

Scientific Program

Monday August 5

PLENARY LECTURES AND AWARDS

Ernie Hall, MSA President
Kristin Bunker, MAS President
Richard A. Blackwell, IMS President

Monday 8:30 AM • Sagamore Ballroom

- 8:30 AM **Opening Welcome:** Ernie Hall, MSA President, Kristin Bunker, MAS President, Richard A. Blackwell, IMS President, and Teresa Ruiz, Program Chair
- 8:45 AM **M&M Plenary Lecture**—“*The Long-Lasting Struggle to Achieve Atomic-Resolution Microscopy by Correcting the Aberrations of Electron Lenses*” by Harald H. Rose; Technical University Darmstadt, Germany
- 9:45 AM **MAS Awards Presentation**
- 10:00 AM **IMS Awards Presentation**
- 10:15 AM *Coffee Break*
- 10:45 AM **MSA Awards Presentation**
- 11:00 AM **M&M Meeting Awards Presentation**
- 11:15 AM **M&M Plenary Lecture**—“*Looking Through Paintings*” by Joris Dik; Delft University of Technology, the Netherlands

IMS Henry Clifton Sorby Award and Lecture MONDAY AFTERNOON

IMS Henry Clifton Sorby Award and Lecture

Session Chair:
Richard A. Blackwell, IMS President

Monday 1:30 PM • Room 204

- 1:30 PM **IMS Henry Clifton Sorby Award & Lecture**—*Evolution of Metallography from Two- to Three-Dimensions and from Qualitative to Quantitative: Implications for Materials Design and Development*; Arun M. Gokhale; Georgia Institute of Technology

BIOLOGICAL SCIENCES SYMPOSIA MONDAY AFTERNOON

B06.01 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals

Session Chairs:
Lois Anderson, Johns Hopkins University;
Michael Goheen, Indiana University;
Patricia Kysar, University of California, Davis;
Jay Jerome, Vanderbilt University School of Medicine

Platform Session

Monday 1:25 PM • Room: 236

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **3** *Is it Rheumatic Aortitis, Fatty Streaking or Both?*; S Siew; Michigan State University
- 1:45 PM **4** (Invited) *Current Trends in the Diagnosis of Primary Ciliary Dyskinesia*; E Wartchow; Children’s Hospital Colorado
- 2:15 PM **5** *First Nucleotide Sequence Data from an Electron Microscopy Based DNA Sequencer*; C Own; Voxa; A Bleloch, W Lerach, C Bowell, M Hamalainen, J Herschleb, C Melville, J Stark, M Andregg, W Andregg; Halcyon Molecular
- 2:30 PM **6** (Invited) *Trafficking Mechanism of Fungal Effector Proteins Inside Rice Cells*; C-H Khang, EA Richardson, Y Hernandez-Rodriguez, LH Chen; University of Georgia; T Todd, B Valent; Kansas State University

Scientific Program

ADVANCES IN INSTRUMENTATION SYMPOSIA MONDAY AFTERNOON

A01.01 Gertrude Rempfer Memorial Symposium on Advances in Electron Optics and Aberration-Corrected Electron Microscopy

Session Chairs:

Sergei Rouvimov, University of Notre Dame;
Rolf Koenenkamp, Portland State University;
Wolfgang Neumann, University of Oregon;
Teresa Ruiz, University of Vermont

Platform Session

Monday 1:25 PM • Room: 240

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **7** (Invited) *High-Resolution LEEM/PEEM by Employing Mirror-Type Aberration Correctors—in Memory of Gertrude F. Rempfer*; HH Rose; Technical University Darmstadt
- 2:00 PM **8** (Invited) *High-Resolution TEM/STEM by Means of Advanced Instrumentation*; M Haider, H Mueller, P Hartel; CEOS GmbH, Germany
- 2:30 PM **9** *Visualization of Optical Wave Propagation in Femtosecond Photoemission Electron Microscopy*; R Koenenkamp, RC Word, JPS Fitzgerald; Portland State University
- 2:45 PM **10** *Determination of Aberration Center of STEM Ronchigram for Fully Automated Aberration Correctors*; T Sannomiya; Tokyo Institute of Technology, Japan; H Sawada, T Nakamichi, F Hosokawa; JEOL, LTD, Japan; Y Nakamura, Y Tanishiro, K Takayanagi; Tokyo Institute of Technology, Japan

A03.01 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen, Denmark

Platform Session

Monday 1:25 PM • Room: 241

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **11** *Exploiting a Direct Detection Camera for In Situ Microscopy*; EA Stach, D Zakharov, RD Rivas; Brookhaven National Laboratory; P Longo, M Lent, A Gubbens, C Czarnik; Gatan Corporation
- 1:45 PM **12** *In Situ Raman Spectroscopy in a TEM*; FI Allen, E Kim, S-G Ryu; University of California, Berkeley; B Ozdol; Lawrence Berkeley National Laboratory; CP Grigoropoulos, AM Minor; University of California, Berkeley
- 2:00 PM **13** *In Situ Environmental Atom Probe Tomography for Studying Gas-Solid Reactions in Extreme Environments: Instrumentation and Results*; S Dumpala, SR Broderick; Iowa State University; PA Bagot; University of Oxford, United Kingdom; K Rajan; Iowa State University
- 2:15 PM **14** *The Application of X-ray Micro- and Nano-Scale Computed Tomography to the Morphological and In Situ Dynamic Study of Polymer Foam Materials*; BM Patterson, NL Cordes, R Gilbertson, Z Smith; Los Alamos National Laboratory
- 2:30 PM **15** (Invited) *Connectomics: The Dense Reconstruction of Neuronal Circuits Using Volume Electron Microscopy*; M Helmstaedter; Max Planck Institute of Neurobiology

Scientific Program

A04.01 Electron Tomography in Life and Material Science

Session Chairs:

Montserrat Bárcena, Leiden University Medical Center;
 Esther Bullitt, Boston University School of Medicine;
 Heiner Friedrich, Eindhoven University of Technology

Platform Session

Monday 1:25 PM • Room: 238

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **16** (Invited) *Electron Tomography Studies to Unravel the 3D Nanostructure of Zeolite Catalysts*; KP de Jong; Utrecht University, Netherlands
- 2:00 PM **17** *Tungsten Tips as a Sample Platform for Single Atom Resolution S/TEM Tomography of Clusters and Interfaces*; P Ercius; Lawrence Berkeley National Laboratory; W Theis; University of Birmingham, United Kingdom
- 2:15 PM **18** *3D Characterization of Nanoparticle Dispersion in Polymer Nanocomposites by TEM Tomography*; F Dalmás, E Leroy, M Roth, F Allouche; Institut de Chimie et des Matériaux Paris-Est, France; F Boué, F Cousin, J Jestin; Laboratoire Léon Brillouin, France
- 2:30 PM **19** *Post-Specimen Cc Correction Enabled Scanning Confocal Electron Energy Loss Microscopy for High-Throughput 3-D Spectroscopic Imaging of Nanomaterials*; HL Xin, H Zheng, P Ercius; Lawrence Berkeley National Laboratory
- 2:45 PM **20** *Depth Sensitive Atomic Resolution Spectroscopy and Imaging of Highly Strained YSZ/STO Epitaxial Heterostructures*; TJ Pennycook, L Jones; University of Oxford, United Kingdom; M Cabero, A Ribera-Calzada, C Leon; Universidad Complutense, Spain; M Varela; Oak Ridge National Laboratory; J Santamaria; Universidad Complutense, Spain; PD Nellist; University of Oxford, United Kingdom

A06.01 Applications of Micro-CT in Life and Material Sciences

Session Chairs:

Rebecca Rudolph, GE Inspection Technologies;
 Daniel S. Perrien, Vanderbilt University;
 Douglas R. Keene, Shriners Hospital for Children

Platform Session

Monday 1:25 PM • Room: 237

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **21** (Invited) *Beyond Bone: Micro-Computed Tomography for Preclinical Specimen Imaging and Applications for Soft Tissue Discovery and Translational Therapeutic Testing*; D Small, SX Vasquez, D Weinstein; Numira Biosciences
- 2:00 PM **22** *Advances in X-ray Microtomography in SEM with Submicron Spatial Resolution: Applications in Life, Earth and Material Sciences*; T Salge, S Boehm; Bruker Nano GmbH, Germany; B Pauwels, A Sasov; Bruker microCT, Belgium; J Alba-Tercedor; Universidad de Granada, Granada
- 2:15 PM **23** (Invited) *Using Micro-Computed Tomography in Biomechanical Studies of Rodent Bone*; S Uppuganti, JS Nyman; Vanderbilt University
- 2:45 PM **24** *Micro-Computed Tomography in a Museum Environment*; F Ahmed; D Sykes; The Natural History Museum

A10.01 Practical Programming for Microanalysis

Session Chairs: Andrew Deal, GE Global Research;
 Philippe T. Pinard, RWTH Aachen University;
 Aaron Torpy, CSIRO Process Science and Engineering

Platform Session

Monday 1:25 PM • Room: 242

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **25** (Invited) *Mastering the Art of Scientific Programming or Application Development as a Tool for Scientific Innovation*; JJ Donovan; University of Oregon

Scientific Program

- 2:00 PM **26** *Inexpensive & Non-Disruptive Retrofitting of a PDP-11 Based Microprobe System with Modern Automation Software*; RA Deist, BJ Willenberg, LA Dempere; University of Florida
- 2:15 PM **27** *CALCZAF, TRYZAF and CITZAF: The Use of Multi-Correction-Algorithm Programs for Estimating Uncertainties and Improving Quantitative X-ray Analysis of Difficult Specimens*; JT Armstrong; Carnegie Institution of Washington; J Donovan; University of Oregon; P Carpenter; Washington University
- 2:30 PM **28** *Random Spectrometer Motion for Removal of Time Dependent Artifacts in Spectroscopy*; P Gopon, P Sobol, J Fournelle; University of Wisconsin
- 2:45 PM **29** *De-MA: A Web Database for Electron Microprobe Analyses to Assist Electron Microprobe Lab Manager and Users*; JM Allaz; University of Colorado, Boulder

A17.01 Vendor Symposium: Latest Developments in Tools for Life and Materials Sciences

Session Chairs:

Elizabeth R. Wright, Emory University;
Alice C. Dohnalkova, Pacific Northwest National Laboratory;
Mark A. Sanders, University of Minnesota

Platform Session

Monday 1:25 PM • Room: 208

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **30** *New Revolutionary Hybrid SEM by Carl Zeiss*; M Bolorizadeh; Carl Zeiss Microscopy, LLC; F Panteleit; Carl Zeiss, GmbH, Germany; F Hitzel; DME Nanotechnology GmbH, Germany
- 1:45 PM **31** *New Ultra-High Resolution SEM for Imaging by Low Energy Electrons*; J Jiruse, M Havelka, J Polster, F Lopour; TESCAN, Česká Republika
- 2:00 PM **32** *Advanced Nanofabrication Using Helium, Neon and Gallium Ion Beams in the Carl Zeiss Orion NanoFab Microscope*; D Elswick, M Ananth, L Stern, J Marshman, D Ferranti, C Huynh; Carl Zeiss Microscopy, LLC
- 2:15 PM **33** *Combined Application of EBSD and ECCI Using a Versatile 5-Axes Goniometer in an SEM*; S Zaefferer; Max-Planck-Institute for Iron Research; S Kleindiek, K Schock, B Volbert; Kleindiek Nanotechnik GmbH, Germany

- 2:30 PM **34** *Expanding the Boundaries of FIB-SEM Technology: Developments for Best Application Results*; I Schulmeyer, M Kienle; Carl Zeiss Microscopy GmbH, Germany
- 2:45 PM **35** *The Latest Innovation on FE-SEM and Its Applications*; S Takeuchi, H Sato, O Takagi; Hitachi High-Technologies America, Inc.; D Hoyle; Hitachi High-Technologies Canada, Inc.

PHYSICAL SCIENCES SYMPOSIA MONDAY AFTERNOON

P01.01 The Art in Microscopy and Microanalysis

Session Chairs:

John Mansfield, University of Michigan;
Alex Ball, The Natural History Museum, London

Platform Session

Monday 1:25 PM • Room: 239

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **36** (Invited) *Compositional Characteristics of Athenian Black Gloss Slips (5th c. B.C.)*; M Walton, K Trentelman; The Getty Conservation Institute; J Maish, D Saunders; J Paul Getty Museum; B Foran; The Aerospace Corporation; P Pianetta, A Mehta; Stanford Synchrotron Radiation Laboratory
- 2:00 PM **37** *A Look at Platinum Prints Using Variable Pressure/Environmental High Resolution Scanning Electron Microscopy -VP HR SEM*; P Ravines; University at Buffalo; N Erdman; JEOL USA; R McElroy; Archive Studio
- 2:15 PM **38** *Similarities and Differences between Pigments in Pre-Hispanic Murals and Codices: A Study by Analytical Electron Microscopy*; JA Arenas Alatorre; Universidad Nacional Autónoma de México; C Gonzalez Tirado; Instituto Nacional de Antropología e Historia, Mexico; Y Silvia-Valasquez; University of Oxford, United Kingdom; JL Ruvalcaba Sil; Universidad Nacional Autónoma de México
- 2:30 PM **39** (Invited) *IRENI Meets Matisse*; J Sedlmair; Synchrotron Radiation Center; J Mass; Winterthur Museum; CS Patterson; The Getty Conservation Institute; B Buckley; Barnes Museum; C Hirschmugl; University of Wisconsin, Milwaukee

Scientific Program

P02.01 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:

Jimmy Liu, Arizona State University

Platform Session

Monday 1:25 PM • Room: 206-207

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **40** (Invited) *Structure Nanoclusters with a Well Defined Number of Atoms Using Aberration-Corrected STEM*; M Jose Yacamán; University of Texas, San Antonio
- 2:00 PM **41** *Catalyst Optimization from Structural and Chemical Analysis of Individual Au-Pd Nanoparticles Using Aberration Corrected STEM*; Q He; Lehigh University; M Sankar, J Pritchard, M Morad, SJ Freakley, JK Edwards, SH Taylor, AF Carley, GJ Hutchings; Cardiff Catalysis Institute; CJ Kiely; Lehigh University
- 2:15 PM **42** *High-Resolution STEM Analysis of Nanoparticle Materials*; AR Lupini, GM Veith, C Li; Oak Ridge National Laboratory; V Iberi, J Camden; University of Tennessee; SJ Pennycook; Oak Ridge National Laboratory
- 2:30 PM **43** *Synthesis of Bimetallic Au-Au₃Cu Core-Shell Nanostructures Passivated with Cu₂S Surface and Atomic Resolution Images by Cs-Corrected STEM*; S Khanal, G Casillas, N Bhattarai, JJ Velazquez-Salazar, A Ponce, M Jose-Yacamán; University of Texas, San Antonio
- 2:45 PM **44** *Alcohol Synthesis from Synthesis Gas over Promoted Rhodium Catalysts: A Study of Promoter and Supports Effects*; Z Guo, J Liu, R Tao, R Meyer, R Klie; University of Illinois, Chicago

P03.01 Imaging the Hard/Soft Materials Interface: Challenges and Solutions

Session Chairs:

David C. Bell, Mor Baram, Harvard University;
Emmanuelle A. Marquis, University of Michigan

Platform Session

Monday 1:25 PM • Room: 244

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **45** (Invited) *Biogenic Organic/Inorganic Nano-Composite: Imaging the Macro to Atomic Structure of Herdmania*

momus Vateritic Spicules; L Kabalah-Amitai; Technion Israel Institute of Technology, Israel; B Mayzel; Tel Aviv University, Israel; Y Kauffmann; Technion Israel Institute of Technology, Israel; AN Fitch; European Synchrotron Radiation Facility, France; L Bloch; Technion Israel Institute of Technology, Israel; PU Gilbert; University of Wisconsin; B Pokroy; Technion Israel Institute of Technology, Israel

- 2:00 PM **46** *Antibody Distribution on Bio-Functionalized Magnetic Nanoparticles Analyzed by Spatial-Resolved EELS*; R Arenal, L De Matteis, L Custardoy, A Mayoral, V Grazu, J Martinez de la Fuente, C Marquina, MR Ibarra; Universidad de Zaragoza, Spain
- 2:15 PM **47** *Understanding Donor-Acceptor Interfaces in Organic Photovoltaics Using Analytical Transmission Electron Microscopy*; J Gilchrist, T Baisey-Fisher, S Heutz; Imperial College London, United Kingdom; DW McComb; The Ohio State University
- 2:30 PM **200 M&M Student Award** *Correlative Microscopy and Spectroscopy of Buried Interfaces in Tooth Enamel*; L Gordon, MJ Cohen, D Joester; Northwestern University

P04.01 Deriving Fundamental Catalyst Properties from Electron Microscopy

Session Chairs:

Larry Allard, Oak Ridge National Laboratory;
Ilke Arslan, Pacific Northwest National Laboratory;
Abhaya K. Datye, University of New Mexico

Platform Session

Monday 1:25 PM • Room: 205

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **49** (Invited) *In Situ Observations of Stability of Pd Nanoparticles in the Presence of Reactive Gases*; L Kovarik; Pacific Northwest National Laboratory; A Genc; FEI Company; A Karim, J Szanyi, JH Kwak, CH Peden; Pacific Northwest National Laboratory
- 2:00 PM **50** *Microstructure of Bimetallic Pt-Pd Nanoparticles under Working Conditions*; TR Johns, JR Gaudet, EJ Peterson; University of New Mexico; JT Miller; Argonne National Laboratory; CH Kim, MP Balogh; General Motors Global R&D; AK Datye; University of New Mexico

Scientific Program

- 2:15 PM **51** *Microscopic Characterization of Heterogeneous Catalysts in 3-D and In Situ/Ex Situ*; I Arslan; Pacific Northwest National Laboratory; S Dey, JD Roehling; University of California, Davis; J Batenburg; Centrum Wiskunde and Informatica, Netherlands; BH Davis; University of Kentucky; BC Gates; University of California, Davis; A Katz; University of California, Berkeley; DE Perea; Pacific Northwest National Laboratory; J Lercher; Technische Universität Munchen, Germany
- 2:30 PM **52** *In Situ Observation of the Changes in Shape and Surface Structure of Pt Nanoparticulate Catalysts in Reactant Gases by Aberration-corrected Environmental Transmission Electron Microscopy*; H Yoshida, H Omote; Osaka University, Japan; M Haruta; Tokyo Metropolitan University, Japan; S Takeda; Osaka University, Japan
- 2:45 PM **53** **M&M Student Award** *Understanding Pt-Co Catalyst Degradation Mechanism: from Ex Situ to In Situ*; Y Yu, ME Holtz; Cornell University; HL Xin; Lawrence Berkeley National Lab; D Wang; Huazhong University of Science & Technology, China; HD Abruña, DA Muller; Cornell University

BIOLOGICAL SCIENCES TUTORIAL MONDAY AFTERNOON

X52.01 Biological Sciences Tutorial: Bio-Imaging and Spectroscopy with Scanning Transmission X-ray Microscopy

Session Chairs:

Elizabeth R. Wright, Emory University;
Scott Stagg, Florida State University

Tutorial Session

Monday 2:00 PM • Room: 210

- 2:00 PM **54** (Invited) *Chemically Selective Imaging and Spectroscopy with Scanning Transmission X-ray Microscopy*; A Hitchcock; McMaster University, Canada; M Obst; Tuebingen University, Germany; T Tyliczszak; Lawrence Berkeley National Laboratory; S Kalirai; McMaster University, Canada; D Bazylnski; University of Nevada

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA MONDAY AFTERNOON

B06.P1 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

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|---------|---|---------|--|
| 3:00 PM | <p>55 <i>Tioredoxins and Glutaredoxins System Proteins: Immunolocalization in The Rat Central Nervous System. An Atlas</i>; ML Aón Bertolino, JI Romero, F Capani; Instituto de Investigaciones Cardiológicas “Prof Dr A Taquini”, Universidad de Buenos Aires, Argentina
Poster # 1</p> | 3:00 PM | <p>60 (Invited) <i>Diagnostic Implications of Multi-Photon Fluorescent Microscopy</i>; CL Phillips, VH Gattone; Indiana University School of Medicine
Poster # 6</p> |
| 3:00 PM | <p>56 <i>Encephalitozoon cuniculi Infection in a Kidney Transplant Recipient</i>; CS Goldsmith, GS Visvesvara, M de Almeida, SR Zaki, CD Paddock; Centers for Disease Control
Poster # 2</p> | 3:00 PM | <p>61 <i>A Comparison of Reflectance and Attenuated Total Internal Reflection Infrared Microspectroscopic Imaging Techniques for the Analysis of Kidney Stones</i>; C Ling; Miami University; JC Williams, AP Evan; Indiana University School of Medicine; AJ Sommer; Miami University
Poster # 7</p> |
| 3:00 PM | <p>57 <i>TEM Training and Practice through a Specimen Sharing Program: CSI for EM Laboratories</i>; CA Radi; Wisconsin Veterinary Diagnostic Laboratory; SE Miller; Duke University; CS Goldsmith; Centers for Disease Control; K Kurth-Toohey; University of Wisconsin
Poster # 3</p> | 3:00 PM | <p>62 <i>Fractal and Image Analysis of Collagen Fibrosis in Hypertensive Induced Myocardial Remodeling in Mouse Hearts Lacking STAT3 Protection</i>; JW Fuseler; University of South Carolina; FA Zouein, M Kurdi, GW Booz; University of Mississippi Medical Center
Poster # 8</p> |
| 3:00 PM | <p>58 <i>Differences in Iron Distribution in Patients with Myelodysplastic Syndromes Carrying SF3B1 Mutations Using Energy-Dispersive X-ray Spectroscopy (XEDS) and Electron-Energy Loss Spectroscopy (EELS)</i>; V Visonte; Cleveland Clinic; N Avishai, R Sharghi-Moshtaghin; Case Western Reserve University; R Mahfouz, A Tabaroki; HJ Rogers; Cleveland Clinic; M Hitomi; Case Western Reserve University; E Hasrouni, BK Hamilton J Barnard; Cleveland Clinic; F Traina; University of Campinas, Brazil; HK Duong, Y Sauntharajah, MA Sekeres, AS Advani, A Heuer, RV Tiu; Cleveland Clinic
Poster # 4</p> | 3:00 PM | <p>63 <i>Exploring the Microangioarchitecture of the Vasa Vasorum of the Human Great Saphenous Vein by SEM and 3D Morphometry of Vascular Corrosion Casts</i>; KM Erlbacher, M Herbst, B Minnich; University of Salzburg, Austria
Poster # 9</p> |
| 3:00 PM | <p>59 <i>High-Resolution Contrast-Enhanced Cone-Beam Computed Tomography as a New Resource for In Vivo Quantitation of Intimal Hyperplasia</i>; L Strittmatter, T Flood, IMJ van der Bom, AL Kühn, AK Wakhloo, M Gounis, G Hendricks; University of Massachusetts Medical School
Poster # 5</p> | 3:00 PM | <p>64 <i>3D Morphometry SEM Analysis of Microvascular Networks and Calculation of Vessel Angioarchitecture Optimalities</i>; B Minnich; University of Salzburg, Austria; S Margiol, J Fryszak, E Bernroider; Vienna University of Economics and Business, Austria
Poster # 10</p> |
| | | 3:00 PM | <p>65 <i>Novel Mechanisms for Resveratrol and Metformin: Implications in Alzheimer’s Disease</i>; M Guo, A Calabro, C Queenan, D Leonardi; Bergen County Technical Schools
Poster # 11</p> |
| | | 3:00 PM | <p>66 <i>A Role for SEM in Autopsy Cases of TRALI</i>; PE Kysar, GN Adamson, H Jensen; University of California, Davis
Poster # 12</p> |
| | | 3:00 PM | <p>67 <i>NFIB is an Epithelial Stem Cell Regulator of Melanocyte Stem Cells in the Hair Follicle Niche</i>; HA Pasolli, C-Y Chang, E Fuchs; The Rockefeller University
Poster # 13</p> |
| | | 3:00 PM | <p>68 <i>Electron Microscopy Studies Reveal a Physiological Basis of Body Size Determination by TGF-β Signaling</i>; RD Schultz; Texas A&M University Health Science Center; EA Ellis; Texas A&M University; TL Gumieny; Texas A&M University Health Science Center
Poster # 14</p> |

Scientific Program

3:00 PM **69** *The Observation of Saccharomyces cerevisiae Ultrastructure Changes under Proline Limitation*; H Chen, X Liang, D Becker; University of Nebraska-Lincoln
Poster # 15

ADVANCES IN INSTRUMENTATION SYMPOSIA MONDAY AFTERNOON

A01.P1 Gertrude Rempfer Memorial Symposium on Advances in Electron Optics and Aberration-Corrected Electron Microscopy

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **70** (Invited) *Photoemission Microscopy for Integrated Photonics*; RC Word, JP Fitzgerald, R Konenkamp; Portland State University
Poster # 16

3:00 PM **71** *CdSe Heterostructures for Photocatalytic Hydrogen Generation*; P Tongying, M Kuno, G Krylova; University of Notre Dame
Poster # 17

3:00 PM **72** *Characterization of a Double-tip Field Emission Source Using Inline Axial Holography*; J Ciston, C Song, C Ophus; Lawrence Berkeley National Laboratory
Poster # 18

3:00 PM **73** *TEM Characterization of 3D InAs QDs Grown under Subcritical Deposition*; S Rouvimov; University of Notre Dame; N Ledentsov, V Shchukin; VI Systems GmbH, Germany
Poster # 19

3:00 PM **74** **MSA Apkarian Scholar** *Electrical Activity of Defects in CdTe Solar Cells via Aberration-Corrected STEM*; C Li; Oak Ridge National Laboratory; Y Wu; The University of Toledo; AR Lupini, A Mouti, J Poplawsky; Oak Ridge National Laboratory; W Yin, N Paudel; The University of Toledo; MA Jassim; National Renewable Energy Laboratory; Y Yan; The University of Toledo; SJ Pennycook; Oak Ridge National Laboratory
Poster # 20

3:00 PM **75** *MnMn/O Interface Termination at the Co₂Mn_aSi/MgO Interface in Magnetic Tunnel Junctions Investigated by Scanning Transmission Electron Microscopy*; F Shi; University of Wisconsin, Madison; H Liu,

M Yamamoto; Hokkaido University; PM Voyles; University of Wisconsin, Madison
Poster # 21

3:00 PM **76** *Anomalous Diffusion of Lanthanum from LaFeO₃ to CaTiO₃ and the Formation of Locally Ordered La_xCa_{1-x}TiO_{3-d} Perovskite Phase Therein*; MB Katz, H Liu, GW Graham, X Pan; University of Michigan
Poster # 22

3:00 PM **77** *Electronic Signature of Magnetic Moment and Fe-Vacancy Order in Fe-Based TlFe_{1.6}Se₂ Investigated by STEM/EELS*; C Cantoni, AF May, JE Mitchell, AS Sefat, MA McGuire, BC Sales; Oak Ridge National Laboratory
Poster # 23

3:00 PM **78** *Rational Design of Helical Nanotubes from Self-Assembly of Coiled-Coil Lock Washers*; C Xu, ER Wright, A Mehta; Emory University; LC Serpell; University of Sussex; X Zuo; Argonne National Laboratory; JS Wall; Brookhaven National Laboratory; VP Conticello; Emory University
Poster # 24

3:00 PM **79** *Microscopic Characterization of MBE-Grown Dilute-Nitride Alloys of GaAsNx (0.01 < x < 0.04) on GaAs (001) for Photovoltaic Solar Cells*; D Tang; Arizona State University; G-K Vijaya, A Freundlich; University of Houston; DJ Smith; Arizona State University
Poster # 25

3:00 PM **80** *Strain Analysis of Semiconductor Device by Moiré Fringes in STEM Image*; N Endo, Y Kondo; JEOL Ltd, Japan.
Poster # 26

3:00 PM **81** *Size Distribution, Imaging and Growth Mechanisms of Self-Assembled InAs Quantum Wires on Vicinal Substrates*; A Scullion, DA Thompson, GA Botton; McMaster University, Canada
Poster # 27

A04.P1 Electron Tomography in Life and Material Science

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **82** *Distribution of the Mitochondria-Associated ER Membrane in Rat Hepatocyte Revealed by FIB/SEM Tomography*; K Ohta, R Higashi, A Togo, S Okayama, K-I Nakamura; Kurume University, Japan
Poster # 28

Scientific Program

3:00 PM **83** *Three-Dimensional Reconstruction of Whole Synapses by STEM Tomography*; AA Sousa, J Zhang, X Chen, JS Diamond, TS Reese, RD Leapman; National Institutes of Health

Poster # 29

3:00 PM **84** *Advances in Microwave-Assisted Freeze Substitution*; DW Dorward, J Raae-Nielsen, BT Hansen, V Nair, ER Fischer; National Institutes of Health

Poster # 30

3:00 PM **85** *EELS Estimation of Ice Accumulation Rates in a Cryo-TEM Equipped with a Multi-Sample Loading Device*; A Avila-Sakar; Purdue University

Poster # 31

3:00 PM **86** *The Development of Bubblegrams is Dose Rate-Dependent*; N Cheng, W Wu, NR Watts, AC Steven; National Institutes of Health

Poster # 32

3:00 PM **87** *Electron Tomography of Hydrated Ferritin Particles Using Carbon Nanotube Liquid Cell*; C Wang, S Sinha-Ray, AL Yarin; University of Illinois, Chicago; T Shokuhfar; Michigan Technological University; R Klie; University of Illinois, Chicago

Poster # 33

3:00 PM **88** *Compressed Sensing Reconstruction of Smooth Signals in Electron Tomography*; R Leary, Z Saghi, PA Midgley, DJ Holland; University of Cambridge, United Kingdom

Poster # 34

3:00 PM **89** *The Effect of Noise in Images on Electron Tomography Reconstruction*; M Hayashida; National Institute of Advanced Industrial Science and Technology, Japan; M Bergen, P Li; National Institute of Nanotechnology, Canada; T Iijima, S Ogawa; National Institute of Advanced Industrial Science and Technology, Japan; M Malac; National Institute of Nanotechnology, Canada

Poster # 35

3:00 PM **90** *Advancing Nanotomography of Polymer Systems*; D Chen, H Friedrich, G de With; Eindhoven University of Technology, Netherlands

Poster # 36

3:00 PM **91** *Optimizing Sampling Schemes for Electron Tomography: Dual- and Multiple-Axis Tomography*; G Haberfehlner, R Serra, D Cooper, G Audoit, S Barraud, P Bleuet; Commissariat à l'énergie atomique, France

Poster # 37

3:00 PM **92** *Electron Tomography for 3D Nanoscale Characterization of Semiconductor Materials and Devices*; G Haberfehlner, P Bayle-Guillemaud, G Audoit; Commissariat à l'énergie atomique, France; MJ Smith, S Crawford, S Gradecak; Massachusetts Institute of Technology; P-H Morel, T Ernst, N Gambacorti, P Bleuet; Commissariat à l'énergie atomique, France

Poster # 38

3:00 PM **93** *Electron and X-ray Tomography of Iron/Iron Oxide Redox Reactions for Large-Scale Hydrogen Storage*; J Gluch; Technical University Dresden, Germany; S Niese; Fraunhofer Institute, Germany; C Jung; Technical University Dresden, Germany; L Röntzsch, E Zschech, B Kieback; Fraunhofer Institute, Germany

Poster # 39

3:00 PM **94** (Invited) *Electrostatic Potentials of Nanostructures Revealed in 3D by Electron Holographic Tomography*; D Wolf; Technical University Dresden, Germany

Poster # 40

A06.P1 Applications of Micro-CT in Life and Material Sciences

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **95** (Invited) *Micro and Nano-CT as a Valuable and Complimentary Tool for Life Science Research*; ME Failace, RA Rudolph; GE Inspection Technologies LP; O Brunke; GE Sensing & Inspection Technologies GmbH, Germany

Poster # 41

3:00 PM **96** *Quantification of Metal-Rich Minerals in Ore Using X-Ray Micro-CT*; F Coppens, B Pauwels; Bruker microCT, Belgium

Poster # 42

3:00 PM **97** (Invited) *Applications of Micro-CT in Earth Sciences*; B Bagley, J Keller; University of Minnesota

Poster # 43

3:00 PM **98** *Characterization of Melt Layers in Firn at Summit, Greenland Using Micro-CT*; RW Lomonaco, I Baker; Dartmouth College

Poster # 44

Scientific Program

- 3:00 PM **99** *3D Virtual Histology of Polychaetes Using Micro-CT*; D Sykes; Natural History Museum; L Hawkins; National Oceanography Centre; F Ahmed; Natural History Museum; S Faulwetter, C Arvanitidis; Hellenic Centre for Marine Research; G Paterson; Natural History Museum
Poster # 45
- 3:00 PM **100** *Characterization of Metal Doped Polymer Capsules Using Confocal Micro X-ray Fluorescence Spectroscopy and X-ray Computed Tomography*; NL Cordes, GJ Havrilla, KA Obrey, BM Patterson; Los Alamos National Laboratory
Poster # 46
- 3:00 PM **101 M&M Student Award** *3D Characterisation of the Occlusion of Dentine Tubules*; H Boswell, A Merkle, J Gelb, P Lander; Xradia; J Skepper; University of Cambridge, United Kingdom; J Earl; GlaxoSmithKline; R Langford; University of Cambridge, United Kingdom
Poster # 47
- 3:00 PM **106** *One FIB Does It All: From Massive Ablation to Nanometer Precision*; C Kübler, K Fladischer, K Schultheiß; Carl Zeiss Microscopy GmbH, Germany; R Hill; Carl Zeiss Microscopy LLC
Poster # 52
- 3:00 PM **107** *Advances in Low Voltage Electron Microscopy from Imaging to Analytical Perspective*; P Woo, M Ohno; Hitachi High-Technologies Canada; S Takeuchi; Hitachi High-Technologies Corp. Japan; R Gauvin, N Brodusch, H Demers; McGill University, Canada
Poster # 53
- 3:00 PM **108** *Application of Low Temperature Broad Ion Milling for Crystallographic Orientation Analysis of Biocalcite*; JJ Clarke; Hitachi High Technologies America, Ltd.
Poster # 54
- 3:00 PM **109** *Advances in Remote Plasma Cleaning of Electron Microscopes and Charged Beam Instruments*; R Vane; XEI Scientific
Poster # 55
- 3:00 PM **110** *Latest Developments in Tools for Life and Materials Sciences: Quorum Technologies Ltd Recent Improvements to Existing Coater Instrumentation*; PR Missing, RC Hennig, HM Dyson; Quorum Technologies Ltd, United Kingdom
Poster # 56
- 3:00 PM **111** *FS-8500 Provides Superior Specimen Preparation*; DL Bentley, G Seo; Boeckeler Instruments Inc
Poster # 57
- 3:00 PM **112** *New Tools for Correlative Light and Electron Microscopy*; M Langhorst, A Yakushevskaya, B Lich; FEI Company
Poster # 58
- 3:00 PM **113** *Cathodoluminescence Detectors Suitable for Easy and Fast Analysis in Geosciences*; J Jiruše, J Kološová; TESCAN, Czech Republic; J Leichmann; Masaryk University, Czech Republic
Poster # 59
- 3:00 PM **114** *Take-Off Angle Imaging to Improve Correlation between BSE Images and X-ray Maps and to Facilitate Mapping of Samples with Macro-Scale Topography*; NC Barbi; PulseTor LLC; A Muto; Hitachi High Technologies America, Ltd.
Poster # 60
- 3:00 PM **115** *Measurements of the X-Ray Transmission Characteristics of Moxtek's AP3 X-Ray Windows*; RT Creighton, S Liddiard, S Cornaby; Moxtek
Poster # 61

A17.P1 Vendor Symposium: Latest Developments in Tools for Life and Materials Sciences

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

- 3:00 PM **102** *TEM Sample Preparation Made Easier: An Ion Mill that Counts Reflected Light Fringes and Runs Recipes Automatically*; A Pakzad; Gatan Inc
Poster # 48
- 3:00 PM **103** *Application of Low Energy Broad Ion Beam Milling to Improve the Quality of FIB Prepared TEM Samples*; A Pakzad, S Mick; Gatan Inc; C Vartuli, J Chung, G Lian; Texas Instruments
Poster # 49
- 3:00 PM **104** *Applications of 40–120 kV Analytical TEM for Nanoscience*; T Kubo, H Kobayashi, T Hashimoto, M Okada, M Kondo, K Nakano, M Wayama; Hitachi High-Technologies Corporation; T Kamino; University of Yamanashi, Japan
Poster # 50
- 3:00 PM **105** *Development of a New High Throughput 120 kV-TEM*; Y Ikeda, T Kaneko, K Ichikawa, Y Tuzuku, K Tanaka, G Utsuno, T Naganuma, C Hamamoto; JEOL Ltd, Japan
Poster # 51

Scientific Program

3:00 PM **116** *Small Angle X-Ray Scattering: Getting the Big Picture of the Very Small*; P Panine, M Fernandez-Martinez, S Rodrigues, R Mahe, F Bossan, P Høghøj; Xenocs SA, France

Poster # 62

3:00 PM **117** *THE NANOWORKBENCH: Automated Nanorobotic System Inside of Scanning Electron or Focused Ion Beam Microscopes*; I Burkart, V Klocke, E Maynicke; Klocke Nanotechnik GmbH, Germany

Poster # 63

A19.P1 Core Facility Management

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **118** *Centralized Instrument Control for a TEM Laboratory*; M Bergen, M Malac; National Institute for Nanotechnology, Canada; RA McLeod; University of Alberta, Canada; D Hoyle; Hitachi High Technologies, Canada; Y Taniguchi, T Yaguchi; Hitachi High-Technologies Corp, Japan; J Chen; National Institute for Nanotechnology, Canada; T Yotsuji; Hitachi High-Technologies Corp, Japan

Poster # 64

3:00 PM **119** *Safety Management in Multidisciplinary Shared Facilities*; S Li, SV Mallipeddi, S Karlman, T Moskal, VP Dravid; Northwestern University

Poster # 65

3:00 PM **120** (Invited) *A Research Driven Microscopy Core at New York University Langone Medical Center*; F Liang, K Dancel, C Petzold; New York University

Poster # 66

PHYSICAL SCIENCES SYMPOSIA MONDAY AFTERNOON

P02.P1 Structure and Composition Analysis of Nanoparticulate Systems

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **121** *TEM Investigations on FeF₂ Based Nanocomposite Battery Materials*; VSK Chakravadhanula; Karlsruhe Institute of Technology; C Kübel, AR Munnangi, B Breitung, AK Powell, M Fichtner, H Hahn; Karlsruhe Institute of Technology, Germany

Poster # 67

3:00 PM **122** *M&M Student Award STEM/EELS and Diffraction Study of Phase Transformation in FeO_{0.7}F_{1.3}/C Nanocomposites after Lithiation/Delithiation*; M Sina, N Pereira, GG Amatucci, F Cosandey; Rutgers University

Poster # 68

3:00 PM **123** *Segregation-Induced Degradation in Hydrogen Storage Mg-Based Thin Films*; Z Li, S Zheng, L Bendersky; National Institute of Standards and Technology

Poster # 69

3:00 PM **124** *Microstructural Characterization of Manganese Oxides Supercapacitors Based on Liquid-Phase Exfoliated for Energy Storage Applications*; H Pettersson, M Canavan, J Coelho; Trinity College Dublin, Ireland; T Pennycook; SuperSTEM Laboratory, United Kingdom; V Nicolosi; Trinity College Dublin, Ireland

Poster # 70

3:00 PM **125** *Effect of Electron Dose on Imaging of Ni@Pt Nanoparticles for Fuel Cells*; F Godinez-Salomon, O Solorza-Feria; Instituto Politecnico Nacional, Mexico; C Kisielowski; Lawrence Berkeley National Laboratory; HA Calderon; Instituto Politecnico Nacional, Mexico

Poster # 71

3:00 PM **126** *Morphological and Chemical Analysis of Fe-Doped Nanotitanates*; AML Costa, BA Marinkovic; Pontificia Universidade Catolica do Rio de Janeiro, Brazil; DJ Smith; Arizona State University; S Paciornik; Pontificia Universidade Catolica do Rio de Janeiro, Brazil

Poster # 72

3:00 PM **127** *Characterization of Oxide Films Grown on SrTiO₃-Buffered Si (001) Substrates*; AR Dhamdhare; Arizona State University

Poster # 73

3:00 PM **128** *Structural Analysis of Flame Synthesized C-Doped TiO₂ Nanocomposite Polymorphs for Energy Related Applications*; J Al-Sharab; New York University Polytechnic Institute; H Halim; Rutgers University; M Abeykoon; Brookhaven National Laboratory; SJ Billinge; Columbia University; B Kear, SD Tse; Rutgers University

Poster # 74

3:00 PM **129** *In Situ Nucleation and Growth of Protein-Templated Magnetic Nanoparticles*; S Kashyap, T Prozorov; Ames Laboratory

Poster # 75

Scientific Program

3:00 PM **130** *Unraveling the Coarsening Mechanism of Palladium Nanoparticles Using In Situ High Resolution Transmission Electron Microscopy*; P Lu, K Chen; Xi'an Jiaotong University, China; X Zhang; Hitachi High Technologies America, Ltd.; Z Shan; Xi'an Jiaotong University, China
Poster # 76

3:00 PM **131** *High Resolution Imaging Analysis of Core/Shell CdSe/ZnS Quantum Dots (QDs) and Graphene QDs Using Cs-Corrected HR-STEM/TEM*; H Shin, K Park; LG Electronics
Poster # 77

3:00 PM **132** *Characterization of Carbon-Coated Titania Nanoparticles with Transmission Electron Microscopy*; DH Anjum, N Memon, SH Chung; King Abdullah University of Science & Technology, Saudi Arabia
Poster # 78

3:00 PM **133 M&M Student Award** *Adsorption of Sb on the {10-10} Facets of ZnO Nanowires*; D Yuchi, J Liu; Arizona State University
Poster # 79

3:00 PM **134** *TEM Characterization of ZnO Nanoparticles Obtained by Mechano-synthesis*; HJ Morales-Rodriguez, F Espinosa-Magana; Centro de Investigacion en Materiales Avanzados, Mexico
Poster # 80

3:00 PM **135** *Structural Properties and Surface Plasmon Polariton Propagation of Gold Nanoplates*; TA Major, MS Devadas, SS Lo, GV Hartland; University of Notre Dame
Poster # 81

3:00 PM **136** *Characterization of E-Beam Fabricated Gold Nanoparticles*; S Madsen, P Kempen, R Sinclair; Stanford University
Poster # 82

3:00 PM **137** *High-Resolution TEM Analysis of Supported Metal Nanoparticles Combining with Image Simulation*; B Zhang; Chinese Academy of Sciences, China; W Zhang, L Shao; Fritz Haber Institute of the Max Planck Society, Germany; DS Su; Chinese Academy of Sciences, China
Poster # 83

3:00 PM **139** *Adsorption of Naphthalene and Pyrene Containing Surfactant Peptides onto Single-Walled Carbon Nanotubes: A Microscopy, Spectroscopy, and Theoretical Study*; DR Samarajeeva, U Ranatunga, B Wilson, A Lemieux, G Dieckmann, S Nielsen, I Musselman; University of Texas, Dallas
Poster # 85

P03.P1 Imaging the Hard/Soft Materials Interface: Challenges and Solutions

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **140** *Image Processing for Phase Imperfections Reconstructed in Electron Holography*; L Wei, T Takayoshi; Nagoya University, Japan
Poster # 86

3:00 PM **141** *Study of Hydrated Lime in Environmental Scanning Electron Microscopy*; E Tihlarikova, V Nedela; Institute of Scientific Instruments, ASCR, Czech Republic; P Rovnanikova; Brno University of Technology, Czech Republic
Poster # 87

3:00 PM **142** *TEM Study of Microstructure of Superhard c-BN/WC-Co Interface*; H Shen; University of Electronic Science and Technology of China; K Sun; University of Michigan; X Xiang, X Zu; University of Electronic Science and Technology of China
Poster # 88

3:00 PM **143** *Quantitative STEM HAADF Analysis of Dilute Bi Containing GaAs*; N Knaub, A Beyer, P Ludewig, W Stolz, K Volz; Philipps Universität Marburg, Germany
Poster # 89

3:00 PM **144** *Characterization of the Interface between Fe₃O₄ Nanoparticles and a GaAs Substrate as a Platform for Next Generation Spintronic Devices*; S Hihath, P Riechers, A Thron, K van Benthem, R Kiehl; University of California, Davis; C Murray, J Chen; University of Pennsylvania
Poster # 90

3:00 PM **145** *Electron Microscopy of Nafion Membrane*; S Yakovlev, K Downing; Lawrence Berkeley National Laboratory; N Balsara; University of California, Berkeley
Poster # 91

3:00 PM **146** *Atomic Structure and Properties of Charged Domain Walls in BiFeO₃ Films*; L Li, P Gao, C Nelson, Y Zhang, S-J Kim; University of Michigan; A Melville, C Adamo, D Schlom; Cornell University; X Pan; University of Michigan
Poster # 92

Scientific Program

3:00 PM **147** *AEM and FESEM Investigation of the Capacity Retention Mechanisms in Novel Composite Sulfur Copolymer Cathodes for High-Energy Density Li-S Batteries*; VP Oleshko, J Kim, C Soles; National Institute of Standards and Technology; JJ Griebel, WJ Chung, AG Simmonds, J Pyun; University of Arizona; SD Hudson; National Institute of Standards and Technology
Poster # 93

P06.P1 Failure Analysis of Structural Materials: Microscopy, Metallography and Fractography

Poster Session

Monday 3:00 PM • Room: Exhibit Hall

3:00 PM **148** *Advanced Characterization of Nanoscale Bridge in Magnetic Tunnel Junction by 3-D EDS Tomography*; K Hwang, J Bae, S Lee, M Park, K Park, J Choi, J Ahn, D Lee, S Ahn, S Park, S Jeong, S Nam, G Jeong, H Cho, E Jung; Samsung Electronics Co, Korea
Poster # 94

3:00 PM **149** *Failure Analysis and Quantitative Image Analysis of Leaded Brass Components*; DF Susan, AC Kilgo, RP Grant, GD Grimm; Sandia National Laboratories
Poster # 95

3:00 PM **150** *On the Study of the Orientated Cracks Formed in ErD₂ Thin Film*; H Shen; University of Electronic Science and Technology of China; K Sun; University of Michigan; X Xiang, X Zu; University of Electronic Science and Technology of China
Poster # 96

3:00 PM **151** *Performance of PET Post-Consumed Bottle Fiber into a Concrete Matrix*; JM Herrera-Ramirez, FJ Baldenebro-Lopez, CD Gomez-Esparza; Centro de Investigación en Materiales Avanzados, Mexico; JH Castorena-Gonzalez, JI Velazquez-Dimas; Universidad Autónoma de Sinaloa, Mexico; W Antunez-Flores, JE Ledezma-Sillas, R Martinez-Sanchez; Centro de Investigación en Materiales Avanzados, Mexico
Poster # 97

3:00 PM **152** *TEM Investigation of Implanted Ag Distribution in PyC and SiC after Annealing*; G Yu, S Dwaraknath, G Ran, G Was, L Wang; University of Michigan
Poster # 98

Tuesday August 6

BIOLOGICAL SCIENCE SYMPOSIUM TUESDAY MORNING

B06.02 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals

Session Chairs:

Jay Jerome, Vanderbilt University School of Medicine;
Patricia Kysar, University of California, Davis;
Michael Goheen, Indiana University;
Lois Anderson, Johns Hopkins University

Platform Session

Tuesday 8:25 AM • Room: 236

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **153** (Invited) *Formation of Mitochondrial Spheroid in Response to Oxidative Stress*; M Li, MP Goheen, X-M Yin; Indiana University
- 9:00 AM **154** *Autophagy Exacerbates the Lysosomal Dysfunction of Late-Stage Atherosclerosis*; WG Jerome, CD Netherland-Van Dyke, CE Romer; Vanderbilt University
- 9:15 AM **155** (Invited) *Delivery of a Novel Connexin-43 Mimetic Peptide Enhances Wound Healing*; K Moore, Z Bryant, A Vandergriff; University of South Carolina; G Ghatnekar; First String Research, Inc; R Gourdie; Virginia Tech Carillion; J Potts; University of South Carolina
- 9:45 AM **156 M&M Student Award** *Size-Dependent Thermo-therapy of Iron Oxide Nanoparticles on Human Breast Adenocarcinoma Cancer Cells*; T Mustafa, Y Xu, F Watanabe; University of Arkansas, Little Rock; Y Zhang; National Center for Toxicological Research, US Food and Drug Administration; M Asar; University of Arkansas, Little Rock; R Little; Howard University; A Karmakar, M Mahmood, K Hudson, A Biris; University of Arkansas, Little Rock

EDUCATION • TUESDAY MORNING

X90.01 Microscopy in the Classroom— Strategies for Education and Outreach

Session Chair:

Craig Queenan and Alyssa Calabro, Bergen County
Technical Schools

Microscopy Education Session

Tuesday 8:55 AM • Room: 212

- 8:55 AM *Welcome & Introduction to the Session*
- 9:00 AM **157** (Invited) *Wright-Patterson Air Force Base Educational Outreach Program*; J Tiley, K Stultz; Air Force Research Laboratory
- 9:30 AM **158** (Invited) *The National Nanotechnology Infrastructure Network's Education and Outreach Programs—Helping Student Understand the Tools of Nanotechnology*; N Healy; Georgia Institute of Technology

ADVANCES IN INSTRUMENTATION SYMPOSIA TUESDAY MORNING

A01.02 Gertrude Rempfer Memorial Symposium on Advances in Electron Optics and Aberration-Corrected Electron Microscopy

Session Chairs:

Rolf Koenenkamp, Portland State University;
Sergei Rouvimov, University of Notre Dame;
Wolfgang Neumann, University of Oregon;
Teresa Ruiz, University of Vermont

Platform Session

Tuesday 8:25 AM • Room: 240

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **159** (Invited) *The Design and Performance of a Double Wien Filter Monochromator for Application in TEM*; A Kirkland, J Warner, JS Kim, P Nellist; Oxford University, United Kingdom; M Mukai, H Sawada, T Kaneyama, K Omoto, A Kimura, A Ikeda, J Zhou; JEOL Ltd., Japan

Scientific Program

9:00 AM **160** *Improving the Spatial Resolution of Low-keV STEM with a Monochromator*; TC Lovejoy, N Dellby, GJ Corbin, P Hrnčirik, MF Murfitt, ZS Szilagy, OL Krivanek; Nion

9:15 AM **161** *A Monochromatic, Aberration-Corrected, Dual-Beam Low Energy Electron Microscope for DNA Sequencing and Surface Analysis*; M Mankos, K Shadman; Electron Optica; H Persson; Stanford Genome Technology Center; A N'Diaye, A Schmid; Lawrence Berkeley National Laboratory; R Davis; Stanford Genome Technology Center

9:30 AM **162** (Invited) *A New View on Bacterially-Produced Uraninite Nanoparticles Ultrastructure Revealed with Aberration Corrected STEM*; A Dohnalkova; Pacific Northwest National Laboratory; A Genc; FEI Company; K Kemner; Argonne National Laboratory; W Burgos; The Pennsylvania State University

A02.01 The Electron Microscope of the Future: Merging the SEM, the STEM and the Ion Microscope

Session Chairs:

David C. Joy, University of Tennessee;

Raynald Gauvin, McGill University, Canada;

Brendan J. Griffin, The University of Western Australia

Platform Session

Tuesday 8:25 AM • Room: 208

8:25 AM *Welcome & Introduction to the Session*

8:30 AM **163** (Invited) *SPM integration into SEM/FIB/SAM Systems New Opportunities? ... or Only Integration Problems?*; W Heichler; SPECS Surface Nano Analysis GmbH, Germany

9:00 AM **164** *Modeling iSE Emission for Ion Beam Imaging*; DC Joy; University of Tennessee; B Griffin; University of Western Australia

9:15 AM **165** *Towards SIMS on the Helium Ion Microscope: Detection Limits and Experimental Results on the ORION*; D Dowsett, L Pillatsch, N Vanhove, T Wirtz; Centre de Recherche Public—Gabriel Lippmann, Luxembourg; S Sijbrandij, J Notte; Carl Zeiss Microscopy LLC

9:30 AM **166** *Correlative Microscopy Using SIMS For High-Sensitivity Elemental Mapping*; T Wirtz, D Dowsett, N Vanhove, Y Fleming; Centre de Recherche Public—Gabriel Lippmann, Luxembourg

9:45 AM **167** *Theoretical 3D Imaging with He+ Ions*; LA Giannuzzi; L A Giannuzzi & Associates LLC

A03.02 New Opportunities for In Situ Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;

Blythe G. Clark, Sandia National Laboratories;

Klaus Qvortrup, University of Copenhagen

Platform Session

Tuesday 8:25 AM • Room: 241

8:25 AM *Welcome & Introduction to the Session*

8:30 AM **168** (Invited) *Suspended Microsystems for In Situ TEM Studies of Processes in Gases and Liquids*; SB Alam, E Jensen; Technical University of Denmark; FM Ross; IBM Research Division; O Hansen, A Burrows, K Mølhave; Technical University of Denmark

9:00 AM **169** *Nanofluidic Cells with Controlled Path Length and Liquid Flow for Rapid, High-Resolution In Situ Electron Microscopy*; C Mueller; University of Toronto, Canada; M Harb; Insight Nanofluidics; JR Dwyer; University of Rhode Island; RJD Miller; University of Hamburg, Germany

9:15 AM **170** *Development of Reinforced Silicon Nitride Membranes for In Situ Liquid Electron Microscopy*; MJ Dukes; Protochips, Inc; KL Klein; University of the District of Columbia; R Thomas, J Damiano; Protochips, Inc

9:30 AM **171** *Beam-Sample Interactions During Liquid Cell Electron Microscopy*; JM Grogan; University of Pennsylvania; FM Ross; IBM T J Watson Research Center; HH Bau; University of Pennsylvania

9:45 AM **172** *Controlling the Electron-Beam Interaction with Liquids for In Situ STEM Imaging*; P Abellan, JE Evans; Pacific Northwest National Laboratory; TJ Woehl, WD Ristenpart; University of California, Davis; I Arslan, ND Browning; Pacific Northwest National Laboratory

A04.02 Electron Tomography in Life and Material Science

Session Chairs:
 Montserrat Bárcena, Leiden University Medical Center;
 Esther Bullitt, Boston University School of Medicine;
 Heiner Friedrich, Eindhoven University of Technology

Platform Session

Tuesday 8:25 AM • Room: 238

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **173** (Invited) *High-Resolution Incoherent Imaging in a Cs Corrected Electron Microscope: A New Tool for High-Resolution Electron Tomography in Life Science*; D Van Dyck, IP Lobato Hoyos; University of Antwerp, Belgium; U Lücken; FEI Company, Netherlands; H Stark; MPI for Biophysical Chemistry, Germany
- 9:00 AM **174** *Breaking the Crowther Limit with "Sudoku" Tomography: Combining Depth-Sectioning and Tilt Series for High-Resolution, Wide-Field Reconstructions*; R Hovden; Cornell University; P Ercius; Lawrence Berkeley National Laboratory; Y Jiang, D Wang, Y Yu, HD Abruna, V Elser, DA Muller; Cornell University
- 9:15 AM **175** (Invited) *Automated Tomographic Reconstruction in the IMOD Software Package*; D Mastronarde; University of Colorado
- 9:45 AM **176 M&M Student Award** *Compressed Sensing Electron Tomography: Theory and Applications*; R Leary, Z Saghi, PA Midgley, DJ Holland; University of Cambridge, United Kingdom

A06.02 Applications of Micro-CT in Life and Material Sciences

Session Chairs:
 Douglas R. Keene, Shriners Hospital for Children;
 Rebecca Rudolph, GE Inspection Technologies;
 Daniel S. Perrien, Vanderbilt University

Platform Session

Tuesday 8:25 AM • Room: 237

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **177** (Invited) *Micro-CT for Visualization of the Internal Structure of Industrial Materials*; A Singhal, Y Zhou; GE Global Research Center

- 9:00 AM **178** *Nano-Scale XRay Computed Tomography: Morphological Analysis of Fuel Cell Electrodes*; P Mandal, WK Epting, S Litster; Carnegie Mellon University

- 9:15 AM **179** (Invited) *Synergistic 3D and 2D Imaging of Unique Extraterrestrial Samples for Curation, Sectioning, and Analysis*; DS Ebel; American Museum of Natural History; JM Friedrich; Fordham University; SW Wallace; American Museum of Natural History; EJ Crapster-Pregont; Columbia University; AJ White; American Museum of Natural History

- 9:45 AM **180** *Characterization of Thin Film Composite Membranes Using Porosimetry and X-Ray Microscopy*; S Soundara Manickam; University of Connecticut; J Gelb; Xradia Inc; JR McCutcheon; University of Connecticut

A07.01 Mass Spectrometry Imaging (MSI): Applications, Current Challenges and Perspectives

Session Chairs:
 Francisco A. Fernandez-Lima, Florida International University;
 Christine M. Mahoney, Pacific Northwest National Laboratory

Platform Session

Tuesday 8:25 AM • Room: 243

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **181** (Invited) *Overview and Latest Developments in Desorption Electrospray Ionization (DESI) Mass Spectrometry Imaging*; CR Ferreira, RG Cooks; Purdue University
- 9:00 AM **182** *LDI-Directed SIMS Imaging for Visualizing Biomolecule Distributions in Bacterial Biofilms at Micron-Scale Resolution*; EJ Lanni; University of Illinois, Urbana-Champaign; R Masyuko, C Driscoll, J Shrout, P Bohn; University of Notre Dame; JV Sweedler; University of Illinois, Urbana-Champaign
- 9:15 AM **183** *Multi-Probe Mass Spectrometry Imaging of Dictyostelium Discoideum Cells*; JD DeBord; Florida International University; R Gomer, E Schweikert; Texas A&M University; F Fernandez-Lima; Florida International University

Scientific Program

9:30 AM **184** *Heterogeneous Processing of Large, Multidimensional Imaging Data Sets Generated by Optical Microscopy Combined with Matrix-Assisted Laser Desorption/Ionization Mass Spectrometry Imaging*; DJ Kissick, T-H Ong, S Rubakhin, J Sweedler; University of Illinois, Urbana-Champaign

9:45 AM **185** *A Mass Spectrometry Imaging Study of Lipid Differentiation in Model Systems*; E Schenk; Florida International University; M Smotherman, C Morgan; Texas A&M University; F Fernandez-Lima; Florida International University

A10.02 Practical Programming for Microanalysis

Session Chairs:

Andrew Deal, GE Global Research;

Philippe T. Pinard, RWTH Aachen University;

Aaron Torpy, CSIRO Process Science and Engineering

Platform Session

Tuesday 8:25 AM • Room: 242

8:25 AM *Welcome & Introduction to the Session*

8:30 AM **186** (Invited) *Programming for Microscopy and Microanalysis*; A Shiveley; UES, Inc; P Shade, M Uchic, M Groeber; Air Force Research Laboratory

9:00 AM **187** *An Open Source Software for the Measurement of Deformation Fields by Means of Digital Image Correlation*; N Vanderesse; École de technologie supérieure, Canada; M Lagacé; Institut de recherche d'Hydro-Québec, Canada; F Bridier, P Bocher; École de technologie supérieure, Canada

9:15 AM **188** *pyMonteCarlo: A Common Programming Interface for Running Identical Simulations Using Different Monte Carlo Programs*; PT Pinard; RWTH Aachen, Germany; H Demers, R Gauvin; McGill University, Canada; S Richter; RWTH Aachen, Germany

9:30 AM **189** *The Use of Revision Control to Implement Best Practices for Experimental Microanalysis*; NWM Ritchie; National Institute of Standards and Technology

9:45 AM **190** *Customization and Automation of Data Acquisition and Evaluation Using DigitalMicrograph Script*; B Schaffer; Gatan Inc

PHYSICAL SCIENCES SYMPOSIA TUESDAY MORNING

P01.02 The Art in Microscopy and Microanalysis

Session Chair:

Cathy Selvius DeRoo, Detroit Institute of Art

Platform Session

Tuesday 8:45 AM • Room: 239

8:25 AM *Welcome & Introduction to the Session*

8:45 AM **191** (Invited) *Chemistry Underneath the Painting Surface: Palmierite Formation in/on a Painting by Johannes Vermeer and by Jacob Jordaens using Laboratory- and Synchrotron-Aided Spectroscopic Methods*; JJ Boon; JAAP Enterprise for Art Scientific Studies

9:15 AM **192** *Understanding Treasures: The Application of Micro-Computed Tomography on the Study of the Blaschka Models*; C Collins, E Vervenioutou, D Sykes, H Walker, F Ahmed; The Natural History Museum, United Kingdom

9:30 AM **193** *The Application of Microfadeometric Testing to Mounted Photographs at the Indianapolis Museum of Art*; MR Columbia; Indiana University-Purdue University Fort Wayne; GD Smith, C Hoevel; Indianapolis Museum of Art; P Messier; Paul Messier, LLC

9:45 AM **194** *Simultaneous EBSD and EDS Characterization of Silver Kennedy Half Dollar Coins*; LH Chan, T Nylese, R Anderhalt, M Nowell, J Lorenzo; EDAX, Inc

P02.02 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:
Chris J. Kiely, Lehigh University

Platform Session

Tuesday 8:25 AM • Room: 206-207

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **195** (Invited) *Pt Nanoparticles as Electrocatalysts for Water Splitting: Atomistic Insights into Functions and Stability*; R Schloegl, E Kudrenko, M Willinger, Y Yi; Fritz-Haber-Institut der Max-Planck-Gesellschaft; R Arrigo; Max-Planck-Institut für chemische Energiekonversion, Germany; F Schueth; Max-Planck-Institut für Kohlenforschung, Germany
- 9:00 AM **196** *Study of Atomically Controlled Au Nanoclusters Using Aberration-Corrected STEM*; N Bhattarai, D Bahena, U Santiago, A Tlahuice, A Ponce, M Jose-Yacamán; University of Texas, San Antonio
- 9:15 AM **197** *Directly Counting Number of Atoms in Au Nanoparticles Supported on Gamma-Alumina by Quantitative-STEM*; L Li, MK France, JC Yang; University of Pittsburgh
- 9:30 AM **198** *Atomic Surface Structures of SrTiO₃ Nanocuboids*; Y Lin; Northwestern University; J Wen; Argonne National Laboratory; L Hu, RM Kennedy, PC Stair, KR Poeppelmeier, LD Marks; Northwestern University
- 9:45 AM **199** *Structure and Composition Analysis of Core-Shell Structure Bimetallic Concave Nanocubes by Aberration-Corrected Scanning Transmission Electron Microscopy*; N Lu, J Wang; University of Texas, Dallas; S Xie; Georgia Institute of Technology; G He; Washington University; Y Xia; Georgia Institute of Technology; MJ Kim; University of Texas, Dallas

P03.02 Imaging the Hard/Soft Materials Interface: Challenges and Solutions

Session Chairs:
Mor Baram, Harvard University;
David C. Bell, Harvard University;
Emmanuelle A. Marquis, University of Michigan

Platform Session

Tuesday 8:25 AM • Room: 244

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **48** (Invited) *Buried Interfaces and Phase Transformations in a Biogenic Single Crystal*; C-H Wu, R Knapp, C Tester; Northwestern University; W Gu, D Jang, J Greer; California Institute of Technology; B Lai, S Chen, C Sun, M Balasubramanian; Argonne National Lab; D Joester; Northwestern University
- 9:00 AM **201** *Analytical Electron Microscopy of Thin Film/Ionic Liquid Interfaces Prepared Using a Focused Ion Beam*; AC Lang, JD Sloppy, R Devlin, H Ghassemi, RJ Sichel-Tissot, S May; Drexel University; JC Idrobo; Oak Ridge National Laboratory; ML Taheri; Drexel University
- 9:15 AM **202** *Morphological and Compositional Analysis of Organic LEDs with Silicon QDs as Active Layer (SiLEDs)*; C Kuebel, F Maier-Flaig, J Rinck, A Powell; Karlsruhe Institute of Technology, Germany; G Ozin; University of Toronto, Canada; U Lemmer; Karlsruhe Institute of Technology, Germany
- 9:30 AM **203** (Invited) *Helium Ion Microscopy for the Imaging of Organic Matrix and Mineral Phase in Developing Tooth Enamel*; C Huyuan, J Marshman; Carl Zeiss Microscopy, LLC; J Dobeck; Forsyth Institute; B Goetze; Carl Zeiss Microscopy, LLC; FB Bidlack; Forsyth Institute

Scientific Program

P04.02 Deriving Fundamental Catalyst Properties from Electron Microscopy

Session Chairs:

Larry Allard, Oak Ridge National Laboratory;
 Ilke Arslan, Pacific Northwest National Laboratory;
 Abhaya K. Datye, University of New Mexico

Platform Session

Tuesday 8:25 AM • Room: 205

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **204** *Time Resolved Growth of Pt From Single Atoms to Nanocrystals with HR-TEM*; P Ercius, Y Borodko; Lawrence Berkeley National Laboratory; G Somorjai; University of California, Berkeley
- 8:45 AM **205** *In Situ Environmental Observation of Oxidative Corrosion of Co and Co-Pt Nanocatalysts*; HL Xin; Lawrence Berkeley National Laboratory; RE Diaz; Center for Functional Nanomaterials; A Genc, L Kovarik; Environmental Molecular Sciences Laboratory; S Carenco, S Alayoglu, EA Pach, GA Somorjai, M Salmeron; Lawrence Berkeley National Laboratory; C Wang; Environmental Molecular Sciences Laboratory; E Stach; Center for Functional Nanomaterials; H Zhang; Lawrence Berkeley National Laboratory
- 9:00 AM **206** *Operando TEM of Catalysts by In Situ Mass Spectrometry*; BK Miller, P Crozier; Arizona State University
- 9:15 AM **207** *Using Operando Methods to Characterize Working Catalysts with TEM, XAS, EXAFS and Raman Spectroscopy*; EA Stach; Brookhaven National Lab; P Baumann; University of Applied Sciences of Northeastern Switzerland; Y Li; Yeshiva University; D Zakharov; Brookhaven National Laboratory; A Frenkel; Yeshiva University
- 9:30 AM **208** (Invited) *In Situ Studies of Working Catalysts at the Mesoscopic Level*; R Schloegl, M Willinger, Z-J Wang, D Vogel, A Knop-Gericke; Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany; R Blume; Helmholtz Zentrum Berlin, Germany; G Rupprechter; Vienna University of Technology, Austria

P06.01 Failure Analysis of Structural Materials: Microscopy, Metallography and Fractography

Session Chairs:

Daniel Dennies, Exponent Failure Analysis Associates;
 Bret Miller, IMR Metallurgical Services

Platform Session

Tuesday 8:25 AM • Room: 245

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **209** (Invited) *Modern Microscopy to Address the Grand Challenges of Corrosion*; WM Kane; Exponent Failure Analysis Associates
- 9:00 AM **210** *Influence of a Cu-Nb Interface on Local Lattice Diffusivity in Cu during Irradiation*; S Mao, S Dillon, R Averback; University of Illinois Urbana Champaign
- 9:15 AM **211** *Failure Analysis of International Low Impact Docking System Latch Hooks*; J Martinez, R Patin, J Figert; NASA Johnson Space Center
- 9:30 AM **212** (Invited) *The Affect of Variable Pressure on the Quality of Energy Dispersive X-ray Analysis Results*; P DeVries; The Boeing Company

P07.01 Special Problems and Solutions: Coatings, Ceramics and Polymers

Session Chairs:

John Sauer, Sauer Engineering;
 Richard E. Chinn, National Energy Technology Laboratory

Platform Session

Tuesday 8:25 AM • Room: 209

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **213** (Invited) *Characterization of Coatings with Ions and Electrons*; LA Giannuzzi; L A Giannuzzi & Associates LLC; NS Smith; Oregon Physics, LLC; S Sampath; Stony Brook University
- 9:00 AM **214** (Invited) *Benefits of Using a Biological Confocal Microscope to Resolve Difficult and Unusual Problems in Material Science*; EJ Sanford; Corning Inc.

Scientific Program

9:30 AM **215** *Microstructural Characterization of a Thermal Barrier Coating System Using SEM, TEM and APT Techniques*; Y Chen; University of Michigan; RC Reed; University of Oxford, United Kingdom; EA Marquis; University of Michigan

9:45 AM **216** *Three-Dimensional Cathodoluminescence by Focused Ion Beam-Scanning Electron Microscopy*; M De Winter, GM Pennock, JA Post, MR Drury; Utrecht University, Netherlands

PHYSICAL SCIENCES TUTORIAL TUESDAY MORNING

X40.01 *Physical Sciences Tutorial: Practical Processing of Spectrum Imaging Datasets by Multivariate Statistical Analysis: Advantages and Disadvantages*

Session Chair:
Patrick Phillips, University of Illinois at Chicago

Tutorial Session

Tuesday 9:00 AM • Room: 210

9:00 AM **217** (Invited) *Practical Processing of Spectrum Images by Multivariate Statistical Analysis: Advantages and Disadvantages*; M Watanabe; Lehigh University

BIOLOGICAL SCIENCES SYMPOSIA TUESDAY MORNING

B01.01 *Developmental Biology and Tissue Engineering: Bridging the Gap through Microscopy*

Session Chairs:
Richard L. Goodwin, Jay D. Potts,
University of South Carolina School of Medicine

Platform Session

Tuesday 10:25 AM • Room: 237

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **218** (Invited) *Tissues in Motion: the Dynamic Environment for Cardiac Morphogenesis*; A Aleksandrova, A Czirok; University of Kansas Medical Center; R Lansford; Children's Hospital Los Angeles; B Rongish; University of Kansas Medical Center

11:00 AM **219** (Invited) *In Situ Multi-Photon Fluorescence Microscopy for Functional Screening of Intracardiac Cell Implants*; W Tao, M Soonpaa; Indiana University; G Keller; McEwen Center for Regenerative Medicine; H Reinecke, C Murry; University of Washington; L Field, M Rubart; Indiana University

11:30 AM **220** *Effect on Glycolysis and Glucose Transporters of Transplanted Isolated Normal Mitochondria from MCF-12A Cells into Breast Cancer Cells*; RL Elliott, XP Jiang, JF Head; EBH Breast Cancer Research and Treatment Center

11:45 AM **221** *Highly Permeable, Transparent and Degradable Membranes for Tissue Scaffolding*; T Gaborski, J Miller; Rochester Institute of Technology; C Striemer; SiMPore Inc; J McGrath; University of Rochester

B06.03 *Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals*

Session Chairs:
Patricia Kysar, University of California, Davis;
Michael Goheen, Indiana University;
Jay Jerome, Vanderbilt University School of Medicine;
Lois Anderson, Johns Hopkins University

Platform Session

Tuesday 10:25 AM • Room: 236

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **222** (Invited) *45 Years of Electron Microscopy and Infectious Diseases, 37 Years at the "Bench" with Negative Stain Processing: What Did I Learn?*; CD Humphrey; Home

11:00 AM **223** *Element Analysis by EDX for Life Science: Light Elements and Bio-Mineralization*; M Falke, R Terborg, A Kaepfel, T Salge, J Berlin; BrukerNano GmbH, Germany; C Biot, C Slomianny; University of Lille, France

11:15 AM **224** (Invited) *High Resolution Electron Microscopy Analysis of the Helicobacter pylori Cag Type IV Secretion System*; JA Gaddy; Vanderbilt University; TL Cover; U.S. Department of Veterans Affairs

11:45 AM **225** *Characterization of Yeast Biofilm by Cryo-SEM and FIB-SEM*; K Dobranska; Institute of Scientific Instruments ASCR, Czech Republic; J Nebesarova; Biology Center ASCR, Czech Republic; F Ruzicka; Masaryk University, Czech Republic; J Dluhos; TESCAN, Czech Republic; V Krzyzanek; Institute of Scientific Instruments ASCR, Czech Republic

Scientific Program

MICROSCOPY EDUCATION SESSION TUESDAY MORNING

X90.02 Microscopy in the Classroom— Strategies for Education and Outreach

Session Chairs:

Craig Queenan and Alyssa Calabro,
Bergen County Technical Schools

Microscopy Education Session

Tuesday 10:30 AM • Room: 212

10:30 AM **226** (Invited) *A Remote Online Microscopy Lab as a Tool for K-12 Science Education and a Platform for Teacher-Scientist Partnerships*; EH Ferrin, A Pratt, K Jona; Northwestern University

11:00 AM **227** (Invited) *Short Courses for Scanning Electron Microscopy and X-ray Microanalysis*; C Lyman; Lehigh University

ADVANCES IN INSTRUMENTATION SYMPOSIUM TUESDAY MORNING

A01.03 Gertrude Rempfer Memorial Symposium on Advances in Electron Optics and Aberration-Corrected Electron Microscopy

Session Chairs:

Wolfgang Neumann, University of Oregon;
Sergei Rouvimov, University of Notre Dame;
Rolf Koenenkamp, Portland State University;
Teresa Ruiz, University of Vermont

Platform Session

Tuesday 10:25 AM • Room: 240

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **228** (Invited) *The Benefit of Automated Electron Diffraction Tomography (ADT) for Nano Science*; U Kolb; Johannes Gutenberg University, Germany

11:00 AM **229** *The Ultra-Stable Scanning Transmission Electron Holography Microscope*; RA Herring; University of Victoria; D Hoyle; Hitachi High Technologies America, Ltd; Y Taniguchi; Hitachi High-Technologies Corporation, Japan; M Haider; Corrected Electron Optic Systems GmbH, Germany

11:15 AM **230** *Quantitative Reconstruction and Analysis of HRTEM Complex Exit Waves Using Inline Holography*; C Ophus, J Ciston, P Ercius; Lawrence Berkeley Lab; C Koch; Universitat Ulm, Germany

11:30 AM **231** (Invited) *Solving the 180 Degree Orientation Ambiguity Related to Spot Diffraction Patterns in Transmission Electron Microscopy*; EF Rauch, M Veron; Grenoble Institute of Technology, France

A02.02 The Electron Microscope of the Future: Merging the SEM, the STEM and the Ion Microscope

Session Chairs:

Raynald Gauvin, McGill University;
Brendan J. Griffin, The University of Western Australia;
David C. Joy, University of Tennessee

Platform Session

Tuesday 10:25 AM • Room: 208

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **232** *High Resolution Imaging and X-Ray Microanalysis at High Count Rate: The Supreme Achievement in Materials Characterization*; R Gauvin; McGill University, Canada; DC Joy; Oak Ridge National Laboratory; N Brodusch, H Demers; McGill University, Canada; P Woo; Hitachi High-Technologies Canada, Inc.

10:45 AM **233** *Simultaneous Bright Field and Dark Field STEM-IN-SEM Imaging of Polymer Nanocomposites*; BS Patel, M Watanabe; Lehigh University

11:00 AM **234** *X-ray Quantitative Microanalysis with an Annular Silicon Drift Detector*; H Demers, N Brodusch; McGill University; DC Joy; Oak Ridge National Laboratory; P Woo; Hitachi High-Technologies Canada, Inc.; R Gauvin; McGill University, Canada

11:15 AM **235** *Fine Structure of Core Loss Excitations in EELS by Monte Carlo Simulation*; M Attarian Shandiz; McGill University, Canada; F Salvat; University of Barcelona, Spain; R Gauvin; McGill University, Canada

11:30 AM **236** *The Difference between Secondary Electron Imaging in Variable Pressure SEM and Conventional SEM: Can They Ever Be the "Same"?*; BJ Griffin; The University of Western Australia; DC Joy; Oak Ridge National Laboratory; JR Michael; Sandia National Laboratories, Albuquerque

11:45 AM **237** *Layer Number Contrast of CVD-Derived Graphene in Low Voltage Scanning Electron Microscopy*; J Xie, JP Spallas; Agilent Technologies

A03.03 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Tuesday 10:25 AM • Room: 241

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **238** *Direct Observation of Pseudocapacitor Electrode Behavior During Electrochemical Biasing Using In Situ Liquid Stage Electron Microscopy*; L Parent; University of California, Davis; V Presser, Y Gogotsi; Drexel University; RR Unocic, RL Sacci; Oak Ridge National Laboratory; JE Evans, ND Browning; Pacific Northwest National Laboratory; ED Perre, B Dunn; University of California, Los Angeles; I Arlan; Pacific Northwest National Laboratory

10:45 AM **239** *In Situ TEM Observation of Rechargeable LiMn_2O_4 Nanowire-Battery*; S Lee; Tokyo Institute of Technology; Y Oshima; Osaka University; E Hosono, H Zhou; National Institute of Advanced Industrial Science and Technology, Japan; K Kim, H Chang, R Kanno, K Takayanagi; Tokyo Institute of Technology, Japan

11:00 AM **240** *Growth and Evolution of Lead Dendrites during Electrochemical Migration under TEM*; M Sun, K Niu, H-G Liao, H Zheng; Lawrence Berkeley National Laboratory

11:15 AM **241** *Quantitative In Situ Electrochemical Liquid Cell Characterization of SEI Formation in Lithium Ion Batteries*; RL Sacci, NJ Dudney, KL More, RR Unocic; Oak Ridge National Laboratory

11:30 AM **242** *Graphene Electrodes for In Situ Transmission Electron Microscopy of Electrochemical Processes*; BC Regan, ER White, WA Hubbard, G Carlson; University of California, Los Angeles

11:45 AM **243 M&M Student Award** *In Situ Electrochemical Measurements in the Nanoaquarium*; NM Schneider; University of Pennsylvania; JH Park; University of California, Los Angeles; JM Grogan; University of Pennsylvania; S Kodambaka; University of California, Los Angeles; DA Steingart; Princeton University; FM Ross; IBM T J Watson Research Center; HH Bau; University of Pennsylvania

A04.03 Electron Tomography in Life and Material Science

Session Chairs:

Montserrat Bárcena, Leiden University Medical Center;
Esther Bullitt, Boston University School of Medicine;
Heiner Friedrich, Eindhoven University of Technology

Platform Session

Tuesday 10:25 AM • Room: 238

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **244** (Invited) *Developments in the Application of Zernike Phase Contrast Technologies to Cryo-Electron Tomography Studies of Bacteria*; ER Wright, RC Guerrero-Ferreira; Emory University

11:00 AM **245** *Elucidating the Role of Viral Non-Structural Proteins on the Morphogenesis of Arterivirus Replication Structures*; B van der Hoeven, EJ Snijder; Leiden University Medical Center, Netherlands; K Knoops; Groningen Biomolecular and Biotechnical Institute, The Netherlands; AJ Koster, M Bárcena; Leiden University Medical Center, Netherlands

11:15 AM **246** *Correlative Light and Electron Microscopic Imaging of Gap Junction Life Cycle Dynamics Using the EM Protein Tags and Phospho-Specific Antibodies*; A Cone; University of California, San Diego; J Martell; Massachusetts Institute of Technology; T Deerinck, G Cavin, C Ambrosi; University of California, San Diego; A Ting; Massachusetts Institute of Technology; M Ellisman, GE Sosinsky; University of California, San Diego

11:30 AM **247** (Invited) *Approaching Tissue Ultrastructure in 3D*; IU Wacker; Karlsruhe Institute of Technology, Germany; NJ Zaluzec; Argonne National Laboratory; A Schertel; Carl Zeiss Microscopy GmbH, Germany; RR Schroeder; Heidelberg University, Germany

Scientific Program

A07.02 Mass Spectrometry Imaging (MSI): Applications, Current Challenges and Perspectives

Session Chairs:

Francisco A. Fernandez-Lima, Florida International University;
Christine M. Mahoney, Pacific Northwest National Laboratory

Platform Session

Tuesday 10:25 AM • Room: 243

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **248** (Invited) *C60 Secondary Ion FT-ICR Mass Spectrometry: High Mass Resolving Power and High Mass Accuracy SIMS*; L Pasa-Tolic; Pacific Northwest National Laboratory; DF Smith; FOM Institute AMOLF, Netherlands; FE Leach, EW Robinson; Pacific Northwest National Laboratory; RM Heeren; FOM Institute AMOLF, Netherlands

11:00 AM **249** *Complimentary Use of MALDI FTICR-MS and TOF-SIMS Imaging Approaches in an Invertebrate*; M Liebke; Imperial College London, United Kingdom; J Fuchser; Bruker Daltronik GmbH, Bremen, Germany; KA Kellersberger; Bruker Daltonik, Billerica MA; S Fearn, D McPhail, JG Bundy; Imperial College London, United Kingdom

11:30 AM **250** (Invited) *3D Molecular Depth Profiling of Biological and Polymeric Materials Using Time-of-Flight Secondary Ion Mass Spectrometry*; PA Clark; ascon USA, Inc.; E Tallarek, D Breitenstein, B Hagenhoff; Tascon GmbH, Germany; N Havercroft; ION-TOF USA, Inc.

A10.03 Practical Programming for Microanalysis

Session Chairs:

Andrew Deal, GE Global Research;
Philippe T. Pinard, RWTH Aachen University;
Aaron Torpy, CSIRO Process Science and Engineering

Platform Session

Tuesday 10:25 AM • Room: 242

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **251** (Invited) *Post Processing Hyper-Spectral Data and Generating More Information from X-ray Maps*; R Wuhrer; University of Western Sydney, Australia; K Moran; Moran Scientific Pty Ltd, Australia

11:00 AM **252** *MSA/MAS/AMAS Hyper-Dimensional Spectral File Format—An Update*; A Torpy, NC Wilson, CM MacRae; CSIRO Australia; NJ Zaluzec; Argonne National Laboratory; M Kundmann; e-Metrikos

11:15 AM **253** *R for X-Ray Microanalysis*; JM Davis; National Institute of Standards and Technology

11:30 AM **254** *Microanalysis Software: Properties and Requirements*; U Rossek, R Terborg, M Falke, A Kaepfel, M Rohde; Bruker Nano GmbH, Germany

11:45 AM **255** *Open-Source Visualization of 3D Data: From Tomography to Spectroscopy*; R Hovden, P Cueva, DA Muller; Cornell University

A16.01 X-ray Microanalysis in Modern Electron Optical Instruments: Is It Really Quantitative in Today's Diverse Architectures?

Session Chairs:

Dale E. Newbury, National Institute of Standards and Technology;
Masashi Watanabe, Lehigh University;
Nestor J. Zaluzec, Argonne National Laboratory

Platform Session

Tuesday 10:25 AM • Room: 244

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **256** (Invited) *Quantitative X-Ray Microanalysis of Multi-Layered Specimens: Capability and Accuracy*; C Merlet; Université Montpellier 2, France

11:00 AM **257** (Invited) *Measurement Strategies for Quantification of Carbon in Steel using EPMA*; PT Pinard, A Aretz; RWTH Aachen University, Germany; J Börder; JEOL Germany GmbH; J Donovan; University of Oregon; S Richter; RWTH Aachen University, Germany

11:30 AM **258** *Quantitative SEM/EDS, Step 1: What Constitutes a Sufficiently Flat Specimen?*; DE Newbury, NW Ritchie; National Institute of Standards and Technology

11:45 AM **259** *Challenges and New Approaches for Quantitative X-Ray Analysis in SEM at Low Beam Voltages*; PJ Statham; Oxford Instruments NanoAnalysis

PHYSICAL SCIENCES SYMPOSIA TUESDAY MORNING

P01.03 The Art in Microscopy and Microanalysis

Session Chair:

Alex Ball, The Natural History Museum, London

Platform Session

Tuesday 10:25 AM • Room: 239

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **260** (Invited) *Near-Surface Chemical Alteration of Nineteenth-Century Architectural Cast Stone*; EP Vicenzi, CA Grissom, AE Charola, E Aloiz, MJ Wachowiak; Smithsonian Institution; J Davis; National Institute of Standards and Technology; JJ Donovan; University of Oregon
- 11:00 AM **261** *Microsampling and Analysis of Particles from Ancient Mesoamerican Stone Masks Reveal Clues of the Manufacturing Process*; TR Rose, JM Walsh; Smithsonian Institution
- 11:15 AM **262** *SEM, and STEM Microstructural and Microchemical Analysis of Pigments Contained in a Salvator Mundi in the Collection of the Detroit Institute of Arts*; JF Mansfield, BM Vyletel; University of Michigan; C Selvius DeRoo; Detroit Institute of the Arts
- 11:30 AM **263** (Invited) *Microscopy and Microanalysis Characterisation Techniques Used to Investigate Cultural Heritage Materials, Paintings and Pigments*; R Wuhrer; University of Western Sydney, Australia; P Dredge; Art Gallery of New South Wales, Australia

P02.03 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:

Miguel Jose Yacaman, University of Texas at San Antonio

Platform Session

Tuesday 10:25 AM • Room: 206-207

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **264** (Invited) *In Situ Measurement of Nanoscale Structural and Chemical Changes in Catalyst Nanoparticles under Reactive Environment*; R Sharma; National Institute of Standards and Technology

- 11:00 AM **265** *Oxidation of Pseudo-Single Domain Fe₃O₄ Particles and Associated Magnetic Response Examined by Environmental TEM and Off-Axis Electron Holography*; TP Almeida, A Muxworthy; Imperial College London, United Kingdom; W Williams; University of Edinburgh, United Kingdom; RE Dunin-Borkowski; Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons, Germany
- 11:15 AM **266** *Measuring the Effects of Ambient Gas Environment on Catalyst Defaceting and Coarsening through Environmental TEM*; SM Saber; Purdue University; R Rao; Honda Research Institute USA, Inc.; SM Kim; Korean Institute of Science and Technology; A Harutyunyan; Honda Research Institute USA, Inc.; EA Stach; Brookhaven National Laboratory
- 11:30 AM **267** *In Situ Atomic-Scale Investigation of Elemental Diffusion in Pt-Co Nanoparticles*; M Chi; Oak Ridge National Laboratory; C Wang; Johns Hopkins University; K More; Oak Ridge National Laboratory; N Markovic, V Stamenkovic; Argonne National Laboratory
- 11:45 AM **268** *In Situ TEM Studies of Metastable Hexagonal Close-Packed Au Nanocatalysts at the Tips of Ge Nanowires*; AF Marshall, S Thombare, PC McIntyre; Stanford University

P04.03 Deriving Fundamental Catalyst Properties from Electron Microscopy

Session Chairs:

Larry Allard, Oak Ridge National Laboratory;
Ilke Arslan, Pacific Northwest National Laboratory;
Abhaya K. Datye, University of New Mexico

Platform Session

Tuesday 10:25 AM • Room: 205

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **269** (Invited) *Single Atom and Cluster Catalysis: The Era of Aberration-Corrected Scanning Transmission Electron Microscopy*; J Liu; Arizona State University
- 11:00 AM **270** *Single Atom Niobium in Graphitic Layers for Enhanced Oxygen Reduction Reaction*; J Guo; University of Tennessee; X Zhang; National Research Council of Canada; P Guan; Johns Hopkins University; C Liu, H Huang, F Xue, X Dong; Dalian University of Technology; SJ Pennycook, MF Chisholm; Oak Ridge National Laboratory

Scientific Program

11:15 AM **271** (Invited) *Pt/g-Al₂O₃ Reduction and Cluster Evolution Characterized by Aberration-Corrected STEM Imaging and EXAFS*; W Sinkler, SR Bare, SD Kelly, SI Sanchez, TM Mezza, SA Bradley; UOP/Honeywell

11:45 AM **272** *Atomic Structures of Pt Nanoparticles on TiO₂ (110)*; T-Y Chang, R Ishikawa; The University of Tokyo, Japan; Y Ikuhara; Japan Fine Ceramics Center; N Shibata; Japan Science and Technology Agency

P06.02 Failure Analysis of Structural Materials: Microscopy, Metallography and Fractography

Session Chairs:

Daniel Dennies, Exponent Failure Analysis Associates;
Bret Miller, IMR Metallurgical Services

Platform Session

Tuesday 10:25 AM • Room: 245

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **273** (Invited) *Corrosion of an Implanted Medical Device: Rare-Earth Magnet Case Study*; EP Guyer, B Pound, S Crane; Exponent

11:00 AM **274** *Fracture Properties of Diffusion Aluminide Bond Coats: An In Situ SEM Study of Microbeam Bending*; N Jaya; Indian Institute of Science, India; S Bhowmick, S Asif, OL Warren; Hysitron, Inc; V Jayaram, SK Biswas; Indian Institute of Science, India

11:15 AM **275** (Invited) *Facets on Fatigue Fractures*; NE Cherolis; Rolls-Royce Corporation

11:45 AM **276** *Computer Tomography, A Useful Instrument for Failure Analyses*; M Panzenboeck, M Borchert; Montanuniversität Leoben, Austria

P07.02 Special Problems and Solutions: Coatings, Ceramics and Polymers

Session Chairs:

John Sauer, Sauer Engineering;
Richard E. Chinn, National Energy Technology Laboratory

Platform Session

Tuesday 10:25 AM • Room: 209

10:25 AM *Welcome & Introduction to the Session*

10:30 AM **277** *Imaging Cellulose Nanocrystals*; I Sacui; National Institute of Standards and Technology; H Szmanski; University of Maryland; DL Blair, JS Urbach; Georgetown University; M Zammarano, JW Gilman; National Institute of Standards and Technology

10:45 AM **278** *Non-Destructive Measurement of a Combinatorial Materials Library for All-Oxide Solar Cells*; C Lang; Oxford Instruments NanoAnalysis, United Kingdom; S Rühle, AY Anderson, A Zaban; Bar Ilan University, Israel; P Statham, S Burgess; Oxford Instruments NanoAnalysis, United Kingdom

11:00 AM **279** *Microstructural Characterization of Ion Implantation Effects in Aluminum Nitride Substrates for Energy-Scavenging Applications*; FS Alleyne, R Gronsky; University of California, Berkeley

11:15 AM **280** *Atomic Scale Dynamics of a Manganese Oxide Phase Change Observed with STEM*; TJ Pennycook, L Jones; University of Oxford, United Kingdom; H Pettersson, V Nicolosi; Trinity College Dublin, Ireland; PD Nellist; University of Oxford, United Kingdom

11:30 AM **281** *Increasing the Corrosion Resistance of Mullite-Based Catalyst Substrates in a Vehicle Exhaust Environment*; CS Todd, M Malanga, R Ziebarth, K Howard, R Newman, A Pyzik, D Grohol, N Shinkel, N Das; Dow Chemical Company

11:45 AM **282** *Effects of Alkali Treatment On the CaP Deposition of Ti₆Al₄V Foams Produced by Two Different Particle Size*; U Turkan; Gediz University, Turkey; M Guden; Izmir Institute of Technology, Turkey; F Kazak; Gediz University, Turkey

Scientific Program

PHYSICAL SCIENCES TUTORIALS TUESDAY MORNING

X41.01 Physical Sciences Tutorial: State-of-the-Art Microanalysis at the nm-Scale and Smaller: Going from Pretty Pictures to Quantitative Analysis of Hyperspectral Data

Session Chair:

Patrick Phillips, University of Illinois, Chicago

Tutorial Session

Tuesday 10:30 AM • Room: 210

X42.01 Physical Sciences Tutorial: Practical Aspects of Atom Probe Tomography in Materials Science

Session Chair:

Patrick Phillips, University of Illinois, Chicago

Tutorial Session

Tuesday 11:30 AM • Room: 210

10:30 AM **283** (Invited) *A Correlative Study of Direct Atomic-Scale Imaging of Hydrogen and Oxygen Interstitials in Niobium Utilized Atom-Probe Tomography and Aberration-Corrected Scanning Transmission Electron Microscopy*; DN Seidman, Y-J Kim; Northwestern University; RF Klie, R Tao; University of Illinois, Chicago

11:30 AM **284** (Invited) *State-of-the-Art Microanalysis at the nm-Scale and Smaller: Going from Pretty Pictures to Quantitative Analysis of Hyperspectral Data*; PG Kotula; Sandia National Laboratories

Scientific Program

MSA Distinguished Scientist Awardee Talks

Prof. C. Barry Carter, University of Connecticut:
"Microscopy Now and Then"

Prof. David DeRosier, Brandeis University:
"From 3D Reconstruction of Electron Micrographs to
Super-Resolution Light Microscopy"

Tuesday 12:15 PM–1:15 PM • Rooms: 203–204

EDUCATION • TUESDAY AFTERNOON

Family Affair

Session Chairs:
Elaine Humphrey, University of British Columbia;
Stuart McKernan, 3M

Education Session

Tuesday 1:30 PM • Room: 212

BIOLOGICAL SCIENCES SYMPOSIA TUESDAY AFTERNOON

B01.02 Developmental Biology and Tissue Engineering: Bridging the Gap through Microscopy

Session Chairs:
Richard L. Goodwin, and Jay D. Potts,
University of South Carolina School of Medicine

Platform Session

Tuesday 1:25 PM • Room: 237

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **285** (Invited) *Adaptations of the Early Embryonic Heart to Increase Hemodynamic Load*; S Rugonyi; Oregon Health & Science University
- 2:00 PM **286** (Invited) *Models and Mechanisms of Aortic Development and Disease*; RL Goodwin, AN Evans, L Junor; University of South Carolina; SV Biechler; Bose; MM Yost; Medical University of South Carolina; V Krishnamurthy; Rice University; RB Hinton; University of Cincinnati; K Maddy; University of Arizona; JD Potts; University of South Carolina
- 2:30 PM **287** *Hand1 Dimer Regulation within the Medial Cranial Neural Crest is Required for Tissue Fusion and Pallet Formation*; RK Fuchs, BA Firull, A Knox, AB Firulli; Indiana University

- 2:45 PM **288** *Microwave-Assisted Fixation, Labeling and Clearing for Optical Microscopy of Thick Specimens*; AT Vogel, G Marqués, MA Sanders; University of Minnesota

ADVANCES IN INSTRUMENTATION SYMPOSIA TUESDAY AFTERNOON

A02.03 The Electron Microscope of the Future: Merging the SEM, the STEM and the Ion Microscope

Session Chairs:
Raynald Gauvin, McGill University;
Brendan J. Griffin, The University of Western Australia;
David C. Joy, University of Tennessee

Platform Session

Tuesday 1:25 PM • Room: 208

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **289** (Invited) *Scanning Electron Microscopy with Slow Electrons*; L Frank, Š Mikmeková, Z Pokorná, I Müllerová; Institute of Scientific Instruments AS CR, Czech Republic
- 2:00 PM **290** *High-Resolution SEM with Coupled Transmission Mode and EDX for Quick Characterization of Micro- and Nanocapsules for Self-Healing Anti-Corrosion Coatings*; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany; D Akcakayiran, D Grigoriev, DG Shchukin; Max-Planck Institute of Colloids and Interfaces, Germany
- 2:15 PM **291 M&M Student Award** *Low-Energy Electron Diffractive Imaging Based on a Single-Atom Electron Source*; C-Y Lin, I-S Hwang, W-T Chang, W-H Hsu, M-T Chang, Y-S Chen, T-T Tsong; Academia Sinica, Taiwan
- 2:30 PM **292** *Combining Operando X-ray Absorption Spectroscopy and Sub-Ångstrom Environmental Electron Microscopy*; EA Stach; Brookhaven National Laboratory
- 2:45 PM **293** *The Future SEM Sees 3 Dimensions ... Bringing Deconvolution Techniques to the Electron Microscope*; F Boughorbel, X Zhuge, P Potocek, L de Bruin, B Lich; FEI Company

A03.04 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Tuesday 1:25 PM • Room: 241

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **294** (Invited) *Doing Structural Biology In Situ—Prospects and Challenges*; JM Plitzko, E Villa, B Engel, Y Fukuda, T Laugks, M Schaffer, A Schwarz, FJ Baeuerlein, J Mahamid; Max Planck Institute of Biochemistry, Germany; L Fitting Kourkoutis; Cornell University; A Rigort, W Baumeister; Max Planck Institute of Biochemistry, Germany
- 2:00 PM **295** *Stable and Strong Cathodoluminescence of Fluorescent Proteins*; H Minoda, T Onuma; Tokyo University of Agriculture and Technology, Japan; N Yamamoto; Tokyo Institute of Technology, Japan; K Nagayama; National Institute for Physiological Sciences, Japan
- 2:15 PM **296 M&M Student Award** *AirSEM: Electron Microscopy in Air, without a Specimen Chamber*; K Nguyen, M Holtz, D Muller; Cornell University
- 2:30 PM **297** (Invited) *Imaging Labeled Protein Complex Subunits in Whole Eukaryotic Cells in their Native Aqueous Environment*; N de Jonge; Vanderbilt University; DB Peckys; INM-Leibniz Institute for New Materials, Germany

A07.03 Mass Spectrometry Imaging (MSI): Applications, Current Challenges and Perspectives

Session Chairs:

Francisco A. Fernandez-Lima, Florida International University;
Christine M. Mahoney, Pacific Northwest National Laboratory

Platform Session

Tuesday 1:25 PM • Room: 243

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **298** (Invited) *AFM and NanoSIMS Analyses of Vaccinia virions*; PK Weber; Lawrence Livermore National Laboratory; SD Gates; Stanford University; RC Condit,

N Moussatche; University of Florida; AJ Malkin; Lawrence Livermore National Laboratory

- 2:00 PM **299** *Combined SIMS-SPM Instrument for High Sensitivity and High Resolution Elemental 3D Analysis*; Y Fleming, T Wirtz, D Dowsett, M Gerard; Centre de Recherche Public—Gabriel Lippmann, Luxembourg; U Gysin, T Glatzel, E Meyer; University of Basel, Switzerland; U Maier, U Wegmann; Ferrovac GmbH, Switzerland
- 2:15 PM **300** *Rough Surface Depth Profiles for the Characterization of Real World Corrosion and Deposition*; B Naes, D Willingham, M Engelhard, C Mahoney, B McNarmara, B Reid, AJ Fahey; Pacific Northwest National Laboratory
- 2:30 PM **301** *FIB-TOF Tomography of Solid Oxide Fuel Cells*; JS Hammond, GL Fisher, SR Bryan; Physical Electronics, Chanhassen MN; R Kanarbik, P Moller; University of Tartu, Estonia

A09.01 Advances in Data Processing in Optical and Electron Microscopy

Session Chairs:

Jeffrey L. Clendenon, Aeon Imaging LLC;
David Morgan, Indiana University;
Edward P. Morris, The Institute of Cancer Research

Platform Session

Tuesday 1:25 PM • Room: 238

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **302** (Invited) *Open Source BioImage Informatics: Tools for Interoperability*; CT Rueden, J Schindelin, BE DeZonia, AR Grisliis, MC Hiner, KW Eliceiri; University of Wisconsin, Madison
- 2:00 PM **303** (Invited) *The Role of Virtual-Tissue Computer Simulations in the Interpretation of Four-Dimensional Microscopy of Developing Tissues: The Example of Polycystic Kidney Disease*; JA Glazier, JM Belmonte, SG Clendenon, JS Gens; Indiana University; A Shirinifard; St Jude Children's Research Hospital; RL Bacallao; Indiana University; RK Mosaliganti, SG Megason; Harvard Medical School; M Swat; Indiana University
- 2:30 PM **304** *Data Processing for Time-Domain Fluorescence Lifetime Imaging Microscopy*; PA Young, A Grisliis; University of Wisconsin; PR Barber; Gray Institute for Radiation Oncology & Biology; PJ Keely, KW Eliceiri; University of Wisconsin

Scientific Program

2:45 PM **305** *Synchronous Digitization and Signal to Noise Enhancement for General Modulated Signal Analysis*; R Muir, S Sullivan, R Oglesbee, G Simpson; Purdue University

A10.04 Practical Programming for Microanalysis

Session Chairs:

Andrew Deal, GE Global Research;

Philippe T. Pinard, RWTH Aachen University;

Aaron Torpy, CSIRO Process Science and Engineering

Platform Session

Tuesday 1:25 PM • Room: 242

1:25 PM *Welcome & Introduction to the Session*

1:30 PM **306** (Invited) *Visualizing EBSD Maps with MTEX*; R Hielscher; TU Chemnitz; F Bachmann; Bergakademie Freiberg, Germany

2:00 PM **307** *Removing Imaging Distortions through Automatic Stitching of EBSD Mosaics*; D Rowenhorst; The US Naval Research Laboratory

2:15 PM **308** *Phase Identification by Image Processing of EBSD Patterns*; EJ Payton, L Agudo Jácome, G Nolze; Federal Institute for Materials Research and Testing, Germany

2:30 PM **309** *Incorporating Inelastic Scattering into Multislice Simulation*; AA Gunawan, A Mkhoyan; University of Minnesota

2:45 PM **310** *Analysis of 3D-EBSD Datasets Obtained by FIB Tomography*; P Konijnenberg, A Khorashadizadeh, S Zaefferer, D Raabe; Max-Planck-Institute for Iron Research, Germany

A15.01 Low Voltage Transmission Microscopy: Pros and Cons

Session Chairs:

Max Haider, CEOS GmbH;

Rasmus R. Schroeder, Heidelberg University

Platform Session

Tuesday 1:25 PM • Room: 240

1:25 PM *Welcome & Introduction to the Session*

1:30 PM **311** (Invited) *Application of Low Voltage Transmission Electron Microscopy*; DC Bell; Harvard University

2:00 PM **312** *Probing the Onset of Functional Behavior by Exciting Reversible Atom Displacements Using Variable Voltages and Dose Rates*; C Kisielowski, L-W Wang; Lawrence Berkeley National Laboratory; P Specht; University of California, Berkeley; JH Kang, R Cieslinski; The DOW Chemical Company

2:15 PM **313** (Invited) *Pros and Cons of Low-kV Transmission Electron Microscopy*; R Egerton; University of Alberta, Canada

2:45 PM **314** *Quantitative Study of Electron Radiation Damage by In Situ Observation of the Phase Transformation from CaCO₃ to CaO as a Function of the Accelerating Voltage (20–300 kV)*; U Golla-Schindler, W Schweigert; University of Ulm, Germany; G Benner, A Orchowski; Carl Zeiss Microscopy GmbH, Germany; U Kaiser; University of Ulm, Germany

A16.02 X-ray Microanalysis in Modern Electron Optical Instruments: Is It Really Quantitative in Today's Diverse Architectures?

Session Chairs:

Dale E. Newbury, National Institute of Standards and Technology;

Masashi Watanabe, Lehigh University;

Nestor J. Zaluzec, Argonne National Laboratory

Platform Session

Tuesday 1:25 PM • Room: 244

1:25 PM *Welcome & Introduction to the Session*

1:30 PM **315** (Invited) *Designing the Optimal Quantitative Electron Probe X-ray Microanalysis Measurement*; NW Ritchie, DE Newbury; National Institute of Standards and Technology

2:00 PM **316** *Effect of the Probe Size and Interaction Volume on Quantitative X-ray Maps across Interfaces of a Cu-Al Roll Bonded Laminate*; H Demers; McGill University, Canada; R Wuhler; University of Western Sydney, Australia; K Moran; Moran Scientific Pty Ltd., Australia; R Gauvin; McGill University, Canada

2:15 PM **317** *Testing Analytical Precision Using Adaptive Shaping at High Throughput*; RB Mott, OE Healy; PulseTor LLC; NW Richtie, AP Lindstrom; National Institute of Standards and Technology

Scientific Program

2:30 PM **318** *Bridging the Gap between EPMA and AEM: The Performance of High Resolution Field-Emission Electron Microprobes in the Analysis of Geological Materials*; JT Armstrong; Carnegie Institution of Washington; P McSwiggen; McSwiggen and Associates; C Nielsen; JEOL USA, Ltd.

2:45 PM **319** *Check and Specification of the Performance of EDS Systems Attached to the SEM by Means of a New Test Material EDS-TM002 and an Updated Evaluation Software Package EDS Spectrometer Test—Version 3.4*; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany; M Procop; IfG—Institute for Scientific Instruments, Germany; V Rackwitz; BAM Federal Institute for Materials Research and Testing, Germany

2:45 PM **325** *Development of a Cathodoluminescence Detection System for the (S)TEM Demonstrating Sub-nm Spatial and Sub-meV Spectral Resolution*; DJ Stowe, L Beeching, RJ Vince, J Oliver, J Parsons, SA Galloway; Gatan

PHYSICAL SCIENCES SYMPOSIA TUESDAY AFTERNOON

P02.04 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:
Alexandre Gloter,

Centre National de la Recherche Scientifique France

Platform Session

Tuesday 1:25 PM • Room: 206-207

A17.02 Vendor Symposium: Latest Developments in Tools for Life and Materials Sciences

Session Chairs:

Elizabeth R. Wright, Emory University;
Alice C. Dohnalkova, Pacific Northwest National Laboratory;
Mark A. Sanders, University of Minnesota

Platform Session

Tuesday 1:25 PM • Room: 239

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **320** *High Throughput, High Quality Analysis in the Electron Microscope*; A Hyde, J Goulden, N Rowlands, S Ubhi; Oxford Instruments
- 1:45 PM **321** *Recent Advancements in Laboratory X-ray Microscopes Enabling 3D and 4D Science*; A Merkle, J Gelb; Xradia, Inc
- 2:00 PM **322** *An Improved Low Energy X-ray Transmission Window*; S Liddiard, M Coffin, M Zappe, J Abbott, C Hustedt; Moxtek; K Zufelt, L Pei, J Lund, R Vanfleet, R Davis; Brigham Young University
- 2:15 PM **323** *High Spatial Resolution, Energy Resolved Imaging with the pnCCD Color X-ray Camera*; S Ihle, H Ryll, H Soltau, A Liebel; PNSensor GmbH; O Scharf, A Bjeoumikhov; IfG—Institute for Scientific Instruments; M Schmidt, L Strüder; PNSensor GmbH
- 2:30 PM **324** *Visualizing and Correcting Dynamic Specimen Processes in TEM Using a Direct Detection Device*; BE Bammes, D-H Chen, L Jin, RB Bilhorn; Direct Electron, LP

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **326** (Invited) *Quantitative STEM and EELS for the Study of Alloy Nanoparticles, Support Materials, and Graphene for Fuel Cell Applications*; MC Chan, F Nan, S Prabhudev, S Stambula, M Bugnet, N Gauquelin, G Botton; McMaster University, Canada
- 2:00 PM **327** *Local Ordering and Lithium Storage in Nanostructured $\text{Li}_4\text{Ti}_5\text{O}_{12}$ Anodes via Scanning Transmission Electron Microscopy*; L Wu, F Wang, Y Zhu; Brookhaven National Laboratory
- 2:15 PM **328** *In Situ TEM Study of Lithiation of Si and Phase Transformation*; C Wang, M Gu, Z Wang, F Gao, J-G Zhang, DR Baer, S Thevuthasan, N Browning, J Liu; Pacific Northwest National Laboratory
- 2:30 PM **329** *Nanoscale Fe State-of-Charge Mapping in LiFePO_4 : A Comparison of EFTEM and STXM Spectrum Imaging*; JD Sugar, F El Gabaly Marquez; Sandia National Laboratories; W Chueh; Stanford University; KR Fenton, PG Kotula; Sandia National Laboratories; T Tylliszczak; Lawrence Berkeley National Laboratory; NC Bartelt, JP Sullivan; Sandia National Laboratories
- 2:45 PM **330** *Fabrication and Characterization of Nanoporous Organically Modified Silica Films on Electrodes as Platforms for Electrocatalytic Oxidation of Phospholipids*; L Mehdi; Pacific Northwest National Laboratory; J Cox; Miami University; N Browning; Pacific Northwest National Laboratory

Scientific Program

P04.04 Deriving Fundamental Catalyst Properties from Electron Microscopy

Session Chairs:

Larry Allard, Oak Ridge National Laboratory;
 Ilke Arslan, Pacific Northwest National Laboratory;
 Abhaya K. Datye, University of New Mexico

Platform Session

Tuesday 1:25 PM • Room: 205

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **331** (Invited) *New Strategies for Controlling the Size, Morphology and Composition of Bimetallic and Trimetallic Catalyst Particles*; CJ Kiely, Q He, R Tiruvalam, AA Herzing; Lehigh University; GJ Hutchings; Cardiff University
- 2:00 PM **332 M&M Student Award** *Measuring Surface Atom Bond Length Contraction in Au and Pt Nanoparticles Using High-Precision STEM Imaging*; AB Yankovich; University of Wisconsin, Madison; B Berkels; Rheinische Friedrich-Wilhelms-Universität; W Dahmen; Rheinisch-Westfaelische Technische Hochschule Aachen, Germany; R Sharpley, P Binev; University of South Carolina; P Voyles; University of Wisconsin, Madison
- 2:15 PM **333** (Invited) *Electron Microscopy Studies of Supported Metal Catalysts Used for Conversion of Synthesis Gas*; KD Jong; Utrecht University, Germany
- 2:45 PM **334** *Electron Imaging of Interfacial Oxygen by Aberration Corrected TEM, the Possibility and Scientific Opportunities*; W Gao; University of Illinois, Urbana-Champaign; J Wen, DJ Miller; Argonne National Laboratory; J-M Zuo; University of Illinois, Urbana-Champaign

P06.03 Failure Analysis of Structural Materials: Microscopy, Metallography and Fractography

Session Chairs:

Daniel Dennies, Exponent Failure Analysis Associates;
 Bret Miller, IMR Metallurgical Services

Platform Session

Tuesday 1:25 PM • Room: 245

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **335** (Invited) *Characterization of Degradation and Failure Modes in Lithium-ion Cells*; Q Horn, K White; Exponent
- 2:00 PM **336** *Three Pipe Corrosion Failure Cases*; A Havics; pH₂, LLC
- 2:15 PM **337** *Distribution of Helium Bubbles in Al/B₄C MMC Irradiated with 400 keV He⁺ Ions*; F Zhang, G Yu, C Lu, X Wang, L Wang; University of Michigan
- 2:30 PM **338** *Structural Analysis of Branched Boron Carbide Nanostructures*; B Cao, Z Guan, T Xu; University of North Carolina, Charlotte
- 2:45 PM **339** *Influence of Ion Beam Damage by FIB on the RESET Amorphous Volume Observation in Phase Change Random Access Memory Device*; J Oh, Y Jang, S Jeon, T Lee; SKhynix Semiconductor Inc, Korea; W Kim, H Kim, C Kim; SKhynix Semiconductor Inc Korea

P07.03 Special Problems and Solutions: Coatings, Ceramics and Polymers

Session Chairs:

John Sauer, Sauer Engineering;
 Richard E. Chinn, National Energy Technology Laboratory

Platform Session

Tuesday 1:25 PM • Room: 209

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **340** (Invited) *Laser and Material Effects on Laser Pulsed Atom Probe Analysis of Oxide and Nitride Ceramics*; BP Gorman, DR Diercks, R Kirchhofer; Colorado School of Mines

Scientific Program

Tuesday August 6

- 2:00 PM **341** *Lead Zirconate Titanate—Zirconia Composites: Microstructural Evaluation of the Homogeneity Using the Voronoi-Diagram Approach*; A Bencan, G Trefalt, M Kamplet, B Malic; Jozef Stefan Institute, Slovenia; Y Seo, KG Webber; Technische Universität Darmstadt, Germany
- 2:15 PM **342** *Interface Evolution of Flux-Grown BaTiO₃ Thin Films on Sapphire Substrates*; J Li, M Burch, DT Harris, J-P Maria, EC Dickey; North Carolina State University
- 2:30 PM **343** *Analytical TEM Study of the Microstructure of LaNiO₃/LaAlO₃ Superlattices*; E Detemple; Max Planck Institute for Intelligent Systems, Germany; QM Ramasse; SuperSTEM Laboratory, United Kingdom; W Sigle; Max Planck Institute for Intelligent Systems, Germany; G Cristiani, H-U Habermeier, B Keimer; Max Planck Institute for Solid State Research, Germany; PA van Aken; Max Planck Institute for Intelligent Systems, Germany
- 2:45 PM **344** *Microstructural Analysis of Novel Ceramic Composites Manufactured by Reactive Metal Penetration (RMP)*; VC Solomon, M Moro, A Yurchko; Youngstown State University

X51.01 Biological Sciences Tutorial: Biomedical Applications of Micro-CT in Hard and Soft Tissues—Going Beyond the Bone

Session Chairs:
Elizabeth R. Wright, Emory University;
Scott Stagg, Florida State University

Tutorial Session

Tuesday 2:30 PM • Room: 210

- 2:30 PM **346** (Invited) *Biomedical Applications of micro-CT in Hard and Soft Tissues—Going Beyond the Bone*; K Takahashi, MA Saleh, N Fleming, T Takahashi; Vanderbilt University; D Perrien; Tennessee Valley Healthcare System

BIOLOGICAL SCIENCES TUTORIALS TUESDAY AFTERNOON

X50.01 Biological Sciences Tutorial: Correlative Imaging of Tissues, the Potential of Large Volume Array Tomography

Session Chairs:
Elizabeth R. Wright, Emory University;
Scott Stagg, Florida State University

Tutorial Session

Tuesday 1:30 PM • Room: 210

- 1:30 PM **345** (Invited) *Correlative Imaging of Tissues: The Potential of Large Volume Array Tomography*; IU Wacker; Karlsruhe Institute of Technology, Germany

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA TUESDAY AFTERNOON

B01.P1 Developmental Biology and Tissue Engineering: Bridging the Gap through Microscopy

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **347** *Examination of the Vasa Vasorum of the Human Great Saphenous Vein: A Scanning Electron Microscopy and 3D-Morphometry Study of Microvascular Corrosion Casts*; M Herbst; University of Salzburg, Austria; T Hölzenbein; Private Medical University Salzburg, Austria; B Minnich; University of Salzburg, Austria
Poster # **99**

3:00 PM **348** *Early State of Spruce Somatic Embryos in Native State Observed Using the ESEM and Cryo-SEM*; V Nedela, J Hrib; Academy of Sciences of the Czech Republic, Czech Republic; L Havel; Mendel University, Czech Republic; J Runstuk; Academy of Sciences of the Czech Republic, Czech Republic
Poster # **100**

3:00 PM **349** *Morphology of Alveolar Macrophage Uptake of Nano-Carbon Materials in Rat Lung*; K Yamamoto, T Yoshida; National Institute of Advanced Industrial Science and Technology, Japan; A Ogami, Y Morimoto; University of Occupational and Environmental Health, Japan
Poster # **101**

3:00 PM **350** *The Missing Genome: Mitochondrial DNA Deletions in Stem Cells*; J Meier, A Calabro, C Queenan, R Pergolizzi; Bergen County Academies
Poster # **102**

3:00 PM **351** *Germ Granule Ultrastructure and Germ Line Protein Localization during Early Embryogenesis in *Penaeid Shrimp**; KA Vincent, KM Karasiewicz, PL Hertzler; Central Michigan University
Poster # **103**

EDUCATION • TUESDAY AFTERNOON

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

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **352** *A Virtual Microscope for Use in Online and Onsite Biology Labs*; T Kawakami, GM Cohen, J Zhong; Troy University
Poster # **104**

3:00 PM **353** *Two Optical Techniques for Observing Hair Cuticles in the Classroom*; GM Cohen; Troy University
Poster # **105**

3:00 PM **354** *The Central Analytical Facility at the University of Alabama*; RL Martens, JD Goodwin, RA Holler; University of Alabama; DE Nilkes, GB Thompson; University of Alabama
Poster # **106**

ADVANCES IN INSTRUMENTATION SYMPOSIA TUESDAY AFTERNOON

A02.P1 The Electron Microscope of the Future: Merging the SEM, the STEM and the Ion Microscope

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **355** *Single-Atom Tip as an Emitter of Gas Field Ion Source*; W-T Chang, I-S Hwang, H-S Kuo; Academia Sinica, Taiwan; T-Y Fu; National Taiwan Normal University; J-L Hou, C-Y Lin, T-T Tsong; Academia Sinica, Taiwan
Poster # **107**

3:00 PM **356** *Novel Silicon Nanowire-Based Electron Detector Utilized in Next Generation Scanning Electron Microscopes*; M Hajmirzaheydarali, M Akbari, S Mohajerzadeh; University of Tehran, Iran
Poster # **108**

3:00 PM **357** *Low Voltage STEM Observation in the Latest FE-SEM*; N Sakamoto, S Takeuchi, K Koyama, M Sasajima, H Sato; Hitachi High-Technologies
Poster # **109**

3:00 PM **358** *Second and Third Order Aperture Aberrations of the Compensated Quadrupole Doublet*; FW Martin; Nano-beam Corporation

Poster # 110

3:00 PM **359** *Simultaneous Bright Field and Dark Field STEM-IN-SEM Imaging of Hard-Soft Composites and Crystalline Materials*; BS Patel, M Watanabe; Lehigh University

Poster # 111

A03.P1 New Opportunities for *In Situ* Techniques and Instruments

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **360** *Development of an Integrated Platform for Cross-Correlative Imaging of Biological Specimens in Liquid using Light and Electron Microscopies*; DA Fischer, DH Alsem; Hummingbird Scientific; B Simon; Evergreen State College; T Prozorov; Ames Laboratory; N Salmon; Hummingbird Scientific

Poster # 112

3:00 PM **361** *Development of a New Type of Thin Film Phase Plate and Its Application for In Situ Observation*; H Minoda, A Yada, Y Kawana; Tokyo University of Agriculture and Technology; H Iijima, Y Konyuuba; JEOL Ltd., Japan

Poster # 113

3:00 PM **362** *In Situ WetSTEMTM Analysis of FIB Fabricated Fluidic Structures*; MP Rossi, M Castagna; FEI Company

Poster # 114

3:00 PM **363** *Atomic-Scale Observation of Lithiation Reaction Front in Single SnO₂ Nanowire*; A Nie; Michigan Technological University; L Gan, Y Cheng; King Abdullah University of Science and Technology, Saudi Arabia; HA Ardakani; Michigan Technological University; Q Li, C Dong; Zhejiang University, China; R Tao, F Mashayek; University of Illinois, Chicago; H Wang; Zhejiang University, China; U Schwingenschlogl; King Abdullah University of Science and Technology, Saudi Arabia; R Klie; University of Illinois, Chicago; R Shahbazian-Yassar; Michigan Technological University

Poster # 115

3:00 PM **364 M&M Post-Doctoral Award** *Novel Micro-Fabricated Chip with Micro-Channels for In Situ Observation of Liquid Samples and Processes in TEM*; E Jensen, A Burrows, K Mølhave; Technical University of Denmark

Poster # 116

3:00 PM **365** *Mechanism of Electron-Beam Induced Au Formation in Aqueous Solution*; JH Park; University of California, Los Angeles; JM Grogan, HH Bau; University of Pennsylvania; SK Kodambaka; University of California, Los Angeles; FM Ross; IBM T J Watson Research Center

Poster # 117

3:00 PM **366** *Failure Modes of Fluid Cell Chambers Used for Liquid In Situ Transmission Electron Microscopy*; E White, WA Hubbard, BC Regan; University of California, Los Angeles

Poster # 118

3:00 PM **367** *A Novel Method of Investigating Wet Bentonite Clay Particles in TEM*; Y Kuwamura; Tokyo University of Agriculture and Technology, Japan; W-A Chiou; University of Maryland, College Park; H Minoda; Tokyo University of Agriculture and Technology, Japan; R Dohrmann, S Kaufhold; Federal Institute for Geosciences and Natural Resources, Germany

Poster # 119

3:00 PM **368** *Atomic Resolution Studies of Metal-Insulator Transition in VO₂ Nanowires*; H Asayesh-Ardakani, A Nie; Michigan Technological University; PM Marley, A Stabile; University at Buffalo; K Sarkar; University of Illinois, Chicago; S Banerjee, S Ganapathy; University at Buffalo; Z Yang, RF Klie; University of Illinois, Chicago; R Shahbazian-Yassar; Michigan Technological University

Poster # 120

3:00 PM **369** *In Situ Study of Anode Reaction in Intermediate Temperature Solid Oxide Fuel Cells*; AH Tavabi, S Muto, T Tanji; Nagoya University, Japan; RE Dunin-Borkowski; Jülich Research Centre, Germany

Poster # 121

3:00 PM **370** *Witness the Explosive Cu-Si Alloying Process Inside a TEM*; M Li, D Xie, Z Shan; Xi'an Jiaotong University, China

Poster # 122

3:00 PM **371** *Internal Temperature Calibration at Nanoscale on In Situ Heating High Resolution Transmission Electron Microscopy*; Y Lan, H Wang; University of Houston; G Chen, Z Ren; Massachusetts Institute of Technology

Poster # 123

Scientific Program

3:00 PM **372** *Analysis of Single Nanoparticle Growth Environments to Explain Abnormal Ostwald Ripening of Nanoparticle Ensembles*; TJ Woehl; University of California, Davis; C Park; Florida State University; JE Evans, I Arslan; Pacific Northwest National Laboratory; WD Ristenpart; University of California, Davis; ND Browning; Pacific Northwest National Laboratory
Poster # 124

A07.P1 Mass Spectrometry Imaging (MSI): Applications, Current Challenges and Perspectives

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **373 M&M Student Award Method Development for Chemical Profiling of a Cell Population Using MALDI Mass Spectrometry Imaging**; T-H Ong, D Kissick, S Rubakhin, J Sweedler; University of Illinois, Urbana-Champaign
Poster # 125

3:00 PM **374 Nano-SIMS Research at the Environmental and Molecular Sciences Laboratory**; Z Zhu, CM Mahoney; Pacific Northwest National Laboratory
Poster # 126

3:00 PM **375 Forensics Applications of Secondary Ion Mass Spectrometry**; CM Mahoney, D Atkinson, R Ewing; Pacific Northwest National Laboratory
Poster # 127

3:00 PM **376 (Invited) Imaging of Lipids, Metabolites and Drugs with Nanospray Desorption Electrospray Ionization Mass Spectrometry**; I Lanekoff, R Chu, C Anderson, C Mahoney, L Paša-Tolic, J Smith, C Timchalk, M Thomas, J Carson, K Burnum, A Konopka, J Laskin; Pacific Northwest National Laboratory
Poster # 128

3:00 PM **377 MSI MALDI-MS for Direct Lipid Profiling of Intact Tissues**; C Lydon, E Schenk, JD DeBord; Florida International University; M Smotherman; Texas A&M University; F Fernandez-Lima; Florida International University
Poster # 129

A09.P1 Advances in Data Processing in Optical and Electron Microscopy

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **378 Arsenic Exposure Inhibits Angiogenesis in Zebrafish via Downregulation of both VEGFA and VEGFR2**; SG Clendenon, D Ganapathi Sankaran; Indiana University; A Shirinifard; St Jude Children's Research Hospital; CW McCollum, M Bondesson Bolin, J-Å Gustafsson; University of Houston; JA Glazier; Indiana University
Poster # 130

3:00 PM **379 3D Multi-Scale Modeling of Early Stage Chick Limb Development**; J Srividhya, JS Gens, JA Glazier; Indiana University
Poster # 131

3:00 PM **380 Open-Source Python Scripting and Analysis with Nion Swift**; MF Murfitt, CE Meyer, G Skone, N Dellby, OL Krivanek; Nion Co
Poster # 132

3:00 PM **381 An Improved Workflow for Reproducible Processing and Analysis of Polycrystalline Electron Diffraction Patterns**; JR Minter; Eastman Kodak Company
Poster # 133

3:00 PM **382 Magnetic Phase Shift Computations for Electron Tomography**; E Humphrey, M De Graef; Carnegie Mellon University
Poster # 134

3:00 PM **383 Modified Transport-of-Intensity Approach for Electrostatic and Magnetic Phase Shift Separation**; E Humphrey; Carnegie Mellon University; C Phatak; Argonne National Laboratory; M De Graef; Carnegie Mellon University
Poster # 135

3:00 PM **384 Comparison of Magnetic Domain Wall Images using Lorentz Microscopy and Magnetic Force Microscopy**; S Hua, M De Graef; Carnegie Mellon University
Poster # 136

3:00 PM **385 SEM Real-Time Image Processing Using a GPGPU Approach**; NH Caldwell, Y Lei, BC Breton, DM Holburn; University of Cambridge
Poster # 137

Scientific Program

Tuesday
August 6

3:00 PM **386 M&M Post-Doctoral Award** *Computational Structure Refinement by Hybrid Reverse Monte Carlo Simulation Incorporating Fluctuation Electron Microscopy*; J Hwang; University of California, Santa Barbara; ZH Melgarejo; University of Wisconsin, Madison; YE Kalay; Middle East Technical University, Turkey; MJ Kramer; Iowa State University; DS Stone, PM Voyles; University of Wisconsin, Madison

Poster # 138

3:00 PM **387 M&M Professional Technical Staff Award** *Novel Super-Fast Three-Dimensional SEM Image Simulation*; P Cizmar, CG Frase, H Bosse; Physikalisches-Technische Bundesanstalt, Germany

Poster # 139

3:00 PM **388** *Measuring and Comparing Local Strain Field and Crystal Rotation at the Microscopic Scale*; F Bridier, J-C Stinville, N Vanderesse; Ecole de technologie superieure, Canada; M Lagacé; Hydro-Quebec research institute, Canada; P Bocher; Ecole de technologie superieure, Canada

Poster # 140

3:00 PM **389** *Dynamic Image Analysis of Glass Fibers as Industrial Fillers and Understanding the Influence of Processing Conditions on the Fiber Length and the Mechanical Properties of Polymers*; P Bajaj, C Strom; Saudi Basic Industries Corporation

Poster # 141

3:00 PM **390** *Automated Structure Detection in HRTEM Images: An Example with Graphene*; J Kling, JS Vestergaard, AL Dahl, TW Hansen, R Larsen, JB Wagner; Technical University of Denmark

Poster # 142

3:00 PM **391** *Geometry vs. Paint Models of Lattice Fringe Visibility for FCC Particles*; S Meyer, P Fraundorf; University of Missouri, St Louis

Poster # 143

3:00 PM **392** *Synchronous Digitization for Modulated Signal Analysis*; R Muir, S Sullivan, R Oglesbee, G Simpson; Purdue University

Poster # 144

A10.P1 Practical Programming for Microanalysis

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **393** *Electron Microprobe Quantitative Mapping vs. Defocused Beam Analysis*; JE Barkman; University of Oregon; P Carpenter; Washington University; J-C Zhao; The Ohio State University; JJ Donovan; University of Oregon

Poster # 145

3:00 PM **394** *Effect of the Absorption on the Shape of the Emitted $\phi(\rho z)$ Depth Distribution for Accurate Quantitative Microanalysis: Evaluation of Analytical Models and Monte Carlo Programs*; H Demers; McGill University, Canada; M Falke, R Terborg; Bruker Nano GmbH, Germany; R Gauvin; McGill University, Canada

Poster # 146

3:00 PM **395** *Simulation of Incoherent Scattering in High-Angle Annular Dark-Field Scanning Electron Microscopy*; A Dutta, C Reid, H Heinrich; University of Central Florida

Poster # 147

A15.P1 Low Voltage Transmission Microscopy: Pros and Cons

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **396** *Imaging Atomic Dynamics in 2D Silica Glass with Low-Voltage Aberration-Corrected TEM*; PY Huang, JS Alden; Cornell University; S Kurasch; University of Ulm; A Shekhawat, AA Alemi, JP Sethna; Cornell University; U Kaiser; University of Ulm; DA Muller; Cornell University

Poster # 148

3:00 PM **397** *Direct Mapping of Stacking Structure in Rotated Bilayer Graphene Using Aberration-Corrected Transmission Electron Microscopy*; JM Yuk, HY Jeong, NY Kim, MJ Lee; Ulsan National Institute of Science and Technology, Republic of Korea; JY Lee; Institute for Basic Science, Republic of Korea; Z Lee; Ulsan National Institute of Science and Technology, Republic of Korea

Poster # 149

Scientific Program

3:00 PM **398** *Physical Limitations on Transmission Electron Microscope Imaging of Lithium Battery Materials*; BD Levin, DA Muller; Cornell University

Poster # 150

3:00 PM **399** *Spectroscopic Studies on Nitrogen-doped Multi-Walled Carbon Nanotubes Using Monochromated STEM-EELS at Low-Voltage*; R Arenal; Universidad de Zaragoza, Spain

Poster # 151

3:00 PM **400** *Low Voltage STEM for the Study of Defects in 2D Materials*; W Zhou, J Lee; Oak Ridge National Laboratory; MD Kapetanakis, MP Prange; Vanderbilt University; AR Lupini; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; J-C Idrobo, SJ Pennycook; Oak Ridge National Laboratory

Poster # 152

3:00 PM **401** *Contrast Enhancement in Low-kV Zero-loss Filtered Imaging of Frozen-Hydrated Biological Specimen*; E Majorovits; Carl Zeiss Microscopy GmbH, Germany; G Hofhaus; Universität Heidelberg, Germany; I Angert, G Benner; Carl Zeiss Microscopy GmbH, Germany; U Kaiser; Universität Ulm, Germany; RR Schröder; Universität Heidelberg, Germany

Poster # 153

3:00 PM **402** *Low Energy Scanning Transmission Electron Microscope*; I Mullerova, E Mikmekova, I Konvalina, L Frank; Institute of Scientific Instruments AS CR, Czech Republic

Poster # 154

A16.P1 X-ray Microanalysis in Modern Electron Optical Instruments: Is It Really Quantitative in Today's Diverse Architectures?

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **404** *First Measurement Results of new SDD Detectors with DEPFET Based readout Node and Minimized Input Capacitance*; J Treis; PNDetector GmbH, Germany; A Bähr; Max-Planck-Institute for Extraterrestrial Physics, Germany; R Eckhardt; PNDetector GmbH, Germany; K Heinzinger; PNSensor GmbH, Germany; K Hermenau; PNDetector GmbH, Germany; G Lutz, P Majewski; PNSensor GmbH, Germany; A Niculae, H Soltau; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany

Poster # 156

3:00 PM **405** *Construction of a SXES Spectrometer for a Conventional SEM*; M Terauchi, S Koshiya, F Satoh; IMRAM, Tohoku University, Japan; H Takahashi, N Handa, T Murano; JEOL Ltd, Japan; M Koike, T Imazono; Quantum Beam Sciences, Japan Atomic Energy Agency; M Koeda, T Nagano, H Sasai, Y Oue, Z Yonezawa, S Kuramoto; Shimadzu Corporation, Japan

Poster # 157

3:00 PM **406** *Determination of the L- and M-Subshell X-Ray Production Cross Sections for Pb and U Using an Electron Microprobe*; A Moy, C Merlet; GM, CNRS, Université de Montpellier II, France; X Llovet; Universitat de Barcelona, Spain; O Dugne; Commissariat à l'énergie atomique, France

Poster # 158

3:00 PM **407** *Re-sampling of SEM-EDS Element Maps to Characterize the Length-Scale of Elemental Heterogeneity*; CS Todd, W Heeschen; The Dow Chemical Company

Poster # 159

3:00 PM **408** *Th-U-Pb Dating of Lunar Granites by X-Ray Microanalysis*; SM Seddio, BL Jolliff, RL Korotev, PK Carpenter; Washington University

Poster # 160

3:00 PM **409** *Quantitative Energy Dispersive Analysis Technique of SiGe at Site-Specific Area Using In Situ Lift-Out TEM Sample*; T-S Park, H-J Kang, J-W Chung, B-M Song, T-S Back, H-J Kim, C-R Kim; SK hynix Semiconductor Inc

Poster # 161

3:00 PM **410** *Structure and Composition Determination from Fluctuation X-ray Scattering*; D Li; Pacific Northwest National Laboratory

Poster # 162

3:00 PM **411** *Chemical Quantification of Oxygen by EDXS in the Oxidation of the Ni-Mo-W System*; C Angeles-Chavez, JA Toledo-Antonio, MA Cortes-Jacome; Instituto Mexicano del Petroleo

Poster # 163

3:00 PM **412** *Achieving Accurate Estimates of Material Composition from Spectrum Images*; PJ Statham; Oxford Instruments NanoAnalysis

Poster # 164

3:00 PM **413** *A Model Unknown Glass Engineered for EPMA WDS Quality Assurance*; DC Meier, JM Davis, JR Anderson, SA Wight; National Institute of Standards and Technology

Poster # 165

3:00 PM **414** *High-Resolution Quantification across Vertical Interfaces Using a Monte Carlo Based Reconstruction Approach*; S Richter, PT Pinard, N Mevemkamp, M Torrilhon; RWTH Aachen University, Germany

Poster # 166

3:00 PM **415** *Chemical Quantification of Atomic-Scale EDS Maps under Thin Specimen Conditions*; P Lu, M Van Benthem; Sandia National Laboratories; Q Jia; Los Alamos National Laboratory

Poster # 167

Institute of Tomar, Portugal; ML Carvalho; University of Lisbon, Spain

Poster # 171

3:00 PM **420** *Trace Element Analysis of Sulfur in a Japanese Sword*; N Mori, R Kamiyama; JEOL Ltd, Japan; T Tanaka; National Institute for Materials Science, Japan; P McSwiggen; McSwiggen & Associates; H Onoders; JEOL Ltd, Japan; C Nielsen; JEOL USA

Poster # 172

PHYSICAL SCIENCES SYMPOSIA TUESDAY AFTERNOON

P01.P1 The Art in Microscopy and Microanalysis

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **416** (Invited) **MSA Samuel Scholar** *The Degradation Process of Lead Chromate Yellows in Paintings by Vincent van Gogh*; L Monico; Università degli Studi di Perugia, Italy; K Janssens; University of Antwerp, Belgium; C Miliani; Università degli Studi di Perugia, Italy; F Vanmeert; University of Antwerp, Belgium; BG Brunetti; Università degli Studi di Perugia, Italy; M Cotte; European Synchrotron Radiation Facility, France; E Hendriks; Van Gogh Museum, Netherlands; M Geldof; Netherlands Cultural Heritage Agency

Poster # 168

3:00 PM **417** *Using EBSD & EDS to Characterize the Surface of 19th Century and Modern Daguerreotypes*; P Ravines; University at Buffalo; LH Chan, M Nowell; EDAX, Inc; R McElroy; Archive Studio

Poster # 169

3:00 PM **418** *Quantitative EDX Analysis of Smalt Pigment in Sixteenth and Eighteenth Century Paintings*; V Kugler, S Bean; Carl Zeiss Microscopy GmbH, Germany; M Spring; National Gallery, United Kingdom

Poster # 170

3:00 PM **419** *Morphological and Compositional Features of Portuguese Polychrome Glazed Pottery Investigated by SEM/EDX—Hints about the Manufacturing Processes*; A Guilherme; University of Lisbon, Spain; V-D Hodoroba, S Benemann; BAM Federal Institute for Materials Research and Testing, Germany; J Coroado; Polytechnic

P02.P2 Structure and Composition Analysis of Nanoparticulate Systems

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **421** *In Situ Growth of Uranyl Clusters Inside Mesoporous Silica SBA-15*; Y Liu, L Jouffret, J Szymanowski, S Rouvimov, G Sigmon, P Burns; University of Notre Dame

Poster # 173

3:00 PM **422** *Microscopic Characterization of CIS/CIGS Nanoparticles Prepared by Reactive Mechanical Milling*; I Santana-Garcia; Instituto Politécnico Nacional, Mexico; C Song, C Kisielowski; Lawrence Berkeley National Laboratory; HA Calderon; Instituto Politécnico Nacional, Mexico

Poster # 174

3:00 PM **423** *Effect of Mechanical Milling on the Microstructure and Morphology of Al₂O₃/SiC Nanocomposite*; C Carreno-Gallardo; Centro de Investigación en Materiales Avanzados S C, Mexico; H Barriga-Calvillo, E Lozano-Rodriguez; Instituto Tecnológico de Chihuahua, Mexico; I Estrada-Guel, MA Neri-Flores; Centro de Investigación en Materiales Avanzados S C, Mexico; C Lopez-Melendez; Universidad La Salle de Chihuahua, Mexico; R Martinez-Sanchez; Centro de Investigación en Materiales Avanzados S C, Mexico

Poster # 175

3:00 PM **424** *Effect of Graphite Addition on the Mechanical Properties and Microstructure in an Aluminum Composite Produced by High-Energy Ball Milling*; JM Mendoza-Duarte, R Martinez-Sanchez, C Carreno-Gallardo, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 176

Scientific Program

3:00 PM **425** *Based-Carbon Reinforcements for Aluminum Composites*; R Perez-Bustamante; Centro de Investigación en Materiales Avanzados, Mexico; D Acosta-Pena, A Reyna-Cruz, E Lopez-Contreras, R Vazquez-Marquez, F Perez-Bustamante; Universidad Autónoma de Chihuahua, Mexico; M Miki-Yoshida, JM Herrera-Ramirez, R Martinez-Sanchez; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 177

3:00 PM **426** *Chemical Analysis of Airbrushed Nickel Nanoparticles for Large-Area Growth of Vertically Aligned Carbon Nanofibers on Metal Surfaces*; A Oni, R White, M Sarac, B Anderson, R Pearce, J Railsback; North Carolina State University; D Hensley; Oak Ridge National Lab; A Melchko, J Tracy, J LeBeau; North Carolina State University

Poster # 178

3:00 PM **427** *Nanoparticle Certified Reference Materials: Development and Microscopical Characterization*; MR Cavaliere; MVA Scientific Consultants

Poster # 179

3:00 PM **428** *Synthesis and Characterization of AgPd/Pt Multiply Twinned Structure Nanoparticles by Using Cs-Corrected STEM*; S Khanal, JJ Velazquez-Salazar, N Bhattacharai, D Bahena, G Casillas, A Ponce, M Jose-Yacamán; University of Texas, San Antonio

Poster # 180

3:00 PM **429** *Low Dose HREM Imaging of Alloyed Metallic and Oxide Nanoparticles Synthesized by Reactive Mechanical Milling*; A Huerta, R Gonzalez-Flores, M Ruiz-Ruiz, LF Suarez-Quintero; Instituto Politécnico Nacional, Mexico; C Song, C Kisielowski; Lawrence Berkeley National Laboratory; HA Calderon; Instituto Politécnico Nacional, Mexico

Poster # 181

3:00 PM **430** *Large-Scale Synthesis of Tungsten Oxide (WO₃) Nanoleaves, Nanoparticles and Nanoflakes*; M Ahmadi, M Guinel; University of Puerto Rico

Poster # 182

3:00 PM **431** *Study of Thiol Protected Au/Co Nanoclusters Using Aberration Corrected STEM*; N Bhattacharai, D Bahena, S Khanal, A Ponce, M Jose-Yacamán; University of Texas, San Antonio

Poster # 183

3:00 PM **432** *Electron Microscopy Study of TiO₂ Hierarchical Structures Prepared by Hydrothermal Synthesis*; G Drazic; National Institute of Chemistry, Solvenia; B Horvat; Jozef Stefan Institute, Slovenia

Poster # 184

3:00 PM **433** *Zinc Doped SnO₂ Electronic Structure Study by EELS*; F Vasquez; CIMAV; V Gallegos-Orozco; Universidad Tecnológica Junta de los Rios, Mexico; C Ornelas-Gutierrez, W Antunez-Flores, A Santos-Beltran, F Paraguay-Delgado; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 185

3:00 PM **434** *Scanning and Transmission Electron Microscopy Studies of Alkali Halides Films Grown by Pulsed Laser Deposition*; DR Acosta, E Mejia, C Sanchez, J Martinez, C Magana; Universidad Nacional Autónoma de México

Poster # 186

3:00 PM **435** *Lattice-Image Estimates of Nano-Particle Fraction-Crystalline*; P Fraundorf; University of Missouri, St Louis; S Mukherjee; University of Missouri

Poster # 187

3:00 PM **436** *Simulation of Decoherence in Fluctuation Electron Microscopy*; A Rezikyan, Z Jibben, B Rock; Arizona State University; G Zhao; University of Pittsburgh; M Treacy; Arizona State University

Poster # 188

P04.P1 Deriving Fundamental Catalyst Properties from Electron Microscopy

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **437** *Utilization of EDX Chemical Maps to Understand Coke Formation in Reforming Catalysts*; SI Sanchez, SA Bradley, MD Moser; UOP-\ Honeywell Company

Poster # 189

3:00 PM **438** *Direct Observation of Single Atoms in Sinter-Resistant and Bimetallic Catalyst Systems Synthesized by Atomic Layer Deposition*; K-B Low; University of Illinois, Chicago; Y Lei, J Lu, JW Elam; Argonne National Laboratory

Poster # 190

3:00 PM **439** *Cathode Luminescence Spectroscopy of Gold Nanoparticle Catalyst in Gas Environments*; T Tanaka, N Yamamoto, T Kunio; Tokyo Institute of Technology, Japan

Poster # 191

3:00 PM **440** *Aberration-Corrected ETEM: In Situ Reduction of Cobalt Oxides*; MR Ward, ED Boyes, PL Gai; University of York, United Kingdom

Poster # 192

3:00 PM **441** *Spatial Distribution of Cerium Valence in Model Planar Pd/Ce_{0.7}Zr_{0.3}O₂ Catalysts*; S Zhang, M Katz, K Sun, O Ezekoye; University of Michigan; M Nandasiri; Pacific Northwest National Laboratory; H Jen; Ford Motor Company; G Graham, X Pan; University of Michigan

Poster # 193

3:00 PM **442** *Electron Tomography of Gold Nanoparticles in Titania Composite Aerogels: Probing Structure to Understand Photochemistry*; T Brintlinger, PA DeSario, JJ Pietron, RM Stroud, DR Rolison; U S Naval Research Laboratory

Poster # 194

3:00 PM **443** *Resolving the Structure of Pt/Mo₂C Catalysts on MWCNTs Using Aberration Corrected STEM*; C Akatay, K Sabnis, F Ribeiro; Purdue University; EA Stach; Brookhaven National Laboratory

Poster # 195

3:00 PM **444** *Development of Stable Pt₃Zn/ZnO Catalyst by Epitaxial Growth*; JX Liu, YA Song; Arizona State University; BT Qiao; Dalian Institute of Chemical Physics, China; YD Huang; Harbin Institute of Technology, China; JY Liu; Arizona State University

Poster # 196

3:00 PM **445** *TEM Characterization on Oxygen-Deficient Titania Supported Pt Electrocatalysts for Energy Conversion*; V Rastegar, J Roller, MJ Arellano-Jimenez, M Janish, R Jain, R Maric, CB Carter; University of Connecticut

Poster # 197

3:00 PM **446** *TEM Characterization of Ceria Supported Pt Catalyst for Water-Gas Shift Reaction Produced by Reactive Spray Deposition Technique*; R Jain, C-H Kuo, J Roller, SL Suib, CB Carter, R Maric; University of Connecticut

Poster # 198

3:00 PM **447** *Atomic Level In Situ Observation of Surface Amorphization in Anatase Photocatalyst During Light Irradiation in Water Vapor*; L Zhang, BK Miller, C Peter; Arizona State University

Poster # 199

3:00 PM **448** *Investigation of Carbon Deposition on Ni/Gd Doped Ceria Reforming Catalysts for Solid Oxide Fuel Cells*; Q Liu, P Crozier; Arizona State University

Poster # 200

3:00 PM **449** *Using Ex Situ TEM to Understand Silica-Supported Ruthenium Catalysts*; C Kliever, S Soled, S Miso; ExxonMobil Research & Engineering

Poster # 201

3:00 PM **450** *Structure and Phase Determination of a Bimetallic Pd-Ru Catalyst Prepared From the Vapor Phase with Reactive Spray Deposition Technology*; JM Roller, R Jain, H Yu; University of Connecticut; MJ Arellano-Jiménez; Universidad Nacional Autónoma de México; R Maric, CB Carter; University of Connecticut

Poster # 202

P07.P1 Special Problems and Solutions: Coatings, Ceramics and Polymers

Poster Session

Tuesday 3:00 PM • Room: Exhibit Hall

3:00 PM **451** *Morphological Analysis of Laser Exposed Phenolic-based Nanocomposites*; S Young, H Aglan; Tuskegee University

Poster # 203

3:00 PM **452** *Characterization of Novel Ceramic Composite Nanofibers by Electron Microscopy*; MT Janish, F Huang, L Zhang, V Rastegar, N Martin, J Chan; University of Connecticut; BB McKenzie, JR Michael; Sandia National Laboratories; C Cornelius, CB Carter; University of Connecticut

Poster # 204

3:00 PM **453** *Diffusion Coating for Ni-Cr-Fe Alloy by the Pack Cementation Process*; AS Khalil; Tabbin Institute for Metallurgical Studies, Egypt

Poster # 205

3:00 PM **454** *3D X-Ray Microscopy (XRM) Technique for Evaluating the Porosity of the 3D Ordered Macroporous Materials by Colloidal Crystal Templating*; H He; Carnegie Mellon University; J Gelb, N Kotwal, A Merkle; Xradia, Inc; K Matyjaszewski; Carnegie Mellon University

Poster # 206

3:00 PM **455** *Diffuse Scattering in Pb(In_{1/2}Nb_{1/2}O₃-Pb(Mg_{1/3}Nb_{2/3})O₃ Relaxor Solid Solutions*; C-W Tai; Stockholm University, Sweden

Poster # 207

3:00 PM **456** *Atomic Local Ordering in Amorphous InGaZnO₃*; T Suzuki, K Takayanagi; Tokyo Institute of Technology, Japan

Poster # 208

3:00 PM **457** *Characterization of Heat Activated Minerals from Puturge (Malatya, Turkey)*; E Izci; Anadolu University, Turkey

Poster # 209

Scientific Program

3:00 PM **458** *Effect of Polymerization Kinetics in the Pore Distribution in Polyacrylamide*; E Rodriguez-Miranda; Universidad de Guanajuato, Mexico; EO Castrejón-González; Instituto Tecnológico de Celaya, Mexico; G Herrera-Pérez; Instituto Tecnológico Superior de Irapuato, Mexico

Poster # 210

3:00 PM **459** *Microstructure Analysis of Electroplated Cr-Fe Alloy Deposits on Cu Substrate*; C-K Lin, C-A Huang; Chang Gung University, Taiwan; W-A Chiou; University of Maryland; C-Y Chen, C-Y Chen; Chang Gung University, Taiwan

Poster # 211

Wednesday August 7

BIOLOGICAL SCIENCES SYMPOSIA WEDNESDAY MORNING

B02.01 AFM-Based Nanoscopies in the Life Sciences

Session Chairs:

John R. Dutcher, University of Guelph;
Christopher M. Yip, University of Toronto;
Laurent Kreplak, Dalhousie University

Platform Session

Wednesday 8:25 AM • Room: 236

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **460** (Invited) *Near Field IR Microscopy of Amyloid Fibrils of beta2-Microglobulin*; M Paulite, G Walker; University of Toronto, Canada
- 9:00 AM **461** *Nanomechanical Measurements in Biological Atomic Force Microscopy (AFM)*; S Hohlbauch, N Greisse, I Revenko, R Proksch; Oxford Instruments
- 9:15 AM **462** (Invited) *Combined Confocal and Atomic Force Microscopy Studies of Force Transmission, Force Generation and Strain Dynamics in Living Cells*; A Pelling; University of Ottawa, Canada
- 9:45 AM **463** *Accurate Nano-Mechanical Mapping of Collagen I Fibrils*; S Baldwin, S Veres, M Lee, L Kreplak; Dalhousie University, Canada

B04.01 Fluorescence Microscopy of Organelle Dynamics

Session Chairs:

Darren Boehning, University of Texas Medical Branch;
Matt Lord, University of Vermont

Platform Session

Wednesday 8:25 AM • Room: 237

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **464** (Invited) *Single Molecule Kinetics of ENTH Binding to Lipid Membranes*; S Rozovsky; University of Delaware; M Forstner; Syracuse University; H Sondermann; Cornell University; J Groves; Lawrence Berkeley National Laboratory

9:00 AM **465** (Invited) *Transport of Lipid Vesicles by the Molecular Motor Myosin Va*; S Nelson, DM Warshaw; University of Vermont

9:30 AM **466** (Invited) *Measuring Time Courses of Endocytic Actin Patch Assembly in Fission Yeast*; E Barone, M James, V Sirotkin; SUNY Upstate Medical University

B05.01 Microscopy of Medical Devices and Biomaterials

Session Chairs:

Coralee McNee, IMR Test Labs;
Gabriel Lucas, Scot Forge Company

Platform Session

Wednesday 8:25 AM • Room: 205

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **467** (Invited) *Metallographic Techniques and Analysis of Nitinol Alloys*; S Lieberman, B James; Exponent Failure Analysis Associates
- 9:00 AM **468** *In Situ and Post-Mortem Observations of Microstructural Evolution in NiTi Polycrystals Strained by Load-biased Thermal Cycling*; M Bowers, L Yang; The Ohio State University; NT Nuhfer, M De Graef; Carnegie Mellon University; MJ Mills; The Ohio State University
- 9:15 AM **469** *Towards Understanding Tribocorrosion in Hip Replacements*; E Hoffman, Y Liao, LD Marks; Northwestern University
- 9:30 AM **470** *Locating and Characterizing Self-Assembled Gadolinium Chelate Nanoparticles in Stem Cells Using TEM*; PJ Kempen, H Nejadnik, D Ye, BK Rutt, J Rao, HE Daldrup-Link, R Sinclair; Stanford University
- 9:45 AM **471** *Resin Impregnation as Basic Tool for the Microanalysis of Microbial Habitats in Soils*; TNH Eickhorst; University of Bremen, Germany

Scientific Program

ADVANCES IN INSTRUMENTATION SYMPOSIA WEDNESDAY MORNING

A03.05 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Wednesday 8:25 AM • Room: 241

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **472** (Invited) *Annealing Effects on the Structural Properties of FIB Prepared Cu Nanopillars—An In Situ TEM Study*; D Kiener; Montanuniversität Leoben, Austria; Z Zhang; Erich Schmid Institute for Materials Science, Austria; S Sturm; Institute Jozef Stefan, Slovenia; S Cazottes, PJ Imrich; Erich Schmid Institute for Materials Science, Austria; C Kirchlechner, G Dehm; Montanuniversität Leoben, Austria
- 9:00 AM **473** *In Situ Electromechanical Study of ZnO Nanowires*; S Bhowmick, D Stauffer; Hysitron, Inc; H Guo; University of California, Berkeley; S Kaps, YK Mishra, V Hrkac; University of Kiel, Germany; O Warren; Hysitron, Inc; R Adelung; University of Kiel, Germany; A Minor; University of California, Berkeley; L Kienle; University of Kiel, Germany
- 9:15 AM **474** *Direct Observation of the Behavior of a Single Gold Grain Boundary by In Situ TEM*; G Casillas, A Ponce, J Velazquez-Salazar, M Jose-Yacamán; University of Texas, San Antonio
- 9:30 AM **475** (Invited) *Recent Development in In Situ Ion Irradiation Transmission Electron Microscopy*; K Hattar, SM Hoppe; Sandia National Laboratories, Albuquerque; C Chisholm; University of California, Berkeley; OJ El-Atwani; Purdue University; BA Hernandez-Sanchez; Sandia National Laboratories, Albuquerque; H Bei, EP George; Oak Ridge National Laboratory; P Hosemann, AA Minor; University of California, Berkeley

A08.01 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Session Chairs:

Natasha Erdman, JEOL USA Inc.;
Joseph R. Michael, Sandia National Laboratories

Platform Session

Wednesday 8:25 AM • Room: 245

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **476** (Invited) *Strain Mapping with Electron Back Scatter Diffraction: Sensitivity Studies and Pattern Remapping*; J Jiang; University of Oxford, United Kingdom; TB Britton; Imperial College London, United Kingdom; AJ Wilkinson; University of Oxford, United Kingdom
- 9:00 AM **477** *Quantification of Epitaxial Strain and Crystal Structure in Nanoscale Oxide Films Using Position Averaged Convergent Beam Electron Diffraction*; J Hwang, JY Zhang, J Son, E Mikheev, AJ Hauser, S Stemmer; University of California, Santa Barbara
- 9:30 AM **478** *High Angular Accuracy EBSD Based on a 3D Hough Transform*; C Maurice; Ecole des Mines, France; AP Day; Aunt Daisy Ltd; R Fortunier; Ecole nationale d'ingénieurs de Saint-Etienne, France
- 9:45 AM **479** *Excellent Agreement between High Resolution EBSD and XRD Strain Measurements on Si_{1-x}Ge_x Films on Si*; MD Vaudin, WA Osborn, LH Friedman, RF Cook; National Institute of Standards and Technology

A09.02 Advances in Data Processing in Optical and Electron Microscopy

Session Chairs:

Jeffrey L. Clendenon, Aeon Imaging LLC;
David Morgan, Indiana University;
Edward P. Morris, The Institute of Cancer Research

Platform Session

Wednesday 8:25 AM • Room: 238

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **480** (Invited) *A New Environment for Modular Image Reconstruction and Data Analysis*; M Radermacher; University of Vermont

Scientific Program

- 9:00 AM **481** *A Real-Time 3D Reconstruction System for Screening Icosahedral Particles under Different Conditions at the Microscope*; G Cardone, X Yan, RS Sinkovits, TS Baker; University of California, San Diego
- 9:15 AM **482** (Invited) *Marker-Free Alignment of Dual-Axis Tilt Series and Subvolume Analysis of Data from Dual-Axis Tomograms*; H Winkler, KA Taylor; Florida State University
- 9:45 AM **483** *Filling the Missing Wedge in Tomography: A Constraint-Based Reconstruction Method for 3D TEM/STEM Imaging*; Y Jiang, R Hovden; Cornell University; P Ercius; Lawrence Berkeley National Laboratory; D Wang, Y Yu, HD Abruña, DA Muller, V Elser; Cornell University

A12.01 Atom Probe Tomography in Correlative Investigations

Session Chairs:

David J. Larson, Cameca Instruments Inc.;
Lan Yao, Oak Ridge National Laboratory

Platform Session

Wednesday 8:25 AM • Room: 243

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **484** (Invited) *Application of a Generalized Approach for APT Simulation: Investigations on Disordered and Complex Sample Structures*; C Oberdorfer, SM Eich, G Schmitz; University of Münster, Germany
- 9:00 AM **485** *Application of Computational Homology and Graph-Theoretic Approaches for Quantitative Chemical Imaging in Atom Probe Tomography*; S Broderick, J Peralta, S Samudrala, K Kaluskar, B Ganapathysubramanian, K Rajan; Iowa State University
- 9:15 AM **486** *Tracing the Solute Distribution and Effects in Materials by Combining Atom Probe Tomography and Atomistic Simulation: Summary of Recent Results*; AV Ceguerra, X-Y Cui, SP Ringer; The University of Sydney, Australia
- 9:30 AM **487** (Invited) *A Level Set Evaporation Model for Heterogeneous Atom Probe Tip*; Z Xu, D Li, W Xu, A Devaraj, R Colby, S Thevuthasan; Pacific Northwest National Laboratory

A13.01 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:

Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Wednesday 8:25 AM • Room: 239

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **488** (Invited) *Unraveling the Mystery: Using Microscopy in a Metallurgical Failure Investigation*; SA Bradley, KW Hagglund, L So, A Stolarski, BL Tiemens; UOP LLC
- 9:00 AM **489** *Microstructural Analysis of Crept Martensitic Steels*; S Swaminathan, M Karadge, T Vishwanath, R Oruganti; GE Global Research
- 9:15 AM **490** *Investigation of d-ZrH_{1.66}/a-Zr Interface in Zr-Based Cladding Materials with Aberration-Corrected Scanning Transmission Microscopy*; S Rajasekhara, PG Kotula, DG Enos, BL Doyle, BG Clark; Sandia National Laboratories, Albuquerque
- 9:30 AM **491** *Rapid Design of an Annealing Heat Treatment through a Combination of Microanalysis and Modeling*; LA Deibler, AA Brown, JD Puskar; Sandia National Laboratories, Albuquerque
- 9:45 AM **492** *Characterization of Dislocations Found in an Array at a Mixed Character Small Angle Boundary of a Cross Rolled and Annealed Aluminium Sample*; M Shamsuz-zoha; University of Alabama

Scientific Program

A14.01 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:
 Moon J Kim, University of Texas at Dallas;
 Ray W. Carpenter, Arizona State University;
 John C. H. Spence, Arizona State University

Platform Session

Wednesday 7:55 AM • Room: 208

- 7:55 AM *Welcome & Introduction to the Session*
- 8:00 AM **493** (Invited) *High Energy Resolution Monochromated EELS-STEM System*; OL Krivanek, TC Lovejoy, NJ Bacon, GJ Corbin, N Dellby, P Hrnčirik, MF Murfitt, G Skone, ZS Szilagyí; Nion Co; PE Batson; Rutgers University; RW Carpenter; Arizona State University
- 8:30 AM **494** *Ultra High Energy Resolution EELS Map Employing an Aberration-Corrected STEM Equipped with a Monochromator*; M Mukai, E Okunishi, M Ashino, K Omoto, T Fukuda, A Ikeda, K Somehara, T Kaneyama; JEOL Ltd, Japan; T Saitoh, T Hirayama; Japan Fine Ceramics Center, Japan; Y Ikuhara; University of Tokyo, Japan
- 8:45 AM **495** *Quantifying Oxygen Vacancies in Fuel-Cells Materials Using Atomic EELS Analysis*; P Longo; Gatan, Inc; MF Chisholm, M Varela, AR Lupini; Oak Ridge National Laboratory; RD Twisten; Gatan, Inc
- 9:00 AM **496** *Atomic-Scale Optical and Vibrational Spectroscopy with Low Loss EELS*; P Cueva, D Muller; Cornell University
- 9:15 AM **497** *A Method to Estimate the Range of Validity of the Thin Film Approximation for Dielectric Function Determination in Nanostructures*; J Zhu, PA Crozier, JR Anderson; Arizona State University

A15.02 Low Voltage Transmission Microscopy: Pros and Cons

Session Chairs:
 Max Haider, CEOS GmbH;
 Rasmus R. Schroeder, Heidelberg University

Platform Session

Wednesday 8:25 AM • Room: 240

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **498** *Quantitative Low-Voltage STEM Imaging in the Presence of Temporal Incoherence*; MP Oxley; Vanderbilt University; SJ Pennycook; Oak Ridge National Laboratory
- 8:45 AM **499** (Invited) *Current Status of the Sub-Angstrom Low-Voltage Electron Microscopy (SALVE) Project*; UA Kaiser; University of Ulm, Germany
- 9:15 AM **500** (Invited) *Low-Voltage TEM/STEM for Atomic Resolution Imaging and Spectroscopy*; K Suenaga; National Institute of Advanced Industrial Science, Japan; T Sasaki, H Sawada; JEOL, Ltd, Japan
- 9:45 AM **501** *Low-Voltage Atomic-Resolution Off-Axis Holography on Hexagonal Boron Nitride*; M Linck; CEOS GmbH; P Ercius, C Ophus; Lawrence Berkeley National Laboratory; N Alem; The Pennsylvania State University; A Zettl; University of California, Berkeley; U Dahmen; Lawrence Berkeley National Laboratory

A16.03 X-ray Microanalysis in Modern Electron Optical Instruments: Is It Really Quantitative in Today's Diverse Architectures?

Session Chairs:

Dale E. Newbury, National Institute of Standards and Technology;
Masashi Watanabe, Lehigh University;
Nestor J. Zaluzec, Argonne National Laboratory

Platform Session

Wednesday 8:25 AM • Room: 244

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **502** (Invited) *Chemical State Mapping via Soft X-rays Using a Wavelength Dispersive Soft X-ray Emission Spectrometer with High Energy Resolution*; H Takahashi, N Handa, T Murano; JEOL Ltd, Japan; M Terauchi; Tohoku University, Japan; M Koike, T Imazono, N Hasegawa; Japan Atomic Energy Agency; M Koeda, T Nagano, H Sasai, Y Oue, Z Yonezawa, S Kuramoto; Shimadzu Corp, Japan
- 9:00 AM **503** (Invited) *Development of an Analytical TEM with a TES Microcalorimeter EDS*; T Hara; National Institute for Materials Science, Japan; K Maehata; Kyushu University, Japan; K Mitsuda, NY Yamasaki; Japan Aerospace Exploration Agency; K Tanaka; Hitachi High-Tech Science Corporation, Japan; Y Yamanaka; Taiyo Nippon Sanso Corporation
- 9:30 AM **504** *Direct Comparison of X-ray Detector Solid Angles in Analytical Electron Microscopes*; NJ Zaluzec; Argonne National Laboratory
- 9:45 AM **505** *Practical Measurement of X-ray Detection Performance of a Large Solid-Angle Silicon Drift Detector in an Aberration-Corrected STEM*; M Watanabe, C Wade; Lehigh University

PHYSICAL SCIENCES SYMPOSIA WEDNESDAY MORNING

P02.05 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:

Stig Helveg, Haldor Topsoe A/S

Platform Session

Wednesday 8:25 AM • Room: 206-207

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **506** (Invited) *Novel Closed-Cell Gas-Reaction Holder Allows Characterization of Behavior of Bimetallic Nanoparticles at Elevated Temperatures and Gas Pressures*; L Allard; Oak Ridge National Laboratory; JE Wittig; Vanderbilt University; M Chi, KL More; Oak Ridge National Laboratory; WC Bigelow; University of Michigan; J Damiano, DP Nackashi; Protochips, Inc
- 9:00 AM **507** *Above 1 ATM Gas Reactions of Nanocatalysts in a Conventional TEM*; HL Xin, H Zheng; Lawrence Berkeley National Lab
- 9:15 AM **508** *In Situ Electron Microscopy and Spectroscopy of Battery Materials*; ME Holtz, Y Yu, J Gao, HD Abruna, DA Muller; Cornell University
- 9:30 AM **509** *Combining Image Simulation and Molecular Dynamics to Understand In Situ Liquid Microscopy*; DA Welch; University of California, Davis; ND Browning, JE Evans; Pacific Northwest National Laboratory; R Faller; University of California, Davis
- 9:45 AM **510** *In Situ Pulsed-Laser-Induced Dewetting: Probing the Assembly Dynamics of Nanoparticle Arrays*; JT McKeown; Lawrence Livermore National Laboratory; NA Roberts; University of Tennessee; JD Fowlkes; Oak Ridge National Laboratory; Y Wu; University of Tennessee; T LaGrange, BW Reed; Lawrence Livermore National Laboratory; PD Rack; University of Tennessee; GH Campbell; Lawrence Livermore National Laboratory

Scientific Program

P04.05 Deriving Fundamental Catalyst Properties from Electron Microscopy

Session Chairs:

Larry Allard, Oak Ridge National Laboratory;
 Ilke Arslan, Pacific Northwest National Laboratory;
 Abhaya K. Datye, University of New Mexico

Platform Session

Wednesday 8:25 AM • Room: 242

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **511** (Invited) *Understanding Behavior of Self-Regenerative Catalysts by Transmission Electron Microscopy and Density Functional Theory*; X Pan, MB Katz, B Li, X Du, K Zhang, Y Duan; University of Michigan; L Allard; Oak Ridge National Laboratory; L Chen; Ningbo Institute of Materials Technology and Engineering, China; A Van der Ven, GW Graham; University of Michigan
- 9:00 AM **512** *Nano-Sized Intermetallics: Unraveling Intricacies of GaPd₂ Catalysts Using Aberration-Corrected STEM*; RK Leary, F de la Pena, JS Barnard; University of Cambridge, United Kingdom; M Walls; Université Paris, France; Y Luo, M Armbruster; Max-Planck-Institut für Chemische Physik fester Stoffe, Germany; JM Thomas, PA Midgley; University of Cambridge, United Kingdom
- 9:15 AM **513** *The Influence of Different Mn-Co Interaction Modes in Mn/Co/TiO₂ Fischer-Tropsch Catalysts*; J Liu, TE Feltes, Y Zhao; University of Illinois, Chicago; JC Idrobo; Oak Ridge National Laboratory; RF Klie; University of Illinois, Chicago; JT Miller, CL Marshall; Argonne National Laboratory; JR Regalbuto, R Meyer; University of Illinois, Chicago
- 9:30 AM **514** *Low-Temperature CO Conversion on 1wt%Pt/CeO₂ Nanocubes*; R Wang, R Dangerfield, D Li; Youngstown State University
- 9:45 AM **515** *Effect of Operating Conditions on the Degradation Mechanism of Pt₃Co Nanocatalysts in PEM Fuel Cells—A Transmission Electron Microscopy Study*; S Rasouli; University of Texas, Austin; DJ Myers; Argonne National Laboratory; S Ball; Johnson Matthey Technology Centre; M Gummalla; United Technologies Research Center; PJ Ferreira; University of Texas, Austin

P05.01 Microstructural Characterization of Metals—150 Years After Sorby

Session Chairs:

James E. Martinez, NASA Johnson Space Center;
 George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Wednesday 8:25 AM • Room: 209

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **516** (Invited) *TEM—Now We Can Image and Identify Single Atoms; What's Next?*; DB Williams; The Ohio State University
- 9:00 AM **517** *TEM Studies of the Oxidation of 316 Stainless Steel with In Situ Proton Irradiation*; SS Raiman, P Wang, Z Jiao, GS Was; University of Michigan, Ann Arbor
- 9:15 AM **518** *TEM Investigation of Deformation Mechanisms in FeMnCrCN TWIP Steel*; JE Wittig, DT Pierce; Vanderbilt University; L Mosecker; RWTH Aachen University, Germany; A Saeed-Akbari; Eidgenössische Technische Hochschule Zürich, Switzerland; M Beigmohamadi, J Mayer; RWTH Aachen University, Germany
- 9:30 AM **519** *Investigation of the Embrittlement of Bi Doped Cu Bicrystals by Aberration-Corrected Scanning Transmission Electron Microscopy*; CA Wade; Lehigh University; L Giannuzzi; L A Giannuzzi & Associates LLC; A Herzog; National Institute of Standards and Technologies; M McLean, R Vinci, M Watanabe; Lehigh University
- 9:45 AM **520** *Characterization of U-Pu-Zr and U-Pu-Mo Fuel Alloys in Transmission Electron Microscope*; A Aitkaliyeva, B Miller, TP O'Holleran, JR Kennedy, BH Sencer, T Hyde; Idaho National Laboratory

TECHNOLOGISTS' FORUM SYMPOSIUM WEDNESDAY MORNING

X30.01 Technologists' Forum Special Topic: EDS Revisited—Basics and Advances

Session Chairs:

E Ann Ellis, Texas A&M University;
Valerie Woodward, Lubrizol Advanced Materials;

Technologists' Forum Session

Wednesday 8:25 AM • Room: 211

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **521** (Invited) *Sample Preparation of "Soft" Matter Materials for EDS Analysis in Both SEM and TEM*; PF Lloyd; UES, Inc
- 9:00 AM **522** (Invited) *Sample Preparation Considerations for X-ray EDS Analysis in the Physical Sciences*; S Walck; Army Research Laboratory
- 9:30 AM **523** (Invited) *Preparation of Life Science Samples for Electron Dispersive X-ray (EDS) Analysis*; DM Sherman; DSImaging LLC

BIOLOGICAL SCIENCES SYMPOSIA WEDNESDAY MORNING

B02.02 AFM-Based Nanoscopies in the Life Sciences

Session Chairs:

Christopher M. Yip, University of Toronto;
John R. Dutcher, University of Guelph;
Laurent Kreplak, Dalhousie University

Platform Session

Wednesday 10:25 AM • Room: 236

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **524** (Invited) *Multimodal Imaging and Spectroscopy Approaches for Studying Ceramide-Induced Reorganization of Lipid Membranes*; LJ Johnston, DM Carter Ramirez, J Day, Z Jakubek; National Research Council, Canada; YA Kim, R Bittman; City University of New York

11:00 AM **525** *Membrane Resiliency Following Large-Scale Local Deformations Using an AFM*; K Haase, AE Pelling; University of Ottawa, Canada

11:15 AM **526** (Invited) *Single-Molecule Manipulation of Enzyme Conformational and Catalytic Dynamics*; Y He, M Lu, J Cao, HP Lu; Bowling Green State University

11:45 AM **527 M&M Student Award** *Calcium Release in Response to Local Nanomechanical Shear Stress Delivered by an AFM Tip*; DJ Modulevsky, NV Bukoreshtliev, AE Pelling; University of Ottawa, Canada

B04.02 Fluorescence Microscopy of Organelle Dynamics

Session Chairs:

Matt Lord, University of Vermont;
Darren Boehning, University of Texas Medical Branch

Platform Session

Wednesday 10:25 AM • Room: 237

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **528** (Invited) *3D Time-Lapse Microscopy Reveals Microtubule Patterning Differences between Adjoining Cell Faces in Arabidopsis Cells*; SL Shaw; Indiana University
- 11:00 AM **529 M&M Student Award** *Tracking the Importance of Tropomyosin in Myosin-II- and Myosin-V-Dependent Processes in Fission Yeast*; LW Pollard, JE Clayton, M Lord; University of Vermont
- 11:15 AM **530 M&M Student Award** *Live Animal PiMPing and Faster Antibody Staining Methods for C. elegans TGF- β Localization Studies*; RD Schultz; Texas A&M Health Science Center; EA Ellis; Texas A&M University; TL Gumienny; Texas A&M Health Science Center
- 11:30 AM **531** (Invited) *Measurement and Visualization of Cell Thickness and Volume by Transmission-Through-Dye Microscopy*; M Model; Kent State University

Scientific Program

B05.02 Microscopy of Medical Devices and Biomaterials

Session Chairs:
Coralee McNee, IMR Test Labs;
Gabriel Lucas, Scot Forge Company

Platform Session

Wednesday 10:25 AM • Room: 205

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **532** (Invited) *Microstructure and Ultrastructure of Implant-Bone and Tendon-Bone Interfaces*; LW Hobbs, H Wang, WM Reese, BM Tomerlin, TYC Lim; Massachusetts Institute of Technology; AE Porter; Imperial College, United Kingdom; M Walton; University of Otago, New Zealand; NJ Cotton; Smith & Nephew, Inc
- 11:00 AM **533** *Quantitative Compositional Analysis of Fluorhydroxyapatite by Atom Probe Tomography*; MN Bachhav, S-R Chang, A McFarland, EA Marquis, B Clarkson; University of Michigan
- 11:15 AM **534** *Charge Contrast Imaging of Human Enamel*; VM Dusevich, C Xu, JP Gorski, Y Wang, MP Walker; University of Missouri, Kansas City
- 11:30 AM **535** *Linkage between Microstructure and Chemical Composition of Iron-Rich Hard Dental Tissues from the Feral Coyppu by Analytical TEM Investigations*; V Srot, U Salzberger, B Bussmann; Max Planck Institute for Intelligent Systems, Germany; B Pokorny, I Jelenko; Ecological Research and Industrial Cooperation, Slovenia; PA van Aken; Max Planck Institute for Intelligent Systems, Germany
- 11:45 AM **536** *Imaging and Microanalysis of Iron Biominerals*; J Shaw, M Saunders, A Boyd, M House; University of Western Australia, Australia; G Cowin; University of Queensland, Australia; A Jones; University of Technology Sydney, Australia; PL Clode; University of Western Australia

ADVANCES IN INSTRUMENTATION SYMPOSIA WEDNESDAY MORNING

A03.06 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:
Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Wednesday 10:25 AM • Room: 241

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **537** *Monitoring Galvanic Replacement of Ag Nanoparticles by Pd Using Low Dose In Situ Liquid S/TEM*; KL Jungjohann, S Bliznakov, R Adzic, E Sutter; Brookhaven National Laboratory
- 10:45 AM **538** *In Situ Cryo-TEM Investigations of Ice Crystallization from Supercooled Water and Interactions between Solid/Liquid Interface and Nanoparticles*; K Tai, S Dillon; University of Illinois, Urbana-Champaign
- 11:00 AM **539** *In Situ TEM of Instabilities in Capped Liquid Films: Capturing the Early Stages of Morphological Development with Nanosecond-Scale Dynamic TEM*; MK Santala, BW Reed; Lawrence Livermore National Laboratory; S Raoux; IBM T J Watson Research Center; T Topuria; IBM Almaden Research Center; T LaGrange, G Campbell; Lawrence Livermore National Laboratory
- 11:15 AM **540** *Grain Boundary Evolution of Face-Centered Cubic Metals during In Situ TEM Annealing*; JG Brons, GB Thompson; University of Alabama
- 11:30 AM **541** *In Situ TEM Heating Study of Cu and Ag Nanoparticle Interaction*; P Lu, T Boyle, B Clark, ME Chandross; Sandia National Laboratories
- 11:45 AM **542** *In Situ Heating Investigations of Dewetting Transitions in Ultra-Thin Ni Films on SiO₂ Layers*; AM Thron, P Greene, K Liu, K van Benthem; University of California, Davis

A05.01 Revisiting Resolution for STEM and TEM

Session Chairs:
Edgar Voelkl, FEI;
John Silcox, Cornell University;
Nasim Alem, Pennsylvania State University

Platform Session

Wednesday 10:25 AM • Room: 240

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **543** (Invited) *Shall We Still Consider HRTEM Image Simulation to Interpret Micrographs Obtained Using Cs (and Cc) Corrected Electron Microscopes?*; PA Stadelmann; École Polytechnique Fédérale de Lausanne, Switzerland
- 11:00 AM **544** (Invited) *Measuring Atoms in Oxide Heterostructures by Quantitative Aberration-Corrected Transmission Electron Microscopy*; KW Urban, C-L Jia; Research Center Juelich, Germany
- 11:30 AM **545** *Automated and Objective Numerical Aberration Correction of HRTEM Complex Exit Waves of Crystal Lattices*; C Ophus; Lawrence Berkeley National Laboratory; M Linck; CEOS GmbH, Germany; J Ciston; Lawrence Berkeley National Laboratory
- 11:45 AM **546** *Benefits of Chromatic Aberration Correction for Off-Axis Electron Holography*; M Linck; CEOS GmbH, Germany; U Dahmen; Lawrence Berkeley National Laboratory

A08.02 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Session Chairs:
Natasha Erdman, JEOL USA Inc.;
Joseph R. Michael, Sandia National Laboratories; ;
Alwyn Eades, Lehigh University

Platform Session

Wednesday 10:25 AM • Room: 245

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **547** (Invited) *Characterizing Severely Plastically Deformed Materials Using Transmission Kikuchi*

Diffraction and Energy Dispersive X-ray Spectroscopy in the Scanning Electron Microscope; P Trimby; The University of Sydney, Australia

- 11:00 AM **548** *Transmission EBSD—Bridging the Gap between SEM and TEM*; A Avishai, J Carter, M Zahiri Azar, B Narayanan, AH Heuer; Case Western Reserve University
- 11:15 AM **549** *New Measurements on the Minimum and Maximum Sample Sizes in t-EBSD*; KP Rice, RH Geiss, RR Keller; National Institute of Standards and Technology
- 11:30 AM **550** (Invited) *Femtosecond Laser Tomography Using the TriBeam System*; TM Pollock, MP Echlin; University of California, Santa Barbara; A Mottura; University of Birmingham, United Kingdom

A09.03 Advances in Data Processing in Optical and Electron Microscopy

Session Chairs:
Jeffrey L. Clendenon, Aeon Imaging LLC;
David Morgan, Indiana University;
Edward P. Morris, The Institute of Cancer Research

Platform Session

Wednesday 10:25 AM • Room: 238

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **551** (Invited) *Advances in 2D, 3D and 4D STEM Image Data Analysis*; L Jones, PD Nellist; University of Oxford, United Kingdom
- 11:00 AM **552** (Invited) *Quantitative Crystallographic and Statistical Image Processing for Materials Science in Scanning Transmission Electron Microscopy*; QM Ramasse, MC Sarahan; SuperSTEM Laboratory, United Kingdom; DG Morgan; Indiana University; ND Browning; Pacific Northwest National Laboratory
- 11:30 AM **553** *SEM Autofocusing and Astigmatism Correction Using FFT and GPGPU Techniques*; NH Caldwell, AJ Marshall, BC Breton, DM Holburn; University of Cambridge, United Kingdom
- 11:45 AM **554** *Advanced Spectrum Analysis with Open Source Software*; P Cueva, DA Muller, R Hovden; Cornell University

Scientific Program

A11.01 Ion Beam Instrumentation and Applications for Physical and Biological Sciences: Non-Gallium

Session Chairs:

Mike Marko, Wadsworth Center;
Keana Scott, National Institute of Standards and Technology;
Trevor E. Clark, Pennsylvania State University

Platform Session

Wednesday 10:25 AM • Room: 242

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **555** (Invited) *Orion NanoFab—2nd Generation Helium Ion Microscope*; DC Joy; University of Tennessee; BJ Griffin; University of Western Australia
- 11:00 AM **556** *Application of Helium Ion Microscope for Sample Modification at Nanoscale*; M Rudneva; Delft University of Technology, Netherlands; E van Veldhoven; Van Leeuwenhoek Laboratory, TNO, Netherlands; SK Maladi, HW Zandbergen; Delft University of Technology, Netherlands
- 11:15 AM **557** *Nanoscale Phase Patterning in a Sr-Doped Lanthanum Cobaltite Thin Film*; DN Leonard, DA Cullen; Oak Ridge National Laboratory; K Klein; Carl Zeiss Microscopy GmbH, Germany
- 11:30 AM **558** *Fast 3D Tomography of C4 Solder Bump by Using Xe Plasma Focused Ion Beam*; T Hrnčir, L Hladik, J Jiruse, F Lopour; Tescan, Czech Republic
- 11:45 AM **559** *Xe+ FIB Milling and Measurement of Amorphous Silicon Damage*; RD Kelley, K Song, B Van Leer; FEI Company, USA; D Wall, L Kwakman; FEI Company, Netherlands

A12.02 Atom Probe Tomography in Correlative Investigations

Session Chairs:

Francois Vurpillot, Centre National de la Recherche Scientifique, Université de Rouen;
Daniel Schreiber, Pacific Northwest National Laboratory

Platform Session

Wednesday 10:25 AM • Room: 243

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **560** (Invited) *Progress in Planar Feature Spatial Reconstruction for Atom Probe Tomography*; BP Geiser, DJ Larson, TJ Prosa, TF Kelly; CAMECA Instruments, Inc
- 11:00 AM **561** *Direct Experimental Measurement of Grain Boundary's Five-Parameters and Solute Segregations at Atomic Level*; L Yao, MK Miller; Oak Ridge National Laboratory
- 11:15 AM **563** *Novel Insights into In-Service Oxidized Inconel 625 Engine Exhausts by a Multi-Technique Approach*; PA Bagot, PE Edmondson, GM Hughes, A Crossley; University of Oxford, United Kingdom; D De Lille; Good Fabrications Ltd
- 11:30 AM **564** *Direct Atomic Scale Observation of the Structure and Chemistry of Order/Disorder γ/γ' Interfaces in Nickel Base Superalloys*; S Meher, S Nag; University of North Texas; R Williams; The Ohio State University; R Srinivasan; ExxonMobil Research and Engineering Company; HL Fraser; The Ohio State University; R Banerjee; University of North Texas
- 11:45 AM **562** *Measuring Chemical Segregation at Grain Boundaries by Atom Probe Tomography*; M Bachhav, Y Chen, E Marquis; University of Michigan; B Geiser; CAMECA Instruments Inc

Scientific Program

A13.02 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:

Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Wednesday 10:25 AM • Room: 239

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **565** (Invited) *Optimizing Fuel Cell Materials through Electron Microscopy and Microanalysis*; DA Cullen, HM Meyer, KS Reeves, DW Coffey, KL More; Oak Ridge National Laboratory
- 11:00 AM **566** *Quantitative Differentiation of Three Iron Oxides by EDS*; J Konopka; Thermo Fisher Scientific
- 11:15 AM **567** *Quantitative Analysis of Carbon in Carbon Steel Using SEM/EDS Followed by Error Correction Approach*; L Zou, Q Zhou; Dalian University of Technology, China
- 11:30 AM **568** *Examination of Polycrystalline Diamond Compact Cutter Used in Drilling Tools in the Oil Industry*; JN Wil-liard, DK Colbert; Baker Hughes, Inc.
- 11:45 AM **569** *Single Crystal Elastic Constants of TWIP Steel Determined from Nanoindentation*; DT Pierce; Vander-bilt University; K Nowag, A Montagne; Swiss Federal Laboratories for Materials Science and Technology; JA Jimenez; Centro Nacional de Investigaciones Met-alurgicas, Spain; JE Wittig; Vanderbilt University; R Ghisleni; Swiss Federal Laboratories for Materials Sci-ence and Technology

A14.02 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:

Moon J Kim, University of Texas at Dallas;
Ray W. Carpenter, Arizona State University;
John C. H. Spence, Arizona State University

Platform Session

Wednesday 10:25 AM • Room: 208

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **570** *Analysis of the Light Element Sensitivity and Measurement Time of the Multiple EDX Pole Shoe Detector "Rococo2"*; A Liebel; PNSensor GmbH, Ger-many; M Bornschlegl, R Eckhardt, S Jeschke, A Niculae; PNDetector GmbH, Germany; H Soltau; PNSensor GmbH, Germany
- 10:45 AM **571** *Detection of Lithium X-rays by EDS*; L Xiaobing, J Holland, S Burgess, S Bhadare, S Yamaguchi, Japan; D Birtwistle, P Statham; Oxford instruments, United Kingdoms; N Rowlands; Oxford Instruments Inc
- 11:00 AM **572** *Ultra-high Resolution EDX Spectrum Imaging: Nuclear Materials Applications*; E Francis, S Haigh, G Burke, A Gholinia, M Preuss; University of Manches-ter, United Kingdom
- 11:15 AM **573 M&M Student Award** *Resolving Ambiguities at the Bi₂Te₃/GaAs Interface with Atomic Resolution EDS*; JH Dycus; North Carolina State University
- 11:30 AM **574** *Using Windowless EDS Analysis of 45-1000eV X-ray Lines to Extend the Boundaries of EDS Nanoanalysis in the SEM*; S Burgess, H James, P Statham, L Xiaobing; Oxford instruments, United Kingdom
- 11:45 AM **575** *Multi-Detector STEM-EDS Mapping of Ion-Irradi-ated Nanostructured Ferritic Alloys*; C Parish; Oak Ridge National Laboratory; RM White, JM LeBeau; North Carolina State University; Y Zhang, MK Miller; Oak Ridge National Laboratory

Scientific Program

A16.04 X-ray Microanalysis in Modern Electron Optical Instruments: Is It Really Quantitative in Today's Diverse Architectures?

Session Chairs:

Dale E. Newbury, National Institute of Standards and Technology;
Masashi Watanabe, Lehigh University;
Nestor J. Zaluzec, Argonne National Laboratory

Platform Session

Wednesday 10:25 AM • Room: 244

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **576** (Invited) *The Real World Practical Issues and Limitations of Silicon Drift Detectors on Electron Microscopes*; A Sandborg, M Coy, B Hammell, R Buchhold; EDAX, Inc
- 11:00 AM **577** *X-ray K-ratios Derived Using Extreme Overvoltage Conditions*; I Onwuzu, JJ Donovan; University of Oregon
- 11:15 AM **578** *Improved SDD Detectors for Ultra-Fast, High-Resolution EDS in Microanalysis*; A Niculae, M Bornschlegl, R Eckhardt, J Herrmann, S Jeschke; PNDetector GmbH; G Krenz, A Liebel, G Lutz, H Soltau, L Strüder; PNSensor GmbH
- 11:30 AM **579** *Combined Quantitative Analysis Using Both Micro-XRF and EDS Analysis Inside the Scanning Electron Microscope*; KC Witherspoon, R Lamb, P Sjöman, MD Hellested; IXRF Systems, Inc
- 11:45 AM **580** *EDS Assisted by Precessing Electron Beam*; Y Liao, LD Marks; Northwestern University

PHYSICAL SCIENCES SYMPOSIA WEDNESDAY MORNING

P02.06 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:

Miaofang Chi, Oak Ridge National Laboratory

Platform Session

Wednesday 10:25 AM • Room: 206-207

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **581** (Invited) *Visualizing and Analyzing Doped and Functionalized Nanoparticles with STEM-EELS Spectro-Microscopy*; A Gloter, M Tence, O Stephan; Centre National de la Recherche Scientifique, France; S-Y Chen; National Taiwan University of Science and Technology; C-L Dong; National Synchrotron Radiation Research Center; M van Schooneveld; Utrecht University; C Colliex; Centre National de la Recherche Scientifique, France
- 11:00 AM **582** *Quantum Confinement in Germanium Quantum Dots Observed by Electron Energy-Loss Spectroscopy*; PD Nguyen; University of Wisconsin, Madison; DM Kepaptsoglou; SuperSTEM Laboratory, United Kingdom; R Erni; Empa, Swiss Federal Laboratories for Materials Science and Technology; Q Ramasse; SuperSTEM Laboratory, United Kingdom; A Olsen; University of Oslo, Norway
- 11:15 AM **583** *Understanding the Superior Performance of $\text{LiNi}_{0.5-x}\text{Mn}_{1.5+x}\text{O}_4$ Spinel Cathodes with Advanced Electron Microscopy*; CD Amos, J Song, K Jarvis, JB Goodenough, PJ Ferreira; University of Texas, Austin
- 11:30 AM **584** *In Situ TEM-EELS For Tracking Lithium Reactions in Battery Electrodes*; F Wang, S-W Kim, L Wu, D Su, Y Zhu, J Graetz; Brookhaven National Laboratory
- 11:45 AM **585** *Effect of Atomic Structure on the Performance of Lithium-Rich Layered Oxides: An Aberration-Corrected STEM and D-STEM Investigation*; K Jarvis, C-C Wang, A Manthiram, P Ferreira; University of Texas, Austin

Scientific Program

P05.02 Microstructural Characterization of Metals—150 Years After Sorby

Session Chairs:

James E. Martinez, NASA Johnson Space Center;
George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Wednesday 10:25 AM • Room: 209

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **586** (Invited) *How to Characterize 3D Microstructure Formation from Micro- to Atomic Scale for the Example of Al-Si Cast Alloys*; F Mücklich, J Barrirero, A Kruglova, M Engstler; Saarland University, Germany
- 11:00 AM **587** *Void Swelling in Self-Ion Irradiated Ferritic-Martensitic Alloy T91*; EM Beckett, Z Jiao, L Wang, G Was; University of Michigan
- 11:15 AM **588** *Microstructural Characterization of an Irradiated 304 Stainless Steel*; Y Chen, E Marquis; University of Michigan
- 11:30 AM **589** *Martensite Formation in the Metallographic Preparation of Austenitic Stainless Steel Welds*; JM Rodelas, MC Maguire, JR Michael; Sandia National Laboratories, Albuquerque
- 11:45 AM **590** *A Novel Experimental Approach to Determine Density Changes in Shear Bands of Metallic Glass by Correlative Analytical TEM*; C Kübel; Karlsruhe Institute of Technology, Germany; H Rösner, M Peterlechner, G Wilde; Westfälische Wilhelms-Universität Münster, Germany

TECHNOLOGISTS' FORUM SYMPOSIUM WEDNESDAY MORNING

X30.02 Technologists' Forum Special Topic: EDS Revisited—Basics and Advances

Session Chairs:

Valerie Woodward, Lubrizol Advanced Materials;
E Ann Ellis, Texas A&M University

Technologists' Forum Session

Wednesday 10:25 AM • Room: 211

- 10:25 AM *Welcome & Introduction to the Session*
- 10:30 AM **591** (Invited) *Everything You Always Wanted to Know about XES*; NJ Zaluzec; Argonne National Laboratory
- 11:00 AM **592** (Invited) *Selecting a Silicon Drift Detector*; NW Ritchie; National Institute of Standards and Technology
- 11:30 AM **593** (Invited) *Guidelines for Microanalysis Using the Energy-Dispersive Spectrometer*; PK Carpenter; Washington University

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA WEDNESDAY AFTERNOON

B03.01 Structural Biology and Cell Ultrastructure

Session Chairs:

Ingeborg Schmidt-Krey, Georgia Institute of Technology;
Paula da Fonseca, MRC Laboratory of Molecular Biology;
Michael Radermacher, University of Vermont

Platform Session

Wednesday 1:25 PM • Room: 238

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **594** (Invited) *The Dynamic Modulation of Water Permeability in the Lens aquaporin-0*; S Reichow, T Gonen; Howard Hughes Medical Institute
- 2:00 PM **595** (Invited) **M&M Post-Doctoral Award** *The Secrets of Life in Boiling Acids: Atomic Structure of Sulfolobus Turreted Icosahedral Virus*; D Veesler; The Scripps Research Institute; T-S Ng; National University of Singapore; AK Sendamarai, BJ Eilers, CM Lawrence; Montana State University; S-M Lok; National University of Singapore; MJ Young; Montana State University; JE Johnson, C-Y Fu; The Scripps Research Institute
- 2:30 PM **596** *Nucleic Acid Content of HBV Capsids Depends on its CTD-Phosphorylation State*; G Tolun, N Cheng, BJ Heymann, PT Wingfield; National Institutes of Health; L Ludgate, J Hu; The Pennsylvania State University College of Medicine; AC Steven; National Institutes of Health
- 2:45 PM **597 MSA Miller Scholarship** *Capturing Enveloped Viruses on Affinity Grids for Downstream Cryo-Electron Tomography Applications*; G Kiss, X Chen, JM Holl, MA Brindley, P Campbell, LA Byrd-Leotis, J Steel, D Steinhauer; Emory University; CL Afonso; US Department of Agriculture, Athens; RK Plemper, P Spearman; Emory University; DF Kelly; Virginia Tech Carilion Research Institute; ER Wright; Emory University

B07.01 Microscopy, Microanalysis and Image Analysis in the Pharmaceutical Sciences

Session Chairs:

Alejandra Camacho, The L'Oréal Institute for Ethnic Hair and Skin Research;
Charles D. Humphrey, Centers for Disease Control and Prevention;
Andrew Vogt, AbbVie, Inc.

Platform Session

Wednesday 1:25 PM • Room: 236

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **598** (Invited) *In Situ Transmission Electron Microscopy of Biological Specimens in Liquid*; MJ Dukes; Protochips, Inc; SM McDonald, DF Kelly; Virginia Polytechnic Institute and State University
- 2:00 PM **599** *Cryo-Electron Microscopy: Attempts to Watch the Formation of Dilute Emulsion via Microemulsion*; H Lee; University of Minnesota; ED Morrison; Segetis; AV McCormick; University of Minnesota
- 2:15 PM **600** *Environmental Scanning Electron Microscopy for the Study of Gold Nanoparticle Uptake in Whole Cells*; D Peckys, N de Jonge; INM Leibniz Institute for New Materials
- 2:30 PM **601** *Imaging Cytometry of Radiation-Induced Translocation of HMGB1*; L Yasui; Northern Illinois University
- 2:45 PM **602** *Two-Photon Microscopy of TLR4 Expressing Cells in Intact Mouse Kidney*; G Bu, J Wellen, P Varada; Pfizer Inc

ADVANCES IN INSTRUMENTATION SYMPOSIA WEDNESDAY AFTERNOON

A03.07 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Wednesday 1:25 PM • Room: 241

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **603** *In Situ and Ex Situ Characterization of Evolution of Defects in AlGaIn/GaN HEMTs under Bias*; H Ghassemi, A Lang, C Johnson; Drexel University; R Wang, B Song, H Xing; Notre Dame University; M Taheri; Drexel University
- 1:45 PM **604 M&M Student Award** *Transmission Electron Microscopy of Coherence and Nanothermodynamic Effects in Graphene Biased In Situ*; WA Hubbard, M Mecklenburg, ER White, A Kerelsky, C Regan; University of California, Los Angeles
- 2:00 PM **605** *New Possibilities for In Situ Electrical Characterization Of Nanosamples at Different Temperatures Combined with Simultaneous TEM Observations*; M Rudneva, T Kozlova, HW Zandbergen; Delft University of Technology, Netherlands
- 2:15 PM **606** *Fabrication of a Lift-Out Grid with Electrical Contacts for Focused Ion Beam Preparation of Lamella for In Situ Transmission Electron Microscopy*; M Mecklenburg, M Brodie; The Aerospace Corporation; W Hubbard, ER White; University of California, Los Angeles; A Bushmaker; The Aerospace Corporation; E Deionno; University of California, Los Angeles; B Foran; The Aerospace Corporation; BC Regan; University of California, Los Angeles
- 2:30 PM **607** *Progress toward Operando TEM Using EELS*; BK Miller, PA Crozier; Arizona State University
- 2:45 PM **608** *Atomic-Scale Imaging of Pt and Pd Nanoparticle Catalysts during CO Oxidation at 1 Bar Reaction Conditions*; SB Vendelbo; Delft University of Technology, Netherlands; CF Elkjaer; Haldor Topsøe A/S, Denmark; I Puspitasari, FJ Creemer; Delft University of Technology, Netherlands; P Dona, L Mele; FEI Company;

B Morana; Delft University of Technology, Netherlands; BJ Nelissen; Albemarle Catalyst Company BV, Netherlands; S Roobol; Leiden University, Netherlands; R van Rijn; Leiden Probe Microscopy BV, Netherlands; S Helveg; Haldor Topsøe A/S, Denmark; PJ Kooyman; Delft University of Technology, Netherlands

A05.02 Revisiting Resolution for STEM and TEM

Session Chairs:

Edgar Voelkl, FEI;
Nasim Alem, Pennsylvania State University;
John Silcox, Cornell University

Platform Session

Wednesday 1:25 PM • Room: 240

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **609** (Invited) *Cs Corrected Images and What You Don't See: Data Mining to the Physical Limits*; D Van Dyck; University of Antwerp, Belgium; C Kisielowski; Lawrence Berkeley National Laboratory; F-R Chen; National Tsing-Hua University, Taiwan
- 2:00 PM **610** *Resolution of the Electron Microscope at the Atomic Scale*; MA O'Keefe; OKCs; L Allard; Oak Ridge National Laboratory; DA Blom; University of South Carolina
- 2:15 PM **611** *Contribution of Cc-Correction to High-Resolution TEM at All Electron Energy Loss Regimes*; J-G Wen, DJ Miller, NJ Zaluzec, JM Hiller, RE Cook; Argonne National Laboratory
- 2:30 PM **612** *Atomic Structure of Through-Thickness Steps in a Grain Boundary*; A Gautam; Lawrence Berkeley National Laboratory; F Lancon; Laboratoire de Simulation Atomistique, France; V Radmilovic; University of Belgrade, Serbia; U Dahmen; Lawrence Berkeley National Laboratory
- 2:45 PM **613** *Instrumental Resolution Limit by Magnetic Thermal Noise from Conductive Parts*; S Uhlemann, H Muller, P Hartel, J Zach, M Haider; CEOS GmbH, Germany

Scientific Program

A08.03 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Session Chairs:

Natasha Erdman, JEOL USA Inc.;

Joseph R. Michael, Sandia National Laboratories;

Patrick Trimby, University of Sydney

Platform Session

Wednesday 1:25 PM • Room: 245

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **614** *Ultra-Fast TEM Electron Diffraction Tomography*; S Nicolopoulos; NanoMEGAS SPRL, Belgium; M Gemmi; Center for Nanotechnology and Innovation, Italy
- 1:45 PM **615** *Automated High Precision Strain Measurement Using Nanobeam Diffraction Coupled with Precession*; AD Darbal, RD Narayan; AppFive LLC; C Vartuli, G Lian; Texas Instruments; R Graham, F Shaapur; NanoTEM; S Nicolopoulos; NanoMEGAS SPRL, Belgium; JK Weiss; AppFive LLC
- 2:00 PM **616** *Analysis of Deformation Induced Grain Growth and Texture Development in Electrodeposited Nickel—A Quantitative Comparison between ACOM-STEM and In Situ X-ray Diffraction*; C Kuebel; Karlsruhe Institute of Technology, Germany; A Kobler; Technische Universität Darmstadt, Germany; P Gruber, J Lohmiller, O Kraft; Karlsruhe Institute of Technology, Germany; C Braun, M Grewer, R Birringer; Universität des Saarlandes, Germany; H Hahn; Karlsruhe Institute of Technology, Germany
- 2:15 PM **617** *Towards Sub-Angström Ptychographic Diffractive Imaging*; P Wang; Nanjing University; DJ Batey, JM Rodenburg; University of Sheffield, United Kingdom; H Sawada; JEOL Ltd, Japan; AI Kirkland; University of Oxford, United Kingdom
- 2:15 PM **618** *Application of Diffraction Mapping on Crystal Grain Imaging*; S Wang; Micron Technology Inc
- 2:30 PM **619** *Measuring Lattice Parameters and Local Rotation Using Convergent Beam Electron Diffraction: One Step Further*; Y Martin; Commissariat à l'énergie atomique, France; J-M Zuo; University of Illinois, Urbana-Champaign; V Favre-Nicolin, J-L Rouvière; Commissariat à l'énergie atomique, France

A11.02 Ion Beam Instrumentation and Applications for Physical and Biological Sciences: Instrumentation

Session Chairs:

Keana Scott, National Institute of Standards and Technology;

Trevor E. Clark, Pennsylvania State University;

Mike Marko, Wadsworth Center

Platform Session

Wednesday 1:25 PM • Room: 242

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **620** (Invited) **M&M Post-Doctoral Award** *EBSD Imaging of Femtosecond Laser Ablated Surfaces Using the TriBeam System*; MP Echlin, M Titus, S Kraemer, T Pollock; University of California, Santa Barbara
- 2:00 PM **621** *New Approach for Rapid Prototyping Using the Combination of Pulsed Laser Ablation and FIB Milling*; R Salzer; Carl Zeiss Microscopy GmbH, Germany
- 2:15 PM **622** *Advances in S/TEM Sample Preparation Using a FIB-SEM: Techniques for the Ultimate Sample*; B Van Leer, D Wall; FEI Company
- 2:30 PM **623** *Focused Ion Beam Slice-and-View Tomography and Correlative Electron Microscopy of Multiphase Meteorite Particles*; ND Bassim, RM Stroud; US Naval Research Laboratory; K Scott; National Institute of Standards and Technology; LR Nittler; Carnegie Institution of Washington; CD Herd; University of Alberta, Canada
- 2:45 PM **624** *Combined EBL/IBL Nanopatterning on Silicon Nitride Membranes for Time-Resolved Magnetic Transmission X-ray Microscopy Experiments*; M Urbánek, T Šikola, L Hladík; Brno University of Technology, Czech Republic; T Hrnčír, J Jiruše; TESCAN, Czech Republic

Scientific Program

A12.03 Atom Probe Tomography in Correlative Investigations

Session Chairs:
Michael Miller, Oak Ridge National Laboratory;
Christian Oberdorfer, University of Münster

Platform Session

Wednesday 1:25 PM • Room: 243

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **625** *Coupling Atom Probe Tomography with Aberration-Corrected Scanning Transmission Electron Microscopy and First-Principles Computations to Investigate Omega Precipitation in Titanium Alloys*; S Nag; University of North Texas; A Devaraj; Pacific Northwest National Laboratory; N Gupta; University of North Texas; R Williams; The Ohio State University; S Srivilliputhur; University of North Texas; HL Fraser; The Ohio State University; R Banerjee; University of North Texas
- 1:45 PM **626** *Combining Structural and Chemical Information on the Nanometer Scale by Correlative TEM and APT*; M Herbig, P-P Choi, D Raabe; Max-Planck-Institut fuer Eisenforschung GmbH, Germany
- 2:00 PM **627** (Invited) *Atom Counting in Atom Probe Tomography Specimens Using Quantitative HAADF-STEM*; W Lefebvre; Université de Rouen, France
- 2:30 PM **628 M&M Student Award** *Towards Atom Probe Tomography of Hybrid Organic-Inorganic Nanoparticles*; LM Gordon, MJ Cohen, D Joester; Northwestern University
- 2:45 PM **629** *Microencapsulation Method for Atom Probe Analysis of Powders*; DC Bell, AP Magyar, A Graham, M Baram; Harvard University

A13.03 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:
Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Wednesday 1:25 PM • Room: 239

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **630** (Invited) *Discovery: Under the Microscope at Kennedy Space Center*; PM Howard; NASA Kennedy Space Center
- 2:00 PM **631** *Understanding Complex Material Systems Using Multiple Characterization Techniques*; S Addepalli, S Thimmegowda; GE Global Research, India
- 2:15 PM **632** *Integrated Nonlinear Optical Microscope for Crystal Centering on a Synchrotron X-ray Beamline*; JA Newman, SJ Toth, CM Dettmar; Purdue University; M Becker, RF Fischetti; Argonne National Laboratory; GJ Simpson; Purdue University
- 2:30 PM **633** *Low kV Imaging Using Charge Balancing*; M Bolorizadeh, K Png; Carl Zeiss Microscopy Ltd, United Kingdom
- 2:45 PM **634 M&M Professional Technical Staff Award** *Microscopy Method for Characterization Oil Uptake in Fried Foods*; DM Williams, J Guo, R Fletcher; Dow Chemical Company

A14.03 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:
Moon J Kim, University of Texas at Dallas;
Ray W. Carpenter, Arizona State University;
John C. H. Spence, Arizona State University

Platform Session

Wednesday 1:25 PM • Room: 208

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **635** (Invited) *Development of a Laser Phase Plate for Zernike Phase Contrast in Electron Microscopy*; M Xu, E Sohr, B Shevitski; University of California, Berkeley; R Glaeser; Lawrence Berkeley National Laboratory; H Mueller; University of California, Berkeley

Scientific Program

- 2:00 PM **636** *Development of a Contact-Potential-Type Phase Plate*; H Tamaki, H Kasai, K Harada, Y Takahashi; Hitachi, Ltd, Japan; R Nishi; Osaka University, Japan
- 2:15 PM **637** *Active Pixel Sensors for Direct Imaging of Electrons from 10 keV up to Several MeV with Large Dynamic Range for TEM Applications*; L Strueder, G Lutz, S Aschauer, P Majewski; PNSensor GmbH, Germany; J Treis, K Hermenau; PNDetector GmbH, Germany; H Ryll, H Soltau; PNSensor GmbH, Germany
- 2:30 PM **638** (Invited) *Implementing Direct Electron Detection Camera K2 and Dose Fractionation for Near Atomic Resolution Single Particle CryoEM*; X Li; University of California San Francisco; S Zheng, DA Agard; Howard Hughes Medical Institute; Y Cheng; University of California San Francisco

- 2:30 PM **642** *An In Situ TEM Study of Ferroelastic Domain Mobility*; P Gao, J Jokisaari, C Nelson; University of Michigan; S-H Baek; University of Wisconsin, Madison; M Trassin; University of California, Berkeley; CW Bark; University of Wisconsin, Madison; R Ramesh; University of California, Berkeley; C-B Eom; University of Wisconsin, Madison; X Pan; University of Michigan
- 2:45 PM **643 M&M Post-Doctoral Award** *The Application of Off-Axis Electron Holography to Electrically Biased Single GaN Nanowires for Electrical Resistivity Measurement*; S Yazdi, T Kasama, M Beleggia; Technical University of Denmark; R Ciechonski; GLO-AB, Sweden; O Kryliouk; GLO-USA; JB Wagner; Technical University of Denmark

PHYSICAL SCIENCES SYMPOSIA WEDNESDAY AFTERNOON

P02.07 Structure and Composition Analysis of Nanoparticulate Systems

Session Chair:

Beth Guiton, University of Kentucky

Platform Session

Wednesday 1:25 PM • Room: 206-207

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **639** (Invited) *Micro-Electro-Mechanical Systems for Electron Microscopy in Catalysis*; S Helveg; Haldor Topsoe A/S, Denmark
- 2:00 PM **640 M&M Student Award** *In Situ TEM Study of Optical and Mechanical Effects on Electrical Properties of CuO Nanowires*; SJ Kim, JR Jokisaari; University of Michigan; A Kargar, D Wang; University of California, San Diego; X Pan; University of Michigan
- 2:15 PM **641** *Analytical Electron Microscopy Investigation of Au/TiO₂ Thin Films Deposited on the Glass Substrate*; M Kawasaki; JEOL USA, Inc; M-J Chen, J-R Yang; National Taiwan University; W-A Chiou; University of Maryland; M Shiojiri; Kyoto Institute of Technology, Japan

P05.03 Microstructural Characterization of Metals – 150 Years After Sorby

Session Chairs:

James E. Martinez, NASA Johnson Space Center;
George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Wednesday 1:25 PM • Room: 209

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **644** (Invited) *Stereology of Microstructural Dihedral Angles in Three-Dimensions*; AM Gokhale, S Zhang; Georgia Institute of Technology
- 2:00 PM **645** *Microstructural Characterization of Cast Alnico 8 Alloys*; L Zhou, H Dillon, R McCallum, I Anderson, M Kramer; Iowa State University; S Constantinides; Arnold Magnetic Technologies Corp
- 2:15 PM **646** *Microstructural Characterization of Mg-Al-Ca Alloys Using Ion Milling Surface Preparation Technique*; S Kaboli, H Demers, N Brodusch, R Gauvin; McGill University, Canada
- 2:30 PM **647** *Analysis of Passivated A-286 Stainless Steel Surfaces for Mass Spectrometer Inlet Systems by Auger Electron and X-Ray Photoelectron Spectroscopy*; H Ajo, D Blankenship, E Clark; Savannah River National Laboratory
- 2:45 PM **648** *Grain Size Measurement Methods: A Review and Comparison*; GF Vander Voort; Consultant—Struers Inc

P08.01 Advanced Atomic-Scale Imaging and Spectroscopy of Materials

Session Chairs:

Nigel Browning, Pacific Northwest National Laboratory;
 Matthew Chisolm, Oak Ridge National Laboratory;
 David C. Bell, Harvard University

Platform Session

Wednesday 1:25 PM • Room: 244

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **649** *The Effects of Annealing on the Inter-Diffusion of Cations across the LaCrO₃/SrTiO₃(100) Interface, and the Formation of La Anti-Site Defect Clusters*; R Colby, H Zhang, S Chambers, B Kabius; Pacific Northwest National Laboratory
- 1:45 PM **650** *Quantification of Cation Ordering in La_{2-2x}Sr_{1+2x}Mn₂O₇ by STEM EELS*; MP Oxley; Vanderbilt University; MA Roland; Universidad Complutense de Madrid, Spain; M Varela, SJ Pennycook; Oak Ridge National Laboratory
- 2:00 PM **651 M&M Student Award** *Direct Observation of Polarization and Charge Transfer at the BaTiO₃/SrTiO₃/GaAs Interfaces*; Q Qiao; University of Illinois, Chicago; R Contreras-Guerrero, R Droopad; Texas State University; RF Klie; University of Illinois, Chicago
- 2:15 PM **652** *Interface Magnetism in LaMnO₃/SrTiO₃ Superlattices: Influence of Oxygen Octahedral Tilts*; MA Roldan; Complutense University of Madrid, Spain; W Siemons; Oak Ridge National Laboratory; J Salafranca; Complutense University of Madrid, Spain; M Varela, AR Lupini, SJ Pennycook, HM Crishten; Oak Ridge National Laboratory

2:30 PM **653** *High-Precision Chemical Analysis and Structural Determination of Functional Oxides by STEM-EELS*; DM Kepaptsoglou; SuperSTEM, United Kingdom; F Azough; University of Manchester, United Kingdom; Q Ramasse; SuperSTEM, United Kingdom; B Schaffer, M Sarahan; Gatan; S Jackson, R Freer; University of Manchester, United Kingdom

2:45 PM **654** *Direct Observation of the Optical Response of Twisted Bilayer Graphene by Electron Energy Loss Spectroscopy*; LA Basile; Escuela Politecnica Nacional, Ecuador; W Zhou; Oak Ridge National Laboratory; J Salafranca; Universidad Complutense de Madrid, Spain; J-C Idrobo; Oak Ridge National Laboratory

TECHNOLOGISTS' FORUM SYMPOSIA WEDNESDAY AFTERNOON

X30.03 Technologists' Forum Roundtable: EDS Revisited – Basics and Advances

Session Organizers:

E Ann Ellis, Texas A&M University
 Valerie Woodward, Lubrizol Advanced Materials;

Technologists' Forum Roundtable Session

Wednesday 1:30 PM • Room: 211

1:30 PM **655** *Technologists' Forum: Roundtable Discussion of Energy Dispersive Spectroscopy*; EA Ellis; Texas A&M University

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA WEDNESDAY AFTERNOON

B02.P1 AFM-Based Nanoscopies in the Life Sciences

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

1:25 PM *Welcome & Introduction to the Session*

3:00 PM **656** *Ball-Shaped Multiwall Carbon Nanotube Tip by Ion-Beam-Induced Deposition of Platinum*; C Han; Korea Research Institute of Standards and Science, South Korea; YH Kahng; National Research Council, Canada; I-Y Park, BC Park, SJ Ahn; Korea Research Institute of Standards and Science, South Korea
Poster # 212

3:00 PM **657** *Scanning Electrochemical Microscopy-Atomic Force Microscopy Probes from Pyrolyzed Parylene C*; KC Morton, MA Derylo, AE Weber, LA Baker; Indiana University
Poster # 213

3:00 PM **658** *Fabrication of 3-D Hollow Metallic Probes Designed for Plasmonic Field Enhancement*; I-Y Park, D Lee, J Choi; Korea Advanced Institute of Standards and Science, South Korea; C Han, S Ahn; Korea Research Institute of Standards and Science, South Korea; S-W Kim; Korea Advanced Institute of Science and Technology, South Korea
Poster # 214

B03.P1 Structural Biology and Cell Ultrastructure

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **659** (Invited) *The Three-Dimensional Structure of Giardia lamblia Virus and Its Comparison to Other Members of the Family Totiviridae*; ME Janssen; University of California, San Diego; KN Parent; Michigan State University; Y Takagi, ML Nibert; Harvard Medical School; TS Baker; University of California, San Diego
Poster # 215

3:00 PM **660** *Cryo-SiN—A New Substrate to Monitor Viral Mechanisms*; JR Tanner; Virginia Tech Carilion Research Institute; MJ Dukes; Protochips, Inc; L Melanson; Gatan, Inc; SM McDonald, DF Kelly; Virginia Tech Carilion Research Institute
Poster # 216

3:00 PM **661** *Electron Microscopic Studies of the Eukaryotic Pre-Replicative Mcm2-7 Complex*; F Beuron; Institute of Cancer Research, United Kingdom; M Douglas, J Fridgola, J Difley; London Research Institute, United Kingdom; EP Morris; Institute of Cancer Research, United Kingdom
Poster # 217

3:00 PM **662** *A Structural Approach to Characterizing the Release of Outer Membrane Vesicles in Vibrio vulnificus*; R Guerrero-Ferreira, ER Wright; Emory University
Poster # 218

3:00 PM **663** *Effects of Glutaraldehyde on the Ryanodine Receptor by Cryo-EM*; J Strauss, T Wagenknecht; State University of New York, Albany
Poster # 219

3:00 PM **664** *Functional Analysis of Conformational Changes of Phosphofruktokinase*; T Ruiz; University of Vermont
Poster # 220

3:00 PM **665** *Correlative Light and Electron Microscopy (CLEM) Techniques for Biological Samples*; V Nair; National Institute of Allergy and Infectious Diseases; FH Hoyt; Montana State University; T Hoenen, ER Fischer; National Institute of Allergy and Infectious Diseases
Poster # 221

3:00 PM **666** *Chile Pepper Carotenoids: The Link between Color and Sub-Cellular Morphology*; J Kilcrease, R Richins, M O'Connell; New Mexico State University
Poster # 222

3:00 PM **667** *Structural Analysis of Plants Exposed to Titanium Dioxide (TiO₂) Nanoparticles*; E McDaniel; University of South Carolina; I Chen; Dutch Fork High School, Irmo, South Carolina; E Balogh, Y Yang, S Ghoshroy; University of South Carolina
Poster # 223

3:00 PM **668** *Microscopic Analysis of the Structure and Function of Silica Storing Cells in Arundo donax Leaves*; E Balogh, JM Herr, S Ghoshroy, CT Hann, CS Brandon, M Czako, L Marton; University of South Carolina
Poster # 224

Scientific Program

3:00 PM **669 M&M Student Award** *Changes in Collagen Ultrastructure Due to the Collagen-Binding Protein DDR1 Impacts GPVI and VWF Binding*; J Tonniges; The Ohio State University; S Chen; Wexner Medical Center; J Lee; The Ohio State University; E Calomeni; Wexner Medical Center; G Agarwal; The Ohio State University

Poster # 225

3:00 PM **670 Collagen Ultrastructure and Skin Mechanics in DDR1 KO Mice**; D Yeung, S Chen, J Tonniges, J Lee, H Powell; The Ohio State University; E Calomeni; Wexner Medical Center; G Agarwal; The Ohio State University

Poster # 226

3:00 PM **671 Looking down the Nose through Large Block-Face (2D) and Serial Section Array (3D) Scanning Electron Microscopy**; L-M Joubert, DT Bravo, JV Nayak; Stanford University School of Medicine

Poster # 227

3:00 PM **672 Contrast Enhancement with Oolong Tea in Staining of Ultrathin Sections**; Y Guo, R Bleher, S Li, VP Dravid; Northwestern University

Poster # 228

3:00 PM **673 Scanning Electron Microscopical Study of the Aphanis dispar (Rüppell 1828) (Pisces: Cyprinodontidae) Scales**; TA Ba-Omar, H Al-Azri, K Al-Adawi; Sultan Qaboos University, Oman

Poster # 229

3:00 PM **674 Contributions of Individual Organic Layers to the Mechanical Properties of Nacre**; K Parratt, N Yao; Princeton University

Poster # 230

3:00 PM **676 Imaging Live Cell Dynamics Using Snapshot Hyperspectral Image Mapping Spectrometry**; AD Elliott; Vanderbilt University; N Bedard; Rice University; A Ustione; Vanderbilt University; MA Baird, MW Davidson; Florida State University; TS Tkaczyk; Rice University; DW Piston; Vanderbilt University

Poster # 232

3:00 PM **677 Hypomorphic ERdj4 Expression Induces ER Stress and Compromises Insulin Secretion in Beta Cells**; C Na, JM Fritz, M Dong, KS Apsley, MW Falconieri, TE Weaver; Cincinnati Children's Hospital Medical Center

Poster # 233

B05.P1 Microscopy of Medical Devices and Biomaterials

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **828 IGF-1 on Titanium Alloy Implants Enhances Their Osseointegration in the Rat Femur: A SEM Study**; G Sovak, A Weiss, I Gotman; Technion, Israel

Poster # 324

10:00 AM **829 Alternative Fixation Procedures for the Inactivation of Dry, Bioforensic Samples for Examination by Electron Microscopy**; RM Hannah, CA Brantner, SS Lehman, MA Firmani, RK Pope; National Biodefense Analysis and Countermeasures Center

Poster # 325

10:00 AM **830 A Systemic Triple Label Strategy for Fluorescent Microscopy of Inflammation in CNS and Non-CNS Tissue**; AJ Woolley, HA Desai, J Gaire, AL Ready, KJ Otto; Purdue University

Poster # 326

10:00 AM **831 Focused Ion Beam Milling of Eukaryotic Cells for Determining Membrane Interaction**; L Lampert, A Barnum, J Jiao; Portland State University

Poster # 327

10:00 AM **832 M&M Student Award Functionalization of Agave Cellulose Nanoparticles and Its Characterization by Microscopy and Spectroscopy Techniques**; C Ponce, J Chanona; Instituto Politecnico Nacional, Mexico; V Garibay, E Palacios; Instituto Mexicano del Petroleo; G Calderon; Instituto Politecnico Nacional, Mexico; R Sabo; U S Department of Agriculture, Madison

Poster # 328

B04.P1 Fluorescence Microscopy of Organelle Dynamics

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **675 Taking Two-Photon Excitation (2PE) Further: 2PE Coupling to Far-Field Optical Nanoscopy and Super Resolution Microscopy towards Three-Dimensional (3D) Imaging of Thick Scattering Specimens**; A Diaspro; Istituto Italiano di Tecnologia, Italy; P Bianchini, F Cella Zanacchi, G Vicidomini, B Harke; University of Genoa, Italy; S Galiani, J Chacko, I Coto, Z Lavagnino, M d'Amora; Istituto Italiano di Tecnologia, Italy

Poster # 231

Scientific Program

10:00 AM **833** *Validation by Scanning Electron Microscopy of Three-Dimensional Coating of PCL/PLLA Scaffolds with Electrospun PLLA Nanofibers for Tissue Engineering*; PE McClellan, WJ Landis; University of Akron

Poster # 329

ADVANCES IN INSTRUMENTATION SYMPOSIA WEDNESDAY AFTERNOON

A03.P2 New Opportunities for *In Situ* Techniques and Instruments

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **678** *Electron Annealing in Aluminum Interconnects Observed Using In Situ TEM Technique*; D Xie, M Li, Z Shan; Xi'an Jiaotong University, China

Poster # 234

3:00 PM **679** *Local Current-Activated Growth of Nanometric Nickel Pillars During In Situ STM-TEM Experiments*; K van Benthem, JF Rufner, CS Bonifacio, TB Holland, RH Castro; University of California, Davis

Poster # 235

3:00 PM **680** *EELS Analyses of Gaseous Atmosphere and Heated Specimen in an ETEM*; T Yaguchi, H Kobayashi, A Watabe; Hitachi High-Technologies Corporation, Japan; T Kamino; Yamanashi University, Japan

Poster # 236

3:00 PM **681** *In Situ Studies of Catalytic Growth of SiC Nanowire*; Y Kang; University of Pittsburgh; P Lu; Xi'an Jiaotong University, China; X Zhang; Hitach HighTechnologies America, Ltd; Z Liu; Kennametal Inc; JL Sturgeon, J Mastovich; RJ Lee Group Inc; Z Shan; Xi'an Jiaotong University, China; JC Yang; University of Pittsburgh

Poster # 237

3:00 PM **682** *Development of SiN-Coated Carbon Membranes for Environmental-Cell Window*; T Kawasaki, Z Cui, N Imaeda, T Tanji; Nagoya University, Japan

Poster # 238

3:00 PM **683** *Oxidation of Nickel Particles in an Environmental TEM*; Q Jeangros; Ecole Polytechnique Federale de Lausanne; T Hansen, J Wagner; Technical University of Denmark; R Dunin-Borkowski; Julich Research Centre, Germany; C Hebert, J Van herle, A Hessler-Wyser; École Polytechnique Fédérale de Lausanne, Switzerland

Poster # 239

3:00 PM **684** *In Situ TEM Investigation on the Effect of Atmosphere on Anatase-to-Rutile Phase Transformation*; H Ghassemi, W Harlow; Drexel University; R Koc; Southern Illinois University; M Taheri; Drexel University

Poster # 240

3:00 PM **685** *3D Microstructural Analysis Using an In Situ Ultramicrotome (Gatan 3 View)*; X Zhong, T Hashimoto, MG Burke, GE Thompson; University of Manchester, United Kingdom

Poster # 241

3:00 PM **686** *Electrical Properties of Pristine and Electron Irradiated CNT Yarns at Small Length Scales: An Electron Microscopy Study*; F Sola; NASA Glenn Research Center

Poster # 242

3:00 PM **687** *In Situ Micro Compression Testing on Polycrystalline Model Materials and Potential Nuclear Fusion Candidate Materials*; CB Howard; University of California, Berkeley; C Shin; Korea Atomic Energy Research Institute, South Korea; S Parker, D Frazer, P Hosemann; University of California, Berkeley; WB Choi, M Fluss; Lawrence Livermore National Laboratory; A Kimura; Kyoto University, Japan

Poster # 243

3:00 PM **688** *The Contribution of Back Stress to Strength in Nanomaterials*; AJ Wagner, ED Hintsala, UR Kortshagen, WW Gerberich, KA Mkhoyan; University of Minnesota

Poster # 244

3:00 PM **689** *In Situ TEM Compression of MgO Nanocubes*; ED Hintsala, AJ Wagner, PK Suri, KA Mkhoyan, WW Gerberich; University of Minnesota

Poster # 245

3:00 PM **690** *Mechanical Properties of Silicon Carbide Fibers by Spherical Indentation Technique*; JA Bencomo-Cisneros; Centro de Investigación en Materiales Avanzados, Mexico; S Young Chávez; Universidad Autónoma de Chihuahua, Mexico; JE Ledezma-Sillas, W Antúnez-Flores, A Díaz-Díaz, JM Herrera-Ramirez; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 246

3:00 PM **691** *In Situ Nanoindentation of Nanocrystalline MgAl₂O₄ Agglomerates and Their Effect on Densification Behavior*; J Rufner, TB Holland, RHR Castro, K van Benthem; University of California, Davis

Poster # 247

A05.P1 Revisiting Resolution for STEM and TEM

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

- 3:00 PM **692** *Viability of HAADF-STEM Imaging Contrast and Simulations as a Measure of B-Site Ordering for Double Perovskites*; BD Esser, M Dixit, A Hauser, RE Williams, F Yang, HL Fraser, D McComb; The Ohio State University
Poster # 248
- 3:00 PM **693** *Assessment of the TEM Information Limit by Means of Tilted Illumination*; H Mueller, S Uhlemann, J Zach, P Hartel, M Haider; CEOS GmbH, Germany
Poster # 249
- 3:00 PM **694** *Imaging Very Thin Particles in ABF STEM*; P Phillips, RF Klie; University of Illinois, Chicago
Poster # 250
- 3:00 PM **695** *The Development and Use of Online Tools in Microscopy and Microanalysis Facilities*; M Apperley, J Whiting; University of Sydney, Australia; B Cribb, C Frost; University of Queensland, Australia; A Ceguerra, P Liddicoat; University of Sydney, Australia; C Aya; Intersect Australia Ltd
Poster # 251
- 3:00 PM **696** *Defects in Two Dimensional Crystals: An Ultra-High Resolution Aberration-Corrected Electron Microscopy Study*; N Alem; Pennsylvania State University; QM Ramasse; SuperSTEM Laboratory, United Kingdom; OV Yazyev; École Polytechnique Fédérale de Lausanne, Switzerland; CR Seabourne; University of Leeds, United Kingdom; CK Kisielowski; Lawrence Berkeley National Laboratory; P Hartel; CEOS GmbH, Germany; B Jiang; FEI Company; R Erni; Swiss Federal Laboratories for Materials Science and Technology Eidgenössische Materialprüfungs- und Forschungsanstalt, Switzerland; K Erickson; University of California, Berkeley; M Sarahan; SuperSTEM Laboratory, United Kingdom; M Rossell; Swiss Federal Laboratories for Materials Science and Technology Eidgenössische Materialprüfungs- und Forschungsanstalt, Switzerland; A Scott; University of Leeds, United Kingdom; S Louie, A Zettl; University of California, Berkeley
Poster # 252

A08.P1 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

- 3:00 PM **697** *A Method for the Correction of EBSPs Distorted by Lens Magnetic Fields*; CT Chou, K Thomsen, J Goulden, H Jiang; Oxford Instruments
Poster # 253
- 3:00 PM **698** *Strain Measurement in FinFET Structures with Epitaxially Grown SiGe on source/Drain Region by Nano Beam Diffraction (NBD) Method*; S-W Kim, D-S Byeon, H Jang, D-H Ko; Yonsei University, South Korea
Poster # 254
- 3:00 PM **699** *A Physics-Based Pattern Dictionary for EBSD Image Segmentation*; SU Park, D Wei; University of Michigan; M De Graef; Carnegie Mellon University; M Shah, J Simmons; US Air Force Research Laboratory; AO Hero; University of Michigan
Poster # 255
- 3:00 PM **700** *TEM Based Micro-texture Measurement for Twinning in a Hot-Rolled Magnesium Alloy with Astar System*; Z Zhang, E Rauch, M Veron; Grenoble Institute of Technology, France
Poster # 256
- 3:00 PM **701** *Monte Carlo Simulations for Applications in Electron Backscatter Diffraction*; A Winkelmann; Max-Planck-Institute of Microstructure Physics, Germany; F Salvat-Pujol, W Werner; Vienna University of Technology, Austria
Poster # 257
- 3:00 PM **702** *EBSD Analysis of Materials Utilizing High Temperature Protochips Aduro System in FE-SEM*; N Erdman, M Shibata; JEOL USA Inc; D Gardiner, B Jacobs; Protochips
Poster # 258
- 3:00 PM **703** *Impact of Friction Stir Welding on the Microstructure and Microtexture of Ferritic-Martensitic HT9 Steel*; LN Brewer, LL Ray, SK Menon; Naval Postgraduate School
Poster # 259

Scientific Program

3:00 PM **704** *Application of Rocking Beam Tableau DF Imaging on Crystal Size Mapping*; S Wang; Micron Technology Inc

Poster # 260

3:00 PM **705** *Combined EBSD+EDS for Phase Differentiation in Zr/Steel Reaction Layers*; C Parish, KA Terrani, D Shin, BA Pint; Oak Ridge National Laboratory

Poster # 261

3:00 PM **706** *Statistics of Deformation Twinning in Cu/Nb Nanolamellar Composites Measured Using Electron Backscatter Diffraction (EBSD)*; RJ McCabe, JS Carpenter, NA Mara, IJ Beyerlein; Los Alamos National Laboratory

Poster # 262

3:00 PM **707** *Visualization and Quantification of Plastic Strain Induced by Indentation in Polycrystalline Nickel*; S Kaboli, H Demers, N Brodusch, R Gauvin; McGill University, Canada

Poster # 263

3:00 PM **708** *Validating a New Approach to the Mapping of Phases by EDS by Comparison with the Results of Simultaneous Data Collection by EBSD*; P Satham, C Penman, J Chaldecott, S Burgess, S Sitzman, A Hyde; Oxford Instruments Inc

Poster # 264

A11.P1 Ion Beam Instrumentation and Applications for Physical and Biological Sciences

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **709** *Peculiarities in FIB Induced Damage of Diamond*; S Rubanov; University of Melbourne, Australia; A Suvorova; University of Western Australia

Poster # 265

3:00 PM **710** *Sputter-Induced Topography on Magnesium During Ion Beam Milling Surface Preparation*; S Kaboli, H Demers, N Brodusch, R Gauvin; McGill University, Canada

Poster # 266

3:00 PM **711** *Applications of the Hybrid Ion Milling Method to Neodymium Magnets*; T Shdiara, M Konomi, S Watanabe; Hitachi High-Technologies Corporation, Japan

Poster # 267

3:00 PM **712** *Automated TEM Sample Preparation from Smaller Device Structure Regions of Semiconductor ICs Using Inline Dual-Beam CLM+ and TEMLink 150*; RS Rai, E Chen, Y Zhang, D Nedeau, Y Chen, W Zhao, SK Lim, Z-H Mai, J Lam; Globalfoundries

Poster # 268

3:00 PM **713** *Effective Utilization of STEM Imaging Capability in FIB for Physical Failure Analysis on 20nm & 14nm Transistor Nodes in Semiconductor Wafer Foundries*; W Zhao, D Nedeau, S Kodali, J Huang, C-K Oh, S-K Lim, R Rai, Z-H Mai, J Lam; Globalfoundries

Poster # 269

3:00 PM **714** *Radioactive Sample Preparation Using Focused Ion Beam*; A Aitkaliyeva, J Madden, B Miller, T Hyde; Idaho National Laboratory

Poster # 270

3:00 PM **715** *Enhancing Ex Situ Lift-Out with EXpressLO*; LA Giannuzzi; L A Giannuzzi and Associates LLC

Poster # 271

A12.P1 Atom Probe Tomography in Correlative Investigations

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **716** (Invited) *Atom Probe Tomography: Beyond the Microscope, a Breakthrough Backdoor for Chemical, Physical and Functional Characterization at the Nanometer Scale*; F Vurpillot, A Gaillard, L Arnoldi, A Vella, L Rigutti, V Tognetti, B Deconihout; Université de Rouen, France

Poster # 272

3:00 PM **717** *Multi-Region Data Simulation for Detection Limit Investigations in IVAS™*; RM Ulfing, BP Geiser, TJ Prosa, DJ Larson; CAMECA Instruments, Inc; J Leroux, B Dupont; CAMECA Société par Actions Simplifiée (SAS), France

Poster # 273

3:00 PM **718** *The Effects of Detector Efficiency on Distinguishing Solute Atoms in Random Solid Solution and Solute Clusters*; MK Miller, L Yao; Oak Ridge National Laboratory

Poster # 274

3:00 PM **719** *Voltage and Laser-Assisted Mode Atom Probe Tomography of Gallium Nitride*; N Dawahre, G Shen, SM Kim, P Kung; University of Alabama

Poster # 275

Scientific Program

3:00 PM **720** *Gaussian Kernel Density Estimator for Voxel Size Selection in Atom Probe Tomography*; K Kaluskar, K Rajan; Iowa State University

Poster # 276

3:00 PM **721** *Improved Mass Resolving Power and Yield in Atom Probe Tomography*; DJ Larson, TJ Prosa, JH Bunton, DP Olson, DF Lawrence, E Oltman, SN Strennin, TF Kelly; CAMECA Instruments, Inc

Poster # 277

3:00 PM **722** *A Weibull Perspective on the Fracture of Atom Probe Specimens*; B Gault; Elsevier Ltd; O Bouaziz; Arce-lorMittal Research

Poster # 278

3:00 PM **723** (Invited) *Simulation-Enhanced Atom Probe for Complete 3D Atomistic Imaging*; MP Moody; University of Oxford, United Kingdom; AV Ceguerra, AJ Breen; University of Sydney, Australia, B Gault, Elsevier Ltd, United Kingdom; XY Cui, LT Stephenson; University of Sydney, Australia; RK Marceau; Max-Planck-Institut für Eisenforschung GmbH, Germany; R Powles, SP Ringer; University of Sydney, Australia

Poster # 279

3:00 PM **724** *Using Spatial Distribution Maps to Estimate APT Efficiency*; BP Geiser, DJ Larson, TJ Prosa, TF Kelly, RM Ulfig; CAMECA Instruments, Inc

Poster # 280

3:00 PM **725** *An Integrated Data Driven Reconstruction and Molecular Dynamics Simulation for Lattice Structure in Atom Probe Tomography*; J Peralta, K Kaluskar, C Loyola, K Rajan; Iowa State University

Poster # 281

3:00 PM **726** *Electric Field Induced Changes in Surface Bonding: Integrating First Principles and Atom Probe Tomography*; C Loyola, J Peralta, S Broderick, K Rajan; Iowa State University

Poster # 282

3:00 PM **727** *Stability of Oxygen-Enriched Nanoclusters and Helium Bubbles in Fe-Based Alloys under Extreme Conditions*; MK Miller, C-L Fu, X Chen, Q Li; Oak Ridge National Laboratory

Poster # 283

3:00 PM **728** *Influence of Co Underlayer Thickness on Mass Resolving Power in Field Evaporated Cu/Co Bilayer*; K Tippey, BC Hornbuckle, B Fu, GB Thompson; University of Alabama

Poster # 284

A13.P1 Microscopy and Microanalysis for Real World Problem Solving

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **729** (Invited) *Procedure for TEM Measurement of Nanoparticles*; WG Stratton, MI Buckett, S McKernan; 3M
Poster # 285

3:00 PM **730** *The Importance of Scanning Electron Microscopy (SEM) and X-Ray Microanalysis (EDS) in Determination of Gunshot Residues (GSR) in Human Hands*; PH Aragao; Universidade Estadual de Londrina, Brazil; LG Bucharles; Polícia Científica de Parana, Brazil; JC Spadotto, AR Rodrigues, VB Motta, BM Biazin, AG Oliveira Junior, CG Jesus Andrade; Universidade Estadual de Londrina, Brazil
Poster # 286

3:00 PM **731** *In Situ Analytical Electron Microscopy Study of the Lithiation of TiO₂ Nanowires Used in Li-Ion Batteries*; M Gu, B Li, W Wang, V Sprenkle, C-M Wang; Pacific Northwest National Laboratory
Poster # 287

3:00 PM **732** *Identifying Minerals of Environmental Concern in Soils from Smelter Operations Using Multiple Microanalytical Methods*; HA Lowers, DJ Bove, SA Morman; US Geological Survey
Poster # 288

3:00 PM **733** *Auger Electron Spectroscopy of Carbon Diffusion Profiles in Low Temperature Carburized Stainless Steels*; W Jennings, A Avishai, B Cowen, H Kahn, F Ernst, AH Heuer; Case Western Reserve University
Poster # 289

3:00 PM **734** *Cathodoluminescence-Based Quantitative Analysis of Radiation Damage in Powellite Single Crystals*; I Jozwik-Biala, J Jagielski, G Gawlik, P Jozwik; Institute of Electronic Materials Technology, Poland; R Ratajczak; National Centre for Nuclear Research, Poland; G Panczer, N Moncoffre, N Bererd; Université de Lyon, France; M Swirkowicz; Institute of Electronic Materials Technology, Poland
Poster # 290

3:00 PM **735** *Characterization of Graphite Inclusions in Cast Iron by Cathodoluminescence and X-Ray Microanalysis*; SA Wight; National Institute of Standards and Technology; JR Hitchings; Comanche Technologies
Poster # 291

Scientific Program

3:00 PM **736** *Morphological Study on Electrochemical Sensor Based Polypyrrole by Scanning Electron Microscopy*; G Gonzalez-Mancera; Universidad Nacional Autonoma de Mexico; JL Reyes, Q Camacho; Universidad Veracruzana, Mexico

Poster # 292

3:00 PM **737** *Confocal and SEM Studies of Protist Parasites on Fresh Produce*; GR Bauchan; U S Department of Agriculture, Beltsville; D Macarisin; University of Maryland; M Santin, R Fayer; US Department of Agriculture, Beltsville

Poster # 293

3:00 PM **738** *Improved Specimen Preparation and SEM Imaging Reveal the Morphology of a West African Sorghum Resistant to Storage Insects*; MW Pendleton, EA Ellis; Texas A&M University; BB Pendleton; West Texas A&M University; NY Diarisso; Institut D'Economie Rurale, Mali

Poster # 294

3:00 PM **739** *Reducing Charging Issues in Silicon on Insulator Cross Sections Under SEM*; M Ordway; University of Missouri, St Louis

Poster # 295

3:00 PM **740** *Fork Method Stabilization of Fiber Embedded Ceramics for TEM Observation*; SW Ordway; University of Missouri, Saint Louis

Poster # 296

3:00 PM **741** *An Effective Approach to Extract Cross-Sectional Information from Top-Down SEM for 20nm & 14nm Transistor Nodes in Semiconductor Wafer-Foundries*; W Zhao, Y Wei, C-K Oh, S Kodali, T Schaeffer, S-K Lim, R Rai, Z-H Mai, J Lam; Globalfoundries, Singapore

Poster # 297

PHYSICAL SCIENCES SYMPOSIA WEDNESDAY AFTERNOON

P05.P1 Microstructural Characterization of Metals—150 Years After Sorby

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **742** *Advantage of HR-STEM for Evaluating Ultra-Fine Carbides Embedded in Steel*; K Yamada, H Nakamichi, K Sato; JFE Steel, Japan

Poster # 298

3:00 PM **743** *EBSD Investigations on Cutting Edges of Non-Oriented Electrical Steel*; H Harstick; Volkswagen AG, Germany; M Ritter; Technische Universität Hamburg-Harburg, Germany; W Riehemann; Technische Universität Clausthal, Germany

Poster # 299

3:00 PM **744** *TEM Study of Discontinuous Reactions in Highly Supersaturated Cu-Co Alloys*; NM Suguhiro; Pontificia Universidade Católica do Rio de Janeiro, Brazil; AL Pinto; Centro Brasileiro de Pesquisas Físicas, Brazil; IG Solórzano; Pontificia Universidade Católica do Rio de Janeiro, Brazil

Poster # 300

3:00 PM **745** *Dislocations in B2/L21 Fe₃₀Ni₂₀Mn₂₀Al₃₀ after High Temperature Deformation*; X Wu, I Baker; Dartmouth College

Poster # 301

3:00 PM **746** *In Situ Melting Behavior Observation of an Eutectic Alloy Nano-needle*; K Sasaki, T Takahashi, S Arai, T Tokunaga, T Yamamoto; Nagoya University, Japan

Poster # 302

3:00 PM **747** *Characterization of Postdischarge-Nitrided 4140 Steel by XRD, SEM and HRTEM*; A Medina-Flores, L Béjar-Gómez, H Carreón, A Ruíz; Ciudad Universitaria, Mexico; I Alfonso; Universidad Autónoma del Carmen, Mexico; G Herrea-Pérez; Instituto Tecnológico Superior de Irapuato, Mexico

Poster # 303

3:00 PM **748** *Efficient Lattice-Image Detection of Icosahedral Twins*; P Fraundorf; University of Missouri, St Louis; C Bishop; University of Tennessee, Knoxville

Poster # 304

Scientific Program

3:00 PM **749** *Microscopic Identification of Strength and Durability of Rail Steels*; H Aglan, CD Fermin; Tukeseege University

Poster # 305

3:00 PM **751** *Localization of a Short Peptide Anti-microbial (AMP) in Staphylococcus aureus by Diaminobenzidine-Eosin Photo-oxidation and Visualization with STEM EDS*; GA Johnson, EA Ellis, H Kim, J-P Pellois; Texas A&M University

Poster # 307

TECHNOLOGISTS' FORUM SYMPOSIUM WEDNESDAY AFTERNOON

X30.P1 Technologists' Forum Special Topics: EDS Revisited—Basics and Advances

Poster Session

Wednesday 3:00 PM • Room: Exhibit Hall

3:00 PM **750** *Anhydrous (Non-Cryogenic) Specimen Preparation of Biological Samples for Energy Dispersive Spectroscopy in the Transmission Electron Microscope*; EA Ellis; Texas A&M University; L Blubaugh; Hitachi High Technologies America, Ltd.

Poster # 306

Scientific Program

Thursday August 8

BIOLOGICAL SCIENCES SYMPOSIA THURSDAY MORNING

B03.02 Structural Biology and Cell Ultrastructure

Session Chairs:

Paula da Fonseca, MRC Laboratory of Molecular Biology;
Michael Radermacher, University of Vermont;
Ingeborg Schmidt-Krey, Georgia Institute of Technology

Platform Session

Thursday 8:25 AM • Room: 238

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **752** (Invited) *Using Monoclonal Fab to Facilitate Single Particle CryoEM Studies of Small Proteins*; S Wu, J Kim, CS Craik, Y Cheng; University of California, San Francisco
- 9:00 AM **753** *In-Focus Cryo-EM Images Using a Hybrid Single-Sideband/Double-Sideband Aperture*; RM Glaeser, B-G Han, S Sassolin, J Jin, S Cabrini; Lawrence Berkeley National Laboratory
- 9:15 AM **754** *Examining the S. elongatus KaiBC Complex by CryoEM and MDFF*; SA Villarreal; Case Western Reserve University; DR Williams; University of Pennsylvania; CH Johnson, M Egli; Vanderbilt University; PL Stewart; Case Western Reserve University
- 9:30 AM **755** *Diverse Morphologies of Influenza Filament Budding: An Ultrastructural Study*; S Vijayakrishnan, C Loney, D Bhella; University of Glasgow, United Kingdom
- 9:45 AM **756** *Immunocytochemical Localization of Noncollagenous Proteins in Mineralized Tissues*; L Chen, R Jaquet, E Lowder, WJ Landis; University of Akron

B07.02 Microscopy, Microanalysis and Image Analysis in the Pharmaceutical Sciences

Session Chairs:

Alejandra Camacho, The L'Oréal Institute for Ethnic Hair and Skin Research;

Charles D. Humphrey, Centers for Disease Control and Prevention;

Andrew Vogt, AbbVie, Inc.

Platform Session

Thursday 8:25 AM • Room: 236

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **757** (Invited) *Correlative Imaging to Probe Heterogeneity of Cross-Linked Gelatin*; J-B Green, R Lin, M Francis-Sedlak, J DiOrio, MA Murphy, S Strathmann, L Stojanovic, J Mantei; Baxter Healthcare
- 9:00 AM **758** *Correlative Imaging of Culturable and Non-Culturable Bacteria*; MA Murphy, Y Pan, M Pasmore, JP DiOrio; Baxter Healthcare
- 9:15 AM **759** *Identification of Pharmaceutical Constituents in Finished Product Form Using Low kV Microanalysis*; T Nylese, R Anderhalt, V Gorcea; EDAX, Inc
- 9:30 AM **760** (Invited) *The Application of Forensic Trace Evidence Analysis to the Detection, Identification and Sourcing of Alleged Foreign Matter in Pharmaceutical Products*; S Palenik, CS Palenik; Microtrace LLC

ADVANCES IN INSTRUMENTATION SYMPOSIA THURSDAY MORNING

A03.08 New Opportunities for *In Situ* Techniques and Instruments

Session Chairs:

Thomas W. Hansen, Technical University of Denmark;
Blythe G. Clark, Sandia National Laboratories;
Klaus Qvortrup, University of Copenhagen

Platform Session

Thursday 8:25 AM • Room: 241

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **761** *In Situ SEM/TEM Observation of Platinum Catalysts on Carbon Support in a Gaseous Atmosphere Using a 300 kV CFE TEM/SEM*; H Matsumoto, T Sato, K Nakano, T Yaguchi, I Nagaoki, Y Nagakubo; Hitachi High-Technologies Corporation, Japan
- 8:45 AM **762** *Oxidation Studies of Carbon Nanotubes for Applications as X-Ray Field Emitters Using an Aberration-Corrected, Environmental TEM*; AL Koh; Stanford University; E Gidcumb, O Zhou; University of North Carolina, Chapel Hill; R Sinclair; Stanford University
- 9:00 AM **763** *In Situ Measurement of Localized Surface Plasmon Resonance of Metal Nanoparticles in Different Surrounding*; PA Lin; University of Maryland, College Park; J Winterstein; FEI Co; H Lezec, R Sharma; National Institute of Standards and Technology
- 9:15 AM **764** *In Situ Characterization of Light Induced Ag Particle Nucleation and Growth on Anatase*; L Zhang, BK Miller, PA Crozier; Arizona State University
- 9:30 AM **765** *Gas Mixing System for Imaging of Nanomaterials under Dynamic Environments by Environmental Transmission Electron Microscopy*; MC Akatay, Y Zvienevich; Purdue University; EA Stach; Brookhaven National Laboratory; F Ribeiro; Purdue University
- 9:45 AM **766** *Estimating the Local Gas Pressure in a Gas Flow Cell Stage In Situ Using Electron Energy Loss Spectroscopy*; R Colby, B Kabius; Pacific Northwest National Laboratory; DH Alsem; Hummingbird Scientific

A05.03 Revisiting Resolution for STEM and TEM

Session Chairs:

Edgar Voelkl, FEI;
Nasim Alem, Pennsylvania State University;
John Silcox, Cornell University

Platform Session

Thursday 8:25 AM • Room: 240

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **767** (Invited) *Addressing Detector Non-Uniformity in Scanning Transmission Electron Microscopy*; JM LeBeau; North Carolina State University; SD Findlay; Monash University
- 9:00 AM **768** *Effects of Charge Transfer in Atomic Bonding on HAADF-STEM Image Simulation*; ML Odlyzko, KA Mkhoyan; University of Minnesota
- 9:15 AM **769 M&M Student Award** *Electron Beam Channeling in Single Atomic Column*; A Mittal, KA Mkhoyan; University of Minnesota
- 9:30 AM **770** *In Situ Study of Nb Hydride for SRF Cavity Applications Using Aberration-Corrected STEM and Electron Energy Loss Spectroscopy*; R Tao; University of Illinois, Chicago; RF Klie; University of Illinois, Chicago; L Cooley, A Romanenko; Fermi National Accelerator Laboratory
- 9:45 AM **771** *STEM EELS Resolution Revisited*; MP Oxley; Vanderbilt University; SJ Pennycook; Oak Ridge National Laboratory

Scientific Program

A08.04 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Session Chairs:
 Natasha Erdman, JEOL USA Inc.;
 Joseph R. Michael, Sandia National Laboratories;

Platform Session

Thursday 8:25 AM • Room: 245

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **772** (Invited) *Characterizing Local Misorientation Gradients Near Grain Boundaries*; S Wright, MM Nowell, LH Chan; EDAX-TSL Inc
- 9:00 AM **773** *Evolution of Microstructure and Microtexture in Friction Stir Welded Oxide Dispersion Strengthened Steel*; BW Baker, S Menon, LN Brewer; Naval Postgraduate School
- 9:15 AM **774** *Quantitative, 3D Studies of the Evolution of Grain Size and Orientation in Nano-Grained, Polycrystalline Thin-Films*; AB Aebersold, C Hébert, DTL Alexander; Ecole Polytechnique Federale de Lausanne, Switzerland
- 9:30 AM **775** *Identifying the Electronic Properties of Grain Boundaries in CdTe Thin-Film Solar Cells Using Electron Backscatter Diffraction and Electron Beam Induced Current Techniques*; J Poplawsky, C Li; Oak Ridge National Laboratory; N Paudel, Y Yan; The University of Toledo; S Pennycook; Oak Ridge National Laboratory
- 9:45 AM **776** *Scanning Nano Beam Electron Diffraction and Applications to Characterization of High Entropy Alloys*; H Xing, K Kim, JM Zuo; University of Illinois, Urbana-Champaign; MA Hemphill, GY Wang; University of Tennessee; CW Tsai, JW Yeh; National Tsing Hua University, Taiwan; KA Dahmen; University of Illinois, Urbana-Champaign; PK Liaw; University of Tennessee

A11.03 Ion Beam Instrumentation and Applications for Physical and Biological Sciences

Session Chairs:
 Keana Scott, National Institute of Standards and Technology;
 Mike Marko, Wadsworth Center;
 Trevor E. Clark, Pennsylvania State University

Platform Session

Thursday 8:25 AM • Room: 242

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **777** (Invited) *Focussed Ion Beam Scanning Electron Microscopy in Biology*; C Kizilyaprak, C Lousert, J Daraspe, BM Humbel; University of Lausanne, Switzerland
- 9:00 AM **778** *Reproducibility in Focused Ion Beam Sample Preparation—A Key Requirement for Cryo-Electron Tomography of Eukaryotic Cells*; M Schaffer, E Villa, B Engel, Y Fukuda, T Laugks, A Rigort, M Schüler, A Schwarz, F Bäuerlein, J Mahami, W Baumeister, JM Plitzko; Max Planck Institute of Biochemistry, Germany
- 9:15 AM **779** *Ion Beam Preparation and Transmission-SEM Imaging of Frozen-Hydrated, Vitreous Lamellas Prepared by the Cryo-FIB-SEM: An All-In-One Instrument*; M De Winter, RJ Mesman, MF Hayles, CT Schneijdenberg; Utrecht University, Netherlands; C Mathisen; FEI Company, Netherlands; JA Post; Utrecht University, Netherlands
- 9:30 AM **780** *Progress in Cryo-FIB Preparation of Biological Specimens for Cryo-TEM*; M Marko, C Hsieh, T Wagenknecht; Wadsworth Center
- 9:45 AM **781 M&M Student Award** *The Use of Focused Ion Beam (FIB) Technology for Cell Wall Structure Elucidation*; M Blumentritt, SD Collins, SM Shaler; University of Maine

A12.04 Atom Probe Tomography in Correlative Investigations

Session Chairs:
Baptiste Gault, Elsevier Ltd;
Paul Bagot, University of Oxford

Platform Session

Thursday 8:25 AM • Room: 243

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **782** (Invited) *Atom Probe Tomography of III-Nitrides Based Semiconducting Devices*; JS Speck, R Shivaraman; University of California, Santa Barbara; Y-R Wu; National Taiwan University; S Choi, R Chung; University of California, Santa Barbara
- 9:00 AM **783 M&M Student Award** *Atom-Probe Tomographic Study of Interfacial Intermixing and Segregation in InAs/GaSb Superlattices*; Y Meng, H Kim; University of Illinois, Urbana-Champaign; D Isheim, DN Seidman; Northwestern University; J-M Zuo; University of Illinois, Urbana-Champaign
- 9:15 AM **784** *Characterization of 3D Dopant Distribution in State of the Art FinFET Structures*; MS Hatzistergos, M Hopstaken; IBM Corporation; E Kim, L Vanamurthy; Globalfoundries; JF Shaffer; IBM Corporation
- 9:30 AM **785** (Invited) *Atom Probe Tomography of Grain Boundaries in Ion Conducting Oxides*; DR Diercks, BP Gorman; Colorado School of Mines

A13.04 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:
Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Thursday 8:25 AM • Room: 239

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **786** (Invited) *Understanding the Effects of Wear Particles: Lessons Learned from Postmortem Retrievals*; DJ Hall, RM Urban, JO Galante, JJ Jacobs; Rush University Medical Center

- 9:00 AM **787** *Use of an Automated SEM to Detect Laboratory Contamination*; AP Lindstrom, NW Ritchie, DE Newbury; National Institute of Standards and Technology
- 9:15 AM **788** *Quantitative X-ray Photoelectron Spectroscopy Imaging for Small Feature Compositional Screening*; DJ Surman, SC Page, AJ Roberts, SJ Coultas; Kratos Analytical Ltd, United Kingdom
- 9:30 AM **789** *Ultra-Thin Iridium as a Replacement Coating for Carbon in High Resolution Quantitative Analyses of Insulating Specimens*; JT Armstrong, KL Crispin; Carnegie Institution of Washington
- 9:45 AM **790** *Focused Electron Beam and Elemental Mapping of Palm-Top EPMA (Scanning) Equipped with CL Spectrometer (Projection)*; S Imashuku, N Fuyuno, A Imanishi, K Hanasaki, K Ohira, J Kawai; Kyoto University, Japan

A14.04 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:
Moon J Kim, University of Texas at Dallas;
Ray W. Carpenter, Arizona State University;
John C. H. Spence, Arizona State University

Platform Session

Thursday 8:25 AM • Room: 208

- 8:25 AM *Welcome & Introduction to the Session*
- 8:30 AM **791** (Invited) *Movie Mode Dynamic Transmission Electron Microscope: Revealing Material Processes at Nanometer and Nanosecond Scales with Multi-Frame Acquisition*; T LaGrange, BW Reed, JT McKeown, MK Santala, WJ Dehope, G Huete, RM Shuttlesworth, GH Campbell; Lawrence Livermore National Laboratory
- 9:00 AM **792** *Capturing Irreversible Reactions with Nanosecond-Scale Dynamic TEM Movies: Measuring Crystal Growth Rates During Laser Annealing of Phase Change Materials*; MK Santala, BW Reed; Lawrence Livermore National Laboratory; S Raoux; IBM T J Watson Research Center; T Topuria; IBM Almaden Research Center; T LaGrange, GH Campbell; Lawrence Livermore National Laboratory
- 9:15 AM **793** *Photoelectron-Pulse Properties from Free-Free Transitions in Ultrafast Transmission Electron Microscopy*; DJ Flannigan; University of Minnesota

Scientific Program

9:30 AM **794** *Results of a pnCCD Based Ultrafast Direct Single Electron Imaging Camera for Transmission Electron Microscopy*; H Ryll; PnSensor GmbH, Germany; K Müller; University of Bremen, Germany; S Ihle, H Soltau; PnSensor GmbH, Germany; I Ordavo; PnDetector GmbH, Germany; A Liebel, R Hartmann; PnSensor GmbH, Germany; A Rosenauer; University of Bremen, Germany; L Strüder; PnSensor GmbH, Germany

9:45 AM **795** *High Brightness Photocathodes for Ultrafast TEM: A New Paradigm*; BL Rickman, JA Berger, AW Nicholls, WA Schroeder; University of Illinois, Chicago

Laboratory, United Kingdom; Ø Prytz; University of Oslo, Norway; G Helgesen; Institute for Energy Technology; R Brydson; University of Leeds, United Kingdom

PHYSICAL SCIENCES SYMPOSIA THURSDAY MORNING

P02.08 Structure and Composition Analysis of Nanoparticulate Systems

Session Chairs:
Dave Cullen, Oak Ridge National Laboratory;
Qian He, Oak Ridge National Laboratory

Platform Session

Thursday 8:25 AM • Room: 206-207

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **796** (Invited) *Direct Observation of the Evolution of Plasmonic Heterostructured Nanowires*; BM Hudak, Y-J Chang, G Li, BS Guiton; University of Kentucky
- 9:00 AM **797** *Ligands in PbSe Nanocrystals: Characterizations and Plasmonic Interactions*; AA Gunawan, B Chernomordik; University of Minnesota; D Plemmons; North Carolina State University; D Deng, E Aydil, A Mkhoyan; University of Minnesota
- 9:15 AM **798** *Analytical STEM Study of P-Doped Silicon Nanocrystals Exhibiting Mid-Infrared Localized Surface Plasmon Resonance*; JS Jeong, DJ Rowe, UR Kortshagen, KA Mkhoyan; University of Minnesota
- 9:30 AM **799** *Plasmon Excitations in Bimetallic Ag Nanostructures by Monochromated E-Beam*; R Sachan; Oak Ridge National Laboratory; A Malasi, G Duscher; University of Tennessee
- 9:45 AM **800** *Topologically Induced Confinement of Collective Modes in Polycrystalline Graphene Nanocones: Measured by Momentum Transfer Dependent STEM-VEELS*; FS Hage; Institute for Energy Technology, Norway; QM Ramasse, DM Kepaptsoglou; SuperSTEM

P05.04 Microstructural Characterization of Metals—150 Years After Sorby

Session Chairs:
James E. Martinez, NASA Johnson Space Center;
George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Thursday 8:25 AM • Room: 209

- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **801** (Invited) *Quantitative Microstructure Characterization by Application of Advanced SEM-Based Electron Diffraction Techniques*; S Zaefner, N-N Elhami, P Konijnenberg, T Jäpel; Max-Planck-Institut für Eisenforschung GmbH, Germany
- 9:00 AM **802** *k-Space Interference of Coherent TDS Electrons for Mean Atomic Displacement Measurements*; RA Herring; University of Victoria, Canada
- 9:15 AM **803** *Mechanism of Deformation Twinning in Tantalum Driven by Extremely Dynamic Shear-Compression at Low Temperature*; C Chen; Northwestern University; JN Florando, M Kumar; Lawrence Livermore National Laboratory; KT Ramesh, KJ Hemker; Johns Hopkins University
- 9:30 AM **804** *Control of Recrystallization Temperature via VC Formation on TiN Nanoparticles in Novel Ultra Low Carbon (ULC) Automotive Strip Steels*; S Zormalia, M Georgiou, G Fourlaris; National Technical University of Athens, Greece
- 9:45 AM **805** *Evidence of Cryogenic Indentation-Induced Grain Growth in Highly Twinned Nanocrystalline Copper*; JG Brons; University of Alabama; HA Padilla; Sandia National Laboratories, Albuquerque; GB Thompson; University of Alabama; BL Boyce; Sandia National Laboratories, Albuquerque

P08.02 Advanced Atomic-Scale Imaging and Spectroscopy of Materials

Session Chairs:

David C. Bell, Harvard University;
Nigel Browning, Pacific Northwest National Laboratory;
Matthew Chisolm, Oak Ridge National Laboratory

Platform Session

Thursday 8:25 AM • Room: 244

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- 8:25 AM **Welcome & Introduction to the Session**
- 8:30 AM **806** *Measuring Phase Transitions in $La_{1-x}Sr_xCoO_3$ Using In Situ Atomic-Resolution Z-Contrast Imaging and EELS*; A Gulec; University of Illinois, Chicago; RF Klie; University of Illinois, Chicago
- 8:45 AM **807** *Interplay of Octahedral Rotations, Magnetic and Electronic Properties in Epitaxial $LaCoO_3$ Thin Films*; JH Jang; Oak Ridge National Laboratory; Y-M Kim; Korea Basic Science Institute, South Korea; R Mishra; Vanderbilt University; L Qiao, MD Biegalski, Z Gai, AR Lupini; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; SJ Pennycook, AY Borisevich; Oak Ridge National Laboratory
- 9:00 AM **808 M&M Student Award** *PFM and TEM Characterization of Polarization in Ferroelectric BFO under Changing Mechanical Constraints*; JR Jokisaari, P Gao, X Pan; University of Michigan
- 9:15 AM **809** *Atomic Structure of Surface Dielectric Dead Layer in $BiFeO_3$ Thin Film*; Y-M Kim; Korea Basic Science Institute, South Korea; AN Morozovska, EA Eliseev; National Academy of Sciences of Ukraine; AR Lupini; Oak Ridge National Laboratory; Y-H Chu; National Chiao Tung University, Taiwan; P Yu, R Ramesh; University of California-Berkeley; SJ Pennycook, SV Kalinin, AY Borisevich; Oak Ridge National Laboratory
- 9:30 AM **810** *Characterization of Structure and Grain Boundary Composition in Undoped and Doped Ceria Synthesized by Spray Drying for Solid Oxide Fuel Cells*; WJ Bowman, PA Crozier; Arizona State University; R Sharma; Center for Nanoscale Science and Technology, National Institute of Standards and Technology
- 9:45 AM **811** *Toroidal Plasmonic Eigenmodes in Oligomer Nanocavities for the Visible Detected by EFTEM and 3D-FDTD Simulations*; B Ogut, N Talebi; Max Planck Institute for Intelligent Systems, Germany; R Vogelgesang; Carl von Ossietzky University of Oldenburg, Germany; W Sigle, PA van Aken; Max Planck Institute for Intelligent Systems, Germany

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA THURSDAY MORNING

B03.P2 Structural Biology and Cell Ultrastructure

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

- 10:00 AM **812 M&M Post-Doctoral Award** *Structure of the T = 3 Hepatitis B Virus Capsid at 3.6Å Resolution*; W Wu, N Cheng, NR Watts, PT Wingfield, AC Steven; National Institute for Arthritis and Musculoskeletal and Skin Diseases
Poster # 308
- 10:00 AM **813** *Ultrastructural Analysis of IpaD at the Tip of the Nascent MxiH Type III Secretion Apparatus of Shigella flexneri*; CR Epler, NE Dickenson; Oklahoma State University; E Bullitt; Boston University WL Picking; Oklahoma State University
Poster # 309
- 10:00 AM **814 M&M Post-Doctoral Award** *Structure of an RNA Silencing Complex in CRISPR-Mediated Immunity*; MS Spilman, AI Cocozaki, Y Shao, NF Ramia, H Li, S Stagg; Florida State University
Poster # 310
- 10:00 AM **815** *Structural Elucidation of Archaeal Box C/D sRNP by Cryo-Electron Microscopy*; WSV Yip, H Shigematsu, DW Taylor; Yale University; H-W Wang; Tsinghua University, China; SJ Baserga; Yale University
Poster # 311
- 10:00 AM **816** *First Structural Characterization of the Chloroplast Division Accessory Protein ARC6*; MW Sung, S Vitha, A Holzenburg; Texas A&M University
Poster # 312
- 10:00 AM **817** *Beyond Imaging: Scanning Electron Microscope for the Quantitative Mass Measurement*; V Krzyzanek; Academy of Sciences of the Czech Republic, Czech Republic; S Tacke; University of Muenster, Germany; K Dobranska; Academy of Sciences of the Czech Republic, Czech Republic; R Reichelt; University of Muenster, Germany
Poster # 313
- 10:00 AM **818** *Ultrastructural Analysis of Haloalkaliphilic Bacteriophage Isolates from Mono Lake, a North American Soda Lake*; KD Moulton, A Hatch, M Movassaghi, N Lobo; University Southern Maine; F Mwaura; University of Nairobi, Kenya; LJ Rothschild; NASA Ames Research Center; SM Duboise; University Southern Maine
Poster # 314
- 10:00 AM **819** *Observation of Early Pollen Exine Patterning by Scanning Electron Microscopy*; AB Kirkpatrick, HA Owen; University of Wisconsin, Milwaukee
Poster # 315
- 10:00 AM **820** *The Atmospheric Scanning Electron Microscope (ASEM) Observes the Critical Moment of Platelet Generation from Megakaryocytes in Solution*; C Sato; National Institute of Advanced Industrial Science and Technology, Japan; H Nishiyama; JEOL, Ltd, Japan; Y Maruyama, T Ebihara; National Institute of Advanced Industrial Science and Technology, Japan; M Suga; JEOL, Ltd, Japan; M Yamamoto, H Motohashi; Tohoku University, Japan
Poster # 316
- 10:00 AM **821** *Detection of Epidermal Growth Factor Receptor Dimers on Wet and Intact Eukaryotic Cells in an Environmental Scanning Electron Microscope*; D Peckys, U Werner, N de Jonge; Leibniz Institute for New Materials, Germany
Poster # 317
- 10:00 AM **822** *STEM Imaging of Magnetotactic Bacteria with the Fluid Cell*; S Kashyap; Ames Laboratory; T Perez-Gonzalez, D Faivre; Max Planck Institute of Colloids and Interfaces, Germany; L Rahn-Lee, A Komeili; University of California, Berkeley; T Prozorov; Ames Laboratory
Poster # 318
- 10:00 AM **823** *Novel Fibrillar Structure in the Stroma of Murine Cornea*; AR Behzad; King Abdullah University of Science and Technology, Saudi Arabia; E Brown, N Shenoi, M Gondo, AR Burns, S Hanlon; University of Houston
Poster # 319
- 10:00 AM **824** *Nucleoid Structure of Escherichia coli as Revealed by Scanning Transmission Electron Microscopy (STEM) and by 3D-Reconstruction of Z-Contrast Images of Serial Sections*; B Reiner, Y Guo, EW Roth, NH Yazdi; Northwestern University; RC Johnson; University of California, Los Angeles; C Guet; Institute of Science and Technology, Austria; J Marko, VP Dravid; Northwestern University
Poster # 320

10:00 AM **825** *Cyanobacteria, Algae and Microbes Used as Bioindicators in Water Quality Analysis of Pocotaligo Watershed in Sumter, SC*; R Byrd, A Sims; University of South Carolina, Sumter; C Brandon, E Balogh; University of South Carolina, Columbia; P Fernandes, K Ghoshroy; University of South Carolina, Sumter

Poster # 321

10:00 AM **826 M&M Student Award** *Morphometric Studies of the Endodermis in Petioles of Seedlings Grown During a Spaceflight Experiment*; CM Johnson, KD Millar, RE Edelmann, JZ Kiss; Miami University

Poster # 322

10:00 AM **827** *Wheat Leaves: The Surface Disposition of Their Epicuticular Wax*; EA Favret, B Pidal; Instituto Nacional de Tecnología Agropecuaria, Argentina

Poster # 323

B07.P1 Microscopy, Microanalysis and Image Analysis in the Pharmaceutical Sciences

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **834** *Correlative Imaging of CD34 Positive Peripheral Blood Stem Cells*; LL Stojanovic, MA Murphy, D Motlagh, JP DiOrio; Baxter Healthcare Corporation

Poster # 330

10:00 AM **835** (Invited) *Microscopy in Glass Corrosion Analysis of Parenteral Products*; RA Carlton; GlaxoSmithKline

Poster # 331

10:00 AM **836** *The Effect of 17- β -estradiol on Cellular Proliferation Mediated by Protein Disulfide Isomerase and the Mammalian Target of Rapamycin (mTOR)*; P Patel, A Calabro, C Queenan, D Leonardi; Bergen County Technical Schools

Poster # 332

ADVANCES IN INSTRUMENTATION SYMPOSIA THURSDAY MORNING

A11.P2 Ion Beam Instrumentation and Applications for Physical and Biological Sciences

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **837** *The Helium Ion Microscope—A Versatile Tool for a Wide Range of Applications*; B Goetze, C Huynh, L Stern, H Wu, D Ferranti, M Ananth; Carl Zeiss LLC

Poster # 333

10:00 AM **838** *Helium Ion Nanomachining in Membranes and Bulk Substrates*; EM Mutunga; University of the District of Columbia; AE Vladar; National Institute of Standards and Technology; LA Stern; Carl Zeiss LLC; KL Klein; University of the District of Columbia

Poster # 334

10:00 AM **839** *Wafer-Scale Ion Beam Lithography of Nanopore Devices*; J Klingfus; Raith USA, Inc; A Nadzeyka, S Bauerdick; Raith GmbH, Germany; T Albrecht, JB Edel; Imperial College London, United Kingdom

Poster # 335

10:00 AM **840** *Three-Dimensional Visualization of Murine Cardiac Tissue Using FIB-SEM Segmentation Techniques*; G Wetzel; Clemson University; JJ Clarke; Hitachi High Technologies America, Ltd.; J Hudson; Clemson University

Poster # 336

10:00 AM **841** *Investigating CNTs in Lung Tissue with FIB-SEM*; C Købler; Technical University of Denmark; AT Saber, UB Vogel; National Research Centre for the Working Environment; K Qvortrup; University of Copenhagen, Denmark; K Mølhave; Technical University of Denmark

Poster # 337

10:00 AM **842** *Fabrication of In-Plane Nanochannels by Focused Ion Beam Milling*; A Kneller, ZD Harms, L Selzer, A Zlotnick, SC Jacobson; Indiana University, Bloomington

Poster # 338

10:00 AM **843** *Cryogenic Focused Ion Beam Milling for Studying Wetting Hysteresis Behavior*; J Su, C Santeufemio, P Wang, H Sun; University of Massachusetts, Lowell

Poster # 339

Scientific Program

10:00 AM **844** *Extreme High Resolution Imaging of Uncoated Cells in a DualBeam™*; JL Riesterer; FEI Company; CS López, E Barklis; Oregon Health and Science University

Poster # 340

10:00 AM **845** *FIB Micromachining of Frozen Systems for TEM*; FI Allen; University of California; LR Comolli; Lawrence Berkeley National Laboratory; EA Marquis; University of Michigan; AM Minor; University of California

Poster # 341

10:00 AM **846** *Cryo-FIB/SEM Investigation of Mechanism of Frost Formation on Lubricant-Impregnated Surfaces*; K Rykaczewski, S Anand, S Bengaluru Subramanyam, KK Varanasi; Massachusetts Institute of Technology

Poster # 342

A12.P2 Atom Probe Tomography in Correlative Investigations

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **847** *Constraining Atom Probe Tomography Reconstructions of Crystalline Oxides*; MJ Cohen, L Gordon; Northwestern University; S Suram, K Kaluskar, K Rajan; Iowa State University; JW Valley; University of Wisconsin; D Joester; Northwestern University

Poster # 343

10:00 AM **848** *Characterization of the Influence of Grain Boundary Character on Oxidation of Nickel Using Atom Probe Tomography*; SL Welsh, JL Evans; University of Alabama, Huntsville

Poster # 344

10:00 AM **849** *Atom Probe Tomography Analysis of a Gallium-Nitride-Based Commercial Light-Emitting Diode*; TJ Prosa, D Olson, AD Giddings; CAMECA Instruments, Inc; W Lefebvre; Université de Rouen, France; PH Clifton, DJ Larson; CAMECA Instruments, Inc

Poster # 345

10:00 AM **850** *Atom Probe Tomography Characterization of a White Etching Area in a Bearing Steel*; J Kang; University of Cambridge, United Kingdom; C Williams; University of Oxford, United Kingdom; B Hosseinkhani; SKF; PE Rivera Diaz del Castillo; University of Cambridge, United Kingdom; PA Bagot, MP Moody; University of Oxford, United Kingdom

Poster # 346

10:00 AM **851** *Atom Probe Tomography Characterization of Catalyst Nanoparticles*; PA Bagot; University of Oxford, United Kingdom; T Li; University of Sydney, Australia; E Tsang, G Smith, MP Moody; University of Oxford, United Kingdom

Poster # 347

10:00 AM **852** *Atom Probe Characterization of Corroded Alloy 600*; B Gault; Elsevier Ltd, United Kingdom; F Scenini; University of Manchester, United Kingdom; MP Moody; University of Oxford, United Kingdom; JH Huang, GA Botton; McMaster University, Canada; D Mangelinck, M Descoins; Université Aix-Marseille, France; RC Newman; University of Toronto, Canada

Poster # 348

10:00 AM **853** *New Applications in Atom Probe Tomography*; DJ Larson; Cameca Instruments Inc; JW Valley, T Ushikubo; University of Wisconsin; MK Miller; Oak Ridge National Laboratory; H Takamizawa, Y Shimizu; Tohoku University, Japan; LM Gordon, D Joester; Northwestern University; D Giddings, DA Reinhard, TJ Prosa, DP Olson, DF Lawrence, PH Clifton, RM Ulfig, I Martin, TF Kelly; Cameca Instruments Inc

Poster # 349

10:00 AM **854** *Atom-Probe Tomographic Study of Precipitation in an Ultrafine-Grained Al-Zn-Mg-Cu Alloy (Al 7075)*; H Wen, K Ma; University of California, Davis; D Isheim, DN Seidman; Northwestern University; JM Schoenung, EJ Lavernia; University of California, Davis

Poster # 350

10:00 AM **855** *3D Characterization Study of High-k Dielectric on GaN Using Atom Probe Tomography*; B Mazumder, X Liu, UK Mishra, JS Speck; University of California, Santa Barbara

Poster # 351

10:00 AM **856** *Application of Atom Probe Tomography to Atomic Layer Deposited Thin Films*; AD Giddings, TJ Prosa, TF Kelly, DJ Larson; CAMECA Instruments, Inc

Poster # 352

10:00 AM **857** *Atom Probe Tomography Study of In-Doped ZnO*; M Baram; Harvard University; MN Bachhav, AH Hunter, EA Marquis; University of Michigan; DC Bell, X Liang, DR Clarke; Harvard University

Poster # 353

10:00 AM **858** *Methods for Micro-to-Nanometer Correlative Tomography*; S Gerstl, M Lucas, E Mueller, P Gasser, RA Wepf; ETH Zürich, Switzerland

Poster # 354

ADVANCES IN INSTRUMENTATION SYMPOSIA THURSDAY MORNING

A14.P1 New Instrumentation at the Limits: Characteristics and Applications

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

- 10:00 AM **859** *Multislice Simulation of Dynamical Elastic Scattering and Orbital Angular Momentum of Vortex Beams in Crystals*; L Xie, P Wang; Nanjing University, People's Republic of China; X Pan; University of Michigan
Poster # 355
- 10:00 AM **860** *Electron Orbital Angular Momentum Transfer to Nanoparticle Plasmon Modes*; TR Harvey, JS Pierce, TS Yahn; University of Oregon; PA Ercius; Lawrence Berkeley National Laboratory; BJ McMorran; University of Oregon
Poster # 356
- 10:00 AM **861** *High Efficiency Electron Diffractive Optics*; JS Pierce, TR Harvey, TS Yahn, BJ McMorran; University of Oregon
Poster # 357
- 10:00 AM **862** *Evaluation of a Multi-Pixel CMOS Photon Detector*; JH Chuah; University of Malaya, Malaysia; DM Holburn, BC Breton, N Caldwell; University of Cambridge, United Kingdom
Poster # 358
- 10:00 AM **863** *The Development of a Large-Area Windowless Energy Dispersive X-ray Detector for STEM-EDX Analysis*; K Tamura, R Namekawa; Hitachi High-Technologies Corporation, Japan; R Buchhold, B Hammell, A Sandborg; EDAX Inc; T Sato, M Konno, H Inada, K Nakamura, Y Taniguchi, T Hashimoto; Hitachi High-Technologies Corporation, Japan
Poster # 359
- 10:00 AM **864** *On Achromatic Probe-Forming Lenses for FIB Columns and Helium Microscopes*; FW Martin; Nanobeam Corporation
Poster # 360
- 10:00 AM **865** *Estimation of Energy Acceptance of SE Detectors in Scanning Electron Microscopy*; K Kumagai, T Sekiguchi; National Institute for Materials Science, Japan
Poster # 361

- 10:00 AM **866** *How Flat is Your Detector? Non-Uniform Annular Detector Sensitivity in STEM Quantification*; KE MacArthur, L Jones, PD Nellist; University of Oxford, United Kingdom
Poster # 362

- 10:00 AM **867** *3D ChemiSTEM™ Tomography of Secondary and Tertiary γ' Precipitates in Ni-Based Superalloys*; R Chowdhury, JM Sosa, RE Williams, HL Fraser, DW McComb; The Ohio State University
Poster # 363

- 10:00 AM **868** *Evaluating Long-Term Stability and Transient Disturbances of a TEM*; M Malac; National Institute for Nanotechnology, Canada; RA McLeod; University of Alberta, Canada; Y Taniguchi; Hitachi High-Technologies Corp, Japan; M Bergen; National Institute for Nanotechnology, Canada; D Hoyle; Hitachi High Technologies Canada, Inc.
Poster # 364

- 10:00 AM **869** *Enhanced Angular Topographic Backscatter Electron Filtering*; D Phifer; FEI Company BV, Netherlands; J Pecher, P Valasek, M Petrek, T Vystavel; FEI Brno, Czech Republic
Poster # 365

- 10:00 AM **870** *Atomic Structure and Chemistry of Defects in Non-Stoichiometric SrVO₃ Thin Films*; H Mohammad Alipour, RM White; North Carolina State University; C Eaton; Pennsylvania State University; JA Moyer; University of Illinois, Urbana-Champaign; R Engel-Herbret; Pennsylvania State University; JM LeBeau; North Carolina State University
Poster # 366

A18.P1 Holography

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

- 10:00 AM **871** *Nanoscale Magnetic Characterization of TMR Spin Valve by Electron Holography*; HS Park; RIKEN, Japan; K Hirata; TDK Corporation, Japan; K Yanagisawa; Okinawa Institute of Science and Technology, Japan; Y Ishida; TDK Corporation, Japan; T Matsuda; Japan Science and Technology Agency; D Shindo; Tohoku University, Japan; A Tonomura; Hitachi High-Technologies Corporation, Japan
Poster # 367

Scientific Program

10:00 AM **872** *Characterization of AlGaIn-Based GRINSCH Using TEM and Electron Holography*; A Boley; Arizona State University; H Sun; Boston University; M McCartney, D Smith; Arizona State University; T Moustakas; Boston University

Poster # 368

10:00 AM **873** *Electron Holography at Low Voltages Exemplified by Graphene*; F Börrnert, A Lubk, F Röder, D Wolf, H Lichte; Technical University Dresden, Germany

Poster # 369

10:00 AM **874 M&M Student Award** *Characterization of Abrupt Heterojunctions in SiGe NW Using Off-Axis Electron Holography*; Z Gan; Arizona State University; D Perea; Pacific Northwest National Laboratory; T Picraux; Los Alamos National Laboratory; D Smith, M McCartney; Arizona State University

Poster # 370

10:00 AM **875** *Characterization of Multilayer Ferromagnetic Nanowire Arrays Using Off-Axis Electron Holography*; A Akhtari Zavareh; Simon Fraser University, Canada; T Kasama; Technical University of Denmark; L-P Carignan, A Yelon, D Ménard; École Polytechnique de Montréal, Canada; R Herring; University of Victoria, Canada; R Dunin-Borkowski; Forschungszentrum Jülich, Germany; M McCartney; Arizona State University; K L.Kavanagh; Simon Fraser University, Canada

Poster # 371

10:00 AM **876** *Polarization and Charge Density Distribution in Highly Strained Mixed Phase BiFeO₃ Studied by STEM and Electron Inline Holography*; YA Shin, K Song; Pohang University of Science and Technology, Republic of Korea; K Chu, C-S Woo, C-H Yang; Korea Advanced Institute of Science and Technology, Republic of Korea; SH Oh; Pohang University of Science and Technology, Republic of Korea

Poster # 372

10:00 AM **877** *Dynamic Scattering Theory for Dark-Field Electron Holography of 3D Strain Fields*; A Lubk; University of Dresden, Germany; E Javon; University of Antwerp, Belgium; MJ Hÿtch; Centre National de la Recherche Scientifique, France

Poster # 373

PHYSICAL SCIENCES SYMPOSIA THURSDAY MORNING

P02.P3 Structure and Composition Analysis of Nanoparticulate Systems

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **878** *A Comparative Study of Quick and Simple Methods for Thickness Measurement of Graphene*; H Pettersson, V Nicolosi; Trinity College Dublin, Ireland

Poster # 374

10:00 AM **879** *Raman Spectroscopy and Microstructural Study of Natural Graphite Processed by High-Energy Ball Mill*; JM Mendoza-Duarte, MH Bocanegra-Bernal, R Martinez-Sanchez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 375

10:00 AM **880** *Effect of High-Energy Ball Milling on the Microstructure of Natural Graphite*; JM Mendoza-Duarte, R Martinez-Sanchez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 376

10:00 AM **881** *Characterization of Annealed Activated Carbon*; C Wisner, SS Mahadik, C Sotiriou-Leventis, N Leventis; Missouri University of Science and Technology

Poster # 377

10:00 AM **882** *Band Structure and Spectroscopy of Graphene-Pd Hybrids*; M Eastman, W Qian, D Hedinger, A Jacobson, B Jiang, J Jiao; Portland State University

Poster # 378

10:00 AM **883** *Novel TiO₂ Based Photocatalyst Utilizing Crystalline Graphene as a Platform*; W Qian, S Fowler, S Cottingham, J Jiao; Portland State University

Poster # 379

10:00 AM **884** *In Situ TEM Observation of the Nucleation and Growth of Metal Oxide Nanoparticles on Graphene*; L Luo, J Wu, J Xu, VP Dravid; Northwestern University

Poster # 380

Scientific Program

10:00 AM **885** *Characterization of Few-Walled Carbon Nanotubes Using Alcohols Aliphatic as Carbon Source*; E Ordonez-Casanova; Universidad Autonoma de Ciudad Juarez, Mexico; M Roman-Aguirre, A Aguilar-Elguezabal, F Espinosa-Magana; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 381

10:00 AM **886** *Effect of the CNT Quality in CNT/Al₂O₃ Composites*; R Perez-Bustamante; Centro de Investigación en Materiales Avanzados, Mexico; F Perez-Bustamante; Universidad Autónoma de Chihuahua, Mexico; P Amezcaga-Madrid, I Estrada-Guel, M Miki-Yoshida, R Martinez-Sanchez; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 382

10:00 AM **887** *Fast STEM EELS Spectrum Imaging Analysis of Pd-Au Based Catalysts*; P Longo, RD Twisten; Gatan, Inc; G Kothleitner; Graz University of Technology, Austria

Poster # 383

10:00 AM **888** *Transmission Electron Microscopy Study on Platinum Nanoparticle Distribution in PEMFC Catalyst Layers under Different Ionomer/Carbon Ratios Fabricated by Direct Dry Deposition*; H Yu, J Roller, R Jain, B Carter, R Maric; University of Connecticut

Poster # 384

10:00 AM **889** *In Situ Study of Pt/Cu/Pt(111) Near-Surface Alloy Model Catalyst in CO*; LT Nguyen, F Tao, F Cheng, L Liu; University of Notre Dame

Poster # 385

10:00 AM **890** *Morphological and Structural Study of GaAs Nanowires Grown Using VLS Method on EBL Patterned Au Catalysts*; BJ O'Dowd; Trinity College Dublin, Ireland; T Wojtowicz; Polish Academy of Sciences; S Rouvimov, X Liu, R Pimpinella; University of Notre Dame; V Kolkovsky, T Wojciechowski, M Zgirski; Polish Academy of Sciences; M Dobrowolska, JK Furdyna; University of Notre Dame

Poster # 386

10:00 AM **891** *Singly Anchored Pt and Pd Atoms on Co₃O₄ and Their Catalytic Performance*; S Zhang, F Tao; University of Notre Dame; AI Frenkel; Yeshiva University; S Takeda; Osaka University, Japan

Poster # 387

10:00 AM **892** *Restructuring Early Transition Metal Oxide for New Catalysis*; FF Tao; University of Notre Dame; S Zhang, H Yoshida, S Takeda; Osaka University, Japan

Poster # 388

10:00 AM **893** *Reversible Pt Nanoparticle Formation in Pt-Doped BaCeO₃ and Related Application*; S Zhang, X Du, M Fang, M Katz, G Graham, X Pan; University of Michigan

Poster # 389

P05.P2 Microstructural Characterization of Metals – 150 Years After Sorby

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **894** *Electron Probe Microanalysis Study on an Unusual Chernobyl Hot "Particle"*; P Pöml; Institute for Transuranium Elements, Germany; B Burakov; VG Khlopin Radium Institute, Russia; T Geisler; University of Bonn, Germany

Poster # 390

10:00 AM **895** *Environment-Sensitive Behaviour of Welds: Challenges in Microstructural Characterisation*; MG Burke, S Schilling, A Welbourne; University of Manchester, United Kingdom

Poster # 391

10:00 AM **896** *Cooling Rate Influence on Corrosion Resistance of a A383 Aluminum Alloy in Contact with E10, E30 and E100 Bio-Ethanol*; M Santos-Beltran, A Santos-Beltran, V Gallegos-Orozco; Universidad Tecnológica Junta de los Rios, Mexico; R Martinez-Sanchez, F Paraguay-Delgado; Centro de Investigación en Materiales Avanzados, Mexico; C Rodriguez-Gonzalez; Universidad Autonoma de Ciudad Juarez, Mexico

Poster # 392

10:00 AM **897** *Microscopic Investigations of Sulfur-Rich Corrosion Products on Copper*; WK Collins, M Ziomek-Moroz; US Department of Energy

Poster # 393

10:00 AM **898** *X-Ray Mapping of Wide Gap Brazed Bi-Metallic Composites*; P Huggett; Materials Solutions Pty Ltd; R Wuhrer; University of Western Sydney, Australia

Poster # 394

10:00 AM **899** *RIMAPS Prediction of Etch Pit Patterns*; NO Fuentes; Comiaión Nacional de Energía Atómica, Argentina; EA Favret; Universidad Nacional de Gral, Argentina

Poster # 395

Scientific Program

10:00 AM **900** *Microstructural Evaluation of Welded Pearlitic Rail Steel*; H Aglan, K Prayakara; Tukeseege University; A Allie; Nucor Steel

Poster # 396

10:00 AM **901** *Effect of the Corrosion on Thin Films Nanostructured of Stainless Steel 304 Deposited by Magnetron Sputtering*; C Lopez-Melendez; Universidad La Salle Chihuahua, Mexico; C Carreño-Gallardo, HE Esparza-Ponce; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 397

10:00 AM **902** *Nano-sized Silicon Dioxide Reinforced Aluminum Alloy 2024-T6*; C Carreño-Gallardo, I Estrada-Guel, C Leyva-Porras; Centro de Investigación en Materiales Avanzados, Mexico; C López-Melendez; Universidad La Salle de Chihuahua, Mexico; R Martínez-Sanchez; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 398

P08.P1 Advanced Atomic-Scale Imaging and Spectroscopy of Materials

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **903** *Resolution Investigation of Potentiometric-Scanning Ion Conductance Microscopy*; A Weber; Indiana University; C-C Chen; National Taiwan University; Y Zhou, LA Baker; Indiana University

Poster # 399

10:00 AM **904** *High Resolution Transmission Electron Microscopy and Selected Area Diffraction Study of Doped Zinc Oxide Thin Film*; L Fang, P Ricou, R Korotkov; Arkema Inc

Poster # 400

10:00 AM **906** *Origin of Ferromagnetism in Perovskite Cobaltites*; T Kishida; Asahi Kasei Corporation, Japan; SJ Pennycook, MF Chisholm; Oak Ridge National Laboratory

Poster # 402

10:00 AM **907** **M&M Student Award** *Evidence for a Thickness-Dependent Crossover from Charge- to Strain-Mediated Magnetoelectric Coupling in $La_{0.7}Sr_{0.3}MnO_3/PbZr_{0.2}Ti_{0.8}O_3$ Thin Film Oxide Heterostructures*; SR Spurgeon, JD Sloppy, CR Winkler, M Jablonski; Drexel University; D Kepaptsoglou; SuperSTEM Laboratory, United Kingdom; P Balachandran, S Nejati; Drexel University; J Karthik, AR Damodaran; University of Illinois, Urbana-Champaign; CL Johnson; Drexel University; H Ambaye, R Goyette, V Lauter; Oak Ridge National

Laboratory; Q Ramasse; SuperSTEM Laboratory, United Kingdom; JC Idrobo; Oak Ridge National Laboratory; KK Lau; Drexel University; SE Lofland; Rowan University; J Rondinelli; Drexel University; LW Martin; University of Illinois, Urbana-Champaign, ML Taheri; Drexel University

Poster # 403

10:00 AM **908** *Study of Electronic Structure of $LiNbO_3$ Nanoparticles by EELS*; V Gallegos-Orozco; Universidad Tecnológica Junta de los Rios; A Santos-Beltran, F Paraguay-Delgado; Centro de Investigación en Materiales Avanzados, Mexico; CA Diaz-Moreno, R Farias-Mancillas; Universidad Autonoma de Ciudad Juarez, Mexico; FR Espinosa-Magaña; Centro de Investigación en Materiales Avanzados, Mexico

Poster # 404

10:00 AM **909** *Synthesis of Carbon Nanofibers by Spray Pyrolysis*; J Bernal, A Garcia-Barrientos; Universidad Politecnica de Pachuca, Mexico; A Juanico; Universidad Politecnica del Valle de Mexico; A Medina, L Bejar-Gomez; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; J Solis; SEP-DGEST-IT, Mexico

Poster # 405

10:00 AM **910** *Galvanic Exchange on Reduced Graphene Oxide. Designing a Multifunctional Two-Dimensional Catalyst Assembly*; S Krishnamurthy, PV Kamat; University of Notre Dame

Poster # 406

10:00 AM **911** *Conductivity Tuning of a Silver Nanowire Mesh Using an UV Light*; S Xu, G Poirier, N Yao; Princeton University

Poster # 407

10:00 AM **912** *Structural and Spectroscopic Properties of $MgTi_2O_5/MgTiO_3$ Composite by Solid State Technique*; E Izci; Anadolu University, Turkey

Poster # 408

10:00 AM **913** *Influence of Bismuth Additive on the Growth of ZnO Nanostructures*; J Xu, JY Liu; Arizona State University

Poster # 409

10:00 AM **914** *Photovoltaic Performance Enhancement in Plasmonic Quantum Dot Solar Cells*; JS Manser, PV Kamat; University of Notre Dame

Poster # 410

10:00 AM **915** *High Spatial Resolution CL Images of ZnO Nanostructures*; J Xu, D Convey, D Yuchi, J Liu; Arizona State University

Poster # 411

P09.P1 Physical Sciences—Nanomaterials Characterization

Poster Session

Thursday 10:00 AM • Room: Exhibit Hall

10:00 AM **916** *Defects in Heavy-Ion Bombarded Compound Semiconductors Due to the Elastic and Inelastic Energy Loss Regimes*; AS Khalil; Tabbin Institute for Metallurgical Studies, Cairo, Egypt; LT Chadderton, AM Stewart, DJ Llewellyn, MC Ridgway, AP Byrne; Australian National University, Canberra

Poster # 412

10:00 AM **917** *Dynamical Control of Orbital Ordering and Ferroelectric-Induced Polar State in Metallic Manganites*; RF Klie, Q Qiao, A Gulec, PJ Phillips; University of Illinois, Chicago

Poster # 413

10:00 AM **918** *Deep Ultra-Violet Emission from GaN/AlN Matrix Grown by Plasma-Assisted Molecular Beam Epitaxy*; J Verma, V Protasenko, A Verma, M Islam, G Xing, D Jena; University of Notre Dame

Poster # 414

10:00 AM **919** *On the Origin of Low Thermal Conductivity in High Thermoelectric Performance in n-type BiAgSeS*; H Wu; Xi'an Jiaotong University, China; Y-L Pei; Beihang University, China; J Li; Harbin Institute of Technology, China; J Sui; Harbin Institute of Technology; L Zhao; Beihang University, China; J He; South University of Science and Technology, China

Poster # 415

10:00 AM **920** *SEM/EDS Characterization of Radioactive Particles in Samples of PM10*; R Ramirez-Leal, H Duarte-Tagles, M Burgos-Hernandez, C Chavez-Toledo; State University of Sonora, Mexico

Poster # 416

10:00 AM **921** *Copper (II) Remediation Using Novel Iron-Phosphate Nanoparticles*; S Rouvimov; University of Notre Dame; N Adam; University of Wyoming; J Gates, B Beachel; East Central University

Poster # 417

Scientific Program

BIOLOGICAL SCIENCES SYMPOSIA THURSDAY AFTERNOON

B03.03 Structural Biology and Cell Ultrastructure

Session Chairs:

Michael Radermacher, University of Vermont;
Ingeborg Schmidt-Krey, Georgia Institute of Technology;
Paula da Fonseca, MRC Laboratory of Molecular Biology

Platform Session

Thursday 1:25 PM • Room: 238

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **922** (Invited) *Structure and Function of Tripeptidyl Peptidase II, a Giant Cytosolic Protease*; A-M Schönegege, J Peters, M Wehmer, W Baumeister, B Rockel; Max Planck Institute of Biochemistry, Germany
- 2:00 PM **923** *Structure of the Human 26S Proteasome*; PC da Fonseca; MRC Laboratory of Molecular Biology, United Kingdom; EP Morris; The Institute of Cancer Research, United Kingdom
- 2:15 PM **924** *3-D Structure of Cellulose Microfibril in Wood Using Electron Tomography and Single Particle Reconstruction Methods*; M Reza, P Engelhardt, J Ruokolainen; Aalto University, Finland
- 2:30 PM **925** *Iron Based Magnetoreception in the Honey Bee Apis mellifera*; A Boyd, M House; University of Western Australia; G Cowin; University of Queensland, Australia; B Baer, P Clode, J Shaw; University of Western Australia
- 2:45 PM **926** *Aspects of the Cytology, Chemical Composition and Elemental Distribution in Leaves of Ni-Hyperaccumulating and Non-Hyperaccumulating Genotypes of Senecio coronatus*; J Mesjasz-Przybylowicz, AD Barnabas; iThemba LABS, South Africa; I Yousef, P Dumas, F Jamme; Soleil Synchrotron, France; T Sechogela, W Przybylowicz; iThemba LABS, South Africa

B07.03 Microscopy, Microanalysis and Image Analysis in the Pharmaceutical Sciences

Session Chairs:

Alejandra Camacho, The L'Oréal Institute for Ethnic Hair and Skin Research;
Charles D. Humphrey, Centers for Disease Control and Prevention

Platform Session and FIG Meeting

Thursday 1:25 PM • Room: 236

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **927** *Multiple Morphologies of Gold-Coated Magnetite Nanoparticles Are Conjugated With Ligands and Can Produce Receptor-Mediated Biological Effects*; ES Krystofiak, EC Mattson; University of Wisconsin, Milwaukee; RM Albrecht; University of Wisconsin, Madison; M Gajdardziska-Josifovska, JA Oliver; University of Wisconsin, Milwaukee
- 1:45 PM **928** (Invited) *Fast Surface Crystal Growth on Organic Glasses Studied by High-Resolution Microscopy*; M Hasebe, D Musumeci, L Yu; University of Wisconsin, Madison
- 2:15 PM **929** *Study of Active Pharmaceutical Ingredient (API) Formulations with Nonlinear Optical (NLO) Microscopy*; AU Chowdhury, SJ Toth, GJ Simpson, LS Taylor; Purdue University
- 2:30 PM **Pharmaceuticals Focused Interest Group Business Meeting**; A Vogt; AbbVie, Inc.

ADVANCES IN INSTRUMENTATION SYMPOSIA THURSDAY AFTERNOON

A08.05 EBSD and Advanced Electron Diffraction and Automated Mapping Techniques for Geological and Materials Research

Session Chairs:
Natasha Erdman, JEOL USA Inc.;
Joseph R. Michael, Sandia National Laboratories;
Andy Deal, GE Global Research

Platform Session

Thursday 1:25 PM • Room: 245

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **930** (Invited) *Using Electron Backscatter Diffraction (EBSD) to Investigate Causes of Seismic Anisotropy in Earth Materials: A Case Study Using Antigorite Serpentine*; SJ Brownlee; Wayne State University; BR Hacker; University of California; GE Harlow; American Museum of Natural History; G Seward; University of California
- 2:00 PM **931** *Improving the Accuracy of Orientation Measurements Using EBSD*; K Thomsen, NH Schmidt, A Bewick, K Larsen, J Goulden; Oxford Instruments
- 2:15 PM **932** *Merging Monte Carlo and Dynamical EBSD Simulations*; P Callahan, M De Graef; Carnegie Mellon University
- 2:30 PM **933** *Advanced EBSD Pattern Interpretation through Iterative Post-Processing*; G Nolze, E Payton; BAM Federal Institute for Materials Research and Testing; A Winkelmann; Max-Planck-Institut für Mikrostrukturphysik, Germany

A11.04 Ion Beam Instrumentation and Applications for Physical and Biological Sciences

Session Chairs:
Trevor E. Clark, Pennsylvania State University;
Mike Marko, Wadsworth Center;
Keana Scott, National Institute of Standards and Technology

Platform Session

Thursday 1:25 PM • Room: 242

- 1:25 PM **Welcome & Introduction to the Session**
- 1:30 PM **934** (Invited) *Understanding Microstructural Changes in Metals Induced by Gallium Ion Beam Irradiation*; JR Michael; Sandia National Laboratories
- 2:00 PM **935** *Switching of the Natural Nanostructure in Bi₂Te₃ Bulk Materials by Low Energy Ion Irradiation*; Z Aabdin, N Peranio, O Eibl; Eberhard Karls Universität Tübingen, Germany
- 2:15 PM **936** *Applications of Focus Ion Beam Technique in the Characterization of Nanocrystal Nonvolatile Memory Devices*; J-G Zheng; University of California, Irvine
- 2:30 PM **937** *Multi-Pore Sensing of Virus Capsids in In-Plane Nanofluidic Devices*; Z Harms, DG Haywood, L Selzer, A Kneller, A Zlotnick, SC Jacobson; Indiana University
- 2:45 PM **938** *Conductivity and Electroosmotic Transport in Nanofluidic Channels*; DG Haywood, ZD Harms, SC Jacobson; Indiana University

Scientific Program

A12.05 Atom Probe Tomography in Correlative Investigations

Session Chairs:

Williams Lefebvre, University of Rouen;
Daniel Perea, Pacific Northwest National Laboratory

Platform Session

Thursday 1:25 PM • Room: 243

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **939** *Compositional and Chemical Segregation in $Li_{1.2}Ni_{0.2}Mn_{0.6}O_2$ Cathode Materials Characterized by Atom Probe Tomography and Scanning Transmission X-ray Microscopy*; A Devaraj, R Colby, M Gu, C Wang; Pacific Northwest National Laboratory; T Tyliczak; Lawrence Berkeley National Laboratory; J Zhang, J Xiao, J Zheng; Pacific Northwest National Laboratory; I Belharouak, D Wang, K Amine; Argonne National Laboratory; S Thevuthasan; Pacific Northwest National Laboratory
- 1:45 PM **940** *A Correlative Atom-Probe Tomography and Transmission Electron Microscope Study of a Thermally Grown Oxide on a Commercial Nickel-Based Superalloy, René N⁵ Y+[®]*; S-I Baik, X Yin, DN Seidman; Northwestern University
- 2:00 PM **941** *Fission Products in Nuclear Fuel: Comparison of Simulated Distribution with Correlative Characterization Techniques*; B Valderrama, HB Henderson; University of Florida; L He, C Yablinsky; University of Wisconsin; J Gan; Idaho National Laboratory; A-R Hassan, A El-Azab; Purdue University; TR Allen; University of Wisconsin; MV Manuel; University of Florida
- 2:15 PM **942** *Complementary Atom Probe Tomography and Electron Microscopy of Oxidation of Ni-Base Alloys in High-Temperature Water Environments*; DK Schreiber, MJ Olszta, SM Bruemmer; Pacific Northwest National Laboratory
- 2:30 PM **943** (Invited) *A Correlated APT and TEM Approach to Understand Nanostructured Ferritic Alloys*; MK Miller, CM Parish, L Yao; Oak Ridge National Laboratory

A13.05 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:

Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Thursday 1:25 PM • Room: 239

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **944** *Getting Back to the Basics. Parameters That Must Be Considered Before Attempting Quantitative EDS Analysis in the TEM*; N Rowlands; Oxford Instruments, Concord M; EF Schumacher; McCrone Associates Inc; AW Nicholls; University of Illinois, Chicago
- 1:45 PM **945 M&M Post-Doctoral Award** *Nanometer-Scale Characterization Tools for Strain-Engineered Semiconductor Devices*; VB Ozdol; Lawrence Berkeley National Laboratory; CT Koch; Ulm University, Germany; AM Minor; Lawrence Berkeley National Laboratory
- 2:00 PM **946** *Quantitation of Overlapping Core Edges in EFTEM Spectrum Imaging of Cells*; RD Leapman, MA Aronova; National Institutes of Health
- 2:15 PM **947** *Determination of the Optical Properties of Carbonaceous Aerosols by Monochromated Electron Energy-Loss Spectroscopy*; J Zhu, PA Crozier, JR Anderson; Arizona State University
- 2:30 PM **948** *Electron Microscopy of Graphene Materials Produced by Combustion Synthesis*; KV Manukyan, S Rouvimov, AS Mukasyan; University of Notre Dame
- 2:45 PM **949** *Direct High Resolution Cryo-TEM Imaging of Liquid Crystals*; M Gao, C Zhang, H-S Park, A Jakli, OD Lavrentovich; Kent State University

A14.05 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:

Moon J Kim, University of Texas at Dallas;
Ray W. Carpenter, Arizona State University;
John C. H. Spence, Arizona State University

Platform Session

Thursday 1:25 PM • Room: 208

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **950** (Invited) *Progress in Electrons Vortex Creation and Application in a Transmission Electron Microscope*; J Verbeeck, A Beche, L Clark, G Guzzinati, R Juchtmans; University of Antwerp, Belgium; A Lubk; University of Dresden, Germany; H Tian, R Van Boxem, G Van Tendeloo; University of Antwerp, Belgium
- 2:00 PM **951** *Addition, Subtraction, and Analysis of Orbital Angular Momentum in Electron Vortex Beams*; T Yahn, JS Pierce, TR Harvey, BJ McMorran; University of Oregon
- 2:15 PM **952** *Production of Vortex Beam Modes from a Magnetic Spiral Phase Plate*; AM Blackburn, JC Loudon; Cambridge University, United Kingdom
- 2:30 PM **953** *Reducing Transient Electric Fields Effect in Ultrafast Electron Diffraction Using Multiple Laser Pulse Train*; Y Hu, J Li, J-M Zuo; University of Illinois, Urbana-Champaign
- 2:45 PM **954** *The Contribution of Thermally Scattered Electrons to Atomic Resolution Elemental Maps*; REA Williams; The Ohio State University; BD Forbes, AJ D'Alfonso; University of Melbourne, Australia; R Srinivasan; The Ohio State University; DO Klenov, B Freitag; FEI Company, Netherlands; HL Fraser; The Ohio State University; LJ Allen; University of Melbourne, Australia; D McComb; The Ohio State University

A18.01 Holography

Session Chairs:

Rafal Dunin-Borkowski, Ernst-Ruska Center;
Martha R. McCartney, Arizona State University

Platform Session

Thursday 1:25 PM • Room: 240

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **955** *Distinguishing P-N Junction and Schottky Barrier in a Working Silicon Nanowire Diode*; K He; University of Maryland; J-H Cho; Los Alamos National Laboratory; Y Jung, M Reed; Yale University; T Picraux; Los Alamos National Laboratory; J Cumings; University of Maryland
- 1:45 PM **956** *Towards Mapping Electrostatic Potentials in Semiconductor Devices under Working Conditions Using Off-Axis Electron Holography*; S Yazdi, T Kasama; Technical University of Denmark; DW McComb; The Ohio State University; AC Harrison; Imperial College London, United Kingdom; RE Dunin-Borkowski; Forschungszentrum Jülich, Germany
- 2:00 PM **957** *Separation of Dopant and Mean Inner Potential Contributions to Potential Profiles Recorded from Very Highly Doped Semiconductor Layers Using Electron Holography*; D Cooper; Commissariat à l'énergie atomique, France; R Dunin-Borkowski; Forschungszentrum Jülich, Germany
- 2:15 PM **958** *Development and Application of Electron Holographic Tomography for the Three-Dimensional Mapping of Electrostatic Potentials*; D Wolf, H Lichte; Technical University Dresden, Germany
- 2:30 PM **959** *Mapping of Two Dimensional Electron Gas at Atomically Abrupt Oxide Interfaces Using Inline Electron Holography*; K Song; Pohang University of Science and technology, Republic of Korea; CT Koch; Ulm University, Germany; S-Y Choi; Korea Institute of Materials Science, Republic of Korea; HN Lee; Oak Ridge National Laboratory; S Ryu, C-B Eom; University of Wisconsin, Madison; SH Oh; Pohang University of Science and technology, Republic of Korea

Scientific Program

2:45 PM **960** *Observation of an All-Solid-State Li-Ion Battery by In Situ Electron Holography and Spatially-Resolved Electron Energy Loss Spectroscopy*; K Yamamoto, T Sato, R Yoshida, H Kurobe; Japan Fine Ceramics Center; H Matsumoto; Hitachi High-Technologies Corporation, Japan; T Hirayama; Japan Fine Ceramics Center; Y Iriyama; Nagoya University, Japan

PHYSICAL SCIENCES SYMPOSIA THURSDAY AFTERNOON

P02.09 Structure and Composition Analysis of Nanoparticulate Systems

Session Chairs:

Renu Sharma, National Institute of Standards and Technology

Platform Session

Thursday 1:25 PM • Room: 206-207

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **961** (Invited) *Electron Tomography of Nanoscale Materials—Opportunities and Challenges Ahead*; P Midgley; University of Cambridge
- 2:00 PM **962** *Preferential Growth of d-Bi₂O₃ Layers on the {11-20} Facets of ZnO Nanowires*; J Xu, J Liu; Arizona State University
- 2:15 PM **963** *Composition Analysis on the Precipitates in the NiTiHf and NiPdTiHf Alloys*; F Yang; The Ohio State University; A Devaraj; Pacific Northwest National Laboratory; RD Noebe; NASA Glenn Research Center; R Williams, MJ Mills, DB Williams, DW McComb; The Ohio State University
- 2:30 PM **964** *Full-Scale Characterization of UVLED Al_xGa_{1-x}N Nanowires Via Advanced Electron Microscopy*; P Phillips; University of Illinois, Chicago; S Carnevale; Ohio State University; R Kumar; Northwestern University; R Myers; The Ohio State University; RF Klie; University of Illinois, Chicago
- 2:45 PM **965** *Determination of Local Structure in Meteoritic Nanoscale Porous Carbon to Explain Entrapped Noble Gases*; R Stroud; Naval Research Laboratory; M Chisholm; Oak Ridge National Laboratory; S Amari; Washington University; J-I Matsuda; Osaka University, Japan

P05.05 Microstructural Characterization of Metals—150 Years After Sorby

Session Chairs:

James E. Martinez, NASA Johnson Space Center;
George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Thursday 1:25 PM • Room: 209

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **966** (Invited) *The Rise of EBSD for Modern Quantitative Metallography*; S Sitzman; Oxford Instruments
- 2:00 PM **967** *Variation of S3 and Coherent S3 Boundary Fraction with Thickness in Nanometric Cu Films*; X Liu; Carnegie Mellon University; AP Warren; University of Central Florida; TN Nuhfer, GS Rohrer; Carnegie Mellon University; KR Coffey; University of Central Florida; K Bar-mak; Columbia University
- 2:15 PM **968** *Unique Recrystallization Resistance of Titanium Metastable β-Alloys under Severe Hot Deformation*; O Ivasishin, P Markovskiy; Kurdyumov Institute for Metal Physics, Ukraine; M Pozuelo, S Prikhodko; University of California, Los Angeles
- 2:30 PM **969** *Investigation of Secondary Hardening in MP35N Wires*; D Sorensen, BQ Li; Medtronic Neuromodulation; WW Gerberich, KA Mkhoyan; University of Minnesota
- 2:45 PM **970** *Stress Corrosion Cracking of an Advanced Aluminum-Copper-Lithium-Silver-Magnesium Alloy at Various Electrical Potentials*; AA Frefer, BS Raddad, AM Abosdell; Tripoli University, Libya

P08.03 Advanced Atomic-Scale Imaging and Spectroscopy of Materials

Session Chairs:

David C. Bell, Harvard University;
Matthew Chisolm, Oak Ridge National Laboratory;
Nigel Browning, Pacific Northwest National Laboratory

Platform Session

Thursday 1:25 PM • Room: 244

- 1:25 PM *Welcome & Introduction to the Session*
- 1:30 PM **971** *Quantitative Electron Diffraction of Graphene: Measurement of Mean-Square Atomic Displacement and Implications for Dark Field Imaging*; M Mecklenburg; The Aerospace Corporation; B Shevitski, W Hubbard, E White; University of California; B Dawson, M Lodge, M Ishigami; University of Central Florida; B Regan; University of California
- 1:45 PM **972** *Correlative Spectrum Imaging of Organic Photovoltaic Devices Using Energy Dispersive X-ray and Electron Energy-Loss Spectroscopy*; FJ Scheltens; The Ohio State University; MF Durstock, CE Tabor, BJ Leever, MD Clark, DP Butcher; Air Force Research Laboratory; DW McComb; The Ohio State University
- 2:00 PM **973** *Identifying the Optical Response of Graphene Using Electron Energy-Loss Spectroscopy*; JC Idrobo; Oak Ridge National Laboratory; FJ Nelson; University at Albany; ZL Miškovic; University of Waterloo; AC Diebold; University at Albany; SJ Pennycook; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University
- 2:15 PM **974** (Invited) *Electronic Properties of TEM-Sculpted Structure in Graphene*; E Kalfon-Cohen, S Bhandari, RM Westervelt, DC Bell; Harvard University
- 2:45 PM **975** *AB/AC Stacking Boundaries in Bilayer Graphene*; J Lin; Vanderbilt University; W Zhou; Oak Ridge National Laboratory; W Fang, J Kong; Massachusetts Institute of Technology; AR Lupini, JC Idrobo, SJ Pennycook; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University

BIOLOGICAL SCIENCES SYMPOSIA THURSDAY AFTERNOON

B03.04 Structural Biology and Cell Ultrastructure

Session Chairs:

Ingeborg Schmidt-Krey, Georgia Institute of Technology;
Paula da Fonseca, MRC Laboratory of Molecular Biology;
Michael Radermacher, University of Vermont;

Platform Session

Thursday 3:25 PM • Room: 238

- 3:25 PM *Welcome & Introduction to the Session*
- 3:30 PM **976** (Invited) *Structure of the Human Cardiac Muscle Myosin Filament*; EP Morris; Institute of Cancer Research, United Kingdom; RW Kensler; University of Puerto Rico Medical School; SB Marston; Imperial College, United Kingdom; JM Squire; University of Bristol, United Kingdom; HA AL-Khayat; Imperial College, United Kingdom
- 4:00 PM **977** *The Structural and Biomechanical Properties of Insect Thick Filaments Expressing Flightin and Cardiac Myosin Binding Protein-C*; L Menard, L Nyland, J Vigoreaux; University of Vermont
- 4:15 PM **978** *M&M Post-Doctoral Award A Synuclein Amyloid Fibrils with Two Entwined Protofibrils Each with One Subunit Per 4.7 Å Axial Rise*; AD Dearborn, N Cheng, JB Heymann; National Institute of Arthritis and Musculoskeletal and Skin Diseases; J Varkey, R Langen; University of Southern California; AC Steven; National Institute of Arthritis and Musculoskeletal and Skin Diseases
- 4:30 PM **979** *M&M Post-Doctoral Award C-Terminal 'Tails' of Tubulin Revealed by Negative Stain EM Tomography*; A Fera; National Institute of Neurological Disorders and Stroke; DL Sackett; Eunice Kennedy Shriver National Institute of Child Health and Human Development; TS Reese; National Institute of Neurological Disorders and Stroke

Scientific Program

4:45 PM **980** *Structural Variation in Polyglutamine-Rich Amyloid Fibrils Imaged by Multiple Electron Microscopy Methods*; R Huang, U Baxa; National Institute of Arthritis, Musculoskeletal and Skin Diseases; G Aldrian, A Ahmed; Centre de Recherches de Biochimie Macromoléculaire, CNRS, France; JS Wall; Brookhaven National Laboratory; N Mizuno; National Institute of Arthritis, Musculoskeletal and Skin Diseases; AV Kajava; Centre de Recherches de Biochimie Macromoléculaire, CNRS, France; AC Steven; National Institute of Arthritis, Musculoskeletal and Skin Diseases

4:30 PM **984** **M&M Student Award** *Atomic Scale Composition Profiling of Ferroelectrics via Laser-Pulsed Atom Probe Tomography and Cross-Correlative Transmission Electron Microscopy*; R Kirchhofer, DR Diercks, BP Gorman; Colorado School of Mines; GL Brennecke; Sandia National Laboratories

4:45 PM **985** *Understanding Mineral Carbonate Formation under Supercritical Conditions using Electron Microscopy and Atom Probe Tomography*; BW Arey, DE Perea, L Kovarik, RJ Colby, O Qafoku, AR Felmy; Pacific Northwest National Laboratory

ADVANCES IN INSTRUMENTATION SYMPOSIA THURSDAY AFTERNOON

A12.06 Atom Probe Tomography in Correlative Investigations

Session Chairs:

Michael Moody, University of Oxford;
Stephan Gerstl, ETH-Zurich

Platform Session

Thursday 3:25 PM • Room: 243

3:25 PM **Welcome & Introduction to the Session**

3:30 PM **981** (Invited) *Combining Atom-Probe Tomography and Focused-Ion Beam Microscopy to Study Individual Presolar Meteoritic Nanodiamond Particles*; D Isheim; Northwestern University; FJ Stadermann, JB Lewis, C Floss, TL Daulton; Washington University; AM Davis; University of Chicago; PR Heck; Field Museum; MJ Pellin, MR Savina; Argonne National Laboratory; DN Seidman; Northwestern University; T Stephan; University of Chicago

4:00 PM **982** *Mapping the Complex Phase Formation at the Surface of Supercritical CO Reacted Fayalite for Geologic Sequestration of Greenhouse Gases*; DE Perea, J Liu, B Arey, L Kovarik, R Colby, O Qafoku, T Thevuthasan, AR Felmy; Pacific Northwest National Laboratory

4:15 PM **983** *Elemental and Isotopic Tomography at Single-Atom-Scale in 4000 and 2400 Ma Zircons*; DA Reinhard; CAMECA Instruments, Inc; JW Valley, T Ushikubo, A Strickland; University of Wisconsin; D Snoeyenbos, D Lawrence, I Martin, DJ Larson, TF Kelly; CAMECA Instruments, Inc; AJ Cavoise; University of Puerto Rico

A13.06 Microscopy and Microanalysis for Real World Problem Solving

Session Chairs:

Janet Woodward, Buckman USA;
Elaine Schumacher, McCrone Associates, Inc;
Stuart McKernan, 3M

Platform Session

Thursday 3:25 PM • Room: 239

3:25 PM **Welcome & Introduction to the Session**

3:30 PM **986** *Forensic Gemmology in Forensic Practice*; M Kotrly, I Turkova; Institute of Criminalistics Prague

3:45 PM **987** *Low Voltage Silicon Drift Detector Microanalysis of the Mineral Tourmaline: Examples From the Black Hills, South Dakota*; CS Schwandt; McCrone Associates, Inc

4:00 PM **988** *Where is the Plutonium?: Detection and Location of Plutonium-Containing Particles in Tank 18 Waste Using Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), Wavelength Dispersive Spectroscopy (WDS), and X-Ray Diffraction (XRD)*; H Ajo, M Hay, D Missimer, P O'Rourke; Savannah River National Laboratory

4:15 PM **989** *High-Performance DyBa₂Cu₃O_{7-x} Superconducting Coated Conductors Grown by Inclined Substrate Deposition with Ic Exceeding 1000 A cm⁻¹*; Z Aabdin, M Dürrschnabel, O Eibl; Eberhard Karls Universität Tübingen, Germany

4:30 PM **990** *Influence of Atomic Scale Compositional Gradients on Colossal Ionic Conductivity in Highly Strained YSZ/STO Heterostructures*; DW McComb, FJ Scheltens; The Ohio State University; J Santamaria, C Leon, A Rivera; Universidad Complutense de Madrid, Spain

4:45 PM **991** *Extensive Analysis of Structure-Property Relationships in Thin-Film Solar Cells Using Scanning Electron Microscopy in Combination with Focused Ion Beam*; D Abou-Ras; Helmholtz-Zentrum Berlin, Germany; K Tsyurulin; Carl Zeiss Microscopy GmbH, Germany; N Schäfer, M Nichterwitz, H Kropf, S Harndt, R Caballero; Helmholtz-Zentrum Berlin, Germany; H Schulz; Carl Zeiss Microscopy GmbH, Germany; F Bauer; Oxford Instruments GmbH, Germany

A14.06 New Instrumentation at the Limits: Characteristics and Applications

Session Chairs:

Moon J Kim, University of Texas at Dallas;
Ray W. Carpenter, Arizona State University;
John C. H. Spence, Arizona State University

Platform Session

Thursday 3:25 PM • Room: 208

- 3:25 PM **Welcome & Introduction to the Session**
- 3:30 PM **992** (Invited) *Developments in Environmental Transmission Electron Microscopy for Catalysis Research*; EA Stach, D Zakharov; Brookhaven National Lab; MC Akatay; Purdue University; P Baumann; University of Applied Sciences of Northeastern Switzerland; F Ribeiro, Y Zvienevich; Purdue University; Y Li, A Frenkel; Yeshiva University
- 4:00 PM **993** *High Contrast BSE Imaging under Ultra Low Voltage Condition by FE-SEM with Energy Filtering*; Y Hashimoto, T Matsuzaki, H Ito, M Konno, S Takeuchi; Hitachi High-Technologies Corporation, Japan
- 4:15 PM **994** *Conical Diffraction Based Super-Resolution System for Fluorescence Microscopy: System Description and Demonstration Visualizing Biological Objects*; GY Sirat; Bioaxial SAS, France; S Shorte; Institut Pasteur, France; LPO Braitbart; Bioaxial SAS, France; L Moisan; Université Paris Descartes, France; JY Tinevez; Institut Pasteur, France; J Caron, C Fallet; Bioaxial SAS, France
- 4:30 PM **995** *Position-Sensitive STEM Detectors for High-Sensitivity Phase Detection*; TJ Pennycook, L Jones, PD Nellist; University of Oxford, United Kingdom
- 4:45 PM **996** *New Low Voltage Scanning Transmission Electron Microscope Detector for Fastest Image Acquisition in BF, DF and HAADF*; R Salzer, J Ackermann, R Arnold, S Meyer, C Kübler; Carl Zeiss Microscopy GmbH, Germany

A18.02 Holography

Session Chairs:

Hannes Lichte, University of Dresden;
David J. Smith, Arizona State University

Platform Session

Thursday 3:25 PM • Room: 240

- 3:25 PM **Welcome & Introduction to the Session**
- 3:30 PM **997** *Split-Illumination Electron Holography*; T Tanigaki; RIKEN, Japan; Y Inada; Tohoku University, Japan; S Aizawa; RIKEN, Japan; T Suzuki; Tokyo Institute of Technology, Japan; HS Park; RIKEN, Japan; T Matsuda; Japan Science and Technology Agency; A Taniyama; Nippon Steel & Sumitomo Metal Corporation, Japan; D Shindo, A Tonomura; RIKEN, Japan
- 3:45 PM **998** *An Assessment of the Origin of Contrast in Off-Axis Electron Holographic Imaging of BaTiO₃ Ferroelectric Domains*; V Tileli; Imperial College London, United Kingdom; D Cooper; Commissariat à l'énergie atomique, France; RE Dunin-Borkowski; Research Centre Jülich, Germany
- 4:00 PM **999 M&M Student Award** *Study of GaAs/Fe Core/Shell Nanowires Using Electron Holography*; D Zhang; Arizona State University; RE Pimpinella, X Liu, M Dobrowolska, JK Furdyna; University of Notre Dame; DJ Smith, MR McCartney; Arizona State University
- 4:15 PM **1000** *Electron Holography of Dipolar Magnetism in Self-Assembled Nanoparticle Chains*; M Beleggia; Danmarks Tekniske Universitet; M Varon; Institut Català de Nanotecnologia, Spain; T Kasama; Danmarks Tekniske Universitet; RE Dunin-Borkowski; Forschungszentrum Juelich, Germany; VF Puentes; Institut Català de Nanotecnologia, Spain; RJ Harrison; University of Cambridge, United Kingdom; C Frandsen; Danmarks Tekniske Universitet
- 4:30 PM **1001** *Density Matrix Reconstruction by Off-Axis Electron Holography*; F Röder, H Lichte; Technical University Dresden, Germany
- 4:45 PM **1002** *Transport of Intensity Phase Reconstruction Revisited*; A Lubk; University of Dresden, Germany; G Guzzinati, L Clark, J Verbeeck; University of Antwerp, Belgium

Scientific Program

PHYSICAL SCIENCES SYMPOSIA THURSDAY AFTERNOON

P05.06 Microstructural Characterization of Metals—150 Years After Sorby

Session Chairs:

James E. Martinez, NASA Johnson Space Center;
George F. Vander Voort, Consultant—Struers Inc.

Platform Session

Thursday 3:25 PM • Room: 209

- 3:25 PM **Welcome & Introduction to the Session**
- 3:30 PM **1003** (Invited) *Characterization of Materials by X-Ray Microanalysis and Other Techniques*; JI Goldstein; University of Massachusetts
- 4:00 PM **1004** *Solidification Kinetics of an Oxide Weld Slag Utilizing SEM and LSCM Imaging*; M Kottman; The Lincoln Electric Company; D Hovis, A Avishai; Case Western Reserve University; M James, BK Narayanan; The Lincoln Electric Company
- 4:15 PM **1005 M&M Student Award** *Helium Ion Implantation Effects of 9Cr-ODS (Oxide Dispersion Strengthened) Steel*; C Lu; University of Michigan; Z Lu; Northeastern University, China; G Yu, L Wang; University of Michigan
- 4:30 PM **1006** *Electro-Polishing Foil Samples for TEM with an Extremely Small Amount of Electrolyte*; H Saka; Nagoya University, Japan; M Yamamoto, Y Shiraishi, M Amano, T Goto; Yamamoto Chemical Company, Ltd., Japan; T Suzuki, S Arai, K Sasaki; Nagoya University, Japan
- 4:45 PM **1007** *Void Shrinkage and Void Lattice Formation in Neutron-Irradiated Molybdenum*; J Bentley; Microscopy and Microanalytical Sciences

P08.04 Advanced Atomic-Scale Imaging and Spectroscopy of Materials

Session Chairs:

David C. Bell, Harvard University;
Nigel Browning, Pacific Northwest National Laboratory;
Matthew Chisolm, Oak Ridge National Laboratory

Platform Session

Thursday 3:25 PM • Room: 244

- 3:25 PM **Welcome & Introduction to the Session**
- 3:30 PM **1008** *Grain-Boundary Phase Transformation of ZnO:Pr System*; Y Sato, J-Y Roh, Y Ikuhara; University of Tokyo, Japan
- 3:45 PM **1009** *Atomic Scale Manipulation of Grain Boundary Structures through Doping and In Situ Gas Reduction*; H Yang; University of California, Davis; Y Sato, H Lee, Y Ikuhara; The University of Tokyo, Japan; P Moeck; Portland State University; PG Kotula; Sandia National Laboratories; ND Browning; Pacific Northwest National Laboratory
- 4:00 PM **1010** *The Effect of High Temperature Annealing on the Grain Characteristics of a Thin Chemical Vapor Deposition Silicon Carbide Layer*; IJ van Rooyen; Idaho National Laboratory; PM van Rooyen; Philip M van Rooyen Network Consultants; ML Dunzik-Gougar; Idaho National Laboratory
- 4:15 PM **1011** *Local Atomic Distortions in Strontium Cobaltite Due to Oxygen Vacancies*; M Chisholm, HJ Jeon, HN Lee; Oak Ridge National Laboratory
- 4:30 PM **1012** *Structure and Deformation Mechanism of the Quasicrystal Strengthening Phase in Al-Mn-Be-Cu Alloys*; J Ciston, C Ophus; Lawrence Berkeley National Laboratory; B Markoli; University of Ljubljana, Slovenia
- 4:45 PM **1013** *Functional Complex Point-Defect Structure in a Huge-Size-Mismatch System*; R Ishikawa; Oak Ridge National Laboratory; N Shibata; University of Tokyo, Japan; F Oba; Kyoto University, Japan; T Taniguchi; National Institute for Materials Science, Japan; SD Findlay; Monash University; I Tanaka; Kyoto University; Y Ikuhara; University of Tokyo, Japan

P09.01 Physical Sciences—Nanomaterials Characterization

Session Chairs:

Robert F. Klie, University of Illinois, Chicago;
Elizabeth C. Dickey, North Carolina State University

Platform Session

Thursday 3:25 PM • Room: 206-207

- 3:25 PM **Welcome & Introduction to the Session**
- 3:30 PM **1014** *Examining Atomistic Defect-Boundary Interactions Induced by Ion Irradiation Using Aberration Corrected Transmission Electron Microscopy*; JA Aguiar; Los Alamos National Laboratory; M Chi; Oak Ridge National Laboratory; P Kotula; Sandia National Laboratories; Z Bi, O Anderoglu, JK Baldwin, JA Valdez, A Misra, B Uberuaga; Los Alamos National Laboratory
- 3:45 PM **1015** *Electric Field-Induced Point Defect Redistribution in TiO₂*; A Moballegh, EC Dickey; NC State University

- 4:00 PM **1016** *Atomic-Scale Study of Grain Boundary Structures in Poly-Crystalline CdTe Solar Cells Using Aberration-Corrected STEM*; T Paulauskas, RF Klie, Z Guo, E Colegrove; University of Illinois, Chicago IL
- 4:15 PM **1017 M&M Student Award** *Atomic Scale Analysis of Chemical Intermixing in MBE-Grown GaSb/InAs Superlattices Based on Z-Contrast Imaging*; H Kim, Y Meng; University of Illinois, Urbana-Champaign; J-L Rouvière; Commissariat à l'énergie atomique, France; J-M Zuo; University of Illinois, Urbana-Champaign
- 4:30 PM **1018** *Na-Rich Interfacial Compound Impacted by Large Coherent Interfacial Strains in Na-Doped P-Type PbTe-PbS Thermoelectrics Investigated by S/TEM*; C Chen, L Zhao, M Kanatzidis, V Dravid; Northwestern University