Monday 8:30 AM  •  Room: America’s Ballroom

8:30 AM  OPENING WELCOME:
Ian M. Anderson, MSA President, Masashi Watanabe, MAS President
David Larson, IFES President
Jay A. Potts, M&M 2017 Program Chair

8:45 AM  1 (INVITED) Imaging Cellular Structure and Dynamics from Molecules to Organisms; Professor Eric Betzig; Janelia Research Campus

9:45 AM  MAS Awards Presentation

10:00 AM  IFES Awards Presentation

10:15 AM  Coffee Break, Ballroom Foyer

10:45 AM  MSA Awards Presentation

11:00 AM  M&M Meeting Awards Presentation

11:15 AM  2 (INVITED) Detecting Massive Black Holes via Attometry: Gravitational Wave Astronomy Begins; Keith Riles; University of Michigan, Ann Arbor

A04.1 Advances in Programming of Quantitative Microscopy for Biological and Materials Science

SESSION CHAIRS:
Hendrix Demers, McGill University, Canada
Philippe Pinard, Oxford Instruments NanoAnalysis

PLATFORM SESSION
Monday 1:30 PM  •  Room: 121

1:30 PM  3 (INVITED) Recent Advances of the Open Source MULTEM Program to Provide Accurate and Fast Electron Microscopy Simulations; IP Lobato Hoyos, J Verbeeck, S Van Aert; University of Antwerp, Belgium

2:00 PM  4 Creation of an XAS and EELS Spectroscopy Resource within the Materials Project Using FEFF9; AK Dozier; CDC-National Institute for Occupational Safety and Health; K Persson; University of California, Berkeley; SP Ong; University of California, San Diego; K Mathew; University of California, Berkeley; C Zheng, C Chen; University of California, San Diego; J Kas, F Vila; University of Washington, et al.

A05.1 Advances in FIB Instrumentation and Applications in Materials and Biological Sciences

SESSION CHAIRS:
Keana Scott, National Institute of Standards and Technology
Nabil Bassim, McMaster University, Canada
Assel Aitkaliyeva, University of Florida

PLATFORM SESSION
Monday 1:30 PM  •  Room: 127

1:30 PM  7 (INVITED) Site Specific Cryo-FIB Preparations Aimed at In Situ Cryo-Electron Tomography; J Mahamid, J Arnold, JM Plitzko; Max Planck Institute of Biochemistry, Germany

2:00 PM  8 Multi-Modal SEM/FIB-SEM for Precise Targeting of Cell-Cell junctions in Human Pancreatic Islets; JW Hughes, MS Joens, JA Fitzpatrick, DW Piston; Washington University in St. Louis

2:15 PM  9 3D Microanalysis of Porous Copper Using FIB-Tomography in Combination with X-ray Computed Tomography; A Wijaya; Materials Center Leoben Forschung GmbH, Austria; B Eichinger; Infineon Technologies, Austria AG; J Rosc, B Sartory; Materials Center Leoben Forschung GmbH, Austria; M Mischitz; Infineon Technologies Austria AG; R Brunner; Materials Center Leoben Forschung GmbH, Austria

2:30 PM  10 Potential of Application Focused Ion Beam in Forensic Science Area; M Kotrly; Institute of Criminalistics, Czech Republic

2:45 PM  11 In Situ TEM Analyses over FIB Lamellae - Investigating High Temperature Conversion of Solution Processed Mo-Precursor to MoS\textsubscript{2} Semiconductor Films.; A Pokle, M Canavan, D Daly; Trinity College Dublin, Ireland; O Gomes, M Marinkovic; Evonik Resource Efficiency GmbH, Germany; V Wagner; Jacobs University Bremen, Germany; V Nicolosi; Trinity College Dublin, Ireland
Scientific Program

A10.1 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

SESSION CHAIR: Robert Keller, National Institute of Standards and Technology

PLATFORM SESSION
Monday 1:30 PM • Room: 124

1:30 PM 12 (INVITED) Low Accelerating Voltage Scanning Transmitted Electron Microscope: Imaging, Diffraction, X-ray Microanalysis, and Electron Energy-Loss Spectroscopy at the Nanoscale; H Demers, N Brodusch, R Gauvin; McGill University, Canada

2:00 PM 13 On-Axis Transmission Kikuchi Diffraction for Orientation Mapping of Nanocrystalline Materials in the SEM; E Brodi, E Bouzy, J-J Fundenberger; Laboratoire d’Etude des Microstructures et de Mécanique des Matériaux, France

2:15 PM 14 The Influence of Microscope and Specimen Parameters on the Spatial Resolution of Transmission Kikuchi Diffraction; GC Sneddon; University of Sydney, Australia; PW Trimby; Oxford Instruments Nanoanalysis; JM Cairney; University of Sydney, Australia

2:30 PM 15 Crystallographic Orientation Image Mapping with Multiple Detector Configurations at 30 – 300 kV; JD Sugar; Sandia National Laboratories; JT McKeown; Lawrence Livermore National Laboratory; DC Bufford, JR Michael; Sandia National Laboratories

2:45 PM 16 Three-Dimensional Analysis of Cracks by Focused Ion Beam and Transmission Kikuchi Diffraction; M Abbasi; SK Innovation, Korea; H-U Guim; Korea Basic Science Institute; I Park, R Ayer, Y Ro; SK Innovation, Korea

A11.1 Anniversary Session—Instrumentation of Atom Probe: 50 Years and Counting

SESSION CHAIR: Thomas Kelly, CAMECA Instruments

PLATFORM SESSION
Monday 1:30 PM • Room: 263

1:30 PM 17 (INVITED) A Personal Retrospective on the Origin of the Time-of-Flight Atom Probe; DF Barofsky; Oregon State University

2:00 PM 18 (INVITED) My Life with Erwin: The Beginning of an Atom-Probe Legacy; JA Panitz; The University of New Mexico

A18.1 Anniversary Session—Celebrating 50 Years of Microanalysis

SESSION CHAIRS: Paul Carpenter, Washington University in St. Louis
Heather Lowers, U.S. Geological Survey
Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION
Monday 1:30 PM • Room: 264

1:30 PM 21 (INVITED) Historical and Current Importance of Electron Probe Microanalysis in Space Sciences, A Retro- and Forward-Looking Perspective; BL Jolliff, PK Carpenter; Washington University in St Louis

2:00 PM 22 Seven Decades of Trans-Atlantic Cooperation in the Development of EPMA; J Fournelle, University of Wisconsin, Madison

2:15 PM 23 There and Back Again: An Unfinished Tale - XEDS in the AEM; NJ Zaluzec; Argonne National Laboratory

2:30 PM 24 (INVITED) Focused Ion Beams for Imaging, Analysis, and Fabrication – Where did They Come From and Where are They Going?; JA Notte; Carl Zeiss Microscopy, LLC
**BIOLOGICAL SCIENCES SYMPOSIA – MONDAY AFTERNOON**

**B01.1 Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications**

**SESSION CHAIRS:**
Bernard Heymann, National Institutes of Health
Esther Bullitt, Boston University
Alasdair Steven, National Institutes of Health

**PLATFORM SESSION**
Monday 1:30 PM • Room: 123

1:30 PM 25 (INVITED) Gina Sosinsky - Excellence in Science, Scholarship, and Humanity; E Bullitt; Boston University; T Ruiz; University of Vermont

1:45 PM 26 (INVITED) Unraveling the Molecular Details of the Cell-ECM Interface: 3D Structures of Membrane-Embedded Integrin Complexes; X-P Xu, KL Anderson, MF Swift, N Volkmann, D Hanein; Sanford-Burnham-Prebys Medical Discovery Institute

2:15 PM 27 (INVITED) Structure of the C. Elegans Innexin-6 Gap Junction Channel; A Oshima, K Tani, Y Fujiyoshi; Nagoya University, Japan

2:45 PM 28 Single Molecule and Single Cell Analysis of HER2 Receptors in Breast Cancer Cells Using Liquid Phase Scanning Transmission Electron Microscopy; N de Jonge; INM – Leibniz Institute for New Materials, Germany; DB Peckys; Saarland University, Germany; S Wiemann; German Cancer Research Center

**B04.1 3D and Intravital Imaging in Development and Beyond**

**SESSION CHAIR:**
David Entenberg, Albert Einstein College of Medicine

**PLATFORM SESSION**
Monday 1:30 PM • Room: 122

1:30 PM 29 (INVITED) Smart Microscopy for Multi-Scale Developmental Biology in Real-Time; J Huiskes; Morgridge Institute for Research

2:00 PM 30 Multi-Scale Time-Lapse Intravital Imaging of Soft Tissues to Map Single Cell Behavior; JM Pastoriza, Y Wang, Albert Einstein College of Medicine; MS Sosa, J Aguirre-Ghiso; Icahn School of Medicine at Mount Sinai; JS Condeelis, MH Oktay, D Entenberg; Albert Einstein College of Medicine

2:15 PM 31 Combining Novel Probes and High Resolution Imaging to Dissect Mitochondrial Function in Living Systems; KA Pena, M Larsen, M Calderon, M Tsang, SC Watkins; University of Pittsburgh; MP Bruchez; Carnegie Mellon University; CM St Croix; University of Pittsburgh

**P PHYSICAL SCIENCES SYMPOSIA – MONDAY AFTERNOON**

**P03.1 Advanced Microscopy and Microanalysis of Complex Oxides**

**SESSION CHAIR:**
Xiaoqing Pan, University of California, Irvine

**PLATFORM SESSION**
Monday 1:30 PM • Room: 274

1:30 PM 33 (INVITED) Imaging Point Defects in Complex Oxides Using Quantitative STEM; H Kim, J Zhang, S Stemmer; University of California, Santa Barbara

2:00 PM 34 Influence of Substrate Temperature and Dopant Distribution at Two-Dimensionally Doped Superconducting La2CuO4 Interfaces; YE Suyolcu, Y Wang, F Baiutti, G Gregori, G Cristiani, W Sigle, J Maier, G Logvenov; Max Planck Institute for Solid State Research, Germany, et al.

2:15 PM 35 Bayesian Statistical Model for Imaging of Single La Vacancies in LaMnO3; J Feng, A Kvit, C Zhang, D Morgan, P Voyles; University of Wisconsin, Madison

2:30 PM 36 (INVITED) Utilizing Atom Probe Tomography for 3D Quantification of Point Defects; BP Gorman, G Burton, DR Diercks; Colorado School of Mines

**P06.1 Nanoparticles: Synthesis, Characterization, and Applications**

**SESSION CHAIR:**
Thomas W. Hansen, Technical University of Denmark

**PLATFORM SESSION**
Monday 1:30 PM • Room: 265

1:30 PM 37 (INVITED) Nanoparticles in the ETEM: From Gas-Surface Interactions of Single Objects to Collective Behavior of Nanocatalysts; T Epiciar; National Institute of Applied Sciences of Lyon, France

2:00 PM 38 Aberration-Corrected STEM Study of Shape Controlled Metallic Core-Shell Nanoparticles for Catalytic Applications; J Wang, N Lu; The University of Texas, Dallas; Y Xia; Georgia Institute of Technology; MJ Kim; The University of Texas, Dallas

2:30 PM 32 (INVITED) Advanced 3D and Live Imaging Reveals Phenotypic Consequences of Disruptions in Mechanical and Genetic Mechanisms Underlying Embryonic Cardiovascular Development; ME Dickinson, Baylor College of Medicine
Scientific Program

2:15 PM 39 Electron Microscopy Investigations of Precious Metal Catalysts: Towards Controlled Synthesis of Ultra-Small Nanoparticles; Q He, T Davies, C Dixon; Cardiff University, United Kingdom; S Althahban, L Lu; Lehigh University; S Freakley, L Abis, N Agarwal; Cardiff University, United Kingdom, et al.

2:30 PM 40 Pt/CoO-ZnO Nanowire Single-Atom Catalysts for Water-Gas Shift Reaction; J Xu, Y Song, J Liu; Arizona State University

2:45 PM 41 Dynamic Investigation of Metal-Support Interactions in Heterodimer Nanoparticles by In Situ Transmission Electron Microscopy; V Ortalan, CW Han, J Greeley; Purdue University; C Wang; Johns Hopkins University; F Ribeiro, C Milligan, T Choksi, P Majumdar; Purdue University, et al.

P08.1 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:
Lori Hathon, University of Houston
Kultaran singh (Bobby) Hooghan, Weatherford Laboratories

PLATFORM SESSION
Monday 1:30 PM • Room: 262

1:30 PM 42 (INVITED) New Technique for Imaging Geologic Materials via Integrated Correlative Light and Electron Microscopy (iCLEM); PC Hackley, BJ Valentine; U.S. Geological Survey; L Voortmann, DV Slingeland; Delmic BV, Netherlands; J Hatcherian; U.S. Geological Survey

2:00 PM 43 High Throughput Shale Rock Imaging Using Multi-Beam Scanning Electron Microscopy; AL Eberle, T Garbowsk; Carl Zeiss Microscopy GmbH; S Bhatiprolu, K Crosby; Carl Zeiss Microscopy, LLC; D Zeidler; Carl Zeiss Microscopy GmbH

2:15 PM 44 Multi-Modal SEM Imaging for Shale Reservoir Characterization; L Hathon; University of Houston; KB Hooghan; Weatherford Labs; M Myers; University of Houston; M Dixon; Weatherford Labs

2:30 PM 45 Raman Microspectroscopy and Raman Imaging of Fluid Inclusions as Method of Phase Identification; S Mamedov; Horiba Scientific

2:45 PM 46 Application of Multiple Imaging Tools for Organic Material Characterization in Shale Reservoirs; Z Liu, L Hathon, M Myers; University of Houston

A ANALYTICAL SCIENCES POSTER SESSIONS – MONDAY AFTERNOON

A02.P1 Compressive Sensing, Machine Learning & Advanced Computation in Microscopy

POSTER SESSION
Monday 3:00 PM • Room: Exhibit Hall

POSTER # 1 3:00 PM 47 A Particle Extraction Method with an Improved Auto-Encoder in Neural Networks with the Aid of HOG Feature Analysis; S Tezuka, G Maeda, M Baba, N Baba; Kogakuin University, Japan

POSTER # 2 3:00 PM 48 Under-Sampling and Image Reconstruction for Scanning Electron Microscopes; Y Zhanag; Argonne National Laboratory; D Godaliyadda; Purdue University; N Nashed, N Ferrier; Argonne National Laboratory; EB Gulsoy; Northwestern University; C Phatak; Argonne National Laboratory

POSTER # 3 3:00 PM 49 (M&M STUDENT SCHOLAR) Segmentation and Contour Extraction in Biological Transmission Electron Microscope Images with ‘Bag-of-Features’ Method in Machine Learning; G Maeda, S Tezuka, S Sakamoto, M Baba, N Baba; Kogakuin University, Japan

POSTER # 4 3:00 PM 50 Deep Learning Segmentation for Epifluorescence Microscopy Images; Y Kassim, O Glinskii; University of Missouri, Columbia; V Glinskii, V Huxley, K Palaniappan; University of Missouri

POSTER # 5 3:00 PM 51 Real-Time Video Enhancement and Computer Vision for In Vivo Microscopy; H Osman; Indiana University

POSTER # 6 3:00 PM 52 A Route to Integrating Dynamic 4D X-ray Computed Tomography and Machine Learning to Model Material Performance; NL Cordes, K Henderson, BM Patterson; Los Alamos National Laboratory

POSTER # 7 3:00 PM 53 Digital Super-Resolution in EELS; SG Schneider, D Pohl; Leibniz Institute for Solid State and Materials Research Dresden, Germany; A Stevens, ND Browning; Pacific Northwest National Laboratory; K Nielsch, B Rellinghaus; Leibniz Institute for Solid State and Materials Research Dresden, Germany

POSTER # 8 3:00 PM 54 Adaptive Biharmonic In-Painting for Sparse Acquisition Using Variance Frames; A Barnum, J Jiao; Portland State University
### Scientific Program

**Monday, August 7**

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<th>POSTER # 9</th>
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| **High-Throughput Large Volume SEM Workflow Using Sparse Scanning and In-Painting Algorithms Inspired by Compressive Sensing:** F Boughrobel, P Potoczek, M Hovorka, L Strakoš, J Mitchels, T Vystavěl, B Lich; Thermo Fisher Scientific, T Dahmen; German Research Centre for Artificial Intelligence, et al.

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<th>POSTER # 10</th>
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| **Implementation of Sparse Image Acquisition in a Conventional Scanning Transmission Electron Microscope:** MA Tanner, S Hwang, CW Han, SV Venkatakrishnan, CA Bouman, V Ortalan; Purdue University

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<th>POSTER # 11</th>
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| **In-Chamber Reel-to-Reel System for Random-Access Volume Electron Microscopy:** S Mikula; Max-Planck Institute of Neurobiology, Germany

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<th>POSTER # 12</th>
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| **The Usage of Modern Data Science in Segmentation and Classification: Machine Learning and Microscopy:** MG Andrew, S Bhattiprolu, D Butnaru, J Correa; Carl Zeiss Microscopy

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<th>POSTER # 13</th>
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| **Reliable Event Detection for Incomplete and Streaming (S)TEM Images:** SM Reehl, B Stanfill; Pacific Northwest National Laboratory; D Ries, M Johnson; Iowa State University; L Mehdi, N Browning, L Bramer; Pacific Northwest National Laboratory

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| **Quantifying Feature Uncertainty in Sub-Sampled Low-Dose (S)TEM Images:** B Stanfill, S Reehl; PNNL; M Johnson; Iowa State University; N Browning, L Mehdi, L Bramer; Pacific Northwest National Laboratory

| POSTER SESSION | Monday 3:00 PM | Room: Exhibit Hall
| POSTER # 15 | 3:00 PM | 61 |
| **Open Source Software for Quantitative X-ray Microanalysis:** OpenMicroanalysis; H Demers; McGill University, Canada; P Pinard; Oxford Instruments NanoAnalysis; S Richter; RWTH Aachen University, Germany; R Gauvin; McGill University, Canada

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<th>POSTER # 16</th>
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| **Quantification of Thin Specimens in a Scanning Transmission Electron Microscope at Low Accelerating Voltage Using the f-ratio Method:** N Brodusch, H Demers, R Gauvin; McGill University, Canada

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**A04.P1 Advances in Programming of Quantitative Microscopy for Biological and Materials Science**

| POSTER SESSION | Monday 3:00 PM | Room: Exhibit Hall
| POSTER # 17 | 3:00 PM | 63 |
| **On-Line Digital-Darkfield TEM Determination of Nanocrystal 3D-Lattices:** PB Fraundorf; University of Missouri, St. Louis

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<th>POSTER # 18</th>
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| **A Semi-Automated Workflow for Segmenting Contents of Single Cardiac Cells from Serial-Block-Face Scanning Electron Microscopy Data:** A Hussain, E Hanssen, V Rajagopal; University of Melbourne, Australia

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<th>POSTER # 19</th>
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| **Detection of Protein Secondary Structure Patterns from 3D Cryo-TEM Maps at Medium Resolution – Combining the Best of SSERTracer and VolTrac:** C Spillers, W Wriggers, J He; Old Dominion University

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| **Gesture-Based Control of ImageJ Using Leap Sensors:** R Brookes; BT Plc; BC Breton, DM Holburn; University of Cambridge, England; NH Caldwell; University of Suffolk

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| **The Dragonfly Macro Engine for Executing Recorded Tasks in Image Processing and Visualization:** M Gendron, N Piche, M Marsh; Object Research Systems

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<th>POSTER # 22</th>
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| **Eye Gaze Pattern Analysis of Whole Slide Image Viewing Behavior in PathEdEx Platform:** I Ersoy, M Kovalenko, C-R Shyu, R Hammer, D Shin; University of Missouri, Columbia

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**A10.P1 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects**

| POSTER SESSION | Monday 3:00 PM | Room: Exhibit Hall
| POSTER # 23 | 3:00 PM | 69 |
| **Non-Destructive Imaging of Extend Defects in III-nitride Thin Film Structures Using Electron Channelling Contrast Imaging:** N-K Gunasekar, M Nouf-Allehiani, D Thomson, E Pascal, B Hourahine, C Trager-Cowan; University of Strathclyde, Scotland

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<th>POSTER # 24</th>
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| **Focused Ion Beam (FIB) Based Tomography of Dislocations Using Electron Channeling Contrast Imaging (ECCI):** S Balachandran; Michigan State University; Z Radha; University of Michigan, Ann Arbor; D Colbry, MA Crimp; Michigan State University

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<th>POSTER # 25</th>
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| **Investigating Defect Contrast in Ge<sub>Si</sub> <sub>1-x</sub>/Si Epitaxial Structures Using Electron Channeling Contrast Imaging:** J Tessmer, M DeGraef, Y Picard; Carnegie Mellon University

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A11.P1 Anniversary Session: Instrumentation of Atom Probe: 50 Years and Counting

POSTER SESSION
Monday 3:00 PM • Room: Exhibit Hall

POSTER # 26
3:00 PM 72 High-Contrast Visualization of Anti-Phase Domains and Screw Dislocations in 3C-SiC; T Borsa, R Brow; University of Colorado Boulder; H Robinson; BASiC 3C, Inc.; B Van Zeghbroeck; University of Colorado Boulder

POSTER # 27
3:00 PM 73 (M&M STUDENT SCHOLAR) Rapid Nanometer Mapping of Nickel-Steel Friction Stir Weld Joint; GW Lee, G Abreu-Faria; The Ohio State University; J Rodriguez; Universidad EIA, Columbia; J Orsborn, AJ Ramirez; The Ohio State University

POSTER # 28
3:00 PM 74 Effects of Ultrasonic Welding on Nanocrystalline Ag-W Investigated with 30kV Transmission Kikuchi Diffraction (tKD) and 300kV STEM SE Imaging; DN Leonard; Oak Ridge National Laboratory; AA Ward, MR French; Rice University; SR Cross; Xtalic Corporation; ZC Cordero; Rice University

POSTER # 29
3:00 PM 75 Effect of Ni Addition on Microstructure and Hardness of A356 Alloy after Hot Plastic Deformation; HM Medrano-Prieto, CG Garay-Reyes, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; CG Nava-Dino, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 30
3:00 PM 76 (INVITED) Synthesis and Characterization of Mg Obtained by Mechanical Alloying and Doped with Al, Y, and Y, O.; C Fernando Marquez; National Autonomous University of Mexico; EA Juárez Arellano; University of Papaloapan, Mexico; J Reyes Gasga; National Autonomous University of Mexico

A18.P1 Anniversary Session: Celebrating 50 Years of Microanalysis

POSTER SESSION
Monday 3:00 PM • Room: Exhibit Hall

POSTER # 35
3:00 PM 81 Carbon Bonding Determination with XES Using a TES Microcalorimeter Detector; GJ Havrilla, K McIntosh, M Croce, M Rabin; Los Alamos National Laboratory; F Vila; University of Washington; R Huber, D Podlesak; Los Alamos National Laboratory, M Carpenter; STAR Cryoelectronics, et al.

POSTER # 36
3:00 PM 82 Advantage of Specimen Heating in FE-EPMA for Performing Quantitative Trace Carbon Analysis in Steel Materials; Y Tanaka, T Yamashita, M Nagoshi; JFE Steel Corporation

POSTER # 37
3:00 PM 83 A New Detection Metric for EDS Detectors; PP Camus; EDAX Inc.

POSTER # 38
3:00 PM 84 Very Large Area Phase Mapping of a Petrographic Thick Section Using Multivariate Statistical Analysis of EDS Spectral Images; SM Seddio; Thermo Fisher Scientific; PK Carpenter; Washington University

POSTER # 39
3:00 PM 85 New Developments in Compositional Stage Mapping by EPMA and Micro-XRF; P Carpenter, T Hahn; Washington University

POSTER # 40
3:00 PM 86 Implementing High Performance Workstation Virtualization for Data Processing in a Multi-User Microscopy Facility; DE Huber, JM Sosa, J Riedel, CD Ellerbrock, DM McComb; The Ohio State University

POSTER # 41
3:00 PM 87 EPMA Characterisation of Quartz and Quartz-Cement from a Triassic Sandstone; CM MacRae, A Torpy; CSIRO. Australia; C Delle Piane; CSIRO Energy; NC Wilson; CSIRO. Australia
**Scientific Program**

**Monday, August 7**

**POSTER # 42**
3:00 PM 88 Phenom Desktop SEM for Gunshot Residue and Cathodoluminescence Imaging and Analysis; K Mason; Eastern Analytical; R Wuhrer; Western Sydney University, Australia

**POSTER # 43**
3:00 PM 89 Characterisation of Acid Resistant Concrete Exposed to Sulphuric Acid Using SEM, EDS and X-ray Mapping; S Salek, R Wuhrer, G Adam, B Samali; Western Sydney University, Australia

**POSTER # 44**
3:00 PM 90 Composition and Crystal Orientation Mapping of Nano-Scale Multi-Phase Rapid Solidification Microstructures in Hypo-Eutectic Al-Cu Alloy Thin Films; JM Wiezorek, C Liu, S Farjami, KW Zweicker; University of Pittsburgh; JT McKeown, GH Campbell; Lawrence Livermore National Laboratory

**BIOLOGICAL SCIENCES POSTER SESSIONS—MONDAY AFTERNOON**

**B01.P1** Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications

**POSTER SESSION**
Monday 3:00 PM • Room: Exhibit Hall

**POSTER # 45**
3:00 PM 91 Cryo-Fixed Stained Microtubules Can Be Imaged With High Electron Doses for Accessing the Full Resolving Power of an Electron Microscope; A Fera, L Dye; Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health

**POSTER # 46**
3:00 PM 92 Human Vision, Cosmic Forces and the 21st Century Scientist; MA Goldstein, Baylor College of Medicine

**POSTER # 47**
3:00 PM 93 The Alignment and Classification of 3D Reconstructions of Rod-Like Molecules Obtained by Electron Tomography; CJ Brooks, T Ruiz, M Radermacher; University of Vermont

**B04.P1** 3D and Intravital Imaging in Development and Beyond

**POSTER SESSION**
Monday 3:00 PM • Room: Exhibit Hall

**POSTER # 48**
3:00 PM 94 Conotruncal Heart Defects: Altered Tissue Morphology and Hemodynamics; RS Jones; University of South Carolina; L Junor; University of South Carolina School of Medicine; MR Hutson, ML Kirby; Duke University Medical Center; RL Goodwin; University of South Carolina School of Medicine

**POSTER # 49**
3:00 PM 95 (M&M STUDENT SCHOLAR) Imaging Live Uterine Tissue Modulation Using Confocal Microscopy; SMB Obayomi, S Peck, DP Baluch; Arizona State University

**POSTER # 50**
3:00 PM 96 Some Novel uses for Three-Dimensional Data from SPM and Stereo SEM; PB Fraundorf; D Osborn; University of Missouri, St. Louis; M Lipp; Universität Stuttgart, Germany

**POSTER # 51**
3:00 PM 97 New Approaches for High lateral Resolution Array Tomography Analysis; Y Yamaguchi; JEOL, Ltd.; M Maeda, Y Kataoka; RIKEN CLST-JEOL Collaboration Center, Kobe; Y Moriya, C Nakayama, T Haruta, M Suga; JEOL, Ltd.; N Erdman; JEOL USA, Inc.; et al.

**POSTER # 52**
3:00 PM 98 4D Quantitative Image Analysis of Cancer Cell Invasion in a Brain Microenvironment Using ImageJ Software; J Gamble, R Tanguay, JA Greenwood; Oregon State University

**PHYSICAL SCIENCES POSTER SESSIONS—MONDAY AFTERNOON**

**P03.P1** Advanced Microscopy and Microanalysis of Complex Oxides

**POSTER SESSION**
Monday 3:00 PM • Room: Exhibit Hall

**POSTER # 53**
3:00 PM 99 Nanoscale Compositional Analysis of a Thermally Processed Entropy-Stabilized Oxide via Correlative TEM and APT; DR Diercks, G Brennecka, BP Gorman; Colorado School of Mines; CM Rost; University of Virginia; J-P Maria; North Carolina State University

**POSTER # 54**
3:00 PM 100 Correlative Raman Spectroscopy and Focused Ion Beam for Targeted Microstructural Analysis of Titania Polymorphs; J Mangum; Colorado School of Mines; LH Chan; TESCAN USA Inc.; L Garten; National Renewable Energy Laboratory; B Gorman; Colorado School of Mines

**POSTER # 55**
3:00 PM 101 Solid State Transition in $\gamma$ to $\alpha$-Al$_2$O$_3$ Induced by SPEX Mechanical Milling; FD Cortes Vega, P Martinez Torres, S Borjas Garcia, J Zarate Medina; Universidad Michoacana de San Nicolas de Hidalgo, Mexico

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<td>56</td>
<td>Molybdenum Oxide Structures Synthesized by Microwave Technique and its Phase Transformation by Thermal Treatment; CE Ornelas, F Paraguay-Delgado; Centro de Investigacion en Materiales Avanzados SC; J Lara-Romero; Universidad Michoacana de San Nicolas de Hidalgo, Mexico</td>
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<td>Contributions of Support Effect to Impregnated Cobalt CeO₂ and SiO₂ Catalysts; Z Liu, R Wang; The University of Alabama</td>
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<td>57</td>
<td>Microstructure Patterns by Switching Spectroscopy Piezo-Response Force Microscopy of Lead Free Perovskite-Type Polycrystalline Thin Films.; GM Herrera-Pérez, O Solís-Canto, J Holguín-Momaca, S Olive-Mendoza, E Guerrero-Lestarjette, G Tapia-Padilla, A Reyes-Rojas, LE Fuentes-Cobas; Centro de Investigación en Materiales Avanzados, S.C., Mexico</td>
<td>62</td>
<td>Investigation of Nanoparticle Reactions with Laser Heating by In Situ TEM; T Isik, S Kundu, IE Gunduz; Purdue University; V Ortalan; Purdue University</td>
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<td>Microstructural and Mechanical Behavior in the Al₂₀₂₄ Alloy Modified With Addition of CeO₂; JD Franco-Madrid; Centro de Investigación en Materiales Avanzados, Mexico; CG Garay-Reyes, I Estrada-Güel; Centro de Investigación en Materiales Avanzados, Mexico; CG Nava-Dino, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico</td>
<td>63</td>
<td>Tungsten and Bismuth Nanoparticles for X-ray Computed Tomography; VN Joshi; Nanoprobes, Inc.orporated</td>
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<td>59</td>
<td>Correlating Surface Roughness and Binder Erosion to Tint Retention of Coatings; PY Eastman, M Koback, J Gu, MB Clark, J Ngunjiri, J Reffner, C Valente; The Dow Chemical Company</td>
<td>64</td>
<td>Electrospray as a Sample Preparation Tool for Electron Microscopic Investigations: Toward Quantitative Evaluation of Nanoparticles; J Mielke; BAM Federal Institute for Materials Research and Testing, Germany; P Dohányosová; Ramen S.A., Belgium; P Müller; BASF SE; S López; Ramen S.A., Belgium; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany</td>
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<td>60</td>
<td>Honeycomb Networks of Metal Oxides from Self-Assembling PS-PMMA Block Copolymers; F Barrows; Northwestern University; P Nealey; Argonne National Laboratory; T Segal-Petertz; Technion-Israel Institute of Technology, Israel; L Stan, J Elam, A Mane; Argonne National Laboratory; E Forath; University of Chicago, A Petford-Long; Argonne National Laboratory, et al.</td>
<td>65</td>
<td>The Stability of High Metal-Loading Pt/Fe₂O₃ Single-Atom Catalyst under Different Gas Environment; S Duan; Arizona State University; R Wang; University of Science and Technology Beijing; J Liu; Arizona State University</td>
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<td>Photo-Mediated Seedless Synthesis of Silver Nanoparticles Using CW-Laser and Sunlight Irradiation; F Félix-Domínguez, RC Carrillo-Torres, JÁ González, J Hernández-Paredes, R Sánchez-Zeferino, ME Álvarez-Ramos; Universidad de Sonora, Mexico</td>
<td>66</td>
<td>On the Morphologies and Photocatalytic Properties of TiO₂ Nanoparticles Synthesized by Pulsed-Laser Decomposition of Titanium Tétraisopropanoxide; M Mozael, Z Dong, BH Kears; Rutgers University; JF AI-Sharab; Northwestern State University; SD Tse; Rutgers University</td>
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<td>62</td>
<td>Elemental Distribution Analysis of Core/Shell Nanocrystals with STEM/EDX; JT Held, K Hunter, UR Korvshagen, KA Mkhoyan; University of Minnesota</td>
<td>63</td>
<td>P06.P1 Nanoparticles: Synthesis, Characterization, and Applications</td>
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<td>POSTER SESSION</td>
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<td>Monday 3:00 PM • Room: Exhibit Hall</td>
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POSTER # 69  3:00 PM  115  Sample Preparation and Analysis of Aggregated ‘Single Atom Alloy’ Nanoparticles by Atom Probe Tomography; C Barroo; Université libre de Bruxelles, Belgium; AJ Akey; Harvard University; J Shan, M Flytzani-Stephanopoulos; Tufts University; DC Bell; Harvard University

POSTER # 70  3:00 PM  116  Analysis of Fluorine Traces in TiO2 Nanoplatelets by SEM-EDX, AES and TOF-SIMS; S Rades, E Ortel, T Wirth, M Holzweber; BAM Federal Institute for Materials Research and Testing, Germany; F Pellegrino, G Martra; University of Torino, Italy; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany

POSTER # 71  3:00 PM  117  Detection of CdS Nanoparticles and Implications for Cadmium Yellow Paint Degradation in Edvard Munch’s The Scream (c. 1910, Munch Museum); BD Levin, KX Nguyen, M Holtz; Cornell University; MB Wiggins; University of Delaware; MG Thomas; Cornell University; ES Tveit; Munch Museum, Norway; TL Mass; Rijksmuseum, R Opila; University of Delaware, et al.

POSTER # 72  3:00 PM  118  Microstructure of Cu-Ni Matrix Nanocomposites Reinforced with Al2O3 Nanoparticles; MI Ramos, NM Suguihiro, E Brocchi, G Solorzano; Pontifical Catholic University of Rio de Janeiro, Brazil

POSTER # 73  3:00 PM  119  Growth Regimes of Hydrothermally Synthesized Potassium Tantalate Nanoparticles; T Ly, LD Marks; Northwestern University

POSTER # 74  3:00 PM  120  Effect of Synthesis Temperature on the Formation of GAC supported Pd and Au NPs; K Meduri, C Stauffer, T Lindner; Portland State University; G O’Brien Johnson, PG Tantmeyk; Oregon Health & Science University; J Jiao; Portland State University

POSTER # 75  3:00 PM  121  Ultrathin Au-Alloy Nanowires: Synthesis and Stability; D Chatterjee, R Narayanan; Indian Institute of Science

P08.P1  Geological Sample Characterization Using Various Imaging Modalities

POSTER SESSION  Monday 3:00 PM • Room: Exhibit Hall

POSTER # 76  3:00 PM  122  3D Core-Scale Organic and Mineral Material Characterization of Source Rocks with Simultaneous Neutron and X-ray Imaging; W LI; Aramco Research Center - Houston; W-S Chiang, J LaManna; National Institute of Standards and Technology; J Kone, J-H Chen; Aramco Research Center - Houston; Y Liu; National Institute of Standards and Technology

POSTER # 77  3:00 PM  123  A New Approach to Microns-Resolution Trace Element and Mineralogy Mapping at PPM Sensitivity for Digital Rock and Geological Research; SJ Lewis, W Yun, S Lau, B Stripe, A Lyon, D Reynolds, S Chen, RI Spink; Sigray, Inc.

POSTER # 78  3:00 PM  124  Effective SEM Analytical Techniques for the Cathodoluminescence Visualization of Intergranular Cements in Saint Peter Sandstone: A Round Robin Exercise; W Schneider; University of Wisconsin, Madison; C MacRae; CSIRO, Australia; J Fournelle; University of Wisconsin, Madison

POSTER # 79  3:00 PM  125  Requirements for a Comprehensive Geological Analysis Solution with EDS; M Hiscock; Oxford Instruments

POSTER # 80  3:00 PM  126  (M&M STUDENT SCHOLAR) Study on Nanophase Minerals and Their Associated Trace Elements in Freshwater Ferromanganese Nodules from Green Bay, Lake Michigan; S Lee, H Xu; University of Wisconsin–Madison

POSTER # 81  3:00 PM  127  Direct Observation of Vacancies, Impurities, Adsorbed Heavy Metals, Cation Ordering, and Interface Structures in Minerals Using Aberration-Corrected STEM; H Xu; University of Wisconsin–Madison

POSTER # 82  3:00 PM  128  Study of Morphological Changes of the Lime Putties During Maturing by SEM/SEEM; E Navrátilová, V Neděla; Institute of Scientific Instruments of the CAS
X72.1  MAS 50th Anniversary Lecture in the Analytical Sciences

Complimentary coffee, tea, and handheld breakfast item provided.

SESSION CHAIR:
Masashi Watanabe, President, Microanalysis Society

PLATFORM SESSION
Tuesday 7:30 AM • Room: 275

7:30 AM  205 (INVITED) Microanalysis: What Is It, Where Did It Come From, and Where Is It Going?; Dale E. Newbury; NIST Fellow, National Institute of Standards and Technology

A02.1  Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy

SESSION CHAIR:
Volkan Ortalan, Purdue University

PLATFORM SESSION
Tuesday 8:30 AM • Room: 260

8:30 AM  129 (INVITED) Implementing Sub-Sampling Methods for Low-Dose (Scanning) Transmission Electron Microscopy (S/TEM); ND Browning, A Stevens, L Kovarik, A Liyu, L Mehai, B Stanfill, S Reehl, L Bramer; Pacific Northwest National Laboratories

9:00 AM  130 Compressively Sensed Video Acquisition in Transmission Electron Microscopy; BW Reed, ST Park, RS Bloom, DJ Masiel; IDES, Inc

9:15 AM  131 (INVITED) Super-Resolution Electron Microscopy Using Multi-Resolution Data Fusion; CA Bouman; Purdue University

9:45 AM  132 Resolution Versus Error for Computational Electron Microscopy; L Luzi, A Stevens; Pacific Northwest National Laboratory; H Yang; Lawrence Berkeley National Laboratory; ND Browning; Pacific Northwest National Laboratory

A04.2  Advances in Programming of Quantitative Microscopy for Biological and Materials Science

SESSION CHAIRS:
Hendrix Demers, McGill University, Canada
Philippe Pinard, Oxford Instruments NanoAnalysis

PLATFORM SESSION
Tuesday 8:30 AM • Room: 121

8:30 AM  133 (INVITED) Electron Microscopy (Big and Small) Data Analysis With the Open Source Software Package HyperSpy; F de la Peña, T Ostasevicius; University of Cambridge, England; VT Fauske; Simula Research Laboratory; P Burdet; University of Cambridge, England; P Jokubauskas; University of Warsaw, Poland; M Nord; University of Glasgow, Scotland; M Sarahan; SuperSTEM, E Prestat; University of Manchester, United Kingdom, et al.

9:00 AM  134 Mapping Data with Heavily Overlapped Spectral Features; P Kikongi; Université de Sherbrooke, Canada; H Demers, R Gauvin; McGill University, Canada; R Gosselin, N Braidy; Université de Sherbrooke, Canada

9:15 AM  135 The Fluorescence Correction of Multilayer Materials for Quantitative X-ray Microanalysis; Y Yuan, H Demers, R Gauvin; McGill University, Canada

9:30 AM  136 (INVITED) Standard Bundles Simplify Standards-Base Quantification in NIST DTSA-II; NW Ritchie, MJ Mengason, DE Newbury; National Institute of Standards and Technology

A05.2  Advances in FIB Instrumentation and Applications in Materials and Biological Sciences

SESSION CHAIRS:
Keana Scott, National Institute of Standards and Technology
Nabil Bassim, McMaster University, Canada
Assel Aitkaliyeva, University of Florida

PLATFORM SESSION
Tuesday 8:30 AM • Room: 127

8:30 AM  137 (INVITED) Building with Ions in the Helium Ion Microscope; OS Ovchinnikova; Oak Ridge National Laboratory

9:00 AM  138 Nanofabrication Limits in Layered Ferroelectric Semiconductors via He-Ion Beam; H Hysmith, A Belianinov, MJ Burch, AV Levlev, V Iberi, MA Susner, MA McGuire, P Maksymovych; Oak Ridge National Laboratory, et al.
A07.1 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

SESSION CHAIR: Ping Lu, Sandia National Laboratories

PLATFORM SESSION
Tuesday 8:30 AM • Room: 261

8:30 AM 142 (INVITED) Understanding Properties of Functional Materials with Atomic-Resolved Electron Energy Loss Spectroscopy; G Botton; McMaster University, Canada; M Bugnet; University of Lyon, France; H Liu; McMaster University, Canada

9:00 AM 143 Enhanced Sensitivity of Atomic-Resolution Spectroscopic Imaging by Direct Electron Detection; DJ Baek, BH Goodge; Cornell University; D Lu; Stanford University; Y Hikita; SLAC National Accelerator Laboratory; HY Hwang; Stanford University; LF Kourkoutis; Cornell University

9:15 AM 144 The Heterogeneous Nucleation Sequence at the Interface of TiB₂ in Al Alloys; J Li; Montanuniversität Leoben, Austria; FS Hage, QM Ramasse; SuperSTEM, United Kingdom; P Schumacher; Montanuniversität Leoben, Austria

9:30 AM 145 (INVITED) Atomic-Scale Characterization of Thermoelectric Oxides Using High Spatial and Energy Resolution STEM-EELS; Q Ramasse, DM Kepaptsoglou; SuperSTEM, United Kingdom; JD Baran; University of Bath, United Kingdom; M Molinari; University of Huddersfield, United Kingdom; SC Parker; University of Bath, United Kingdom; T Mizoguchi; University of Tokyo; F Azough, R Freer; University of Manchester, United Kingdom

A10.2 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

SESSION CHAIR: Robert R. Keller, National Institute of Standards and Technology

PLATFORM SESSION
Tuesday 8:30 AM • Room: 124

8:30 AM 146 (INVITED) Investigating Stress-Assisted Grain Growth in Nanocrystalline Materials Using In Situ Transmission Kikuchi Diffraction; P Trimby; Oxford Instruments Nanoanalysis; G Sneddon, V Bhatia, JM Cairney; University of Sydney, Australia

9:00 AM 147 Dynamical Simulations of Transmission Kikuchi Diffraction (TKD) Patterns; E Pascal; University of Strathclyde, Scotland; S Singh; Carnegie Mellon University; B Hourahine, C Trager-Cowan; University of Strathclyde, Scotland; M De Graef; Carnegie Mellon University


9:30 AM 149 (INVITED) Applications of Multivariate Statistical Methods to Analysis of Electron Backscatter Diffraction and Transmission Kikuchi Diffraction Datasets; AJ Wilkinson, Y Zayachuk, DM Collins; University of Oxford, United Kingdom; R Korla; University of Oxford, United Kingdom and Indian Institute of Technology Hyderabad
A11.2  Anniversary Session: Instrumentation of Atom Probe: 50 Years and Counting

SESSION CHAIR:
David Larson, CAMECA Instruments

PLATFORM SESSION
Tuesday 8:30 AM  •  Room: 263

8:30 AM 150 (INVITED) The Pulsed-Laser Atom Probe: A Review of Its Development and Initial Applications; GL Kellogg; Retired

9:00 AM 151 (INVITED) Evolution of Atom Probe Data Collection Toward Optimized and Fully Automated Acquisition; TJ Prosa, DA Reinhard, HG Saint Cyr, I Martin, KP Rice, Y Chen, DJ Larson; CAMECA Instruments, Inc.

9:30 AM 152 (IFES STUDENT SCHOLAR) On the Multiple Event Detection in Atom Probe Tomography; Z Peng, B Gault; Max-Planck-Institut für Eisenforschung GmbH, Germany; MW Ashton; University of Florida; SB Sinnott; Pennsylvania State University; P-P Choi; Max-Planck-Institut für Eisenforschung GmbH, Germany; Y Li; Ruhr-Universität Bochum, Germany; D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany

9:45 AM 153 (M&M STUDENT SCHOLAR) Simplifying Observation of Hydrogen Trapping in Atom Probe Tomography; Y-S Chen, D Haley, PA Bagot, MP Moody; University of Oxford, United Kingdom

A16.1  In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION
Tuesday 8:30 AM  •  Room: 130

8:30 AM 154 (INVITED) Control of Radiation Chemistry During Liquid Cell TEM to Synthesize Transition Metal and Bimetallic Nanoparticles; TJ Woehl; University of Maryland

9:00 AM 155 Time Lapse Liquid Phase Scanning Transmission Electron Microscopy of Nanoparticles; N de Jonge, A Verch, J Hermannsdörfer; INM – Leibniz Institute for New Materials, Germany; KP de Jong, J Zečević; Utrecht University, Netherlands

A18.2  Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:
Julie Chouinard, University of Oregon
Paul Carpenter, Washington University in St. Louis
Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION
Tuesday 8:30 AM  •  Room: 264

8:30 AM 159 (INVITED) Micro X-ray Fluorescence: A Personal Perspective of 30 Years; GJ Havrilla; Los Alamos National Laboratory

9:00 AM 160 New Developments in Compositional Stage Mapping by EPMA and Micro-XRF; PCarpenter; Washington University in St. Louis

9:15 AM 161 Five Dimensional X-ray Imaging with the Color X-ray Camera; J Davis, J Schmidt, M Huth; PNDetector GmbH, Germany; R Hartmann; PNSensor GmbH, Germany; H Soltau; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany

9:30 AM 162 Considerations for the Acquisition of Very Large Area EDS Spectral Image Mosaics; SM Seddio; Thermo Fisher Scientific; PK Carpenter; Washington University in St. Louis

9:45 AM 163 Progress in X-ray Mapping in Electron Microscopes Toward Single-Atom Analysis; M Watanabe; Lehigh University
Scientific Program

**BIOLOGICAL SCIENCES SYMPOSIA – TUESDAY MORNING**

**B01.2 Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications**

**SESSION CHAIRS:**
Bernard Heymann, National Institutes of Health
Esther Bullitt, Boston University School of Medicine
Alasdair Steven, National Institutes of Health

**PLATFORM SESSION**
Tuesday 8:30 AM • Room: 123

8:30 AM **164** Probing the Molecular Basis for the Lateral Flexibility of Tight Junction Strands; ES Krystofok, J Zhao, A Ballesteros Morcillo; National Institute on Deafness and Other Communication Disorders; CM Van Itallie; National Heart, Lung, and Blood Institute; R Cui; National Institute on Deafness and Other Communication Disorders; JM Anderson; National Heart, Lung, and Blood Institute; C Fenollar Ferrer; National Institute of Neurological Disorders and Stroke, B Kachar; National Institute on Deafness and Other Communication Disorders

9:00 AM **165** STORM and TEM Identify the Cardiac Ephapse: An Intercalated Disk Nanodomain with Previously Unanticipated Functions in Cardiac Conduction; R Veeraraghavan, GS Hoeker; Virginia Tech Carilion Research Institute; AA Lavida; Imperial College London, England; X Wan, I Deschenes; Case Western Reserve University; J Smyth; Virginia Tech Carilion Research Institute; J Gorelik; Imperial College London, England, et al.

9:30 AM **166** Galactose Induces Formation of Chains of the Retinal Adhesion Protein, Retinoschisin; B Heymann, C Vijayasaratathy; National Institutes of Health; R Huang; Howard Hughes Medical Institute; A Dearborn, PA Sieving, AC Steven; National Institutes of Health

**PHYSICAL SCIENCES SYMPOSIA – TUESDAY MORNING**

**P01.1 Characterization of Semiconductor Materials and Devices**

**SESSION CHAIR:**
Moon J. Kim, University of Texas, Dallas

**PLATFORM SESSION**
Tuesday 8:30 AM • Room: 267

8:30 AM **173** Characterization of Semiconductor Materials Using Electron Holography; L Zhou; Ames Laboratory; Z Gan; Intel Corporation; M-G Han; Brookhaven National Laboratory; DJ Smith, MR McCartney; Arizona State University

9:00 AM **174** Observation and Analysis of an Electrically Active Layer at the Core-Shell Interface of a GaN Nanowire by Advanced Electron Microscopy; S Yazdi; Rice University; T
Kasama, JB Wagner; Technical University of Denmark; R Ciechonski; GLO-AB; RE Dunin-Borkowski; Forschungszentrum Jülich, Germany; E Ringe; Rice University

9:15 AM 175 2D Junction Profiling on Semiconductor Device Reliability Fail; Y-Y Wang, J Nxumalo, A Katnani, D Ioannou, J Brown, K Bandy, M Macdonald; Globalfoundries Inc.; J Bruley; IBM

9:30 AM 176 Investigating Ionic Transport Anisotropy in Oxygen-Deficient Lanthanum Cobaltites via STEM and First Principles Theory; AY Birenbaum; Oak Ridge National Laboratory; L Qiao; University of Manchester, United Kingdom; M Biegalski, V Cooper, A Borisevich; Oak Ridge National Laboratory

9:45 AM 177 Differential Phase-Contrast Imaging with Reduced Dynamical Diffraction Effect; A Nakamura, Y Kohno; JEOL, Ltd., Japan; H Sasaki; Furukawa Electric, Ltd.; N Shibata; The University of Tokyo, Japan

P03.2 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:
Elizabeth Dickey, North Carolina State University

PLATFORM SESSION
Tuesday 8:30 AM • Room: 274

8:30 AM 178 (INVITED) Dissecting Electronic Structure of a New Line Defect in NdTiO₃ by EELS; KA Mkhoyan; University of Minnesota

9:00 AM 179 Probing Disorder in MBE-Grown Oxide Films Using Quantitative STEM; H Kim, S Raghavan, O Shoron, S Stemmer; University of California, Santa Barbara

9:15 AM 180 Oxide Epitaxy with Large Symmetry Mismatch: Bronze-phase VOₓ on SrTiO₃; H Sims; Vanderbilt University; X Gao, S Lee, JA Nichols, TL Meyer, TZ Ward; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University, MP Chisholm; Oak Ridge National Laboratory, et al.

9:30 AM 181 (M&M STUDENT SCHOLAR) Compositional Ordering and Polar Nano-Regions: Physical Effects of Sn Alloying in SrTiO₃, Thin Films; ED Grimley; North Carolina State University; T Wang, B Jalan; University of Minnesota; JM LeBeau; North Carolina State University

9:45 AM 182 (M&M STUDENT SCHOLAR) Identification and Quantification of Boron Dopant Sites in Antiferromagnetic Cr₂O₃ Films by Electron

P04.1 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices

SESSION CHAIR:
Marta D. Rossell, Swiss Federal Laboratories for Materials Science and Technology, Switzerland

PLATFORM SESSION
Tuesday 8:30 AM • Room: 266

8:30 AM 183 (INVITED) Quantitative STEM: Comparative Studies of Composition and Optical Properties of Semiconductor Quantum Structures; A Rosenauer, FF Krause, K Müller-Caspary, E Goldmann, F Jahnke; University of Bremen, Germany; M Paul, M Jetter, P Michler; University of Stuttgart, Germany, et al.

9:00 AM 184 (INVITED) Correlative Transmission Electron Microscopy of Highly Perfect Fe₃O₄ Nanocubes; A Kovács, P Diehle; Forschungszentrum Jülich, Germany; T Maeda; Kyushu University, Japan; J Caron; Forschungszentrum Jülich, Germany; J Muro-Cruces, AG Roca; Consejo Superior de Investigaciones Científicas, Spain; J Arbiol, J Nogués; CSIC and Barcelona Institute of Science and Technology, Spain, et al.

9:30 AM 185 Observing Nanoscale Orbital Angular Momentum in Plasmon Vortices with Cathodoluminescence; J Hachtel; Oak Ridge National Laboratory; SY Cho; New Mexico State University; R Davidson; U.S. Naval Research Laboratory; M Chisholm, JC Idrobo; Oak Ridge National Laboratory; R Haglund, S Pantelides; Vanderbilt University, B Lawrie; Oak Ridge National Laboratory

9:45 AM 186 Cathodoluminescence Mapping of Defect Regions in Cadmium Sulfide Nanowires; O Cretu, C Zhang, D Golberg; National Institute for Materials Science, Japan
Scientific Program

P06.2  Nanoparticles: Synthesis, Characterization, and Applications

SESSION CHAIR: Marc-Georg Willinger, Fritz Haber Institute of the Max Planck Society, Germany

PLATFORM SESSION
Tuesday 8:30 AM • Room: 265

8:30 AM 187 (INVITED) Structural Transformations of Au and Au-Cu Nanoparticles During Liquid-Phase Synthesis and Redox Reactions in Gaseous Environment; D Alloaye, N Ahmad, H Prunier, A Chmielewski, J Nelayah, G Wang, C Ricolleau; Université Paris – CNRS, France

9:00 AM 188 From Atoms to Functional Nanomaterials; Structural Modifications as Observed Using Aberration-Corrected STEM; SI Sanchez; UOP LLC, a Honeywell Company; LF Allard; Oak Ridge National Laboratory; MT Schaal, SA Bradley, GJ Gajda; UOP LLC, a Honeywell Company

9:15 AM 189 Studies of the Hierarchical Structure in UCT Manganese Oxides; B Deljoo, T Jafari, SL Suib, MAindow; University of Connecticut

9:30 AM 190 Combustion Synthesis of Ni-SiO₂ Nanoscale Materials; KV Manukyan, S Rouvimov, AS Mukasyan; University of Connecticut

9:45 AM 191 Development of Two-Dimensional Polycrystalline Co₃O₄, Hierarchical Structures and Pt/₇Co₃O₄ Single-atom Catalysts; Y Cai; Arizona State University; Y Guo; East China University of Science and Technology; J Liu; Arizona State University

P08.2  Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS: Lori Hathon, University of Houston
Bobby Hooghan, Weatherford Laboratories

PLATFORM SESSION
Tuesday 8:30 AM • Room: 262

8:30 AM 193 (INVITED) In Situ Nanoscale Imaging and Spectroscopy of Energy Storage Materials; RR Unocic, RL Sacci, X Sang, KA Unocic, GM Veith, NJ Dudley, KL More; Oak Ridge National Laboratory

9:30 AM 194 Liquid-Cell TEM Observations of Sn Lithiation Reactions: A Temperature Case Study; S Goriparti; Sandia National Laboratories; Z Warecki; University of Maryland; KL Harrison, AJ Leenheer; Sandia National Laboratories; J Cumings; University of Maryland; KL Jungjohann; Sandia National Laboratories

9:45 AM 195 Real Time Observation of Initial Conversion Reaction of Co₃O₄ Nanoparticles Using Graphene Liquid Cell Electron Microscopy; JH Chang, JY Cheong, SJ Kim, J-W Jung, C Kim, HK Seo; Korea Advanced Institute of Science and Technology; JW Shin; Institute for Basic Science, Korea; JM Yulk; Korea Advanced Institute of Science and Technology, et al.

P07.1  Advanced Characterization of Energy-Related Materials

SESSION CHAIR: Chongmin Wang, Pacific Northwest National Laboratory

PLATFORM SESSION
Tuesday 8:30 AM • Room: 276

8:30 AM 192 (INVITED) Advancing In Situ Analytical Electron Microscopy for Probing Dynamic Nano-Scale Solid State Electrochemistry; YS Meng; University of California, San Diego

9:00 AM 196 Application of Low-Voltage FESEM and TEM to the Study of Mineral and Organic-Matter Components in Unconventional Gas Shales, With a Focus on Organic Pores Structure; PL Smith, T Zhang; University of Texas, Austin

9:00 AM 197 Cross-Modal Characterization for Quantifying Fracturing Fluid Effects on Organic-Rich Source Rocks; W Li, B Lai, F Liang; Aramco Research Center – Houston

9:15 AM 198 (M&M STUDENT SCHOLAR) An Integrated Workflow to Predict Macro-Scale Transport Properties in Gas Shales by Coupling Molecular Dynamics Simulation with Lattice Boltzmann Method; Y Ning, S He, G Qin; University of Houston

9:30 AM 199 Microstructural Analysis of the Transformation of Organic Matter During Artificial Thermal Maturation of the Upper Cretaceous Boquillas (Eagle Ford) Formation, Texas, USA; K Hooghan; Weatherford Laboratories; WK Camp; Anadarko Petroleum Corporation; W Knowles, TE Ruble; Weatherford Laboratories
9:45 AM  **200** Organic Matter Characterization in Shales: A Systematic Empirical Protocol; KN Hooghan; Weatherford Laboratories; I. Hathon, M Myers; University of Houston; ML Dixon; Weatherford Laboratories

**P10.1**  75th Anniversary Session: Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications

**SESSION CHAIRS:**
Aiden A. Martin, Lawrence Livermore National Laboratory
Nestor J. Zaluzec, Argonne National Laboratory

**PLATFORM SESSION**
Tuesday 8:30 AM  •  Room: 125

8:30 AM  **201** (INVITED) CVD Diamond Films – Synthesis, Microstructure, Applications; W Jaeger; Christian Albrechts University of Kiel, Germany

9:00 AM  **202** Graphitization of Diamond by Means of UV Laser Writing: a Transmission Electron Microscopy Study; A Taurino; National Council for Research; M Catalano; University of Texas, Dallas; M De Feudis, AP Caricato, M Martino; Universita’ del Salento, Italy; Q Wang, MJ Kim; University of Texas, Dallas

9:15 AM  **203** Formation of Dynamic Topographic Patterns During Electron Beam Induced Etching of Diamond; AA Martin; Lawrence Livermore National Laboratory; A Bah, J Bishop, I Aharonovich, M Toth; University of Technology Sydney, Australia

9:30 AM  **204** (INVITED) Nitrogen Defects in Diamond Examined by an Electron Microprobe; NC Wilson, CM MacRae, A Torpy; CSIRO, Australia; A Tomkins; Monash University, Australia

**T**  **BIOLOGICAL SCIENCES TUTORIAL** – TUESDAY MORNING

**X42.1** CryoEM with Phase Plates

**SESSION CHAIR:**
Tommi White, University of Missouri, Colombia

**PLATFORM SESSION**
Tuesday 8:30 AM  •  Room: 126

8:30 AM  **172** (INVITED) Biological Sciences Tutorial: CryoEM with Phase Plates; R Danev; Max Planck Institute of Biochemistry, Germany

**TF**  **TECHNOLOGISTS’ FORUM SESSIONS** – TUESDAY MORNING

**X30.1** Tech Forum: Cryo-Tomography of Macromolecular Complexes in Whole Cells: Lessons in Cryo-FIB Milling and Vitreous Cryo-Sectioning

**SESSION CHAIRS:**
Janice G Pennington, University of Wisconsin, Madison
Frank Macaluso, Albert Einstein College of Medicine

**PLATFORM SESSION**
Tuesday 8:30 AM  •  Room: 132

8:30 AM  **209** (INVITED) Successful Cryo-Electron Tomography of Vitreous Cryo Sections; J Pierson; Materials & Structural Analysis (formerly FEI), Thermo Fisher Scientific; PJ Peters; The Maastricht Multimodal Molecular Imaging Institute

9:00 AM  **210** (INVITED) Cryo-FIB Milling and Lift-Out for Preparation of Specimens for Cryo-TEM; MJ Zachman, JM Noble, LF Kourkoutis; Cornell University
A02.2 Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy

SESSION CHAIR: Volkan Ortalan, Purdue University

PLATFORM SESSION
Tuesday 10:30 AM • Room: 260

10:30 AM 212 Spatial Resolution Smaller Than the Pixel Size? Yes We Can!; L Strueder; PNSensor GmbH, Germany; J Davis; PNDetetor; R Hartmann, P Holl; PNSensor GmbH, Germany; S Ihle; PNDetector GmbH, Germany; D Kalok; PNSensor GmbH, Germany; H Soltau; PNDetector GmbH, Germany

10:45 AM 213 Design and Development of Coded Aperture Compressive Sensing Acquisition for High Frame Rate TEM Imaging; L Kovarik, A Stevens, A Liyu; Pacific Northwest National Laboratory; J Davidson, R Bilhorn; Direct Electron, LP; N Browning; Pacific Northwest National Laboratory

11:00 AM 214 Phase Imaging: A Compressive Sensing Approach; SG Schneider; Leibniz Institute for Solid State and Materials Research Dresden, Germany; A Stevens, ND Browning; Pacific Northwest National Laboratory; D Pohl, K Nielsch, B Rellinghaus; Leibniz Institute for Solid State and Materials Research Dresden, Germany

A04.3 Advances in Programming of Quantitative Microscopy for Biological and Materials Science

SESSION CHAIRS: Hendrix Demers, McGill University, Canada
Philippe Pinard, Oxford Instruments NanoAnalysis

PLATFORM SESSION
Tuesday 10:30 AM • Room: 121

10:30 AM 217 tomviz: Providing Advanced Electron Tomography by Streamlining Alignment, Reconstruction, and 3D Visualization; Y Jiang, E Padgett; Cornell University; MD Hanwell, C Quammen, C Harris, S Waldon; Kitware Inc; DA Muller; Cornell University, R Hvovden; University of Michigan

10:45 AM 218 Pycroscopy – An Open Source Approach to Microscopy and Microanalysis in the Age of Big Data and Open Science; S Somnath, CR Smith, S Jesse, N Laanait; Oak Ridge National Laboratory

11:00 AM 219 The ImageJ Ecosystem: An Open and Extensible Platform for Biomedical Image Analysis; CT Rueden, KW Eliceiri; University of Wisconsin, Madison

11:15 AM 220 Gesture-Based Control of Scanning Electron Microscopes Using Leap Sensors; S Cater; BT Plc; BC Breton, DM Holburn; University of Cambridge, England; NH Caldwell; University of Suffolk, England

11:30 AM 221 MIPAR™: 2D and 3D Image Analysis Software Designed by Materials Scientists, for All Scientists; JM Sosa, DE Huber, BA Welk, HL Fraser; The Ohio State University

A05.3 Advances in FIB Instrumentation and Applications in Materials and Biological Sciences

SESSION CHAIRS: Keana Scott, National Institute of Standards and Technology
Nabil Bassim, McMaster University, Canada
Assel Aitkaliyeva, University of Florida

PLATFORM SESSION
Tuesday 10:30 AM • Room: 127

10:30 AM 222 A Specific Image Processing Code in MatLab to Perform Advanced Nodularity and Nodule Count Analysis of Austempered Ductile Iron Castings; B Cetin; FNSS Defense Systems, Inc., Turkey; H Kurtuldu; Baskent University, Turkey; G Durkaya, K Davut; Atilim University, Turkey
10:30 AM 223 A Comparison of Current and Emerging Ion and Laser Beam Techniques for High Throughput Material Removal; S Subramaniam; Intel Corporation; MP Echlin; University of California, Santa Barbara; K Muthur, K Johnson; Intel Corporation

10:45 AM 224 Improvements in Characterization of FIB Prepared Surfaces of Aluminum Using Xe+ Plasma FIB; B Van Leer, R Passey; Thermo Fisher Scientific

11:00 AM 225 Comparison of Characteristics of Neon, Argon, and Krypton Ion Emissions from Gas Field Ionization Source with Single Atom Tip; H Shichi; S Matsubara, T Hashizume; Hitachi, Ltd., Japan

11:15 AM 226 (INVITED) Cold-Atom Ion Sources for Focused Ion Beam Applications; J J McClelland, WR McGehee, VP Oleshko, CL Soles; S Takeuchi; O Kirilov, D Gundlach, E Strelcov; National Institute of Standards and Technology, et al.

11:45 AM 227 HIM-SIMS: Correlative SE/Chemical Imaging at the Limits of Resolution; D Dowsett, T Wirtz, L Yedra; Luxembourg Institute of Science and Technology

A07.2 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

SESSION CHAIR: Jian-Min Zuo, University of Illinois, Urbana-Champaign

PLATFORM SESSION Tuesday 10:30 AM • Room: 261

10:30 AM 228 (INVITED) Atomic Resolution STEM-EELS Studies of Defects and Local Structural Distortions in Oxide Interfaces; G Sanchez-Santolino; University of Tokyo, Japan; MA Roldan; Universidad Complutense de Madrid, Spain; Q Qiao; Temple University; L Begon-Lours; CNRS-Thales, France; MA Frechero, JJ Salafranca; Universidad Complutense de Madrid, Spain; R Mishra; Washington University in St. Louis, C Leon; Universidad Complutense de Madrid, Spain, et al.

11:00 AM 229 (INVITED) Mapping Giant Oscillator Excitons in Semiconducting Nano Wires; MF Chisholm; Oak Ridge National Laboratory; J Ge, M Tian; The University of Tennessee; HP Wagner; University of Cincinnati; G Duscher; The University of Tennessee

11:30 AM 230 Emergence of the Collective Oscillations in Electron Energy Loss Spectra of d-Electrons in III-V Nitrides; R Dhall, JH Dycus; North Carolina State University; D Vigil-Fowler; National Renewable Energy Lab; JM Le Beau; North Carolina State University

11:45 AM 231 Plasmon Energy Mapping in Aluminum and Indium with Sub-Nanometer Resolution; B Zutter; University of California, Los Angeles; M Mecklenburg; University of Southern California; BC Regan; University of California, Los Angeles

A10.3 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

SESSION CHAIR: Shirin Kaboli, University of Nevada, Las Vegas

PLATFORM SESSION Tuesday 10:30 AM • Room: 124

10:30 AM 232 (INVITED) Comparison of Dislocation Mapping Using Electron Channeling Contrast Imaging and Cross-Correlation Electron Backscattered Diffraction; BE Dunlap; Michigan State University; TJ Rubbles; National Institute of Aerospace; DT Fullwood; Brigham Young University; MA Crimp; Michigan State University

11:00 AM 233 Collection of Selected Area Electron Channeling Patterns (SACP) on an FEI Helios NanoLab Scanning Electron Microscope; RD Kerns; University of Michigan; S Balachandran; Michigan State University; AH Hunter; University of Michigan; MA Crimp; Michigan State University

11:15 AM 234 (M&M STUDENT SCHOLAR) Automated Acquisition and Analysis of Selected Area Electron Channeling Patterns in an FEG-SEM; J Tessmer, S Singh, Y Picard, M DeGraef; Carnegie Mellon University

11:30 AM 235 Crystallographic Orientation Maps Obtained from Ion and Backscattered Electron Channeling Contrast; C Lafond, T Douillard, S Cazottes; National Institute of Applied Sciences of Lyon, France; S Dubail; Axonsquare Ltd., France; C Langlois; National Institute of Applied Sciences of Lyon, France
Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA -
TUESDAY MORNING CONTINUED

11:45 AM 236 Expanding Capabilities of Low-kV STEM Imaging and Transmission Electron Diffraction in FIB/SEM Systems; T Vystavěl, L Tůma, P Stejskal, M Unčovský, J Skalický, R Young; Thermo Fisher Scientific

A12.1 Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography

SESSION CHAIRS:
Baptiste Gault, Max-Planck Institute for Iron Research GmbH, Germany
Arun Devaraj, Pacific Northwest National Laboratory

PLATFORM SESSION
Tuesday 10:30 AM • Room: 263

10:30 AM 237 (INVITED) Correlating Irradiation-Induced Solute Clustering with Changes of Hardness in Low and High Flux Reactor Pressure Vessel Steels; JM Hyde; National Nuclear Laboratory; KB Wilford; Rolls Royce

11:00 AM 238 Exploring Artifact Signals in Atom Probe Mass Spectra; F Meisenkothen, EB Steel; National Institute of Standards and Technology

11:15 AM 239 Field Evaporation Behavior of Ternary Compound Semiconductor In$_x$Al$_{1-x}$N; B Mazumder, S Broderick; University at Buffalo; J Peralta; Universidad Andres Bello, Chili; H Foronda; JS Speck; University of California, Santa Barbara; K Rajan; University at Buffalo

11:30 AM 240 (INVITED) Recent Reconstruction Developments in IVAS; BP Geiser; CAMECA Instruments Inc; F Vurpillot; Groupe de Physique des Matériaux; Y Chen; KP Rice; CAMECA Instruments Inc; S Wright; EDAX; DA Reinhard, G Sobering, RM Ulfig; CAMECA Instruments Inc, et al.

A16.2 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Libor Kovarík, Pacific Northwest National Laboratory

PLATFORM SESSION
Tuesday 10:30 AM • Room: 130

10:30 AM 241 (INVITED) Electron Beam Effects on Liquid Specimens in (S)TEM; N Jiang; Arizona State University

11:00 AM 242 Dynamic Nanobubbles in Graphene Liquid Cell Under Electron Beam Irradiation; L Wang; Argonne National Laboratory; L Liu; Peking University; A Moshin; University of Tennessee; H Sheng, J Wen, D Miller; Argonne National Laboratory

11:15 AM 243 Stability of Silicon Dioxide in Liquid Phase TEM; MJ Meijerink, KP De Jong, J Zecèvic; Utrecht University, Netherlands

11:30 AM 244 Ionic Liquid by Hitachi Enables In Situ Imaging of Potable Water in IV-HRTEM; M Gajardziska-Josifovska, DP Robertson; University of Wisconsin, Milwaukee; JP Kilcrease; Hitachi High Technologies America

11:45 AM 245 Using STEM to Probe the In Situ Dynamics of Multimetallic Nanoparticles Grown in Polymer Nanoreactors; JS Du, P-C Chen, VP Dravid, CA Mirkin; Northwestern University

A18.3 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:
Julie Chouinard, University of Oregon; Paul Carpenter, Washington University in St. Louis

PLATFORM SESSION
Tuesday 10:30 AM • Room: 264

10:30 AM 246 Historical Development of the CAMECA EPMA; C Henderson, A-S Robbes, MP Moret; CAMECA; D Larson; CAMECA Inc.; K Baxter; AMETEK do Brasil, Ltda.

11:00 AM 247 History of JEOL Microbeam Analysis: High Accuracy Analyses for Scientific and Industrial Work from the Centimeter to Nanometer Scale; H Takahashi, H Yamada, S Notoya, M Takakura, T Murano; JEOL, Ltd. Japan; R Robertson, P McSwiggen; JEOL USA, Inc.

11:45 AM 248 EDAX – More Than 50 Years of Influence on Microanalysis; PP Camus, T Nylese; EDAX Inc.

11:15 AM 249 50 Years of Microanalysis: A Little History of Who’s Who, A Perspective from Bruker; T Juzwak; Bruker Nano Analytics

11:30 AM 250 The Magic That Turns a Tiny Cloud of Electrons Into An X-ray Spectrum; RB Mott; PulseTor LLC
11:45 AM 251 SEM/EDS Trace Analysis: Limits Imposed by Fluorescence of the Detector; DE Newbury, NW Ritchie, M Mengason, K Scott; National Institute of Standards and Technology

BIOLOGICAL SCIENCES SYMPOSIA - TUESDAY MORNING CONTINUED

B06.1 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells

SESSION CHAIRS:
Deborah Kelly, Virginia Tech
Elizabeth Wright, Emory University

PLATFORM SESSION
Tuesday 10:30 AM • Room: 120

10:30 AM 252 3D Reconstruction of Zucchini- and Tobacco Yellow Mosaic Virus Induced Ultrastructural Changes in Plants; B Zechmann; Baylor University; G Zellnig; University of Graz, Austria

10:45 AM 253 (M&M STUDENT SCHOLAR) Cryo-Electron Tomography Analysis of Infectious Extracellular Vesicles from a Non-Enveloped RNA Virus; JE Yang, ED Rossignol, E Bullitt; Boston University School of Medicine

11:00 AM 254 (INVITED) Primary Envelopment of the Herpes Simplex 1 Virion; WW Newcomb; NIAMS-National Institutes of Health; J Fontana; University of Leeds England; DC Winkler, JB Heymann, N Cheng, AC Steven; NIAMS-National Institutes of Health

11:30 AM 255 Flexible Fitting and Refinement of Atomic Structures Using the Coarse-Grained DDFF Force Field Tailored to 5-10Å Resolution Cryo-TEM Maps; J Kovacs; Old Dominion University; VE Galkin; Eastern Virginia Medical School; W Wriggers; Old Dominion University

11:45 AM 256 The Near-to-Native-State Architecture of Measles Virus Assembly Sites and Isolated Measles Virus Particles; ER Wright, JD Strauss; Emory University; Z Ke; Georgia Institute of Technology; CM Hampton, F Leon; Emory University; M Brindley; The University of Georgia; RK Plemper; Georgia State University

P01.2 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:
Michael Gribelyuk, GlobalFoundries Inc.

PLATFORM SESSION
Tuesday 10:30 AM • Room: 267

10:30 AM 261 (INVITED) The Measurement of Strain, Chemistry and Electric Fields by STEM-based Techniques; J-L Rouviere, B Haas, E Robin, D Cooper, N Bernier; University Grenoble Alpes, France; M Williamson; Thermo Fisher Scientific

11:00 AM 262 Methodology to Improve Strain Measurement in III-V Semiconductors Materials; M Vatanparast, PE Vullum; Norwegian University of Technology and Science; M Nord; University of Glasgow, Scotland; TW Reenaas, R Holmestad; Norwegian University of Technology and Science - NTNU

Scientific Program

B07.2 Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems

SESSION CHAIR:
Matthew Joens, Washington University in St. Louis

PLATFORM SESSION
Tuesday 10:30 AM • Room: 122

10:30 AM 257 (INVITED) Correlative Light and Electron Imaging of Cell-Cell Interactions Within the Islet of Langerhans; DW Piston, J Hughes, A Ustione; Washington University in St. Louis

11:00 AM 258 (INVITED) Correlative Fluorescence and Electron Microscopy in 3D; J Franks, C Wallace; University of Pittsburgh; M Shibata; JEOL, USA Inc.; M Suga; JEOL, Ltd., Japan; N Erdman; JEOL, USA Inc.; S Watkins; University of Pittsburgh

11:30 AM 260 Development of Two Different Types of Correlative Light and Electron Microscope for Real-Time Imaging and Quick Loading of Sample; I-Y Park, M Bae, Y Haam; Korea Research Institute of Standards and Science
Scientific Program

**P03.3 Advanced Microscopy and Microanalysis of Complex Oxides**

**SESSION CHAIR:**
Xiaoqing Pan, University of California, Irvine

**PLATFORM SESSION**
Tuesday 10:30 AM • Room: 274

10:30 AM 266 (INVITED) Interfacial Coupling and Polarization of Perovskite ABO, Heterostructures; Y Zhu; Brookhaven National Laboratory

11:00 AM 267 ELNES Spectrum Unmixing and Mapping for Oxide/Oxide Interfaces; S Lu; Arizona State University; K Kormondy, T Ngo, E Ortman; University of Texas, Austin; T Aoki; Arizona State University; A Posadas, J Ekerdt, A Demkov; University of Texas, Austin, et al.

11:15 AM 268 Identifying Novel Polar Distortion Modes in Engineered Magnetic Oxide Superlattices; S GHosh; Vanderbilt University; A Choquette, S May; Drexel University; M Oxley, A Lupini; Oak Ridge National Laboratory; S Pantelides; Vanderbilt University; A Borisievc; Oak Ridge National Laboratory

11:30 AM 269 (INVITED) High Resolution Studies of Oxide Multiferroic Interfaces in the Aberration-Corrected STEM; J Grandal, JI Beltran; Universidad Complutense de Madrid, Spain; G Sanchez-Santolino; University of Tokyo, Japan; F Gallego, J Tornos; Instituto de Ciencia de Materiales de Madrid – CSIC, Spain; M Cabero, C Leon; Universidad Complutense de Madrid, Spain, F Mompean; Instituto de Ciencia de Materiales de Madrid - CSIC, Spain, et al.
National Laboratory; F Ding; Hong Kong Polytechnic University; R Schloegl, MG Willinger; Fritz Haber Institute of the Max Planck Institute, Germany

11:00 AM 276 Organic Surface Modification and Analysis of Titania Nanoparticles for Self-Assembly in Multiple Layers; S Rades; BAM Federal Institute for Materials Research and Testing, Germany; P Borghetti; Sorbonne Universités, France; E Ortel, T Wirth; BAM Federal Institute for Materials Research and Testing, Germany; S García, E Gómez, M Blanco; IK4-Tekniker, Spain, G Alberto; University of Turino, Italy, et al.

11:15 AM 277 Understanding the Self-Assembly of a Janus-Type POM–POSS Co-Cluster from Low-Dose Cryo STEM; C Kuebel; Karlsruhe Institute of Technology, Germany; C Ma, H Wu, M-B Hu, H-K Liu, W Wang; Nankai University, China

11:30 AM 278 Wet-Chemical Synthesis of Electrochromic WO$_3$ and W$_x$Mo$_{1-x}$O$_3$ Nanomaterials with Phase and Morphology Control; S Tripathi, K Ghosh; Indian Institute of Science; A Roy; Kyushu University, Japan; AK Singh, N Ravishankar; Indian Institute of Science

11:45 AM 279 Gold Nanoparticle Photoaffinity Labels for Electron Microscopy.; VN Joshi; Nanoprobes, Incorporated; M England; Suffolk Community College; D Mitra, FR Furuya, L Kuznetsova, R Ismail, JF Hainfeld, RD Powell; Nanoprobes, Incorporated

P07.2 Advanced Characterization of Energy-Related Materials

SESSION CHAIR: Katie Jungjohann, Sandia National Laboratories

PLATFORM SESSION Tuesday 10:30 AM • Room: 276

10:30 AM 280 (INVITED) Imaging Electrochemical Processes in Li Batteries by Operando STEM; ND Browning, L Mehdì, A Stevens, W Xu, WA Henderson, J-G Zhang, K Mueller, H Mehta; Pacific Northwest National Laboratory, et al.

11:00 AM 281 Mo$_x$S$_y$ Composite Cathodes for Long Cycle Life High Performance Li-S Batteries Studied by FESEM and High-Resolution AEM; VP Oleshko; National Institute of Standards and Technology; PT Dirlam, AG Simmonds, TS Kleine; University of Arizona; CL Soles; National Institute of Standards and Technology; J Pyun; University of Arizona

11:15 AM 282 Towards Understanding Ionic Transport Mechanisms of Sodium in Graphitic Materials by In Situ TEM; K He; Northwestern University

11:30 AM 283 Operando Injection of Oxygen Ions to Organometal Halide Perovskite (CH$_3$NH$_3$PbI$_3$) Under In Situ Electrical Biasing STEM-EELS; HJ Jung; Northwestern University; D Kim; Korea Advanced Institute of Science and Technology; S Kim; Northwestern University; B Shin; Korea Advanced Institute of Science and Technology; VP Dravid; Northwestern University

11:45 AM 284 Complementary Methodical Approach for the Analysis of a Perovskite Solar Cell Layered System; S Rades; BAM Federal Institute for Materials Research and Testing, Germany; F Oswald, S Narbey; Solaronix SA , Switzerland; J Radnik, V-D Hodoroaba; BAM Federal Institute for Materials Research and Testing, Germany

P08.3 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIR: Bradley De Gregorio, U.S. Naval Research Laboratory

PLATFORM SESSION Tuesday 10:30 AM • Room: 262


11:00 AM 286 Identification of Rare Polytypes of Presolar SiC with Coordinated TEM, Raman Spectroscopy, and NanoSIMS Measurements; RM Stroud; U.S. Naval Research Laboratory; N Liu; Carnegie Institution of Washington; A Steele, CM Alexander, LR Nittler; Carnegie Institution of Washington

11:15 AM 287 Coordinated X-ray, Ion, and Electron Microanalysis Approach Towards Understanding the Earliest-Formed Solids in the Solar System; P Mane; University of Arizona; S Wallace; EDAX, Ametek; M Bose; Arizona State University; K Domanik, T Zega; University of Arizona; M Wadhwa; Arizona State University
Tuesday, August 8

**PHYSICAL SCIENCES SYMPOSIA**

**TUESDAY MORNING CONTINUED**

11:30 AM 288 (MSA POSTDOCTORAL SCHOLAR) Transmission Electron Microscopy Studies of Carbonaceous Chondrites Which Experienced Experimentally Simulated Space Weathering Effects; MS Thompson, LP Keller, R Christoffersen; NASA Johnson Space Center; MJ Loeffler; NASA Goddard Space Flight Center; RV Morris, TG Graff, Z Rahman; NASA Johnson Space Center

11:45 AM 289 Alteration of Helium-Filled Bubbles and Space Weathered Material During Heating in the TEM; KD Burgess, RM Stroud; U.S. Naval Research Laboratory

**P10.2 75th Anniversary Session:** Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications

*SESSION CHAIRS:*
Aiden A. Martin, Lawrence Livermore National Laboratory
Nestor J. Zaluzec, Argonne National Laboratory

**PLATFORM SESSION**

**Tuesday 10:30 AM • Room: 125**

10:30 AM 290 (INVITED) TEM Study of Amorphous Carbon with Fully sp3-Bonded Structure; J Wen; Argonne National Laboratory; Z Zeng; Center for High Pressure Science and Technology Advanced Research; L Yang; Carnegie Institution of Washington; Q Zeng; Center for High Pressure Science and Technology Advanced Research, China; DJ Miller; Argonne National Laboratory; W Yang, H-K Mao; Carnegie Institution of Washington

11:00 AM 291 Atomic and Electronic Structures of Functionalized Nanodiamond Particles; SL Chang, C Dwyer, K March; Arizona State University; M Mermoux; Universite Grenoble Alps, France; N Nunn, O Shenderova; International Technology Center; E Osawa; NanoCarbon Research Institute, Japan, AS Barnard; CSIRO, Australia

11:15 AM 292 Polycrystalline Diamond Films Produced by Hot-Filament Chemical Vapor Deposition; MJ Arellano-Jimenez; The University of Texas, San Antonio; J Alcantar-Pena; Universidad de Sonora, Mexico; E Ortega Aguilar, M Jose Yacaman; The University of Texas, San Antonio; O Auciello; University of Texas, Dallas

11:30 AM 293 (INVITED) EELS Studies on Nanodiamonds and Amorphous Diamond-like Carbon Materials; R Arenal; Universidad de Zaragoza, Spain

X32.1 Tech Forum: Light Sheet Microscopy

*SESSION CHAIR:*
Caroline A Miller, Indiana University/Purdue University Indianapolis

**PLATFORM SESSION**

**Tuesday 10:30 AM • Room: 132**

10:30 AM 294 (INVITED) Optimized Live Volumetric Imaging with Light Sheet Microscopy and Related Strategies; TV Truong; University of Southern California

11:15 AM 295 (INVITED) diSPIM Allows Three-Dimensional Characterization of Calcium Activity in Intact Islets of Langerhans; Z Lavagnino, DW Piston; Washington University in St. Louis

**MSA Distinguished Scientist Awardee Lectures**

12:15 - 1:15 PM • Room 123

Lunch served to first 100 participants

**DISTINGUISHED SCIENTIST - PHYSICAL**

Nestor J. Zaluzec,
Argonne National Laboratory

Make Every Electron Count

**DISTINGUISHED SCIENTIST - BIOLOGICAL**

David W. Piston,
Washington University in St. Louis

The Quest to Measure Transient Biomolecular Interactions in vivo
**A02.3  Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy**

**SESSION CHAIR:** Andrew Stevens, Pacific Northwest National Laboratory

**PLATFORM SESSION**

**Tuesday 1:30 PM  •  Room: 260**

1:30 PM 296 **An Information Theoretic Approach for Creating 3D Spatial Images from 4D Time Series Data;** W Wriggers, J Kovacs, F Castellani, PT Vernier, DJ Krusienski; Old Dominion University

1:45 PM 297 **Computer Vision Techniques Applied to the Reconstruction of the 3D Structure of Dislocations;** E Oveisi, S de Zanet, P Fua, C Hébert; École Polytechnique Fédérale de Lausanne, Switzerland

2:00 PM 298 **A Framework to Learn Physics from Atomically Resolved Images;** L Vlcek; Oak Ridge National Laboratory; AB Maksov; University of Tennessee; M Pan; Huazhong University of Science and Technology; China; S Jesse, SV Kalinin, RK Vasudevan; Oak Ridge National Laboratory

2:15 PM 299 **Denoising Electron-Energy Loss Data Using Non-Local Means Filters;** N Mevenkamp, B Berkels; RWTH Aachen University, Germany; M Duchamp; Nanyang Technological University, Singapore

2:30 PM 300 **Compressive Classification for TEM-EELS;** W Hao, A Stevens; Pacific Northwest National Laboratory; H Yang; Lawrence Berkeley National Laboratory; M Gehm; Duke University; ND Browning; Pacific Northwest National Laboratory


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**A05.4  Advances in FIB Instrumentation and Applications in Materials and Biological Sciences**

**SESSION CHAIRS:**
Keana Scott, National Institute of Standards and Technology
Nabil Bassim, McMaster University, Canada
Assel Aitkaliyeva, University of Florida

**PLATFORM SESSION**

**Tuesday 1:30 PM  •  Room: 127**

1:30 PM 302 *(INVITED)* **Sample Preparation for Nano-Mechanical Testing on Radioactive Materials;** P Hosemann, D Frazer, A Reichardt, H Vo, C Howard; University of California, Berkeley

2:00 PM 303 **Novel Setup for High-Performance Simultaneous 3D EBSD and 3D EDS Acquisition;** R Váňa, J Dluhoš, L Hladík; TESCAN Brno, s.r.o., Česká republika; J Lindsay, J Goulden; Oxford Instruments

2:15 PM 304 **Developments in Large Volume 3D Analysis via P-FIB: EBSD & EDS;** J Lindsay; Oxford Instruments NanoAnalysis; T Burnett; University of Manchester, United Kingdom; J Goulden; Oxford Instruments NanoAnalysis; P Frankel, A Garner; University of Manchester, United Kingdom; B Winiarski; Thermo Fisher Scientific (Formerly FEI); PJ Withers; University of Manchester, United Kingdom

2:30 PM 305 **Automated 3D Block Preparation Procedure for Focused Ion Beam 3D analyses;** XL Zhong, PJ Withers, X Zhang, SB Lyon, TL Burnett, X Zhou, MG Burke; University of Manchester, United Kingdom

2:45 PM 306 **A Comparison of Ga FIB and Xe-Plasma FIB of Complex Al Alloys;** A Ernst, M Wei, M Aindow; University of Connecticut
ANALYTICAL SCIENCES SYMPOSIA – TUESDAY AFTERNOON CONTINUED

A06.1 Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy

SESSION CHAIR: Nikhil Chawla, Arizona State University

PLATFORM SESSION
Tuesday 1:30 PM • Room: 121

1:30 PM 307 Secondary Ion Mass Spectrometry in the TEM: Isotope Specific High-Resolution Correlative Imaging; L Yedra, S Eswara, D Dowsett, QH Hoang, T Wirtz; Advanced Instrumentation for Ion Nano-Analytics, Luxembourg Institute of Science and Technology

1:45 PM 308 Application of Serial Sectioning Microscopy to Additively Manufactured Metallic Samples; M Chapman, JM Scott; UES Inc.; E Schwalbach, M Groeber, S Donegan, M Uchic; U.S. Air Force Research Laboratory

2:00 PM 309 (INVITED) Solidification in 4D: From Dendrites to Eutectics; Y Sun; Northwestern University; A Shahani; University of Michigan; J Gibbs; Los Alamos National Laboratory; A Cecen, S Kalidindi; Georgia Institute of Technology; X Xiao; Argonne National Laboratory

2:30 PM 310 3D Imaging of Titanium Alloys Multi-Layered Structures (MLS) Via X-ray Microscopy; S Prikhodko; University of California, Los Angeles; M Norouzi Rad; Carl Zeiss Microscopy LLC; P Markovsky, D Savvakin; G.V. Kurdymov Institute for Metal Physics, Ukraine; N Julian; University of California, Los Angeles; O Ivasishin; G.V. Kurdymov Institute for Metal Physics, Ukraine

2:45 PM 311 Multimodal 3D Time-Lapse Studies of Corrosion Pitting and Corrosion-Fatigue Behavior in 7475 Aluminum Alloys; TJ Stannard; Arizona State University; H Bale; Carl Zeiss X-ray Microscopy; T Chengattu, S Ninerty, J Williams; Arizona State University; X Xiao; Argonne National Laboratory; A Merkle; Carl Zeiss X-ray Microscopy; E Lauridsen; Xnovo Technology ApS, Denmark, et al.

A07.3 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

SESSION CHAIR: Ping Lu, Sandia National Laboratories

PLATFORM SESSION
Tuesday 1:30 PM • Room: 261

1:30 PM 312 (INVITED) Fundamental Limit to Single-Atom Analysis by STEM-EDX Spectroscopy; M Watanabe; Lehigh University; RF Egerton; University of Alberta, Canada

2:00 PM 313 (INVITED) Atomistic Understanding of Structural Evolution in AlNiCo Alloys Using Advanced AC-STEM; L Zhou, W Tang; Ames Laboratory; P Lu; Sandia National Laboratories; I Anderson, M Kramer; Ames Laboratory

2:30 PM 314 (MSA POSTDOCTORAL SCHOLAR) Mapping the Chemistry Within, and the Strain Around, Al-Alloy Precipitates at Atomic Resolution by Multi-Frame Scanning Transmission Electron Microscopy; L Jones; University of Oxford, United Kingdom; S Wenner, M Nord, PH Ninive; Norwegian University of Science and Technology; OM Løvvik, C Marioara; SINTEF, Norway; R Holmestad; Norwegian University of Science and Technology; P Nellist; University of Oxford, United Kingdom

A10.4 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

SESSION CHAIR: Shirin Kaboli, University of Nevada, Las Vegas

PLATFORM SESSION
Tuesday 1:30 PM • Room: 124

1:30 PM 316 (INVITED) Challenges Associated with Transmission Experiments in the SEM; JR Michael; Sandia National Laboratories
Scientific Program

Tuesday, August 8

A12.2 Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography

SESSION CHAIRS:
David Larson, CAMECA Instruments
Jonathan Hyde, National Nuclear Laboratory
Baishakhi Mazumder, University at Buffalo

PLATFORM SESSION
Tuesday 1:30 PM • Room: 263

1:30 PM 319 (INVITED) Reconstructing APT Datasets: Challenging the Limits of the Possible; F Vurpillot, D Zanuttini, S Parviainen; Normandie University, France; B Mazumder; University at Buffalo; N Rolland; Normandie University, France; JS Speck; University of California, Santa Barbara; C Hatzoglou; Normandie University, France

2:00 PM 320 (IFES STUDENT SCHOLAR) High Fidelity Reconstruction of Experimental Field Ion Microscopy Data by Atomic Relaxation Simulations; S Katnagallu, A Nematollahi; Max-Planck-Institut für Eisenforschung GmbH, Germany; M Dagan, M Moody; University of Oxford, United Kingdom; B Grabowski, B Gault, D Raabe, J Neugebauer; Max-Planck-Institut für Eisenforschung GmbH, Germany

2:15 PM 321 Atomistic Simulations of Surface Effects Under High Electric Fields; S Parviainen; Université et INSA de Rouen, France; M Dagan; University of Oxford, United Kingdom; S Katnagallu, B Gault; Max-Planck-Institut für Eisenforschung, Germany; M Moody; University of Oxford, United Kingdom; F Vurpillot; Université et INSA de Rouen, France

2:30 PM 322 Coupling Molecular Dynamics and Finite Element Simulations to Investigate the Nearest Neighbor Dependence of Field Evaporation; T Withrow, C Oberdorfer; The Ohio State University; E Marquis; University of Michigan; W Windl; The Ohio State University

2:45 PM 323 Atomic Level Studies of Step Dynamics in Homogeneous Crystal Growth; MA Koppa, DH Dunlap, PR Schwoebel; University of New Mexico

A16.3 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION
Tuesday 1:30 PM • Room: 130

1:30 PM 324 (INVITED) Understanding Reaction Mechanisms in Electrochemistry and Corrosion: Liquid-Cell S/TEM; K Jungjohann, S Goriparti, C Chisholm, B Mook, K Harrison, A Leenheer, K Zavadil; Sandia National Laboratories

2:00 PM 325 Investigating Local Corrosion Processes in Real and Diffraction Space by In Situ TEM Liquid Cell Experiments; J Key, S Zhu; Georgia Institute of Technology; CM Rouleau, RR Unocic; Oak Ridge National Laboratory; Y Xie, J Kacher; Georgia Institute of Technology

2:15 PM 326 Driving Liquid Chemistry with In Situ STEM in Monolayer Window Encapsulated Liquid Cells; JR Jokisaari, A Mukherjee, X Hu, R Klie; University of Illinois, Chicago

2:30 PM 327 SEM and Auger Electron Spectroscopy of Liquid Water through Graphene Membrane; H Guo, A Yulaev, E Strelcov, A Kolmakov; National Institute of Standards and Technology

2:45 PM 328 In Situ Imaging and Spectroscopy of Particles in Liquid; X-Y Yu, B Arey; Pacific Northwest National Laboratory
A17.1 Biological Soft X-ray Tomography

SESSION CHAIRS:
Carolyn Larabell, University of California, San Francisco
Kenneth Fahy, SiriusXT, Ireland

PLATFORM SESSION
Tuesday 1:30 PM • Room: 122

1:30 PM 329 (INVITED) The National Center for X-ray Tomography: Status Update; G McDermott, R Boudreaux, J-H Chen, A Ekman, MA Le Gros, TE Plautz, CA Larabell; University of California, San Francisco

2:00 PM 330 (INVITED) Cryo Soft X-ray Tomography and Other Techniques at Diamond Light Source; MC Darrow, M Harkiolaki, MC Spink, I Luengo, M Basham, EM Duke; Diamond Light Source, United Kingdom

2:15 PM 331 (INVITED) Correlation of Soft X-ray Tomography with Fluorescence Microscopy in Biological Study; L-J Lai, Z-J Lin, C-C Hsieh, Y-J Su, D-J Wang, S-Y Chiang, G-C Yin; National Synchrotron Radiation Research Center, Taiwan

A18.4 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:
Paul Carpenter, Washington University in St. Louis
Heather Lowers, U.S. Geological Survey
Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION
Tuesday 1:30 PM • Room: 264

1:30 PM 333 (INVITED) Advances in Atomic-Resolution and Molecular-Detection EELS; OL Krivanek, N Deldby, TC Lovejoy; Nion; RF Egerton; University of Alberta, Canada; P Rez; Arizona State University

2:00 PM 334 (INVITED) Quantitative Aspects of 3D Chemical Tomography in the Scanning Transmission Electron Microscope; AA Herzing; National Institute of Standards and Technology

2:30 PM 335 (INVITED) The Many Connections Between Atom Probe and Electron Microscopy; TF Kelly; Cameca Instruments, Inc.

B06.2 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells

SESSION CHAIRS:
Elizabeth Wright, Emory University
Teresa Ruiz, University of Vermont

PLATFORM SESSION
Tuesday 1:30 PM • Room: 120

1:30 PM 336 (INVITED) Staphylococcus aureus Pathogenicity Islands: Hijackers on the Bacteriophage Assembly Pathway; T Dokland, JL Kizziah; University of Alabama, Birmingham; AD Dearborn; National Institute for Arthritis and Musculoskeletal and Skin Diseases; KA Manning; University of Alabama, Birmingham; EA Wall, L Klenow, LK Parker, GE Christie; Virginia Commonwealth University

2:00 PM 337 Deformation of the S. aureus Cell Envelope Due to Surface Adhesion; J Gu, T Chou, M Libera; Stevens Institute of Technology

2:15 PM 338 Exploring Cellular Morphology of Thermoplasma Acidophilum by Cryo-Electron Tomography with Volta Phase Plate; Y Fukuda, F Beck, I Nagy, R Danev, W Baumeister; Max Planck Institute of Biochemistry, Germany

2:30 PM 339 (INVITED) The Use of Cryotomography to Study the Complex Morphological Remodeling of Membranes in Bacteria; E Tocheva; Universite de Montreal, Canada

B08.1 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals

SESSION CHAIRS:
Gang (Greg) Ning, Pennsylvania State University
Ruching Hsia, University of Maryland

PLATFORM SESSION
Tuesday 1:30 PM • Room: 123

1:30 PM 340 Graphene Enclosure Facilitates Single-Molecule Analysis of ErbB Receptors in Intact, Hydrated Eukaryotic Cells by Electron Microscopy; IN Dahmke, A Verch; INM – Leibniz Institute for New Materials, Germany; R Weatherup; Lawrence Berkeley National Laboratory;
**PHYSICAL SCIENCES SYMPOSIA – TUESDAY AFTERNOON**

**P01.3** Characterization of Semiconductor Materials and Devices

**SESSION CHAIR:**
Jayhoon Chung, Texas Instruments Inc.

**PLATFORM SESSION**
Tuesday 1:30 PM • Room: 267

1:30 PM 346 (INVITED) Electrostatic Potential Mapping by Secondary-Electron Voltage-Contrast and Electron-Beam-Induced-Current in TEM; M-G Han; Brookhaven National Laboratory; JA Garlow; Stony Brook University; Y Zhu; Brookhaven National Laboratory

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**P03.4** Advanced Microscopy and Microanalysis of Complex Oxides

**SESSION CHAIR:**
Jiyan Dai, The Hong Kong Polytechnic University

**PLATFORM SESSION**
Tuesday 1:30 PM • Room: 274

1:30 PM 351 (INVITED) Interface and Surface Local Atomic Structures of Lithium Ion Battery Oxides; Y Ikuhara; University of Tokyo, Japan

2:00 PM 352 (MSA POSTDOCTORAL SCHOLAR) Utilizing High-Temperature Atomic-Resolution STEM and EELS to Determine Reconstructed Surface Structure of Complex Oxide; W Xu, PC Bowes, ED Grimley, DL Irving, JM LeBeau; North Carolina State University
**Scientific Program**

**PHYSICAL SCIENCES SYMPOSIA - TUESDAY AFTERNOON CONTINUED**

2:15 PM  **353**  (M&M STUDENT SCHOLAR)  Aberration-Corrected STEM Imaging and EELS Mapping of BaTiO$_3$/SrTiO$_3$ Interfacial Defects; H Wu, S Lu; Arizona State University; P Ponath; University of Texas, Austin; T Aoki; Arizona State University; JG Ekerdt, AA Demkov; University of Texas, Austin; MR McCartney, DJ Smith; Arizona State University

2:30 PM  **354**  Combined EELS and XAS Analysis of the Relationship Between Depth Dependence and Valence in LSMO Thin Films; J Fitch; North Carolina State University; R Trappen, C-Y Huang, J Zhou, G Cabrera; West Virginia University; S Dong; Southeast University; S Kumari, MB Holcomb; West Virginia University, et al.

2:45 PM  **355**  Probing Electronic Structure of BaSnO$_3$ by EELS Analysis and Ab Initio Calculations; H Yun, M Topsakal, A Prakash, C Leighton, B Jalan, R Wentzcovitch, KA Mkhoyan, JS Jeong; University of Minnesota

**P04.3 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices**

**SESSION CHAIR:**
Valeria Nicolosi, Trinity College Dublin, Ireland

**PLATFORM SESSION**
Tuesday 1:30 PM • Room: 266

1:30 PM  **356**  (INVITED) Correlating the Structure and Composition of 2D Materials with Their Catalytic Activity; M Bar-Sadan, OE Meiron, V Kuraganti; Ben-Gurion University of the Negev, Israel; L Houben; Weizmann Institute of Science, Israel

2:00 PM  **357**  Nanoscale Strain Tomography by Scanning Precession Electron Diffraction; DN Johnstone; University of Cambridge, England; AT van Helvoort; Norwegian University of Science & Technology, Norway; PA Midgley; University of Cambridge, England

2:15 PM  **358**  Picometer-Precision Strain Mapping of Two-Dimensional Heterostructures

Using an Electron Microscope Pixel Array Detector (EMPAD); Y Han; Cornell University; S Xie; Chicago University; K Nguyen, M Cao, MW Tate, P Purohit, SM Gruner; Cornell University, J Park; Chicago University, et al.

2:30 PM  **359**  (INVITED) Understanding 2D Crystal Vertical Heterostructures at the Atomic Scale Using Advanced Scanning Transmission Electron Microscopy; S Haigh, AP Rooney, TJ Slater, E Prestat, E Khestanova, R Dryfe, M Velicky, RV Gorbachev; University of Manchester, United Kingdom, et al.

**P06.4 Nanoparticles: Synthesis, Characterization, and Applications**

**SESSION CHAIR:**
Thomas W. Hansen, Technical University of Denmark

**PLATFORM SESSION**
Tuesday 1:30 PM • Room: 265

1:30 PM  **360**  (INVITED) From High-Precision Imaging to High-Performance Computing: Leveraging ADF-STEM Atom-Counting and DFT for Catalyst Nano-Metrology; L Jones; University of Oxford, United Kingdom; J Aarons; University of Southampton, United Kingdom; A Varambhia; University of Oxford, United Kingdom; K MacArthur; Research Center Jülich GmbH, Germany; D Ozkaya, M Sarwar; Johnson Matthey Technology Centre, United Kingdom; C-K Skylaris; University of Southampton, United Kingdom, P Nellist; University of Oxford, United Kingdom

2:00 PM  **361**  High-Throughput Quantitative STEM Mass Measurement in Statistically Robust Populations of Supported Metal Nanoparticles; SD House; University of Pittsburgh; Y Chen, R Jin; Carnegie Mellon University; JC Yang; University of Pittsburgh

2:15 PM  **362**  Epitaxial Quantum Dot Superlattices: From Synthesis to Characterization to Electronic Structure; BH Savitzky; Cornell University; R Howden; University of Michigan; K Whitham, T Hanrath, LF Kourkoutis; Cornell University
2:30 PM 363 Atomic Electron Tomography: Probing 3D Structure and Material Properties at the Single-Atom Level; Y Yang; University of California, Los Angeles; C-C Chen; National Sun Yat-sen University, Taiwan; MC Scott; University of California, Berkeley; C Ophus; Lawrence Berkeley National Laboratory; R Xu, A Pryor Jr., L Wu; University of California, Los Angeles, F Sun; University at Buffalo, et al.

2:45 PM 364 (M&M STUDENT SCHOLAR) Quantitative STEM of Catalyst Nanoparticles Using ADF Imaging with Simultaneous EDS and EELS Spectroscopy; AM Varambhia, L Jones; University of Oxford, United Kingdom; D Ozkaya; Johnson Matthey; S Lozano-Perez, P Nellist; University of Oxford, United Kingdom

P07.3 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:
Judith Yang, University of Pittsburgh

PLATFORM SESSION
Tuesday 1:30 PM • Room: 276

1:30 PM 365 (INVITED) Liquid Cell TEM Observation of Platinum-Based Alloy Nanoparticle Growth; L Zheng, W-I Liang, K Bustillo, H Zheng; Lawrence Berkeley National Laboratory

2:00 PM 366 In Situ Optical Microscopy of the Electrochemical Intercalation of Lithium into Single Crystal Graphite; JJ Lodico, M Woodall, HL Chan, WA Hubbard, BC Regan; University of California, Los Angeles

2:15 PM 367 EELS Probing of Lithium Based 2D Battery Compounds Processed by Liquid Phase Exfoliation; J Coelho, E Mcguire, C Downing, P Casey, S Park, C McGuinness, V Nicolosi; Trinity College Dublin, Ireland

2:30 PM 368 (M&M STUDENT SCHOLAR) Early Growth Stages of Directly Synthesized Large-Area Zeolite Nanosheets; P Kumar, M-Y Jeon, M Tsapatsis, A Mkhouyan; University of Minnesota, Twin Cities

2:45 PM 369 In Situ Observation of Structural Change in Single-Crystalline LiFePO4 Nanoflakes During Electrochemical Cycling; S Kim, VP Dravid, K He; Northwestern University

P08.4 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:
Bradley De Gregorio, U.S. Naval Research Laboratory
Kultaran Singh (Bobby) Hooghan, Weatherford Laboratories

PLATFORM SESSION
Tuesday 1:30 PM • Room: 262

1:30 PM 370 (INVITED) Curiosity Rover Mars Hand Lens Imager (MAHLI) Views of the Sediments and Sedimentary Rocks of Gale Crater, Mars; KS Edgett; Malin Space Science Systems; RA Yingst, ME Minitti; Planetary Science Institute; MR Kennedy, GM Krezoski, DM Fey; Malin Space Science Systems; S Le Mouélic; Université de Nantes, France; SK Rowland; University of Hawaii, et al.

2:00 PM 371 Using Combined TEM, Raman, XRD, and VNIR Techniques to Investigate Secondary Phase Formation and Textural Relationships in Brine + Jarosite Experiments; KM Miller, CM Phillips-Lander, GW Strout; University of Oklahoma; JL Bishop; SETI and NASA Ames Research Center; AS Elwood Madden, ME Elwood Madden; University of Oklahoma

2:15 PM 372 Quantitative Relief Models of Rock Surfaces on Mars at Sub-Millimeter Scales from Mars Curiosity Rover Mars Hand Lens Imager (MAHLI) Observations: Geologic Implications; JB Garvin; NASA; KS Edgett; Malin Space Science Systems; R Dotson; Fireball LLC; DM Fey; Malin Space Science Systems; KE Herkenhoff; U.S. Geological Survey; BJ Hallet; University of Washington; MR Kennedy; Malin Space Science Systems

2:30 PM 373 The Mineralogy of the K-Pg Transition on the Peak Ring of the Chicxulub Impact Crater in Drill Cores of IODP-ICDP Expedition 364; A Wittmann; Arizona State University; SP Gulick; University of Texas, Austin; JV Morgan; Imperial College London, United Kingdom; E Chenot; Université de Bourgogne-Franche Comté, France; GL Christeson; University of Texas, Austin; PF Claeyts; Vrije Universiteit Brussel, Belgium; CS Cockell; University of Edinburgh, Scotland, MJ Coolen; Curtin University, Australia, et al.
Scientific Program

**PHYSICAL SCIENCES SYMPOSIA – TUESDAY AFTERNOON CONTINUED**

2:45 PM 374 Visualizing Iron Oxidation State in a Possible Cometary Clast from Carbonaceous Meteorite LAP 02342; BT De Gregorio, RM Stroud; U.S. Naval Research Laboratory

**P10.3 75th Anniversary Session: Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications**

SESSION CHAIRS:
Aiden A. Martin, Lawrence Livermore National Laboratory
Nestor J. Zaluzec, Argonne National Laboratory

PLATFORM SESSION
Tuesday 1:30 PM • Room: 125

1:30 PM (INVITED) The Enigmatic Origin of Meteoritic Nanodiamonds – An Approach with Atom-Probe Tomography; PR Heck; The Field Museum of Natural History

2:00 PM Did Nanodiamonds Rain from the Sky as Woolly Mammoths Fell in Their Tracks Across North America 12,900 Years Ago?; TL Daulton, S Amari; Washington University in St Louis; AC Scott; Royal Holloway University of London, United Kingdom; M Hardiman; University of Portsmouth; N Pinter; University of California, Davis; RS Anderson; Northern Arizona University

2:15 PM Multimodal Analysis of Diamond Crystals and Layers Using RISE Microscopy; R Váňa, J Dluhoš; TESCAN Brno, s.r.o, Česká republika; M Varga, C Schmid; TU Darmstadt; A Kromka; Czech Academy of Sciences, v.v.i.

2:30 PM Use of C-C and C-N Molecular Emissions in Laser-Induced Breakdown Spectroscopy Data to Determine Diamond Provenance; CE McManus; Materialytics, LLC; J Dowe; Analytical Data Services; NJ McMillan; New Mexico State University

**TECHNOLOGISTS’ FORUM SESSION – TUESDAY AFTERNOON**


SESSION CHAIR:
Caroline A Miller, Indiana University/Purdue University Indianapolis

PLATFORM SESSION
Tuesday 1:30 PM • Room: 132

1:30 PM (INVITED) Atomic Force Microscopy: A Multifunctional Tool for Materials Characterization in Shared Resource Centers; BB Massani; University of Arizona

2:15 PM (INVITED) Applications of Atomic Force Microscopy in Biological Research; J Wallace; Indiana University – Purdue University Indianapolis

**BIOLOGICAL SCIENCES TUTORIAL – TUESDAY AFTERNOON**

X43.1 Practical Strategies for Cryo-CLEM Experiments

SESSION CHAIR:
Tommi White, University of Missouri, Colombia

PLATFORM SESSION
Tuesday 1:30 PM • Room: 126

1:30 PM (INVITED) Practical Strategies for Cryo-CLEM Experiments; CM Hampton; Emory University
Scientific Program

POSTER # 90 3:00 PM 388 eC-CLEM: Flexible Multidimensional Registration Software for Correlative Microscopies with Refined Accuracy Mapping; X Heiligenstein; CNRS, PSL Research University, France; P Paul-Gilloteaux; CNRS INSERM, Université de Nantes, France / PSL Research University; M Belle; CryoCapCell, France; G Raposo, J Salamero; CNRS, PSL Research University, France

POSTER # 91 3:00 PM 389 Development of an Efficient Methodology for the Mapping and Digital Analysis of 3D Surfaces via SEM; D Stalla, K Banks, J Brown, F Bunyak, E Giuliano, T White; University of Missouri

A07.P1 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

POSTER SESSION Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 92 3:00 PM 390 Microstructure and Hardness of Al$_{24.25}$Mg Alloy After Plastic Deformation; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; IK Gómez-Barraza; Universidad Autónoma de Chihuahua, Mexico; MA Ruiz-Esparza-Rodríguez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; JP Flores-De-los-Rios, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R-MS Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 93 3:00 PM 391 Effect of Mg Addition and Solution Heat Treatment Time on Microstructure and Hardness of Al$_{24.25}$Mg Alloy; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; IK Gómez-Barraza; Universidad Autónoma de Chihuahua, Mexico; MA Ruiz-Esparza-Rodríguez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; JP Flores-De-los-Rios, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R-MS Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER SESSION
Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 102 10kfps Transmission Imaging in a 196 Beam SEM; W Zuidema, S Rahangdale, P Keijzer; Delft University of Technology, Netherlands; AH Wolters, BN Giepmans; University Medical Center Groningen, Netherlands; JP Hoogenboom, P Kruit; Delft University of Technology, Netherlands

POSTER # 103 Measurement of Vortex Beam Phase by Electron Holography; K Harada, K Niitsu, K Shimada, YA Ono, D Shindo; CEMS

POSTER # 104 Development of a Fountain Detector for Spectroscopy of Secondary Electrons in SEM; T Agemura, H Iwai, T Sekiguchi; National Institute for Materials Science, Japan

POSTER # 105 Non-Diffractive Electron Bessel Beams for Scanning Electron Microscopy in Transmission Mode Using Direct Phase Masks; S Hettler, M Dries; Karlsruhe Institute of Technology, Germany

POSTER # 106 (M&M STUDENT SCHOLAR) Applications of Forward Modeling to Refinement of Grain Orientations; S Singh; Carnegie Mellon University; A Leff, M Taheri; Drexel University; M De Graef; Carnegie Mellon University

POSTER # 107 EBSD – A Powerful Tool for the Analysis of Magnetic Materials; D Hohs, T Grubesa, D Schuller, T Bernthal, D Goll, G Schneider; Materials Research Institute

POSTER # 108 2015 NIST Workshop on Analytical Transmission Scanning Electron Microscopy; RR Keller; National Institute of Standards and Technology
**POSTER SESSION**
**Tuesday 3:00 PM • Room: Exhibit Hall**

**POSTER # 109**
3:00 PM **407**  
On Mass-Thickness Contrast in Annular Dark-Field STEM-in-SEM Images; R White, J Holm; National Institute of Standards and Technology

**POSTER # 110**
3:00 PM **408**  
Revised Algorithm for Image Sharpness Measurement in Scanning Electron Microscopy Based on Derivative Method in ISO/TS 24597 document; S Kim; Chonbuk National University, Korea; BC Park; Korea Research Institute of Standards and Science; I-S Oh, JS Kim; Chonbuk National University, Korea

**A12.P1 Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography**

**POSTER SESSION**
**Tuesday 3:00 PM • Room: Exhibit Hall**

**POSTER # 111**
3:00 PM **409**  
First-Principles Calculation of Field Evaporation and Surface Diffusion on BCC Fe (001); T Ohnuma; Central Research Institute of Electric Power Industry (CRIEPI), Japan

**POSTER # 112**
3:00 PM **410**  
Zooming in on Field Evaporation Behavior: A Time Depending Density Functional Theory Study; K Kaluskar; Indian Institute of Science Education and Research Bhopal; J Peralta, C Loyola; Universidad Andrés Bello, Chile; S Broderick, K Rajan; University at Buffalo

**POSTER # 113**
3:00 PM **411**  
Correlative TEM and Atom Probe Tomography – A Case Study on Structural Materials for Fusion Reactors; S Kraemer; Harvard University; P Wells; University of California, Santa Barbara; C Oberdorfer; Ohio State University; RG Odette; University of California, Santa Barbara

**POSTER # 114**
3:00 PM **412**  
A Methodology for Investigation of Grain-Boundary Diffusion and Segregation; Z Peng, T Meiners; Max-Planck-Institut für Eisenforschung GmbH, Germany; Y Lu; Ludwig-Maximilians-Universität München, Germany; B Gault, C Liebscher, D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany

**POSTER # 115**
3:00 PM **413**  
Tracking Structural Modifications from In Situ Atom Probe Gas-Solid Reactions Through Computational Homology; S Broderick, T Zhang, K Rajan; University at Buffalo

**POSTER # 116**
3:00 PM **414**  
Visualizing and Quantifying Spinodal Decomposition in a Duplex Stainless Steel; SMburu, RP Kolli; University of Maryland; DE Perea, J Liu; Pacific Northwest National Laboratory; SC Schwarm, S Ankem; University of Maryland

**POSTER # 117**
3:00 PM **415**  
Automated Crystallographic Identification of Atom Probe’s Ion Desorption Map; Y Chen, KP Rice, TJ Prosa, DA Reinhard, BP Geiser; CAMECA Instruments Inc.; MM Nowell, SI Wright; EDAX

**POSTER # 118**
3:00 PM **416**  
An Open-Access Atom Probe Tomography Mass Spectrum Database; DR Diercks; Colorado School of Mines; SS Gerstl; ETH Zurich, Switzerland; BP Gorman; Colorado School of Mines

**A18.P2 Anniversary Session: Celebrating 50 Years of Microanalysis**

**POSTER SESSION**
**Tuesday 3:00 PM • Room: Exhibit Hall**

**POSTER # 119**
3:00 PM **417**  
How to Set Up Your STEM for EELS at Very High Energy Losses; I MacLaren, AJ Craven, C Black, S McFadzean; University of Glasgow, Scotland; H Sawada; JEOL, UK Ltd.

**POSTER # 120**
3:00 PM **418**  
Portable Electron Microscopy and Microanalysis in Extreme Environments; CS Own, MF Murfitt, LS Own, J Cushing; Voxa; J Martinez, K Thomas-Keprta; Jacobs/JETS NASA Johnson Space Center; DR Pettit; NASA Johnson Space Center

**POSTER # 121**
3:00 PM **419**  
Near Shadowless EDS Tomography for Sliced Sample Realized by X-ray Collection with One Large Sized SDD Detector; Y Aoyama, I Ohnishi, E Okunishi, N Endo, T Sasaki, Y Iwasawa, Y Kondo; JEOL
Scientific Program

A  ANALYTICAL SCIENCES POSTER SESSIONS - TUESDAY AFTERNOON CONTINUED

POSTER # 122
3:00 PM 420  Understanding EDXS Analysis of Nanostructures in TEM; H Li, P Banerjee, K Flores; Washington University in St. Louis

POSTER # 123
3:00 PM 421  Elemental Analyses of Heat Resistant Steels by High-Energy-Resolution EDS Analyzer Based on Superconducting-Tunnel-Junction Array; G Fujii, M Ukibe, S Shiki, M Ohkubo; National Institute of Advanced Industrial Science and Technology, Japan

POSTER # 124
3:00 PM 422  The “Great VPSEM Gotcha”: Great VPSEM Imaging Does Not Imply Great VPSEM X-ray Microanalysis! Degraded Spatial Resolution is Always Imposed by Gas Scattering; DE Newbury, NW Ritchie; National Institute of Standards and Technology

POSTER # 125
3:00 PM 423  Standardization of the MSA/MAS/AMAS Hyper-Dimensional File Format; A Torpy; CSIRO, Australia; M Kundmann; e-Metrikos; NC Wilson, CM MacRae; CSIRO, Australia; NJ Zaluzec; Argonne National Laboratory

POSTER # 126
3:00 PM 424  EDS-Based Phase Analysis of Alkali Activated Slag; NA Alharbi, RK Hailstone, B Varela; Rochester Institute of Technology

POSTER # 127
3:00 PM 425  SEM Study of Corrosion Deposits of Ni-Mn-Ga Fe Doped Shape Memory Alloys; M Sánchez-Carrillo, HJ Morales-Rodriguez; Universidad Tecnológica de Chihuahua Sur, Mexico; JP Flores-de-los-Ríos; Universidad Autónoma de Chihuahua, Mexico; E Huape-Parilla; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; A Santos-Beltrán, V Gallegos-Orozco; Universidad Tecnológica de Chihuahua Sur, Mexico

POSTER # 128
3:00 PM 426  Analytical Spatial Resolution in EPMA: What is it and How can it be Estimated? AG Moy, JH Fournelle; University of Wisconsin, Madison

B  BIOLOGICAL SCIENCES POSTER SESSIONS - TUESDAY AFTERNOON

B06.P1  3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells

POSTER SESSION
Tuesday 3:00 PM  •  Room: Exhibit Hall

POSTER # 129
3:00 PM 427  (M&M STUDENT SCHOLAR)  Single Particle CryoEM of the Anthrax Toxin Initial Engagement Complex; AJ Machen; University of Kansas; N Akkaladevi, TA White; University of Missouri; M Fisher; University of Kansas

POSTER # 130
3:00 PM 428  Applications of Bubblegram Imaging; W Wu, N Cheng; National Institute of Health; J Fortana; University of Leeds; AC Steven; National Institute of Health

POSTER # 131
3:00 PM 429  3D Structural Analysis and Classification of EmaA, a Collagen Binding Adhesin; CJ Brooks, KP Mintz, M Radermacher, T Ruiz; University of Vermont

POSTER # 132
3:00 PM 430  (M&M STUDENT SCHOLAR)  Structure and Function of the Staphylococcus Aureus Bacteriophage 80α Baseplate; JL Kizziah; University of Alabama, Birmingham; AD Dearborn; National Institute for Arthritis and Musculoskeletal and Skin Diseases; KA Manning, T Dokland; University of Alabama, Birmingham

POSTER # 133
3:00 PM 431  Structure Analysis of a Sugar-Moiety Chimera of EmaA, a Collagen Adhesin of a Gram-negative Bacterial Pathogen; GG Tang-Siegel, CJ Brooks, M Radermacher, KP Mintz, T Ruiz; University of Vermont

POSTER # 134
3:00 PM 432  Plasma Cleaning Improves the Image Quality of Serial Block-Face Scanning Electron Microscopy (SBFSEM) Volumetric Data Sets; B Armbruster; XEI Scientific, Inc.; C Booth; Gatan Inc; S Searle; Gatan UK; M Cable, R Vane; XEI Scientific, Inc.

POSTER # 135
3:00 PM 433  Electron Microscopy and Tomography on Endocytosis of Macrophages; I Ratnayake, P Ahrenkiel; South Dakota School of Mines and Technology; N Thiex, A Hoppe; South Dakota State University
B07.P1 Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems

POSTER SESSION
Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 136
3:00 PM 434 Cell Interactions in Wound Biofilm and In Vitro Biofilm Revealed by Electron Microscopy; B Deng; The Ohio State University, S Ghatak, S Steiner, P Chata; The Ohio State University Wexner Medical Center; JW Peck, DW McComb, CK Sen; The Ohio State University

POSTER # 137
3:00 PM 435 The Lateral Habenula has Vesicles that Accumulate Either GABA or Glutamate; S Zhang, DH Root, DJ Barker, M Morales; National Institute on Drug Abuse

POSTER # 138
3:00 PM 436 Luminescent Ruthenium Complex Labels for Correlative Microscopy.; VN Joshi; Nanoprobes, Incorporated; N Pipalia; Weill Cornell Medical College; E Rosa-Molinar; The University of Kansas; M Auer; Lawrence Berkeley National Laboratory

POSTER # 139
3:00 PM 437 Effect of Tip Morphology of Vertically Aligned Alumina Nanowire Arrays on Ovalbumin Uptake of Dendritic Cells; SC Aier, K Meduri; Portland State University; M Newman; Oregon Health & Sciences University; R Ekeya, P Crawford; Portland State University; D Austin; Oregon State University; L Lampert; Portland State University, JF Conley; Oregon State University, et al.

POSTER # 140
3:00 PM 438 Structures of Green Culms and Charcoal of Bambusa multiplex; M Kawasaki; JEOL, USA Inc.; V Yordsri, C Thanachayanont, C Junin; National Metal and Materials Technology Center; S Asahina; JEOL, Ltd.; T Oikawa; JEOL, Asia PTE Ltd.; A Saiki; University of Toyama, Japan; M Shiojiri; Kyoto Institute of Technology

POSTER # 141
3:00 PM 439 High Throughput Correlation of Dendritic Spines: 2-Photon In Vivo Live Imaging to SEM Utilizing the Automated Tape-Collecting Ultramicrotome and Array Tomography; CI Thomas, K-S Lee, S Peter, D Fitzpatrick, N Kamasawa; Max Planck Florida Institute for Neuroscience

B08.P1 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals

POSTER SESSION
Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 145
3:00 PM 443 MacCallum’s Triangle – Is It Rheumatic? Is It Traumatic? Or Is It Both?; S Siew; Michigan State University

POSTER # 146
3:00 PM 444 Zika Virus, a Newly Emergent Flavivirus; CS Goldsmith, DB Rabeneck, RB Martines, J Bhatnagar, D Rollin, SR Zaki; U.S. Centers for Disease Control and Prevention

POSTER # 147
3:00 PM 445 Correlative Confocal and Environmental Scanning Electron Microscopy for Investigating the Fungal Invasion of Plant Surfaces in Their Native State; AJ Bowling, HE Pence, T Slanec, LL Granke; Dow AgroSciences
Scientific Program

B09.P1  Methodologies, Technologies, and Analysis of Biological Specimens

Tuesday Session 3:00 PM  •  Room: Exhibit Hall

POSTER #  154
3:00 PM  452  One Simple and Reproducible Sample Prep Protocol Used to Compare the Surface Topography (SEM) of the Mouse and Newt RPE and the Bruch’s Membrane; PT Lam, C Gutierrez, ML Duley, RE Edelmann, ML Robinson; Miami University

POSTER #  155
3:00 PM  453  Sample Optimization for In Situ Lamella Preparation for Cryo-Electron Tomography; JM Mitchels; Thermo Fisher Scientific; J Novacek, M Pekerek; Central European Institute of Technology, Czech Republic

POSTER #  156
3:00 PM  454  A Freeze Drying Sample Preparation Method for Correlative Light and Scanning/Transmission Electron Microscopy; K Uryu, N Soplop, D Acehan, CM Rice; The Rockefeller University; MT Catanese; King’s College London; A Hoshino, D Lyden; Weill Cornell Medical College

POSTER #  157
3:00 PM  455  Freeze Drying Method with Gaseous Nitrogen for Biological Application of Helium Ion Microscopy; K Uryu, CM Rice; The Rockefeller University; MT Catanese; King’s College London; G Santulli; Columbia University; H Totary-Jain; University of South Florida; C Huynh, B Goetze; Carl Zeiss Microscopy, LLC

POSTER #  158
3:00 PM  456  (INVITED)  Quantifying Pancreatic Islet Architecture with Confocal Fluorescence Microscopy: Endocrine Cell Type Distribution Effects on Hormone Secretion; CM Richman, DW Piston; Washington University in St. Louis

POSTER #  159
3:00 PM  457  Morphological Studies of Penetration Pathways Via Stratum Corneum and Hair Follicles Using Nano-Sized Iron Oxide; K-J Choi, B-K Park, S-H Lee, Q Wang; Thermo Fisher Scientific (Formerly FEI); S-H Lee; Yonsei University College of Medicine, Korea

POSTER #  160
3:00 PM  458  Nucleus Classification in Colon Cancer H&E Images Using Deep Learning; A Hamad, F Bunyak, I Ersoy; University of Missouri, Columbia

POSTER #  161
3:00 PM  459  3D Printed Optics; H Osman; Indiana University School of Medicine
POSTER # 160
3:00 PM 460 Graphic User Interface for Reliable and Repeatable Quantification of Neuron Morphology and Microstructural Analysis; J La, B Mason, T Donaldson, C Yelleswarapu; University of Massachusetts, Boston

POSTER # 163
3:00 PM 461 Absolute Configuration, Optical Activity and Raman Microscopy of L and D-Glutamic Acid; LY Fox-Urbi; Centro de Investigación en, Alimentación, y Desarrollo, Mexico; Y Soberanes; Centro de Investigación en Alimentación, y Desarrollo, Mexico; V Guzman-Luna, G Saab-Rincon; Universidad Nacional Autónoma de México; J Hernández; Universidad de Sonora, Mexico; RR Sotelo-Mundo; Centro de Investigación en, Alimentación, y Desarrollo, Mexico

POSTER # 164
3:00 PM 462 Surface Characterization of Porous Nanomaterials in Environmental Applications by Scanning Electron Microscopy; G-W Lee, JH Kwon; KIER; S-C Jang; Inha University, Korea; K Myung; KIER; YS Huh; Inha University, Korea

POSTER # 165
3:00 PM 463 Analysis of Polymer-Biomacromolecule Composites in the Solid State via Energy Dispersive Spectroscopy-Scanning Electron Microscopy; PW Lee, N Avishai, JK Pokorski; Case Western Reserve University

POSTER # 166
3:00 PM 464 Carbon Nanostructures Synthetized by Chemical Reaction Using Rongalite and Polyethyleneimine as Complex Agents.; J Gonzalez, RC Carrillo-Torres, ME Alvarez-Ramos, SJ Castillo; Universidad de Sonora, Mexico

POSTER # 167
3:00 PM 465 Biomimetic Synthesis of Ceramic Composites; P Moghimian, V Srot; Max Planck Institute for Solid State Research, Germany; SJ Facey; University of Stuttgart, Germany; PA van Aken; Max Planck Institute for Solid State Research, Germany

POSTER # 168
3:00 PM 466 Quantitative Analyzing the Spatial Organization of the Organelles in Cancer Cell Using Soft X-ray Tomography; J-H Chen, R Boudreau, A Ekman, G McDermott; University of California, San Francisco; M LeGros, C Larabell; University of California, San Francisco, Lawrence Berkeley National Laboratory

POSTER # 169
3:00 PM 467 Microstructure and Electrical Conductivity of (Y,Sr)CoO_{3-δ} Thin Films Tuned by the Film-Growth Temperature; H Jing, G Hu, S-B Mi, L Lu, M Liu, S Cheng, S Cheng; Xi'an Jiaotong University, China, C-L Jia; Forschungszentrum Jülich, Germany

POSTER # 170
3:00 PM 468 Epitaxial Growth and Atomic-Scale Investigation of Dielectric Ca_{1.46}Nb_{1.11}Ti_{1.38}O_{7} Thin Films; X-W Jin; Xi'an Jiaotong University, China; Y-H Chen; Nanjing University of Posts & Telecommunications, China; L Lu, S-B Mi, H Wang; Xi'an Jiaotong University, China; C-L Jia; Forschungszentrum Jülich, Germany

POSTER # 171
3:00 PM 469 Statistical Measurement of Polar Displacements in Complex Oxides; L Miao, D Mukherjee, GA Stone, N Alem; The Pennsylvania State University

POSTER # 172
3:00 PM 470 Influence of Bulk Polarization and Surface Polarity on Surface Reconstructions and Related Local Properties of Multiferroic BiFeO_{3} Film; L Jin; Research Centre Jülich; P Xu; ETH Zürich, Switzerland; Y Zeng; Research Centre Jülich, Xi'an Jiaotong University, China, Tsinghua University, China; L Lu; Xi'an Jiaotong University, China; J Barthel; Research Centre Jülich, RWTH Aachen University, Germany; T Schulthess; ETH Zürich, Switzerland; RE Dunin-Borkowski; Research Centre Jülich, H Wang; Xi'an Jiaotong University, China, et al.

POSTER # 173
3:00 PM 471 The Interactions of Ferroelectric Domain Walls and Crystallographic Defects in the PbTiO_{3} Films; X Ma; Chinese Academy of Sciences

POSTER # 174
3:00 PM 472 Atomic Level Structural Modulations at the Negatively Charged Domain Walls in BiFeO_{3} Films; X Ma; Chinese Academy of Sciences

POSTER # 175
3:00 PM 473 Zr-Doped Al_{2}O_{3}, Grain Boundary and Interfacial Microstructure; Z Liu; Kennametal, Inc.
**Tuesday, August 8**

**P04.P1 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices**

**POSTER SESSION**  
**Tuesday 3:00 PM • Room: Exhibit Hall**

**POSTER # 176**  
3:00 PM  **474**  
Electron-Beam-Induced Deposition of Carbon Nanorod via Spot Mode as Highly Stable and Sensitive AFM Probe Tip; W Qian, C Nguyen; University of Nebraska, Lincoln; D Liu; Zhejiang Northwest A&F University, China; J A Turner; University of Nebraska, Lincoln

**POSTER # 177**  
3:00 PM  **475**  
Breaking Friedel's Law in Polar Two-Dimensional Materials; P Deb, Y Han, S Xie, ME Holtz; Cornell University; J Park; University of Chicago; DA Muller; Cornell University

**POSTER # 178**  
3:00 PM  **476**  
Characterizing Multi-Layer Pristine Graphene, Its Contaminants, and Their Origin Using Transmission Electron Microscopy; TH Brintlinger, ND Bassim, J Winterstein, A Ng; US Naval Research Laboratory; MS Lodge, M Ishigami; University of Central Florida; K Whitener, PE Sheehan; U.S. Naval Research Laboratory, et al.

**POSTER # 179**  
3:00 PM  **477**  
SEM and TEM Study of a Ceramic Membrane/Laser Induced Graphene Composite; MB Bayati, H Peng, H Deng, J Lin, TA White, MF de Cortalezzi; University of Missouri

**POSTER # 180**  
3:00 PM  **478**  
Electron Diffraction of Germanane; A Hanks, BD Esser, S Jiang, JE Goldberger, DW McComb; The Ohio State University

**POSTER # 181**  
3:00 PM  **479**  
Growth Dynamics, Stacking Sequence and Interlayer Coupling in Few-Layer Graphene Revealed by In Situ SEM; Z-J Wang; Fritz Haber Institute of the Max Planck Society, Germany; G Eres; Oak Ridge National Laboratory; F Ding; Hong Kong Polytechnic University; R Schloegl, MG Willinger; Fritz Haber Institute of the Max Planck Institute, Germany

**P06.P2 Nanoparticles: Synthesis, Characterization, and Applications**

**POSTER SESSION**  
**Tuesday 3:00 PM • Room: Exhibit Hall**

**POSTER # 182**  
3:00 PM  **480**  
RISE - Raman SEM Imaging of Single Layer and Twisted Bilayer Graphene; U Schmidt; WITec GmbH; H Zimmermann, S Freitag; Carl Zeiss Microscopy GmbH; T Dieing; WITec GmbH

**POSTER # 183**  
3:00 PM  **481**  
Revealing the Bonding of Nitrogen Impurities in Monolayer Graphene; Juan Carlos Idrobo; Oak Ridge National Laboratory; C Su, J Li, J Kong; Massachusetts Institute of Technology

**POSTER # 184**  
3:00 PM  **482**  

**POSTER # 185**  
3:00 PM  **483**  
Local Layer Stacking and Structural Disorder in Graphene Oxide Studied via Scanning Electron Diffraction.; AS Eggeman, RK Leary, DN Johnstone, PA Midgley; University of Cambridge, England

**POSTER # 186**  
3:00 PM  **484**  
Visualizing the Spatial Distribution of Ripples in Graphene with Low-Energy Electron Diffraction Imaging; I-S Hwang, W-H Hsu, W-T Chang, C-Y Lin; Academia Sinica, Tiawan; T Latychevskaia; University of Zurich, Switzerland

**POSTER # 187**  
3:00 PM  **485**  
Morphological and Structural Analysis of Magnetic Support Produced from Magnetite (Fe₃O₄) Nanoparticles and Recycled Polyamide; LG Santos; State University of Londrina, Brazil; JG Spadotto; Pontifical Catholic University of Rio de Janeiro, Brazil; DF Valezi, M Fontana, CLB Guedes; State University of Londrina, Brazil; IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil; E Di Mauro; State University of Londrina, Brazil
POSTER # 188
3:00 PM  486  Influence of Microstructure on the Magnetic Properties of Goethite (α-FeOOH); DF Valezi; State University of Londrina, Brazil; JC Spadotto; Pontifical Catholic University of Rio de Janeiro, Brazil; LG Santos, JPT Baú; State University of Londrina, Brazil; CE Carneiro; Western Bahia Federal University, Brazil; DA Zaia; State University of Londrina, Brazil; ACS da Costa; State University of Maringá, Brazil, IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil, et al.

POSTER # 189
3:00 PM  487  Structural Characterization of Monodisperse SiO₂ Spherical Nanoparticles Grown by Controlled Method to Develop Optical Phantoms; E Ortiz-Rascón; CONACyT - Universidad de Sonora, Mexico; RC Carrillo-Torres, I López-Miranda, FJ Carrillo-Pesqueira, J Medina-Monares, RP Duarte-Zamorano, ME Álvarez-Ramos; Universidad de Sonora, Mexico

POSTER # 190
3:00 PM  488  Characterization of Metal Matrix Composites Reinforced with Carbon Nanotubes by High Resolution Transmission Electron Microscopy; CA Isaza Merino; Universidad Nacional de Colombia, Facultad de Minas; JE Ledezma Sillas, JM Herrera Ramírez; Centro de Investigación en Materiales Avanzados, México; JM Meza Meza; Universidad Nacional de Colombia

POSTER # 191
3:00 PM  489  Synthesis and Characterization of Carbon Nanotubes Via Spray Pyrolysis Method; E Uriza-Vega, M Herrera-Ramirez; Centro de Investigación en Materiales Avanzados S.C., Mexico; C Lópex-Meléndez; Universidad La Salle Chihuahua, Mexico; I Estrada-Guel; Centro de Investigación en Materiales Avanzados S.C., Mexico; E Martínez-Franco; Centro de Ingeniería y Desarrollo Industrial; R Martínez-Sánchez, C Carreño-Gallardo; Centro de Investigación en Materiales Avanzados S.C., Mexico

POSTER # 192
3:00 PM  490  Effect of Multiwall Carbon Nanotubes (MWCNs) Reinforcement on the Mechanical Behavior of Synthesis 7075 Aluminum Alloy Composites by Mechanical Milling; E Uriza-Vega, I Estrada-Guel, M Herrera-Ramirez; Centro de Investigación en Materiales Avanzados S.C., Mexico; E Martínez-Franco; Centro de Ingeniería y Desarrollo Industrial; C Lópex-Meléndez; Universidad La Salle

POSTER # 193
3:00 PM  491  Electron-Beam Induced Activation of Catalyst Supports for CNT Growth; J Carpena-Núñez; National Research Council; Air Force Research Laboratory; B Davis; University of Missouri; AE Islam, G Sargent; UES, Inc.; N Murphy; U.S. Air Force Research Laboratory; T Back; University of Dayton Research Institute; M Matthew; University of Missouri, B Maruyama; U.S. Air Force Research Laboratory

POSTER # 194
3:00 PM  492  Carbón Nanostructures Synthesized Using Rongalite and Polyethyleneimine as Complex Agents; JA González, RC Carillo, E Alvarez, JS Castillo; Universidad de Sonora, Mexico

POSTER # 195
3:00 PM  493  Monitoring the Degradation of Lubricating Oil by Means of Surface Plasmon; JA Heredia-Cancino, F Félix-Domínguez, R Carrillo-Torres, ME Álvarez-Ramos; Universidad de Sonora, Mexico

POSTER # 196
3:00 PM  494  Preparation and Microscopic Characterization of Biobased Nanoparticles from Natural Waste Materials; VK Rangari, S Jeelani; Tuskegee University

POSTER # 197
3:00 PM  495  Biocompatible, Biodegradable Radio-Opaque Polymer Nanoparticles.; VN Joshi; Nanoprobes, Inc.; H Smilowitz; University of Connecticut Health Center

POSTER # 198
3:00 PM  496  Effect of Functionalization and Size of CNTS in The Production of Nanocomposites; S Simões; CEMMPRE, University of Porto, Portugal; PJ Ferreira; University of Texas, Austin and International Iberian Nanotechnology Laboratory; F Viana; CEMMPRE, University of Porto, Portugal; MAL Reis; Faculdade de Ciências Exatas e Tecnologia, Universidade Federal do Pará, Brazil; MF Vieira; CEMMPRE, University of Porto, Portugal

POSTER # 199
3:00 PM  497  Evaluation of the Effects of Multiwall Carbon Nanotubes (MWCNs) Reinforcement on the Mechanical Behavior of Synthesis 7075 Aluminum Alloy Composites by Mechanical Milling; E Uriza-Vega, I Estrada-Guel, M Herrera-Ramirez; Centro de Investigación en Materiales Avanzados S.C., Mexico; E Martínez-Franco; Centro de Ingeniería y Desarrollo Industrial; R Martínez-Sánchez, C Carreño-Gallardo; Centro de Investigación en Materiales Avanzados S.C., Mexico
**P07.P1  Advanced Characterization of Energy-Related Materials**

**POSTER SESSION**
Tuesday 3:00 PM  •  Room: Exhibit Hall

**POSTER # 199**
3:00 PM  497  Nucleation of Metal Nanoparticles on Amorphous Substrate: Insights into Orientation Preference and Heterogeneous Catalysis; D Chatterjee, A Regunath, K K, R Ahmad, AK Singh, R Narayanan; Indian Institute of Science

**POSTER # 200**
3:00 PM  498  Quantitative 3D Information of Supported Pd/CMK-3 Catalysts at The Nanoscale; W Wang, D Wang, C Kuebel; Karlsruhe Institute of Technology, Germany; A Villa; Università di Milano, Italy

**POSTER # 201**
3:00 PM  499  Multi-Dimensional Multi-Functional Catalytic Architecture: A Selectively Functionalized Three-Dimensional Hierarchically Ordered Macro/Mesoporous Network for Cascade Reactions Analyzed by Electron Tomography; RK Leary; University of Cambridge, England; C Parlett; Aston University, United Kingdom; J Barnard, FD Peña; University of Cambridge, England; M Isaacs; Aston University, United Kingdom; S Beaumont; University of Durham, United Kingdom; K Wilson, A Lee; Aston University, England, et al.

**POSTER # 202**
3:00 PM  500  Quantification of Material Property Changes During Electrode Degradation in Polymer Electrolyte Fuel Cells Using X-ray Computed Tomography; RT White, S Eberhardt, M Najm; Simon Fraser University, Canada; M Dutta; Ballard Power Systems; FP Orfino, E Kjeang; Simon Fraser University, Canada

**POSTER # 203**
3:00 PM  501  Crystallization Processes of Amorphous GeSn Thin Films by Heat Treatment and Electron Beam Irradiation; T Kimura, M Ishimaru; Kyushu Institute of Technology, Japan; M Okugawa, R Nakamura; Osaka Prefecture University, Japan; H Yasuda; Osaka University, Japan

**POSTER # 204**
3:00 PM  502  Real-time Observation of Sintering Process of Carbon-Supported Platinum Nanoparticles in Oxygen and Water Through Environment TEM; L Luo, Y Shao, C Wang; Pacific Northwest National Laboratory

**POSTER # 205**
3:00 PM  503  In Situ Electron Diffraction Studies of Sodium Electrochemistry in MoS₂; J Wu, Q Li, Z Yao; Northwestern University; S Mitra; Indian Institute of Technology; S Hao; Northwestern University; TS Sahu; Indian Institute of Technology Bombay; Y Li, C Wolverton; Northwestern University, et al.

**POSTER # 206**
3:00 PM  504  The Effect of Electron Beam Dosage in the Decomposition Behavior of Electrolytes Encapsulated Inside the Graphene Sheets Based on In Situ TEM Observation; JY Cheong, JH Chang, JM Yuk, JY Lee, I-D Kim; Korea Advanced Institute of Science and Technology

**POSTER # 207**
3:00 PM  505  In Situ TEM Observation on the Agglomeration of Nanoparticles in the Interface of SnO₂; JY Cheong, JH Chang, SJ Kim; HK Seo, JW Shin, JM Yuk, JY Lee; Korea Advanced Institute of Science and Technology, et al.

**POSTER # 208**
3:00 PM  506  Electron Microscopy Study of ALD Protective Coating on the FeOF Electrode; C-F Lin, S-C Liou, M Noked, W-A Chiou, GW Rubloff; University of Maryland

**POSTER # 209**
3:00 PM  507  PtBi Alloy Nanoparticles on Reduced Graphitic Oxide Support for Electrocatalysis; S Tripathi, N Ravishankar; Indian Institute of Science

**POSTER # 210**
3:00 PM  508  Combining In Situ SEM with High Sensitivity Analytical TEM for Understanding the Degradation of Metallic Interconnects in SOFC; S Poitel; Ecole Polytechnique Fédérale de Lausanne, Switzerland; Z-J Wang, M Willinger; Fritz Haber Institute of the Max Planck Society, Germany; J van Herle, C Hébert; Ecole Polytechnique Fédérale de Lausanne, Switzerland

**POSTER # 211**
3:00 PM  509  A Comparative TEM Study of Soot Particles Derived from Used Diesel and Gasoline Engine Oils; A Janssen; The University of Manchester, United Kingdom; L Felisari; BP Technology Centre; MA Kulzick; BP Corporate Research Centre; G Burke; The University of Manchester, United Kingdom
**P08.P2** Geological Sample Characterization Using Various Imaging Modalities

**POSTER SESSION**
Tuesday 3:00 PM • Room: Exhibit Hall

**POSTER # 212**
3:00 PM 510  
Microanalysis of Geologic Materials Exposed to Surface Conditions on the Planet Venus; BG Radoman-Shaw, RP Harvey; Case Western Reserve University; GC Costa, NS Jacobson, LM Nakley; NASA Glenn Research Center

**POSTER # 213**
3:00 PM 511  
FIB/STEM Investigation of Four Impact Craters from the Stardust Comet Sample Return Mission Foils; BA Haas; Washington University in St. Louis; RM Stroud; U.S. Naval Research Laboratory; C Floss; Washington University in St. Louis

**POSTER # 214**
3:00 PM 512  
Laboratory Evidence of Slow-Cooling for Carbon Droplets in Red-Giant Atmospheres; PB Fraundorf; University of Missouri, St. Louis; M Lipp; Universität Stuttgart; TJ Savage, D Osborn; University of Missouri, St. Louis

**POSTER # 215**
3:00 PM 513  
Quantifying the 3-Dimensional Shape of Lunar Regolith Particles Using X-ray Computed Tomography and Scanning Electron Microscopy at Sub-Å Resolution; AN Chiaramonti; National Institute of Standards and Technology; JD Goguen; Jet Propulsion Laboratory; EJ Garboczi; National Institute of Standards and Technology

**POSTER # 216**
3:00 PM 514  
Dynamical in Situ Study of Morphological Changes of Bentonite in ESEM; E Navrátilová, V Neděla; Institute of Scientific Instruments of the CAS, Czech Republic; H Sun, D Mašín; Charles University, Czech Republic

**P10.P1** 75th ANNIVERSARY SESSION
Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications

**POSTER SESSION**
Tuesday 3:00 PM • Room: Exhibit Hall

**POSTER # 217**
3:00 PM 515  
Cathodoluminescence Study of Microdiamonds and Improvements of Signal Detection by Lowering Temperature of the Sample; N Vaskovicova, R Skoupy, A Patak, K Hrubanova, V Krzyzanek; Institute of Scientific Instruments of the CAS, v.v.i., Brno, Czech Republic

**POSTER # 218**
3:00 PM 516  
SEM and EPMA Analyses of Metallic Inclusions in Diamonds – Probing the Earth’s Deep Mantle; ES Bullock; Carnegie Institution for Science; EM Smith; Gemological Institute of America; SB Shirey; Carnegie Institution for Science

**POSTER # 219**
3:00 PM 517  
Microstructural Characterization of Polycrystalline Diamond Sintered at Ultrahigh Pressures; EG Minnaar, J Neethling, J Westraadt; Centre for High-Resolution Transmission Electron Microscopy
Sci entific Program

MICROSCOPY OUTREACH
POSTER SESSION

TUESDAY AFTERNOON

X90.P1 Microscopy in the Classroom:
Strategies for Education and Outreach

POSTER SESSION
Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 220
3:00 PM 518 (MSA K-12 STUDENT SCHOLARSHIP) Eutectic Solidification in Zn-Sn Binary Alloys: An Experiment for High Schools; J Aindow; Academy of Aerospace and Engineering; H Yu; University of Connecticut; MA Bellinger; Academy of Aerospace and Engineering; M Aindow; University of Connecticut

POSTER # 221
3:00 PM 519 Complex Web Construction: Additional Clues to Mechanical Properties; D Shattuck; Massachusetts Institute of Technology; W Delise, N Lloyd, J Schmidt, K Baum, D Roos, R Dettelbach, K Sanon; Concord Middle School, et al.

POSTER # 222
3:00 PM 520 Sensitivity of TEM data on Lightspeed to Camera-Length’s Voltage Variation; P Fraundorf, D Osborn, T McBroom; University of Missouri, St. Louis
ANNIVERSARY LECTURE

X73.1 IFES Lecture Marking the 50th Anniversary of the Invention of the Atom Probe

Complimentary coffee, tea, and handheld breakfast item provided.

SESSION CHAIRS:
David J. Larson, President
International Field Emission Society (IFES)
Stephan Gerstl, IFES Steering Committee Member

PLATFORM SESSION
Wednesday 7:30 AM • Room: 275

7:30 AM 599 (INVITED) Point-Projection Microscopy;
John A. Panitz; University of New Mexico

ANALYTICAL SCIENCES SYMPOSIA—WEDNESDAY MORNING

A02.4 Compressive Sensing, Machine Learning & Advanced Computation in Microscopy

SESSION CHAIR:
Andrew Stevens, Pacific Northwest National Laboratory

PLATFORM SESSION
Wednesday 8:30 AM • Room: 260

8:30 AM 521 (INVITED) Sparsity, Parsimony, and Data Reduction – Applications Across Multi-Dimensional Electron Microscopy; PA Midgley; University of Cambridge, England

9:00 AM 522 Scanning Precession Electron Diffraction Study of Hybrid Precipitates in a 6xxx Series Aluminium Alloy; JK Sunde; Norwegian University of Science and Technology; DN Johnstone; University of Cambridge, England; CD Mariarosa; SINTEF; AT van Helvoort; Norwegian University of Science and Technology; PA Midgley; University of Cambridge, England; R Holmestad; Norwegian University of Science and Technology


9:30 AM 524 Combining a Convolutional Neural Network and Watershed Segmentation for Identifying U-Bearing Particles in Secondary Ion Mass Spectrometry Images; JG Tarolli, BE Naes, DW McComb; University of Manchester; JS Earl; GlaxoSmithKline Consumer Healthcare R&D; DW McComb; The Ohio State University

9:45 AM 525 A Convolutional Neural Network Approach to Thickness Determination Using Position Averaged Convergent Beam Electron Diffraction; W Xu, J LeBeau; North Carolina State University

A06.2 Bridging Length Scales with 2D, 3D, and 4D Multiscale/ Multimodal Microscopy

SESSION CHAIR:
Arno Merkle, Carl Zeiss X-ray Microscopy, Inc.

PLATFORM SESSION
Wednesday 8:30 AM • Room: 121

8:30 AM 526 The Use of LOM, SEM, FIB and APT to Clarify The Sequences of Failure of a Hot Dip Galvanized Structural Steel Section; M Panzenböck, C Freitag; Montanuniversität Leoben, Austria

8:45 AM 527 In Situ Mechanical Studies of Plastic Bonded Explosive, Multiscale 3D Imaging and Modeling; BM Patterson, K Henderson, N Cordes, D Walters, DJ Luscher, V Manner, B Tappan, JD Yeager; Los Alamos National Laboratory

9:00 AM 528 (M&M PTSA AWARDEE) Correlative 3D Imaging and Characterization of Human Dentine; IN Boona, F Scheltens, J Sosa; The Ohio State University; TL Burnett, PJ Withers; University of Manchester, United Kingdom; JS Earl; GlaxoSmithKline Consumer Healthcare R&D; DW McComb; The Ohio State University

9:15 AM 529 Correlative Microscopy in 3D: Recent Advancements in Multi-Scale Materials Science; J Gelb, T Volkenandt, A Merkle; Carl Zeiss Microscopy

9:30 AM 530 Correlated Electron Microscopy Across Length Scales to Elucidate Structural, Electrical and Chemical Properties of Oxide Grain Boundaries; WJ Bowman; Massachusetts Institute of Technology; MN Kelly, GS Rohrer; Carnegie Mellon University; CA Hernandez; Arizona State University; A Darbal; AppFive LLC; PA Crozier; Arizona State University

9:45 AM 531 Understanding Nanoscale 4D Microstructural Evolution in Aluminum Alloys using Transmission X-ray Microscopy (TXM); CS Kaira; Arizona State University; V De Andrade; Argonne National Laboratory; S S. Singh; Indian Institute of Technology Kanpur; C Cantzos; Arizona State University; F De Carlo; Argonne National Laboratory; N Chawla; Arizona State University

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Scientific Program

A07.4 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

SESSION CHAIR:
Mark Oxley, Oak Ridge National Laboratory

PLATFORM SESSION
Wednesday 8:30 AM • Room: 261

8:30 AM 532 (INVITED) Absolute-Scale Comparison with Simulation for Quantitative Energy-Dispersive X-ray Spectroscopy in Atomic-Resolution Scanning Transmission Electron Microscopy; SD Findlay; Monash University, Australia; Z Chen; Cornell University; M Weyland; Monash University, Australia; X Sang, W Xu, JH Dycus, JM LeBeau; North Carolina State University, LJ Allen; University of Melbourne, Australia

9:00 AM 533 Numerical Modeling of Specimen Geometry for Quantitative Multiple Detector EDS; W Xu, JH Dycus, JM LeBeau; North Carolina State University

9:15 AM 534 Probing the Effects of Electron Channelling on EDX Quantification; KE MacArthur; Forschungszentrum Jülich, Germany; HG Brown, SD Findlay; Monash University, Australia; LJ Allen; University of Melbourne, Australia

9:30 AM 535 Improving Atomic-Scale Elemental Mapping Resolution of STEM-EDS Through Optimizing Experimental Conditions; P Lu; Sandia National Laboratories; R Yuan, JM Zuo; University of Illinois, Urbana-Champaign

9:45 AM 536 A Combined Atomic-Resolution STEM and First-Principles Approach Towards Understanding the Origins of the First Solar-System Solids; T Zega, V Manga; University of Arizona; K Watanabe; Hitachi High Technologies Corporation, Japan; K Domanik, P Mane; University of Arizona; A Hanawa, H Inada, J Howe; Hitachi High Technologies Corporation, Japan, et al.

A08.1 Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS:
Kazu Suenaga, National Institute of Advanced Industrial Science and Technology, Japan
David Muller, Cornell University

PLATFORM SESSION
Wednesday 8:30 AM • Room: 132

8:30 AM 537 (INVITED) Applications of High Precision STEM Imaging to Structurally Complex Materials; J Feng, C Zhang, D Zhou, Z Xu, D Morgan, P Voyles; University of Wisconsin, Madison

9:00 AM 538 Mapping Picometer Scale Periodic Lattice Distortions with Aberration-Corrected Scanning Transmission Electron Microscopy; BH Savitzky, I El Baggari; Cornell University; AS Admasu, J Kim, S-W Cheong; Rutgers University; R Hovden; University of Michigan; LF Kourkoutis; Cornell University

9:15 AM 539 Atomic Resolution Imaging of YAlO₃:Ce in the Chromatic and Spherical Aberration Corrected PICO Transmission Electron Microscope; L Jin, KW Urban, CL Jia, J Barthel; Research Center Juelich, Germany

9:30 AM 540 Three-Dimensional Point Defect Imaging by Large-Angle Illumination STEM; R Ishikawa; The University of Tokyo, Japan; SJ Pennycook; National University of Singapore; AR Lupini; Oak Ridge National Laboratory; SD Findlay; Monash University, Australia; N Shibata, Y Ikuhara; The University of Tokyo, Japan

9:45 AM 541 Atomap - Automated Analysis of Atomic Resolution STEM Images; M Nord; Norwegian University of Science and Technology, Norway; PE Vullum; SINTEF; I MacLaren; University of Glasgow, Scotland; T Tybell, R Holmestad; Norwegian University of Science and Technology, Norway
A09.1 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

SESSION CHAIR: 
Owen K. Neill, Washington State University

PLATFORM SESSION 
Wednesday 8:30 AM • Room: 264

8:30 AM 542 Current Status of ISO/TC191 – Microbeam Analysis; P Camus; EDAX, Inc.; D Meier; McCrone Associates; R Marinenko; National Institute of Standards and Technology

8:45 AM 543 (INVITED) Creating and Using Secondary Reference Materials for EPMA and LA-ICPMS; JW Singer; Rensselaer Polytechnic Institute

9:15 AM 544 (INVITED) Natural and Synthetic Glass and Crystal Reference Materials for Trace Element Microanalysis; WO Nachlas; Syracuse University

9:45 AM 545 Use of Mineral Reference Standards in EPMA: Instrumental Calibration, Standards Comparison, and Quality Control; PK Carpenter; Washington University; EP Vicenzi; Museum Conservation Institute

A10.5 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

SESSION CHAIR: 
Robert Keller, National Institute of Standards and Technology

PLATFORM SESSION 
Wednesday 8:30 AM • Room: 124

8:30 AM 546 (INVITED) Automated Serial Section Large-Field Transmission-Mode Scanning Electron Microscopy (tSEM) for Volume Analysis of Hippocampus Ultrastructure; JM Mendenhall, M Kuwajima, KM Harris; University of Texas

9:00 AM 547 Improved Image Quality in SEM Imaging of Thin Tissue Sections; W Zuidema, JP Hoogenboom; Delft University of Technology, Netherlands; P Kruit; Delft University of Technology, Netherlands

9:45 AM 548 (INVITED) Electron Channelling Contrast Imaging (ECCI): An Amazing Tool for Observations of Crystal Lattice Defects in Bulk Samples; S Zaefferer; Max Planck Institute for Iron Research, Germany

A13.1 Applications of Atom Probe Tomography

SESSION CHAIR: 
Mattias Thuvander, Chalmers University of Technology, Sweden

PLATFORM SESSION 
Wednesday 8:30 AM • Room: 263

8:30 AM 550 (INVITED) Application of Atom Probe Tomography to Nitride Semiconductors; RA Oliver, F Tang, S Bennett; University of Cambridge, England; TL Martin, PA Bagot, GD Smith, MP Moody; University of Oxford, United Kingdom

9:00 AM 551 Correlated Transmission Electron Microscopy and Atom Probe Tomography Study of Boron Distribution in BGaN; B Bonef, R Cramer, F Wu, JS Speck; University of California, Santa Barbara

9:15 AM 552 (INVITED) Exploration of Doped Semiconductors at the Atomic Scale; A Rodil, C Krammel, R Plantenga, S Koelling, P Koenraad; Eindhoven University of Technology, Netherlands

9:45 AM 553 Correlative Transmission EBSD-APT Analysis of Grain Boundaries in Cu(In,Ga)Se2 and Cu2ZnSnSe4 Based Thin-Film Solar Cells; T Schwarz, G Stechmann, B Gault; Max-Planck-Institut für Eisenforschung GmbH, Germany; O Cojocaru-Mirédin; RWTH Aachen University, Germany; P-P Choi; Korea Advanced Institute of Science and Technology; A Redinger, S Siebentritt; University of Luxembourg, D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany

A14.1 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR: 
Andrew M. Minor, University of California, Berkeley

PLATFORM SESSION 
Wednesday 8:30 AM • Room: 131

8:30 AM 554 (INVITED) In Situ TEM Study of Mechanical Size Effects in TiC Strengthened Steels; S Taniguchi; Advanced Technology Laboratories, Nippon Steel & Sumitomo Metal Corporation, Amagasaki, Japan; R Soler, C Kirchlechner, C Liebscher; Max-Planck-Institut für Eisenforschung GmbH, Germany; A Taniyama; Nippon Steel& Sumitomo Metal Corporation, Futsu, Japan; G Dehm; Max-Planck-Institut für Eisenforschung GmbH, Germany
Scientific Program

ANALYTICAL SCIENCES SYMPOSIA
WEDNESDAY MORNING CONTINUED

9:00 AM 555 In Situ Elastic Strain Mapping via EBSD of Micro-Sized Specimens; MJ McLean, WA Osborn; National Institute of Standards and Technology

9:15 AM 556 In Situ Strain Mapping of Planar Slip in 304 Stainless Steel; TC Pekin; University of California, Berkeley; C Gammer; Austrian Academy of Sciences; J Ciston, C Ophus; Lawrence Berkeley National Laboratory; AM Minor; University of California, Berkeley

9:30 AM (INVITED) In Situ TEM Fracture Testing for Shallow Ion Irradiated Layers; JP Wharry; Purdue University; KH Yano; Boise State University

A16.4 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION
Wednesday 8:30 AM • Room: 130

8:30 AM 558 (INVITED) Visualization of Electrochemical Reaction Dynamics in Liquids Using TEM; W Zheng, Z Zeng, H Zheng; Lawrence Berkeley National Laboratory

9:00 AM 559 Multi-Modal Characterization of New Battery Technologies by Operando ec-STEM; BL Mehdi, J Chen, A Stevens; Pacific Northwest National Laboratory; C Park; Florida State University; L Kovarik, AV Liyu, W Henderson, J-G Zhang; Pacific Northwest National Laboratory, et al.

9:15 AM 560 Using Scanning Transmission X-ray Microscopy to Reveal the Origin of Lithium Compositional Spatiodynamics in Battery Materials; J Lim, Y Li; Stanford University; DH Alsem; Hummingbird Scientific; H So, SC Lee; Stanford University; P Bai, DA Cogswell; Massachusetts Institute of Technology, X Liu; Stanford University, et al.

9:30 AM 561 Visualization of Peptide-Peptide Interactions in FET Biosensors with Liquid-Cell TEM; L Xing, M-S Hsiao, A Islam, N Bedford, R Martineau, Y Ngo, S Kim, L Drummy; U.S. Air Force Research Laboratory

A17.2 Biological Soft X-ray Tomography

SESSION CHAIRS:
Carolyn Larabell, University of California, San Francisco
Kenneth Fahy, SiriusXT, Ireland

PLATFORM SESSION
Wednesday 8:30 AM • Room: 122

8:30 AM 562 PSF Corrected Reconstruction in Soft X-ray Tomography (SXT); AA Ekman, TE Plautz, J-H Chen, G McDermott, MA LeGros, C Larabell; University of California, San Francisco

8:45 AM 563 High Resolution Soft X-ray Tomography of Large Samples By Focal Series Projections; J Otón; Centro Nacional de Biotecnología, Spain; E Pereiro, JJ Conesa; ALBA Light Source; FJ Chichón; Centro Nacional de Biotecnología, Spain; JL Carrascosa; Instituto Madrileño de Estudios Avanzados en Nanociencia Spain; JM Carazo; Centro Nacional de Biotecnología, Spain

9:00 AM 564 Development of a Commercial Laboratory Scale Soft X-ray Microscope; T McEnroe; SiriusXT; F O'Reilly; University College Dublin, Ireland; P Sheridan, J Howard, R Byrne, A O'Connor, D Rogers, C Rogers; SiriusXT, et al.

9:15 AM 565 Progress Toward Automatic Segmentation of Soft X-ray Tomograms Using Convolutional Neural Networks; TE Plautz, R Boudreau, J-H Chen, AA Ekman, MA LeGros, G McDermott, CA Larabell; University of California, San Francisco

9:30 AM (INVITED) Soft X-ray Tomography: Filling the Gap Between Light and Electrons for Imaging Hydrated Biological Cells; LM Collinson, M-C Domart, R Carzaniga, M Razi; Francis Crick Institute, United Kingdom; P Guttmann, G Schneider; Helmholtz-Zentrum Berlin für Materialien und Energie GmbH; E Pereiro; ALBA Synchrotron Light Source, Spain, S Tooze; Francis Crick Institute, United Kingdom, et al.
B06.3 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells

SESSION CHAIRS:
Teresa Ruiz, University of Vermont
Deborah Kelly, Virginia Tech

PLATFORM SESSION
Wednesday 8:30 AM • Room: 120

8:30 AM  567 (INVITED) Structural Analysis of the Helicobacter Pylori Pore-Forming Toxin, VacA; MD Ohi, TL Cover, NJ Foegeding, TM Pyburn; Vanderbilt University

9:00 AM  568 Capturing Near Atomic Resolution Snapshots of the Ribosome Assembly Process Using Direct Electron Detectors; J Ortega, A Razi; McGill University, Canada

9:15 AM  569 Spatial Organization of the Ccq1-Tpz1-Poz1 Telomere Complex; HW Scott; Case Western Reserve University; J-K Kim, C Yu, L Huang, F Qiao; University of California, Irvine; D Taylor; Case Western Reserve University

9:30 AM  570 (INVITED) Structural Studies that Define Regulatory Interactions within the Mitochondrial Fission Machinery; RW Clinton, CA Francy, JA Mears; Case Western Reserve University

B08.2 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals

SESSION CHAIRS:
Gang (Greg) Ning, Pennsylvania State University
Ru-ching Hsia, University of Maryland

PLATFORM SESSION
Wednesday 8:30 AM • Room: 123

8:30 AM  571 (INVITED) 3D Virtual Histology and its Potential Contributions to Science; KC Cheng; Pennsylvania State University

9:00 AM  572 Effect of Gamma Irradiation on Autophagic Flux in Glioblastoma Cells That Express LC3B-eGFP-mCHERRY; LS Yasui, V Bui, A Latgnotha; Northern Illinois University

9:15 AM  573 (INVITED) Super-Resolution Imaging of the Kidney Glomerulus in Health and Disease Conditions; HY Suleiman, R Roth, JH Miner; Washington University; AS Shaw; GenenTech

9:45 AM  574 Magnesium-Supported Continuous Growth of Rodents’ Incisors; V Srot, B Bussmann, J Deuschle; Max Planck Institute for Solid State Research, Germany; B Pokorny; Environmental Protection College + Institute ERICo, Slovenian Forestry Institute, Slovenia; M Watanabe; Lehigh University; PA van Aken; Max Planck Institute for Solid State Research, Germany

P01.4 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:
Esther Chen, GlobalFoundries Inc.

PLATFORM SESSION
Wednesday 8:30 AM • Room: 267

8:30 AM  576 (INVITED) Epitaxial Growth of ZnO Monolayer on Graphene: The Thinnest Metal Oxide Semiconductor; H-K Hong, J Lee, NY Kim, S Son, JH Kim; Ulsan National Institute of Science and Technology, Korea; R Erni; Empa – Swiss Federal Laboratories for Materials Science and Technology, Korea; Z Lee; Ulsan National Institute of Science and Technology, Korea

9:00 AM  577 Strain Coupling During Lithiation of a FeO/SrTiO3 Epitaxial Thin Film; S Hwang, Q Meng; Brookhaven National Laboratory; P-F Chen; Academia Sinica; K Kisslinger, Y Zhu, EA Stach; Brookhaven National Laboratory; Y-H Chu; National Chiao Tung University, Taiwan; D Su; Brookhaven National Laboratory

9:15 AM  578 Directly Identifying Phase Segregation in 2D Quaternary Alloys; J Hachtel; Oak Ridge National Laboratory; S Susarla, V Kochat; Rice University; C Tiwary; Rice University; P Ajayan; Rice University; JC Idrobo; Oak Ridge National Laboratory

9:30 AM  579 Cross-Sectional STEM Imaging and Spectroscopy of Devices with Embedded 2D Materials; RJ Wu, D Reifnyder Hickey, A MkhoV; University of Minnesota
Scientific Program

**P03.5  Advanced Microscopy and Microanalysis of Complex Oxides**

**SESSION CHAIR:**
Xihan Sang, Oak Ridge National Laboratory

**PLATFORM SESSION**
Wednesday 8:30 AM • Room: 274

8:30 AM  **581**  (INVITED)  (MSA POSTDOCTORAL SCHOLAR)
Interaction Between Ferroelectric Polarization and Defects in BiFeO$_3$ Thin Films; I. Li, L. Xie, Y. Zhang; University of California, Irvine; X. Cheng, Z. Hong; University of Pennsylvania; C. Adamo, C. Heikes, D. Schlom; Cornell University, et al.

9:00 AM  **582**
Understanding the Effect of Doping and Epitaxial Strain on the Ferroelectric Polarization of Layered Perovskite Thin Films; M. Campanini; Swiss Federal Laboratories for Materials Science and Technology; M. Trassin, C. Ederer; ETH Zurich, Switzerland; R. Erni, MD Rossell; Swiss Federal Laboratories for Materials Science and Technology

9:15 AM  **583**
Transmission Electron Microscopy and First-Principles Study on Highly Strained BiFeO$_3$ grown on LaAlO$_3$; I-T Bae; Binghamton University; A. Kovacs; Forschungszentrum Juelich; HJ Zhao, J. Iniguez; Luxembourg Institute of Science and Technology; S. Yasui; Tokyo Institute of Technology; T. Ichinose, H. Naganuma; Tohoku University

9:30 AM  **584**  (INVITED)  STEM-EELS Investigation of Charge and Strain Distributions in Perovskite Oxide Thin Films; A. Gloter; CNRS - Université Paris-Sud; X. Li, G. Tieri; CNRS - Université Paris-Sud; M. Marinova; CNRS; D. Preziosi, V. Garcia, S. Fusil, A. Barthelemy; CNRS - Thales Research and Technology, France et al.
Scientific Program

P07.4  Advanced Characterization of Energy-Related Materials

SESSION CHAIR:
Meng Gu, The Dow Chemical Company

PLATFORM SESSION
Wednesday 8:30 AM  •  Room: 276

8:30 AM 590 (INVITED)  In Situ TEM Study of the Hydrogen Effect on the Interface Between Al and Its Oxide at Room and Elevated Temperature; D Xie, M Li, Z Shan; Xi’an Jiaotong University, China

9:00 AM 591 (INVITED)  Measuring the Phase Transformation Kinetics Under Non-Equilibrium Conditions from Time-Resolved High-Resolution TEM Images; R Sharma; National Institute of Standards and Technology; Z Hussiani; Center for Nanoscale Science and Technology; PAA Lin, B Natarajan; National Institute of Standards and Technology

9:30 AM 592  In Situ TEM Observations of Oxygen Surface Dynamics in CeO\textsubscript{2} Cubes; EL Lawrence, SL Chang, PA Crozier; Arizona State University

9:45 AM 593  In Situ Observation of Cooling in a Bismuth Telluride and Bismuth-Antimony Telluride Nanoscale Heterojunction; M Mecklenburg, WA Hubbard, B Vareskic, B Zutter; University of California, Los Angeles; S Aloni; Lawrence Berkeley National Laboratory; BC Regan; University of California, Los Angeles

P08.5  Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:
Bradley De Gregorio, U.S. Naval Research Laboratory
Lori Hathon, University of Houston

PLATFORM SESSION
Wednesday 8:30 AM  •  Room: 262

8:30 AM 594 (INVITED)  High-Resolution Imaging of Short-Range Order Materials (Allophane) with Aberration Corrected TEM and Direct Electron Detection; TG Sharp, SL Chang; Arizona State University

9:00 AM 595  Electron Energy Loss Near Edge Structures as a Tool to Elucidate Natural and Artificial Minerals Structures; T Dennenwaldt, F Nabiei, DT Alexander; Ecole Polytechnique Fédérale de Lausanne, Switzerland; J Badro; Université Paris Sorbonne; P Gillet, H Piet, C Hébert; Ecole Polytechnique Fédérale de Lausanne, Switzerland

9:15 AM 596  Accurate Grain and Phase Boundary Location by Dictionary-Based Indexing of Geological EBSD Data; S Singh; Carnegie Mellon University; K Marquardt; University of Bayreuth, Germany; M De Graef; Carnegie Mellon University


9:45 AM 598  Quantitative Processing of EDS Maps: A Presentation of Solutions to Mapping Artifacts and Applications in Cosmochemistry; L Kööp, AM Davis; The University of Chicago

T PHYSICAL SCIENCES TUTORIAL—WEDNESDAY MORNING

X40.1  Large Scale Data Acquisition and Analysis for Materials Imaging and Spectroscopy

SESSION CHAIR:
Donovan Leonard, Oak Ridge National Laboratory

PLATFORM SESSION
Wednesday 8:30 AM  •  Room: 126

8:30 AM 575 (INVITED)  Tutorial: Processing of Atomic Resolution Images and Multispectral Data; S Jesse, A Belianninov; Oak Ridge National Laboratory
Scientific Program

A01.1 Vendor Symposium

SESSION CHAIRS:
Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University School of Medicine

PLATFORM SESSION
Wednesday 10:30 AM • Room: 125

10:30 AM 600 Probing the Element Distribution at the Organic-Inorganic Interface Using EDS; M Falke, A Kaeppel; Bruker Nano GmbH, Germany; B Yu; Bruker Nano Analytics Division; T Salge; Natural History Museum, London; R Terborg; Bruker Nano GmbH, Germany

10:45 AM 601 ZEISS Crossbeam – Advancing Capabilities in High Throughput 3D Analysis and Sample Preparation; T Volkenandt, F Pérez-Willard, M Rauscher; Carl Zeiss microscopy GmbH, Germany; PM Anger; Carl Zeiss microscopy, LLC

11:00 AM 602 A Dedicated Backscattered Electron Detector for High-Speed Imaging and Defect Inspection; M Schmid, A Liebel, R Lackner, D Steigenhöfer, A Niculae, H Soltau; PNDetector GmbH, Germany

11:15 AM 603 Large Area 3D Structural Characterization by Serial Sectioning Using Broad Ion Beam Argon Ion Milling; P Nowakowski, ML Ray, PE Fischione; E.A. Fischione Instruments

11:30 AM 604 New Scios CryoTM - Dedicated FIB/SEM for Advanced Cryo-Lamella Preparation in Structural Biology; JM Mitchels, D van Rossum, A Rigort; Thermo Fisher Scientific

11:45 AM 605 Advances in Serial-Section Broad-Ion-Beam Tomography; T Hosman, S Coyle; Gatan Inc; M Hassel-Shearer, JA Hunt; Gatan, Inc; A Gholinia, P Withers; University of Manchester, United Kingdom

A02.5 Compressive Sensing, Machine Learning & Advanced Computation in Microscopy

SESSION CHAIR:
Rowan Leary, University of Cambridge, United Kingdom

PLATFORM SESSION
Wednesday 10:30 AM • Room: 260

10:30 AM 606 3D Deconvolution for Cryo-Scanning Transmission Electron Tomography; B Waugh, SG Wolf, S Rubin; Weizmann Institute of Science, Israel; E Branlund, J Sedat; University of California, San Francisco; M Elbaum; Weizmann Institute of Science, Israel

10:45 AM 607 Scanning Electron Microscope Point Spread Function Determination Through the Use of Particle Dispersions; MD Zotta, E Lifshin; SUNY Polytechnic Institute

11:00 AM 608 Viability of Point Spread Function Deconvolution for SEM; MC Nevins; Rochester Institute of Technology; MD Zotta; Nanojehm; RK Hailstone; Rochester Institute of Technology; E Lifshin; SUNY Polytechnic Institute

11:15 AM 609 (M&M STUDENT SCHOLAR) GENFIRE: A Generalized Fourier Iterative Reconstruction Algorithm for High-Resolution 3D Electron and X-ray Imaging; AP Pryor, Y Yang, A Rana, M Gallagher-Jones, J Zhou, YH Lo; University of California, Los Angeles; G Melinte; Institut de Physique et Chimie des Matériaux de Strasbourg, France; JA Rodriguez; University of California, Los Angeles, et al.


11:45 AM 611 Dragonfly SegmentationTrainer - A General and User-Friendly Machine Learning Image Segmentation Solution; N Piche, I Bouchard, M Marsh; Object Research Systems, Canada
Scientific Program

Wednesday, August 9

A06.3 Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy

SESSION CHAIR: James Evans, Pacific Northwest National Laboratory

PLATFORM SESSION
Wednesday 10:30 AM • Room: 121

10:30 AM 612 (INVITED) Cross-scale Integrated Bioimaging by 3D Light-, X-ray and Electron Microscopy - From Organisms, Organs and Tissue to Cells, Organelles, and Macromolecular Complexes; M Auer; Lawrence Berkeley National Laboratory

11:00 AM 613 (INVITED) Integrated Dynamic 3D Imaging of Microbial Processes and Communities in Rhizosphere Environments: The Argonne Small Worlds Project; K Kemner, M Hereld; Argonne National Laboratory; N Scherer; University of Chicago; O Cossairt; Northwestern University; B Glick; University of Chicago; N Ferrier, R Wilton, P Noirot; Argonne National Laboratory, et al.

11:30 AM 614 Correlative Tomography for Additive Manufacturing of Biomedical Implants; BB Winiarski, G Pyka; Thermo Fisher Scientific (FEI Czech Republic s.r.o.); M Benedetti; University of Trento, Italy; TL Burnett; University of Manchester, United Kingdom; D Laeveren; Thermo Fisher Scientific (FEI Czech Republic s.r.o.); M Dallago; University of Trento, Italy; PJ Withers; University of Manchester, United Kingdom

11:45 AM 615 Dissecting the Cellular Behaviour of Colorectal Cancer via Multimodal Imaging and Correlative Microscopy; F Braet; University of Sydney, Australia

A08.2 Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS: Knut Urban, Research Center Jülich, Germany
David J. Smith, Arizona State University

PLATFORM SESSION
Wednesday 10:30 AM • Room: 132

10:30 AM 616 (INVITED) Aberration-Corrected STEM/EELS at Cryogenic Temperatures; L Kourkoutis, I El Baggari, BH Savitzky, DJ Baek, BH Goodge, RHovden, MJ Zachman; Cornell University

11:00 AM 617 Direct Solid-State Nucleation from Preexisting Coherent Precipitates in Aluminium; L Bourgeois, Y Chen, Z Zhang, Y Zhang, N Medhekar; Monash University, Australia

11:15 AM 618 Evaluation of Aberration-Corrected Optical Sectioning for Exploring the Core Structure of ½[111] Screw Dislocations in BCC Metals; D Hernandez-Maldonado; SuperSTEM, United Kingdom; R Gröger; Academy of Sciences of the Czech Republic; QM Ramasse; SuperSTEM, United Kingdom; PB Hirsch; PD Nellist; University of Oxford, United Kingdom

11:30 AM 619 (INVITED) Quantitative Mapping of Strain, Polarization, and Octahedral Distortion at Unit Cell Resolution by Scanning Electron Diffraction; J Ciston, R dos Reis, Y Meng, C Ophus; Lawrence Berkeley National Laboratory; LW Martin; University of California Berkeley

A09.2 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

SESSION CHAIR: Owen K. Neill, Washington State University

PLATFORM SESSION
Wednesday 10:30 AM • Room: 264

10:30 AM 620 (INVITED) Status of the Smithsonian Microbeam Standards 2017 with a Discussion of the Venerable VG-2 Basalt Glass; T Rose, C Brown; Smithsonian Institution

11:00 AM 621 Relative Uncertainties in Mass Attenuation Coefficients and Their Influence on Quantitative EDS and WDS Analysis; R Terborg; Bruker Nano GmbH, Germany; J Dellith, A Scheffel; Leibniz Institute of Photonic Technology, Germany; M Abratis; Bruker Nano GmbH, Germany

11:15 AM 622 (INVITED) Minerals from the Kakanui Volcanic Breccia: A 2017 Look at Geological Reference Materials for EPMA; J Fournelle; University of Wisconsin, Madison; J Scott; University of Otago, New Zealand

11:30 AM 623 Application of SIMS-SSAMS to Characterization of Surrogate Pre- and Post-Detonation Urban Debris Standard Reference Materials; WR Thompson, KS Grabowski; U.S. Naval Research Laboratory; AJ Fahey; Corning, Inc.

11:45 AM 624 ζ Factor and k-Factor Determination Using Needle Samples; HO Colijn, DW McComb; Ohio State University

WITHDRAWN
A13.2 Applications of Atom Probe Tomography

SESSION CHAIR:
Michael Moody, University of Oxford, United Kingdom

PLATFORM SESSION
Wednesday 10:30 AM • Room: 263

10:30 AM 625 Nanoscale Chemical Imaging of Coking Mechanisms in a Zeolite ZSM-5 Crystal by Atom Probe Tomography; JD Poplawsky; Oak Ridge National Laboratory; JE Schmidt; Utrecht University, Netherlands; B Maxumber, W Guo; Oak Ridge National Laboratory; D Fu, O Attila, M de Winter, F Meirer; Utrecht University, Netherlands, et al.

10:45 AM 626 Atom Probe Tomography of Human Tooth Enamel and the Accurate Identification of Magnesium and Carbon in the Mass Spectrum; A La Fontaine, J Cairney; University of Sydney, Australia

11:00 AM 627 Distinguishing Meteoritic Nanodiamonds from Amorphous Carbon Using Atom-Probe Tomography; JB Lewis; Washington University; D Isheim; Northwestern University; C Floss; Washington University; D Seidman; Northwestern University

11:15 AM 628 Atomic Elemental Tomography of Heavy Element Biomaterials; X Wang; McMaster University, Canada; RM Schofield, MH Nesson; University of Oregon; A Devaraj; Pacific Northwest National Laboratory

11:30 AM 629 (IFES STUDENT SCHOLAR) Metallic Nanoshell for Three-Dimensional Chemical Mapping of Low Conductive Materials with Pulsed-Voltage Atom Probe Tomography; V Adineh; Monash University, Australia; R Marceau; Deakin University, Australia; J Fu; Monash University, Australia

11:45 AM 630 Nanoscale Chemical Variations at Boundaries in a $\text{BaCe}_{0.8}Y_{0.2}O_{3-\delta} - \text{Ce}_{0.8}Y_{0.2}O_{3-\delta}$ Dual Phase Hydrogen Separation Membrane; G Burton, D Diercks, B Gorman; Colorado School of Mines

A14.2 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:
Sanjit Bhowmick, Bruker Corporation

PLATFORM SESSION
Wednesday 10:30 AM • Room: 131

10:30 AM 631 (INVITED) Investigation of Grain Growth and Deformation in Nanocrystalline Metals Through In Situ TEM Mechanical Testing and Crystallographic Orientation Mapping; CM Barr, DC Bufford, K Hattar; Sandia National Laboratories

11:00 AM 632 Development of Quantitative In Situ TEM Nanomechanical Testing for Polymers; NR Velez, FL Allen; University of California, Berkeley / Lawrence Berkeley National Laboratory; MA Jones, GF Meyers; The Dow Chemical Company; AM Minor; University of California, Berkeley / Lawrence Berkeley National Laboratory

11:15 AM 633 (M&M STUDENT SCHOLAR) Nanoindentation on Graphene-Encapsulated Single Cells; J Li, C Zheng, B Liu, Y Kim, J Li, W Yan, J Fu; Monash University, Australia

11:30 AM 634 (INVITED) In Situ Mechanical Testing of Contacts Between Nanoscale Bodies: Measuring the Load-Dependence of Contact Area.; SB Vishnubhotla; University of Pittsburgh; R Chen; University of California, Merced; SR Khanal; University of Pittsburgh; X Hu, A Martini; University of California, Merced; TD Jacobs; University of Pittsburgh

A15.1 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:
Mike Marko, Wadsworth Center

PLATFORM SESSION
Wednesday 10:30 AM • Room: 127

10:30 AM 635 (INVITED) Detection of Isolated Metal Ions on Ferritin by Single-Particle Cryo-STEM Reconstruction; N Elad, G Bellapadrona, L Houben, I Sagi, M Elbaum; Weizmann Institute of Science, Israel

11:00 AM 636 (INVITED) (M&M STUDENT SCHOLAR) Dose-Efficient Cryo-STEM Imaging of Whole Cells Using the Electron Microscope Pixel Array Detector; KA Spoth, KX Nguyen, DA Muller, LF Kourkoutis; Cornell University
Scientific Program

Wednesday, August 9

A16.5 In situ and operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Libor Kovarik, Pacific Northwest National Laboratory

PLATFORM SESSION
Wednesday 10:30 AM • Room: 130

10:30 AM 639 (INVITED) Operando and Multimodal Studies of Speciation and Activity of Pt Catalysts During the Hydrogenation of Ethylene; E Stach; Brookhaven National Laboratory; S Zhou; University of Illinois, Urbana-Champaign; Y Li; Stony Brook University; D Liu, Y-M Liu; University of Illinois, Urbana-Champaign; J Liu; Stony Brook University; D Zakharov; Brookhaven National Laboratory; Q Wu; Stony Brook University, et al.

11:00 AM 640 (MSA POSTDOCTORAL SCHOLAR) In Situ Characterization of Catalytic Reactions Promoted by Localized Surface Plasmon Resonance Energy; C Wang, W-CD Yang, D Sil, A Agrawal, R Sharma; National Institute of Standards and Technology

11:15 AM 641 In Situ TEM Observation of MultiLayer Graphene Formation from CO on Cobalt Nanoparticles at Atmospheric Pressure; PJ Kooyman; University of Cape Town; GM Bremmer; Leiden University, Netherlands; E Zacharaki, AO Sjåstad; University of Oslo; V Navarro; Netherlands Organisation for Applied Scientific Research; JW Frenken; Leiden University, Netherlands

11:30 AM 642 Atomic Scale Environmental Transmission Electron Microscopy Study of the Surface Mobility of Ceria Nanocubes; M Bugnet; Centre National de la Recherche Scientifique, France; SH Overbury, Z Wu; Oak Ridge National Laboratory; FC Aires, T Epicier; Centre National de la Recherche Scientifique, France

11:45 AM 643 Room Temperature CO Dissociation on Selective Edges of Gold Nanoparticles; W-CD Yang, C Wang, R Sharma; National Institute of Standards and Technology

A17.3 Biological Soft X-ray Tomography

SESSION CHAIRS:
Carolyn Larabell, University of California, San Francisco
Kenneth Fahy, SiriusXT, Ireland

PLATFORM SESSION
Wednesday 10:30 AM • Room: 122

10:30 AM 644 Chromatin Reorganization During Viral Infection; V Aho, M Myllys; University of Jyvaskyla, Finland; CA Larabell; Lawrence Berkeley National Laboratory; M Vihinen-Ranta; University of Jyvaskyla, Finland

10:45 AM 645 Multimodal Imaging and Soft X-ray Nanotomography to Optimize Algal-Based Lipid Feedstocks; C Smallwood, W Chrisler; Pacific Northwest National Laboratory; J-H Chen; Lawrence Berkeley National Laboratory; E Patello; Pacific Northwest National Laboratory; R Boudreau, M Le Gros; Lawrence Berkeley National Laboratory; JE Evans; Pacific Northwest National Laboratory

11:00 AM 646 Near-Edge Absorption Soft X-ray Nanotomography of Cells Incubated with Nanoparticles; JJ Conesa; ALBA Synchrotron Light Source, Spain; J Oton; Spanish National Center for Biotechnology, Spain; FJ Chichon, JL Carrascosa; Spanish National Center for Biotechnology, Spain

11:15 AM 647 (INVITED) Sorting Out the JUNQ: The Spatial Nature of Protein Quality Control; EM Sontag; Stanford University; J-H Chen, G McDermott; University of California, San Francisco; D Gestaut; Stanford University; C Larabell; University of California, San Francisco; J Frydman; Stanford University

11:45 AM 648 Quantitative 3D Analysis of Structural Organization of Normal and Tumor Cells; CA Larabell, MA Le Gros; University of California, San Francisco
Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA - WEDNESDAY MORNING

B06.4 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells

SESSION CHAIRS:
Deborah Kelly, Virginia Tech
Elizabeth Wright, Emory University
Teresa Ruiz, University of Vermont

PLATFORM SESSION
Wednesday 10:30 AM • Room: 120

10:30 AM 649 Evolution and Fate of the Residual Body of Toxoplasma gondii revealed by FIB-SEM series; M Attias, KR Miranda, W De Souza; Universidade Federal do Rio de Janeiro, Brazil

10:45 AM 650 (INVITED) Revealing the Native Molecular Architecture of the Nuclear Periphery Using Cryo-Focused Ion Beam Milling, Light Microscopy, and Electron Tomography; E Villa, R Watanabe, R Buschauer, V Lam, K Khanna; University of California, San Diego; J Singla, F Alber; University of Southern California

11:15 AM 651 Cryo-FIB Milling Reveals Complex Vesicular Architecture in Photosynthetic Bacteria; JM Noble; Cornell University; J Lubieniecki, JM Plitzko, H Engelhardt, W Baumeister; Max Planck Institute of Biochemistry, Germany; LF Kourkoutis; Cornell University

11:30 AM 652 Amorphous Solid Phase Deposition of Ions and Phosphate within Eukaryotic Mitochondrial Matrices – Imaging and Characterization by CryoSTEM Tomography and Energy-Dispersive X-ray Spectroscopy; SG Wolf, Y Mutsafi, T Ilani, M Elbaum, D Fass; Weizmann Institute of Science, Israel

11:45 AM 653 In Situ Liquid Cell Electron Microscopy: An Evolving Tool for Biomedical and Life Science Applications; MJ Dukes; Protochips, Inc; C Varano, DF Kelly; Virginia Tech Carilion Research Institute

B08.3 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals

SESSION CHAIRS:
Jon Charlesworth, Trace Christensen; Mayo Clinic
Gang (Greg) Ning, Pennsylvania State University

PLATFORM SESSION
Wednesday 10:30 AM • Room: 123

10:30 AM 654 (MSA POSTDOCTORAL SCHOLAR) Phantoms Models to Characterize Influenza Hemagglutinin-Based Vaccines; DM McCraw, AK Harris; National Institutes of Health

10:45 AM 655 (INVITED) The Role of Electron Microscopy in Pediatric Pathology; EP Wartchow; Children's Hospital Colorado

11:15 AM 656 Mobile Image Analysis for Microscopic Images of Seeds; K Gao, M Warmund, T White, R Angelovici, F Bunyak; University of Missouri, Columbia

11:30 AM 657 Centriole Mediated Neurogenesis of OSN in Fish; SK De, SK Sarkar; Vidyasagar University, India

11:45 AM 658 (M&M STUDENT SCHOLAR) Molecular Consequences of Cardiac Valve Development as a Result of Altered Hemodynamics; V Menon, L Junor, JF Eberth; University of South Carolina School of Medicine; SM Ford; University Hospitals, Rainbow Babies and Children's Hospital; MT McPheeters, MW Jenkins; Case Western Reserve University; M Belhaj, JD Potts; University of South Carolina School of Medicine
P01.5  Characterization of Semiconductor Materials and Devices

SESSION CHAIR:
Moon J. Kim, University of Texas, Dallas

PLATFORM SESSION
Wednesday 10:30 AM  •  Room: 267

10:30 AM  660  Structure and Chemistry of Oxide Surface Reconstructions in III-Nitrides Observed Using STEM-EELS; JH Dycus, KJ Mirrielees, ED Grimley, R Dhall; North Carolina State University; R Kirste, S Mita; Adroit Materials, Inc.; Z Sitar, R Collazo; North Carolina State University, et al.

10:45 AM  661  Field Emission from Zinc Oxide Nanobelt; AAsthana, YK Yap; Michigan Technological University; RS Yassar; University of Illinois, Chicago

11:00 AM  662  High Spatial Resolution Energy Dispersive X-ray Spectroscopy and Atom Probe Tomography Study of Indium Segregation in N-Polar InGaN Quantum Wells; M Catalano; University of Texas, Dallas; B Bonef, C Lund, UK Mishra, S Keller; University of California, Santa Barbara; MJ Kim; University of Texas, Dallas

11:15 AM  663  Detailed In Situ Observations of Electromigration in Aluminum Wires; M Mecklenburg; University of Southern California; B Zutter, WA Hubbard; University of California, Los Angeles; S Aloni; Lawrence Berkeley National Laboratory; BC Regan; University of California, Los Angeles

11:30 AM  664  Direct Observation of Oxygen Movement in Graphene Oxide-Based Resistive Switching Memory; S Kim; Northwestern University; JC Kim, HY Jeong; Ulsan National Institute of Science and Technology, Korea

11:45 AM  665  Point and Extended Defects in Ultra Wide Band Gap β-Ga2O3 Interfaces; JM Johnson, S Krishnamoorthy, S Rajan, J Hwang; The Ohio State University
**Scientific Program**

**P03.6 Advanced Microscopy and Microanalysis of Complex Oxides**

**SESSION CHAIR:**
James LeBeau, North Carolina State University

**PLATFORM SESSION**
Wednesday 10:30 AM • Room: 274

10:30 AM **670** Measuring the Cation and Oxygen Atomic Column Displacement at Picometer Precision; Y Wang; Max Planck Institute for Solid State Research, Germany; L Jones; University of Oxford, United Kingdom; B Berkels; RWTH Aachen University, Germany; W Sigle, P van Aken; Max Planck Institute for Solid State Research, Germany

10:45 AM **671** (INVITED) Atomic Mapping of Domain Configurations in Ferroelectric Thin Films; X Ma; Chinese Academy of Sciences, China

11:15 AM **672** Correlating Local Chemistry and Local Cation Displacements in the Relaxor Ferroelectric PMN; MJ Cabral; North Carolina State University; S Zhang; University of Wollongong, Australia; JT Chi, BJ Reich, EC Dickey, JM LeBeau; North Carolina State University

11:30 AM **673** Atomic-Scale Investigations of Domain Walls in Polycrystalline BiFeO₃; G Drazic; National Institute of Chemistry in Ljubljana, Slovenia; A Bencan; Jozef Stefan Institute, Slovenia; D Damjanovic; Swiss Federal Institute of Technology; T Rojac; Jozef Stefan Institute, Slovenia

11:45 AM **674** Multimodal Chemical and Functional Imaging of Nanoscale Transformations in Ferroelectric Thin Films; AV Ievlev, CC Brown, P Maksymovych, SV Kalinin, OS Ovchinnikova; Oak Ridge National Laboratory

**P04.5 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices**

**SESSION CHAIR:**
Marta D. Rossell, Swiss Federal Laboratories for Materials Science and Technology

**PLATFORM SESSION**
Wednesday 10:30 AM • Room: 266

10:30 AM **675** (INVITED) Probing Strain-Induced Phenomena in Low Dimensionality Multiferroic Oxides; C Magén; Universidad de Zaragoza, Spain; R Guzmán; Institut de Ciència de Materials de Barcelona, ICMAB-CSIC; S Farokhipoor; University of Groningen, Netherlands; L Maurel, E Langenberg; Universidad de Zaragoza, Spain; J Iñiguez; Luxembourg Institute of Science and Technology; S Venkatesan; Ludwig-Maximilians-Universität München, Germany, AR Lupini; Oak Ridge National Laboratory, et al.

11:00 AM **676** Atomic Scale Structure and Defects in 2D GaSe Films and Van der Waals Interface; JM Johnson, CH Lee, S Krishnamoorthy, S Rajan, J Hwang; The Ohio State University

11:15 AM **677** Ge Nanowires: Sn Catalysts and Ge/Ge₁₋ₓSnₓ Core-Shell Structures; AF Marshall, G Chan, AC Meng, M Braun, PC McIntyre; Stanford University

11:30 AM **678** (M&M STUDENT SCHOLAR) Structural and Magnetic Characterization of B20 Skyrmion Thin Films and Heterostructures Using Aberration-Corrected Lorentz TEM and Differential Phase Contrast STEM; BD Esser, AS Ahmed, RK Kawakami, DW McComb; The Ohio State University

11:45 AM **679** Lorentz TEM Image Simulations of Dzyaloshinskii Domain Walls Under an In-Plane Magnetic Field; MP Li, M De Graef, V Sokalski; Carnegie Mellon University
P07.5 Advanced Characterization of Energy-Related Materials

**SESSION CHAIR:**
Raymond R. Unocic, Oak Ridge National Laboratory

**PLATFORM SESSION**
Wednesday 10:30 AM • Room: 276

10:30 AM **680** *(INVITED)* Integrating Novel Microscopy into Battery Research: From Atomic Resolution to In Situ and Functional Imaging; M Chi, C Ma, A Lupini, K More; Oak Ridge National Laboratory; C Nan; Tsinghua University, China; J Sakamoto; University of Michigan; N Dudney; Oak Ridge National Laboratory

11:00 AM **681** Atomic-Scale Characterization of Electrode Materials in Lithium/Sodium-Ion Batteries by STEM; L Gu; Institute of Physics, Chinese Academy of Sciences

11:15 AM **682** New Full-Range Electron Tomography Procedure for Accurate Quantification of Surfaces, Curvature, and Porosity in Energy-Related Nanomaterials; E Padgett, R Hovden, JA Da Silva, T Hanrath, DA Muller; Cornell University

11:30 AM **683** Revealing the Nanoscale Structure and Chemistry of Intact Solid-Liquid Interfaces in Electrochemical Energy Storage Devices by Cryo-FIB Lift-Out and Cryo-STEM; MJ Zachman, Z Tu, LA Archer, LF Kourkoutis; Cornell University

11:45 AM **684** *(MSA POSTDOCTORAL SCHOLAR)* Identifying and Engineering the Stacking Sequence in CVD Grown Few-Layer MoS₂ via Aberration-Corrected STEM; A Yan; University of California, Berkeley; W Chen; Illinois Institute of Technology; C Ophus, J Ciston; Lawrence Berkeley National Laboratory; CH Merino, A Zettl; University of California, Berkeley

P08.6 Geological Sample Characterization Using Various Imaging Modalities

**SESSION CHAIRS:**
Lori Hathon, University of Houston
Kultaransingh (Bobby) Hooghan, Weatherford Laboratories

**PLATFORM SESSION**
Wednesday 10:30 AM • Room: 126

10:30 AM **685** Iterative Reconstruction Techniques for X-ray Microscopy in Geosciences; MG Andrew, S Graham, W Thompsoon; Carl Zeiss Microscopy

**T BIOLOGICAL SCIENCES TUTORIAL–WEDNESDAY MORNING**

X44.1 Freeze Fracture, Deep-Etch & 3D Anaglyphs

**SESSION CHAIR:**
Tommi White, University of Missouri, Colombia

**PLATFORM SESSION**
Wednesday 10:30 AM • Room: 126

10:30 AM **659** *(INVITED)* Biological Sciences Tutorial: Freeze-fracture, Deep-etch, and 3D Anaglyphs; R Roth; Washington University School of Medicine
Scientific Program

A01.2  Vendor Symposium

SESSION CHAIRS:
Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University School of Medicine

PLATFORM SESSION
Wednesday 1:30 PM • Room: 125

1:30 PM 691 Three-Dimensional Optical Microstructure Analysis of Ferrite and Pearlite Phases in a Medium Carbon Steel; B Turner, S Ganti; UES Inc.; B Davis; WSD Consulting Inc; V Sundar; UES Inc.

1:45 PM 692 Temporal Compressive Sensing Instrumentation for TEM; DJ Masiel, RS Bloom, ST Park, BW Reed; Integrated Dynamic Electron Solutions, Inc.

2:00 PM 693 Developments in AZtec: New Solutions for EBSD; J Goulden, A Bewick, P Trimby; Oxford Instruments

2:15 PM 694 A Detection System with Controlled Surface Sensitivity for a New UHR SEM; P Sytař, J Jiruše, J Páral; TESCAN Brno s.r.o., Czech Republic

2:30 PM 695 Correlative In-Situ AFM & SEM & EDX Analysis of Nanostructured Materials; M Winhold, M Leitner; GETec Microscopy GmbH; A Lieb, P Frederix; Nanosurf AG; F Hofbauer, T Strunz; GETec Microscopy GmbH; J Sattelkov, H Plank; Institute for Electron Microscopy and Nanoanalysis, et al.

A03.1  Big, Deep, and Smart Data in Microscopy

SESSION CHAIR:
Eric Stach, Brookhaven National Laboratory

PLATFORM SESSION
Wednesday 1:30 PM • Room: 260

1:30 PM 696 (INVITED) Computational Methods for Large Scale Scanning Transmission Electron Microscopy (STEM) Experiments and Simulations; C Ophus, H Yang, R dos Reis, Y Meng; Lawrence Berkeley National Laboratory; A Pryor Jr., J Miao; University of California, Los Angeles; TC Pekin, AM Minor; University of California Berkeley, et al.

2:00 PM 697 (M&M STUDENT SCHOLAR) Joint Denoising and Distortion Correction for Atomic Column Detection in Scanning Transmission Electron Microscopy Images; C Zhang; University of Wisconsin, Madison; B Berkels; RWTH Aachen University, Germany; B Wirth; University of Münster; PM Voyles; University of Wisconsin, Madison

2:15 PM 698 Less is More: Bigger Data from Compressive Measurements; A Stevens, ND Browning; Pacific Northwest National Laboratory

2:30 PM 699 Acquisition and Fast Analysis of Multi-Dimensional STEM Data; AR Lupini, AY Borisevich, JC Idrobo; Oak Ridge National Laboratory

2:45 PM 700 (INVITED) Reconstruction of Randomly and Partially Sampled STEM Spectrum-Images; E Monier, T Oberlin; University of Toulouse, France; N Brun, M Tencé; University Paris-Sud, University Paris-Saclay; N Dobigeon; University of Toulouse, France

3:00 PM 700.5 (INVITED) Active Learning in High-Throughput Diffraction of Combinatorial Libraries; I Takeuchi; University of Maryland

A08.3  Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS:
Jim Ciston, Lawrence Berkeley National Laboratory
David Muller, Cornell University

PLATFORM SESSION
Wednesday 1:30 PM • Room: 132

1:30 PM 701 Towards a Direct Visualization of Charge Transfer in Monolayer Hexagonal Boron Nitride Using a Fast Pixelated Detector in the Scanning Transmission Electron Microscope; GT Martinez; University of Oxford, United Kingdom; TJ Pennycook; University of Vienna, Austria; TC Naginey, I. Jones; University of Oxford, United Kingdom; H Yang; Lawrence Berkeley National Laboratory; J Yates, RJ Nicholls; University of Oxford, United Kingdom, M Huth; PNDetector GmbH, Germany, et al.

1:45 PM 702 (M&M STUDENT SCHOLAR) Enhanced Resolution from Full-Field Ptychography with an Electron Microscope Pixel Array Detector; Y Jiang, Y Han, Z Chen, V Elser, DA Muller; Cornell University
2:00 PM 703 Quantitative Relation Between Differential Phase Contrast Images Obtained by Segmented and Pixelated Detectors; T Seki, G Sánchez-Santolino, R Ishikawa, Y Ikuhara, N Shibata; The University of Tokyo, Japan

2:15 PM 704 (MSA POSTDOCTORAL SCHOLAR) Quantitative Specimen Electric Potential Maps Using Segmented and Pixel Detectors in Scanning Transmission Electron Microscopy; HG Brown; Monash University, Australia; N Shibata; The University of Tokyo, Japan; Z Chen; Cornell University; M Weyland, TC Petersen, DM Paganin, MJ Morgan; Monash University, Australia, H Sasaki; Furukawa Electric Ltd., et al.

2:30 PM 705 Theory and Practice of Diffractionometry on Single Tungsten Atoms Using Electron Microscope Pixel Array Detectors; MC Cao, Y Han, Y Jiang, KW Nguyen, P Purohit, MW Tate, SM Gruner, V Elser; Cornell University, et al.

2:45 PM 706 Imaging of Individual Vacancies Using Electron Channeling Contrast in STEM; JM Johnson, J Hwang; The Ohio State University

A09.3 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

SESSION CHAIR:
Owen K. Neill, Washington State University

PLATFORM SESSION
Wednesday 1:30 PM • Room: 264

1:30 PM 707 (INVITED) Synthetic and Natural Reference Materials for EPMA, LA-ICPMS, LA-MC-ICPMS, SIMS, and Spectroscopic Microanalysis; JM Hanchar; Memorial University of Newfoundland

2:00 PM 708 Thoughts on Standards Materials and Analytical Routines for Electron Backscatter Diffraction (EBSD); MM Nowell, SI Wright; EDAX, Inc.

2:15 PM 709 Standardless EDS Composition Analysis Using Quantitative Annular Dark-Field Imaging; JH Dycus, W Xu, JM LeBeau; North Carolina State University

2:30 PM 710 Practical Utilization of Uranium-Containing Particulate Test Samples for SEM/EDS and SIMS Automated Particle Analysis Method Validation; MS Wellons, M DeVore, RM Rogers, J Hewitt; Savannah River National Laboratory; TL Williamson, TJ Tenner; Los Alamos National Laboratory; T Darroudi; Clemson University

A13.3 Applications of Atom Probe Tomography

SESSION CHAIR:
Mattias Thuvander, Chalmers University of Technology, Sweden

PLATFORM SESSION
Wednesday 1:30 PM • Room: 263

1:30 PM 711 (INVITED) 3DAP/TEM Study of Precipitation Hardened Magnesium Alloys; T Sasaju, T Ohkubo, K Hono; National Institute for Materials Science, Japan

2:00 PM 712 Atom Probe Tomography and Analytical Scanning Transmission Electron Microscopy of Rapid Solidification Microstructures in Al-Cu Alloy Thin Films; JM Wiezorek, KW Zweieracker, C Liu; University of Pittsburgh; I Martin, T Prosa, DJ Larson; CAMECA Instruments, Inc.

2:15 PM 713 On the Dose Rate Dependence of Cr Clustering in Ion-Irradiated Fe-18Cr Alloys; E Anderson; University of Michigan; R Odette, N Almirall; University of California, Santa Barbara; S Turney; Lawrence Livermore National Laboratory; E Marquis; University of Michigan

2:30 PM 714 (MSA POSTDOCTORAL SCHOLAR) Recent Progress of Correlative Transmission Electron Microscopy and Atom Probe Tomography for Materials Characterization; W Guo; Oak Ridge National Laboratory

2:45 PM 715 (M&M STUDENT SCHOLAR) In-Process Precipitation During Laser Additive Manufacturing Investigated by Atom Probe Tomography; P Kürnsteiner; Max-Planck-Institut für Eisenforschung GmbH, Germany; MB Wilms, A Weisheit; Fraunhofer Institute for Laser Technology; P Barriobero-Vila; Vienna University of Technology; EA Jägle, D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany
A14.3  Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:
Tevis Jacobs, University of Pittsburgh

PLATFORM SESSION
Wednesday 1:30 PM • Room: 131

1:30 PM  716  (INVITED) Imaging the Structural Evolution in Nanocrystalline Metals During Mechanical Deformation; C Kuebel; Karlsruhe Institute of Technology, Germany; A Kobler; Zeiss Microscopy; A Kashiwar, H Hahn; Karlsruhe Institute of Technology, Germany

2:00 PM  717  Micro-Mechanical In Situ Measurements in Thin Film Systems Regarding the Determination of Residual Stress, Fracture Properties and Interface Toughness; R Konetschnik; Montanuniversität Leoben, Austria; D Kozic, HP Gänser; Materials Center Leoben Forschung GmbH, Austria; D Kiener; Montanuniversität Leoben, Austria; R Brunner; Materials Center Leoben Forschung GmbH, Austria

2:15 PM  718  STEM Characterization of the Deformation Substructure of a NiCoCr Equiatomic Solid Solution Alloy; J Miao, CE Slone, TM Smith, CNiu; The Ohio State University; H Bei; Oak Ridge National Laboratory; M Ghaizaiidei; The Ohio State University; GM Pharr; Texas A&M University, MJ Mills; The Ohio State University

2:30 PM  719  (INVITED) The Role of Bcc Mg/Nb Interfaces in Nanocomposite Deformation Observed via In Situ Mechanical Testing in TEM; Y Chen, NLi; Los Alamos National Laboratory; S Yadav; Indian Institute of Technology, Madras; XLiu, JK Baldwin, RHoagliand; Los Alamos National Laboratory; JWang; University of Nebraska, Lincoln, N Mara; Los Alamos National Laboratory

A15.2  Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:
Mike Marko, Wadsworth Center

PLATFORM SESSION
Wednesday 1:30 PM • Room: 127

1:30 PM  720  (INVITED) New Strategies for Improving CryoEM Single Particle Analysis in EMAN 2.2; SJ Ludtke, TDuramaz, M Chen, JM Bell; Baylor College of Medicine

2:00 PM  721  (INVITED) Towards High Resolution in Cryo-Electron Tomography; S Pfeffer, MA Kheishebein, RDanev; Max-Planck Institute of Biochemistry, Germany; F Förster; Utrecht University, Netherlands

SUBSTITUTION: High-resolution Structure Determination Based on Cryo-electron Tomography; K. Taylor; Florida State University

2:30 PM  722  (INVITED) Going Deeper in Cryo Electron Tomography with Neural Networks; M Chen, WDai, SY Sun, MF Schmid, WChiu, SJLudtke; Baylor College of Medicine

A16.6  In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Guangwen Zhou, Binghamton University

PLATFORM SESSION
Wednesday 1:30 PM • Room: 130

1:30 PM  723  (INVITED) Spatio-Temporally Resolved In Situ Transmission Electron Microscopy of the Dynamics of Nanostructured Materials; TW Hansen, PLiu; Technical University of Denmark; JMadsen; Department of Physics; PSchlexer; University of Milano-Bicocca; B Sebök; Technical University of Denmark; JSchietz; Department of Physics; JB Wagner; Technical University of Denmark

2:00 PM  724  Visualizing Redox Chemistry in Oxide Surfaces at Atomic-Resolution; MEk; Haldor Topsoe AS; QMRamassee; SuperSTEM, United Kingdom; I. Arnarson, PG Moses; Haldor Topsoe AS; CKisielowski; Lawrence Berkeley National Laboratory; JR. Jinschek; The Ohio State University; SHelvég; Haldor Topsoe AS

2:15 PM  725  Surface Dynamics Associated with Redox Processes on TiO2 Nanoparticles; Q Liu, S Chang, PCrozier; Arizona State University

2:30 PM  726  Model “Alloy” Specimens for MEMS-Based Closed-Cell Gas Reactions; LFAillard, HMMeyer III, DKHensley; Oak Ridge National Laboratory; WCBigelow; University of Michigan; KAUncic; Oak Ridge National Laboratory
Scientific Program

B02.1 Microstructure Characterization of Food Systems

SESSION CHAIRS:
Jinping Dong, Cargill Minneapolis R&D Centre
Joël Wallecan, Cargill Minneapolis R&D Centre

PLATFORM SESSION
Wednesday 1:30 PM • Room: 121

1:30 PM 727 Applications of X-ray Micro Computed Tomography Technology in Food Research; AD Lape, V St. Jeor, J Johnson, P Smith; Cargill

1:45 PM 728 (INVITED) Food Structure, Its Formation and Breakdown; PJ Lillford; University of Birmingham, United Kingdom

2:15 PM 729 (INVITED) Understanding the Effect of Processing on the Structure of Plant Cell Walls as a Mean to Design Novel Clean Label Ingredients; J Dong; Cargill Minneapolis R&D Centre; K Moelants; Cargill R&D Centre, Europe; T Lipkje, A Steinbach; Cargill Minneapolis R&D Centre; J Mazoyer; Centre of Expertise Texture

2:45 PM 730 (INVITED) The Effect of Bran Reduction on Protein Secondary Structure in Intermediate Wheatgrass (Thinopyrum Intermedium) Dough; C Gajadeera; University of Minnesota; A Marti; University of Milan; BP Ismail; University of Minnesota

B05.1 Pharmaceuticals and Medical Science

SESSION CHAIR:
Bridget Carragher, New York Structural Biology Center

PLATFORM SESSION
Wednesday 1:30 PM • Room: 123

1:30 PM 731 Revealing the Iron Oxides Mineral Core in Ferritin due to the Variations in the H and L Subunits; S Narayanan, E Firlar, S Shafiee, K He, R Shahbazian-Yassar, T Shokuhfar; University of Illinois, Chicago

1:45 PM 732 (INVITED) Structure of the Insulin Receptor in Complex with Insulin Using Single Particle Cryoem Analysis; G Scapin; Merck & Co, Inc.; V Dandey, Z Zhang; New York Structural Biology Center; W Prosis; Merck & Co, Inc.

2:00 PM 733 Visualizing the Protein Corona: A Qualitative and Quantitative Approach Towards the Nano-Bio-Interface; I Lieberwirth; Max Planck Institute for Polymer Research, Germany

2:30 PM 734 (INVITED) (MSA POSTDOCTORAL SCHOLAR) Conformational Changes in HIV-1 Env Trimer Induced by a Single CD4 as Revealed by Cryo-EM; P Acharya; New York Structural Biology Center AND National Institutes of Health; Q Liu; National Institutes of Health; X Ma, M Lu; Yale University; VP Dandey, ET Eng, WJ Rice, C Wigge; New York Structural Biology Center, et al.

P01.6 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:
Michael Gribelyuk, GlobalFoundries Inc.

PLATFORM SESSION
Wednesday 1:30 PM • Room: 267

1:30 PM 736 (INVITED) Advances in Elemental Electron Tomography for the State-of-the-Art Semiconductor Devices and Circuits Characterization and Failure Analysis; B Fu, M Gribelyuk, FH Baumann, C Fang, W Zhao, E Chen, I Brooks; GlobalFoundries Inc.

2:00 PM 737 Automated STEM/EDS Metrology Characterization of 3D NAND Devices; Z Zhong, J Roller, O Bidiju, J Blackwood, M Verheijen, O Uguurlu, J Donald; Thermo Fisher Scientific

2:15 PM 738 Toward Automated S/TEM Metrology of Advanced CMOS Devices: Journey to Obtain a Precise and Accurate Measurement; W Weng; GlobalFoundries Inc.; H Tan; Thermo Fisher Scientific; A Katnani; GlobalFoundries Inc.

Scientific Program

**PHYSICAL SCIENCES SYMPOSIA - WEDNESDAY AFTERNOON CONTINUED**

2:45 PM 740  **Manganese Segregation Behavior in Damascene Metal Lines; G Lian, M Ali, S Boettcher; IBM Inc.**

**P02.2 TEM/STEM/EELS/SNOM of Ultralow Energy Excitations**

**SESSION CHAIR:**
Phil Batson, Rutgers University

**PLATFORM SESSION**
Wednesday 1:30 PM  •  Room: 261

1:30 PM 741  **(INVITED) Understanding Imaging and Energy-Loss Spectra Due to Phonon Excitation; LJ Allen; University of Melbourne, Australia; HG Brown; Monash University, Australia; BD Forbes; University of Melbourne, Australia; NR Lugg; The University of Tokyo, Japan; SD Findlay; Monash University, Australia**

2:00 PM 742  **Localized Signals in Vibrational STEM-EELS; C Dwyer, T Aoki, P Rez, L-YS Chang; Arizona State University; TC Lovejoy, OL Krivanek; Nion Co.**

2:15 PM 743  **Investigating Molecule-Plasmon Interactions in Chemically-Functionalized Metal Nanoparticles Using Monochromated EELS; P Abellan; SuperSTEM, United Kingdom; PZ El-Khoury; Pacific Northwest National Laboratory; FS Hage; SuperSTEM, United Kingdom; J Cotton; University of Leeds; AG Joly, WP Hess; Pacific Northwest National Laboratory; R Brydson; University of Leeds, QM Ramasse; SuperSTEM, United Kingdom**

2:30 PM 744  **(INVITED) Chemical Nano-Imaging with Tip-Enhanced Vibrational Spectroscopy; EA Muller, MB Raschke; University of Colorado**

**P03.7 Advanced Microscopy and Microanalysis of Complex Oxides**

**SESSION CHAIR:**
Lin-Ze Li, University of California, Irvine

**PLATFORM SESSION**
Wednesday 1:30 PM  •  Room: 274

1:30 PM 745  **(INVITED) In Situ Observation of Cu Filaments Evolution in SiO Layer; Z Zhang, F Yuan, C Liu, F Zhou, HM Yau, W Lu, X Qiu; The Hong Kong Polytechnic University, H-SP Wong; Stanford University, et al.**

2:00 PM 746  **Partial Ferroelastic Domain Mediated Ferroelectric Domain Switching; Y Zhang, L Li; University of California, Irvine; Y Chu; National Chiao Tung University, Taiwan; X Pan; University of California, Irvine**

2:15 PM 747  **In Situ Transmission Electron Microscopy Study of Oxygen Vacancy Ordering and Dislocation Annihilation in Undoped and Sm-Doped CeO; Ceramics During Redox Processes; Y Ding, Y Chen, KC Pradel, M Liu, ZL Wang; Georgia Institute of Technology**

2:30 PM 748  **(M&M STUDENT SCHOLAR) In Situ STEM-EELS Observation of Ferroelectric Switching of BaTiO Film on GaAs; L Hong; University of Illinois, Chicago; D Huber; The Ohio State University; R Contreras-Guerrero, R Droopad; Texas State University; RF Klie; University of Illinois, Chicago**

2:45 PM 749  **(M&M STUDENT SCHOLAR) Emergent Phase Coherence of Stripe Order in Manganites Revealed with Cryogenic Scanning Transmission Electron Microscopy; I El Baggari, BH Savitzky, R Hovden; Cornell University; AS Admasu, J Kim, S-W Cheong; Rutgers University; LF Kourkoutis; Cornell University**

**P05.1 Imaging and Spectroscopy of Beam Sensitive Materials**

**SESSION CHAIR:**
Ray Egerton, University of Alberta, Canada

**PLATFORM SESSION**
Wednesday 1:30 PM  •  Room: 266

1:30 PM 750  **(INVITED) TEM Investigations of Peptoid Structures; KH Downing, X Jiang, RN Zuckermann, NP Balsara; Lawrence Berkeley National Laboratory**

2:00 PM 751  **(M&M STUDENT SCHOLAR) Determining Nanoscale Molecular Ordering in Semiconducting Polymers; GA Calderon Ortiz, M Zhu, J Hwang; The Ohio State University**

2:15 PM 752  **Nanobeam Scanning Diffraction for Orientation Mapping of Polymers; KC Bustillo; Lawrence Berkeley National Laboratory; O Panova; University of California, Berkeley; XC Chen; Lawrence Berkeley National Laboratory; CJ Takacs; Stanford University; J Ciston, C Ophus; Lawrence Berkeley National Laboratory**
X41.1  Entrepreneurship in the Microscopy Community

SESSION CHAIR: Donovan Leonard, Oak Ridge National Laboratory

PLATFORM SESSION
Wednesday 1:30 PM • Room: 126
1:30 PM 753 (INVITED)  Entrepreneurship in Microscopy: Lessons from a Journey; TF Kelly; CAMECA Instruments, Inc

X91.1  Family Affair

SESSION CHAIRS: Elaine Humphrey, University of Victoria, Canada
Janet Schwarz, University of Vermont

PLATFORM SESSION
Wednesday 1:30 PM • Room: 124
1:30 PM 759.5  Family Affair; E Humphrey, University of Victoria, Canada

P07.6  Advanced Characterization of Energy-Related Materials

SESSION CHAIR: Langli Luo, Pacific Northwest National Laboratory

PLATFORM SESSION
Wednesday 1:30 PM • Room: 276
1:30 PM 755 (INVITED)  In Situ TEM Study of Phase Evolution in Individual Battery Materials; K Karki, H Zhang, Y Huang, MS Whittingham; Binghamton University; EA Stach; Brookhaven National Laboratory; G Zhou; Binghamton University

2:00 PM 756 (INVITED)  Pre-Irradiation Characterization of Radiation Resistant Nanocrystalline and Ultrafine-grained Austenitic Steels; H Wen; Idaho State University; Idaho National Laboratory; R Carnahan, A Hoffman, I Robin, M Wilding; Idaho State University

2:15 PM 757 Systematic Transmission Electron Microscopy Study Investigating Lithium and Magnesium Intercalation in Vanadium Oxide Polymorphs; A Mukherjee, HD Yoo, G Nolis; University of Illinois, Chicago; J Andrews, S Banerjee, J Cabana, RF Klie; University of Illinois, Chicago

2:30 PM 758 The Intermediate State of the Layered \rightarrow\text{Spinel} Phase Transformation in LiNi_{0.80}Co_{0.15}Al_{0.05}O_2 Cathode; H Zhang; University of Binghamton

2:45 PM 759 S/TEM Study of Fading Mechanism of Lithium Transition Metal Oxide Cathode for Lithium Ion Battery; C Wang, P Yan, J Zheng, J-G Zhang; Pacific Northwest National Laboratory
Scientific Program

A01.P1 Vendor Symposium

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 223

POSTER # 224
3:00 PM 761 A New Core Facility for Electron and Ion Microscopy at the University of Arizona; TJ Zega, BB Massani, Y-J Chang, K Domanik, K Nebesny, P Wallace, N Armstrong, E Corral; University of Arizona, et al.

POSTER # 225
3:00 PM 762 In Situ Thermal Shock of Lunar and Planetary Materials Using A Newly Developed MEMS Heating Holder in A STEM/SEM; J Howe; Hitachi High-Technologies America, Inc.; MS Thompson; NASA Johnson Space Center; S Dogel; Hitachi High-Technologies Canada, Inc.; K Ueda, T Matsumoto, H Kikuchi; Hitachi High-Technologies Corporation, Japan; M Reynolds, H Hosseinkhannazer; Norcada Inc, et al.

POSTER # 226
3:00 PM 763 High Spatial Resolution and Wide Range EDS Analysis with FE-SEM; S Takeuchi, Y Hashimoto, M Sasajima, K Hosoya, Y Dan; Hitachi High-Technologies Corporation, Japan; S Miyasaka; Horiba Ltd.; S Yamaguchi; Oxford Instruments KK

POSTER # 227
3:00 PM 764 Application of Temperature Controlled Stage in Atmospheric Scanning Electron Microscopy; M Sakaue, S Miyoshi, Y Ominami; Hitachi High-Technologies Corporation, Japan

POSTER # 228
3:00 PM 765 High Performance Silicon Drift Detectors; A Pahlke, T Eggert, R Fojt, M Fraczek, L Hölt, J Knobloch, N Miyakawa, J Rumpf; KETEK GmbH, et al.

A05.P1 Advances in FIB Instrumentation and Applications in Materials and Biological Sciences

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 234
3:00 PM 771Focused Ion Beam Prepared Cross-Sectional Transmission Electron Microscopy Preparation on CaGe₂ on Ge(111) Grown By Molecular Beam Epitaxy; RE Williams, J Xu, A Hanks, A Ahmed, IV Pinchuk, DW McComb, R Kawakami, J Katoch; The Ohio State University

POSTER # 235
3:00 PM 772Cross Sectional Analysis of Cation Doped Transition Metal Oxide Mesoporous Catalyst Materials; S Poges, B Dutta, H Khanna, E Moharreri, M Aindow, SL Suib; University of Connecticut

POSTER # 236
3:00 PM 773TEM Specimen Preparation for In Situ Heating Experiments Using FIB; S Vijayan; University of Connecticut; JR Jinschek; The Ohio State University; S Kujawa, J Greiser; FEI Company; M Aindow; University of Connecticut
POSTER # 237
3:00 PM 774 Ga⁺ and Xe⁺ FIB Milling and Measurement of FIB Damage in Aluminum; B Van Leer, A Genc, R Passey; Thermo Fisher Scientific

POSTER # 238
3:00 PM 775 Applications of an In Situ Low Energy Argon Ion Source for Improvement of TEM and SEM Sample Quality; A Prokhodtseva, J Mulders, T Vystavěl; Thermo Fisher Scientific

POSTER # 239
3:00 PM 776 Accurate Removal of Implanted Gallium and Amorphous Damage from TEM Specimens after Focused Ion Beam (FIB) Preparation; P Nowakowski, CS Bonifacio, MJ Campin, ML Ray, PE Fischione; E.A. Fischione Instruments

POSTER # 240
3:00 PM 777 Narrow-Beam Argon Ion Milling of Carbon-Supported Ex Situ Lift-Out FIB Specimens; MJ Campin, CS Bonifacio; E.A. Fischione Instruments, Inc; HH Kang; GlobalFoundries Inc.; P Nowakowski, M Boccabella, PE Fischione; E.A. Fischione Instruments, Inc

POSTER # 241
3:00 PM 778 Towards Automatic Lamella Thinning Using Live Thickness Measurements and Smart End-Point Detection; T Volkenandt, F Pérez-Willard, M Rauscher; Carl Zeiss Microscopy GmbH, Germany; PM Anger; Carl Zeiss Microscopy, LLC

POSTER # 242
3:00 PM 779 Optimizing Van der Waals Forces for FIB Ex Situ Lift Out; LA Giannuzzi; EXpressLO LLC; T Clark; The Pennsylvania State University

POSTER # 243
3:00 PM 780 A Novel Approach in Sample Preparation of Li Content Materials for TEM Research; S-C Liou, C-F Lin, W-A Chiou, G Rubolff; University of Maryland

POSTER # 244
3:00 PM 781 FIB/SEM Imaging of Microbial Induced Calcite Precipitation in Sandy Soil; L Li, K Wen; Jackson State University; C Li; Inner Mongolia University of Technology; F Amini; Jackson State University

POSTER # 245
3:00 PM 782 Investigating 3D Printing with Microscopy and Spectroscopy Techniques; BW Arey, CA Barrett, I Arslan, Z Kennedy, M Warner; Pacific Northwest National Laboratory; H Schroder; Bruker Company

POSTER # 246
3:00 PM 783 Analysis of Void Volume in Composite Electrode of All-Solid-State Lithium-Ion Battery Employing FIB-SEM and Union Operation Image Processing; Y Yamamoto, Y Iriyama, S Muto; Nagoya University, Japan

A08.P1 Advances and Applications of Aberration-Corrected Electron Microscopy

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 246A
3:00 PM 783.5 A Novel Strategy to Effectively Characterize FinFET Device by Multidirectional Comprehensive Analytical TEM in Semiconductor Wafer-foundries; WW Zhao, B Fu, Y Wei, I Brooks; GlobalFoundries Inc., U.S. Inc.

POSTER # 247
3:00 PM 784 Development of Compact Cs/Cc Corrector with Annular and Circular Electrodes; T Kawasaki, R Yoshida, T Kato; Japan Fine Ceramics Center; T Nomaguchi, T Agemura; Hitachi High-Technologies; T Kodama; Meijo University; M Tomita; Vacuum Device Inc.; T Ikuta; Osaka Electro-Communication University

POSTER # 248
3:00 PM 785 Performance of Low-kV Aberration-Corrected STEM with Delta-Corrector and CFEG in Ultrahigh Vacuum Environment; K Suenaga; National Institute of Advanced Industrial Science and Technology, Japan; K Kimoto; National Institute for Materials Science, Japan; M Mukai, Y Kohno, S Morishita, T Sasaki; JEOL, Ltd.

POSTER # 249
3:00 PM 786 Phase Retrieval Quantitative Comparison Between Tilt-Series Imaging in TEM and Position-Resolved Coherent Diffractive Imaging in STEM; E Liberti; Diamond Light Source; G Martinez, C O’Leary, P Nellist, A Kirkland; University of Oxford, United Kingdom

POSTER # 249
3:00 PM 786 Phase Retrieval Quantitative Comparison Between Tilt-Series Imaging in TEM and Position-Resolved Coherent Diffractive Imaging in STEM; E Liberti; Diamond Light Source; G Martinez, C O’Leary, P Nellist, A Kirkland; University of Oxford, United Kingdom

POSTER # 250
3:00 PM 787 A Novel Method for Higher Order Aberration Correction in Electron Microscopes; S Hoque, H Ito; Hitachi High-Technologies Corporation, Japan; A Takaoka, R Nishi; Osaka University, Japan
Scientific Program

ANALYTICAL SCIENCES
POSTER SESSIONS - WEDNESDAY AFTERNOON CONTINUED

POSTER # 251
3:00 PM 788 Analysis of Phase Difference Variations for Strong Dynamical Objects Using Wigner Distribution Deconvolution Ptychography; GT Martinez; University of Oxford, United Kingdom; H Yang; Lawrence Berkeley National Laboratory; PD Nellist; University of Oxford, United Kingdom

POSTER # 252
3:00 PM 789 A Comparison of Phase-Retrieval Algorithms for Focused-Probe Electron Ptychography; GT Martinez; University of Oxford, United Kingdom; MJ Humphry; Phasefocus; PD Nellist; University of Oxford, United Kingdom

A09.P1 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

POSTER SESSION
Wednesday 3:00 PM  Room: Exhibit Hall

POSTER # 253
3:00 PM 790 Measuring Carbon in Steel Using Calibration Curves on the Microprobe; Failed Cap Screw Study; RP Grant, JM Rodelas, DF Susan, NR Sorensen, JR Michael; Sandia National Laboratories

POSTER # 254
3:00 PM 791 Inspection Tool for Testing an Electron Beam in an Objective Lens of Electron Microscope; C Han, J-M Jeong, S-C Lee, J-G Kim; Korea Basic Science Institute, Korea

POSTER # 255
3:00 PM 792 Collection Efficiency of the Twin EDS Detectors for Quantitative X-ray Analysis on a New Probe-Corrected TEM/STEM; J Howe; Hitachi High-Technologies America, Inc.; T Ramprasad; University of Arizona; A Hanawa, H Inada; Hitachi High Technologies Corporation; J Jimenez; Hitachi High Technologies America, Inc.; D Hoyle; Hitachi High Technologies Canada Inc.; E Voelkl; Hitachi High Technologies America Inc.; T Zega; University of Arizona

POSTER # 256
3:00 PM 793 Focused Interest Group on Microanalytical Standards (FIGMAS): An Update; OK Neill; Washington State University; A vonderHandt; University of Minnesota; JM Allaz; University of Colorado

POSTER # 257
3:00 PM 794 Rare Earth Orthophosphate Reference Materials from Na₂CO₃-MoO₃ Flux: New Synthetic Procedures and Trace Element Determinations; JW Singer, DJ Cherniak; Rensselaer Polytechnic Institute

POSTER # 258
3:00 PM 795 Microprobe Analysis of Pu-Ga Standards; AD Wall, JP Romero, D Schwartz; Los Alamos National Laboratory

A13.P1 Applications of Atom Probe Tomography

POSTER SESSION
Wednesday 3:00 PM  Room: Exhibit Hall

POSTER # 259
3:00 PM 796 Nanoscale Investigation of Belgian Chocolate by Atom Probe Tomography; C Barroo; Université libre de Bruxelles, Belgium; AJ Akey; DC Bell; Harvard University

POSTER # 260
3:00 PM 797 Field Evaporation Characteristics in Hafnium Carbides; F Vogel, S Ngai, C Smith, GB Thompson; University of Alabama

POSTER # 261
3:00 PM 798 Improving Local Electrode Performance by Tesla Coil Electric Discharges; D Isheim; Northwestern University; A Akey; Harvard University; SS Gerstl; ETH Zurich, Switzerland

POSTER # 262
3:00 PM 799 Sensitivity Analysis of Laser Effect on Mg-Gd-Er Alloy; R Hu; Nanjing University of Science and Technology; X Zheng, W Du; Beijing University of Technology; G Sha; Nanjing University of Science and Technology

POSTER # 263
3:00 PM 800 Atom Probe Tomography Quantification of Alloy Fluctuations in (Al,In,Ga)N; B Bonef; University of California, Santa Barbara; M Laurent; University of California, Davis; S Keller, UK Mishra; University of California, Santa Barbara
Scientific Program

POSTER # 264
3:00 PM  801  Identifying Nanometer-Scale Clustering in InAlAsSb Random Alloys Using Atom Probe Tomography; NA Kotulak, K Knipling, LC Hirst, S Tomasulo, J Abell; U.S. Naval Research Laboratory; M Gonzalez; Sotera Defense Solutions, Inc.; MK Yakes, JR Meyer; U.S. Naval Research Laboratory, et al.

A16.P1  In Situ and Operando Characterization of Material Processes in Liquids and Gases

POSTER SESSION
Wednesday 3:00 PM  •  Room: Exhibit Hall
POSTER # 265
3:00 PM  802  In Situ Analytical Microscopy of Asphaltene Aggregation and Growth; NJ Zuluze; Argonne National Laboratory; A Janssen; University of Manchester, United Kingdom; MA Kulzick; BP Corporate Research Center; MG Burke; University of Manchester, United Kingdom

POSTER # 266
3:00 PM  803  Study of Alkali Halide Solid Solutions by Scanning Electron Microscopy and X-ray Diffraction; R Rodriguez-Mijangos, O Hernández-Negrete, RC Carrillo-Torres, FJ Carrillo-Pesqueira, ME Alvarez-Ramos, J Hernández-Paredes; Universidad de Sonora, Mexico

POSTER # 267
3:00 PM  804  In Situ TEM Observation of Water Splitting; JA Rodriguez Manzo, NJ Salmon, DH Alsem; Hummingbird Scientific

POSTER # 268
3:00 PM  805  Electrochemical Measurements During In Situ Liquid-Electrochemical TEM Experiments; E Fahrenkrug; University of Michigan; DH Alsem, NJ Salmon; Hummingbird Scientific; S Maldonado; University of Michigan

POSTER # 269
3:00 PM  806  Water Vapor in Closed-Cell In Situ Gas Reactions: Initial Experiments; KA Unocic; Oak Ridge National Laboratory; AK Datye; University of New Mexico; WC Bigelow; University of Michigan; LF Allard; Oak Ridge National Laboratory

POSTER # 270
3:00 PM  807  Manipulation and Immobilization of Nanostructures for In Situ STEM; AW Robertson, BL Mehdi, L Kovarik, ND Browning; Pacific Northwest National Laboratory

POSTER # 271
3:00 PM  808  In Situ S/TEM Reduction Reaction of Calcined Cu/BEA-Zeolite Catalyst; KA Unocic; Oak Ridge National Laboratory; DA Ruddy; National Renewable Energy Laboratory; TR Krause; Argonne National Laboratory; S Habas; National Renewable Energy Laboratory

B  BIOLOGICAL SCIENCES POSTER SESSIONS-
WEDNESDAY AFTERNOON

B02.P1  Microstructure Characterization of Food Systems

POSTER SESSION
Wednesday 3:00 PM  •  Room: Exhibit Hall
POSTER # 272
3:00 PM  809  Imaging and Characterization of Metallic Antioxidants in Plant Based Food Using Energy Dispersive Spectroscopy; TL Nylese; EDAX, Inc.

POSTER # 273
3:00 PM  810  Biochar from Alpaca Manure, The Basics; DR Sutton, OM Vierrether; Sutton at Home Alpaca; KE Anderson; DKPE Engineering; CA Wisner; Missouri University of Science and Technology

B05.P1  Pharmaceuticals and Medical Science

POSTER SESSION
Wednesday 3:00 PM  •  Room: Exhibit Hall
POSTER # 274
3:00 PM  811  Electron Microscopy and Spectroscopy of Citrate Induced Calcium Oxalate Crystal Structure and Hydration State Changes, and Implications for Kidney Stones; DJ Banner, E Firlar, JK Finlay, R Shahbazian-Yassar, T Shokuhfar; The University of Illinois, Chicago

POSTER # 275
3:00 PM  812  Rotavirus Double and Triple Layered Viral Particles: Correlative Characterization Using Electron Microscopy, Disc Centrifuge and Capillary Electrophoresis; A Miseur, P Blain, A Coppens, C Chapelle, C Hens, G Delpiérre, M Deschuyteneer; GSK Vaccines

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**POSTER # 276**
3:00 PM  813  Methylene Blue Loaded PLGA Nanoparticles: Combined Emulsion, Drug Release Analysis and Photodynamic Activity; C Gutiérrez-Valenzuela, R Rodríguez-Córdova, Y Hernández-Giottonini, P Guerrero-Germán, A Lucero-Acuña; Universidad de Sonora, Mexico

**POSTER # 277**
3:00 PM  814  (M&M STUDENT SCHOLAR)  Alginate Microcapsule Technology and Impacts on Cell Therapy Development; M Belhaj, V Menon; School of Medicine, University of South Carolina; B Rohrer; Medical University of South Carolina and Ralph H Johnson VA Medical Center; J Potts; School of Medicine, University of South Carolina

**POSTER # 278**
3:00 PM  815  Cryogenic Transmission Electron Microscopy (Cryo-TEM) Reveals Morphological Changes of Liposomal Doxorubicin During In Vitro Release; Y Wu, P Petrochenko; Food and Drug Administration; FC Szoka; University of California; S Manna, B Koo, N Zheng, W Jiang, J Zheng; Food and Drug Administration

**POSTER # 279**
3:00 PM  816  Quantification and Identification of Visible and Subvisible Particulates from Elastomeric Components Contributing to the Total Particle Count of Pharmaceutical Products; E McPherson, C Bingham, D Carter, W Toomey, M Scofield, R Pulvirenti; Luitpold Pharmaceuticals

**POSTER # 280**
3:00 PM  817  Nanoparticles for Detection, Diagnostics, and Targeting Using Hyperspectral Imaging; D Baah, B Tiimob, K Cousin, W Abdela, T Samuel, C Fermin; Tuskegee University

**POSTER # 281**
3:00 PM  818  The Effect of Fullerene Soot on the Mechanical Properties of Chitosan; O Velázquez Meraz, A Tejeda Ochoa, JE Ledezma Sillas, C Carreño Gallardo; Centro de Investigación en Materiales Avanzados S.C., Mexico; FC Robles Hernández; University of Houston; JM Herrera Ramírez; Centro de Investigación en Materiales Avanzados S.C., Mexico

**POSTER # 282**
3:00 PM  819  Using Negative Staining TEM to Study Structure/Function Relationships of Cystic Fibrosis Host-Adapted Opportunistic Pathogen Pseudomonas Aeruginosa; DL Chance, TP Mawhinney; University of Missouri

**POSTER # 283**
3:00 PM  820  Three-dimensional Visualization of Ion Nanodomains in Subcellular Compartments; W Girard-Dias, W De Souza, K Miranda; Federal University of Rio de Janeiro, Brazil

**POSTER # 284**
3:00 PM  821  Large Area, High-resolution Multilayered Imaging Approach Using Block-Face SEM: Identification of Neuro-degeneration in Mouse Model of 22q11 Deletions Syndrome; CA Brantner, P Mistry, L Matsiyevskiy, C Bryan, D Meechan, TM Maynard, A Popratiloff; The George Washington University

**POSTER # 285**
3:00 PM  822  The Tolerance of Chromium (VI) by Delftia Acidovorans; H Zuo, H Dong; Miami University

**POSTER # 286**
3:00 PM  823  Characterizing the Intracellular Trafficking of Helicobacter Pylori VacA; NJ Foegeding, T Cover, M Ohi; Vanderbilt University

**B08.P2  Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals**

**POSTER SESSION**
Wednesday 3:00 PM  •  Room: Exhibit Hall

**POSTER # 280**
3:00 PM  817  Nanoparticles for Detection, Diagnostics, and Targeting Using Hyperspectral Imaging; D Baah, B Tiimob, K Cousin, W Abdela, T Samuel, C Fermin; Tuskegee University

**POSTER # 281**
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**POSTER # 284**
3:00 PM  821  Large Area, High-resolution Multilayered Imaging Approach Using Block-Face SEM: Identification of Neuro-degeneration in Mouse Model of 22q11 Deletions Syndrome; CA Brantner, P Mistry, L Matsiyevskiy, C Bryan, D Meechan, TM Maynard, A Popratiloff; The George Washington University

**POSTER # 285**
3:00 PM  822  The Tolerance of Chromium (VI) by Delftia Acidovorans; H Zuo, H Dong; Miami University

**POSTER # 286**
3:00 PM  823  Characterizing the Intracellular Trafficking of Helicobacter Pylori VacA; NJ Foegeding, T Cover, M Ohi; Vanderbilt University
P01.P1 Characterization of Semiconductor Materials and Devices

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 287
3:00 PM 824 An Application of High-Resolution Dual-Lens Dark-Field Electron Holography in Strain Analysis for Nanometer Semiconductor Device in Wafer-foundries; WW Zhao, Y-Y Wang, B Fu; GlobalFoundries Inc.

POSTER # 288
3:00 PM 825 Electron Tomography Study on Nanoscale HfOx/AlOy-Based Resistive Switching Device; J Zhang; Hewlett Packard Enterprise Labs; P Erccius; Lawrence Berkeley National Laboratory; P Zhang, J Luo; Nanolab Technologies Inc; K Kim, M Zhang, RS Williams; Hewlett Packard Enterprise Labs

POSTER # 289
3:00 PM 826 Image Simulation and Analysis to Predict the Sensitivity Performance of a Multi-Electron Beam Critical Dimension Metrology Tool; M Mukhtar, B Thiel; State University of New York Polytechnic Institute

POSTER # 290
3:00 PM 827 Structural Switch of AlN Sputtered Thin Films from (101) to (002) Orientation, Driven by the Growth Kinetics; A Taurino, MA Signore; National Council for Research; M Catalano, MJ Kim; University of Texas, Dallas

POSTER # 291
3:00 PM 828 Finding Unstrained 10-nm Lattice Defects in Silicon, Given 1011 Per Cubic Centimeter; J Roberts, D Osborn, P Fraundorf; University of Missouri-St Louis

POSTER # 293
3:00 PM 830 Novel FIB-less Fabrication of Electrical Devices for In Situ Biasing; R Dhall, JH Dycus, M Cabral, E Grimley, W Xu; North Carolina State University; J Damiano; Protochips Inc; JM LeBeau; North Carolina State University

P02.P1 TEM/STEM/EELS/SNOM of Ultralow Energy Excitations

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 294
3:00 PM 831 Photoemission Electron Microscopy as a New Tool to Study the Electronic Properties of 2D Crystals and Inhomogeneous Semiconductors; T Ohta, M Berg; Sandia National Laboratories; K Keyshar; Rice University; JM Kephart; Colorado State University; TE Beecham; Sandia National Laboratories; R Vajtai, P Ajayan; Rice University, AD Mohite; Los Alamos National Laboratory, et al.

POSTER # 295
3:00 PM 832 Temperature-Dependent Signals in STEM Electron Beam-Induced Current (EBIC) Imaging; WA Hubbard, ER White; University of California, Los Angeles; M Mecklenburg; University of South California; BC Regan; University of California, Los Angeles

POSTER # 296
3:00 PM 833 High Contrast SEM Observation of Semiconductor Dopant Profile Using TripleBeam® System; Y Aizawa, T Sato, T Sunaoshi, H Matsumoto, T Agemura, S Torikawa, I Nakatani, M Kiyohara; Hitachi High-Tech Science Corporation

POSTER # 297
3:00 PM 834 Advanced Characterization of Emerging Semiconductor Devices Using Low Energy, Broad Ion Beam Argon Milling; P Nowakowski; E A Fischione Instruments; J Sagar; Oxford Instruments; ML Ray, PE Fischione; E A Fischione Instruments

WITHDRAWN

POSTER # 298
3:00 PM 835 STEM-EELS Evaluation of the Dependence of Localized Surface Plasmon Linewidth on the Size of Au Nanoparticles; J Wei, J Xu; Arizona State University; X Bai; Chinese Academy of Science; J Liu; Arizona State University

POSTER # 299
3:00 PM 836 Predicting the Electronic Structure of CeO2 Grain Boundaries for Comparison with Atomic Resolution EELS; T Boland, P Rez, P Crozier; Arizona State University
Scientific Program

POSTER # 300
3:00 PM 837  EELS Investigation of Al$_2$O$_3$ at 30 keV and Below; First Results of Alumina's Structural Sensitivity to a Low-Energy Electron Beam; T Sunaoshi, M Shirai, S Okada, K Kaji; Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies, America

POSTER # 301
3:00 PM 838  Energy Filtered STEM Imaging at 30kV and Below – A New Window into the Nano-World; T Sunaoshi, M Shirai, S Okada, K Kaji; Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies, America

POSTER # 302
3:00 PM 839  (M&M STUDENT SCHOLAR) Probing Interfacial and Surface Effects with Vibrational Electron Energy Loss Spectroscopy; K Venkatraman, Q Liu, K March, P Rez, P Crozier; Arizona State University

POSTER # 303
3:00 PM 840  Ultrahigh Resolution of Electron Energy Loss Spectroscopy by a Monochromated Titan TEM: Towards Challenging Nanomaterials Characterization; S Lopatin, B Cheng; King Abdullah University of Science & Technology, Saudi Arabia; W-T Liu, M-L Tsai; National Tsing Hua University, Taiwan; J-H He; King Abdullah University of Science & Technology, Saudi Arabia; A Chuvilin; CIC nanoGUNE, Ikerbasque, Spain

POSTER # 304
3:00 PM 841  (M&M STUDENT SCHOLAR) Monochromated EELS and Optical Spectroscopy of Layered Carbon Nitrides; DM Haiber, PA Crozier; Arizona State University

POSTER # 305
3:00 PM 842  Direct Polarity Determination of Ferroelectric Ca$_{0.28}$Ba$_{0.72}$Nb$_2$O$_6$ Single Crystal by Combined Defocused Convergent Beam Electron Diffraction and Simulation; X He; University of Missouri at Columbia; L Gu; Chinese Academy of Sciences

POSTER # 306
3:00 PM 843  Simultaneous Structural and Electrical Analysis of Vanadium Dioxide Using In Situ TEM; H Ghassemi, B Jacobs; Protochips Inc; H Asayesh-Ardakani, W Yao; University of Illinois, Chicago; L Giannuzzi; Expresslo; R Shahbazian-Yassar; University of Illinois, Chicago

POSTER # 307
3:00 PM 844  Study of Yttria-Tantala Binary Using Scanning Transmission Electron Microscopy; D Park, CA Macauley, A Fernandez, C Levi; University of California, Santa Barbara

POSTER # 308
3:00 PM 845  Supper Lattice Structure Transformation Based on Nonstoichiometric Bismuth Oxychloride; S Wu; Chongqing University, China; Oak Ridge National Laboratory; J Sun; Chongqing University, China; S Yang; Oak Ridge National Laboratory

POSTER # 309
3:00 PM 846  Multimodal Imaging of Cation Disorder and Oxygen Deficiency-Mediated Phase Separation in Double Perovskite Oxides; SR Spurgeon, PV Sushko, A Devaraj, Y Du, T Droubay, SA Chambers; Pacific Northwest National Laboratory

POSTER # 310
3:00 PM 847  In Situ Observation of Phase Separation in High-Temperature Superconductor La$_{1-x}$Sr$_x$CuO$_4$; JS Jeong, W Wu, G Yu, M Greven, KA Mkhowan; University of Minnesota

POSTER # 311
3:00 PM 848  Modulating the Redox Equilibrium of Silver Using Electron Beams; H Sheng, J Wen, L Wang, DJ Miller; Argonne National Laboratory; H Zheng, S Jia, F Cao, H Liu; Wuhan University, China, et al.
Scientific Program
Wednesday, August 9

POSTER # 312
3:00 PM 849 Formation of Single-Atom-Thick Copper Oxide Monolayers; K Yin; Southeast University; Y-Y Zhang; Vanderbilt University; Y Zhou; L Sun; Southeast University; MF Chisholm; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; W Zhou; Oak Ridge National Laboratory

POSTER # 313
3:00 PM 850 Structural and Electronic Properties of Ti Doped ZnO: XRD, TEM, EELS and Ab Initio Simulations; R Medlin, J Minár, P Šutta, W Khan, O Šipr, P Novák, M Netrvalová; University of West Bohemia, Czech Republic

POSTER # 314
3:00 PM 851 Characterization of the Molecular Crystal L-Alaninium Oxalate by Raman Microscopy, Optical Microscopy and X-ray Powder Diffraction; FJ Carrillo-Pesqueira, RC Carrillo-Torres, O Hernández-Negrete, ME Alvarez-Ramos, J Hernández-Paredes; Universidad de Sonora, Mexico

P04.P2 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 315
3:00 PM 852 Ambient Dependent Formation of Zn₃SiO₇ and SiO₂ from Core-Shell ZnO@SiO₂; S’ Tripathi; Indian Institute of Science; A Roy; Kyushu University, Japan; N Ravishankar; Indian Institute of Science

POSTER # 316
3:00 PM 853 Probing Two-dimensional (Bi,Sb)₆Te₃ /h-BN Heterostructures Using Complementary S/TEM and Simulation Techniques; D Reifsnyder Hickey; University of Minnesota; JS Lee; The Pennsylvania State University; RJ Wu; University of Minnesota; N Samarth; The Pennsylvania State University; KA Mkhoyan; University of Minnesota

POSTER # 317
3:00 PM 854 Atomic Study of Hybrid Spintronic Heterostructures: CoₓFeAlₓ₅Si₉ₓ₂/Ge(111); Z Nedelkoski; University of York, United Kingdom; D Kepaptsov; SuperSTEM, United Kingdom; B Kuerbanjiang; University of York, United Kingdom; QM Ramasse; SuperSTEM, United Kingdom; A Ghasemi, C Love, S Cavill; University of York, United Kingdom, K Hamaya; Osaka University, et al.

POSTER # 318
3:00 PM 855 In Situ Heating Study of 2H-MoTe₂ to Mo₆Te₆ NW Phase Transition; Q Wang, H Zhu, C Zhang, R Addou, K Cho, RM Wallace, MJ Kim; The University of Texas, Dallas

POSTER # 319
3:00 PM 856 Quantification of Electron Beam Heating Effect in TEM; H Guo, P Zhou, D Natelson, J Lou; Rice University

POSTER # 320
3:00 PM 857 Structural and Compositional Analysis of Core/Shell QDs by Transmission Electron Microscopy Techniques; N Fernández-Delgado, M Herrera, J Pizarro, PL Galindo; University of Cádiz, Spain; PJ Rodríguez-Cantó, R Abargues; Intenanomat S.L.; JP Martínez-Pastor; University of Valencia, Spain; SI Molina; University of Cádiz, Spain

POSTER # 321
3:00 PM 858 Electron Probe Microanalysis of Electrospun NdₓOᵧ Nanofibers Doped with Ce/Zn; SS Johnson, RO Broomfield, GY Woodland, JG Breitzer, DE Autrey, S Han, Z Luo; Fayetteville State University

POSTER # 322
3:00 PM 859 Identification of Tin Whisker Growth on Tin Plated Copper Substrate; A Knight, H Aglan; Tuskegee University; D Burdick; The Boeing Company

POSTER # 323
3:00 PM 860 Microscopic Analysis of Tin Whisker Growth on Tin Plated Copper Microchip Leads; A Rochester; Tuskegee University; D Burdick; The Boeing Company; H Aglan; Tuskegee University

POSTER # 324
3:00 PM 861 Interfacial Strain Mapping and Chemical Analysis of Strained-Interface Heterostructures by Nanodiffraction and Electron Energy-Loss Spectroscopy; WJ Bowman; Massachusetts Institute of Technology; S Schweiger, R Pfenninger; ETH Zürich, Switzerland; E Izadi; Arizona State University; A Darbal; AppFive LLC; JL Rupp; ETH Zürich, Switzerland; PA Crozier; Arizona State University

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Scientific Program

PHYSICAL SCIENCES
POSTER SESSIONS – WEDNESDAY AFTERNOON CONTINUED

P06.P3 Nanoparticles: Synthesis, Characterization, and Applications

POSTER SESSION
Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 325
3:00 PM 862 Characterization of Cu-30Mo Alloys Synthesized by Mechanical Alloying; O Hernández, A Medina, S Borjas, L Bejar; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Bernal; TecNM Instituto Tecnológico de Orizaba; J Vega; Universidad Michoacana de San Nicolás de Hidalgo, Mexico

POSTER # 326
3:00 PM 863 Microstructural Changes in Aluminum Mechanically Milled Sintered by Conventional Method and Induction; JM Mendoza-Duarte; Centro de Investigación en Materiales Avanzados, Mexico; FC Robles-Hernandez; University of Houston; C Carreño-Gallardo, I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 327
3:00 PM 864 (M&M STUDENT SCHOLAR) Structure and Function of Nano-Sized InSb Precipitate Embedded in an Al Alloy; Y Zhang, X Gao, NV Medhekar, L Bourgeois; Monash University, Australia

POSTER # 328
3:00 PM 865 Aluminum Sintering in Air Atmosphere Using High Frequency Induction Heating; JM Mendoza-Duarte; Centro de Investigación en Materiales Avanzados, Mexico; FC Robles-Hernandez; University of Houston; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 329
3:00 PM 866 Photo-Induced Solution Deposition of Silver Nanoparticles on a Tb₃⁺ Doped SiO₂–GeO₂–Na₂O Glass; F Félix-Dominguez, JA González-Olmos, RA Íniguez-Palomares, J Alvarado-Rivera, RC Carrillo-Torres, E Álvarez; Universidad de Sonora, Mexico

POSTER # 330
3:00 PM 867 Synthesis of Neodymium Hydroxide Nanoparticles with CTAB at Low Temperature; P Martínez-Torres, SE Borjas-García; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; NL Gómez-Ortíz; Centro de Investigaciones en Óptica A.C. Mexico; N Dasgupta-Schubert; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Pichardo-Molina; Centro de Investigaciones en Óptica A.C., Mexico; DR García-Zavala; Instituto Tecnológico de Morelia, Mexico

POSTER # 331
3:00 PM 868 Synthesis of Mesoporous Zirconia by Using Alkoxide Precursor and Triethanolammine as Hydrolysis Stabilizer; SE Borjas García, PG Martínez Torres; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; N Gómez Ortíz; Centro de Investigaciones en Óptica A.C., Mexico; N Dasgupta-Schubert, G Viramontes Gamboa; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Bernal Ponce; Instituto Tecnológico de Orizaba, Mexico; A Medina Flores; Universidad Michoacana de San Nicolás de Hidalgo, Mexico, JL Pichardo Molina; Centro de Investigaciones en Óptica A.C., Mexico, et al.

POSTER # 332
3:00 PM 869 Synthesis and Characterizations of Amorphous Manganese Oxide Particles and Platelets for the Application of Rechargeable Lithium Batteries; JF Al-Sharab; Northwestern State University; Y Yang; Rutgers University

POSTER # 333
3:00 PM 870 Ordering of Nanoparticles Along Concentric Nanoings Observed in Al-Cu-Fe Alloy; H Hampikian; B Kothe, C Li; Clarion University; M Caputo; Youngstown State University
P07.P2  Advanced Characterization of Energy-Related Materials

POSTER SESSION
Wednesday 3:00 PM  •  Room: Exhibit Hall

POSTER # 334
3:00 PM  871  The Influence of pH Control of the Reaction Solution in the Growth of ZnO Films by CBD Technique for Solar Cell Applications; F Vásquez-M, Universidad Tecnológica Tula-Tepeji, Hidalgo, Mexico; A Garcia-Barrientos, Universidad Autónoma de San Luis Potosí, Mexico; JL Bernal; Instituto Tecnológico de Orizaba, Mexico; R Ambrosio; Benemerita Universidad Autonoma De Puebla, Mexico; R Balderas; Universidad Autónoma de San Luis Potosí, Mexico; R Ramírez-Bon; CINVESTAV-IPN Unidad Queretaro, Mexico

POSTER # 335
3:00 PM  872  Understanding Hollow Metal Oxide Nanomaterial Formation with In Situ Transmission Electron Microscopy; L Yu, R Han; University of Kentucky; X Sang, J Liu; Oak Ridge National Laboratory; A Patel; University of Kentucky; K Page; Oak Ridge National Laboratory; BS Guiton; University of Kentucky

POSTER # 336
3:00 PM  873  Electron Microscopy of Heterostructure for Solar Energy Recovery: ZnO Nanowires and CaO Nanoparticles; O Cigarroa-Mayorga, JE Neri; Instituto Politecnico Nacional ESFM; C Kisielowski; Lawrence Berkeley National Laboratory Molecular Foundry; HA Calderon; Instituto Politecnico Nacional, Mexico

POSTER # 337
3:00 PM  874  Asymmetric Phase Transition Pathways During Li/Na Migration in 2D Materials; S Chen; Harbin Institute of Technology, China; P Gao; Peking University

POSTER # 338
3:00 PM  875  Microstructural Evolution and Oxidation Behavior of T91/T92 Steel upon Long-Term Steam Test; K Shin, H Ma; Changwon National University, Korea; Y He; KEPCO Research Institute

POSTER # 339
3:00 PM  876  Investigating the Electrochemical Reversibility of Transition Metal Oxide Conversion Materials Through STEM-EELS; FC Castro, VP Dravid; Northwestern University
Scientific Program

Thursday, August 10

**ANNIVERSARY LECTURE**

X70.1 MSA 75th Anniversary Lecture in the Biological Sciences

Complimentary coffee, tea, and handheld breakfast item provided.

**SESSION CHAIR:**
Michael Marko, Immediate Past President, Microscopy Society of America

**PLATFORM SESSION**
Thursday 7:30 AM • Room: 275

**7:30 AM**

957 (INVITED) Development of High-Resolution TEM for Imaging Native, Radiation-Sensitive Biological Macromolecules; Robert M. Glaeser; Lawrence Berkeley National Laboratory, University of California, Berkeley

**ANALYTICAL SCIENCES SYMPOSIA – THURSDAY MORNING**

A01.3 Vendor Symposium

**SESSION CHAIRS:**
Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 125

8:30 AM 883 Automated Image Analysis Using a Tabletop Low Voltage TEM; M Colomb-Delsuc, G Kylberg, M Ryner, I-M Sintorn; Vironova AB, Sweden

8:45 AM 884 Progress in a New Method of Thickness Measurement by X-ray Analysis in TEM; S Lozano-perez; University of Oxford, United Kingdom; P Pinard, J Holland, PJ Statham, JT Sagar; Oxford Instruments Nanoanalysis

9:00 AM 885 Developments in Reel-to-Reel Electron Microscopy Infrastructure; CS Own, MF Murfitt, LS Own, J Cushing; Voxa

9:15 AM 886 Numerical Procedures to Determine Potential Distribution from Electronic Field Vectors Observed in Differential Phase Contrast (DPC) Imaging; A Ishizuka, M Oka, K Ishizuka; HREM Research Inc., Japan; T Seki, N Shibata; The University of Tokyo, Japan

9:30 AM 887 Wide Field-of-View Reflection-Mode Ptychographic Imaging Microscope with Tabletop 12.7 nm High Harmonic Illumination; M Tansalvala, CL Porter, M Gerrity; University of Colorado; GP Miley; Northwestern University; X Zhang; Kapteyn-Murnane Laboratories; CS Bevis, ER Shanblatt, R Karl; University of Colorado, et al.

A03.2 Big, Deep, and Smart Data in Microscopy

**SESSION CHAIR:**
Sergei Kalinin, Oak Ridge National Laboratory

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 260

8:30 AM 889 (INVITED) Robust Nanostructure from High Throughput Powder Diffraction Data; S Billinge; Columbia University

9:00 AM 890 Statistical Analyses of Electron Nanodiffraction Patterns to Examine Order and Structural Variability in Amorphous Materials; AC Liu, ED Bojesen; Monash University, Australia; P Harrowell; University of Sydney, Australia; TC Petersen; Monash University, Australia

9:15 AM 891 Multivariate Statistical Analysis of a Multimodal Diffraction and X-ray Spectral Series Data Set; PG Kotula, MH Van Bentham; Sandia National Laboratories

9:30 AM 892 (INVITED) Leveraging First Principles Modeling and Machine Learning for Microscopy Data Inversion; MK Chan; Argonne National Laboratory

A08.4 Advances and Applications of Aberration-Corrected Electron Microscopy

**SESSION CHAIRS:**
Lena Kourkoutis, Cornell University
David J. Smith, Arizona State University

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 132

8:30 AM 893 (INVITED) Electron Microscopy with Structured Electrons; BJ McMorran; University of Oregon; PErcius; Lawrence Berkeley National Laboratory; TR Harvey; University of Oregon; M Linck; Corrected Electron Optical Systems GmbH, Germany; C Ophus; Lawrence Berkeley National Laboratory; J Pierce; University of Oregon

9:00 AM 894 Three-Dimensional Confocal Imaging Using Coherent Elastically Scattered Electrons; C Zheng; Monash University, Australia; I Sorin; FEI Electron Optics; Y Zhu; Hong Kong Polytechnic University; J Etheridge; Monash University, Australia
Scientific Program

**A13.4 Applications of Atom Probe Tomography**

**SESSION CHAIR:**
Michael Moody, University of Oxford, United Kingdom

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 263

8:30 AM 898 Atom Probe Tomography Studies of the Initiation of Localized Corrosion in Aluminum Alloy 2024; R Parvizi, RK Marceau; Deakin University, Australia; AE Hughes; CSIRO, Australia; P Cizek; Deakin University, Australia; AM Glenn; CSIRO, Australia; MY Tan, M Forsyth; Deakin University, Australia

8:45 AM 899 Degradation Mechanism of Molds for Precision Glass Molding; Z Peng, M Rohwerder; Max-Planck-Institut für Eisenforschung GmbH, Germany; M Friedrichs; Fraunhofer Institute for Production Technology, Germany; P-P Choi, B Gault, T Meiners; Max-Planck-Institut für Eisenforschung GmbH, Germany; H Kreilkamp, F Klocke; Fraunhofer Institute for Production Technology, Germany, et al.

9:00 AM 900 Atom Probe Characterization of Oxide Layers Formed on Polycrystalline Nickel Based Superalloys; MT Lapington, DJ Crudden, RC Reed, MP Moody, PA Bagot; University of Oxford, United Kingdom

9:15 AM 901 Microstructures and Properties of As-Cast AlCrFeMnV, AlCrFeTiV, and AlCrMnTiV

High Entropy Alloys; KE Knipling; U.S. Naval Research Laboratory; PU Narayana; Thomas Jefferson High School for Science and Technology; LT Nguyen; U.S. Naval Research Laboratory

9:30 AM 902 (M&M STUDENT SCHOLAR) Linking Experimental Solute Segregation Specificity in Nanocrystalline Alloys to Computational Predictions; X Zhou, GB Thompson; University of Alabama

9:45 AM 903 Improved Atom Probe Methodology for Studying Carbon Redistribution in Low-Carbon High-Ms Lath Martensitic Steels; L Morsdorf, B Gault, D Ponge; Max-Planck-Institut für Eisenforschung, Germany; CC Tasan; Massachusetts Institute of Technology; D Raabe; Max-Planck-Institut für Eisenforschung, Germany

**A14.4 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques**

**SESSION CHAIR:**
Nan Li, Los Alamos National Laboratory

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 131

8:30 AM 904 (INVITED) Microstructural and Nanomechanical Characterization of In Situ He Implanted and Irradiated Fcc Materials; P Hosemann; University of California, Berkeley; D Kaoumi, C Zheng; North Carolina State University; D Frazer; University of California, Berkeley

9:00 AM 905 In Situ Study of Mechanical Testing and Fracture Process of Glassy Polystyrene Grafted Nanoparticle Assembly: Impact of Film Thickness and Strain Rate; M-S Hsiao; U.S. Air Force Research Laboratory; Y Jiao; UES, Inc.; R Wheeler; U.S. Air Force Research Laboratory; J Lefebvre, S Bhowmick; Bruker Corporation; RA Vaia, LF Drummy; U.S. Air Force Research Laboratory

9:15 AM 906 Characterization of Dislocations in Single-Crystalline Ag-Sn Intermetallic Alloys; H Yu, Y Sun, S-W Lee; University of Connecticut; PC Canfield; Iowa State University; M Aindow; University of Connecticut

9:30 AM 907 (INVITED) In Situ Deformation of Various Micro/Nanoscaled Samples in the Transmission Electron Microscope: Experimental Results and Pitfalls; R Sarkar; Arizona State University; C Ebner; University of Vienna, Austria; J Rajagopalan; Arizona State University; C Rentenberger; University of Vienna, Austria
A15.3 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:
Radostin Danev, Max Planck Institute for Biochemistry, Germany

PLATFORM SESSION
Thursday 8:30 AM • Room: 127

8:30 AM 908 Phase Contrast Single Particle Analysis at Atomic Resolutions; M Khoshouei, R Danev; Max-Planck Institute of Biochemistry, Germany; M Radjainia; Thermo Fisher Scientific (formerly FEI); W Baumeister; Max-Planck Institute of Biochemistry, Germany

8:45 AM 909 (M&M STUDENT SCHOLAR) Efficient Cryo-EM: Measuring Effects of Particle Orientation in Electron Microscopy; K Naydenova, CJ Russo; Medical Research Council Laboratory of Molecular Biology, UK

9:00 AM 910 (INVITED) Streptavidin Monolayer-Crystal Affinity Grids: A Step Toward Controlling What Happens During Cryo-EM Sample Preparation; RM Glaeser, B-G Han; Lawrence Berkeley National Laboratory; JH Cate; University of California, Berkeley

SUBSTITUTION:
9:00 AM 910 New Methods for CryoEM Sample Preparation; B Carragher; New York Structural Biology Center

9:30 AM 911 (INVITED) Ion Channel in Lipid Nanodisc by Single Particle Cryo-Em - Pushing the Technology Limit; D Asarnow, E Palovcak, Y Gao, D Julius; University of California, San Francisco; Y Cheng; Howard Hughes Medical Institute, University of California, San Francisco

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A16.7 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Guangwen Zhou, Binghamton University

PLATFORM SESSION
Thursday 8:30 AM • Room: 130

8:30 AM 912 (INVITED) In Situ Field Emission of Carbon Nanotubes in Oxygen Using Environmental TEM and the Influence of the Imaging Electron Beam; AL Koh; Stanford University; E Gidcumb, O Zhou; University of North Carolina, Chapel Hill; R Sinclair; Stanford University

9:00 AM 913 (INVITED) In Situ Observation of Shape Transformation and Surface Oxidation of Pd Nanocrystals; A Yoon; University of Illinois, Urbana-Champaign; P-H Lu; Forschungszentrum Jülich, Germany; Z-W Shan; Xi’an Jiaotong University, China; J-M Zuo; University of Illinois, Urbana-Champaign

9:15 AM 914 In Situ Imaging and Spectroscopy of the Carbon Deposition Mechanism on Ni/CoO2 Solid Oxide Fuel Cell Anode Catalyst; EL Lawrence, PA Crozier; Arizona State University

9:30 AM 915 The Effect of Gas on Image Quality and Resolution in In Situ Scanning Transmission Electron Microscopy; Y Zhu, ND Browning; Pacific Northwest National Laboratory


A18.5 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:
Paul Carpenter, Washington University in St. Louis
Julie Chouinard, University of Oregon
Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION
Thursday 8:30 AM • Room: 264

8:30 AM 917 Advances in (and a Brief History of) Cathodoluminescence Microscopy; DJ Stowe, M Bertillon, JA Hunt; Gatan, Inc.

8:45 AM 918 (INVITED) Optimisation of Soft X-ray Spectroscopy at Room and Liquid Nitrogen Temperatures; CM MacRae, NC Wilson, A Torpy; CSIRO, Australia

9:15 AM 919 Integration of Quantitative Compositional Mapping and Image Processing Routines: A Powerful Approach to Petrologic Investigations; TM Hahn, PK Carpenter, BL Jolliff; Washington University in St. Louis

9:30 AM 920 (INVITED) Analysis of Multi-Signal Hyperspectral Datasets Collected by EPMA; NC Wilson, CM MacRae, A Torpy; CSIRO, Australia
Scientific Program

**B02.2 Microstructure Characterization of Food Systems**

**SESSION CHAIRS:**
Jinping Dong, Cargill Minneapolis R&D Centre
Joël Wallecan, Cargill Minneapolis R&D Centre

**PLATFORM SESSION**
**Thursday 8:30 AM • Room: 121**

**8:30 AM** 921  Understanding pH-Induced Softening of Feta Cheese During Storage at the Ultrastructural Level – A Structure-Function Case Study; AH Vollmer, NN Youssef, JA Powell, X Qi, DJ McMahon; Utah State University

**8:45 AM** 922 (INVITED) Bimodal Force Spectroscopy as a Technique to Determine the Young’s Moduli of Protein Fibils and Nanoparticles; OG Jones; Purdue University

**9:15 AM** 923 (INVITED) Raman Microspectroscopy and Its Role in Solving Today’s Food Industry Challenges; S Zbylut; General Mills International / Medallion Labs

**9:45 AM** 924 What Went Wrong? Forensics & Food Microstructural Characterization; VL St. Jeor; Cargill Incorporated

**B03.1 Imaging the Biology of Cells and Tissues: Just Do It Right**

**SESSION CHAIR:**
Jay Potts, University of South Carolina

**PLATFORM SESSION**
**Thursday 8:30 AM • Room: 122**

**8:30 AM** 925 (INVITED) Characterizing an Ionic Liquid as a Biological Fixative in Fluorescence Microscopy; LA Trinh, F Cutrale, SE Fraser; University of Southern California; JP Kilcrease; Hitachi High Technologies America, Inc.; E Rosa-Molinar; University of Kansas

**9:00 AM** 926 (MSA POSTDOCTORAL SCHOLAR) Label-Free Imaging of Stem Cell Adhesion and Dynamic Tracking of Boundary Evolution Using Photonic Crystal Enhanced Microscopy (PCEM); Y Zhuo, JS Choi; University of Illinois, Urbana-Champaign; T Marin; Research Park in University of Illinois, Urbana-Champaign; HY Yu, BA Harley, BT Cunningham; University of Illinois, Urbana-Champaign

**9:30 AM 927** High-Speed / Long-Time, High-Resolution / Large-Fields In Vivo Imaging by 4K / 8K CMOS Sensors Without Trade-Off Factors; S Nishimura; Jichi Medical University and The University of Tokyo, Japan

**P01.7 Characterization of Semiconductor Materials and Devices**

**SESSION CHAIR:**
Jayhoon Chung, Texas Instruments Inc.

**PLATFORM SESSION**
**Thursday 8:30 AM • Room: 267**

**8:30 AM** 928 Accretion Detection via Scanning Acoustic Microscopy in Microelectronic Components - Considering Symmetry Breaking Effects; E Grünwald, R Hammer, J Rosc, B Sartory, R Brunner; Materials Center Leoben Forschung GmbH, Austria

**8:45 AM** 929 Unraveling the Crystal Structure of All-Inorganic Halide Perovskites Using CBED and Electron Ptychography; R dos Reis, H Yang, C Ophus, T Shalapska, G Bizarri, D Perrodin, P Ercius, J Ciston; Lawrence Berkeley National Laboratory, et al.

**9:00 AM** 930 Nanometer-Scale Resolved Cathodoluminescence Imaging: New Insights into GaAs/AlGaAs Core-Shell Nanowire Lasers; M Müller, P Veit; Otto-von-Guericke-University Magdeburg, Germany; B Loitsch, J Winnerl, S Matic; Technical University of Munich, Germany; F Bertram; Otto-von-Guericke-University Magdeburg, Germany; G Koblmüller, JJ Finley; Technical University of Munich, Germany, et al.

**9:15 AM** 931 Heterovalent ZnTe/GaSb and ZnSe/GaAs grown by Molecular Beam Epitaxy; BD Tracy, M Lassise, Y-H Zhang, DJ Smith; Arizona State University

**9:30 AM** 932 On the Effects of Column Occupancy and Static Atomic Disorder on the Analysis of Chemical Ordering in Ga(P_{1-x}Bi_x) Compounds; A Beyer, L Nattermann, K Volz; Philipps-Universität Marburg, Germany

**9:45 AM** 933 TEM characterization of GaSb Grown on Single Crystal Offcut Silicon (001); H Porter, M Steer, A Craven, D McGrouther, I Thayne, I MacLaren; University of Glasgow, Scotland

**WITHDRAWN**
Scientific Program

Thursday, August 10

**P02.3**  TEM/STEM/EELS/SNOM of Ultralow-Energy Excitations

**SESSION CHAIR:**
Ian MacLaren, University of Glasgow, Scotland

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 261

8:30 AM  **934** (INVITED)  Exploring Vibrational and Valence Loss Spectra from Oxide Nanoparticles; PA Crozier, Q Liu, K Venkatraman, DM Haiber, WJ Bowman, K March, P Rez; Arizona State University

9:00 AM  **935** Detecting Sub Bandgap Energies in CIGS with Electron Energy-Loss Spectroscopy; J Deitz, P Paul, A Arehart; The Ohio State University; S Karki, S Marsillac; Old Dominion University; T Grassman, D McComb; The Ohio State University

9:15 AM  **936** Local Mapping of Bandgap Electronic State in Pr₆Ce₁₋ₓO₁₋ₓ: Elucidating Enhancement and Mechanism of Grain Boundary Electrical Conductivity; WJ Bowman; Massachusetts Institute of Technology; E Sediva; ETH Zürich, Switzerland; T Aoki; Arizona State University; JL Rupp; ETH Zürich, Switzerland; PA Crozier; Arizona State University

9:30 AM  **937** Understanding Guided Light Modes in Oxide Nanoparticles with Monochromated EELS; Q Liu; Arizona State University; SC Quillin, DJ Masiello; University of Washington; PA Crozier; Arizona State University

9:45 AM  **938** Ultra-High Energy Resolution EELS; T Lovejoy, N Bacon, A Bleloch, N Delly, M Hoffman, O Krivanek; Nion

**P03.8**  Advanced Microscopy and Microanalysis of Complex Oxides

**SESSION CHAIR:**
Peng Wang, University of Nanjing, China

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 274

8:30 AM  **939** (INVITED)  Intricate Physics of Coherent Electron Beam/Oxide Materials Interaction Revealed By 4D Inline Holography—Electron Ptychography; H Xin; Brookhaven National Laboratory; X Zhong, J Lin, Z Liao, J Zhu; Tsinghua University, China; X Huang; Brookhaven National Laboratory

9:00 AM  **940** Measuring Orbital Angular Momentum (OAM) and Torque Transfer from Polarization Vortices with the Electron Microscopy Pixel Array Detector; KX Nguyen, Y Jiang, MC Cao, P Purohit; Cornell University; AK Yadav; University of California, Berkeley; J Junquera; University of Cantabaria, Spain; MW Tate; Cornell University, R Ramesh; University of California, Berkeley, et al.

9:15 AM  **941** Measuring Ferroelectric Order Parameters at Domain Walls and Vortices in Hexagonal Manganites with Atomic Resolution STEM; ME Holtz; Cornell University; K Shapovalov; Universite de Bordeaux, France; J Mundy, CS Chang; Cornell University; D Meier; Norwegian University of Science and Technology; A Cano; Universite de Bordeaux, France; DA Muller; Cornell University

9:30 AM  **942** (INVITED)  Quantifying Local Structure of Complex Oxides Using Accurate and Precise Scanning Transmission Electron Microscopy; JM LeBeau, M Cabral, JH Dycus, ED Grimley; North Carolina State University; S Zhang; University of Wollongong, Australia; EC Dickey; North Carolina State University

**P05.2**  Imaging and Spectroscopy of Beam Sensitive Materials

**SESSION CHAIR:**
Andre Mkhoyan, University of Minnesota

**PLATFORM SESSION**
Thursday 8:30 AM • Room: 266

8:30 AM  **943** (INVITED)  Automated Image Acquisition and Analysis of Beam Sensitive Samples; E Stach, DN Zakharov, Y Lin, S Yoo; Brookhaven National Laboratory; G Resch; Nexperion, Austria

9:00 AM  **944** Way to Reduce Electron Dose in Pseudo Atomic Column Elemental Maps by 2D STEM Moiré Method; Y Kondo, K-I Fukunaga, E Okunishi, N Endo; JEOL, Ltd., Japan

9:15 AM  **945** Electron Beam-Induced Object Excitations at Atomic Resolution - Minimization and Exploitation; C Kisielowski; Lawrence Berkeley National Laboratory, HA Calderon; UPALM-Zacatenco, México, D F; S Helveg; Haldor Topsoe A/S, Denmark; P Specht; University of California, Berkeley
PHYSICAL SCIENCES
SYMPOSIA—
THURSDAY MORNING CONTINUED

9:30 AM 946 Reducing Electron Beam Damage with Multipass Transmission Electron Microscopy; C Ophus; Lawrence Berkeley National Laboratory; T Juffman, SA Koppell, BB Klopfer; Stanford University; R Glaeser; Lawrence Berkeley National Laboratory; MA Kasevich; Stanford University

9:45 AM 947 Overcoming the Challenges of Beam-Sensitivity in Fuel Cell Electrodes; DA Cullen, BT Sneed, KL More; Oak Ridge National Laboratory

P07.7 Advanced Characterization of Energy-Related Materials

SESSION CHAIR: Katie Jungjohann, Sandia National Laboratories

PLATFORM SESSION
Thursday 8:30 AM • Room: 276

8:30 AM 948 (INVITED) Tuning the Outward to Inward Swelling in Lithiated Silicon Nanotubes Via Surface Oxide Coating; J Wang; Zhejiang University, China; H Luo; Georgia Institute of Technology; Y Liu; North Carolina State University; Z Zhang; Zhejiang University, China; SX Mao; University of Pittsburgh; C Wang; Pacific Northwest National Laboratory; T Zhu; Georgia Institute of Technology

9:00 AM 949 Comparison of Spinel and Monoclinic Crystal Structures of γ-Al₂O₃ for Simulation of Electron Energy Loss Spectra; HO Ayoola, CS Bonifacio, Q Zhu; University of Pittsburgh; D Su; Brookhaven National Laboratory; JJ Kas; JJ Rehr; University of Washington, Seattle; E Stach; Brookhaven National Laboratory, WA Saidi; University of Pittsburgh; et al.

9:15 AM 950 Visualization of Phase Evolution of Ternary Spinel Transition Metal Oxides (CuFe₂O₄) During Lithiation; EA Stach; Brook Haven National Laboratory; ES Takeuchi, AC Marschilok, KJ Takeuchi, CA Cama, J Li; Stony Brook University

9:30 AM 951 On the Detection Limits of Li K X-rays Using Windowless Energy Dispersive Spectrometer (EDS); P Hovington, V Timoshevskii, S Bessette; Hydro-Quebec; S Burgess, P Statham; Oxford Instruments NanaoAnalysis; H Demers, R Gauvin; McGill University, Canada, K Zaghb; Hydro-Quebec

9:45 AM 952 3D Characterization of Silicon Based Electrode Material for Advanced Lithium-Ion Storage Technologies; T Vorauer, J Rosc; Materials Center Leoben Forschung GmbH, Austria; PH Jouneau, P Bayle-Guillemaud; University Grenoble Alpes, France; B Fuchsbiehler, S Koller; Varta Micro Innovation GmbH; R Brunner; Materials Center Leoben Forschung GmbH, Austria

P09.1 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS:
M. Grace Burke, University of Manchester, United Kingdom
Bryan Miller, Naval Nuclear Laboratory

PLATFORM SESSION
Thursday 8:30 AM • Room: 265

8:30 AM 953 (INVITED) Revealing Nanometre-Scaled Solutes Clusters in Neutron Irradiated Low Alloy Steels; J Lim; UK Atomic Energy Authority; MG Burke; University of Manchester, United Kingdom

9:00 AM 954 (INVITED) Investigating the Influence of Zircaloy-4 Grain Orientation on Oxide Corrosion Films Formed in an Autoclave Environment; GA Lucadamo, JA Gruber; Naval Nuclear Laboratory

9:30 AM 955 The Corrosion of Secondary Phase Precipitates in Zircaloy in Superheated Water; I MacLaren, KJ Annand; University of Glasgow, Scotland; M Gass; AMEC Foster Wheeler, UK

9:45 AM 956 Microstructural Characterization of Pu-Zr Fuels; A Aitkaliyeva; University of Florida; CA Papesch; Idaho National Laboratory
A03.P1  Big, Deep, and Smart Data in Microscopy

POSTER SESSION
Thursday 10:00 AM  •  Room: Exhibit Hall

POSTER #  346
10:00 AM  958  What Can We Learn from the Shapes of Secondary Electron Puddles on Direct Electron Detectors?; A Datta, SW Chee; National University of Singapore; B Bammes, L Jin; Direct Electron, LP; D Loh; National University of Singapore, Singapore

POSTER #  347
10:00 AM  959  Rapid Measurement of I-V Curves via Complete Information Acquisition; S Somnath, P Maksymovych, S Kalinin, S Jesse, R Vasudevan; Oak Ridge National Laboratory

POSTER #  348
10:00 AM  960  Separation of Hard to Distinguish Phases in Automated Feature Analysis; M Hiscock, S Burgess, C Lang; Oxford Instruments

POSTER #  349
10:00 AM  961  (INVITED) Understanding and Exploiting the Interaction of Electron Beams with Low-Dimensional Materials – From Controlled Atomic-Level Manipulation to Circumventing Radiation Damage; T Susi, A Mittelberger, C Kramberger, C Mangler, C Hofer, TJ Pennycook, J Kotakoski, JC Meyer; University of Vienna, Austria

POSTER #  350
10:00 AM  962  Supervised Component Analysis for EELS Mapping; S Wang; Micron Technology, Inc.

POSTER #  351
10:00 AM  963  Processing a Five Dimensional X-ray Image: Big Data Challenges and Opportunities; J Davis, J Schmidt, M Huth; PNDetector GmbH, Germany; R Hartmann; PNSensor GmbH, Germany; H Soltau; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany

POSTER #  352
10:00 AM  964  Inter-Phase Relationships Revealed in 3-Dimensional Orientation Spaces; R Krakow, RJ Bennett, DN Johnstone, PA Midgley, R Hielscher; TU Chemnitz; CM Rae; University of Cambridge, United Kingdom

A08.P2  Advances and Applications of Aberration-Corrected Electron Microscopy

POSTER SESSION
Thursday 10:00 AM  •  Room: Exhibit Hall

POSTER #  354
10:00 AM  966  Depth-Dependent Contrast in Probability-Current Imaging from Channeling in Crystalline Materials; Z Chen, KK Nguyen, CS Chang, MC Cao, DA Muller; Cornell University

POSTER #  355
10:00 AM  967  Better Contrast for Imaging Defects by ABF; P Gao; Peking University, China

POSTER #  356
10:00 AM  968  Z-Contrast Imaging for Elemental Analysis: Single Atoms to Clusters; MC Akatay, W Sinkler, SI Sanchez, SA Bradley; Honeywell UOP

POSTER #  357
10:00 AM  969  Facet Selective Growth of Iridium Chains/Wires of Single-Atom Width on the \{10-10\} Surfaces of ZnO Nanowires; J Xu, Y Song, H Wu, J Liu; Arizona State University

POSTER #  358
10:00 AM  970  Z-Contrast Imaging of Incommensurately Modulated Structure in Plagioclase Feldspars; H Xu, S Jin; University of Wisconsin, Madison

POSTER #  359
10:00 AM  971  Atomic Resolution Microscopy of Clathrate-I Type Borosilicates; R Ramlau, W Jung, Y Grin; Max-Planck-Institut für Chemische Physik fester Stoffe, Germany
A13.P2  Applications of Atom Probe Tomography

POSTER SESSION
Thursday 10:00 AM  •  Room: Exhibit Hall

POSTER # 360
10:00 AM  972 Atom Probe Tomography of Reduced Phases in Apollo 16 Regolith Sample 61501,22; P Gopon; University of Oxford, United Kingdom; M Spicuzza; University of Wisconsin; TF Kelly, DA Reinhard, TJ Prosa, DJ Larson; CAMECA Instruments, Inc.; J Fournelle; University of Wisconsin, Madison

POSTER # 361
10:00 AM  973 An Atom Probe Tomography Study of Ni-Cr-Al-Ti High-Temperature Oxidation; TL Barth, EA Marquis; University of Michigan, Ann Arbor

POSTER # 362
10:00 AM  974 The Supersaturation and Transient Volume Measurement for Nucleation, Growth, Coarsening in a Concentrated Ni-Based Superalloy; S-I Baik; Northwestern University

POSTER # 363
10:00 AM  975 Nanoscale Phase Separation in Al_{62}CoCrFeNi(Cu) High Entropy Alloys as Studied by Atom Probe Tomography; KE Knipling; U.S. Naval Research Laboratory; JL Tharpe, PK Liaw; The University of Tennessee

POSTER # 364
10:00 AM  976 Influence of Ni, Mo and Mn Content on the G-Phase Precipitation and Spinodal Decomposition of Aged Duplex Stainless Steels; R Badyka, C Pareige; Centre National de la Recherche Scientifique, Université et INSA de Rouen; S Saïlet, C Domain; EDF R&D

POSTER # 365
10:00 AM  977 Investigation of Novel Phase Transformation Mechanisms in Titanium Alloys Using Atom Probe and Aberration-Corrected Scanning Transmission Electron Microscope; Y Zheng; The Ohio State University; T Alam, R Banerjee; University of North Texas; HL Fraser; The Ohio State University

A14.P1  Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

POSTER SESSION
Thursday 10:00 AM  •  Room: Exhibit Hall

POSTER # 366
10:00 AM  978 An Analysis of Nanoindentation in a NiCoAlFeMo High Entropy Alloy Produced by Sintering; CD Gómez-Esparza, CA Rodríguez-González; Universidad Autónoma de Ciudad Juárez Mexico; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 367
10:00 AM  979 Effect of Ti and W Additions on the Microstructural Behavior of a Nanocrystalline CoCrFeMoNi High Entropy Alloy; CD Gómez-Esparza, H Camacho-Montes; Universidad Autónoma de Ciudad Juárez, Mexico; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico; CA Rodríguez-González; Universidad Autónoma de Ciudad Juárez, Mexico

POSTER # 368
10:00 AM  980 Mechanical Behavior on Microstructure of B4C Particles Reinforced 2024 Aluminum Matrix Composite Obtained by Mechanical Milling; C Carreño-Gallardo, H Camacho-Montes; Universidad Autónoma de Ciudad Juárez, Mexico; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados S.C., Mexico; C López-Meléndez; Universidad La Salle Chihuahua, Mexico

POSTER # 369
10:00 AM  981 Microstructure and Superconductivity of Bi/Ni Bilayers Prepared by Pulsed Laser Deposition; L Liu; Pontificia Universidade Católica do Rio de Janeiro, Brazil; Y Xing, D Franceschini; Universidade Federal Fluminense, Brazil; G Solórzano; Pontificia Universidade Católica do Rio de Janeiro, Brazil

POSTER # 370
10:00 AM  982 Correlated EBSD and High Speed Nanoindentation Mapping; E Hintsala, J Risan, R Dietrich, R Nay; Bruker Corporation

POSTER # 371
10:00 AM  983 In Situ Study of High-Temperature Mechanical Properties of Carbon Nanotube Scaffolds; S Bhowmick; Bruker Corporation; CS Tiwary; Rice University; S Asif; Bruker Corporation; PM Ajayan; Rice University
POSTER # 372
10:00 AM 984 TEM Study of Polycrystalline Co-Ni-Ga for Applications of Shape Memory Alloys; M Sánchez-Carrillo; Universidad Tecnológica de Chihuahua Sur, Mexico; JP Flores-de-llos-Ríos; Universidad Autónoma de Chihuahua, Mexico; HJ Morales-Rodríguez; Universidad Tecnológica de Chihuahua Sur, Mexico; J Ramos-Cano; Universidad Autónoma de Coahuila, Mexico; A Santos-Beltrán, V Gallegos-Orozco; Universidad Tecnológica de Chihuahua Sur, Mexico

POSTER # 373
10:00 AM 985 Study of Nanostructured NiCrMo Base Alloy Applied via LVOF Thermal Spray; VG Gallegos-Orozco, A Santos-Beltrán; Universidad Tecnológica de Chihuahua Sur, Mexico; M Santos; Centro de Investigación en Materiales Avanzados, Mexico; H Morales-Rodríguez, I Ronquillo-Orrelas, R Carbajal-Sánchez; Universidad Tecnológica de Chihuahua Sur Mexico; C Modesto; Universidad Tecnológica de Chihuahua Sur, Mexico, V Orozco; Centro de Investigación en Materiales Avanzados, Mexico, et al.

POSTER # 374
10:00 AM 986 Microstructural Characterization of Inconel 718 for Aeronautical Use; A Martínez; Centro de Investigacion en Materiales Avanzados, Mexico, MT Santoyo, O Vázquez; Instituto Tecnológico de Morelia, Mexico; JM Herrera; Centro de Investigacion en Materiales Avanzados, Mexico

POSTER # 375
10:00 AM 987 Influence of Salt Fluxes on Recycled Al Nanocomposites Reinforced with TiO₂ Nanoparticles Produced in Liquid State; A Santos-Betran, V Gallegos-Orozco, H Morales-Rodriguez, M Sanchez-Carrillo; Universidad Tecnológica de Chihuahua Sur, Mexico; I Estrada-Guel; Centro de Investigacion en Materiales Avanzados, Mexico; C Modesto-Acosta; Universidad Tecnologica de Chihuahua Sur, Mexico

POSTER # 376
10:00 AM 988 Improved Understanding of Material Behavior Using Correlative In Situ Techniques; MJ Cordill, J Kreith; Erich Schmid Institute of Material Science, Austria; M Winhold, M Leitner, CH Schwalb; GETec Microscopy GmbH, Austria

POSTER # 377
10:00 AM 989 Comparative Study between Vickers and Knoop Micro-hardness of Ultra High Temperature Ceramics; N Seetala, A Simpson, C Provo; Grambling State University; L Matson; Air Force Laboratory; H Lee; UES, Inc.

POSTER # 378
10:00 AM 990 Effect of Build Orientation on the Mechanical Properties and Fracture Behavior of ABS Produced by Fused Deposition Modeling; F Akasheh, A Rochester, H Aglan; Tuskegee University

POSTER # 379
10:00 AM 991 Technique for In Situ Meso-Scale Uniaxial Mechanical Testing in the SEM; C Spellman, V Verma, A Arzoumanidis, Z Zanzinger; PsyloTech, Inc

POSTER # 380
10:00 AM 992 Low-Cost Functionalized Pseudoboehmite/Aluminum Substrates for The Analysis of Nanoparticles by SEM; MM Martinez-Garcia, PE Cardoso-Avila, N Gomez-Ortiz, JL Pichardo-Molina; Centro de Investigaciones en Optica AC, Mexico

A15.P1 Pushing the Limits of Cryo-TEM: Development and Applications

POSTER SESSION
Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 381
10:00 AM 993 Relating Sampling Anisotropy to Resolution Anisotropy in Cryo-EM Maps; PR Baldwin, YZ Tan, ET Eng, CS Potter, B Carragher; New York Structural Biology Center

POSTER # 382
10:00 AM 994 Hole-Free Phase Plate Energy Filtering Imaging of Graphene: Toward Quantitative Hole-Free Phase Plate Imaging in a TEM; M Malac; National Institute for Nanotechnology, Canada, NRC and University of Alberta, Canada; E Kano; University of Alberta, Canada; M Hayashida; National Institute for Nanotechnology, Canada; M Kawasaki, S Motoki; JEOL, USA Inc.; RF Egerton; University of Alberta, Canada; I Ishikawa, Y Okura; JEOL, Ltd., Japan, et al.
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<th>Authors</th>
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<tr>
<td>383</td>
<td>10:00</td>
<td>Cryo-FIB Lift-Out Sample Preparation Using a Novel Cryo-gripper Tool</td>
<td>AJ Smith; Kleindiek Nanotechnik GmbH, Germany; T Laugks; Max Planck Institute of Biochemistry, Germany; S Kleinmiek; Kleindiek Nanotechnik GmbH, Germany; S Albert; Max Planck Institute of Biochemistry, Germany; MP Johnson, WH Wood; University of Sheffield; BD Engel, W Baumeister; Max Planck Institute of Biochemistry, Germany, et al.</td>
</tr>
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<td>384</td>
<td>10:00</td>
<td>Design of a High Capacity Puck Storage System for Cryo-EM Grids in a Facility Setting</td>
<td>A Estevez, C Arthur, A Rohou, C Ciferri; Genentech</td>
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<tr>
<td>385</td>
<td>10:00</td>
<td>Self-Blotting Nanowire Grids for Cryo-EM Sample Preparation</td>
<td>H Wei, Z Zhang, V Dandey; A Raczkowski; B Carragher, CS Potter; New York Structural Biology Center</td>
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<td>386</td>
<td>10:00</td>
<td>Studying the Effects of Interfacial Coupling in La$<em>{0.5}$Sr$</em>{0.5}$CoO$_{3-\delta}$ Thin Films on SrTiO$_3$ Using In Situ Cooling Experiments</td>
<td>X Rui; University of Illinois, Chicago; J Walter, C Leighton; University of Minnesota; RF Klie; University of Illinois, Chicago</td>
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<td>387</td>
<td>10:00</td>
<td>Distinguish Coexistence of Nanoemulsion and Liposome in Propofol by Cryogenic Transmission Electron Microscopy (cryo-TEM)</td>
<td>Y Wu, P Petrochenko, JH Myung, S Manna, B Koo, S Choi, D Kozak, J Zheng; Food and Drug Administration</td>
</tr>
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<td>388</td>
<td>10:00</td>
<td>The Effects of Impurities on Crystal Growth Rate in an Isothermal Continuous-Flow Reactor Using a Photomicroscopic Method</td>
<td>L-D Shiau; Chang Gung University, Taiwan</td>
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<td>389</td>
<td>10:00</td>
<td>In Situ Observation of Rh-CaTiO$_3$ Catalysts During Reduction and Oxidation Treatments By Transmission Electron Microscopy</td>
<td>S Dai; University of California, Irvine; S Zhang, M Katz; University of Michigan; G Graham, X Pan; University of California, Irvine</td>
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<td>390</td>
<td>10:00</td>
<td>Temperature Measurement in a TEM Using Electron Diffraction of Amorphous Films</td>
<td>M Hayashida, K Cui; National Institute for Nanotechnology, Canada; M Malac; marek <a href="mailto:malac@gmail.com">malac@gmail.com</a></td>
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<td>391</td>
<td>10:00</td>
<td>Formation of Swiss-Cheese-Like Nanostructure of α-Fe$_2$O$_3$ by Reduction</td>
<td>W Zhu; Binghamton University; J Winterstein, R Sharma; National Institute of Standards and Technology; G Zhou; Binghamton University</td>
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<td>392</td>
<td>10:00</td>
<td>In Situ Study of Dynamics of CuAu Alloy Nanoparticles on Oxide Supports</td>
<td>W Gao; University of California, Irvine; M Colombo; Istituto Italiano di Tecnologia; S Dai, S Zhang, G Graham, X Pan; University of California, Irvine</td>
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<td>393</td>
<td>10:00</td>
<td>In Situ TEM Study on Size-Dependent Thermal Stability of Nickel Filled Silica Nano-Opals</td>
<td>P Moradifar, Y Liu, J Russell, T Mallouk, J Badding, N Alem; University of Pennsylvania</td>
</tr>
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<td>394</td>
<td>10:00</td>
<td>Addressing In Situ Challenges Using Integrated Hardware and Software</td>
<td>BK Miller, S Mick; Gatan Inc</td>
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POSTER # 395  
10:00 AM  1007  (M&M STUDENT SCHOLAR)  Atomic-Scale Relaxation Dynamics in the Supercooled Liquid State of a Metallic Glass Nanowire by Electron Correlation Microscopy; P Zhang; University of Wisconsin, Madison; Z Liu, J Schroers; Yale University; PM Voyles; University of Wisconsin, Madison

POSTER # 396  
10:00 AM  1008 Three-Dimensional Analyses of Degradation in PEMFCs; T Daio; Osaka University; I Narita; Osaka Kyoiku University, Japan; K Suganuma; Osaka University, Japan

POSTER # 397  
10:00 AM  1009 The Stability of Sapphire in the Presence of Water: An Environmental TEM Study; J Carpena-Núñez; National Research Council; D Zakharov; Brookhaven National Laboratory; AE Islam, G Sargent; UES, Inc.; EA Stach; Brookhaven National Laboratory; B Maruyama; U.S. Air Force Research Laboratory

POSTER # 398  
10:00 AM  1010 Atomic-Resolution Characterization of Surface Structures and Metal-Support Interfaces on Nanostructured Pt/CoO Catalysts Performing CO Oxidation; J Vincent, PA Crozier; Arizona State University

POSTER # 399  
10:00 AM  1011 Understanding Redox Effects on Supported Bimetallic Particles; CE Kliewer; ExxonMobil

POSTER # 400  
10:00 AM  1012 Nanoscale Observation of Intact Biological Specimens in Water with High-Contrast Imaging by Scanning Electron-Assisted Dielectric-impedance Microscopy; T Ogura, T Okada; National Institute of Advanced Industrial Science and Technology

POSTER # 401  
10:00 AM  1013 Morphological and Production Changes in Planktonic and Biofilm Cells Monitored Using SEM and Raman Spectroscopy; K Hrubanova, V Krzyzanek, O Samek, R Skoupy, M Šiler, J Ježek; Institute of Scientific Instruments of the CAS, v.v.i., Czech Republic; S Obruča; Brno University of Technology, Czech Republic, P Zemanek; Institute of Scientific Instruments of the CAS, v.v.i., Czech Republic

POSTER # 402  
10:00 AM  1014 Large-Area Ultrastructural Analysis on Alteration of Synaptic Vesicles in the 835MHz Radiofrequency-Exposed Cerebral Cortex of Mice Brain Using Limitless Panorama and 3D Electron Tomography; H-J Kim; Korea Basic Science Institute; JH Kim, D-H Yu; Dankook University, Korea; AR Je, S Choi, H-S Kweon; Korea Basic Science Institute; HR Kim; Dankook University, Korea, YH Huh; Korea Basic Science Institute

POSTER # 403  
10:00 AM  1015 Advantages of Using a Variable Pressure Serial Block Face Scanning Electron Microscope for 3D Volume Analyses; CS López; Oregon Health & Science University; C Bouchet-Marquis; Thermo Fisher Scientific; M Williams; Oregon Health & Sciences University

POSTER # 404  
10:00 AM  1016 Developing a Training Module in Rigor and Reproducibility in Imaging Sciences; AM Medina-Lopez, H Shinogle-Decker, N Martinez-Rivera, E Rosa-Molinar; The University of Kansas
Thursday, August 10

**P01.P2 Characterization of Semiconductor Materials and Devices**

**POSTER SESSION**
Thursday 10:00 AM • Room: Exhibit Hall

**POSTER # 405**
10:00 AM 1017 *Radial Interference Contrast in In Situ SEM Observation of Metal Oxide Semiconductor Film Crystallization;* K Shigeto; Hitachi High-Technologies Corporation, Japan; T Kizu, K Tsukagoshi, T Nabatame; National Institute for Materials Science, Japan

**POSTER # 406**
10:00 AM 1018 *Analysis of Amorphous-to-Crystalline Germanium Stack with Cs-Corrected Analytical STEM;* DH Anjum; King Abdullah University of Science & Technology, Saudi Arabia; KH Lee; Nanyang Technological University, Singapore; G Zhou; University of British Columbia, Canada; Q Zhang, N Wei; King Abdullah University of Science & Technology, Saudi Arabia; GM Xia; University of British Columbia, Canada; CS Tan; Nanyang Technological University, Singapore, X Zhang; King Abdullah University of Science & Technology, Saudi Arabia

**POSTER # 407**
10:00 AM 1019 *Growth of ZnO Thin Films Synthesized By Chemical Routes for Optoelectronic Applications;* R Sánchez-Zeferino, ME Álvarez-Ramos, RC Carrillo-Torres, S Munguia-Rodríguez, JA Gonzalez, G Saavedra-Rodríguez; Universidad de Sonora, Mexico

**POSTER # 408**
10:00 AM 1020 *Assessing Hexagonal Boron Nitride Crystal Quality by Defect Sensitive Etching;* T Hoffman, Y Zhao, S Liu; Kansas State University; N Khan; Georgia Gwinnett College; M Twigg, N Bassim; McMaster University, Canada; J Edgar; Kansas State University

**POSTER # 409**
10:00 AM 1021 *Exploring the Structural and Electronic Properties of Nanowires at Their Mechanical Limits;* B Ozdol; Lawrence Berkeley National Laboratory; C Gammer; Austrian Academy of Sciences; L Zeng; Chalmers

**P05.P1 Imaging and Spectroscopy of Beam Sensitive Materials**

**POSTER SESSION**
Thursday 10:00 AM • Room: Exhibit Hall

**POSTER # 410**
10:00 AM 1022 *Mapping Anti-phase Domains by Polarity Sensitive Orientation Imaging Using Electron Backscatter Diffraction;* N-K Gunasekar, S Vespucci; University of Strathclyde, Scotland; A Vilalta-Clemente; University of Oxford, United Kingdom; H Jussila; Aalto University, Finland; A Winkelmann; Bruker Nano GmbH, Germany; G Nolze; BAM; N Subramaniyam; Aalto University, Finland, AJ Wilkinson; University of Oxford, United Kingdom, et al.

**POSTER # 411**
10:00 AM 1023 *Transmission Electron Microscopy of Vertically Stacked ErAs-InAs Semimetal - Quantum Dot Nanocomposite Heterostructures Grown on GaAs(001) Substrates;* K Mahalingam, YZ Zhang, KG Eyink, J Peoples, B Urwin, L Grazulis, M Hill; U.S. Air Force Research Laboratory

**POSTER # 412**
10:00 AM 1024 *Correlation of Etch Pits and Dislocations in As-grown and Thermal-Cycle-Annealed HgCdTe(211) Films;* M Vaghayenegar; Arizona State University; RN Jacobs, JD Benson, AJ Stoltz, LA Almeida; U.S. Army Development and Engineering Command; DJ Smith; Arizona State University

**University of Technology, Sweden;** S Bhowmick; Hysitron Inc; T Nordqvist, P Krogstrup; Niels Bohr Institute, Denmark; AM Minor, U Dahmen; Lawrence Berkeley National Laboratory, et al.

**POSTER # 413**
10:00 AM 1025 *Characterization of Fluorescence-Tagged Polymeric Particles Using Confocal Laser Scanning Microscopy and Three-Dimensional Structured Illumination Microscopy;* X Wang, M Wei; Nalco Water, An Ecolab Company

**POSTER # 414**
10:00 AM 1026 *Polymer Imaging in SEM – Charge, Damage and Coating-Free.;* P Wandrol; Thermo Fisher Scientific; M Slouf; Institute of Macromolecular Chemistry ASCR, Czech Republic
### Scientific Program

**Thursday, August 10**

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<td>415</td>
<td>10:00</td>
<td>The Structure and Electronic States of Self-Assembled C60 Crystals</td>
<td>T Ramprasad; University of Arizona; J Howe; Hitachi High Technologies America, Inc.; Tj Gnanapakasa; University of Arizona; A Hanawa; Hitachi High Technologies Inc., Japan; J Jiminez; Hitachi High Technologies America, Inc.; K Muralidaran, Tj Zega; University of Arizona</td>
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<td>416</td>
<td>10:00</td>
<td>Investigation of the Nature of Capping Layer Materials for FIB-SEM Preparation: Implications for the Study of Carbonaceous Material in Extraterrestrial Samples</td>
<td>P Haenecour, TJ Zega; The University of Arizona; JY Howe; Hitachi High-Technologies America, Inc.; P Wallace; The University of Arizona; C Floss; Washington University in St. Louis; T Yada; Institute of Space and Astronautical Science, Japan</td>
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<td>417</td>
<td>10:00</td>
<td>Characterization of BiVO$_4$ Powders and Thin Films by Electron Microscopy and Electron Energy Loss Spectroscopy</td>
<td>HA Calderon; Instituto Politecnico Nacional, Mexico; FM Toma, JK Cooper, ID Sharp, P Ercius; Lawrence Berkeley National Laboratory; OE Cigarroa- Mayorga, E Neri; Instituto Politecnico Nacional, Mexico</td>
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<td>418</td>
<td>10:00</td>
<td>Convenient Optics for High Dispersion Small Angle Electron Diffraction with Highly Coherent Low Dose Illumination</td>
<td>M Kawasaki; JEOL USA, Inc.; M Shiojiri, K Nishio; Kyoto Institute of Technology, Japan</td>
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<td>419</td>
<td>10:00</td>
<td>Transmission Electron Microscope Observation of Charge Distribution on Insulating Thin Films by Hydro-Carbon Deposition</td>
<td>K Harada, K Shimada, K Niitsu; RIKEN, Japan; T Katsuta; Vacuum Device Inc.; T Ohno; Tecnex Lab; D Shindo; RIKEN, Japan</td>
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<td>420</td>
<td>10:00</td>
<td>Accelerating Voltage and Probe Current Dependence of Electron Beam Drilling Rates for Silicon Crystal</td>
<td>N Endo, Y Kondo; JEOL, Ltd., Japan</td>
</tr>
<tr>
<td>421</td>
<td>10:00</td>
<td>Expanding the Depth of Field for Imaging with Low keV Electrons: High-Resolution Surface Observations of Nanostructured LaB$_6$ Using Low keV Secondary and Backscattered Electrons</td>
<td>T Sunaoshi, S Okada, K Kaji; Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies America; R Ramachandran, T Salguero; University of Georgia</td>
</tr>
</tbody>
</table>

**Poster # 422** Non-Invasive Morphological and Elemental Analysis of Ivory Plate for Artworks Authentication Using ESEM and EDS | E Tihlaříková; V Neděla; Institute of Scientific Instruments of the CAS, Czech Republic; J Hradilová; Academy of Fine Arts in Prague; D Hradil; Institute of Inorganic Chemistry of the CAS, Czech Republic |
| 423      | 10:00| Microgel Swelling Studied by Cryo-SEM | J Liang, F Teng, T Chou, M Libera; Stevens Institute of Technology |
| 424      | 10:00| Treading Lightly – Achieving Spectroscopy and Elemental Maps of Beam Sensitive Specimens in the SEM | SR Burgess, J Holland, JT Sagar; Oxford Instruments Nanaanalysis |
| 425      | 10:00| Imaging Hydrated Nanostructured Zeolite X Using Single-Electron-Detection Camera | S Chen, S Don, SL Chang; Arizona State University |
| 426      | 10:00| Imaging Hydrated Nanostructured Zeolite X Using Single-Electron-Detection Camera | S Chen, S Don, SL Chang; Arizona State University |
| 427      | 10:00| Non-Invasive Morphological and Elemental Analysis of Ivory Plate for Artworks Authentication Using ESEM and EDS | E Tihlaříková; V Neděla; Institute of Scientific Instruments of the CAS, Czech Republic; J Hradilová; Academy of Fine Arts in Prague; D Hradil; Institute of Inorganic Chemistry of the CAS, Czech Republic |

**Poster # 428** Low Dose Characterization of Diamondoid Carbon Nanothreads by Transmission Electron Microscopy | S Juhl, X Li, J Badding, N Alem; The Pennsylvania State University |
POSTER # 430
10:00 AM 1042 Exposing Advanced Building Strategies of Strongly Iron-Enriched Incisors; V Srot, B Bussmann, J Deuschle; Max Planck Institute for Solid State Research, Germany; B Pokorny; Environmental Protection College + Institute ERICo, Velenje, Slovenian Forestry Institute, M Watanabe; Lehigh University; PA van Aken; Max Planck Institute for Solid State Research, Germany

POSTER # 430A
10:00 AM 1042.5 Application of Electron Counting to Electron Energy-loss Spectroscopy and Implications for Low-Dose Characterization; JL Hart, AC Lang, AC Leff; Drexel University; P Longo, C Trevor, R Twsten; Gatan; ML Taheri; Drexel University

POSTER # 431
10:00 AM 1043 Development of Quantitative Techniques with Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) for Li Characterization in High Energy Batteries.; S Bessette; Hydro-Quebec and McGill University; Canada; P Hovington, C Kim; Hydro-Quebec; R Gauvin, H Demers; McGill University, Canada; K Zaghib; Hydro-Quebec

POSTER # 432
10:00 AM 1044 Electron Tomography of PEM Fuel Cell Catalyst Coarsening on Alternate Carbon Supports; BT Sneed, DA Cullen, KS Reeves, KL More; Oak Ridge National Laboratory

POSTER # 433
10:00 AM 1045 Direct Observation of Hafnia Structural Phase Transformations; BM Hudak; University of Kentucky; SW Depner; University of Buffalo; GR Waetzig, S Banerjee; Texas A&M University; BS Guiton; University of Kentucky

POSTER # 434
10:00 AM 1046 Annealing Effects on TiO2 Photocatalytic Degradation of Methylene Blue; R Catabay, S Fowler; Portland State University; A Leng; Lincoln High School; J Jiao; Portland State University

POSTER # 435
10:00 AM 1047 TEM Analysis of CsPbBr3 Nanocrystals: Challenges and Perspectives; M Brennan, M Kuno, S Rouvimov; University of Notre Dame

POSTER # 436
10:00 AM 1048 Monochromated Electron Energy-Loss Spectroscopy of Lead-Free Halide Perovskite Semiconductors; JA Alexander, ET McClure, PM Woodward, DW McComb; The Ohio State University

POSTER # 437
10:00 AM 1049 Structural Change of a Cu/ZnO Catalyst Under Methanol Observed by ETEM; H Chi, C Bonifacio, C Andolina; University of Pittsburgh; E Stach; Brookhaven National Laboratory; G Veser, J Yang; University of Pittsburgh

POSTER # 438
10:00 AM 1050 A 4D Framework for Probing Structure-Property Relationships in Lithium Ion Batteries; J Gelb; San Jose State University; D Finegan; University College London, UK; M McNeil; San Jose State University; D Brett, PR Shearing; University College London, United Kingdom

POSTER # 439
10:00 AM 1051 Calculation of the Electric Field Based on Average Momentum Transfer Using Pixelated Electron Detector in STEM; W Gao, C Addiego, X Pan; University of California, Irvine

POSTER # 440
10:00 AM 1052 Nanoscale Imaging of Subsurface Oxygen Formation on Rhodium Catalysts.; SV Lambeets, C Barroo; Université libre de Bruxelles, Belgium; S Owczarek; University of Wroclaw, Poland; E Genty, N Gilis, T Visartde Bocarmé; Université libre de Bruxelles, Belgium

POSTER # 441
10:00 AM 1053 Microstructure and Crystallographic Determination of Nanoporous Catalysts; C Barroo; Université libre de Bruxelles, Belgium; T Egle, AJ Akey, DC Bell; Harvard University; J Biener; Lawrence Livermore National Laboratory
Scientific Program

POSTER # 442
10:00 AM 1054 Corrosion Analysis of Electrical Connectors Using SEM; J Ford, H Aglan, A Ludwick; Tuskegee University

P09.P1 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

POSTER SESSION
Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 443
10:00 AM 1055 EBSD and TEM Microstructural Studies of New Fuel Cladding in Generation-IV Sodium-Cooled Fast Nuclear Reactors; P Nowakowski, BS Bonifacio, MJ Campin, ML Ray, PE Fischione; E.A. Fischione Instruments; S Mathieu; Université de Lorraine, France

POSTER # 444
10:00 AM 1056 Assessment of Corrosion Resistance of Candidate Alloys for Accident Tolerant Fuel Cladding Under Reactor Conditions; S Rouvimov; S Grdanovska; University of Notre Dame

POSTER # 445
10:00 AM 1057 Structural Characterization of Fission Products in Irradiated TRISO Fuels Using Transmission Kikuchi Diffraction, Transmission Electron Microscopy, and Synchrotron X-ray Absorption Spectroscopy; RL Seibert; Illinois Institute of Technology; CM Parish, JD Hunn, CA Baldwin, KA Terrani; Oak Ridge National Laboratory; J Terry; Illinois Institute of Technology

POSTER # 446
10:00 AM 1058 Identification of Fluorescent Material Using FE-SEM/EDS and a Variable Pressure Secondary Electron Detector; H Ajo, D DiPrete; Savannah River National Laboratory

POSTER # 447
10:00 AM 1059 He+ Irradiation Induced Cracking and Exfoliating on the Surface of Ti₃AlC₂; H Shen; China Academy of Engineering Physics

POSTER # 448
10:00 AM 1060 Measurement of Irradiation-Induced Swelling in Stainless Steels with a New Transmission Electron Microscopy Method; L He; University of Wisconsin, Madison; H Xu; University of Tennessee; L Tan; Oak Ridge National Laboratory; PM Voyles, K Sridharan; University of Wisconsin, Madison

WITHDRAWN

POSTER # 449
10:00 AM 1061 Defect Characterization in Irradiated Nanocrystalline Materials via Automated Crystal Orientation Mapping; PK Suri, JE Nathaniel; Drexel University; CM Barr; Drexel University, Sandia National Laboratories; JK Baldwin; Los Alamos National Laboratory; K Hattar; Sandia National Laboratories; ML Taheri; Drexel University

POSTER # 450
10:00 AM 1062 Surface Morphology Analysis of Ti-6Al-4V, V-4Ti-5Cr, and Molybdenum Exposed to Low Power Nd: YAG Laser; H Aglan, A Kumar, K Muir; Tuskegee University; A Hassanein; Purdue University

POSTER # 451
10:00 AM 1063 Discontinuous Precipitation in Aged Welded Joints of High Cr-Ni Superalloy; JC Spadotto, G Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil

POSTER # 452
10:00 AM 1064 Morphological Evolution and Coalescence of γ’ Precipitates; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; SE Hernández-Martínez, JL Hernández-Rivera, JJ Cruz-Rivera; Universidad Autónoma de San Luis Potosí, Mexico; MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; HJ Dorantes-Rosales; Instituto Politécnico Nacional, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 453
10:00 AM 1065 Microstructure Evolution of Ti Tritides During Aging; HFW H.F. Wang, SMP S.M. Peng, HHS H.H. Shen, XSZ X.S. Zhou; China Academy of Engineering Physics

POSTER # 454
10:00 AM 1066 STEM Imaging and Phase Mapping of Precipitation in Alloy 718 Using an Electron Microscope Pixel Array Detector; CA Wade; The University of Manchester, United Kingdom; E Yucelen, S Sluyterman, B Freitag; Thermo Fisher Scientific; G Burke; The University of Manchester, United Kingdom
Thursday, August 10

Scientific Program

PHYSICAL SCIENCES POSTER SESSIONS– THURSDAY MORNING CONTINUED

POSTER # 455
10:00 AM  1067 Microstructure Evolution of Ni-Base Superalloy 625: From Conventional Thermomechanical Processed to Selective Laser Melting Processed; C Labre; Pontifical Catholic University of Rio de Janeiro, Brazil; AL Pinto; Brazilian Center of Research in Physics; IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil

POSTER # 456
10:00 AM  1068 Microstructural Study of the Heat-Treated 17-4PH Stainless Steel Parts Prepared by Selective Laser Melting; Y Sun, M Aindow, RJ Hebert; University of Connecticut

POSTER # 457
10:00 AM  1069 Precipitation in an Irradiated 625 Plus Alloy; L-J Yu, E Marquis; University of Michigan

POSTER # 458
10:00 AM  1070 Auger Electron Spectroscopy Analysis of Pit Initiation at MnS Nano-Inclusions in Carbon Steel; JG Newman, JS Hammond; Physical Electronics; BH Davis, Z Suo, R Avci; Montana State University; DF Paul; Physical Electronics; I Beech; University of Oklahoma

POSTER # 459
10:00 AM  1071 Microstructural Characterization of Irradiated and Hydrurate Zr-2.5%Nb AND Zr – 1%Nb; C Vazquez, AM Fortis, PB Bozzano, RA Versaci; Centro Atómico Constituyentes, Argentina

75TH MSA ANNIVERSARY LECTURE

X71.1  MSA 75th Anniversary Lecture in the Physical Sciences

SESSION CHAIR:
Ian M. Anderson, President, Microscopy Society of America

PLATFORM SESSION
Thursday 12:15 PM • Room: 275
12:15 PM  1132 (INVITED) Smarter Than an iPhone: The Emergence of the Modern Electron Microscope; Ondrei L. Krivanek; Nion R&D, Arizona State University

ANALYTICAL SCIENCES SYMPOSIA– THURSDAY AFTERNOON

A01.4  Vendor Symposium

SESSION CHAIRS:
Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University

PLATFORM SESSION
Thursday 1:30 PM • Room: 125
1:30 PM  1073 Hardware and Software Advances in Commercially Available Atom Probe Tomography Systems; RM Ulfig, TJ Prosa, Y Chen, KP Rice, I Martin, DA Reinhard, BP Gieser, E Oltman; CAMECA Instruments, Inc., et al.
1:45 PM  1074 Atom Probe Tomography with the Easier to Operate EIKOS®; KP Rice, Y Chen, RM Ulfig, D Lenz, J Bunton, M van Dyke, DJ Larson; CAMECA Instruments, Inc.
2:00 PM  1075 Development of an X-ray Based Spectroscopy MicroXRF System with LA-ICP-MS Capabilities: Trace-Level Microns-scale Mapping and Femtogram Detection Sensitivity; S Lau, SJ Lewis, W Yun, B Stripe, J Kirz, A Lyon, D Reynolds, RI Spink; Sigray, Inc.
2:15 PM  1076 Improving Sensitivity and Productivity with High Count Rate X-ray Spectrum Images; SR Burgess, M Hiscock, P Pinard; Oxford Instruments Nanoanalysis
2:30 PM 1077 3D Mapping Grain Morphology and Grain Orientations by Laboratory Diffraction Contrast Tomography; I Lavery; Carl Zeiss X-ray Microscopy; N Gueninchault; Xnovo Technology, Denmark; H Bale, C Holzner; Carl Zeiss X-ray Microscopy; F Bachmann, E Lauridsen; Xnovo Technology, Denmark

2:45 PM 1078 Silicon Drift Detectors: Limitations for Throughput and Resolution; J Rafaelsen; EDAX, Inc.

A03.3 Big, Deep, and Smart Data in Microscopy

SESSION CHAIR:
Eric Stach, Brookhaven National Laboratory

PLATFORM SESSION
Thursday 1:30 PM • Room: 260

1:30 PM 1079 Accurate Diffraction Peak Identification for Scanning Electron Nanodiffraction Based on Automated Image Processing and Feature Detection; R Yuan, Y Meng; University of Illinois, Urbana-Champaign; J Zhang; Intel Corporation; J-M Zuo; University of Illinois, Urbana-Champaign

1:45 PM 1080 (INVITED) Autonomous Experimentation Applied to Carbon Nanotube Synthesis; B Maruyama; U.S. Air Force Research Laboratory

2:15 PM 1081 G-Mode – Full Information Capture Applied to Scanning Probe Microscopy; S Somnath, SV Kalinin, S Jesse; Oak Ridge National Laboratory

2:30 PM 1082 Combinatorial Microscopy in Liquids with Low Energy Electrons; E Strelcov, H Guo, A Yulaev; National Institute of Standards and Technology; J Wang, N Appathurai, S Urquhart; CLS; J Vinson, S Sahu; National Institute of Standards and Technology, et al.

2:45 PM 1083 Physic-Based Image Reconstruction of SiC Grain Boundaries; A Ziabari; Purdue University; JM Rickman; Lehigh University; JP Simmons; Air Force Research Lab; CA Bouman; Purdue University

A08.5 Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS:
Ben McMorran, University of Oregon
David Muller, Cornell University

PLATFORM SESSION
Thursday 1:30 PM • Room: 132

1:30 PM 1084 (INVITED) Low-Voltage TEM/STEM for Imaging and Spectroscopy of Low-Dimensional Materials; K Suenaga; National Institute for Advanced Industrial Science and Technology, Japan

2:00 PM 1085 (INVITED) A New Detection Scheme for Van Der Waals Heterostructures, Imaging Individual Fullerenes Between Graphene Sheets, and Controlling the Vacuum in Scanning Transmission Electron Microscopy; G Argentero, K Mustonen, R Mirzayev, A Mittelberger, T Susi, GT Leuthner; University of Vienna, Austria; Y Cao; University of Manchester, United Kingdom, M Monazam; University of Vienna, Austria, et al.

2:30 PM 1086 (MSA POSTDOCTORAL SCHOLAR) Etching and Mending of Graphene Edges by Cu and Pt Atoms; E Kano; University of Tsukuba, Japan; A Hashimoto, M Takeguchi; National Institute for Materials Science, Japan

2:45 PM 1087 Quantification of Low Voltage Images of 2-Dimensional Materials in Aberration-Corrected Scanning Transmission Electron Microscopy.; MP Oxley; Oak Ridge National Laboratory; NG Cross, G Duscher; University of Tennessee; LJ Allen; University of Melbourne, Australia; MF Chisholm; Oak Ridge National Laboratory
Scientific Program

A14.5  Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:
Khalid Hattar, Sandia National Laboratories

PLATFORM SESSION
Thursday 1:30 PM  •  Room: 131

1:30 PM 1088  (INVITED) Coupling Quantitative Dislocation Analysis with In Situ Loading Techniques: New Insight into Deformation Mechanisms; ML Taheri, G Vetterick, AC Leff; Drexel University; M Marshall; Sandia National Laboratories; JK Baldwin, A Misra; Los Alamos National Laboratory; K Hattar; Sandia National Laboratories

2:00 PM 1089 Characterization of Dislocation Plasticity in Rhenium Using In Situ TEM Deformation; JE Sabisch, AM Minor; University of California, Berkeley

2:15 PM 1090 In Situ TEM Investigation of the Deformation Mechanisms and Microstructural Changes in Ultrafine-Grained Non-Textured Aluminum Film Using Automated Crystal Orientation Mapping; E Izadi, P Peralta, J Rajagopalan; Arizona State University

2:30 PM 1091  (INVITED) Understanding Heterogeneous Deformation in Polycrystalline Al 6061 by In Situ SEM Deformation and HREBSD Characterization; J Yoo; Georgia Institute of Technology; J Carroll, J Emery; Sandia National Laboratories; J Kacher; Georgia Institute of Technology

A16.8  In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:
Libor Kovarik, Pacific Northwest National Laboratory

PLATFORM SESSION
Thursday 1:30 PM  •  Room: 130

1:30 PM 1096 Constructing a Predictive Model of Copper Oxidation from Experiment and Theory; CM Andolina, MT Curnan, Q Zhu, WA Saidi, JC Yang; University of Pittsburgh

1:45 PM 1097 Multi-Scale Red-Ox Dynamics of Active Metal Catalysts Revealed by a Combination of In Situ Scanning and Transmission Electron Microscopy; R Farra, J Cao, A RinaldiF, E Willinger, X Huang; Fritz Haber Institute of the Max Planck Society, Germany; M Greiner; Max Planck Institute for Chemical Energy Conversion; R Schlegl, MG Willinger; Fritz Haber Institute of the Max Planck Society, Germany

2:00 PM 1098 In Situ S/TEM Observation of Hydrogen Bubbles Formation and Evolution in Aluminium Nanoparticles; Y Liu; North Carolina State University; T Zhu; Georgia Institute of Technology
2:15 PM 1099 Atomic-Scale Investigation on the Structure Evolution of the MnCr₂O₄ Nano-Octahedron in a Stainless Steel in Corrosion Environment by In Situ Ex-Environment TEM Observations; Y Zhou, B Zhang, S Zheng, X Ma; Shenyang National Laboratory for Materials Science, Chinese Academy of Sciences, China

2:30 PM 1100 New Approaches to In Situ Heating in FIB/SEM Systems; L Novák, M Wu, P Wandrol; Thermo Fisher Scientific; M Kolibal; Central European Institute of Technology - Brno University of Technology; T Vystavěl; Thermo Fisher Scientific

2:45 PM 1101 Modified Transport-of-Intensity Approach for Mapping In Situ Magnetic Induction; C Phatak, V Brajuskovic, F Barrows, A Petford-Long; Argonne National Laboratory

B BIOLOGICAL SCIENCES SYMPOSIA - THURSDAY AFTERNOON

B03.2 Imaging the Biology of Cells and Tissues: Just Do It Right

SESSION CHAIR:
Eduardo Rosa-Molinar, University of Kansas

PLATFORM SESSION
Thursday 1:30 PM • Room: 122

1:30 PM 1106 (INVITED) Gold Nanoparticle Technology to Address Variability in EM Labeling; RD Powell, VN Joshi, FR Furuya, W Liu, JW Dubendorff, JF Hainfeld; Nanoprobes, Inc.; E Rosa-Molinar; University of Kansas

2:00 PM 1107 (INVITED) FRIL is for the Tenacious: Maintaining Rigor and Reproducibility; JE Rash, T Yasumura, KG Vanderpool; Colorado State University; N Martinez-Rivera, E Rosa-Molinar; University of Kansas; JI Nagy; University of Manitoba, Canada

2:30 PM 1108 Comparison of 3D Cellular Imaging Techniques Using Scanned Electron Probes; RD Leapman, EL McBride, A Rao, G Zhang, Q He, MD Guay; National Institutes of Health; ID Pokrovskaya, B Storrie; University of Arkansas for Medical Sciences, et al.

B05.2 Pharmaceuticals and Medical Science

SESSION CHAIR:
Bridget Carragher, New York Structural Biology Center

PLATFORM SESSION
Thursday 1:45 PM • Room: 123

1:45 PM 1109 The Microstructure of Pharmaceutical Materials Revealed by Scanning Electron Diffraction; DN Johnstone, PA Midgley; University of Cambridge, United Kingdom

2:00 PM 1110 Multi-Linear Regression Model to Predict the Electron Stability of Poorly Soluble Active Pharmaceutical Ingredients; M Sari, A Brown, N Hondow, R Brydson; University of Leeds, United Kingdom; H Blade, L Hughes, S Cosgrove; AstraZeneca
### Scientific Program

#### BIOLGICAL SCIENCES SYMPOSIA - THURSDAY AFTERNOON CONTINUED

**2:15 PM 1111**  
**Real-Time Imaging of Protein Therapeutics Using Liquid Cell EM**  
LM DiMemmo; Bristol-Myers Squibb Company; AC Varano; Virginia Tech; J Haulenbeek; Bristol-Myers Squibb Company; MJ Dukes; Protochips, Inc; SP Piccoli; Bristol-Myers Squibb Company; DF Kelly; Virginia Tech

**2:30 PM 1112** (INVITED)  
**Obtaining 3Å Resolution Structures of Biomedical Targets at 200 keV**  
MA Herzik, M Wu; The Scripps Research Institute; ME Matyskiela, PP Chamberlain; Celgene Corporation; GC Lander; The Scripps Research Institute

#### PHYSICAL SCIENCES SYMPOSIA - THURSDAY AFTERNOON

**P01.8 Characterization of Semiconductor Materials and Devices**

**SESSION CHAIR:**  
Esther Chen, Global Foundries

**PLATFORM SESSION**  
Thursday 1:30 PM • Room: 267

1:30 PM 1113  
**Structural and Chemical Assessment of InAs/AlGaAs Quantum Dot Structures for Enlarged Bandgap Intermediate Band Solar Cells**  
M Catalano, A Taurino, M Lomascolo, A Creti; National Council for Research; V Tasco, A Passaseo; Consiglio Nazionale delle Ricerche, Italy; MJ Kim; University of Texas, Dallas

1:45 PM 1114  
**HAADF-STEM Study of MBE-Grown Dirac Semimetal Cd$_3$As$_2$**  
S S. Rezaie, H Kim, T Schumann, M Goyal, S Stemmer; University of California, Santa Barbara

2:00 PM 1115  
**Thickness-Dependent Defect Evolution in GaAs$_{0.9}$Sb$_{0.1}$/GaAs Heterostructures**  
A Gangopadhyay, A Maros, N Faleev, D Smith; Arizona State University

2:15 PM 1116  
E Ortega; University of Texas, San Antonio; YL Casallas-Moreno; Instituto Politécnico Nacional, Mexico; M López-López; Centro de Investigación y de Estudios Avanzados, Mexico; A Ponce; University of Texas, San Antonio

2:30 PM 1117  
**Nanoscale Structure-Property Relationship in Amorphous Hydrogenated Boron Carbide for Low-k Dielectric Applications**  
S Im; The Ohio State University; MM Paquette, M Belhadj-Larbi, P Rulis; University of Missouri, Kansas City; R Sakidja; Missouri State University; J Hwang; Ohio State University

2:45 PM 1118  
**HAADF STEM and PL Characterization of Monolayer-Thick GaN/(Al,Ga)N Quantum Wells for Deep UV Optoelectronics Applications**  
AA Toropov, E Evropeytsev, VN Jmerik, DV Nechaev, SV Ivanov; Ioffe Institute, Russia; S Rouvimov; University of Notre Dame

**P05.3 Imaging and Spectroscopy of Beam Sensitive Materials**

**SESSION CHAIR:**  
Osamu Terasaki, Korea Advanced Institute of Science and Technology

**PLATFORM SESSION**  
Thursday 1:30 PM • Room: 266

1:30 PM 1119 (INVITED)  
**Recent Advances on Imaging Porous Frameworks by Electron Microscopy Methods**  
AA Mayoral; University of Zaragoza, Spain; D Diaz; Instituto de Catálisis y Petroleoquimica, CSIC, Spain; JE Readman; University of Central Lancashire, United Kingdom

2:00 PM 1120 (INVITED)  
**Structure Determination of Molecular Sieve Nanoparticles with Electron Microscopy and Powder X-ray Diffraction**  
X Zhang, JA Thakkar, J Zha; Pennsylvania State University

2:30 PM 1121  
**Characterization of MEL Defects in 2-Dimensional MFI Nanosheets**  
P Kumar, H Zhang, N Rangnekar, M Tsapatsis, A Mkhoyan; University of Minnesota, Twin Cities

2:45 PM 1122  
**Low-Dose and In-Painting Methods for (Near) Atomic Resolution STEM Imaging of Metal Organic Frameworks (MOFs)**  
BL Mehdi, AJ Stevens; Pacific Northwest National Laboratory; P Mocek; Portland State University; A Dohnalkova, A Vjunov, JL Fulton, DM Camaioni; Pacific Northwest National Laboratory, OK Farha; Northwestern University, et al
Scientific Program
Thursday, August 10

P07.8  Advanced Characterization of Energy-Related Materials

SESSION CHAIR:
Judith Yang, University of Pittsburgh

PLATFORM SESSION
Thursday 1:30 PM • Room: 276

1:30 PM 1123 (INVITED) Designing Catalysts for Meeting the DOE 150°C Challenge for Exhaust Emissions; C Carrillo, H Xiong, AT DeLaRiva, D Kunwar, EJ Peterson, SR Challa; University of New Mexico; G Qi, M Wiebenga; General Motors Global R&D, et al.

2:00 PM 1124 Computationally Assisted STEM and EXAFS Characterization of Tunable Rh/Au and Rh/Ag Bimetallic Nanoparticle Catalysts; SD House, CS Bonifacio; University of Pittsburgh; J Timoshenko; Stony Brook University; P Kunal, H Wan, Z Duan, H Li; University of Texas, Austin, JC Yang; University of Pittsburgh, et al.

2:15 PM 1125 3D Imaging of Nanoalloy Catalysts at Atomic Resolution; J Zhou, Y Yang, Z Zhao; University of California, Los Angeles; C Ophus, P Ercius; Lawrence Berkeley National Laboratory; Y Huang, J Miao; University of California, Los Angeles

2:30 PM 1126 Unveiling the Atomistic Processes of the Accelerated Decomposition of 8.5 mol% Y2O3–stabilized ZrO2 by Environmental TEM; B Butz, AL Koh, R Sinclair; Stanford University

2:45 PM 1127 TEM Characterization of Heterojunctions for Photocatalytic Application: ZrO2-TiO2 and CuO/ZrO2-TiO2; D Guerrero-Arequa, R Gomez; Universidad Autonoma Metropolitana Iztapalapa, Mexico; HA Calderon; Instituto Politecnico Nacional, Mexico

P09.2  Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS:
Bryan Miller, Naval Nuclear Laboratory
Djamel Kaoumi, North Carolina State University

PLATFORM SESSION
Thursday 1:30 PM • Room: 265

1:30 PM 1128 (INVITED) Understanding Corrosion of 304 Stainless Steels Using Atom Probe Tomography; K Fisher, EA Marquis; University of Michigan

2:00 PM 1129 (INVITED) Dynamic Secondary Ion Mass Spectrometry (SIMS) Imaging of Materials for the Nuclear Industry: Historical Perspectives and Recent Advances; G McMahon; University of Manchester, United Kingdom; B Miller; Naval Nuclear Laboratory; G Burke; University of Manchester, United Kingdom

2:30 PM 1130 Characterization of Corrosion Films on Austenitic Stainless Steels Exposed to High-Temperature Deaerated Water; JK Heuer, MJ Stiger; Naval Nuclear Laboratory

2:45 PM 1131 EBSD and TEM Analysis of the Heat Affected Zone of Laser Welded AISI 304/308 Stainless Steel; K Mao; Purdue University; Y Wu; Center for Advanced Energy Studies; JP Wharry; Purdue University

A ANALYTICAL SCIENCES SYMPOSIA
THURSDAY AFTERNOON CONTINUED

A01.5  Vendor Symposium

SESSION CHAIRS:
Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University

PLATFORM SESSION
Thursday 3:30 PM • Room: 125

3:30 PM 1133 Development of Fast Pixelated STEM Detector and its Applications Using 4-Dimensional Dataset; R Sagawa; JEOL, Ltd., Japan; H Yang; Lawrence Berkeley National Laboratory; L Jones; University of Oxford, United Kingdom; M Simson, M Huth, H Soltau; PN Detector GmbH, Germany; PD Nellist; University of Oxford, United Kingdom, Y Kondo; JEOL, Ltd., Japan

3:45 PM 1134 Stable and Flexible Side-Entry Stage for Nion STEMs; MT Hotz, G Corbin, N Delby, TC Lovejoy, G Skone; Nion; J-D Blazit, M Kociak, O Stephan; Université Paris Sud XI, et al.

4:00 PM 1135 STEM and TEM: Disparate Magnification Definitions and a Way Out; E Voelkl; Hitachi High Technologies America; D Hoyle; Hitachi High-Technology Canada; J Howe; Hitachi High Technologies America; H Inada, T Yotsui; Hitachi High-Technologies Corporation, Japan

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Scientific Program

A18.7 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:
Paul Carpenter, Washington University in St. Louis
Heather Lowers, U.S. Geological Survey
Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION
Thursday 3:30 PM  •  Room: 264

3:30 PM 1142 (INVITED) Characterizing the Effectiveness of Atomic Layer Deposited Coatings for the Prevention of Glass Disease; ME Hiebert, RJ Phaneuf; University of Maryland; E Vicenzi; Smithsonian Institution

4:00 PM 1143 Testing a New Electron Microprobe and Developing New Analytical Protocols; JM Allaz; University of Colorado, Boulder

4:15 PM 1144 Characterization of Complex Industrial Specimens by Hyperspectral EPMA Mapping; A Torpy, NC Wilson, CM MacRae; CSIRO. Australia

4:30 PM 1145 EPMA and Quantitative EDS of Rare Earth Elements in Geochronological Reference Materials; HA Lowers; U.S. Geological Survey; NW Ritchie; National Institute of Standards and Technology; DT Adams; U.S. Geological Survey

4:45 PM 1146 Quantitative Electron Probe Microanalysis of Fe at Low Accelerating Voltage Using the Lα and Lβ X-ray Lines; AG Moy, JH Fournelle; University of Wisconsin, Madison

A15.5 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIRS:
Mike Marko, Wadsworth Center
Radostin Danev, Max Planck Institute for Biochemistry

PLATFORM SESSION
Thursday 3:30 PM  •  Room: 127

3:30 PM 1138 (INVITED) Improving Detectors for Cryo-Electron Microscopy; PE Mooney; Gatan, Inc

4:00 PM 1139 (INVITED) On-the-Fly Image Quality Evaluation for Single-Particle Analysis Cryo-Electron Microscopy; L Yu; Thermo Fisher Scientific; E Franken; Thermo Fisher Scientific; A Voigt, F Grollios, P Tiemeijer, S Reyntjens; Thermo Fisher Scientific

4:30 PM 1140 Accurate Cryo-EM Characterizations of Polypeptoid Vesicles; X Jiang; Lawrence Berkeley National Laboratory; J Sun; Qingdao University of Science and Technology, China; RN Zuckermann; Lawrence Berkeley National Laboratory; NP Balsara; University of California, Berkeley; KH Downing; Lawrence Berkeley National Laboratory

4:45 PM 1141 The Future of Direct Electron Detection in Cryo-TEM; G Van Duinen, L Yu, E Franken, M Kuijper, H Roeven, B Janssen; Thermo Fisher Scientific
Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA - THURSDAY AFTERNOON CONTINUED

B03.3 Imaging the Biology of Cells and Tissues: Just Do It Right

SESSION CHAIR: Michael Stanley, Chroma Technology

PLATFORM SESSION
Thursday 3:30 PM • Room: 122

3:30 PM 1147 Biofilm Structure of Geobacter Sulfur Reducers by Helium Ion Microscopy; A Belianinov, MC Halsted, MJ Burch, K Songkl, ST Retterer; Oak Ridge National Laboratory

4:00 PM 1148 (INVITED) Statistical Design of Experiments to Ensure "Rigor and Reproducibility" in Imaging Sciences; VN Joshi, RD Powell; Nanoprobes, Inc.; E Rosa-Molinar; University of Kansas

B05.3 Pharmaceuticals and Medical Science

SESSION CHAIR: Jason R. Mantei, Baxter Healthcare

PLATFORM SESSION
Thursday 3:30 PM • Room: 123

3:30 PM 1149 (INVITED) Digital Radiography/Computed Tomography of Medical Devices; JM Troedel; Baxter International

4:00 PM 1150 4D Laboratory X-ray Microscopy for the In Situ Investigation of Drug Release in a Push-Pull Osmotic Pump Tablet; H Bale, W Harris, A Merkle; Carl Zeiss Microscopy

4:15 PM 1151 (INVITED) Solving Contaminant and Unexpected Material Problems in Drugs and Medical Devices Using Microscopy Methods – An Overview; DL Joslin; McCrone Associates

4:45 PM 1152 Determining the Number of Components for Multivariate Curve Resolution: Case Study Using Raman Mapping of Pharmaceutical Tablets; C Fauteux-Lefebvre, F B Lavoie, M-J Colbert; Universite de Sherbrooke, Canada; J-M Guay; Pfizer Global Supply; R Gosselin; Universite de Sherbrooke, Canada

PHYSICAL SCIENCES SYMPOSIA - THURSDAY AFTERNOON CONTINUED

P05.4 Imaging and Spectroscopy of Beam Sensitive Materials

SESSION CHAIR: Prashant Kumar, University of Minnesota

PLATFORM SESSION
Thursday 3:30 PM • Room: 266

3:30 PM 1153 (INVITED) Direct Detection Image Detector and Electron Counting – A New Tool for High-resolution Imaging of Metal-Organic Frameworks; M Pan; Gatan, Inc.

4:00 PM 1154 Revealing the Structure of Graphitic Carbon Nitride Through Low-Dose TEM Using a Direct Electron Detector; DM Haiber, PA Crozier; Arizona State University

4:15 PM 1155 Determining Optical Absorption Coefficients in Beam Sensitive Materials Using Monochromated Electron Energy-Loss Spectroscopy; JA Alexander, FJ Scheltens; The Ohio State University; LF Drummy, MF Durstock; U.S. Air Force Research Laboratory; FS Hage, QM Ramasse; SuperSTEM, UK; DW McComb; Ohio State University

4:30 PM 1156 (INVITED) Damage by Induced Electric Field in Beam-Sensitive Materials; N Jiang; Arizona State University

P09.3 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS: Gene Lucadamo, Naval Nuclear Laboratory
Ian MacLaren, University of Glasgow, Scotland

PLATFORM SESSION
Thursday 3:30 PM • Room: 265

3:30 PM 1157 (INVITED) Microstructure Characterization of Ion-Irradiated Ferritic/Martensitic HT9 Steel; D Kaoumi, C Zheng; North Carolina State University
Using In Situ TEM Triple Ion Beam Irradiations to Study the Effects of Deuterium, Helium, and Radiation Damage on TPBAR Components; C Taylor, B Muntifering, C Snow; Sandia National Laboratories; D Senor; Pacific Northwest National Laboratory; K Hattar; Sandia National Laboratories

Combining Transmission Kikuchi Diffraction and Scanning Transmission Electron Microscopy for Irradiated Materials Studies; CM Parish, K Wang, PD Edmondson, KA Terrani, X Hu; Oak Ridge National Laboratory; RL Seibert; Illinois Institute of Technology; Y Katoh; Oak Ridge National Laboratory

A Snapshot of the Microstructural Evolution of Alloy 800H Under Heavy Ion Irradiation; E Anderson, EM Marquis; University of Michigan