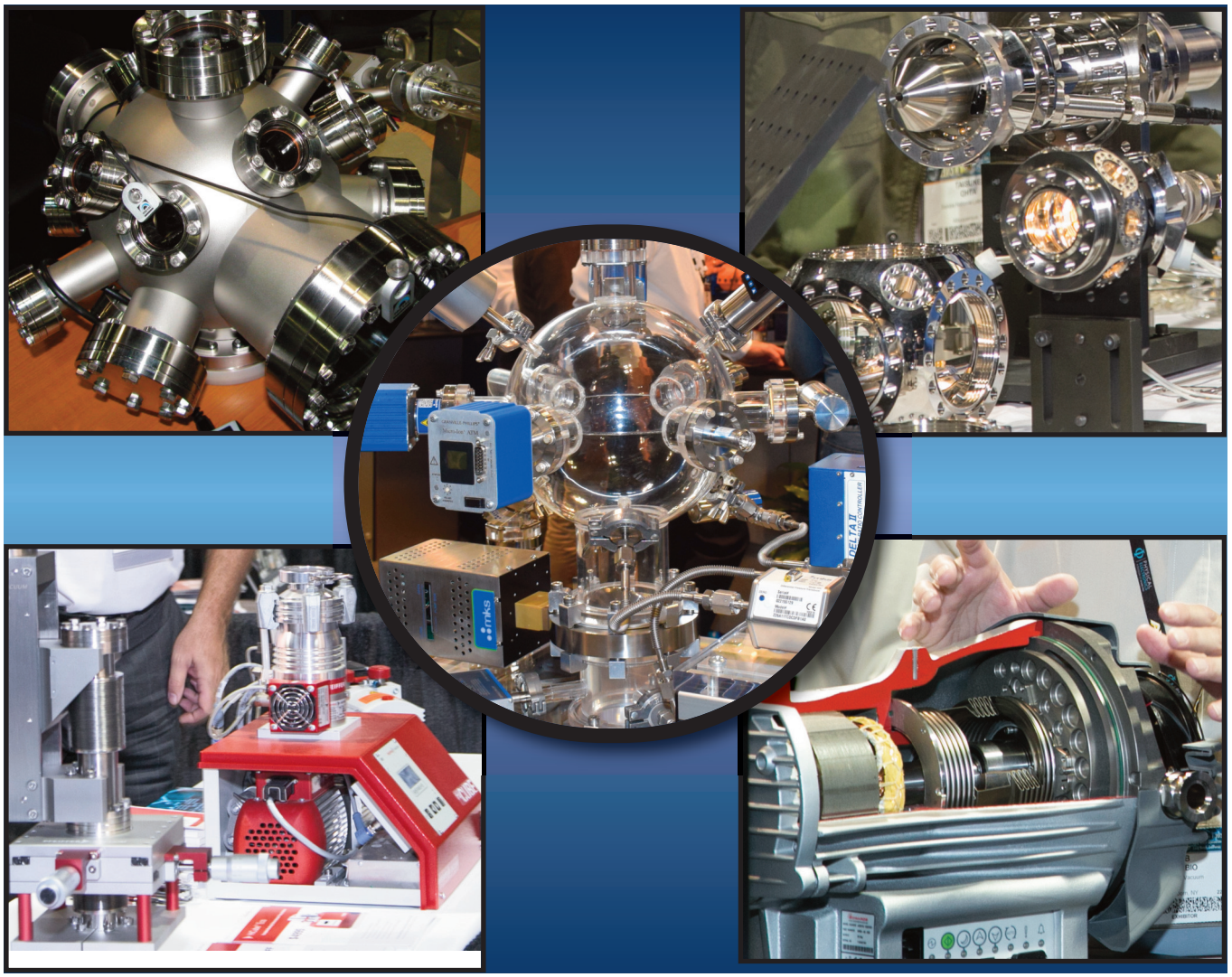
2019 Exhibit Schedule

Oct. 22	**Tuesday**	**10am - 5:00pm**
Oct. 23	**Wednesday**	**10am - 4:30pm**
Oct. 24	**Thursday**	**10am - 2:30pm**

PRODUCT LOCATOR

Not sure where to find what you're looking for?

The Product Locator will help you find the vendors you need. Product categories are listed alphabetically followed by the supplier(s) and their corresponding booth location.



Product Locator

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Kurt J. Lesker Company	601

Cryogenic Filling and Transfer Systems	Booth
Nextron Corporation	329

Cryogenic Piping	
Joseph Oat Corporation	801

Custom Vacuum Systems	
AJA International, Inc.	511
ANCORP	501
ANDERSON DAHLEN	407
Atlas Technologies	533
BriskHeat Corporation	400
Cosmotec, Inc.	306
Edwards Vacuum	527
Extrel CMS	720
Ferrovac GmbH	436
HeatWave Labs Inc.	411
Hiden Analytical, Inc.	310
Hine Automation	800
HVA, LLC	311
Joseph Oat Corporation	801
Kimball Physics Inc.	201
Kurt J. Lesker Company	601
LDS Vacuum Products, Inc.	409
McAllister Technical Services, Inc.	727
MeiVac, Inc.	301
MKS Instruments	600
MODION®	424
Nextron Corporation	329
Nor-Cal Products, Inc.	623
PHPK Technologies	707
PVD Products	200
RF VII Inc.	524
Semicore Equipment, Inc.	532
Sigma Surface Science	615
Staib Instruments	326
SynSysCo	317
Taiwan Instrument Research Institute	337
Vacuum Volume, LLC	205

Detectors / Multipliers	
Extrel CMS	720
Hiden Analytical, Inc.	310
Horiba Scientific	710
Micro Photonics	303
SPECS Surface Nano Analysis, Inc.	401
SPI Supplies	433

E-Beam Gun Power Supplies	Booth
INFICON	211
Kaufman & Robinson, Inc.	607
Kimball Physics Inc.	201
Kurt J. Lesker Company	601
McAllister Technical Services, Inc.	727
MeiVac, Inc.	301
Micro Photonics	303
SPECS Surface Nano Analysis, Inc.	401
Staib Instruments	326
Von Ardenne	706

E-Beam Gun Sweeps	
Kimball Physics Inc.	201
MeiVac, Inc.	301
Von Ardenne	706

E-Beam Guns	
Cosmotec, Inc.	306
HeatWave Labs Inc.	411
Kimball Physics Inc.	201
Kurt J. Lesker Company	601
McAllister Technical Services, Inc.	727
MeiVac, Inc.	301
Micro Photonics	303
Princeton Scientific Corp	507
Sigma Surface Science	615
SPECS Surface Nano Analysis, Inc.	401
Staib Instruments	326
Super Conductor Materials	721
Von Ardenne	706
Yugyokuen Ceramics Co., Ltd.	410

Electroforming Services	
BellowsTech, LLC	333

Electroforms: Custom	
BellowsTech, LLC	333

Electron Sources	
Princeton Scientific Corp	507
Williamsburg Scientific Instruments	316

Employment Services / Recruiting	
AVS Career Center	146

Equipment, Used	Booth
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
Hine Automation	800
LDS Vacuum Products, Inc.	409
Pfeiffer Vacuum Technology, Inc.	621
RF VII Inc.	524
Semicore Equipment, Inc.	532
SynSysCo	317

Fittings, Gaskets, Flanges, Seals	
AccuStrata	616
ANCORP	501
ANDERSON DAHLEN	407
Atlas Technologies	533
BellowsTech, LLC	333
Cosmotec, Inc.	306
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
Ferrovac GmbH	436
HVA, LLC	311
INFICON	211
Kimball Physics Inc.	201
Kurt J. Lesker Company	601
LDS Vacuum Products, Inc.	409
McAllister Technical Services, Inc.	727
MKS Instruments	600
MODION®	424
Nonsequitur Technologies	307
Nor-Cal Products, Inc.	623
Pfeiffer Vacuum Technology, Inc.	621
Precision Plus Vacuum Parts	716
Solid Sealing Technology, Inc.	309
UC Components	700
Vacuum Volume, LLC	205
Yugyokuen Ceramics Co., Ltd.	410

FT-IR	
MKS Instruments	600
Thermo Fisher Scientific	420

Gas Control Systems	
Anderson Dahlen	407
Cosmotec, Inc.	306
Hiden Analytical, Inc.	310
MKS Instruments	600
Nel Hydrogen	632
Nextron Corporation	329
RASIRC	513
Teledyne Hastings Instruments	429

Gauges, Tubes	Booth
AccuStrata	616
AdValue Technology LLC	522
Duniway Stockroom Corp.	414
Edwards Vacuum	527
Hiden Analytical, Inc.	310
INFICON	211
Instrutech, Inc.	714
Kurt J. Lesker Company	601
Midwest Vacuum Inc.	709
MKS Instruments	600
Pfeiffer Vacuum Technology, Inc.	621
Precision Plus Vacuum Parts	716
The Digivac Company	616
Vacuum Research Corporation	415
Vacuum Volume, LLC	205

GC-MS / LC-MS	
Hiden Analytical, Inc.	310
INFICON	211
Nel Hydrogen	632
Yugyokuen Ceramics Co., Ltd.	410

Glassware	
AdValue Technology LLC	522
ANCORP	501

Glove Boxes	
Physical Electronics	500

Ion / Electron Guns	
Cosmotec, Inc.	306
HeatWave Labs Inc.	411
Hiden Analytical, Inc.	310
ION-TOF USA	406
Kaufman & Robinson, Inc.	607
Kimball Physics Inc.	201
Kratos Analytical, Inc.	701
Kurt J. Lesker Company	601
Micro Photonics	303
Nonsequitur Technologies	307
Physical Electronics	500
Princeton Scientific Corp	507
ScientaOmicron, Inc.	611
Scion Plasma LLC	314
Sigma Surface Science	615
SPECS Surface Nano Analysis, Inc.	401
Staib Instruments	326
Veeco Instruments	516
Yugyokuen Ceramics Co., Ltd.	410

Ion Beam Deposition Systems/Guns	Booth
AJA International, Inc.	511
Cosmotec, Inc.	306
HeatWave Labs Inc.	411
Hiden Analytical, Inc.	310
Kaufman & Robinson, Inc.	607
Kurt J. Lesker Company	601
McAllister Technical Services, Inc.	727
Micro Photonics	303
Physical Electronics	500
Princeton Scientific Corp	507
PVD Products	200
Scion Plasma LLC	314
Semicore Equipment, Inc.	532
Sigma Surface Science	615
SPECS Surface Nano Analysis, Inc.	401
Veeco Instruments	516

Leak Detectors	
Duniway Stockroom Corp.	414
Edwards Vacuum	527
Hiden Analytical, Inc.	310
INFICON	211
LDS Vacuum Products, Inc.	409
Midwest Vacuum Inc.	709
MKS Instruments	600
Nel Hydrogen	632
Pfeiffer Vacuum Technology, Inc.	621
Shimadzu Industrial Equipment	712
SynSysCo	317
Vacuum Volume, LLC	205
Yugyokuen Ceramics Co., Ltd.	410

Lithography Systems	
Heidelberg Instruments, Inc.	413
Nel Hydrogen	632
Raith America, Inc.	313
RASIRC	513
ScientaOmicron, Inc.	611

Machining (Bulk and Special)	
ANCORP	501
ANDERSON DAHLEN	407
Atlas Technologies	533
Ferrovac GmbH	436
Kurt J. Lesker Company	601
McAllister Technical Services, Inc.	727
MODION®	424
Nextron Corporation	329
Super Conductor Materials	721
UC Components	700

Machining (Repair, Refurb, Mods)	Booth
ANDERSON DAHLEN	407
Atlas Technologies	533
LDS Vacuum Products, Inc.	409
McAllister Technical Services, Inc.	727
MODION®	424
Precision Plus Vacuum Parts	716
Super Conductor Materials	721
VAT Group	732

Magnetron Sputtering Cathodes	
AJA International, Inc.	511
Kurt J. Lesker Company	601
MeiVac, Inc.	301
Princeton Scientific Corp	507
PVD Products	200
Sigma Surface Science	615
SPI Supplies	433
Super Conductor Materials	721
Von Ardenne	706

Magnetron Sputtering Equipment	
AJA International, Inc.	511
Kurt J. Lesker Company	601
MeiVac, Inc.	301
PVD Products	200
Sigma Surface Science	615
SINGULUS TECHNOLOGIES AG	515
SPI Supplies	433
Von Ardenne	706

Mass Flow Controller/Accessories	
Cosmotec, Inc.	306
Horiba Scientific	710
LDS Vacuum Products, Inc.	409
MKS Instruments	600
Nextron Corporation	329
Nor-Cal Products, Inc.	623
Teledyne Hastings Instruments	429

Materials / Standards	Booth
AdValue Technology LLC	522
AJA International, Inc.	511
Amuneal Mfg Corporation	203
ANCORP	501
Kurt J. Lesker Company	601
Nel Hydrogen	632
Princeton Scientific Corp	507
R.D. Mathis Company	606
SPI Supplies	433
Super Conductor Materials	721
United Mineral and Chemical Corp.	434
Yugyokuen Ceramics Co., Ltd.	410

Materials Testing	
Amuneal Mfg Corporation	203
Bruker Nano Surfaces	717
Cosmotec, Inc.	306
Film Sense	702
Horiba Scientific	710
ION-TOF USA	406
J.A. Woollam Co., Inc.	300
Kimball Physics Inc.	201
Physical Electronics	500
Princeton Scientific Corp	507
SPECS Surface Nano Analysis, Inc.	401
SPI Supplies	433
Staib Instruments	326

Microscopy	
AdValue Technology LLC	522
Bruker Nano Surfaces	717
Horiba Scientific	710
Kimball Physics Inc.	201
Park Systems, Inc.	729
Pfeiffer Vacuum Technology, Inc.	621
PVD Products	200
ScientaOmicron, Inc.	611
SPECS Surface Nano Analysis, Inc.	401
SPI Supplies	433
Thermo Fisher Scientific	420
Yugyokuen Ceramics Co., Ltd.	410

NanoFabrication Systems	
Hiden Analytical, Inc.	310
Hine Automation	800
Nel Hydrogen	632
Raith America, Inc.	313
ScientaOmicron, Inc.	611

Product Locator

Ovens, Vacuum	Booth
Anderson Dahlen	407
HeatWave Labs Inc.	411
Hiden Analytical, Inc.	310
Joseph Oat Corporation	801
Princeton Scientific Corp	507
SINGULUS TECHNOLOGIES AG	515
The Digivac Company	616

Particle Monitoring	
Horiba Scientific	710
RASIRC	513

Planar Magnetron Cathods	
AJA International, Inc.	511
Kurt J. Lesker Company	601
MeiVac, Inc.	301
PVD Products	200
Super Conductor Materials	721
Von Ardenne	706

Process Controllers/Monitors	
AccuStrata	616
BriskHeat Corporation	400
Extrel CMS	720
Film Sense	702
Horiba Scientific	710
INFICON	211
k-Space Associates, Inc.	612
Kurt J. Lesker Company	601
MeiVac, Inc.	301
MKS Instruments	600
RASIRC	513
The Digivac Company	616
Von Ardenne	706

Publishers	
AIP Publishing	627
American Institute of Physics	508
AVS Publications	626

Pumps, Equipment, Services & Supplies	Booth
Anderson Dahlen	407
CS Clean Solutions, Inc.	614
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
Edwards Vacuum	527
Extrel CMS	720
Gamma Vacuum	633
HeatWave Labs Inc.	411
HVA, LLC	311
Inland Vacuum Industries, Inc.	423
Kashiyama-USA Inc.	421
Kurt J. Lesker Company	601
LDS Vacuum Products, Inc.	409
MODION®	424
Nextron Corporation	329
Osaka Vacuum USA, Inc.	506
Pfeiffer Vacuum Technology, Inc.	621
PHPK Technologies	707
Precision Plus Vacuum Parts	716
SAES Group	321
Semicore Equipment, Inc.	532
Shimadzu Industrial Equipment	712
SINGULUS TECHNOLOGIES AG	515
Solberg Manufacturing, Inc.	704
SPI Supplies	433
SynSysCo	317
Vacuum Research Corporation	415

Purification Systems	
CS Clean Solutions, Inc.	614
Nel Hydrogen	632
R.D. Mathis Company	606
RASIRC	513

RAMAN Spectroscopy	
Bruker Nano Surfaces	717
Horiba Scientific	710
Nextron Corporation	329
Thermo Fisher Scientific	420

Recruiter/Job Placement/Career Services	
American Institute of Physics	508
AVS Career Center	146

Reflection Electron Energy Loss Spectroscopy	
Williamsburg Scientific Instruments	316

Product Locator

RF Systems/Generators/Power Supplies

	Booth
Extrel CMS	720
Kurt J. Lesker Company	601
MeiVac, Inc.	301
Micro Photonics	303
MKS Instruments	600
MODION®	424
PVD Products	200
RF VII Inc.	524
Semicore Equipment, Inc.	532
SPI Supplies	433
T&C Power Conversion, Inc.	536
TDK-Lambda Americas Neptune	610

Sample Manipulation & Heating

AdValue Technology LLC	522
Anderson Dahlen	407
Ferrovac GmbH	436
Kurt J. Lesker Company	601
Nextron Corporation	329
SPI Supplies	433

Scanning Probe Microscopy Systems

Bruker Nano Surfaces	717
ION-TOF USA	406
Park Systems, Inc.	729
ScientaOmicron, Inc.	611
Sigma Surface Science	615
SPECS Surface Nano Analysis, Inc.	401

Software

Kyungwon Tech Co., Ltd.	520
MKS Instruments	600
Tech-X Corporation	537

Spectrometer Accessories

AccuStrata	616
AdValue Technology LLC	522
Cosmotec, Inc.	306
Extrel CMS	720
Ferrovac GmbH	436
Hiden Analytical, Inc.	310
Horiba Scientific	710
Kratos Analytical, Inc.	701
Nel Hydrogen	632
SAES Group	321
Shimadzu Industrial Equipment	712
Thermo Fisher Scientific	420

Sputtering Deposition System

	Booth
AJA International, Inc.	511
Cosmotec, Inc.	306
Hiden Analytical, Inc.	310
Kaufman & Robinson, Inc.	607
Kurt J. Lesker Company	601
MeiVac, Inc.	301
Micro Photonics	303
Nor-Cal Products, Inc.	623
Princeton Scientific Corp	507
PVD Products	200
RASIRC	513
RF VII Inc.	524
Scion Plasma LLC	314
Semicore Equipment, Inc.	532
Sigma Surface Science	615
SINGULUS TECHNOLOGIES AG	515
SPECS Surface Nano Analysis, Inc.	401
SPI Supplies	433
Von Ardenne	706

Temperature Sensors

BriskHeat Corporation	400

Testing Laboratory

Nel Hydrogen	632
Nextron Corporation	329

Thickness Monitors/Measurement

ANCORP	501
Bruker Nano Surfaces	717
Film Sense	702
Hiden Analytical, Inc.	310
Horiba Scientific	710
INFICON	211
J.A. Woollam Co., Inc.	300
k-Space Associates, Inc.	612
Kurt J. Lesker Company	601
Micro Photonics	303
RASIRC	513
SPI Supplies	433
Veeco Instruments	516

Product Locator

Thin Film Vacuum Coating	Booth
AdValue Technology LLC	522
Bruker Nano Surfaces	717
Cosmotec, Inc.	306
Hiden Analytical, Inc.	310
Hine Automation	800
Kaufman & Robinson, Inc.	607
Kurt J. Lesker Company	601
Luxel Corp.	412
Micro Photonics	303
Nel Hydrogen	632
Nextron Corporation	329
Nor-Cal Products, Inc.	623
Princeton Scientific Corp	507
PVD Products	200
RF VII Inc.	524
ScientaOmicron, Inc.	611
Scion Plasma LLC	314
Sigma Surface Science	615
SINGULUS TECHNOLOGIES AG	515
SPECS Surface Nano Analysis, Inc.	401
SPI Supplies	433
Strem Chemicals, Inc.	207
Super Conductor Materials	721
Taiwan Instrument Research Institute	337

ToF SIMS Instruments	
Hiden Analytical, Inc.	310
ION-TOF USA	406
Physical Electronics	500
SPECS Surface Nano Analysis, Inc.	401

Tubing/Piping/Bellows Assemblies	
AdValue Technology LLC	522
ANCORP	501
ANDERSON DAHLEN	407
Atlas Technologies	533
BellowsTech, LLC	333
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
LDS Vacuum Products, Inc.	409
Midwest Vacuum Inc.	709
MKS Instruments	600
Nor-Cal Products, Inc.	623
Vacuum Research Corporation	415

UV VIS	
AdValue Technology LLC	522
Horiba Scientific	710
Thermo Fisher Scientific	420

Vacuum System Accessories	booth
ANCORP	501
Anderson Dahlen	407
Atlas Technologies	533
BellowsTech, LLC	333
BriskHeat Corporation	400
Cosmotec, Inc.	306
CS Clean Solutions, Inc.	614
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
Edwards Vacuum	527
Extrel CMS	720
Ferrovac GmbH	436
HeatWave Labs Inc.	411
Hiden Analytical, Inc.	310
Hine Automation	800
Huntington Labs	528
HVA, LLC	311
INFICON	211
Inland Vacuum Industries, Inc.	423
Instrutech, Inc.	714
Kaufman & Robinson, Inc.	607
Kimball Physics Inc.	201
Kurt J. Lesker Company	601
LDS Vacuum Products, Inc.	409
Luxel Corp.	412
McAllister Technical Services, Inc.	727
MeiVac, Inc.	301
Micro Photonics	303
Midwest Vacuum Inc.	709
MKS Instruments	600
MODION®	424
Nextron Corporation	329
Nonsequitur Technologies	307
Nor-Cal Products, Inc.	623
Osaka Vacuum USA, Inc.	506
Pfeiffer Vacuum Technology, Inc.	621
PHPK Technologies	707
Precision Plus Vacuum Parts	716
Princeton Scientific Corp	507
PVD Products	200
R.D. Mathis Company	606
RF VII Inc.	524
SAES Group	321
Scion Plasma LLC	314
Semicore Equipment, Inc.	532
Solberg Manufacturing, Inc.	704
Solid Sealing Technology, Inc.	309
SPI Supplies	433
Staib Instruments	326
Yugyokuen Ceramics Co., Ltd.	410

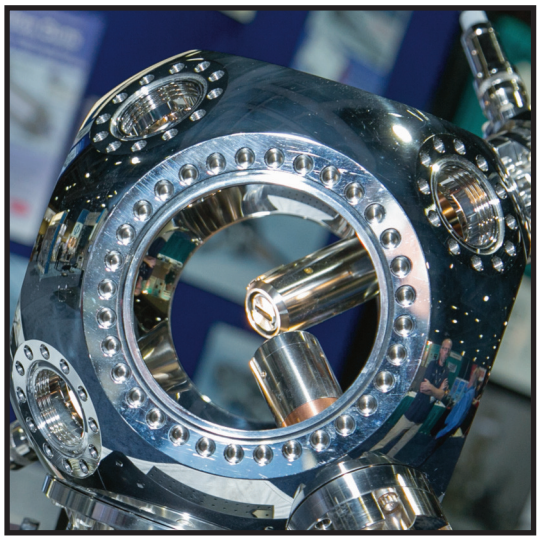
Vacuum System Accessories *(Continued)*	Booth
SynSysCo	317
The Digivac Company	616
UC Components	700
Vacuum Research Corporation	415
Vacuum Volume, LLC	205
VAT Group	732

Vacuum System Replacement Parts	
ANCORP	501
ANDERSON DAHLEN	407
Atlas Technologies	533
BellowsTech, LLC	333
Cosmotec, Inc.	306
Ebara Technologies, Inc.	723
Edwards Vacuum	527
Extrel CMS	720
Ferrovac GmbH	436
HeatWave Labs Inc.	411
Hine Automation	800
Huntington Labs	528
LDS Vacuum Products, Inc.	409
Micro Photonics	303
Midwest Vacuum Inc.	709
MODION®	424
Nor-Cal Products, Inc.	623
Precision Plus Vacuum Parts	716
R.D. Mathis Company	606
RF VII Inc.	524
SAES Group	321
Solberg Manufacturing, Inc.	704
SynSysCo	317
UC Components	700
VAT Group	732



Valves	Booth
ANCORP	501
ANDERSON DAHLEN	407
Duniway Stockroom Corp.	414
Ebara Technologies, Inc.	723
Edwards Vacuum	527
Hiden Analytical, Inc.	310
Huntington Labs	528
HVA, LLC	311
KITZ SCT AMERICA	713
Kurt J. Lesker Company	601
LDS Vacuum Products, Inc.	409
McAllister Technical Services, Inc.	727
MeiVac, Inc.	301
Midwest Vacuum Inc.	709
MKS Instruments	600
Nor-Cal Products, Inc.	623
Pfeiffer Vacuum Technology, Inc.	621
PHPK Technologies	707
Precision Plus Vacuum Parts	716
Vacuum Research Corporation	415
VAT Group	732

X-Ray Photoelectron Spectrometers	
Cosmotec, Inc.	306
Kratos Analytical, Inc.	701
Physical Electronics	500
ScientaOmicron, Inc.	611
Sigma Surface Science	615
SPECS Surface Nano Analysis, Inc.	401
Thermo Fisher Scientific	420



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AVS - ASK THE EXPERTS - VAC TECH DIV. **634**
http://www.avs.org/forum.aspx
Have Questions? We have answers! The Vacuum Technology Division is pleased to again host Ask the Experts during the AVS-66 exhibit. Bring us your problems with vacuum system specifications, troubleshooting, process control, contamination, and we will do our best to point you to a good solution. Ask the Experts is an unbiased, open forum with the resources to discuss and help solve vacuum related issues.

AVS ART ZONE & CONTEST **202**
www.avs.org
Let your fellow colleagues be the judge or your artistic interpretations of science as art. Stop by to cast your vote for your favorite images.

AVS CAREER CENTER **146**
The AVS Professional Leadership Committee will be hosting the AVS Career Center, open to all attendees, at the International Symposium for the purpose of connecting job seekers with potential employers. The goal is to facilitate contact and networking during the Symposium.

AVS CHARGING LOUNGE **138**
Phone running out of juice? Stop by the new charging lounge where you will find comfortable seating and secure phone lockers where you can recharge your phone. Relax in the lounge or take a walk around the exhibit hall. Set your own pin code on your locker just like a safe in a hotel room. Safe and Secure !

AVS Exhibitor Technology Sessions **152**
Come learn about the latest technology from the vendors exhibiting at AVS ! Stage area in the exhibit hall

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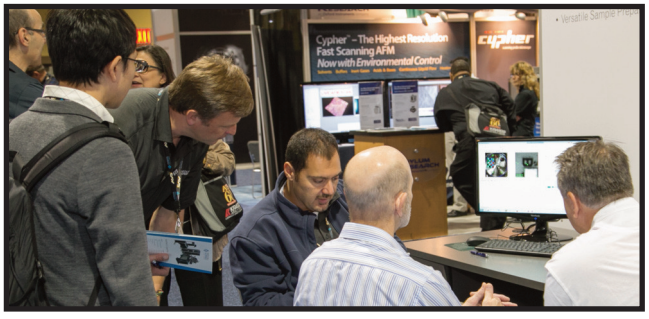

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Events Calendar

Featuring AVS Meetings and Sponsored/Endorsed Topical Conferences

2019

TACT 2019 International Thin Films Conference
November 17-20, 2019
Taipei, Taiwan
Web: tact2019.conf.tw

Workshop on Innovative Nanoscale Devices & Systems (WINDS)
December 1-6, 2019
Kohala Coast (Big Island), Hawaii
Web: winds-meeting.info

2020

The 3rd International Symposium of the Vacuum Society of the Philippines
January 8-10, 2020
Cebu, Philippines
Web: vacuumphilippines.org/isvsp2020

The 47th International Conference on the Physics and Chemistry of Surfaces and Interfaces (PCSI-47)
January 19-23, 2020
Boulder, Colorado
Web: pcsiconference.org

5th Area Selective Deposition Workshop
April 2-3, 2020
Stanford, California
Web: asd2020.avs.org

International Conference on Metallurgical Coatings and Thin Films (ICMCTF 2020)
April 26-May 1, 2020
San Diego, California
Web: icmctf2020.avs.org

Surface Analysis 2020
June 2-5, 2020
Golden, Colorado
Web: rmcavs.org

AVS 20th International Conference on Atomic Layer Deposition (ALD 2020) featuring the **7th International Atomic Layer Etching Workshop (ALE 2020)**
June 28-July 1, 2020
Ghent, Belgium
Web: ald2020.avs.org

21st International Conference on Molecular Beam Epitaxy
August 30-September 4, 2020
Puerto Vallarta, Jalisco

Gallium Oxide Workshop (GOX 2020)
August 31-September 3, 2020
Arlington, Virginia

23rd International Conference on Ion Implantation Technology (IIT 2020)
September 20-24, 2020
San Diego, California
Web: mrs.org/iit2020

AVS 67th International Symposium & Exhibition
October 25-30, 2020
Denver, Colorado
Web: avs.org/symposium

AVS Pacific Rim Symposium on Surfaces, Coatings and Interfaces (PacSurf 2020)
December 6-10, 2020
Waikoloa, Hawaii
Web: pacsurf2020.avs.org

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