

# PCSI 2023 & AQS Workshop Program Overview

<b>Room /Time</b>	<b>REDONDO ROOM</b>
<b>SuA</b>	<b>PCSI-SuA: Novel Device Characterization</b>
<b>SuE</b>	<b>PCSI-SuE: Characterization Methods</b>
<b>MoM</b>	<b>PCSI-MoM1: 2D and VdW Materials PCSI-MoM2: Semiconductor Heterostructures/Nanostructures/Interfaces/Surfaces</b>
<b>MoA</b>	<b>PCSI-MoA1: Semiconductor Discovery/Interface/Surface Characterization PCSI-MoA2: Organics, Semiconductors, and Molecules</b>
<b>MoE</b>	<b>PCSI-MoE: Novel Materials</b>
<b>TuM</b>	<b>PCSI-TuM1: Electronic and Structural Properties of Films and Surfaces PCSI-TuM2: Materials for High Power Electronics</b>
<b>TuE</b>	<b>PCSI-TuE: Spin Transport and Spintronics</b>
<b>WeM</b>	<b>PCSI-WeM1: Topological and Magnetic Materials PCSI-WeM2: Oxide Semiconductors and Memristor Materials</b>
<b>WeA</b>	<b>PCSI-WeA1: Photoemission Spectroscopy and high-k Dielectrics PCSI-WeA2: Graphene</b>
<b>ThM</b>	<b>PCSI-ThM1: Spin Dynamics for Quantum Sensing PCSI-ThM2: Si Qubits and Spin Centers</b>
<b>ThA</b>	<b>AQS-ThA1: AVS Quantum Science Workshop: NV Sensors for Quantum Sensing AQS-ThA2: AVS Quantum Science Workshop: Color Centers for Quantum Sensing</b>
<b>FrM</b>	<b>AQS-FrM1: AVS Quantum Science Workshop: Superconducting Quantum Computing AQS-FrM2: AVS Quantum Science Workshop: Novel Materials for Quantum Computing</b>
<b>FrA</b>	<b>AQS-FrA1: AVS Quantum Science Workshop: Topological Quantum Materials AQS-FrA2: AVS Quantum Science Workshop: 2D Materials for Quantum Sensing</b>
<b>POSTERS</b>	<b>During All Session Breaks – Sunday – Thursday</b>

# Sunday Afternoon, January 15, 2023

PCSI  
Room Redondo - Session PCSI-SuA  
Novel Device Characterization  
Moderator: Holger Eisele, Otto-von-Guericke-Universität, Germany

4:00pm	Welcome and Opening Remarks	
4:05pm	INVITED: PCSI-SuA-2 Electroemission Spectroscopy of GaN-Based Diodes – Revealing the Inner Working of LEDs and More!, <b>Jim Speck</b> , University of California Santa Barbara	
4:45pm	INVITED: PCSI-SuA-10 Characterization of Semiconductor Nanostructures using Ultra-high Resolution STEM-CL, <b>Gordon Schmidt</b> , <i>J. Christen, F. Bertram</i> , Otto-von-Guericke-University	
5:25pm	PCSI-SuA-18 Optimizing ToF-SIMS Depth Profiles of Semiconducting Heterostructures, <b>Jan Tröger</b> , University of Münster, Germany; <i>R. Kersting, B. Hagenhoff</i> , Tascon GmbH, Germany; <i>D. Bougeard</i> , University of Regensburg, Germany; <i>H. Riemann, N. Abrosimov</i> , Institute for Crystal Growth Berlin, Germany; <i>J. Klos, L. Schreiber</i> , RWTH Aachen University, Germany; <i>H. Bracht</i> , University of Münster, Germany	

# Sunday Evening, January 15, 2023

<b>PCSI</b> <b>Room Redondo - Session PCSI-SuE</b> <b>Characterization Methods</b> <b>Moderator: Chip Eddy, Jr., ONR Global, UK</b>		
<b>7:30pm</b>	<b>INVITED: PCSI-SuE-1</b> Atomic Scale Structural Characterization of Material Surfaces and Interfaces via Atomic Electron Tomography, <b>Yongsoo Yang</b> , Korea Advanced Institute of Science and Technology, Republic of Korea	
<b>8:10pm</b>	<b>INVITED: PCSI-SuE-9</b> Understanding Interface Effects in Van der Waals Heterostructures with Neutron Reflectometry, <b>Alex Grutter</b> , National Institute for Science and Technology (NIST)	

# Monday Morning, January 16, 2023

Room Redondo		
8:30am	<b>INVITED: PCSI-MoM1-1</b> Step-Edge Nucleation and Domain Orientation Control in Epitaxy of Transition Metal Dichalcogenides on Sapphire, <i>H. Zhu</i> , The Pennsylvania State University; <i>T. Choudhury</i> , The Pennsylvania State University, India; <i>N. Nayir</i> , The Pennsylvania State University, Turkey; <i>T. Mc Knight</i> , <i>N. Trainor</i> , <i>A. van Duin</i> , <b>Joan Redwing</b> , The Pennsylvania State University	<b>PCSI</b> <b>Session PCSI-MoM1</b> <b>2D and VdW Materials</b> <b>Moderator:</b> <b>Anthony Rice</b> , National Renewable Energy Laboratory
9:10am	<b>PCSI-MoM1-9</b> Effects of Strain and Local Topography on Electromechanical Coupling in Monolayer Transition Metal Dichalcogenides, <b>Claire Ganski</b> , <i>A. De Palma</i> , <i>E. Yu</i> , The University of Texas at Austin	
9:15am	<b>PCSI-MoM1-10</b> Probing Edge State Conductance in Ultra-Thin Topological Insulator Films, <i>A. Leis</i> , <b>Jonathan Karl Hofmann</b> , <i>M. Schleenvoigt</i> , <i>K. Moors</i> , <i>H. Soltner</i> , <i>V. Cherepanov</i> , <i>P. Schüffelgen</i> , <i>G. Mussler</i> , <i>D. Grützmacher</i> , <i>B. Voigtländer</i> , <i>F. Lüpke</i> , <i>F. Tautz</i> , Forschungszentrum Juelich GmbH, Germany	
9:20am	<b>INVITED: PCSI-MoM1-11</b> MBE Growth of Transition-Metal Dichalcogenides, <b>Wojciech Pacuski</b> , University of Warsaw, Poland	
10:00am	<b>Coffee Break &amp; Poster Viewing</b>	
10:40am	<b>PCSI-MoM2-27 UPGRADED:</b> Hydrogen Cleaning Induced Surface Modifications of GaAs(110), <b>Dorothee Sophie Rosenzweig</b> , Technische Universität Berlin, Germany; <i>M. Hansemann</i> , Paul Drude Institut Paul Drude Institut für Festkörperelektronik, Germany; <i>P. Ebert</i> , <i>M. Schnedler</i> , Peter Gruenberg Institut Forschungszentrum Juelich, Germany; <i>M. Daehne</i> , Technische Universität Berlin, Germany; <i>H. Eisele</i> , Otto-von-Guericke-Universität, Germany	<b>PCSI</b> <b>Session PCSI-MoM2</b> <b>Semiconductor</b> <b>Heterostructures/Nanostructures/Interfaces/Surfaces</b> <b>Moderator:</b> <b>Norbert Esser</b> , TU Berlin and Leibniz-Institut für Analytische Wissenschaften-ISAS-e.V., Germany
11:00am	<b>PCSI-MoM2-31</b> Surface Work Function Engineering of Diamond-like Carbon Through Spatial Selective Gallium Implantation, <b>Jiayun Liang</b> , <i>Z. Al Balushi</i> , University of California at Berkeley	
11:05am	<b>PCSI-MoM2-32</b> Nanotrench Formation along Step Edges of Vicinal Si(111) Surfaces by Wet-chemical Treatments, <b>Kenta Arima</b> , <i>Z. Ma</i> , <i>T. Takeuchi</i> , <i>R. Hashimoto</i> , <i>R. Sun</i> , <i>K. Yamamura</i> , Osaka University, Japan	
11:10am	<b>PCSI-MoM2-33</b> III-V Materials Grown Directly on V-groove Si for Solar Cells, <b>Theresa Saenz</b> , <i>J. Mangum</i> , <i>J. Boyer</i> , <i>A. Neumann</i> , <i>R. France</i> , <i>W. McMahan</i> , National Renewable Energy Laboratory; <i>J. Zimmerman</i> , Colorado School of Mines; <i>E. Warren</i> , National Renewable Energy Laboratory	
11:15am	<b>PCSI-MoM2-34</b> Improved Passivation Performance of Atomic-layer-deposited (ALD)-MoO <sub>x</sub> Film by Introducing an Al <sub>2</sub> O <sub>3</sub> Interlayer, <b>Hyo Sik Chang</b> , Chungnam National University, Republic of Korea	
11:20am	<b>PCSI-MoM2-35 UPGRADED:</b> Determining the Arrangement of sub-Surface Dopants in a Silicon Quantum Device Platform, <b>Håkon Røst</b> , Norwegian University of Science and Technology (NTNU), Norway; <i>E. Tosi</i> , Instituto de Ciencia de Materiales de Madrid, Spain; <i>F. Strand</i> , <i>A. Åsland</i> , Norwegian University of Science and Technology (NTNU), Norway; <i>P. Lacovig</i> , <i>S. Lizzit</i> , Elettra-Sincrotrone Trieste, Italy; <i>J. Wells</i> , University of Oslo, Norway	
11:40am	<b>PCSI-MoM2-39</b> Cross-sectional Scanning Tunneling Microscopy Study of 6.1 Å Family Semiconductors for ULTRARAM™ Memory, <b>Aurelia Trevisan</b> , Eindhoven University of Technology, The Netherlands; <i>P. Hodgson</i> , Lancaster University, UK; <i>D. Lane</i> , University of Adelaide, Australia; <i>M. Hayne</i> , Lancaster University, UK; <i>P. Koentraad</i> , Eindhoven University of Technology, The Netherlands	
11:45am	<b>PCSI-MoM2-40</b> Surface Reaction and Plasma Induced Damage by Atomic Layer Etching Process, <b>Sung Gyu Pyo</b> , Chung-Ang University, Republic of Korea	

# Monday Afternoon, January 16, 2023

Room Redondo		
2:00pm	INVITED: PCSI-MoA1-1 (Al,Gd)N as a Novel Material for Neutron Detection: Materials Discovery and Interface Design, <b>Nancy Haegel</b> , National Renewable Energy Laboratory	<b>PCSI</b> <b>Session PCSI-MoA1</b> <b>Semiconductor Discovery/Interface/Surface Characterization</b> <b>Moderator:</b> <b>Dorothee Sophie Rosenzweig</b> , Technische Universität Berlin, Germany
2:40pm	PCSI-MoA1-9 Surface Calibrated Electron Holography: Anomalous Strain Relaxation and Minimization of Polarization Changes at III-Nitride Hetero-Interfaces, <b>Michael Schnedler</b> , Y. Wang, Q. Lan, F. Zheng, L. Freter, Y. Lu, U. Breuer, Forschungszentrum Jülich GmbH, Germany; H. Eisele, Otto-von-Guericke-Universität Magdeburg, Germany; J. Carlin, R. Butté, N. Grandjean, EPFL, Switzerland; R. Dunin-Borkowski, P. Ebert, Forschungszentrum Jülich GmbH, Germany	
2:45pm	PCSI-MoA1-10 Surface Carrier Density in 2D and 3D Indium Nitride Structures, <b>Fernando Maia de Oliveira</b> , A. V. Kuchuk, Institute for Nanoscience and Engineering, University of Arkansas; C. Romanitan, National Institute for Research and Development in Microtechnologies, Romania; H. V. Stanchu, Institute for Nanoscience and Engineering, University of Arkansas; M. E. Ware, Department of Electrical Engineering, University of Arkansas; Y. Mazur, G. J. Salamo, Institute for Nanoscience and Engineering, University of Arkansas	
2:50pm	PCSI-MoA1-11 Structure and Chemistry of ZnGeN <sub>2</sub> Quantum Wells in GaN for use in Green LEDs, M. Tellekamp, National Renewable Energy Laboratory; <b>Maira Miller</b> , Colorado School of Mines; A. Rice, National Renewable Energy Laboratory; D. Diercks, Colorado School of Mines; A. Tamboli, National renewable Energy Laboratory	
2:55pm	PCSI-MoA1-12 Direct Time- and Momentum-Resolved Imaging of Exciton Dynamics in Monolayer WS <sub>2</sub> , A. Kunin, Stony Brook University; S. Chernov, J. Bakalis, stony Brook University; Z. Li, S. Cheng, M. Madugula, The Ohio State University; Z. Withers, Stony Brook University; M. White, stony Brook University/Brookhaven National Laboratory; G. Schönhense, Johannes Gutenberg-Universität, Germany; X. Du, stony Brook University; <b>Roland K. Kawakami</b> , The Ohio State University; T. Allison, Stony Brook University	
3:00pm	<b>Coffee Break &amp; Poster Viewing</b>	
3:45pm	INVITED: PCSI-MoA2-22 Surface Resonant Raman Scattering: Analysis of Vibrations at Clean Surfaces and Monolayer Films, <b>Norbert Esser</b> , TU Berlin and Leibniz-Institut für Analytische Wissenschaften-ISAS-e.V., Germany	<b>PCSI</b> <b>Session PCSI-MoA2</b> <b>Organics, Semiconductors, and Molecules</b> <b>Moderator:</b> <b>M. Brooks Tellekamp</b> , National Renewable Energy Laboratory
4:25pm	PCSI-MoA2-30 Ordered Monolayer Growth of N-Heterocyclic Carbenes on Silicon Surfaces, M. Franz, Technische Universität Berlin, Germany; S. Chandola, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany; M. Koy, Westfälische Wilhelms-Universität Münster, Germany; <b>Robert Zielinski</b> , Technische Universität Berlin, Germany; H. Aldahhak, Universität Paderborn, Germany; M. Das, M. Freitag, Westfälische Wilhelms-Universität Münster, Germany; U. Gerstmann, Universität Paderborn, Germany; D. Liebig, A. Hoffmann, C. Kosbab, M. Rosin, Technische Universität Berlin, Germany; W. Schmidt, Universität Paderborn, Germany; C. Hogan, Università di Roma 'Tor Vergata', Italy; F. Glorius, Westfälische Wilhelms-Universität Münster, Germany; N. Esser, Leibniz-Institut für Analytische Wissenschaften – ISAS e.V., Germany; M. Dähne, Technische Universität Berlin, Germany	
4:30pm	PCSI-MoA2-31 Arrangement and Electronic Properties of Cobalt Phthalocyanine Molecules on B-Si(111)-√3 × √3 R30°, <b>Susi Lindner-Franz</b> , M. Kubicki, Technische Universität Berlin, Germany; H. Eisele, Otto-von-Guericke-Universität Magdeburg, Germany; M. Dähne, M. Franz, Technische Universität Berlin, Germany	
4:35pm	PCSI-MoA2-32 Bio-Resorbable Memristorwith Alginate as an Active Layer for Transient Electronics, <b>Hojung Jeon</b> , Y. Rim, Department of Intelligent Mechatronics Engineering, and Convergence Engineering for Intelligent Drone, Sejong University, Republic of Korea	

# Monday Evening, January 16, 2023

PCSI  
Room Redondo - Session PCSI-MoE  
Novel Materials  
Moderator:  
Christopher Palmstrøm, University of California, Santa Barbara

**7:30pm** INVITED: PCSI-MoE-1 Machine Learning in the Quantum Regime Through Physical-Principle-Informed Representations, **Qimin Yan**, Northeastern University

**8:10pm** PCSI-MoE-9 UPGRADED: Ultra-Thin Freestanding Membranes Enables New Discovery of Interfacial Properties, **Xiao Zhao**, **Y. Lu**, **M. Salmeron**, LBNL

**8:30pm** PCSI-MoE-13 UPGRADED: Extreme Spatiotemporal Imaging and Control of Nanophotonic Components and Their Neuromorphic Applications, **L. Wittenbecher**, **D. Winge**, **A. L'Huillier**, Lund University, Sweden; **J. Vogelsang**, Oldenburg University, Germany; **D. Zigmantas**, Lund University, Sweden; **A Mikkelsen**, NanoLund and Department of Physics, Lund University, Sweden

# Tuesday Morning, January 17, 2023

Room Redondo		
8:30am	<b>PCSI-TuM1-1 UPGRADED</b> Strain Soliton Formation in Epitaxial Bismuth Thin Films, <b>Jason Dong</b> , <i>H. Inbar, C. Dempsey, A. Engel, C. Palmstrøm</i> , University of California Santa Barbara	<b>PCSI</b> <b>Session PCSI-TuM1</b> <b>Electronic and Structural Properties of Films and Surfaces</b> <b>Moderator:</b> <b>Jia Li</b> , Brown University
8:50am	<b>PCSI-TuM1-5</b> Epitaxial Growth and Surface Studies of Bi/ Hexagonal $\zeta$ -Phase Mn <sub>2</sub> N/MgO (001) using Molecular Beam Epitaxy and Scanning Tunneling Microscopy, <b>Ashok Shrestha</b> , <i>A. Abbas, A. Smith</i> , Ohio University	
8:55am	<b>PCSI-TuM1-6</b> One-Dimensional Spin-Polarized Surface States on Bi(112) Compared to States on Other Vicinal Surfaces of Bi, <b>Anna Cecilie Åsland</b> , <i>J. Bakkelund</i> , Norwegian University of Science and Technology (NTNU), Norway; <i>E. Thingstad</i> , University of Basel, Switzerland; <i>H. Røst</i> , Norwegian University of Science and Technology (NTNU), Norway; <i>S. Cooil</i> , University of Oslo, Norway; <i>J. Hu</i> , Norwegian University of Science and Technology (NTNU), Norway; <i>I. Vobornik, J. Fujii</i> , Instituto Officina dei Materiali (IOM)-CNR, Italy; <i>A. Sudbø</i> , Norwegian University of Science and Technology (NTNU), Norway; <i>J. Wells</i> , University of Oslo, Norway; <i>F. Mazzola</i> , Instituto Officina dei Materiali (IOM)-CNR, Italy	
9:00am	<b>PCSI-TuM1-7</b> Epitaxial Growth and Electronic States of Ultrathin Bi (0001) Films on InSb (111)B, <i>H. Inbar, J. Dong, A. Engel</i> , UC Santa Barbara; <i>M. Zubair</i> , University of Delaware; <i>C. Dempsey, Y. Chang</i> , UC Santa Barbara; <i>A. Fedorov</i> , ALS-LBNL; <i>A. Janotti</i> , University of Delaware; <b>Chris Palmstrøm</b> , UC Santa Barbara	
9:05am	<b>PCSI-TuM1-8</b> Thermal Stability and Sn Segregation in GeSn Structures, <b>Hryhorii Stanchu</b> , Institute for Nanoscience and Engineering, Department of Electrical Engineering, University of Arkansas; <i>O. Olorunsola, A. Kuchuk, A. Said, F. de Oliveira, Y. Mazur, M. Benamara, S. Yu, G. Salamo</i> , University of Arkansas	
9:10am	<b>PCSI-TuM1-9</b> Growth of Ge <sub>1-x</sub> Sn <sub>x</sub> Heteroepitaxial Layers with High Sn Content on InAs (001) Substrate, <b>Nirosh M Eldose</b> , Nanoscale Material Science Engineering, University Of Arkansas; <i>H. Stanchu</i> , Department of Electrical Engineering, University Of Arkansas; <i>C. Gunder, C. Li, F. Maia de Oliveira, Y. Mazur, M. Benamara</i> , Nanoscale Material Science Engineering, University Of Arkansas; <i>S. Yu</i> , Department of Electrical Engineering; <i>G. J. Salamo</i> , Nanoscale Material Science Engineering, University Of Arkansas	
9:15am	<b>PCSI-TuM1-10</b> Black Phosphorus/GaAs Heterojunctions for Infrared Detection, <b>Emma Renteria</b> , University of New Mexico; <i>S. Addamane</i> , Center for Integrated Nanotechnologies, Sandia National Labs; <i>T. Rotter, G. Balakrishnan, F. Cavallo</i> , University of New Mexico	
9:20am	<b>PCSI-TuM1-11 UPGRADED</b> Sub-Nanoscale Chemical Analysis with Nano-Confined Localized Surface Plasmons, <b>Nan Jiang</b> University of Illinois - Chicago	
9:40am	<b>PCSI-TuM1-15</b> Light Induced Surface Tension Gradients for Hierarchical Assembly of Particles from Liquid Metals, <b>Jiayun Liang</b> , <i>Z. Al Balushi</i> , University of California at Berkeley	
9:45am	<b>PCSI-TuM1-16</b> Charge Transport in SrTiO <sub>3</sub> :Rh and BiVO <sub>4</sub> Nanoparticle Photocatalysts for Z-scheme Water Splitting, <b>Brian Zutter</b> , Sandia National Laboratories; <i>Z. Chen</i> , University of California Irvine; <i>L. Barrera</i> , University of Michigan, Ann Arbor; <i>A. Lapp, A. Bhandarkar</i> , Sandia National Laboratories; <i>K. Watanabe, A. Kudo</i> , Tokyo University of Science, Japan; <i>D. Esposito</i> , Columbia University; <i>R. Chandran</i> , University of Michigan, Ann Arbor; <i>S. Ardo</i> , University of California Irvine; <i>A. Talin</i> , Sandia National Laboratories	
9:50am	<b>PCSI-TuM-1-17</b> Improvement of Thermal Stability of Ultrathin NiAl Films, <b>Kyeong Youn Song</b> , Sungkyunkwan University, Republic of Korea	
9:55am	<b>PCSI-TuM-18</b> Frequency-Dependent Conductivity of Granular Metals, <b>Laura Biedermann</b> , <i>M. McGarry, S. Gilbert, W. Bachman, J. Flicker</i> , Sandia National Laboratories; <i>P. Kotula</i> , Sandia; <i>M. Siegal</i> , Sandia National Laboratories	
10:00am	<b>Coffee Break &amp; Poster Viewing</b>	

# Tuesday Morning, January 17, 2023

<b>10:40am</b>	<b>INVITED: PCSI-TuM2-27</b> Challenges in SiO <sub>2</sub> /Si Interface Engineering for SiC Power MOSFETs, <b>Takuji Hosoi</b> , Kwansai Gakuin University, Japan; <b>T. Shimura, H. Watanabe</b> , Osaka University, Japan	<b>PCSI</b> <b>Session PCSI-TuM2</b> <b>Materials for High Power Electronics</b> <b>Moderator:</b> <b>Gordon Schmidt</b> , Otto-von-Guericke-University Magdeburg, Germany
<b>11:20am</b>	<b>PCSI-TuM2-35</b> Epitaxial Growth of Ga <sub>2</sub> O <sub>3</sub> Films with Different Ligand Structures by Mist Chemical Vapor Deposition, <b>Jang Hyeok Park, Y. Rim</b> , Sejong University, Republic of Korea	
<b>11:25am</b>	<b>PCSI-TuM2-36</b> Investigating SiC/Graphene/SiC(0001) Remote Epitaxy Using Hot-wall CVD, <b>Daniel Pennachio</b> , US Naval Research Laboratory; <b>J. Hajzus</b> , ASEE Research Associate at the US Naval Research Laboratory; <b>A. Lang</b> , US Naval Research Laboratory; <b>R. Stroud</b> , Former: US Naval Research Laboratory, Current: SESE, Arizona State University; <b>R. Myers-Ward</b> , US Naval Research Laboratory	
<b>11:30am</b>	<b>PCSI-TuM2-37</b> Tailoring Growth Interfaces of Virtual Substrates for Power Electronics, <b>Dennice Roberts, M. Miller, A. Norman, B. Tellekamp</b> , National Renewable Energy Laboratory	
<b>11:35am</b>	<b>PCSI-TuM2-38</b> Investigating the Structurally and Chemically Heterogeneous Interface of AlGa <sub>N</sub> on (111) TaC, <b>D. Roberts</b> , National Renewable Energy Laboratory; <b>M. Miller</b> , Colorado School of Mines, USA; <b>A. Rice, M. Brooks Tellekamp</b> , National Renewable Energy Laboratory	
<b>11:40am</b>	<b>PCSI-TuM2-39</b> Titanium Dioxide Gate Dielectrics for ScAlN Barrier HEMT Structures, <b>Neeraj Nepal, V. Wheeler, B. Downey, M. Hardy, D. Meyer</b> , U.S. Naval Research Laboratory	
<b>11:45am</b>	<b>PCSI-TuM2-40</b> Effect of Substrate and Growth Method on Vanadium Dioxide Thin Films by RF Magnetron Sputtering, <b>Adam Christensen, A. Posadas, A.A. Demkov</b> , The University of Texas at Austin; <b>B. Zutter, P. Finnegan, S. Bhullar, S. Bishop, A. Talin</b> , Sandia National Laboratories	



# Tuesday Evening, January 17, 2023

PCSI

Room Redondo - Session PCSI-TuE

Spin Transport and Spintronics

Moderator: **Scott Crooker**, Los Alamos National Laboratory

7:30pm

INVITED: PCSI-TuE-1 Proximitized Materials: From Spintronics to Majorana States, **Igor Zutic**, University at Buffalo-SUNY

8:10pm

INVITED: PCSI-TuE-9 Spin/Valley Pumping and Long-Distance Spin Transport in Monolayer TMD Semiconductors, **Cedric Robert**, LPCNO, CNRS INSA Toulouse, France

# Wednesday Morning, January 18, 2023

Room Redondo		
8:30am	<b>INVITED: PCSI-WeM1-1</b> Development of Thin Film Platforms for Tunable Topological Materials, <b>Anthony Rice</b> , NREL	<b>PCSI</b> <b>Session PCSI-WeM1</b> <b>Topological and Magnetic Materials</b> <b>Moderator: Joan Redwing</b> , The Pennsylvania State University
9:10am	<b>PCSI-WeM1-9</b> Electrical Transport of Zn-doped Dirac Semimetal Cd <sub>3</sub> As <sub>2</sub> Films, <b>Ian Leahy</b> , <i>J. Nelson, A. Rice, K. Alberi</i> , National Renewable Energy Laboratory	
9:15am	<b>PCSI-WeM1-10</b> Epitaxial Growth of Weyl Semimetal TaAs on GaAs(001), <i>J. Nelson, A. Rice, Ian Leahy</i> , NREL; <i>R. Kurlito</i> , University of Colorado at Boulder; <i>J. Mangum</i> , NREL; <i>A. Shackelford</i> , University of Colorado at Boulder; <i>M. van Schlifgaarde</i> , NREL; <i>M. Holtz</i> , Colorado School of Mines; <i>D. Dessau</i> , University of Colorado at Boulder; <i>K. Alberi</i> , NREL	
9:20am	<b>PCSI-WeM1-11</b> Quasi Van Der Waals Epitaxy of Magnetic Topological Insulator on GaAs (111) Substrate, <b>Yuxing Ren</b> , <i>L. Tai, S. Chong, G. Qiu, K. Wang</i> , University of California, Los Angeles	
9:25am	<b>PCSI-WeM1-12 UPGRADED</b> Asymmetric Magnetic Proximity Interactions in Ferromagnet/Semiconductor van der Waals Heterostructures, <b>Scott Crooker</b> , Los Alamos National Laboratory	
9:45am	<b>PCSI-WeM1-16</b> Atomic Layer Epitaxial Growth of Kagome Magnet Fe <sub>3</sub> Sn <sub>2</sub> Thin Films, <b>Shuyu Cheng</b> , <i>B. Wang, I. Lyalin, N. Bagués, A. Bishop, D. McComb, R. Kawakami</i> , Ohio State University	
9:50am	<b>PCSI-WeM1-17</b> Selectively Oriented Crystalline Growth of Mn <sub>3</sub> Sn on Al <sub>2</sub> O <sub>3</sub> (0001) using Molecular Beam Epitaxy, <b>Sneha Upadhyay</b> , <i>T. Erickson, H. Hall, A. Shrestha</i> , Ohio University; <i>J. Moreno</i> , Universidad Autónoma de Puebla, Instituto de Física, Apartado, Mexico; <i>D. Ingram</i> , Ohio University; <i>K. Sun</i> , The University of Michigan; <i>A. Smith</i> , Ohio University	
9:55am	<b>Coffee Break &amp; Poster Viewing</b>	
10:35am	<b>INVITED: PCSI-WeM2-26</b> Advancement and Prospects of Ultra-Wide-Bandgap Oxide Semiconductors, <b>Shizuo Fujita</b> , Kyoto University, Japan; <i>K. Kaneko</i> , Ritsumeikan University, Japan; <i>K. Tanaka</i> , Kyoto University, Japan	<b>PCSI</b> <b>Session PCSI-WeM2</b> <b>Oxide Semiconductors and Memristor Materials</b> <b>Moderator:</b> <b>Holger Eisele</b> , Otto-von-Guericke-Universität, Germany
11:15am	<b>PCSI-WeM2-34</b> Adsorption of Gases on $\beta$ -Ga <sub>2</sub> O <sub>3</sub> Surfaces, <b>Jonathan Karl Hofmann</b> , Forschungszentrum Jülich GmbH, Germany; <i>C. Schulze, D. Rosenzweig</i> , Technical University of Berlin, Germany; <i>Z. Galazka</i> , Leibnitz-Institut für Kristallzüchtung, Germany; <i>M. Dähne</i> , Technical University of Berlin, Germany; <i>H. Eisele</i> , Otto-von-Guericke-Universität, Magdeburg, Germany	
11:20am	<b>PCSI-WeM2-35</b> Design of Rare-Earth Nickelate Memristors, <b>Olivia Schneble</b> , Colorado School of Mines; <i>B. Tellekamp</i> , National Renewable Energy Laboratory; <i>J. Zimmerman</i> , Colorado School of Mines	
11:25am	<b>PCSI-WeM2-36</b> Image Recognition Process of IGZO/CsPbBr <sub>3</sub> Photosynaptic Transistors Imitating Human Learning Processes, <b>Goeun Choi</b> , <i>Y. Rim</i> , Department of Intelligent Mechatronics Engineering, and Convergence Engineering for Intelligent Drone, Sejong University, Republic of Korea	
11:30am	<b>PCSI-WeM2-37</b> IGZO Synaptic Transistors Using Ionic Gel-Based Electric Double Layer Operation for Low Voltage Driving, <b>Kyongjae Kim</b> , <i>Y. Rim</i> , Sejong University, Republic of Korea	
11:35am	<b>PCSI-WeM2-38 UPGRADED</b> Electrostatic Shaping of Magnetic Transition Regions in La <sub>0.7</sub> Sr <sub>0.3</sub> MnO <sub>3</sub> , <i>Q. Lan</i> , Forschungszentrum Jülich GmbH, Germany; <i>C. Wang</i> , Tsinghua University, China; <i>L. Jin, M. Schnedler, L. Freter</i> , Forschungszentrum Jülich GmbH, Germany; <i>K. Fischer</i> , National Institute of Technology, Japan; <b>Philipp Ebert</b> , <i>R. Dunin-Borkowski</i> , Forschungszentrum Jülich GmbH, Germany	

# Wednesday Afternoon, January 18, 2023

Room Redondo		
2:00pm	<b>INVITED: PCSI-WeA1-1</b> Optical Field-Driven Ultrafast Electron Control Inside of Graphene and at the Surface of Metal Needle Tips, <b>Peter Hommelhoff</b> , Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Germany	<b>PCSI</b> <b>Session PCSI-WeA1</b> <b>Photoemission Spectroscopy and high-k Dielectrics</b> <b>Moderator: Igor Zutic</b> , University at Buffalo-SUNY
2:40pm	<b>PCSI-WeA1-9</b> The Diamond (111) Surface Reconstruction and Epitaxial Graphene Interface, <b>Simon Cooil</b> , University of Oslo, Norway	
2:45pm	<b>PCSI-WeA1-10</b> Hard X-Ray Photoelectron Spectroscopy for Material Science Applications, <b>P. Amann</b> , <b>Takahiro Hashimoto</b> , Scienta Omicron, Germany	
2:50pm	<b>INVITED: PCSI-WeA1-11</b> Advanced Semiconductor-Oxide Interfaces of Ferroelectric and RRAM Devices, <b>Rainer Timm</b> , Lund University, Sweden	
3:30pm	<b>PCSI-WeA1-19</b> Stoichiometric Control and Optical Properties of BaTiO <sub>3</sub> Thin Films Grown by Hybrid MBE, <b>Benazir Fazlioglu Yalcin</b> , <b>A. Suceava</b> , <b>T. Kuznetsova</b> , <b>Z. Wang</b> , <b>I. Dabo</b> , <b>V. Gopalan</b> , Penn State University; <b>R. Engel-Herbert</b> , Paul Drude Institute, Germany	
3:35pm	<b>Coffee Break &amp; Poster Viewing</b>	
4:20pm	<b>INVITED: PCSI-WeA2-29</b> Dioidic Transport in Graphene Moiré Systems, <b>Jia Li</b> , Brown University	<b>PCSI</b> <b>Session PCSI-WeA2</b> <b>Graphene</b> <b>Moderator:</b> <b>Cedric Robert</b> , LPCNO, CNRS INSA Toulouse, France
5:00pm	<b>PCSI-WeA2-37 UPGRADED</b> Proximity-Induced Superconductivity in Epitaxial Topological Insulator/Graphene/Gallium Heterostructures, <b>Cequn Li</b> , Pennsylvania State University	
5:20pm	<b>PCSI-WeA2-41</b> Stabilizing Phosphorus Oxides at Confined Heterointerfaces, <b>Jiayun Liang</b> , <b>Z. Al Balushi</b> , University of California at Berkeley	
5:25pm	<b>PCSI-WeA2-42</b> Origin of Rectangular-like Lattice on Nanographene in STM Images Unveiled by First-Principles Calculations, <b>J. Li</b> , <b>K. Inagaki</b> , <b>R. Sun</b> , <b>K. Yamamura</b> , <b>Kenta Arima</b> , Osaka University, Japan	
5:30pm	<b>PCSI-WeA2-43</b> Valley-Controlled Even-Denominator Fractional Quantum Hall Effect in Bernal-Stacked Bilayer Graphene, <b>Ke Huang</b> , <b>H. Fu</b> , Department of Physics, The Pennsylvania State University; <b>D. Reifsnnyder Hickey</b> , Department of Chemistry, The Pennsylvania State University; <b>N. Alem</b> , Department of Materials Science and Engineering, The Pennsylvania State University; <b>X. Lin</b> , International Center for Quantum Materials, Peking University, China; <b>K. Watanabe</b> , Research Center for Functional Materials, National Institute for Materials Science, Japan; <b>T. Taniguchi</b> , International Center for Materials Nanoarchitectonics, National Institute for Materials Science, Japan; <b>J. Zhu</b> , Department of Physics, The Pennsylvania State University	

# Thursday Morning, January 19, 2023

Room Redondo		
8:30am	<p><b>INVITED: PCSI-ThM1-1</b> Theory of Spin Center Sensing of Diffusion, <i>Denis Candido</i>, University of Iowa</p>	<p><b>PCSI</b>  <b>Session PCSI-ThM1</b>  <b>Spin Dynamics for Quantum Sensing</b>  <b>Moderator:</b>  <b>Christopher Palmstrøm</b>, University of California, Santa Barbara</p>
9:10am	<p><b>INVITED: PCSI-ThM1-9</b> Probing Spin Dynamics on Diamond Surfaces Using a Single Quantum Sensor, <i>N. de Leon, Jared Rovny</i>, Princeton University</p>	
9:50am	<p><b>PCSI-ThM1-17 UPGRADED</b> Quantum Decoherence in Superconducting Circuits: Contrasting Loss Mechanisms of Nb and Si Surface Oxides, <i>D Frank Ogletree</i>, Molecular Foundry, Lawrence Berkeley Lab; <i>V. Altoé, A. Schwartzberg, C. Song, D. Santiago</i>, Molecular Foundry, LBL; <i>I. Siddiqi</i>, Physics Department, UC Berkeley and Materials Sciences, LBL</p>	
10:10am	<p><b>Coffee Break &amp; Poster Viewing</b></p>	
10:50am	<p><b>INVITED: PCSI-ThM2-29</b> Interface-Dependent Valley Splitting in Si Quantum Dot Qubits, <i>Mark Friesen</i>, University of Wisconsin-Madison</p>	<p><b>PCSI</b>  <b>Session PCSI-ThM2</b>  <b>Si Qubits and Spin Centers</b>  <b>Moderator:</b>  <b>Christopher Palmstrøm</b>, University of California, Santa Barbara</p>
11:30am	<p><b>PCSI-ThM2-37</b> Experimental Signature of Topologically Protected Surface States in a New-Type Centrosymmetric Superconductor PdBi<sub>2</sub>, <i>Jinbang Hu</i>, Norwegian University of Science and Technology (NTNU), Norway; <i>J. Wells</i>, University of Oslo (UiO), Norway</p>	
11:35am	<p><b>PCSI Closing Remarks</b></p>	
11:40am		
12:20pm		

# Thursday Afternoon, January 19, 2023

Room Redondo		
<b>1:55pm</b>	<b>AQS Workshop Welcome and Opening Remarks</b>	<b>AVS Quantum Science Workshop</b> <b>Session AQS-ThA1</b> <b>NV Sensors for Quantum Sensing</b> <b>Moderator:</b> <b>Andrew Yeats</b> , Naval Research Laboratory
<b>2:00pm</b>	<b>INVITED: AQS-ThA1-2</b> Quantum Sensing with NV Centers, <i>Erika Janitz</i> , <i>C. Deaen</i> . ETH Zürich. Switzerland	
<b>2:40pm</b>	<b>INVITED: AQS-ThA1-10</b> Diamond Quantum Sensors: Sensitivity Frontier, <i>V. Acosta</i> , <i>Yaser Silani</i> , University of New Mexico	
<b>3:20pm</b>	<b>Coffee Break</b>	
<b>3:50pm</b>	<b>INVITED: AQS-ThA2-24</b> Engineering Diamond for Quantum Sensing, <i>Jennifer M. Schloss</i> , <i>J. Mallek</i> , <i>D. deQuilettes</i> , <i>E. Price</i> , <i>L. Pham</i> , <i>J. Barry</i> , <i>M. Steinecker</i> , <i>D. Phillips</i> , <i>D. Braje</i> , Massachusetts Institute of Technology Lincoln Laboratory	
<b>4:30pm</b>	<b>INVITED: AQS-ThA2-32</b> Quantum Diamond Sensors — Best of Both Worlds. <i>Ron Walsworth</i> . University of Maryland	
<b>5:10pm</b>	<b>INVITED: AQS-ThA2-40</b> Spin-Carrying Quantum Centers in Wide-Band Gap Semiconductors as Magnetometry Sensors for Space Applications, <i>Hannes Kraus</i> , Jet Propulsion Laboratory	

# Friday Morning, January 20, 2023

<b>Room Redondo</b>	
<b>8:45am</b>	<p><b>INVITED: AQS-FrM1-1</b> Laser-Annealing Josephson Junctions to Achieve Scaled-Up High-Performance Superconducting Quantum Processors, <b>Jared Hertzberg</b>, IBM Research</p>
<b>9:25am</b>	<p><b>INVITED: AQS-FrM1-9</b> Progress Towards Merged-Element Transmons, <b>David Pappas</b>, <i>E. Lachman</i>, <i>J. Mutus</i>, Rigetti Computing; <i>C. Palmstrom</i>, University of California Santa Barbara</p>
<b>10:05am</b>	<b>Coffee Break</b>
<b>10:35am</b>	<p><b>INVITED: AQS-FrM2-23</b> A Neutral Atom Quantum Processor Supporting Long Coherence Times, <b>Kristen Pudenz</b>, Atom Computing</p>
<b>11:15am</b>	<p><b>INVITED: AQS-FrM2-31</b> Scalable Integrated Quantum dot networks and Nanophotonic Neuromorphic ‘Brain-Inspired’ Computing, <i>J.Q. Grim</i>, <i>A. Bracker</i>, <i>J. Hart</i>, Naval Research Laboratory; <i>S. Carter</i>, Laboratory of Physical Sciences; <i>C. Kim</i>, Naval Research Laboratory; <i>M. Kim (Jacobs)</i>; <i>I. Welland</i>, <i>K. Tran</i>, <i>I. Vurgaftman</i>, <i>T. Reinecke</i>, <b>Andrew Yeats</b>, Naval Research Laboratory</p>

**AVS Quantum Science Workshop**  
**Session AQS-FrM1**  
**Superconducting Quantum Computing**  
**Moderator:**  
**Hannes Kraus**, Jet Propulsion Laboratory

**AVS Quantum Science Workshop**  
**Session AQS-FrM2**  
**Novel Materials for Quantum Computing**  
**Moderator:**  
**Ron Walsworth**, University of Maryland

# Friday Afternoon, January 20, 2023

<b>Room Redondo</b>		
<b>2:00pm</b>	<p><b>INVITED: AQS-FrA1-1</b> Topological Materials, a New Quantum State of Matter. <i>Luis A. Jauregui</i>. University of California Irvine</p>	<p><b>AVS Quantum Science Workshop</b>  <b>Session AQS-FrA1</b>  <b>Topological Quantum Materials</b>  <b>Moderator:</b>  <b>Erika Janitz</b>, ETH Zürich, Switzerland</p>
<b>2:40pm</b>	<p><b>INVITED: AQS-FrA1-9</b> Probing Topologically Protected Quantum States with Scanning Tunneling Microscopy, <i>An-Ping Li</i>, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory</p>	
<b>3:20pm</b>	<p><b>Coffee Break</b></p>	
<b>3:50pm</b>	<p><b>INVITED: AQS-FrA2-23</b> Artificial Graphene Nanoribbons with Tailored Topological States, <i>Nathan P. Guisinger</i>, Argonne National Laboratory</p>	<p><b>AVS Quantum Science Workshop</b>  <b>Session AQS-FrA2</b>  <b>2D Materials for Quantum Sensing</b>  <b>Moderator:</b>  <b>Chip Eddy, Jr.</b>, ONR Global, UK</p>
<b>4:30pm</b>	<p><b>INVITED: AQS-FrA2-31</b> Quantum Sensing and Nuclear Spin Control with Spin Defects in a 2D Material, <i>Tongcang Li</i>, Purdue University</p>	
<b>5:10pm</b>	<p><b>AQS Workshop Closing Remarks</b></p>	

