

Onsite Program Guide & Exhibitor Information

Exhibitor
Guide
INCLUDED!



M&M 2017 MICROSCOPY & MICROANALYSIS

August 6-10, 2017 • St. Louis, MO



www.microscopy.org/MandM/2017

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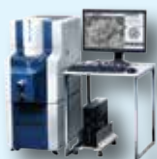
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Atomic Force Microscopy

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> Welcome from the Society Presidents

On behalf of the sponsoring societies, we are excited to welcome you to St. Louis, Missouri for Microscopy & Microanalysis 2017! **The theme of the M&M 2017 meeting is “Anniversaries.”** The Microscopy Society of America and the Microanalysis Society, which established the joint M&M meeting format more than twenty years ago, are celebrating their 75th and 50th anniversaries, respectively. In addition, the M&M meeting is cosponsored for the first time by the International Field Emission Society to commemorate the 50th anniversary of the invention of the atom probe.

We are excited to offer special anniversary programming this year! Anniversary lectures by pioneering figures in microscopy and microanalysis are featured in special morning and midday sessions. You'll be able to hear about the development and future prospects for instrumentation and techniques that are at the forefront of our field today, while enjoying some complimentary coffee and a breakfast item. MSA's Student Council will be hosting an inaugural pre-meeting event on Saturday that will treat attendees to a sampling of the best work, across scientific disciplines, presented at the meeting by early career scientists.

The technical program kicks off with our annual Monday morning plenary session, featuring the major awards ceremonies for the sponsoring societies, the M&M meeting awards, and two exciting plenary talks by Eric Betzig, winner of the 2014 Nobel Prize in Chemistry “for the development of super-resolved fluorescence microscopy,” and Keith Riles, a member of the LIGO Scientific Collaboration that in 2015 detected gravitational waves, a prediction of Einstein's theory of general relativity. The Exhibition Hall opens at noon, and is the largest annual exhibition in the field showcasing the latest state-of-the-art instrumentation and accessories in microscopy and microanalysis. M&M 2017 will provide you with the opportunity to stay abreast of the latest new technologies, hear the latest developments in the techniques and applications of all areas of microscopy and microanalysis, and most importantly network with colleagues.



Ian M. Anderson
*President,
Microscopy Society
of America*



Masashi Watanabe
*President,
Microanalysis Society*



David J. Larson
*President, International
Field Emission Society*



Download the
**Microscopy &
Microanalysis
Annual Scientific
Meeting
MOBILE APP!**

**Navigate the meeting like
a pro with the M&M 2017
mobile app, powered by
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With the M&M 2017 mobile app, you can:

- Meeting Info & up-to-the-minute presenter info
- Multi-Device Sync
- Alerts
- Exhibitors
- Scheduling
- Maps & floor plans
- Connect with colleagues & friends
- Join in on social media with #MM2017STL
- And much, much more!



Downloading the App is Easy!

SEARCH: The App Store or Google Play for “M&M Annual Meeting”



SCAN:



For All Other Device Types (including BlackBerry, Windows, and all other web browser-enabled devices):

While on your smartphone, point your mobile browser to l.core-apps.com/mm_meetings to be directed to the proper download version for your phone.

**Should you have any questions, please
contact support@core-apps.com.**

> Future Meeting Dates



August 4-8, 2019

Portland, OR



August 2-6, 2020

Milwaukee, WI



August 1-5, 2021

Pittsburgh, PA

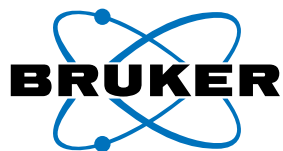


July 31-August 4, 2022

Portland, OR



> 2017 Sponsors



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Sponsor List as of July 1, 2017

> Essential Meeting & Venue Information

Accessibility

If you require special accommodation in order to participate fully in the meeting, please ask to speak with the meeting manager, or email MeetingManager@microscopy.org. Requests made after July 1 or onsite at the meeting will be accommodated as much as possible.

Awards

Major Society Awards for MSA, MAS, and IFES, along with M&M student awards, will be presented at the Plenary Session immediately following the first Keynote Talk (Monday morning). For detailed listings of all awards, criteria, and award winners, please visit <http://www.microscopy.org/awards/society.cfm>.

Cancellation and Refund Policy

Refund requests received prior to July 21, 2017 will be honored less a \$60 administrative fee. No refunds will be issued for cancellations (for any reason) received on or after July 21, 2017, and no refunds will be issued onsite in St. Louis, MO. Email: MMRegistration@conferencemanagers.com or fax (703) 964-1246.

Food for Purchase

Inexpensive, portable breakfast and snack items are available for purchase in the convention center on the ground level (7:30 am – 10:30 am). Lunch concessions are available for purchase inside the exhibit hall during lunch hours (11:00 am – 2:00 pm).

St. Louis & Regional Visitor Information

Stop by the Explore St. Louis booth located inside the convention center to pick up local information including maps, dining guides, tour info, and visitor information on St. Louis and surrounding areas.

Internet & Email

Free wireless internet is available for M&M attendees in the America's Center Convention Complex. Check your email and surf the web at the Internet Café inside the M&M exhibit hall during exhibit hours (located next to the MSA MegaBooth). For more information on the MegaBooth, see page 23.

Job & Resume Postings/ Placement Office

See *MSA MegaBooth info* on Page 23.

Post your company's or department's job listing, peruse posted resumes for that perfect job candidate, or post your own resume. Take advantage of thousands of microscopists and microscopy companies all gathered in one place! Go to the MSA MegaBooth (Exhibit Hall) for details.

M&M 2018 – Meeting & City Information

Stop by for advance information on the 2018 M&M Meeting in Baltimore, Maryland! The 2018 booth is located in the main registration area, and has visitors guides, maps, and other important information about Charm City.

MSA MegaBooth [Booth #304]

See *complete details* on Page 23.

Check out all that MSA has to offer its members and M&M attendees: Free Internet Café, book display from scientific publishers, updated information on the Certification Board, and a DVD Library. Register for the popular Vendor Tutorials, sign up for MSA Membership, check out recent editions of Microscopy Today, learn about Project MICRO, and join the Technologists' Forum.

Phone Numbers & Information

- **M&M 2017 Registration Desk:**
314-282-5920
- America's Center Convention Complex
Main: (314) 342-5036
- Exhibitor Services: <https://explorestlouis.com/meetings-conventions/americas-center/exhibitor-information/>
- Downtown Urgent Care: (314) 436-9300;
<http://stlhealthworks.com/>

Proceedings

Conference Proceedings are distributed at Registration. All Full Meeting registrations include a free copy of the proceedings on digital medium. Hard-copy proceedings are available for purchase through Cambridge University Press (allow several weeks for delivery). Inquire at the Registration Desk or email: MMProceedings@cambridge.org.

MAS Booth

MAS has a membership and information booth located in the main registration foyer on the 1st level outside the exhibit hall entrance. Sign up for membership, get information on Society events at or after the M&M Meeting, and find out all it has to offer.

Smoking Policy:

M&M 2017 is a smoke-free meeting. If you wish to smoke, you will need to go to designated outdoor areas.

Tote Bags

All non-Exhibitor Meeting Registrants are entitled to a meeting tote bag. Bags are distributed in the registration area.

Volunteer Room

The volunteer & student bursary office is in the 116 Show Office on the 1st level. Check in here for volunteer assignments and sign-outs.



> Registration

Onsite Registration Desk **CALL OR TEXT: 314-282-5920**

America's Center Convention Complex

Pick up your badge and materials at the Registration desk according to the schedule below. The Sunday Social starts at 6:30 pm in the Grand Ballroom, which is at the Marriott St. Louis Grand Hotel across the street. You must have your badge and ticket to enter the reception.

Registration Hours:

Thursday, August 3*	1:00 pm – 5:00 pm
Friday, August 4*	8:00 am – 1:00 pm
Friday, August 4	1:00 pm – 6:00 pm
Saturday, August 5	8:00 am – 6:00 pm
Sunday, August 6	7:00 am – 7:30 pm
Monday, August 7	7:00 am – 6:00 pm
Tuesday, August 8	7:30 am – 5:00 pm
Wednesday, August 9	7:30 am – 5:00 pm
Thursday, August 10	7:30 am – 3:00 pm

***EXHIBITORS ONLY**

Commercial Exhibition Hours:

Monday, August 7	12:00 pm – 5:30 pm
Tuesday, August 8	10:00 am – 5:30 pm
Wednesday, August 9	10:00 am – 5:30 pm
Thursday, August 10	10:00 am – 2:00 pm

Vendor Tutorials

MONDAY, AUGUST 7

5:45 pm - 6:45 pm

TUESDAY, AUGUST 8

5:45 pm - 6:45 pm

WEDNESDAY, AUGUST 9

5:45 pm - 6:45 pm

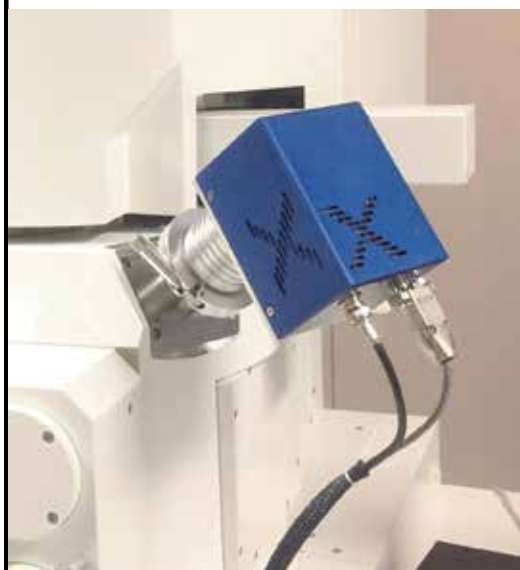
Attendees may register for complimentary Vendor Tutorials at the MSA MegaBooth inside the Exhibit Hall beginning on Monday, August 7. All Vendor Tutorial participants are required to sign up in advance. First come, first served. Availability is not guaranteed.

Speaker and Awardee Reimbursement Desk

is located at Registration and will be open Sunday – Thursday during the meeting. Stop by at your convenience to submit your form and receipts.

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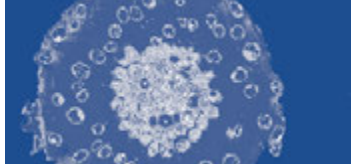
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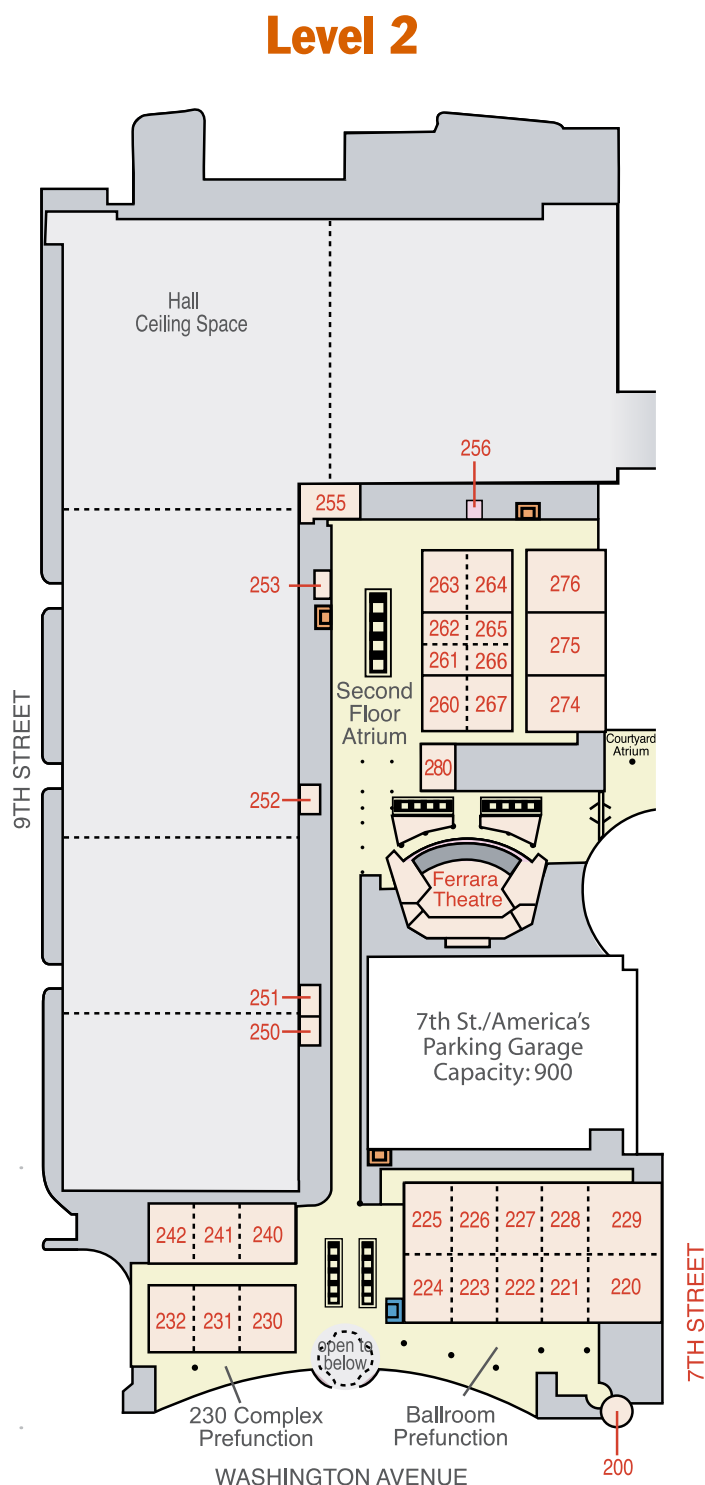
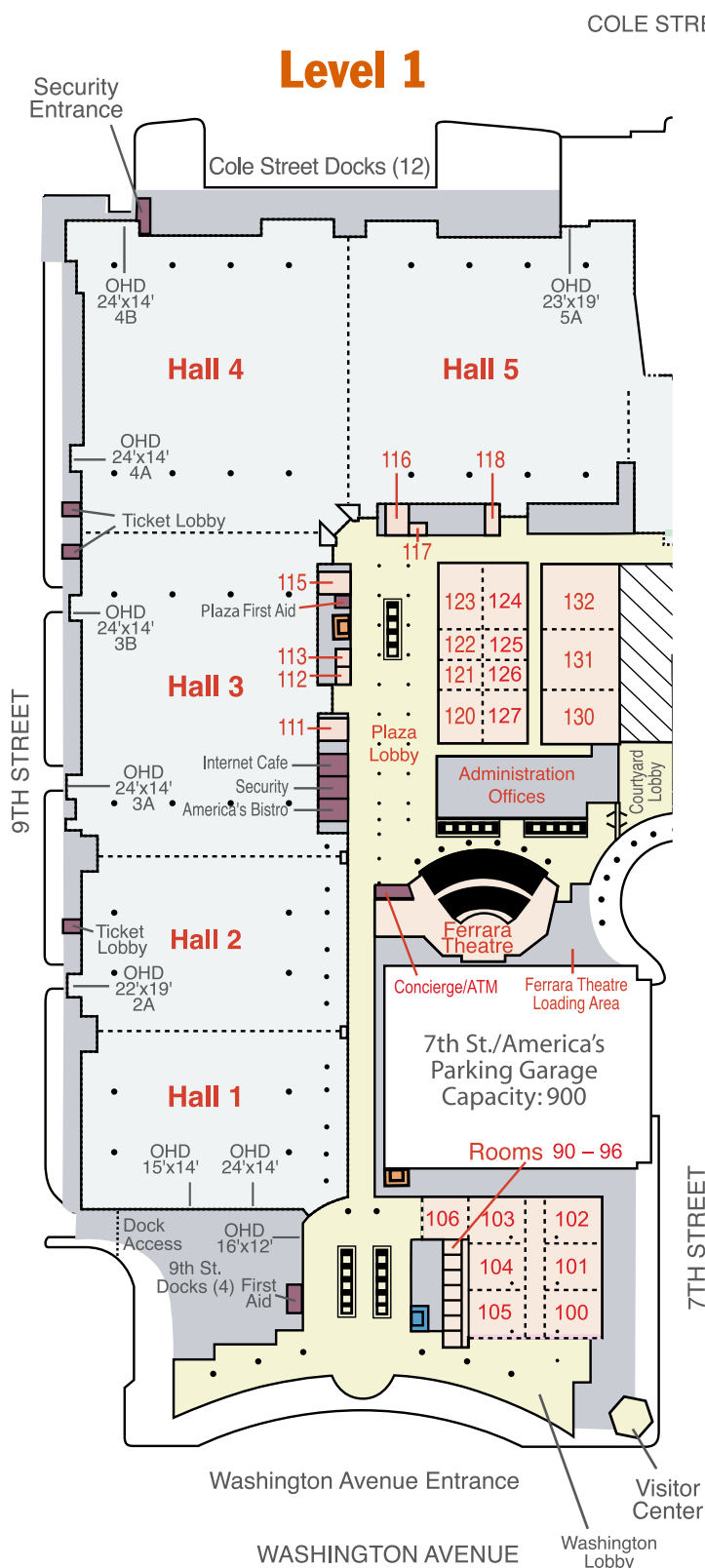
*Visit us at M&M booth 1108 for details.



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> America's Center Convention Complex



Unless indicated otherwise, all official conference events are being held at America's Center Convention Complex, located in downtown St. Louis.

> Hotel, Travel, & City Information



Getting to & around St. Louis

The St. Louis-Lambert International Airport (STL) is located only 14 miles (roughly 20 minutes by car) from downtown St. Louis. The airport features free Wi-Fi, guest services information and assistance center, and several restaurants, stores, and personal-services outlets. Visit <http://flystl.com/> for detailed information about the airport.

Ground Transportation

CAR/VAN/SHUTTLE:

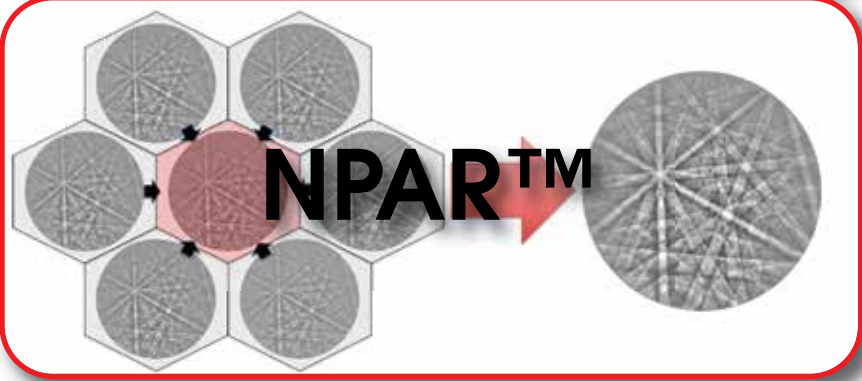
Visit <http://www.flystl.com/parking-and-transport/parking> for detailed information on taxi service, limousine service, and scheduled shuttle service fees and schedules.

MORE ST. LOUIS TRAVEL INFO: For detailed attraction, tour, dining, and travel information for visitors, please visit Explore St. Louis at www.explorestlouis.com

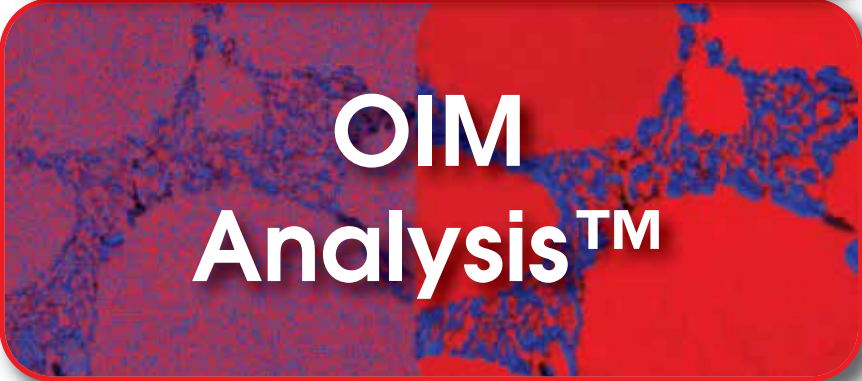




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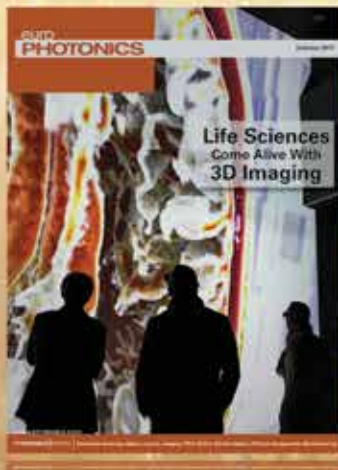
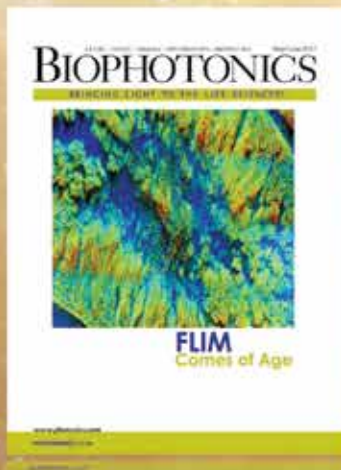
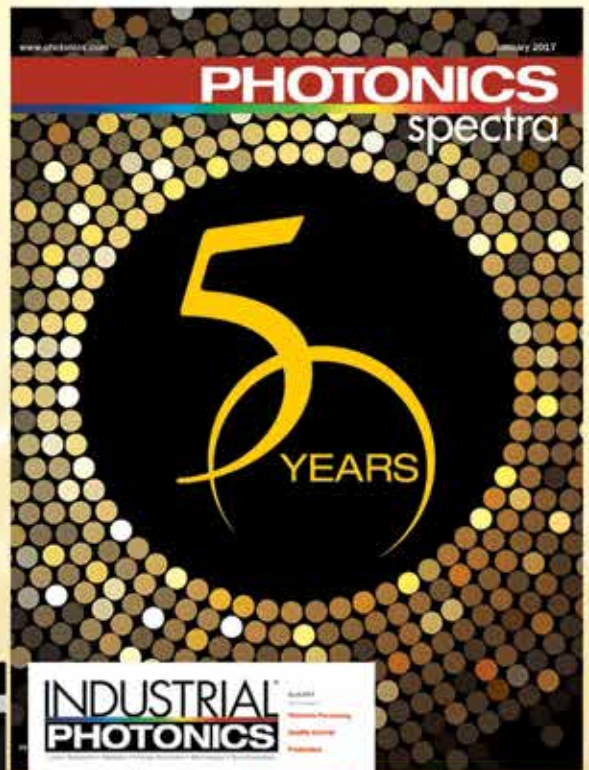
Visit the EDAX team at Booth #324 to see:

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- NPAR™ - a unique way to improve EBSD indexing
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> Social Events & Onsite Awards

M&M 2017 Sunday Evening Social Event

MARRIOTT ST. LOUIS GRAND HOTEL – MAJESTIC BALLROOM
SUNDAY, AUGUST 6, 2017 | 6:30 PM - 9:00 PM

One ticket is included with most registrations (see *Registration Page* for details).

ADDITIONAL TICKETS:

\$80 each for adults; \$35 each for children 12 and under.

**PLEASE NOTE: Onsite availability of tickets is not guaranteed. Register for the meeting and buy extra tickets early to be sure that you're able to attend.*

This year's welcome event at the Marriott St. Louis Grand Hotel will be a fun and informal get-together. Enjoy a delicious Midwest-inspired supper buffet; catch up with friends and colleagues. Remember that St. Louis is the ultimate Anheiser-Busch "company town"! After the reception, grab some old and new friends and check out some of the watering holes in Laclede's Landing and the Ballpark Village area.



Micrograph Competition

This micrograph competition promotes the innovative blending of art and science. Open to all forms of microscopic imaging, winners of this competition are selected on the basis of artistic merit and general audience appeal. A maximum of three (3) cash awards will be presented. Winners and runners-up will have the chance to see their work published in a conference brochure for M&M 2018! Bring your best work with you to St. Louis and enter the competition! Boards for posting your work will be in the M&M 2017 registration area. For competition rules and details, go to: http://www.microscopy.org/MandM/2017/meetings/apply_award.cfm.



Student Poster Awards

(Immediately following daily Poster Presentations & Happy Hours!)

Poster presentations are an excellent format for all participants to engage in intensive discussion with other researchers in the field. MSA provides cash awards to the most outstanding student posters (first author) each day (up to two in each of three categories). Student poster awards will be presented immediately following each day's poster session, in the Exhibit Hall.



MAS Social Event – for MAS Members Only!

WEDNESDAY, AUGUST 9, 2017 | 6:30 PM - 9:00 PM

Stop by the MAS booth in the lobby to check your membership status and pick up your ticket for the MAS social event on Wednesday evening, August 9 – immediately following the MAS Business Meeting.



> Meetings & Special Events Schedule

As of July 1. Please check with your committee chair/liaison to confirm!

All events held at America's Center Convention Complex unless otherwise noted.

*Marriott Hotel is the Marriott St. Louis Grand Hotel, located across the street from the convention center.

Friday, August 4, 2017

	TIME	LOCATION
MSA Council	8:30 AM	Portland/Benton (Marriott Hotel)

Saturday, August 5, 2017

	TIME	
MSA Council	8:30 AM	Portland/Benton (Marriott Hotel)

Sunday, August 6, 2017

	TIME	
IFES Steering Committee	9:00 AM	Room 280
MAS Council	9:00 AM	Room 267
<i>Microscopy Today</i> Editors & Editorial Board	3:00 PM	Room 261
Sunday Welcome Reception (<i>ticket required</i>)	6:30 PM	Majestic Ballroom (Marriott Hotel)

Monday, August 7, 2017

	TIME	
Technologists' Forum Board	7:15 AM	Room 242
MSA Awards + Fellows Committees	7:15 AM	Room 280
MaM Editorial Board	12:15 PM	Room 266
MSA International Committee	12:15 PM	Room 126
MAS Meal with a Mentor	12:15 PM	Room 241
FOM FIG Roundtable: Handling Big Data	12:15 PM	Room 242
FIG: Diagnostic Microscopy	12:15 PM	Room 280
FIG: Focused Ion Beam	12:15 PM	Room 125
FIG: Atom Probe Field Ion Microscopy	12:15 PM	Room 240
Technologists' Forum Business Meeting	3:30 PM	Room 261
MSA-CUP Book Series Advisory Board	4:15 PM	Room 280
Student Mixer	5:30 PM	Room 240-241-242
Vendor Tutorials in Exhibit Hall (<i>Sign up in advance at MSA MegaBooth</i>)	5:45 – 6:45 PM	Exhibit Hall

> Meetings & Special Events Schedule



As of July 1. Please check with your committee chair/liaison to confirm!

All events held at America's Center Convention Complex unless otherwise noted.

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Tuesday, August 8, 2017

	TIME	LOCATION
MSA Local Affiliated Societies & MAS Affiliated Regional Societies	7:15 AM	Room 280
M&M 2018 – Program Planning for Symposium Organizers	10:00 AM	Room 275
MSA Distinguished Scientists Awardee Lectures	12:15 PM	Room 123
FIG: Cryo-preparation	12:15 PM	Room 241
FIG: Electron Microscopy in Liquids and Gases	12:15 PM	Room 131
FIG: Electron Crystallography	12:15 PM	Room 242
FIG: FOM (Lunch Meeting)	12:15 PM	Room 280
FIG: MicroAnalytical Standards	12:15 PM	Room 240
FIG: 3D EM in the Biological Sciences	3:00 PM	Room 120
MSA Education Committee	3:30 PM	Room 240
FIG Business Meeting	3:30 PM	Room 241
Post-Doc Reception	5:30 PM	Room 280
MSA Student Council	5:30 PM	Room 242
Vendor Tutorials at the Exhibit Hall (<i>Sign up in advance at MSA MegaBooth</i>)	5:45 – 6:45 PM	Exhibit Hall
Presidents' Reception (<i>Invitation Only</i>)	Offsite	

Wednesday, August 9, 2017

	TIME	
MSA Certification Board	7:15 AM	Room 242
MSA Membership Committee	7:15 AM	Room 241
MAS - ANSI Meeting	12:15 PM	Room 242
MSA Members' Meeting	12:15 PM	Room 240-241
FIG: Pharmaceuticals	12:15 PM	Room 120
MAS Business Meeting	5:15 PM	Room 127
Vendor Tutorials in Exhibit Hall (<i>Sign up in advance at MSA MegaBooth</i>)	5:45 PM – 6:45 PM	Exhibit Hall
MAS Members Social (<i>See MAS Booth for Details</i>)	Offsite	

Thursday, August 10, 2017

	TIME	
M&M Sustaining Members	8:30 AM	Room 280
MSA Standards Committee	12:15 PM	Room 118
M&M 2017 Wrap-Up & Debrief (<i>by invitation only</i>)	5:30 PM	Room 280

> Thank you to our Sustaining Members

(as of July 1, 2017)

3Scan

Advanced MicroBeam, Inc.

Advanced Microscopy Techniques

Angstrom Scientific Inc.

Applied Physics Technologies, Inc.

Birla Carbon Company

Boeckeler Instruments Inc

Bruker Nano Analytics

CAMECA Instruments, Inc.

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Diatome U.S.

Direct Electron, LP

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E.A. Fischione Instruments, Inc.

EDAX Inc.

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Gatan, Inc.

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ibss Group, Inc.

International Centre for Diffraction Data

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JEOL USA, Inc

Lehigh Microscopy School

Leica Microsystems, Inc.

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Materials Analytical Services, LLC

Micro Star Technologies, Inc.

Micron, Inc.

NanoSpective

Nion Co.

Oxford Instruments America, Inc.

Pace Technologies

PNDetector GmbH

Probe Software, Inc.

Protochips, Inc.

PulseTor, LLC

Raith America, Inc.

RaySpec Ltd (used to be SGX Sensortech)

Scientific Instrumentation Services, Inc.

SEMTEC Laboratories, Inc.

SEMTech Solutions, Inc.

Separation Science

South Bay Technology, Inc.

SPI Supplies/Structure Probe, Inc.

Ted Pella, Inc.

TESCAN USA

Thermo Fisher Scientific, Inc.

Tousimis Research Corporation

TSS Microscopy LLC

XEI Scientific, Inc.



Society & Awards Information

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M&M 2017
**MICROSCOPY &
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August 6-10, 2017 • St. Louis, MO

Council & Appointed Officers

2017 COUNCIL – OFFICERS & DIRECTORS

President	Ian M. Anderson
Past President	Michael Marko
President-Elect	Robert L. Price
Secretary	Pamela F. Lloyd
Treasurer	Peter A. Crozier
Director	Esther Bullitt
Director	Luisa Amelia Dempere
Director	Elizabeth A. Dickey
Director	Andreas Holzenburg
Director	Deborah F. Kelly
Director (Local Affiliated Societies)	Beverly E. Maleeff
Director	Paul M. Voyles

APPOINTED OFFICERS

Archives	Michael Marko
Awards Committee Chair	Christine A. Brantner
Bylaws	Michael Marko
Certification Board Chair	Edward P. Calomeni
Educational Outreach Committee Chairs	Dave Becker Alyssa Waldron
Educational Resources Chair	Elizabeth R. Wright
Fellows Chair	Robert L. Price
Finance	Peter A. Crozier
Information Technology	Nestor J. Zaluzec
International Committee	David C. Bell
Membership Committee Chair	Jeffrey Lengyel
Nominating Committee Chair	Michael Marko
Placement Office	David W. Tomlin
Sustaining Members Chair	Stephen E. Mick
Student Council President	Joshua Silverstein
Technologists' Forum	Caroline A. Miller

FOCUSED INTEREST GROUPS

Focused Interest Group Chair	Andrew D. Vogt
3D Electron Microscopy in the Biological Sciences	Teresa Ruiz Michael Radermacher
Aberration-Corrected Electron Microscopy	Paul M. Voyles
Atom Probe Field Ion Microscopy	Arun Devaraj
Cryo-preparation	Kim Rensing
Diagnostic Microscopy	Jon E. Charlesworth
Electron Crystallography and Automated Mapping Techniques	Yoosuf N. Picard
Electron Microscopy in Liquids and Gas (EMLG)	Raymond R. Unocic
Facilities Operation & Management (FOM)	Christine A. Brantner
Focused Ion Beam	Nicholas Antoniou
Pharmaceuticals	John-Bruce D. Green
MicroAnalytic Standards	Julien M. Allaz

2017 STUDENT COUNCIL

President	Joshua Silverstein
Past President	James P. Kilcrease
President-Elect	Janet L. Gbur
Secretary	A. Cameron Varano
Treasurer	Ethan L. Lawrence
Program Chair	William J. Bowman

PUBLICATIONS

Microscopy and Microanalysis Editor in Chief	John F. Mansfield
Onsite Program Guide Editor	Richard L. Martens
M&M 2017 Proceedings Editor	Gail J. Celio
Microscopy Today Editor	Charles E. Lyman

M&M 2017 ANNUAL MEETING PROGRAM CHAIR

Jay D. Potts

SOCIETY & MEETING MANAGEMENT

Association Management	Drohan Management Group
Managing Director	Robert Dziuban
Meeting Management	Conference Managers
Meeting & Registration Managers	Nicole Guy, Maeve Carey, Corey Siembieda
Exhibition Management	Corcoran Expositions, Inc.
Exhibits & Sponsorship Managers	Doreen Bonnema, Mary Michalik

MSA PAST PRESIDENTS

1942	G.L. Clark	1967	Joseph J. Comer	1992	Patricia Calarco
1943-	R. Bowling Barnes	1968	John H. Luft	1993	Michael S. Isaacson
1944		1969	Wilbur C. Bigelow	1994	Robert R. Cardell
1945	James Hillier	1970	Russell Steere	1995	Terence E. Mitchell
1946	David Harker	1971	Robert M. Fisher	1996	Margaret Ann Goldstein
1947	William G. Kinsinger	1972	Daniel C. Pease	1997	C. Barry Carter
1948	Perry C. Smith	1973	Benjamin Siegel	1998	Ralph M. Albrecht
1949	F.O. Schmitt	1974	Russell J. Barnett	1999	David C. Joy
1950	Ralph W.G. Wyckoff	1975	Gareth Thomas	2000	Kenneth H. Downing
1951	Robley C. Williams	1976	Etienne de Harven	2001	Ronald M. Anderson
1952	R.D. Heidenreich	1977	Thomas E. Everhart	2002	Stanley L. Erlandsen
1953	Cecil E. Hall	1978	Myron C. Ledbetter	2003	J. Alwyn Eades
1954	Robert G. Picard	1979	John Silcox	2004	Sara E. Miller
1955	Thomas F. Anderson	1980	Michael Beer	2005	M. Grace Burke
1956	William L. Grube	1981	John J. Hren	2006	W. Gray (Jay) Jerome
1957	John H.L. Watson	1982	Lee Peachey	2007	Michael A. O'Keefe
1958	Max Swerdlow	1983	David B. Wittry	2008	William T. Gunning
1959	John H. Reisner	1984	J. David Robertson	2009	David J. Smith
1960	D. Gordon Sharp	1985	Dale E. Johnson	2010	David W. Piston
1961	D. Maxwell Teague	1986	Robert M. Glaeser	2011	Nestor J. Zaluzec
1962	Keith R. Porter	1987	Linn W. Hobbs	2012	Janet H. Woodward
1963	Charles Schwartz	1988	Jean Paul Revel	2013	Ernest L. Hall
1964	Sidney S. Breese	1989	Ray W. Carpenter	2014	Jeanette Killius
1965	Virgil G. Peck	1990	Keith R. Porter	2015	John F. Mansfield
1966	Walter Frajola	1991	Charles E. Lyman	2016	Michael Marko

2017

David C. Bell
Paul E. Fischione
Christopher J. Kiely
Jeanette Killius
Laurence D. Marks
Peter Rez
Phillip E. Russell
Heide Schatten

2016

Helmut Gnaegi
Ernest L. Hall
David N. Mastronarde
Stuart McKernan
Renu Sharma
George D.W. Smith
Kenneth A. Taylor
James E. Wittig

2015

Rafal E. Dunin-Borkowski
Michael E. Davidson
E. Ann Ellis
Peter W. Hawkes
Miguel José-Yacamán
Kent L. McDonald
Stanley Frank Platek
Michael T. Postek
Susanne Stemmer
Michael M.J. Treacy

2014

Gianluigi Botton
Wah Chiu
Abhaya K. Datye
Marija Gajdardziska-Josifovska
Lucille A. Giannuzzi
Thomas F. Kelly
John F. Mansfield
Martha R. McCartney
Xiaoqing Pan
David W. Piston

2013

Timothy S. Baker
Nigel D. Browning
David J. DeRosier
Hamish L. Fraser
David A. Muller
Michael Radermacher
David J. Smith
Eric A. Stach

2012

Ulrich Dahmen
Margaret Ann Goldstein
Moon Kim
William J. Landis
Jingyue Liu
Beverly E. Maleeff
Robert L. Price
Frances M. Ross
David N. Seidman
Debra Sherman
Nan Yao

2011

Ueli Aebi
Philip E. Batson
Patricia G. Calarco-Isaacson
Peter A. Crozier
J. Alwyn Eades
Brendan J. Griffin
William T. Gunning, III
W. Gray Jerome
Richard D. Leapman
Hannes Lichte
Charles E. Lyman
Michael A. O'Keefe
George Perry
Robert B. Simmons
Janet H. Woodward

2010

Ralph M. Albrecht
Lawrence F. Allard, Jr.
Kenneth H. Downing
Joseph I. Goldstein
Michael S. Isaacson
Michael K. Miller
George Pappas
Stephen J. Pennycook
John P. Petrali
Zhong L. Wang
David B. Williams

2009 (Inaugural Class)

Marc Adrian	Sara E. Miller
Ronald M. Anderson	Terrence E. Mitchell
James Bentley	Thomas Mulvey
Mary Grace Burke	Dale E. Newbury
Ray W. Carpenter	Gertrude Rempfer
C. Barry Carter	Jean-Paul Revel
Albert V. Crewe	Harald Rose
Marc De Graef	F.O. Schmitt
Vinayak P. Dravid	Caroline Schooley
Jacques Dubochet	Ryuichi Shimizu
Patrick Echlin	John Silcox
Raymond F. Egerton	Robert Sinclair
Marilyn G. Farquhar	S.J. Singer
Don W. Fawcett	Fritiof Sjostrand
Joachim Frank	Kenneth C.A. Smith
Robert M. Glaeser	Avril V. Somlyo
Audrey M. Glauert	John C.H. Spence
Raymond Kenneth Hart	Alasdair C. Steven
Hatsujiro Hashimoto	Peter R. Swann
Richard Henderson	Gareth Thomas
Peter B. Hirsch	Kiyoteru Tokuyasu
Archibald Howie	Nigel Unwin
Hugh E. Huxley	Joseph S. Wall
Takeo Ichinokawa	Oliver C. Wells
Sumio Iijima	Michael J. Whelan
Shinya Inoué	Nestor J. Zaluzec
David C. Joy	Elmar Zeitler
Morris J. Karnovsky	Yimei Zhu
Aaron Klug	
Ondrej L. Krivanek	
Myron C. Ledbetter	
Dennis McMullan	
Joseph R. Michael	

Distinguished Scientist Awards

PHYSICAL SCIENCES (2017)

Nestor J. Zaluzec

Argonne National Laboratory

A Fellow of both Oak Ridge National Laboratory and the Computational Institute of the University of Chicago, Zaluzec has and continues to hold the tripartite role of Senior Scientist, Educator and Inventor at Argonne National Laboratory. As an innovator, his research includes development of instrumentation and techniques for state-of-the-art analysis in X-ray and electron spectroscopy, as well as electron optics, targeted toward expanding the impact of electron-optical beam lines for characterization of soft and hard matter in both static and dynamic states. In addition to creating tools for science, as a researcher he also wields these bleeding edge technologies with collaborators to study vexing problems in technologically important materials. Over the last 40 years, this research has included studies of: structural phase transformations, radiation damage in metals and ceramics, immobilization of nuclear waste, magnetic nano-arrays, elemental segregation in: alloys, semiconductors, polymers, and catalysts; in vacuum, gases and liquids. He is now expanding his interests into the realm of soft-matter and cryo-microscopy of proteins and macromolecules. One of the earliest to realize the impact of the Internet he established the TelePresence Microscopy Collaboratory, which served as a early model for outreach to the community providing unencumbered access to scientific resources. For the last quarter of a century, he has also presided over the Microscopy Listserver, a communication forum that links over four thousand microscopists and microanalysts worldwide. In addition to his prior and current adjunct and visiting professorial appointments at universities (IIT, UIUC, UIC, NIU, Manchester), he is also a member of several professional societies (MSA, MAS, MSC/SMC, ACMM, EMS, and MMMS) and has held various roles therein. He also engages the next generation of scientists through his work with middle and high school students via the Illinois Junior Academy of Science.



BIOLOGICAL SCIENCES (2017)

David W. Piston

Washington University

David W. Piston is the Edward J. Mallinckrodt Jr. Professor of Cell Biology & Physiology, Physics, and Bioengineering at Washington University in St. Louis. Dr. Piston received his training in physics with a bachelor degree from Grinnell College, followed by M.S. and Ph.D. degrees from the University of Illinois. His doctoral research was performed with Enrico Gratton, and he subsequently completed a postdoctoral research fellowship in Applied Physics with Watt Webb at Cornell University. During his time at Cornell, two-photon excitation microscopy was invented, which led Dr. Piston into biomedical research. From 1992 to 2014, Dr. Piston was on the faculty at Vanderbilt University. He was a Beckman Young Investigator Award (1993), NIH Study Section Chair (2004-2006), a member of the Searle Scholars Advisory Board (2006-2012), and is currently the Associate Editor for Cell Biophysics of the Biophysical Journal. His diverse research group focuses on the understanding the molecular mechanisms that underlie hormone secretion from islets of Langerhans in the pancreas. Driven by this biomedical focus, the lab develops and applies novel fluorescence microscopies to improve temporal resolution and increase information content. These approaches include multi-color fluctuation spectroscopy, light sheet microscopy, hyperspectral imaging, and correlative light and electron microscopy. To optimize these methods, his lab also develops novel biosensors, largely based on the Green Fluorescent Protein and its relatives. His lab combines these new approaches and probes to allow quantitative measurements of constituent islet cell behaviors in situ at various points along key signaling pathways for glucose homeostasis.



	BIOLOGICAL SCIENCES	PHYSICAL SCIENCES
1975	Keith R. Porter	Robert Heidenreich
1976	L.L. Marton	Albert V. Crewe
1977	Robley C. Williams	James Hillier
1978	Thomas Anderson	Vernon E. Cosslett
1979	Daniel C. Pease	John M. Cowley
1980	George E. Palade	Gareth Thomas
1981	Sanford L. Palay	Vladimir K. Zworykin
1982	Richard M. Eakin	Benjamin M. Siegel
1983	Hans Ris	Otto Scherzer
1984	Cecil E. Hall	Charles W. Oatley
1985	Gaston Dupouy	Ernst Ruska
1986	F. O. Schmitt	Peter B. Hirsch
1987	Marilyn G. Farquhar	Jan B. LePoole
1988	Morris J. Karnovsky	Hatsujiro Hashimoto
1989	Don W. Fawcett	Elmar Zeitler
1990	Audrey M. Glauret	Gertrude F. Rempfer
1991	Hugh E. Huxley	Archibald Howie
1992	Fritiof Sjöstrand	Oliver C. Wells
1993	Jean-Paul Revel	Kenneth C.A. Smith
1994	Andrew P. Somlyo	Dennis McMullan
1995	Shinya Inoué	David B. Wittry

	BIOLOGICAL SCIENCES	PHYSICAL SCIENCES
1996	Myron C. Ledbetter	John Silcox
1997	S. J. Singer	Peter R. Swann
1998	Avril V. Somlyo	Michael J. Whelan
1999	Sir Aaron Klug	Takeo Ichinokawa
2000	K. Tokuyasu	S. Amelinckx
2001	Patrick Echlin	Thomas Mulvey
2002	Marc Adrian	Ryuichi Shimizu
2003	Joachim Frank	Harald Rose
2004	Robert M. Glaeser	Raymond F. Egerton
2005	Richard Henderson	Sumio Iijima
2006	Joseph S. Wall	John C.H. Spence
2007	Nigel Unwin	Terence E. Mitchell
2008	Alasdair C. Steven	Ondrej L. Krivanek
2009	Jacques Dubochet	Robert Sinclair
2010	George Papas	Michael S. Isaacson
2011	Ueli Aebi	Hannes Lichte
2012	Timothy S. Baker	Ulrich Dahmen
2013	David J. DeRosier	C. Barry Carter
2014	Wah Chiu	David J. Smith
2015	Michael W. Davidson	Peter W. Hawkes
2016	Kenneth H. Downing	George W. Smith

BURTON MEDAL AWARD (2017)

Christopher J. Russo

MRC Laboratory of Molecular Biology

Born in Detroit, Michigan, Chris attended the University of Notre Dame where he studied electrical engineering and philosophy, obtaining two bachelors degrees. He then went on to graduate school at Harvard and MIT as part of the HST Medical Engineering and Medical Physics program, a joint course between Harvard College, MIT and Harvard Medical School, where he studied physics and medicine. Under the supervision of Jene Golovchenko (Physics, Engineering) and Daniel Branton (Biology), he completed his PhD thesis on imaging DNA attached to carbon nanotubes using several microscopy methods, including scanning probe and high-resolution aberration corrected electron microscopy.

After his PhD he did a short Post-Doc in the Physics Department at Harvard. During this time, he developed a new technique to create nanopores in graphene with atomic precision that combined ion bombardment with high energy electron irradiation.

He then moved to the MRC Laboratory of Molecular Biology in Cambridge UK to do a post-doc with Lori Passmore. Together, they worked on developing new methods for electron cryomicroscopy (cryo-EM), and in particular focused on how the specimen support could affect the resolution of cryo-EM images. This led to a number of advances including simple techniques to modify graphene for use as a specimen support for biological molecules and the development of a new specimen support structure, made entirely of gold, that reduced movement during imaging fifty-fold. Chris has since started his own group at LMB, and continues to study the physical phenomena that limit resolution in cryo-EM and thus enable the development of new devices, instruments and methods to improve the imaging power of the electron microscope in biology.



MORTON D. MASER DISTINGUISHED SERVICE AWARD (2017)

David W. Tomlin

Azimuth Corporation

Dave Tomlin has been a member of MSA since 1999. He has served as: Chair of the Education Committee (2013-2015), MegaBooth Committee member (2003-2014), Coordinator of the MegaBooth (2015-present), Placement Office Co-Chair (2012-2014), Placement Office Chair (2015-present), Director-Local Affiliated Societies (2009-2011), Symposium Organizer and Session Chair (2007), MSA Logo and Website Redesign Team (2009), Website Redesign Team (2015) and is a Technologist Forum member. He is also an active member of his local affiliate society, the Microscopy Society of the Ohio River Valley (MSORV) where he is currently the webmaster and is finishing his second year as President. He has also served as Chair, Bulletin Editor, Webmaster and Treasurer for the Dayton Local Section of the American Chemical Society. Dave has also been active in his local community, where he served on the board of the local youth soccer program, was the Committee and Advancement Chair for BSA Troop 114, and for the last 7 years he has served as President and Treasurer of the Tri-County North Band Boosters.

Dave received his B.S. in Chemistry (1985) and Ph.D. in Physical Chemistry (1990), both from Miami University in Oxford, OH. While completing his doctorate, he held a Department of Energy Research Participation Fellowship (1986-1990) at the EG&G Mound Labs, Miamisburg, OH. He also held a National Research Council Post-Doctoral Fellowship (1991-1993) at the Naval Research Laboratory, Washington, DC. For the last 22 years he has been at the Air Force Research Laboratory, Materials and Manufacturing Directorate, Wright-Patterson Air Force Base, Ohio. His research interests are focused on utilizing optical, confocal, electron and ion beam microscopies, to investigate failures in semiconductor and electronic devices.



YEAR RECIPIENT

1975	James Lake	1998	Ian M. Anderson
1976	Michael S. Isaacson	1999	Zhong Lin Wang
1977	Robert Sinclair	2000	Eva Nogales
1978	David C. Joy	2001	Jian Min Zuo
1979	Norton B. Gilula	2002	Nigel D. Browning
1980	John C.H. Spence	2003	Frances M. Ross
1981	Barbara J. Panessa-Warren	2004	Z. Hong Zhou
1982	Nestor J. Zaluzec	2005	David J. Larson
1983	Ronald Gronsky	2006	David A. Muller
1984	David B. Williams	2007	Peter D. Nellist
1985	Richard D. Leapman	2008	Steven J. Ludtke
1986	J. Murray Gibson	2009	Eric A. Stach
1987	Ron A. Milligan	2010	Sergei V. Kalinin
1988	A.D. Romig, Jr.	2011	Radostin Danev
1989	Laurence D. Marks	2012	David S. Ginger
1990	W. Mason Skiff	2013	John L. Rubinstein
1991	Joseph R. Michael	2014	Maria Varela
1992	Kannan M. Krishnan	2015	Andrew M. Minor
1993	Joseph A.N. Zasadzinski	2106	Miaofang Chi
1994	Jan M. Chabala		
1995	Joanna L. Batstone		
1996	Vinayak P. Dravid		
1997	P.M. Ajayan		

YEAR RECIPIENT

1992	Ronald M. Anderson	2000	Barbara A. Reine
	G. W. Bailey		Hildegard H. Crowley
	Frances L. Ball	2002	Beverly E. Maleeff
	M. Blair Bowers	2003	M. Grace Burke
	Deborah L. Clayton	2004	Ralph M. Albrecht
	Joseph Harb	2005	W. Gray (Jay) Jerome
	Kenneth R. Lawless	2006	Jeanette Killius
	Morton D. Maser	2007	Robert L. Price
	Caroline Schooley	2008	Stuart McKernan
	John H.L. Watson	2010	Pamela F. Lloyd
1993	E. Laurence Thurston	2011	Janet H. Woodward
1994	Richard F.E. Crang	2012	Gina E. Sosinsky
1995	Raymond K. Hart	2013	Caroline A. Miller
1996	José A. Mascorro	2014	Michael Marko
1997	William T. Gunning III	2015	JoAn Hudson
1998	Nestor J. Zaluzec	2016	Amanda Lawrence
1999	Charles E. Lyman		

ALBERT CREWE AWARD (2017)

Pinshane Y. Huang

University of Illinois, Urbana-Champaign

Pinshane Y. Huang is an Assistant Professor in Materials Science and Engineering at the University of Illinois Urbana-Champaign. She holds a PhD in Applied Physics from Cornell University and completed a postdoctoral fellowship at Columbia University. Huang's work in aberration-corrected microscopy and spectroscopy has been instrumental in the discovery of novel physical phenomena in two-dimensional (2D) materials and the realization of atomically-thin electronics. Her key contributions include: elucidating the structure and properties of defects in single atomic layers of graphene and 2D semiconductors, providing the first atomic-scale view into the structure and dynamics of a two-dimensional silica glass, and characterizing interfaces in 2D devices. Since starting her research lab at the University of Illinois in 2015, Huang has established a research group focused on using electron microscopy and spectroscopy to design a new generation of flexible electronics and energy harvesting devices.



GEORGE PALADE AWARD (2017)

Rengasayee Veeraraghavan

Virginia Tech Carilion Research Institute

Rengasayee (Sai) Veeraraghavan earned his PhD from the University of Utah's Department of Bioengineering and completed postdoctoral training at the University of Utah's Department of Mathematics and at the Virginia Tech Carilion Research Institute. He is currently a Research Assistant Professor at the Virginia Tech Carilion Research Institute investigating the structural underpinnings of the propagation of electrical excitation through the heart in health and in disease. As a postdoctoral trainee, he investigated the functional implications of the spatial organization of proteins and their ultrastructural milieu by combining an array of techniques including single molecule localization microscopy, transmission electron microscopy and whole heart optical voltage mapping. As part of this work, he developed STochastic Optical Reconstruction Microscopy-based Relative Localization Analysis, a novel approach for high throughput quantitative assessment of the spatial organization of proteins from single molecule localization data. Using this approach, he has identified a sodium channel-rich nanodomain within the cardiomyocyte intercalated disk and its involvement in non-canonical mechanisms of electrical communication between cardiomyocytes. These findings could prompt a paradigm shift in our understanding of the mechanisms underlying cardiac excitation spread and provide the basis for the development of novel anti-arrhythmic therapies. In ongoing research, he is investigating the role of vascular dysfunction in dysregulating intercalated disk nanodomains and the contribution of these effects to the genesis and progression of atrial fibrillation.



YEAR RECIPIENT

2012	Wu Zhou
2013	Lena Fitting-Kourkoutis
2014	Jinwoo Hwang
2015	Meng Gu
2016	Ryo Ishikawa

YEAR RECIPIENT

2012	Gabriel C. Lander
2013	Peng Ge
2014	Ricardo C. Guerrero-Ferreira
2015	Alexey Amunts
2016	Dmitry Lyumkis

HILDEGARD H. CROWLEY OUTSTANDING TECHNOLOGIST AWARD FOR BIOLOGICAL SCIENCES (2017)



Patricia S. Connelly
National Institutes of Health

Patricia Stranen Connelly has a B.A. in biology from Immaculata University and began her career in electron microscopy in 1971 with Gerd Maul at Temple University Health Sciences Center. She continued at the Wistar Institute of Anatomy and Biology and was recruited in 1976 to join the labs of Shinya Inoué and Lew Tilney at the University of Pennsylvania where she remained until Lew's retirement in 2005. Her career continued at the National Heart, Lung, and Blood Institute of NIH where she assisted Mathew P. Daniels in the founding of the Electron Microscopy Core Facility.

Pat has received recognitions such as Outstanding Basic Science Award and an Orloff Science Award from NHLBI. Her main focus has been to assist others, from students to seasoned investigators, by passing on the knowledge and wisdom she has gained through the years on teaching microscopy, protocols, machines, and on moving EM laboratories and microscopes. This is accomplished not only by replying to requests of past students and co-workers and those on the Microscopy List Server but also those whom she comes in contact with at M&M each year. She has been an active member of the Facilities Operation and Management Focus Interest Group and has served as its secretary. She volunteers at the Outreach/Project Micro Booth and assists with the Family Affair Session.

CHUCK FIORI OUTSTANDING TECHNOLOGIST AWARD FOR PHYSICAL SCIENCES (2017)



Richard L. Martens
The University of Alabama

Richard L. Martens began his electron microscopy career at "the turn of the century." After receiving his BA in English in 1995 from The University of Wisconsin, Madison and an AD in Electron Microscopy from the Madison Area Technical College in Madison, Wisconsin, Richard worked at Imago Scientific Instruments, (now Cameca Instruments, Inc.) developing instrumentation and specimen preparation techniques for the local electrode atom probe microscope. Richard became manager of the Central Analytical Facility (CAF) at The University of Alabama in 2006. The CAF maintains major research instrumentation and is a "hands-on" user facility – training and educating students, faculty and staff on using research instrumentation. The CAF is a premier microanalytical and microstructural characterization facility within the Southeast region. In 2012, Richard was on the local organizing committee for the 53rd International Field Emission Symposium, (IFES) that was held at the University of Alabama. In 2013, he was elected to leader of the MSA Atom Probe Focused Interest group. In 2016, Richard became the Editor of the M&M Onsite Program Guide, helped organize the NSF sponsored 1st Atom Probe Tomography (APT) Workshop for Earth Sciences and the 1st MSA Pre-Meeting Congress on APT. He was also on the organizing committee for the MAS 5th Topical Conference on EBSD.

YEAR RECIPIENT

1993	Ben O. Spurlock
1994	not awarded
1995	Kai Chien
1996	not awarded
1997	John P. Benedict
1998	Hilton H. Mollenhauer
1999	John M. Basgen
2000	Nancy Crise Smith
2001	not awarded
2002	José A. Mascorro
2003	not awarded
2004	not awarded
2005	John J. Bozzola
2008	Thomas Deerinck
2009	Mary Morphew
2010	E. Ann Ellis
2011	Robert Grassucci
2012	Kunio Nagashima
2013	Robyn Roth
2014	Hong Yi
2015	Norman Olson
2016	Frank Macaluso

YEAR RECIPIENT

1993	not awarded
1994	Bernard J. Kestel
1995	not awarded
1996	David W. Ackland
1997	Stanley J. Klepeis
1998	Charles J. Echer
1999	John C. Wheatley
2000	not awarded
2001	Conrad G. Bremer
2002	not awarded
2003	Edward A. Ryan
2004	Mark C. Reuter
2005	Chris Nelson
2008	not awarded
2009	Lynne Gignac
2010	not awarded
2011	not awarded
2012	not awarded
2013	K. Shawn Reeves
2014	Eddy Garcia-Meitin
2015	Masahiro Kawasaki
2016	not awarded



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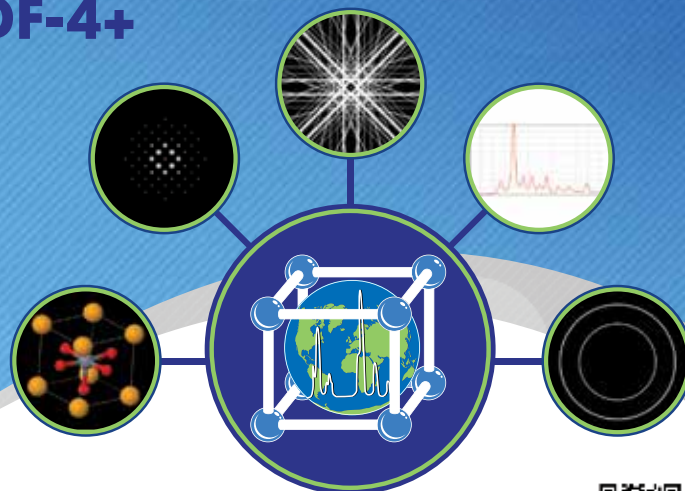
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Julie Chouinard
Vincent (Vin) Smentkowski
Emma Bullock
Roseann Csencsits
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1968	L.S. Birks
1969	K.F.J. Heinrich
1970	R.E. Ogilvie
1971	A.A. Chodos
1972	K. Keil
1973	D.R. Beaman
1974	P. Lublin
1975	J.E. Colby
1976	E. Lifshin
1977	J.I. Goldstein
1978	J.D. Brown
1979	D.F. Kyser
1980	O.C. Wells
1981	J.R. Coleman
1982	R.L. Myklebust
1983	R. Bolon
1984	D.C. Joy
1985	D.E. Newbury
1986	C.G. Cleaver
1987	C.E. Fiori
1988	W.F. Chambers
1989	D.B. Wittry
1990	A.D. Romig, Jr
1991	J.T. Armstrong
1992	D.B. Williams
1993	T.G. Huber
1994	J.A. Small
1995	J.J. McCarthy
1996	D.E. Johnson
1997	J.R. Michael
1998	R.B. Marinenko
1999	J.J. Friel
2000	C.E. Lyman
2001	R.W. Linton
2002	G.P. Meeker
2003	E.S. Etz
2004	P.K. Carpenter
2005	I.H. Musselman
2006	R. Gauvin
2007	P.G. Kotula
2008	I.M. Anderson
2009	C. Johnson
2010	E.P. Vicenzi
2011	J.H.J. Scott
2012	J.F. Mansfield
2013-14	K.L. Bunker
2015-16	T.F. Kelly

DUNCUMB AWARD FOR EXCELLENCE IN MICROANALYSIS

Thomas F. Kelly

Thomas F. Kelly received his B.S. with highest honors in Mechanical Engineering from Northeastern University in June 1977 and a Ph.D. in Materials Science in December 1981 from the Massachusetts Institute of Technology. He was on the faculty at the University of Wisconsin-Madison from January 1983 until September 2001. Tom was also Director of the Materials Science Center from 1992 to 1999.

While serving as a professor of Materials Science and Engineering in the University of Wisconsin-Madison College of Engineering until September 2001, Tom founded Imago Scientific Instruments to commercialize the Local Electrode Atom Probe, or LEAP. The LEAP is a major advance for atom probe tomography by capturing a three-dimensional atom-by-atom "images" of materials at high speeds and high resolution.

Tom Kelly has been active in the fields of analytical electron microscopy, atom probe microscopy, rapidly solidified materials, and electronic and superconducting materials for over 40 years. He has published over 250 papers and 17 patents in these fields in that time. Tom has driven innovation in instrumentation for atom probe tomography over the past two decades. He continues to pursue microscopy innovations such as atomic-scale tomography by developing new detector technologies and combining atom probe tomography with electron microscopy in a single instrument.

Tom was a member of the executive council of the Microscopy Society of America from 2000 to 2002, the International Steering Committee of the International Field Emission Society from 2002 to 2008 and President of the International Field Emission Society from 2006 to 2008. He has served as the inaugural chair of the Microscopy Today Innovation Awards Committee for the Microscopy Society of America since 2010. Tom was an Editor of Microscopy and Microanalysis from 2010 to 2015 and is on the Editorial Board of Microscopy Today. From 2010 to 2012, Tom served on the Council of the Microanalysis Society. In 2012, he was elected President of the Microanalysis Society and served as President from August 2014 to August 2016. He is a fellow of the Microscopy Society of America and the International Field Emission Society.



KURT F.J. HEINRICH AWARD

Andrew Herzing

Andrew Herzing received his M.Sc. and Ph.D. in materials science and engineering from Lehigh University under the supervision of Professor Christopher Kiely. During this period he was awarded the George P. Conard award for outstanding graduate student. He then spent two years as a National Research Council postdoctoral fellow at the National Institute of Standards and Technology in Gaithersburg, MD, where he is now a staff scientist in the Material Measurement Laboratory. Andrew's research is centered on the quantitative structural and chemical characterization of small volumes of material using electron microscopy techniques. In particular, he is currently focused on the characterization of organic composites, developing quantitative methods for three-dimensional characterization of materials using tomographic techniques, and the measurement of surface plasmon resonance behavior in individual nanostructures. He has contributed to over 70 peer-reviewed publications and three book chapters in a wide variety of fields involving electron microscopy.



Previous Awardees

2007	D.B. Williams
2008	J. I. Goldstein
2009	D.E. Newbury
2010	D.C. Joy
2011	J.R. Michael
2012	J. Bentley
2013	E. Lifshin
2014	O. L. Krivanek
2015	P. J. Statham
2016	David Muller

Previous Awardees

1986	P.J. Statham
1987	J.T. Armstrong
1988	D.B. Williams
1989	R.D. Leapman
1990	R.W. Linton
1991	A.D. Romig, Jr.
1992	S.J. Pennycook
1993	P.E. Russell
1994	J.R. Michael
1995	E.N. Lewis
1997	R. Gauvin
1998	V.P. Dravid
1999	J. Bruley
2000	H. Ade

2001	C. Jacobsen
2002	D.A. Wollman
2005	M. Watanabe
2006	M. Toth
2007	G. Kothleitner
2008	P.G. Kotula
2009	D. Drouin
2010	H. Demers
2011	L.N. Brewer
2012	E.A. Marquis
2013	J.M. LeBeau
2014	B.P. Gorman
2015	P. Pinard
2016	Julien Allaz

PRESIDENTIAL SCIENCE AWARD

Michael K. Miller

Michael K. Miller, of ORNL's Materials Science and Technology Division, began his career at ORNL in the Metals and Ceramics Division in 1983. He received his D. Phil. from the Department of Metallurgy and Science of Materials, Oxford University, in 1977 and continued there as a Science Research Council Fellow until 1979. He spent 4 years as a visiting scientist at the U.S. Steel Research Laboratory in Monroeville, Pennsylvania, before joining ORNL.

Dr. Miller is recognized as one of the premier scientific leaders in the field of atom probe field-ion microscopy and atom probe tomography. He has pioneered the application of these techniques to a broad range of materials, statistical data, analysis methods, and new instrument design.

During his tenure at ORNL, Miller has established himself as the preeminent researcher in atom probe field-ion microscopy and atom probe tomography. He is currently leading ORNL's fundamental experimental efforts to understand and exploit the unprecedented properties and behaviors of nanostructured ferritic steels.

His scientific impact is demonstrated not only by his ongoing research and development accomplishments, but also by his contributions to the continued success of the Shared Research Equipment (SHaRE) User program at ORNL. His work attracts atom probe users from domestic and international universities, industry, and other national laboratories, helping to make the SHaRE atom probe facility into the leading laboratory of its kind.

Miller has authored or co-authored more than 460 publications in peer-reviewed journals, written three books, co-edited a book and 13 special volumes, and has made more than 730 presentations, of which 125 were invited. He has been honored with several major awards, including the Coslett Award in 2004 from the Microbeam Analysis Society and the Prince Hassan Medal for Scientific Contributions at the International Level in 1998. Most recently, Miller, a resident of Oak Ridge, was recognized as a 2009 Fellow of The Minerals, Metals and Materials Society (TMS) and as a 2010 Fellow of the Microscopy Society of America.

Miller became a Corporate Fellow in 2010.



PRESIDENTIAL SERVICE AWARD

Daniel Kremser

Dr. Dan Kremser joined Battelle in January 2005 and is a Principal Research Scientist in their Advanced Materials Resource Group. He has over 35 years experience in analytical instrumentation applications and in laboratory management. Dr. Kremser's technical expertise is in the characterization of materials and solving complex analytical problems associated with advanced analytical instrumentation. He has worked with a wide variety of physical systems and applications domains, ranging from earth-forming materials and geological samples to organic compounds and soft materials. In the instrumentation realm he is widely known for his skill and precision as an operator and for his numerous contributions to the field of quantitative elemental and compositional measurement and characterization, most notably X-ray diffraction (XRD), electron beam instruments such as electron microprobes (EPMA) and scanning electron microscopes (SEM) equipped with wavelength-dispersive and energy-dispersive X-ray spectrometers, and inductively coupled plasma-mass spectrometers (ICP-MS). Dr. Kremser obtained a Bachelor's degree in Geology from the University of Connecticut, and earned a PhD in Earth and Planetary Sciences from Washington University in St. Louis.

Dan has a strong record of involvement with the Microanalysis Society (MAS) and its local affiliated regional societies (ARes) throughout his career. Dr. Kremser joined MAS in 1982 and has served our society with distinction and tireless energy in several roles, starting as MAS Director from 2005-2007, Membership Services Chair from 2008-2012 and finally as Treasurer from 2013-2016. At the local level, Dan has contributed significantly to three regional societies: the Microscopy Society of the Ohio River Valley (MSORV), the Microscopy Society of Northeast Ohio (MSNO), and the Central States Microscopy and Microanalysis Society (CSM&MS), serving as President of each of the above as well as other council positions.



Previous Awardees

1977	R. Castaing	2000	R.F. Egerton
1978	K.F.J. Heinrich	2001	P.E. Batson
1979	P. Duncumb	2002	K. Keil
1980	D.B. Wittry	2003	P.E. Russell
1981	S.J.B. Reed	2004	J.T. Armstrong
1982	R. Shimizu	2005	G. Slodzian
1983	J. Philibert	2006	B.J. Griffin
1984	L.S. Birks	2007	R.D. Leapman
1985	E. Lifshin	2008	T. F. Kelly
1986	R.L. Myklebust	2009	J.R. Michael
1987	O.C. Wells	2010	J.J. Donovan
1988	J.D. Brown	2011	P.J. Statham
1989	J. Hillier	2012	N.J. Zaluzec
1990	T.E. Everhart	2013	P. Echlin
1997	D.B. Williams	2014	H.L. Fraser
1998	F.H. Schamber	2015	M.R. Keenan
1999	R.A. Sareen	2016	M. Jercinovic

Previous Awardees

1977	P. Lublin	1997	J.A. Small
1978	D.R. Beaman	1998	J.J. McCarthy
1979	M.A. Giles	1999	T.G. Huber
1980	A.A. Chodos	2000	R.B. Marinenko
1981	R.L. Myklebust	2001	C.E. Lyman
1982	J. Doyle	2002	J.F. Mansfield
1983	D.E. Newbury	2003	I.H. Musselman
1984	J.I. Goldstein	2004	J.R. Michael
1985	M.C. Finn	2005	G.P. Meeker
1986	V. Shull	2006	H.A. Freeman
1987	D.C. Joy	2007	P.K. Carpenter
1988	C.G. Cleaver	2008	L.M. Ross
1989	W.F. Chambers	2009	V. Woodward
1990	C.E. Fiori	2010	S.A. Wight
1991	T.G. Huber	2011	D.T. Kremser
1992	E.S. Etz	2012	C. Johnson
1993	H.A. Freeman	2013	J.J. McGee
1994	J.L. Worrall	2014	I.M. Anderson
1995	R.W. Linton	2015	S. McKernan
1996	P. F. Hlava	2016	H. Lowers

MAS OUTSTANDING PAPER AWARDS (2017)

These awards are presented annually to the authors of outstanding papers from the previous annual meeting in each of four categories.

RAYMOND CASTAING – BEST STUDENT PAPER AWARD:

Volatile Addition to the Inner Solar System Between 4.566 and 4.564 Ga: Evidence from Angrite Meteorites

A. R. Sarafian¹, S. G. Nielsen¹, H. R. Marschall¹, G. A. Gaetani¹, E. H. Hauri², K. Righter³, E. Sarafian¹

¹Woods Hole Oceanographic Institution, 266 Woods Hole Rd. Woods Hole MA

²Department of Terrestrial Magnetism, Carnegie Institution of Washington, Washington, DC

³NASA-JSC, Mailcode XI2, 2101 NASA Pkwy, Houston, TX

V.G. MACRES – BEST INSTRUMENTATION/SOFTWARE PAPER AWARD:

Multi-Beam Scanning Electron Microscope Design

Pieter Kruit¹ and Yan Ren¹

¹Delft University of Technology, Department of Imaging Physics; Delft, The Netherlands

V.E. COSSLETT – BEST INVITED PAPER AWARD:

Microanalysis of Fossil Micrometeorites and Meteorites to Study A Major Asteroid Collision ~470 Million Years Ago

Philipp R. Heck^{1,2} and Birger Schmitz^{1,3}

¹Robert A. Pritzker Center for Meteoritics and Polar Studies, The Field Museum of Natural History; Chicago, IL, USA.

²Chicago Center for Cosmochemistry and Department of the Geophysical Sciences, The University of Chicago; Chicago, IL, USA.

³Astrogeobiology Laboratory, Department of Physics; Lund University, Sweden.

L.S. BIRKS – BEST CONTRIBUTED PAPER AWARD:

Dissociation of Molecular Ions During the DC Field Evaporation of ZnO in Atom Probe Tomography

Ivan Blum^{1*}, David Zanuttini¹, Lorenzo Rigutti¹, François Vurpillot¹, Julie Douady², Emmanuelle Jacquet², Pierre-Matthieu Anglade², Benoit Gervais², Angela Vella¹, Aurore Gaillard¹

¹Groupe de Physique des Matériaux (GPM), UMR CNRS 6634, Université et INSA de Rouen, Avenue de l'Université, BP 12, 76801 Saint Étienne du Rouvray, France

²Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR CNRS 6252, ENSICAEN, CNRS, CEA/IRAMIS, Université de Caen, Boulevard Henri Becquerel, BP5133, 14070 CAEN Cedex 05, France

> M&M Meeting Awards

M&M STUDENT SCHOLAR AWARDS – SPONSORED BY MSA



Jay Aindow, Academy of Aerospace and Engineering – *K-12 Student Scholarship*
Marwa Belhaj, University of South Carolina
Gabriel Calderon Ortiz, The Ohio State University
Allessandra DiCorato, Northwestern University
Ismail El Baggari, Cornell University
Bryan Esser, The Ohio State University
Everett Grimley, North Carolina State University
Diane Haiber, Arizona State University
Liang Hong, University of Victoria, Canada
Yi Jiang, Cornell University
Takaaki Kinoshita, Soka University, Japan
James Kizziah, University of Alabama, Birmingham
Prashant Kumar, University of Maryland
Jiayao Li, Monash University, Australia
Alexandra Machen, University of Kansas
Vinal Menon, University of South Carolina
Katerina Naydenova, University of Cambridge, United Kingdom
S.M. Bukola Obayomi, Arizona State University
Katherine Spoth, Cornell University
Congli Sun, University of Wisconsin
Aakash Varambhia, Oxford University
Kartik Venkatraman, Arizona State University
Hsin Wei Wu, Arizona State University
Jie Yang, Boston University – *Raleigh & Clara Miller Memorial Scholarship*
Chenyu Zhang, University of Wisconsin
Pei Zhang, University of Wisconsin
Yong Zhang, Monash University, Australia

M&M STUDENT SCHOLAR AWARDS – SPONSORED BY MAS



Elaina Anderson, University of Michigan
Yi-Sheng Chen, Oxford University, United Kingdom
Philipp Kürnsteiner, Max Planck Institute for Iron Research, Germany
Genevieve Lee, The Ohio State University
Seungyeol Lee, University of Wisconsin
Gen Maeda, Kogakuin University, Japan
Benjamin Martineau, Cambridge University, United Kingdom
Yang Ning, University of Houston
Alan Pryor, University of California, Los Angeles
Saransh Singh, Carnegie Mellon University
Joseph Tessmer, Carnegie Mellon University
Weiyi Xie, The Ohio State University
Xuyang Zhou, University of Alabama

M&M POSTDOCTORAL SCHOLAR AWARDS

Priyamvada Acharya, National Institutes of Health – *Robert P. Apkarian Memorial Scholarship, Biological Sciences*
Cédric Barroo, Free University of Brussels, Belgium
Hamish Brown, Monash University, Australia – *Robert P. Apkarian Memorial Scholarship, Physical Sciences*
Wei Guo, Oak Ridge National Laboratory
Lewys Jones, University of Oxford, United Kingdom – *Eric Samuel Scholarship*
Emi Kano, University of Alberta, Canada
Linze Li, University of California, Irvine
Dustin McCraw, National Institutes of Health
Michelle Thompson, National Aeronautics and Space Administration
Canhui Wang, National Institute of Standards and Technology
Weizong Zu, North Carolina State University
Aiming Yan, University of California, Berkeley
Yue Zhou, University of Illinois

M&M PROFESSIONAL TECHNICAL STAFF AWARD

Isabel Boona, The Ohio State University

2016-2018 IFES Steering Committee

David J. Larson	President
François Vurpillot	Vice-President
Gregory Thompson	Secretary
Michael Moody	Treasurer
Julie Cairney	
Mattias Thuvander	
Stephan A. A. Gerstl	
Gang Sha	
Ross Marceau	
Baptiste Gault	

IFES Past Presidents

2014 - present	D.J. Larson
2008 - 2014	N. Kruse
2006 - 2008	T.F. Kelly
2002 - 2006	R.G. Forbes
2000 - 2001	D.N. Seidman
1996 - 2000	R.G. Forbes
1993 - 1996	M.K. Miller
1990 - 1993	G.D.W. Smith
1987 - 1990	J.H. Block

IFES Fellows

Hans-Olof Andrén
Didier Blavette
Alfred Cerezo
Paul Cutler
Richard Forbes
Georgiy Fursey
Robert Gomer
Kazuhiro Hono
Gary Kellogg
Thomas Kelly
Hans Juergen Kreuzer
Norbert Kruse
Allan Melmed
Michael Miller
Marwan Mousa
Osamu Nishikawa
John Panitz
Simon Ringer
Guido Schmitz
David Seidman
George Smith
Krystyna Stiller
Lyn Swanson
Tien Tzou Tsong

E.W. Müller Young Scientist Award

(1978)	A.R. Waugh
(1979)	H.-W. Fink
(1980)	Y. Kuk
(1981)	S.J. Banard
(1982)	J.M. Derochette
(1983)	D.R. Kingham
(1984)	M.G. Hetherington
(1985)	M. Ahmad
(1986)	L. Karlsson
(1987)	P.P. Camus
(1988)	A. Cerezo
(1989)	J. Dirks
(1990)	J.E. Brown
(1991)	F. Danoix
(1992)	H. Schmid
(1993)	M.C. Reckzu
(1994)	R.C. Thomson
(1995)	C. Voss
(1996)	L. Li
(1997)	C. Schmuck-Pareige
(1998)	K. Nagaoka
(2001)	Ch. Lang
(2002)	E. A. Marquis
(2004)	B. Cho
(2006)	W.M. Tsang
(2008)	M. Moors
(2010)	P. Stender
(2012)	M. Roussel
(2014)	C. Oberdorfer
(2016)	M. Dagan

2017 IFES Travel Scholarship Awards

Ziron Peng

On the Multiple Event Detection in Atom Probe Tomography

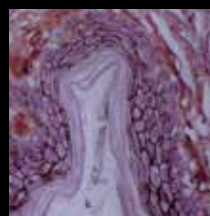
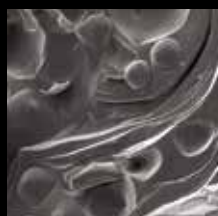
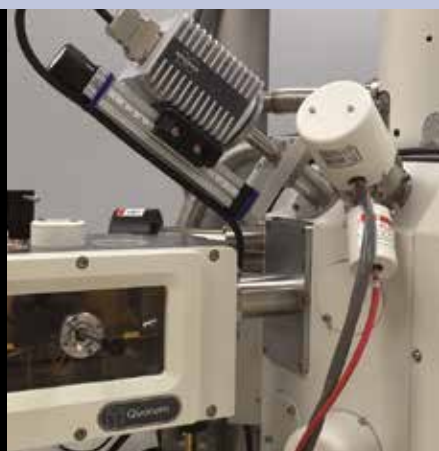
Shyam Katnagallu

High Fidelity Reconstruction of Experimental Field Ion Microscopy Data by Atomic Relaxation Simulations

Vahid Adineh

Metallic Nanoshell for Three-Dimensional Chemical Mapping of Low Conductive Materials with Pulsed-Voltage Atom Probe Tomography

Meeting Program Information



Spacious Labs
State-of-the-Art Equipment
Certified Instructors
New Equipment Demos

Announcing the

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We are excited to announce that our new academy is now open! We are now offering training courses and workshops led by our certified faculty. Located next to our extensive warehouse in Hatfield, PA, just minutes from Philadelphia, we are now also offering demonstrations of new equipment. Take advantage of the knowledge Electron Microscopy Sciences is now able to provide and the valuable information you will gain.

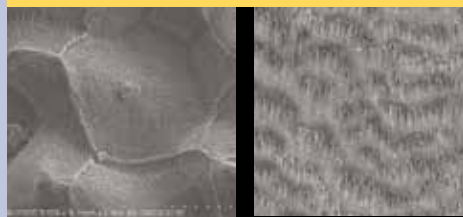
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M&M 2017
**MICROSCOPY &
MICROANALYSIS**
August 6-10, 2017 • St. Louis, MO

> Friday, August 4, 2017

8:30 AM	MSA Council	Portland/Benton (Marriott Hotel)
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> Saturday, August 5, 2017

8:30 AM	MSA Council	Portland/Benton (Marriott Hotel)
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8:30 AM – 5:00 PM	Pre-Meeting Congress	
	X60 – Inaugural Pre-Meeting Congress for Early Career Professionals in Microscopy & Microanalysis	Room 275-276

> Sunday, August 6, 2017

8:30 AM – 5:00 PM	Sunday Short Courses	
	X10 – Specimen Preparation for Biological EM of Resin-embedded Samples: Cryo-methods, Correlative LM-EM and 3-D Imaging	Room 120
	X11 – Immunolabeling Technology for Light and Electron Microscopy	Room 121
	X12 – Practical Considerations for Image Analysis and Use of ImageJ/Fiji	Room 122
	X13 – 3-D Reconstruction with SerialEM and IMOD	Room 123
	X14 – Detectors: If You Can't Detect It, Then You Can't Measure It	Room 125
	X15 – Variable Pressure and Environmental Scanning Electron Microscopy: What Can They Do For Me?	Room 126
8:30 AM – 5:00 PM	Pre-Meeting Congresses	
	X62 – Smaller, Faster, Better: New Instrumentation for Electron Microscopy	Room 276
	X63 – Understanding Radiation Beam-Damage during Cryo-, ETEM, Gas- and Liquid-Cell Electron Microscopy	Room 130
9:00 AM	MAS Council	Room 267
9:00 AM	IFES Steering Committee	Room 280
10:00 AM	Pre-Meeting Congress	
	X61 – Focused Ion Beam Applications and Equipment Developments	Room 274
3:00 PM – 5:00 PM	Microscopy Today Editors & Editorial Board	Room 261
6:30 PM	Sunday Evening Social Event — <i>Marriott St Louis Grand Hotel - Majestic Ballroom</i>	

> Monday, August 7, 2017

7:15 AM	MSA Awards + Fellows Committees	Room 280
7:15 AM	Technologists' Forum Board	Room 242
8:30 AM – 12:00 PM	M&M 2017 Plenary Sessions	America's Ballroom (2nd level)
	Opening Welcome	
	PLENARY TALK #1: Eric Betzig , Janelia Farm Research Campus, Ashburn, VA <i>Imaging Life at High Spatiotemporal Resolution</i>	
	MAS Awards Presentation	
	IFES Awards Presentation	
	Coffee & Donuts Break	
	MSA Awards Presentation	
	M&M Meeting Awards Presentation	
	PLENARY TALK #2: Keith Riles, PhD , University of Michigan, Ann Arbor <i>Detecting Massive Black Holes via Attometry – Gravitational Wave Astronomy Begins</i>	

> Monday, August 7, 2017 (Cont'd.)

12:00 PM – 1:30 PM	Lunch Break	
12:00 PM – 5:30 PM	Exhibit Hall Open	Exhibit Hall 4-5
12:15 PM	MaM Editorial Board	Room 266
12:15 PM	MSA International Committee	Room 126
12:15 PM	MAS Meal with a Mentor	Room 241
12:15 PM	FOM FIG Roundtable	Room 242
12:15 PM	FIG: Diagnostic Microscopy	Room 280
12:15 PM	FIG: Focused Ion Beam	Room 125
12:15 PM	FIG: Atom Probe Field Ion Microscopy	Room 240
1:30 PM – 3:00 PM	PM Symposia & Sessions	
	A04 – Advances in Programming of Quantitative Microscopy for Biological and Materials Science	Room 121
	A05 – Advances in FIB Instrumentation and Applications in Materials and Biological Sciences	Room 127
	A10 – Advances in Scanning Electron Microscopy—Transmission Modes and Channeling Effects	Room 124
	A11 – Instrumentation of Atom Probe: 50 Years and Counting	Room 263
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B01 – Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications	Room 123
	B04 – 3D and Intravital Imaging in Development and Beyond	Room 122
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	Room 265
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
3:00 PM – 5:00 PM	Monday Poster Presentations	Exhibit Hall 4-5
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	
	A04 – Advances in Programming of Quantitative Microscopy for Biological and Materials Science	
	A10 – Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects	
	A11 – Instrumentation of Atom Probe: 50 Years and Counting	
	A18 – Celebrating 50 Years of Microanalysis	
	B01 – Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications	
	B04 – 3D and Intravital Imaging in Development and Beyond	
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	
	P08 – Geological Sample Characterization using Various Imaging Modalities	
3:30 PM	Technologists' Forum Business Meeting	Room 261
4:15 PM	MSA-CUP Book Series Advisory Board Meeting	Room 280
5:00 PM	Student Poster Awards	Exhibit Hall 4-5
5:30 PM	Student Mixer	Room 240-241-242
5:45 PM – 6:45 PM	Vendor Tutorials (<i>Sign up in advance at MSA MegaBooth</i>)	Exhibit Hall 4-5

> Tuesday, August 8, 2017

7:15 AM	MSA Local Affiliated Societies & MAS Affiliated Regional Societies	Room 280
7:30 AM	MAS 50th Anniversary Lecture in the Analytical Sciences	Room 275
	<i>Coffee & breakfast item provided</i>	
	X72 – Microanalysis: What Is It, Where Did It Come From, and Where Is It Going?	
	Dale E. Newbury , National Institute of Standards and Technology	
8:30 AM – 10:00 AM	AM Symposia & Sessions	
	X30 – Tech Forum: Cryo-Tomography of Macromolecular Complexes in Whole Cells: Lessons in Cryo-FIB Milling	Room 275
	X42 – Biological Sciences Tutorial: CryoEM with Phase Plates	Room 126
	X90 – Microscopy Outreach: Microscopy in the Classroom	Room 131
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	Room 260
	A04 – Advances in Programming of Quantitative Microscopy for Biological and Materials Science	Room 121
	A05 – Advances in FIB Instrumentation and Applications in Materials and Biological Sciences	Room 127
	A07 – Materials Characterization using Atomic-scale EDX/EELS Spectroscopy	Room 261
	A10 – Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects	Room 124
	A11 – Instrumentation of Atom Probe: 50 Years and Counting	Room 263
	A16 – <i>In situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B01 – Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications	Room 123
	B07 – Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems	Room 122
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	Room 266
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	Room 265
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
	P10 – Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications	Room 125
10:00 AM – 5:30 PM	Exhibit Hall Open	
10:00 AM – 10:30 AM	Coffee Break in Exhibit Hall	
10:00 AM	M&M 2018—Program Planning for Symposium Organizers	Room 275
10:30 AM – 12:00 PM	AM Symposia & Sessions (Cont'd.)	
	X32 – Tech Forum: Developing and Applying Light Sheet Imaging Technology to the Study of Dynamic Biological Systems	Room 275
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	Room 260
	A04 – Advances in Programming of Quantitative Microscopy for Biological and Materials Science	Room 121
	A05 – Advances in FIB Instrumentation and Applications in Materials and Biological Sciences	Room 127
	A07 – Materials Characterization using Atomic-scale EDX/EELS Spectroscopy	Room 261
	A10 – Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects	Room 124
	A12 – Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography	Room 263
	A16 – <i>In situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B06 – 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells	Room 120
	B07 – Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems	Room 122
	P01 – Characterization of Semiconductor Materials and Devices	Room 267

> Tuesday, August 8, 2017 (Cont'd.)

10:30 AM – 12:00 PM	AM Symposia & Sessions (Cont'd.)	
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	Room 266
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	Room 265
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
	P10 – Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications	Room 125
12:00 PM – 1:30 PM	Lunch Break	
12:15 PM	MSA Distinguished Scientist Awardee Lectures (<i>Lunch provided to first 100 participants</i>)	Room 123
12:15 PM	FIG: Cryo-Preparation	Room 241
12:15 PM	FIG: Electron Microscopy in Liquids and Gases	Room 131
12:15 PM	FIG: Electron Crystallography	Room 242
12:15 PM	FIG: FOM (Lunch Meeting)	Room 280
12:15 PM	FIG: MicroAnalytical Standards	Room 240
1:30 PM – 3:00 PM	PM Symposia & Sessions	
	X31 – Atomic Force Microscopy for Imaging and Materials/Biomaterials: Properties Characterization of Surfaces, Films and Interfaces	Room 275
	X43 – Biological Sciences Tutorial: Practical Strategies for Cryo-CLEM Experiments	Room 126
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	Room 260
	A05 – Advances in FIB Instrumentation and Applications in Materials and Biological Sciences	Room 127
	A06 – Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy	Room 121
	A07 – Materials Characterization using Atomic-scale EDX/EELS Spectroscopy	Room 261
	A10 – Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects	Room 124
	A12 – Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography	Room 263
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A17 – Biological Soft X-ray Tomography	Room 122
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B06 – 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells	Room 120
	B08 – Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals	Room 123
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	Room 266
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	Room 265
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
	P10 – Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications	Room 125
3:00 PM – 5:00 PM	Tuesday Poster Presentations	Exhibit Hall
	X90 – Microscopy Outreach: Microscopy in the Classroom	
	A06 – Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy	
	A07 – Materials Characterization using Atomic-scale EDX/EELS Spectroscopy	
	A10 – Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects	
	A12 – Reconstruction, Simulations, and Data Analysis in Atom Probe Tomography	
	A18 – Celebrating 50 Years of Microanalysis	
	B06 – 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells	
	B07 – Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems	
	B08 – Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals	
	B09 – Methodologies, Technologies and Analysis of Biological Specimens	

> Tuesday, August 8, 2017 (Cont'd.)

3:00 PM – 5:00 PM	Tuesday Poster Presentations (Cont'd.)	Exhibit Hall
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	
	P07 – Advanced Characterization of Energy-Related Materials	
	P08 – Geological Sample Characterization using Various Imaging Modalities	
	P10 – Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications	
3:00 PM	FIG: 3D EM in the Biological Sciences	Room 120
3:30 PM	FIG Business Meeting	Room 241
3:30 PM	MSA Education Committee	Room 240
5:00 PM	Student Poster Awards	Exhibit Hall
5:30 PM	Post-Doctoral Researchers' Reception	Room 280
5:30 PM	MSA Student Council	Room 242
5:45 PM	Vendor Tutorials (<i>Sign up in advance at MSA MegaBooth</i>)	Exhibit Hall
6:30 PM	Presidents' Reception (<i>Invitation Only</i>)	Offsite

> Wednesday, August 9, 2017

7:15 AM	MSA Certification Board	Room 242
7:15 AM	MSA Membership Committee	Room 241
7:30 AM	IFES Lecture Marking the 50th Anniversary of the Invention of the Atom Probe	Room 275
	<i>Coffee & breakfast item provided</i>	
	X73 – <i>The Point-Projection Microscope</i> John A. Panitz, University of New Mexico	
8:30 AM – 10:00 AM	AM Symposia & Sessions	
	X40 – Physical Sciences Tutorial: Large Scale Data Acquisition and Analysis for Materials Imaging and Spectroscopy	Room 126
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	Room 260
	A06 – Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy	Room 121
	A07 – Materials Characterization using Atomic-scale EDX/EELS Spectroscopy	Room 261
	A08 – Advances and Applications of Aberration-Corrected EM	Room 275
	A09 – Standards, Reference Materials, and Their Applications in Quantitative Microanalysis	Room 264
	A10 – Advances in Scanning Electron Microscopy—Transmission Modes and Channeling Effects	Room 124
	A13 – Applications of Atom Probe Tomography	Room 263
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	Room 131
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A17 – Biological Soft X-Ray Tomography	Room 122
	B06 – 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells	Room 120
	B08 – Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals	Room 123
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	Room 266
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
10:00 AM – 5:30 PM	Exhibit Hall Open	
10:00 AM – 10:30 AM	Coffee Break in Exhibit Hall	

> Wednesday, August 9, 2017 (Cont'd.)

10:30 AM – 12:00 PM	AM Symposia & Sessions (Cont'd.)	
	X44 – Biological Sciences Tutorial: Freeze Fracture, Deep-Etch & 3D Anaglyphs	Room 126
	A01 – Vendor Symposium	Room 125
	A02 – Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy	Room 260
	A06 – Bridging Length Scales with 2D, 3D, and 4D Multiscale/Multimodal Microscopy	Room 121
	A08 – Advances and Applications of Aberration-Corrected EM	Room 275
	A09 – Standards, Reference Materials, and their Applications in Quantitative Microanalysis	Room 264
	A13 – Applications of Atom Probe Tomography	Room 263
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	Room 131
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	Room 127
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A17 – Biological Soft X-ray Tomography	Room 122
	B06 – 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells	Room 120
	B08 – Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals	Room 123
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P02 – TEM/STEM/EELS/SNOM of Ultralow Energy Excitations	Room 261
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	Room 266
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P08 – Geological Sample Characterization using Various Imaging Modalities	Room 262
12:00 PM – 1:30 PM	Lunch Break	
12:15 PM	MAS - ANSI Meeting	Room 242
12:15 PM	MSA Members' Meeting	Room 240-241
12:15 PM	FIG: Pharmaceuticals	Room 120
1:30 PM – 3:00 PM	PM Symposia & Sessions	
	X41 – Physical Sciences Tutorial: Entrepreneurship in the Microscopy Community	Room 126
	X91 – Family Affair	Room 124
	A01 – Vendor Symposium	Room 125
	A03 – Big, Deep and Smart Data in Microscopy	Room 260
	A08 – Advances and Applications of Aberration-Corrected EM	Room 275
	A09 – Standards, Reference Materials, and Their Applications in Quantitative Microanalysis	Room 264
	A13 – Applications of Atom Probe Tomography	Room 263
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	Room 131
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	Room 127
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	B02 – Microstructure Characterization of Food Systems	Room 121
	B05 – Pharmaceutical and Medical Science	Room 123
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P02 – TEM/STEM/EELS/SNOM of Ultralow Energy Excitations	Room 261
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P05 – Imaging and Spectroscopy of Beam-sensitive Materials	Room 266
	P07 – Advanced Characterization of Energy-Related Materials	Room 276

> Wednesday, August 9, 2017 (Cont'd.)

3:00 PM – 5:00 PM	Wednesday Poster Sessions	Exhibit Hall
	A01 – Vendor Symposium	
	A05 – Advances in FIB Instrumentation and Applications in Materials and Biological Sciences	
	A08 – Advances and Applications of Aberration-Corrected EM	
	A09 – Standards, Reference Materials, and Their Applications in Quantitative Microanalysis	
	A13 – Applications of Atom Probe Tomography	
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	
	B02 – Microstructure Characterization of Food Systems	
	B05 – Pharmaceutical and Medical Science	
	B08 – Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants and Animals	
	P01 – Characterization of Semiconductor Materials and Devices	
	P02 – TEM/STEM/EELS/SNOM of Ultralow Energy Excitations	
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	
	P04 – Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices	
	P06 – Nanoparticles: Synthesis, Characterization, and Applications	
	P07 – Advanced Characterization of Energy-Related Materials	
5:00 PM	Student Poster Awards	Exhibit Hall
5:15 PM	MAS Business Meeting	Room 127
5:45 PM	Vendor Tutorials (<i>Sign up in advance at MSA MegaBooth</i>)	Exhibit Hall
6:30 PM	MAS Members' Social (<i>See MAS Booth for Details</i>)	Offsite

> Thursday, August 10, 2017

7:30 AM	MSA 75th Anniversary Lecture in the Biological Sciences	Room 275
	<i>Coffee & breakfast item provided</i>	
	X70 – <i>Development of High-resolution TEM for Imaging Native, Radiation-sensitive Biomolecules</i> Robert M. Glaeser , Lawrence Berkeley National Laboratory, University of California, Berkeley	
8:30 AM	M&M Sustaining Members Meeting	Room 280
8:30 AM – 10:00 AM	AM Symposia & Sessions	
	A01 – Vendor Symposium	Room 125
	A03 – Big, Deep and Smart Data in Microscopy	Room 260
	A08 – Advances and Applications of Aberration-Corrected EM	Room 275
	A13 – Applications of Atom Probe Tomography	Room 263
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	Room 131
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	Room 127
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B02 – Microstructure Characterization of Food Systems	Room 121
	B03 – Imaging the Biology of Cells and Tissues: Just Do It Right	Room 122
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P02 – TEM/STEM/EELS/SNOM of Ultralow Energy Excitations	Room 261
	P03 – Advanced Microscopy and Microanalysis of Complex Oxides	Room 274
	P05 – Imaging and Spectroscopy of Beam-sensitive Materials	Room 266
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P09 – Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems	Room 265
10:00 AM – 2:00 PM	Exhibit Hall Open	Exhibit Hall
10:00 AM – 12:00 PM	Coffee Break + Poster Session	Exhibit Hall

> Thursday, August 10, 2017 (Cont'd.)

10:00 AM – 12:00 PM	Thursday Poster Sessions	Exhibit Hall
	A03 – Big, Deep and Smart Data in Microscopy	
	A08 – Advances and Applications of Aberration-Corrected EM	
	A13 – Applications of Atom Probe Tomography	
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	
	B03 – Imaging the Biology of Cells and Tissues: Just Do It Right	
	P01 – Characterization of Semiconductor Materials and Devices	
	P05 – Imaging and Spectroscopy of Beam-sensitive Materials	
	P07 – Advanced Characterization of Energy-Related Materials	
	P09 – Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems	
12:00 PM	Student Poster Awards	Exhibit Hall
12:00 PM – 1:30 PM	Lunch Break	
12:15 PM	MSA Standards Committee	Room 118
12:15 PM	MSA 75th Anniversary Lecture in the Physical Sciences	Room 275
	X71 – <i>Smarter Than an iPhone: The Emergence of the Modern Microscope</i> Ondrej Krivanek, Nion R&D, Arizona State University	
1:30 PM – 3:00 PM	PM Symposia	
	A01 – Vendor Symposium	Room 125
	A03 – Big, Deep and Smart Data in Microscopy	Room 260
	A08 – Advances and Applications of Aberration-Corrected EM	Room 275
	A14 – Nanomechanical Characterization of Materials using Microscopy and Microanalysis Techniques	Room 131
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	Room 127
	A16 – <i>In-situ</i> and <i>operando</i> Characterization of Materials Processes in Liquids and Gases	Room 130
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B03 – Imaging the Biology of Cells and Tissues: Just Do It Right	Room 122
	B05 – Pharmaceutical and Medical Science	Room 123
	P01 – Characterization of Semiconductor Materials and Devices	Room 267
	P05 – Imaging and Spectroscopy of Beam-sensitive Materials	Room 266
	P07 – Advanced Characterization of Energy-Related Materials	Room 276
	P09 – Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems	Room 265
3:00 PM – 3:30 PM	Coffee Break	
3:30 PM – 5:00 PM	Late PM Symposia	
	A01 – Vendor Symposium	Room 125
	A15 – Pushing the Limits of Cryo-TEM: Development and Applications	Room 127
	A18 – Celebrating 50 Years of Microanalysis	Room 264
	B03 – Imaging the Biology of Cells and Tissues: Just Do It Right	Room 122
	B05 – Pharmaceutical and Medical Science	Room 123
	P05 – Imaging and Spectroscopy of Beam-sensitive Materials	Room 266
	P09 – Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems	Room 265
5:30 PM	M&M 2017 Wrap-Up & Debrief (<i>By invitation only</i>)	Room 280

Welcome to Microscopy and Microanalysis 2017 in St. Louis, Missouri, and to our exciting Anniversary celebration!

The Microscopy Society of America, the Microanalysis Society and the International Field Emission Society welcome you to Microscopy and Microanalysis 2017 in historic St. Louis, Missouri. As you have come to expect, Microscopy and Microanalysis 2017 will highlight the latest innovations in many different microscopy and microanalysis techniques as well as their applications to important research in biological, physical and materials sciences.

In addition, we are offering four exciting pre-meeting Congresses – including the inaugural Pre-Meeting Congress for Early Career Professionals, organized by the MSA Student Council. The Exhibition will again feature and display the newest developments in commercial technologies aimed at providing new and improved capabilities in your laboratory. Plan to attend the lively daily poster sessions, held in the exhibit hall – they are fun and engaging social events too!

We are pleased to offer what are sure to be fascinating plenary talks: Eric Betzig, winner of the 2014 Nobel Prize in Chemistry “for the development of super-resolved fluorescence microscopy”, will speak on Imaging Cellular Structure and Dynamics from Molecules to Organisms. Keith Riles, a member of the LIGO Scientific Collaboration, that in 2015 detected gravitational waves, a prediction of Einstein’s theory of general relativity, will speak on Detecting Massive Black Holes via Attometry – Gravitational Wave Astronomy Begins.

The Executive Program Committee and all of our symposium organizers have worked tirelessly to produce the technical program for Microscopy and Microanalysis 2017. On behalf of the program committee, MSA, MAS and IFES, welcome to Microscopy and Microanalysis 2017 and St. Louis, Missouri. Have a great week!



Jay Potts

Program Committee Chair
University of South Carolina
School of Medicine



Yoosuf Picard

Program Vice-Chair
Carnegie Mellon University



Kat Crispin

MAS Co-Chair
Pennsylvania State University



Michael Moody

IFES Co-Chair
University of Oxford,
United Kingdom

By Pioneering Figures in Microscopy & Microanalysis



X72.1 MAS 50TH ANNIVERSARY LECTURE IN THE ANALYTICAL SCIENCES:

Microanalysis: What Is It, Where Did It Come From, and Where Is It Going?

Dale E. Newbury, NIST Fellow,
National Institute of Standards and Technology

SESSION CHAIR:
Masashi Watanabe, President, Microanalysis Society

TUESDAY, AUGUST 8, 7:30 AM ROOM 275

Coffee, tea, and a handheld breakfast item will be provided for attendees of this morning session.

"Microanalysis" in the Microanalysis Society parlance refers to spatially-resolved elemental and molecular analysis performed at the micrometer to nanometer to picometer scales. Our "founding father," Raymond Castaing, achieved the first practical elemental microanalysis at the micrometer scale in his seminal Ph.D. thesis of 1951, wherein he not only made the first successful microprobe instrument for electron-excited X-ray spectrometry but also described the physical basis for converting the measured X-ray intensities into concentration values. Electron-excited X-ray microanalysis has been the backbone of MAS and its predecessors (EPASA, the Electron Probe Analysis Society of America and the Microbeam Analysis Society), and it has been joined by other excitation beams (ions and photons) and spectrometries (ion, electron, and photon). Although every niche in excitation-detection combinations has been explored, present excitement comes from exploiting large scale data structures collected as multi-dimensional spectrum images with the advanced software systems that can mine these vast structures for the information contained therein. The future as always is unpredictable, but improvements in spatial resolution, efficiency, and specificity are likely.



X73.1 IFES LECTURE MARKING THE 50TH ANNIVERSARY OF THE INVENTION OF THE ATOM PROBE:

Point-Projection Microscopy

John A. Panitz, University of New Mexico

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

WEDNESDAY, AUGUST 9, 7:30 AM ROOM 275

Coffee, tea, and a handheld breakfast item will be provided for attendees of this morning session.

The Field Emission Microscope, introduced in 1937, was first the Point-Projection Microscope. This talk highlights the legacy of the first Point-Projection Microscope and its progenies: the Field Ion Microscope, the Topografiner and the Atom-Probe. The Atom-Probe Field Ion Microscope was introduced in 1967. For the first time a microscope became available that could determine the nature of one single atom seen on a metal surface and selected from neighboring atoms at the discretion of the observer. In 1973 the 10 cm Atom Probe was introduced. Patented in 1975 as the Field Desorption Spectrometer and dubbed the Imaging Atom-Probe, it allowed individual atoms to be identified and imaged as a function of depth from the surface; thereby becoming the first 3D Atom Probe. Today, the Atom Probe has emerged as an important tool in the arsenal of techniques used to develop new materials for technology and industry. As Atom Probe technology advances new vistas of exploration will emerge, continuing the unique legacy of the Point-Projection Microscope.





X70.1 MSA 75TH ANNIVERSARY LECTURE IN THE BIOLOGICAL SCIENCES:

Development of High-Resolution TEM for Imaging Native, Radiation-Sensitive Biomolecules

Robert M. Glaeser, Lawrence Berkeley National Laboratory; University of California, Berkeley

SESSION CHAIR:

Michael Marko, Immediate Past President, Microscopy Society of America

THURSDAY, AUGUST 10, 7:30 AM ROOM 275

Coffee, tea, and a handheld breakfast item will be provided for attendees of this morning session.

Following the commercial introduction of “direct detection” cameras in ~2012, single-particle electron cryo-microscopy (cryo-EM) has produced atomic-resolution structures for a large number of biological macromolecules. This new capability requires that the native, hydrated structure be maintained during imaging, of course. This is something that, at first glance, is not compatible with putting specimens into the vacuum of the electron microscope. Furthermore, ionization damage happens so easily for such specimens that high-resolution features are too noisy to be discerned in images recorded with a “safe” exposure. While practical work-arounds have partially circumvented these problems, current results still fall well short of what is physically possible. Additional technical improvements are thus very welcome and, indeed, expected. These include reliable phase plates, which have just begun to appear, and cameras whose quantum efficiency is at least 2X-improved at high resolution.



X71.1 MSA 75TH ANNIVERSARY LECTURE IN THE PHYSICAL SCIENCES:

Smarter Than an iPhone: The Emergence of the Modern Microscope

Ondrej L. Krivanek, Nion R&D; Arizona State University

SESSION CHAIR:

Ian M. Anderson, President, Microscopy Society of America

THURSDAY, AUGUST 10, 12:15 PM ROOM 275

Much like mobile phones, microscopes in general and electron microscopes, in particular, have made great strides in sophistication, power, and user-friendliness. The underlying technology is the modern microprocessor, which has automated the mundane and made the sophisticated readily accessible. The progress has happened on many fronts:

- Microscope optics, which can include several hundred independently adjustable optical elements, in order to resolve $<0.5 \text{ \AA}$ and $<10 \text{ meV}$
- Auto-tuning algorithms, which can adjust tens of independent optical parameters in quasi-real-time, and make the instrument user-friendly despite all the optical elements “under the hood.”
- Detectors, which are getting close to the ultimate: capturing the X, Y, t (time) and E (energy) signature of every arriving electron
- Analysis software, which can separate weak signals from noise and discern subtle data patterns in data sets amounting to many Gigabytes

This talk reviews the progress made and provides practical examples of new capabilities.



Imaging Cellular Structure and Dynamics from Molecules to Organisms

MONDAY 9:00 AM

ROOM: America's Ballroom (2nd Level)

Eric Betzig, Ph.D., Janelia Farm Research Campus, Ashburn, Virginia



Eric Betzig obtained a B.S. in Physics from Caltech and a Ph.D. in Applied Physics at Cornell. In 1988, he became a PI at AT&T Bell Labs where he extended his thesis work on near-field optical microscopy, the first method to break the diffraction barrier. By 1993, he held a world record for data storage density and recorded the first super-resolution fluorescence images of cells as well as the first single molecule images at ambient temperature. Frustrated with technical limitations and declining standards as more jumped into the field, he quit science and by 1996 was working for his father's machine tool company. The commercial failure of the technologies he developed there left him unemployed in 2003 and looking for new directions. This search eventually culminated in his co-invention of the super-resolution technique photo-activated localization microscopy (PALM) with his best friend, Bell Labs colleague Harald Hess. For this work, Betzig was co-recipient of the 2014 Nobel Prize in Chemistry along with Stefan Hell and William E. Moerner. Since 2005, he has been a Group Leader at the Janelia Research Campus, developing new optical imaging technologies for biology.

Eric Betzig¹

¹. Janelia Research Campus, Howard Hughes Medical Institute, Ashburn, VA USA.

The hallmark of life is that it is animate. Every living thing is a complex pocket of reduced entropy through which matter and energy flow continuously. Thus, although structural imaging is informative, a more complete understanding of the molecular basis of cellular physiology requires high-resolution imaging of the dynamics of the cell in its native state across all four dimensions of spacetime simultaneously.

Unfortunately, several factors conspire to render such unperturbed, physiological 4D imaging difficult. First, as powerful as genetically encoded fluorescent proteins have become, until recently they have rarely been used at endogenous expression levels, and therefore can upset the homeostatic balance of the cell. New genome editing technologies, specifically CRISPR / CAS9, address this problem. Second, conventional live cell imaging tools such as spinning disk confocal microscopy are too slow to study fast cellular processes across cellular volumes, create out-of-focus photo-induced damage and fluorescence photobleaching, and subject the cell at the point of measurement (i.e., the excitation focus) to peak intensities orders of magnitude beyond that under which life evolved. In the past few years, we have used “non-diffracting” beams, specifically Bessel beams and 2D optical lattices, to create ultra-thin light sheets capable of imaging of sub-cellular dynamics in 3D across whole cells and small embryos with near-isotropic resolution at up to 1000 image planes/sec over hundreds of time points ([1], Fig. 1). We have worked with over fifty different groups to apply these tools in areas including: mitotic spindle alignment during asymmetric stem cell division [2]; actomyosin contractions driving the initial gastrulation of *C. elegans* embryos [3]; binding kinetics of single transcription factor molecules to DNA in live stem cells [4]; dynamic, heterogeneous remodeling of P granule proteins in *C. elegans* embryos [5]; asymmetric formation of clathrin-coated pits on the dorsal /ventral surfaces at the leading edge of motile cells [6]; rapid 3D redistribution of actin in T cells during the formation for the immunological synapse [7]; and spatiotemporal quantification of microtubule growth tracks throughout the cellular volume at all mitotic stages [8].

Finally, much of the contribution of optical microscopy to cell biology has come from observing individual cells cultured onto glass substrates, and yet it is certain that they did not evolve there. True physiological imaging likely requires studying cells in their parent organisms, where all the external environmental cues that drive gene expression, and hence their structural and functional phenotypes, are present. However, such imaging is compromised by the highly inhomogeneous refractive index of most biological tissues, which distorts light rays and thereby degrades both resolution and signal. We have adopted methods of adaptive optics (AO), initially developed in astronomy, to recover diffraction-limited performance deep within living systems ([9], Fig. 2, left and bottom), and have recently combined AO on both the excitation and detection arms of our lattice light sheet microscope to image sub-cellular dynamics noninvasively within multicellular systems such as developing zebrafish embryos (unpublished, Fig. 2, upper right).

References:

- [1] B.-C. Chen, *et al.*, *Science* **346**, (2014), 1257998.
- [2] S.J. Habib, *et al.*, *Science* **339**, (2013), p. 1445.
- [3] M. Roh-Johnson, *et al.*, *Science* **335**, (2012), p. 1232.
- [4] J. Chen, *et al.*, *Cell* **156**, (2014), p. 1274.
- [5] J.T. Wang, *et al.*, *eLife* **3**, (2014), p. e04591.
- [6] C. Kural, *et al.*, *Mol. Biol. Cell* **26**, (2015), p. 2044.
- [7] A.T. Ritter, *et al.*, *Immunity* **42**, (2015), p. 864.
- [8] N. Yamashita, *et al.*, *J. Biomed. Opt.* **20**, (2015), p. 101206.
- [9] K. Wang, *et al.*, *Nat. Meth.* **11**, (2014), p. 625.

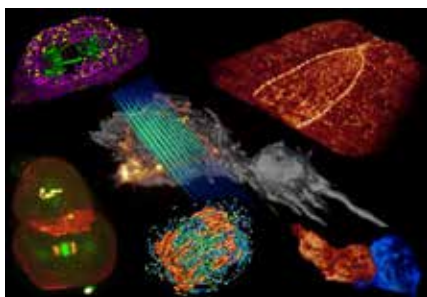


Figure 1. In lattice light sheet microscopy, an ultrathin illumination plane (blue-green, center) excites fluorescence (orange) in successive planes as it sweeps through a specimen (gray) to generate a 3D image. Applications in mitosis, embryonic development, and immunology are shown in several surrounding examples [1].

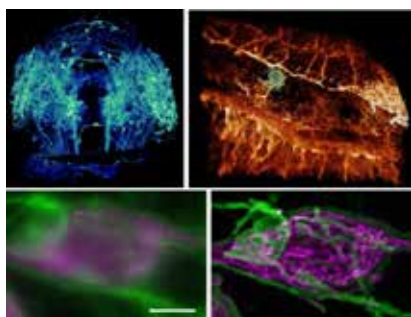


Figure 2. Top Left: Adaptive optical (AO) two-photon image of a sparse set of neurons across 240 x 240 x 270 μm in the developing zebrafish brain [9]. Bottom: Two color confocal images of plasma membranes (green) and mitochondria (magenta) in a neuron 150 μm deep, before (left) and after (right) AO correction [9]. Top Right: AO lattice light sheet microscopy of different cell types in the developing zebrafish ear, showing skin cells (top layer), the fluid-filled perilymphatic space (middle) containing a neutrophil (light blue), and hindbrain neurons (bottom layer).

Detecting Massive Black Holes via Attometry—Gravitational Wave Astronomy Begins

MONDAY 11:15 AM **ROOM: America's Ballroom (2nd Level)**

Keith Riles, Ph.D., University of Michigan, Ann Arbor



In their first observing run, the two detectors of the Advanced Laser Interferometer Gravitational-Wave Observatory (Advanced LIGO) simultaneously observed transient gravitational-wave signals. The detected waveforms indicated the inspiral and merger of pairs of massive black holes more than 1 billion years ago. These discoveries marked the first direct detections of gravitational waves and the first observations of binary black hole mergers. Ironically but perhaps not surprisingly, the detection of these cataclysmic events so far away depended on measuring distance changes between mirrors at the attometer level. The first gravitational-wave discoveries and the instruments that made them possible are presented.

Professor Riles carries out research into the fundamental forces of nature, working in both gravitational wave and elementary particle physics. He leads the Michigan Gravitational Wave Group and is a member of the LIGO Scientific Collaboration (LSC), which in September 2015 discovered gravitational waves from the merger of two massive black holes. This \$300 million project, led by Caltech and MIT, operates 4-km Michelson laser interferometers at sites in Hanford, Washington and Livingston, Louisiana. These interferometers are designed to measure minute disturbances in space itself to a relative precision better than 1 part in a billion trillion (10^{-21}). Transient “ripples in space” can emanate from violent but distant astrophysical phenomena, including colliding black holes or neutron stars and supernovae.

Using LIGO data, the Michigan Gravitational Wave Group has placed upper limits on longer-lived but still weaker ($<10^{-24}$) ripples from unknown, rapidly spinning neutron stars in the Milky Way. Searches are now under way for gravitational waves emitted by isolated neutron stars using an algorithm called PowerFlux for binary neutron stars, using an algorithm called TwoSpect. Both programs were developed by the University of Michigan group. In addition, the group has carried out extensive work on LIGO detector characterization, including calibration, and on detector commissioning.

Professor Riles has also spent part of his research time in recent years studying the physics potential and the detector requirements of a future linear electron-positron collider with a center of mass energy of 350 GeV and higher.

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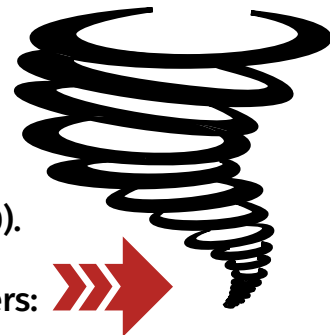
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SEVERE WEATHER

Missouri frequently experiences severe thunderstorms, **including tornado watches and warnings**, during the summer months.

- Tornado Watches and Warnings will be posted on the Center's information screens.
- If a tornado warning is issued, Public Address announcements will be made directing guests to seek shelter in a safe place.
- **Exhibit Hall 4** is a Tornado Shelter (Aisles 100-400). Look for signs with this symbol on other meeting rooms that serve as the building's tornado shelters:



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An **EMERGENCY CARD** with important numbers is included with your registration badge.

> Sunday Short Courses

ORGANIZER: Elizabeth Wright, Emory University

- These full-day courses run from 8:30 AM to 5:00 PM on Sunday, August 6, 2017.
- A certificate of participation will be issued to each requesting participant, following the conclusion of the M&M 2017 meeting.
- Two (2) Continuing Microscopy Education Units are available (registration fee \$10 for members).
- Morning and afternoon coffee breaks are included (breakfast and lunch are on your own).
- Separate registration with additional fees is required (see registration desk onsite, or online form for more information).

X10 Specimen Preparation for Biological EM of Resin-embedded Samples: Cryo-methods, Correlative LM-EM, and 3D Imaging

LEAD INSTRUCTOR: Kent McDonald
America's Center • Room 120

In this course, we review why cryo-techniques for biological specimen preparation are superior to conventional methods. We discuss high-pressure freezing, freeze substitution, and preserving fluorescence in polymerized resins. Attendees taking this course leave with a better understanding of biological EM cryo-techniques and their role in different applications such as correlative LM-EM, EM tomography, EM immunolabeling, and as the best method for preservation of fine cellular structure. Specimen preparation procedures for resin-based 3D imaging methods are also discussed.

X11 Immunolabeling Technology for Light and Electron Microscopy

LEAD INSTRUCTOR: Caroline Miller
America's Center • Room 121

The requirements for successful immunohistochemical and immunocytochemical labeling vary widely with different biological systems. The optimal techniques for light-microscope labeling often differ greatly from those needed for electron microscopy. The basics of immunolabeling at the light- and electron-microscope levels are presented, illustrated with examples from several different biological systems. Some of the more complex methods and applications used in electron microscopy are discussed in depth. The course covers specimen preparation, immunogold labeling and enhancement methods, multiple labeling and correlative LM/EM techniques.

X12 Practical Considerations for Image Analysis, ImageJ and Clemex Vision

LEAD INSTRUCTOR: James Grande
America's Center • Room 122

This workshop covers a wide range of practical topics in the field of image analysis. Subjects are covered in an easy-to-understand format so that users with little or no experience can understand how image analysis can provide extensive quantitative measurements that may lead to better understanding of material performance. Topics range from input devices to image-processing algorithms and how best to extract quantitative data. Treating image analysis as a problem-solving tool along with discerning key metrics within a microstructure is discussed through several real-life examples. Comparisons using ImageJ/Fiji and a commercial image analysis product are demonstrated.

X13 3D Reconstruction with SerialEM and IMOD

LEAD INSTRUCTOR: Cindi Schwarz

America's Center • Room 123

This workshop covers the use of SerialEM for data acquisition and IMOD for 3D reconstruction and analysis. For SerialEM, topics include basic operation, low dose mode, STEM imaging, use of direct detector cameras, tilt series acquisition, montaging, and automatic acquisition from multiple areas. For IMOD, topics include reconstruction from single and dual-axis tilt series, alignment of slices or tomograms from serial sections, automated processing of multiple tilt series, and modeling and visualization. Cryo and room-temperature applications are covered. Although the emphasis is on biological samples, many points apply to materials science.

X14 Detectors: If You Can't Detect It, Then You Can't Measure It

LEAD INSTRUCTOR: Nestor J. Zaluzec

America's Center • Room 125

Imaging and spectroscopy have long played pivotal roles in the characterization of materials in both the biological and physical sciences. Of course, a signal must absolutely be detectable from an object in order to make any observations or measurements. For this course, we assemble a cadre of researchers from both academia and industry, who discuss the principles of various imaging and spectroscopic detectors, their limitations, and future prospects and technologies. Topics include optical sensors and single-particle sensors for photons, X-rays, electrons and ions, as well as electromagnetic-field sensors, and the use of these sensors as imaging/spectroscopic detectors.

X15 Variable Pressure and Environmental Scanning Electron Microscopy: What Can They Do For Me?

LEAD INSTRUCTOR: John Mansfield

America's Center • Room 126

Variable-pressure scanning EM (VPSEM) and environmental scanning EM (ESEM), while readily available, are not used as frequently as they should be. This course compares the structure, operation, and special detectors of the two. The practicality of X-ray spectroscopy is examined. The unique contrast mechanisms in these microscopes are discussed. The use of the VPSEM as an in situ platform for hot, cold and mechanical testing experiments is also covered. Applications experts from instrument manufacturers are invited to describe new developments. A summary presentation comparing the VPSEM with conventional SEM concludes the course.



> Pre-Meeting Congresses

SEPARATE REGISTRATION & FEE REQUIRED. See registration desk in St. Louis if you wish to register onsite.
See individual listings below for information on meals and breaks.

X60 Inaugural Pre-Meeting Congress for Early Career Professionals in Microscopy & Microanalysis

**SATURDAY, AUGUST 5, 2017 • 8:30 AM – 5:00 PM
ROOM 275-276 • AMERICA'S CENTER**

INCLUDED IN REGISTRATION FEE:

Breakfast, AM Break, Lunch, PM Break; offsite social gatherings on Friday and Saturday evenings

Organized by MSA's Student Council

ORGANIZERS:

William J. Bowman, Massachusetts Institute of Technology
A. Cameron Varano, Virginia Tech (Biological Sciences)
Janet L. Gbur, Case Western Reserve University (Physical Sciences)
Ethan L. Lawrence, Arizona State University

This congress is organized by early career professionals, primarily for early career professionals, though all M&M registrants are welcome to attend. The pre-meeting offers a highly interactive forum for participants to share cutting edge research, network, and engage with peers ahead of the main meeting. Invited speakers have been selected from among awardees to be honored at M&M 2017, and gives attendees an opportunity to experience a sampling of the best research presented by their peers across scientific disciplines in biological science, physical science, analytical science, and instrumentation. Contributed talks and posters give attendees an opportunity to discuss their work with peers in an intimate and highly interactive setting. Further professional development opportunities include a luncheon featuring a panel of recent graduates currently working in industry, academia, policy, and government labs.

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X61 Focused Ion Beam Applications and Equipment Developments

**SUNDAY, AUGUST 6, 2017 • 10:00 AM – 5:00 PM
ROOM 274 • AMERICA'S CENTER**

INCLUDED IN REGISTRATION FEE:

AM Coffee, Lunch, PM Break

*Organized by MSA's Focused Ion Beam (FIB)
Focused Interest Group*

ORGANIZERS:

Nicholas Antoniou, Revera
Srinivas Subramaniam, Intel Corporation

Focused ion beam (FIB) technology is used in a variety of fields from electronics to life sciences. The applications space can be divided into categories such as cryogenic FIB, Direct-write lithography, 3D structure creation, etc. These topics are grouped together into sessions as follows: TEM specimen preparation, cryogenic FIB-SEM, FIB lithography and general patterning, gas assisted etching and deposition, and instrumentation. One hour is allotted to each category with 2-3 papers and 20 minutes for open discussion. At the end of the congress, posters are set up for informal interaction with the authors and participants.

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X62 Smaller, Faster, Better: New Instrumentation for Electron Microscopy

**SUNDAY, AUGUST 6, 2017 • 8:30 AM – 5:00 PM
ROOM 276 • AMERICA'S CENTER**

INCLUDED IN REGISTRATION FEE:

Breakfast, AM Break, Lunch, PM Break

Organized by MSA's Aberration-Corrected Electron Microscopy (ACEM) Focused Interest Group

ORGANIZERS:

Juan-Carlos Idrobo, Oak Ridge National Laboratory
Robert Klie, University of Illinois, Chicago
Huolin Xin, Brookhaven National Laboratory
Paul Voyles, University of Wisconsin
Phil Rice, IBM

Developments in instrumentation drive new science. Now, two decades after the first working aberration correctors, this pre-meeting congress addresses the question, what's next? Topics covered include advances in detectors, especially high-speed pixelated and segmented detectors; monochromators to achieve energy resolution below 10 meV; aberration correctors, especially at low voltage; fast beam manipulation, especially for compressed sensing; and high brightness sources. Example applications and supporting advances in data processing and simulation are included. This pre-meeting congress consists of invited talks and a poster session.

THANK YOU TO OUR SPONSORS:



X63 Understanding Radiation Beam-Damage during Cryo-, ETEM, Gas- and Liquid-Cell Electron Microscopy

**SUNDAY, AUGUST 6, 2017 • 8:30 AM – 5:00 PM
ROOM 130 • AMERICA'S CENTER**

INCLUDED IN REGISTRATION FEE:

Breakfast, AM Break, Lunch, PM Break

ORGANIZERS:

Katherine Jungjohann, Sandia National Laboratories
Taylor Woehl, University of Maryland
Patricia Abellan, SuperSTEM Laboratory, United Kingdom

Electron-beam induced radiation damage to gases, liquids, and vitrified ice is a technical problem for the electron microscopy (EM) study of natural and engineered structures as they exist in their ambient environments. This pre-meeting congress is designed to provide insight into the processes that occur when a high-energy electron beam interacts with a material, its gas/liquid/solid embedding medium and the interfaces between them. Steady-state radiation conditions will be evaluated in terms of temperature variations, external probing, mass transport, and imaging modes for describing the reactive system. Speakers highlight the electron-dose threshold tolerances, low-LET ionizing radiation effects, damage mechanisms, prevention, and control of radiation effects for small volume environmental studies. The format consists of invited presentations from radiation chemists and individuals with significant contributions to understanding electron-beam effects for environmental EM and in situ X-rays cells. The congress features a lunch-time poster session and a panel discussion to identify the major challenges going forward and should interest EM researchers in the areas of cryo-EM, ETEM, gas-cell EM and liquid-cell EM.

THANK YOU TO OUR SPONSORS:



A01 Vendor Symposium

ORGANIZERS: Paul Voyles, Esther Bullitt

Room 125 • America's Center

WEDNESDAY 10:30 AM and 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 8:30 AM, 1:30 PM, and 3:30 PM

This symposium is a forum for vendors to highlight advances in the development and improvement of their products. It covers new methods and technologies that advance the fields of microscopy and microanalysis for both physical and biological sciences, and provides a forum for exchange of ideas and best practices.

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

ORGANIZERS: Andrew Stevens, Rowan Leary, Volkan Ortolan

Room 260 • America's Center

MONDAY 3:00 PM POSTER SESSION
TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
WEDNESDAY 8:30 AM and 10:30 AM

This symposium is concerned with the use of advanced statistical, mathematical, and computational methods, in microscopy and spectroscopy. Papers focus on important topics in both machine learning and compressive sensing, especially their application to the acquisition and analysis of image, diffraction, and spectral data. The symposium covers new microscope designs that depend on computational recovery techniques and other novel post facto machine learning and computational techniques for powerful analysis of microscope data. Our target audience is generic microscope users, to introduce new techniques to the community and facilitate communication leading to their adoption.

A03 Big, Deep, and Smart Data in Microscopy

ORGANIZERS: Sergei V. Kalinin, Eric Stach

Room 260 • America's Center

WEDNESDAY 1:30 PM
THURSDAY 8:30 AM and 1:30 PM
10:00 AM PM POSTER SESSION

The symposium is intended to be the forum for scientists interested in opportunities offered by the rapidly developing technologies for data intensive computer imaging. It aims to cover the full knowledge generation cycle in imaging, starting from data stream capture in

electron, probe, and optical microscopies, automatic image compression and storage, and compressed sensing technologies. Special attention is devoted to physics-based multivariate methods for data analysis, combining the power of statistical methods with physical insights into the origins of the signal. Contributions include automatic image analytics, including extraction of physical order parameter fields and chemical phases, defect and phase boundary identification, and registration between multimedia images for direct structure-property relationship mapping and data mining. Finally, contributions concerning materials property extraction from static and dynamic imaging data as well as integration between materials genomics and experimental data analyses are presented.

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

ORGANIZERS: Hendrix Demers, Philippe Pinard

Room 121 • America's Center

MONDAY 1:30 PM
3:00 PM POSTER SESSION
TUESDAY 8:30 AM and 10:30 AM

Cutting-edge quantitative analyses do not only require state-of-the-art instruments but also innovative programs to collect and analyze data. The development of programs, scripts, and libraries opens the door to new applications of microanalysis, helps solve more challenging and important problems, and promotes the advancement of microscopy. This symposium aims to showcase programs written by microscopists for their particular biological and materials applications, to encourage the community to write or contribute to existing programs, and to promote collaborative work that allows the development of new ideas and projects in microanalysis.

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

ORGANIZERS: Keana Scott, Nabil Bassim, Assel Aitkaliyeva

Room 127 • America's Center

MONDAY 1:30 PM
3:00 PM POSTER SESSION
TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
WEDNESDAY 3:00 PM POSTER SESSION

Focused ion beam instruments are now available with a widening choice of ions and with new applications

involving both imaging and milling with ions. With recent advances in detector technology and analysis techniques, applications span the needs of the semiconductor industry, materials science, and biology. This symposium includes all aspects of ion beam technology. Topics such as theoretical or experimental work on ion-solid interactions, FIB-based specimen preparation, processing and fabrication methods, FIB-based 2D and 3D analyses of hard and soft materials, novel data acquisition and processing methods, and practical data handling strategies are presented. Advances in new instrumentation or methods such as light ion sources, high current ion sources, mass filtered ion sources or low energy ion milling are also presented.

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

ORGANIZERS: Nikhilesh Chawla, James Evans, Arno P. Merkle

Room 121 • America's Center

TUESDAY 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM, and 10:30 AM

Multiscale imaging aids in the understanding of how changes at each scale of interaction impacts whole systems. For material science applications, this can mean linking the atomic scale to bulk material or engineering scales. Whereas in biology it means placing macromolecular complexes and other subcellular components into a whole cell context or localizing single cells in a larger community, plant or animal scale context. Although each sample may have different temporal and spatial requirements, a common need exists to create hierarchical volumetric imaging data with increasing resolution or field-of-view under both static and *in situ* conditions in order to observe structural evolution (e.g. 4D). This symposium brings together leaders in both materials science and biological fields for bridging scales in 2D, 3D and 4D microscopy using a variety of modalities alongside appropriate quantitative analysis techniques.

A07 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

ORGANIZERS: Ping Lu, Jian-Min Zuo, Mark Oxley

Room 261 • America's Center

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM

Advances in atomic-scale chemical imaging using EDX and/or EELS signals in STEM/TEM provide an unprecedented opportunity for materials characterization. Chemical structures of crystal lattices and defects can be directly imaged in principle at atomic-scale in real space under proper imaging conditions. Such information greatly facilitates understanding of materials physical properties. However, because of the strong electron interaction with solids and the technical challenges in data collection and interpretation, quantitative analyses as well as the types of materials problems can be addressed by atomic-scale chemical imaging are still challenging and further development requires concerted experimental and theoretical efforts. This symposium addresses the latest development and technical advances in the field, and in particular highlight recent applications of the techniques in resolving structures of crystals, thin films, interfaces, and defects in various materials systems including metals, oxides and semiconductors, and developments in quantification methods as well as advanced theoretical models.

A08 Advances and Applications of Aberration-Corrected Electron Microscopy

ORGANIZERS: David Muller, David Smith

Room 132 • America's Center

WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 8:30 AM and 1:30 PM
10:00 AM POSTER SESSION

The major objective of this symposium is to provide an overview of recent advances and applications of aberration-corrected TEMs and aberration-corrected STEMs, in particular to illustrate the wide diversity of materials that are being studied and problems that are being solved using these instruments. Topics of special interest include novel imaging and detector modes that are enabled by correctors, resolution and dose limits including AC-cryoEM, data acquisition and image artifacts, and approaches for extracting quantitative information about atomic locations and identity in 3D environments.

A09 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis**ORGANIZERS:** Julien Allaz, Anette von der Handt, Owen K. Neill**Room 264 • America's Center****WEDNESDAY** 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION

Standards and reference materials are essential for obtaining accurate quantitative compositional data from X-ray microanalysis by EPMA or SEM (WDS/EDS), as well as from other microanalytical techniques (LA-ICP-MS, SIMS, XRF, FTIR, Raman spectroscopy, etc.). These materials must be rigorously evaluated for their reference compositions and homogeneity, must be widely available to the analytical community, and must be properly maintained to avoid contamination or deterioration. Contributions include the synthesis, evaluation, distribution, and maintenance of standards and reference materials, as well as their appropriate use in microanalysis, standard-based applications of quantitative microanalysis, and the development of new quantitative microanalytical protocols.

A10 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects**ORGANIZERS:** Robert Keller, Raynald Gauvin, Shirin Kaboli**Room 124 • America's Center**

MONDAY 1:30 PM
3:00 PM POSTER SESSION

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION

WEDNESDAY 8:30 AM

This symposium presents recent advances in two growing realms of methods that extend established limits of conventional SEM characterization. Transmission techniques for diffraction, imaging, and spectroscopy in the SEM are seeing rapid adoption in varied areas such as nanocrystalline materials, nanoparticles, corrosion, highly-deformed materials, geology, and biology. Electron channeling plays an important role in contrast mechanisms for imaging of grain substructures, defects, strain fields, and magnetic domains in materials. While these characterization realms tend to see separate development in terms of instrumentation and applications, they share many aspects of electron scattering theory. Channeling phenomena also affects data collected by transmission techniques. Contributions

addressing contrast mechanisms, instrumentation, improvements in resolution, and novel problems solved by transmission techniques and channeling methods in any class of materials are presented. Target attendees include scientists, engineers, and laboratory technicians working in materials science, metallurgy, nanotechnology, geology, and biology.

A11 Instrumentation of Atom Probe: 50 Years and Counting**ORGANIZERS:** Ross Marceau, Prakash Kolli, Thomas Kelly**Room 263 • America's Center**

MONDAY 1:30 PM
3:00 PM POSTER SESSION

TUESDAY 8:30 AM

***FEATURED INVITED SPEAKER:** John Panitz, Emeritus Professor of Physics, University of New Mexico

The year 2017 marks the 50th anniversary of atom probe. The technique has a rich history from its origin with field ion microscopy as a precursor, through the evolution of many advancements, to the recent flourishing of its most prominent form, atom probe tomography (APT). The proliferation of APT has continued with its impact upon an increasingly broad range of materials research. The aim of this symposium is twofold: to capture and showcase some of the key historical breakthroughs that underpin the technique to this day, noting their associated impacts on scientific research; and to highlight ongoing research at the cutting edge of APT instrumentation and technique development. Contributions are presented from both these areas.

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

ORGANIZERS: Baptiste Gault, Arun Deveraj,
David J. Larson

Room 263 • America's Center

TUESDAY 10:30 AM and 1:30 PM
3:00 PM POSTER SESSION

This symposium is part of the event organized for the 50th anniversary of the atom probe, and focuses on the methods used to treat raw data, in order to build the point-cloud that constitutes the tomographic reconstruction, as well as the methods applied to the point cloud to extract information regarding the presence of secondary phases, atomic clusters, or local structure (e.g. atomic planes). Another aspect covers numerical simulations of the field evaporation process which underpins atom probe tomography, and which enable to gain a better understanding of the fundamental aspects of the technique, including the image formation and some of the artifacts commonly affecting the data. Target attendees include scientists and engineers from all levels with an interest in atom probe tomography.

A13 Applications of Atom Probe Tomography

ORGANIZERS: Michael Moody, Mattias Thuvander,
Didier Blavette

Room 263 • America's Center

WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 8:30 AM
10:00 AM POSTER SESSION

Atom probe tomography (APT) continues to be adapted for the atomic-scale characterization of an increasingly diverse range of materials and devices. APT underpins research into a wide variety of alloys and semiconductors, and more recently, the analysis of materials previously considered too exotic for APT, such as minerals, biomaterials and large band gap insulators. Furthermore, APT is playing an increasingly important role in device failure-analysis, and in understanding in-service degradation of microstructure of materials subject to, for example, elevated temperatures, nuclear irradiation or corrosive conditions. Contributions featuring research enabled by APT, and in particular the development of APT for new applications, are presented.

A14 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

ORGANIZERS: Sanjit Bhowmick, Andrew Minor,
Daniel Kiener, Nan Li

Room 131 • America's Center

WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
THURSDAY 8:30 AM and 1:30 PM
10:00 AM POSTER SESSION

Nanomechanical testing inside an electron microscope provides an opportunity for real-time imaging of the dynamics of deformation in materials at the micrometer, nanometer, and atomic scale. Recent advances in microscopy techniques, analytical detectors, high-speed cameras, and computing resources are able to provide unprecedented insights and fundamental understanding of elasticity, plasticity, fatigue, and fracture in nanostructured materials. The focus of this symposium is bringing the growing *in situ* mechanical characterization community together to discuss key developments in techniques and experimental methods that aid in the understanding of deformation mechanisms of small-scale materials. Contributions on advanced mechanical characterization in controlled environments, which include elevated temperature, cryogenic temperature, electrical and magnetic fields, gas, and humidity, are presented.

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

ORGANIZERS: Mike Marko, Radostin Danev

Room 127 • America's Center

WEDNESDAY 10:30 AM and 1:30 PM
THURSDAY 8:30 AM, 1:30 PM, and 3:30 PM
10:00 AM POSTER SESSION

Cryo-EM is attracting great interest now that technological advances are facilitating single-particle maps with resolution in the 3 Å range, and sub-tomogram-averaged maps in the 1 nm range, all with the sample in a near-native, hydrated state. This symposium highlights technology and applications, with invited speakers who are key to the latest developments, and includes contributed papers from participants in this exciting field.

A16 *In situ* and *operando* Characterization of Material Processes in Liquids and Gases**ORGANIZERS:** Raymond Unocic, Guangwen Zhou, Libor Kovarik**Room 130 • America's Center****TUESDAY** 8:30 AM, 10:30 AM, and 1:30 PM**WEDNESDAY** 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION**THURSDAY** 8:30 AM and 1:30 PM
10:00 AM POSTER SESSION

Within the past few years, *in situ* and *operando* electron microscopy has evolved to the point where high spatial and temporal resolution imaging, diffraction, and spectroscopy can be performed to elucidate the behavior of materials within liquid and gaseous environments either in response to external stimuli (*in situ*) or under a working condition (*operando*). This symposium focuses on the development of advanced techniques for *in situ/operando* experimentation and utilization of such techniques to study fundamental materials structure and chemistry, functional properties, dynamical behavior under non-equilibrium conditions, and materials synthesis/degradation. Understanding the effect of sample-beam interactions, which often limits the applicability of *in situ* TEM techniques, is also of interest in this symposium. The symposium focuses on all aspects of imaging and analysis, covering imaging, diffraction and chemical analysis approaches available through *in situ* TEM.

A17 Biological Soft X-Ray Tomography**ORGANIZERS:** Carolyn Larabell, Kenneth Fahy**Room 122 • America's Center****TUESDAY** 1:30 PM**WEDNESDAY** 8:30 AM and 10:30 AM

This symposium is a forum for the exchange of information and knowledge on the use of soft X-ray tomography for imaging biological specimens. Soft X-ray tomography images fully hydrated, intact cells in 3D without the use of contrast agents or other visualization enabling molecules. Invited papers include those describing technical advances in specimen preparation, data processing and reconstruction, imaging formation theory, and novel applications of the soft X-ray tomography in cell science. Target audience include cell biologists, and scientists and engineers interested in novel microscopies, including correlative imaging methods.

A18 Celebrating 50 Years of Microanalysis**ORGANIZERS:** Paul Carpenter, Edward Vicenzi, Julie Chouinard**Room 264 • America's Center****MONDAY** 1:30 PM

3:00 PM POSTER SESSION

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM

3:00 PM POSTER SESSION

THURSDAY 8:30 AM, 1:30 PM, and 3:30 pm

We celebrate 50 years of microanalysis with a perspective of past, present, and future scientific accomplishments, and the evolution of MAS over half a century. To mark this golden anniversary, invited and contributed papers present: the history and development of quantitative microanalysis, current microanalysis challenges, and especially important developments for the future of our discipline. Contributions include EPMA, SEM, WDS, EDS, STEM, EELS, correction algorithms, data processing and visualization, cathodoluminescence, micro-XRF spectrometry, and historical and educational aspects of MAS.

B01 Gina Sosinsky Memorial Symposium: Imaging of Cellular Communications

ORGANIZERS: Bernard Heymann, Esther Bullitt,
Alasdair Steven

Room 123 • America's Center

MONDAY 1:30 PM
3:00 PM POSTER SESSION
TUESDAY 8:30 AM

Gina Sosinsky's recent passing represents a severe loss. Gina was a valuable contributor to the 3D-EM community and a delightful person. This symposium honors her and her work on cellular communication. One of her main interests was the junctions between eukaryotic cells, and how these serve both structural and communication functions. The former is essential to maintain the integrity of tissues, while the latter ensures propagation of signals between cells. Gina made important contributions to how gap junctions form selective channels between cells, and couple their cytoplasm to allow solute exchange. Adherens junctions and desmosomes provide mechanical contacts involved in transmitting force signals. Tight junctions offer selectivity to the passage of solutes in the spaces between cells. Retinoschisin is involved in maintaining the layered structure of the retina. Synaptic transmission affords the communication of information. The extracellular matrix forms a scaffolding for these and other proteins in the interstices between cells. Defects in these proteins cause debilitating diseases. This symposium highlights the progress being made towards determining the structures and functions of proteins mediating cell-cell interactions using electron microscopy, light microscopy, and other visualization techniques.

B02 Microstructure Characterization of Food Systems

ORGANIZERS: Jinping Dong, Joel Wallecan

Room 121 • America's Center

WEDNESDAY 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 8:30 PM

Understanding of microstructure and functionality correlations leads the recent trend in food research. Various microscopy and microanalysis techniques are constantly employed by scientists to characterize food microstructures. However, many challenges are faced in this field due to the high complexity nature of the food. Many unique imaging and characterization methods have been developed in individual labs. There is a high demand for the exchange of experience and knowledge in the field, which is the intent of this symposium. This symposium presents applications of microscopy-related techniques to characterize food microstructures and to draw their relationship with functionalities. Topics include, but are not limited to light, fluorescence, electron, ion, X-ray, and spectroscopy based microscopy techniques with their applications in food research.

B03 Imaging the Biology of Cells and Tissues: Just Do It Right

ORGANIZERS: Eduardo Rosa-Molinar, Jay Potts

Room 122 • America's Center

THURSDAY 8:30 AM, 1:30 PM, and 3:30 PM
10:00 AM POSTER SESSION

This symposium serves as a forum for the exchange of information, ideas, and knowledge regarding rigor and reproducibility in imaging sciences, a topic of increasing frequency and importance. Assuring confidence in and reproducibility of imaging results and their interpretation requires thoughtful consideration of the microscopic and experimental controls and procedures, detailed reporting of experimental design, methodologies, and means of analysis, as well as a review of a long and rich literature in the imaging sciences. Using case studies, panelists discuss the most significant and recurring imaging issues, strive to reach a consensus about the extent to which rigor and reproducibility is a problem, and, suggest individual and organizational means of addressing the concern. Target attendees include undergraduate and graduate students, post-doctoral researchers, and scientists of all levels of experience/expertise and related backgrounds.

B04 3D and Intravital Imaging in Development and Beyond**ORGANIZERS:** David Entenberg, Kevin Eliceiri, Sandra Rugonyi**Room 122 • America's Center****MONDAY** 1:30 PM
3:00 PM POSTER SESSION

While conventional optical imaging tools like 2D in vitro assays offer the ability to tightly and reproducibly control experimental conditions, they do not adequately reflect the topography or diversity of environments encountered by cells in vivo. 3D and intravital imaging can remove these restrictions and restore the heterogeneity of environments present in the living organism. For example, 3D organoid cultures free cells from the culture dish's two-dimensional confines revealing more physiologically relevant motility and extracellular matrix interactions; whole mount imaging preserves the structural integrity and spatial arrangement of the living organism; and intravital imaging further restores multiple host cell interactions, connection to lymphatic and vascular circuits and regulatory signals from distant organs. These increasingly more physiological environs come at the price of greatly increased challenges for the design of experiments and extraction of interpretable information from them. This session is a forum for highlighting new developments and techniques in the art and science of 3D and intravital imaging as well as what can be learned from their application to areas ranging from development to pathology.

B05 Pharmaceuticals and Medical Science**ORGANIZERS:** Bridget Carragher, Jason Mantei**Room 123 • America's Center****WEDNESDAY** 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 1:45 PM and 3:30 PM

This symposium presents diverse content related to the manufacturing and use of pharmaceuticals and medical products. Detailed case studies demonstrate the use of advanced techniques to address the unique problems that arise during drug discovery, vaccine research, formulation, biocompatibility, production, product life cycle, and eventual patient use. Also included are in-depth technical presentations covering the development of methods specially optimized for use with these real-world material and biological systems. The research may involve the use of hybrid or correlative techniques that are inclusive and generally include any of the instruments and methods found in the exposition.

B06 3D Structures of Macromolecular Assemblies, Cellular Organelles, and Whole Cells**ORGANIZERS:** Deborah F. Kelly, Elizabeth Wright, Teresa Ruiz**Room 120 • America's Center****TUESDAY** 10:30 AM and 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM and 10:30 AM

Our understanding of the 3D structure and functional subtleties of cells, microorganisms and macromolecular assemblies has skyrocketed due to recent advances in EM imaging technology and hybrid methodologies. This symposium highlights structural studies of cells, microorganisms and macromolecules using state-of-the-art high resolution techniques. These techniques include, electron tomography; electron crystallography; single particle cryo-EM; helical reconstruction; STEM; AFM; X-ray crystallography, and molecular modeling. Biological topics of interest include: cellular architectures, metabolism, trafficking, and division; gene regulation, transcription, and translation; host-pathogen interactions and virus structure; In situ studies using TEM and SEM; and all aspects of structure-function studies of biological assemblies.

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

ORGANIZERS: James A.J. Fitzpatrick, Matthew S. Joens, Joshua Z. Rappoport

Room 122 • America's Center

TUESDAY 8:30 AM and 10:30 AM
3:00 PM POSTER SESSION

Correlating light and charged particle (both electron, ion and X-ray) microscopy methodologies serves to bridge the multi-scale gap that hinders both the two- and three-dimensional analyses of rare cellular and sub-cellular level events that remain beyond reach due to the diffraction limit of light. The need to correlate information obtained from both types of datasets has proven a significant challenge, but has evolved in recent years with the advent of new probes, processing techniques, and detectors with substantially increased sensitivity. We highlight the scientific innovations that address the correlation of light and charged particle microscopy of biological samples and soft materials. This symposium is a forum for the dissemination of correlative workflows and advanced sample preparation methods. Invited papers include those describing novel approaches for correlating information from multiple light modalities with X-ray, electron and ion microscopy datasets. Of particular interest are innovative developments of new CLEM probes and contrast agents, advanced methods for ultrastructural preservation and dynamic in situ measurements. Target attendees include engineers and scientists from all levels of bio-imaging expertise and all related backgrounds.

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

ORGANIZERS: Gang (Greg) Ning, Ru-ching Hsia, Trace Christensen, Jon Charlesworth

Room 123 • America's Center

TUESDAY 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM and 10:30 AM
3:00 PM POSTER SESSION

Microscopy is not only useful but also critically important in the ongoing research, detection, diagnosis and treatment of disease. Advances that improve rapid and accurate detection and treatment often involve the use of various microscopic techniques. These varied techniques provide us with an improved ability to diagnose and research the origins, development and response of diseases in human, plant and animal specimens. This symposium is an opportunity to share information on the investigation of pathogenic cells, tissues and entire organisms in clinical, diagnostic and research laboratories. Emphasis is placed on using latest microscopy in both clinical and research laboratories.

B09 Methodologies, Technologies, and Analysis of Biological Specimens

TUESDAY 3:00 PM POSTER SESSION

P01 Characterization of Semiconductor Materials and Devices

ORGANIZERS: Moon J. Kim, Michael Gribelyuk, Jayhoon Chung, Esther Chen

Room 267 • America's Center

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
 3:00 PM POSTER SESSION
THURSDAY 8:30 AM and 1:30 PM
 10:00 AM POSTER SESSION

The symposium reviews progress in advanced characterization of current and emerging semiconductor materials and devices. This includes 3D and planar devices, wide-gap semiconductors and heterostructures for nanoelectronics applications. The emphasis is on understanding the microstructure, defects, failure mechanisms, correlation of structure with device performance. Presentations include state-of-the-art characterization of current semiconductor materials/devices as well as new and emerging semiconductors.

P02 TEM/STEM/EELS/SNOM of Ultralow Energy Excitations

ORGANIZERS: Ian MacLaren, Philip E. Batson

Room 261 • America's Center

WEDNESDAY 10:30 AM and 1:30 PM
 3:00 PM POSTER SESSION
THURSDAY 8:30 AM

New monochromated microscopes and new high stability EEL spectrometers are allowing dramatic advances in understanding low energy excitations in materials, nanostructures and even organic molecules at high spatial resolution. This includes atomic and molecular vibrations, low energy electronic excitations (e.g. interband transitions), and surface plasmons. Scanning Near-Field Optical Microscopy, SNOM, uses optical techniques to obtain similar information. Topics of interest include new developments in each field and cross-disciplinary discussion. Contributions include hardware developments; software techniques and algorithms for data analysis; theory of the measurement science; low loss interactions between fast electrons and solids and near-field optical interactions with matter; and applications covering both physical and biological sciences. Additional contributions include new developments that are correlated with complementary techniques such as Raman spectroscopy, cathodoluminescence, inelastic neutron scattering, and low energy electron based high resolution EELS.

P03 Advanced Microscopy and Microanalysis of Complex Oxides

ORGANIZERS: Xiaoqing Pan, Peng Wang, Elizabeth Dickey

Room 274 • America's Center

MONDAY 1:30 PM
 3:00 PM POSTER SESSION
TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
 3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
 3:00 PM POSTER SESSION
THURSDAY 8:30 AM

Complex oxide materials exhibit a broad range of functional properties, such as high temperature superconductivity, metal-insulator transitions, colossal magnetoresistance, (anti-) ferromagnetism, (anti-) ferroelectricity, piezoelectricity, and multiferroicity. In many of these materials, unique functionality is derived from local structure and disorder, and there is a need to understand the interplay between chemistry, atomic structure and electronic structure at the atomic scale and across correlation lengths of tens to hundreds of nanometers. In addition, recent technical advances in the atomic-scale synthesis of oxide materials have provided a fertile new ground for creating fascinating phenomena and novel states of matter at their interfaces. A completely new class of electronic devices can be envisaged and engineered by tailoring the physical properties on the atomic scale. This symposium focuses on analytical transmission electron microscopy techniques, aberration-correction, spectroscopy, and in situ methods to characterize these emerging properties across interfaces, thin films and bulk materials for the understanding of new phenomena that occur in these complex-oxide materials. Contributions include reports on either new technique advances or novel applications of microscopy and microanalysis tools.

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

ORGANIZERS: Marta D. Rossell, Jordi Arbiol, Valeria Nicolosi, Quentin Ramasse

Room 266 • America's Center

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION

WEDNESDAY 8:30 AM and 10:30 AM
3:00 PM POSTER SESSION

Low-dimensional systems, which are restricted in one, two or even three dimensions, exhibit many properties that are notably different from those of their bulk counterparts. With reduction in size, intriguing and extraordinary electronic, thermal, mechanical, chemical, magnetic, and optical phenomena can be introduced. Suitable control of the properties and responses of these low-dimensional structures may result in the development of new devices and disruptive technologies. This symposium focuses on the use of cutting-edge microscopy and microanalysis techniques to characterize these emerging low-dimensional structures and devices. The techniques include, but are not limited to, analytical transmission electron microscopy techniques, aberration-correction, spectroscopy, and in situ methods (optical, electronic, and mechanical). Of particular interest are contributions that apply state-of-the-art instrumentations to investigate and model defects, interfaces, diffusion, ordering, and doping. Presentations include the areas of nanowires, nanotubes, nanoribbons, nanobelts, nanosheets, rings, heterostructures, homostructures, and quantum structures.

P05 Imaging and Spectroscopy of Beam-Sensitive Materials

ORGANIZERS: K. Andre Mkhoyan, Osamu Terasaki, Ray F. Egerton, Prashant Kumar

Room 266 • America's Center

WEDNESDAY 1:30 PM

THURSDAY 8:30 AM, 1:30 PM, and 3:30 PM
10:00 AM POSTER SESSION

This symposium highlights (not limited to) the experimental and theoretical research advances for electron beam sensitive materials in innovative imaging and spectroscopy methods, electron beam damage mechanisms, low-dose analytical TEM/STEM and SEM imaging, EELS and EDX spectroscopy, and analysis. Need of cleaner, environment friendly technologies for energy production, storage and electronics in the future, has created a demand for advanced materials and devices. Metal-organic

frameworks (MOFs), zeolites and mixed organic-inorganic composites have shown huge potential in catalysis, separation, carbon capture and energy storage. However, these materials bring unique challenges due to their very-high electron beam-sensitivity, making routine imaging and spectroscopy a challenge.

P06 Nanoparticles: Synthesis, Characterization, and Applications

ORGANIZERS: Thomas W. Hansen, Abhaya Datye, Marc-George Willinger

Room 265 • America's Center

MONDAY 1:30 PM

3:00 PM POSTER SESSION

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION

WEDNESDAY 3:00 PM POSTER SESSION

Nanoparticles find a wide range of applications varying from food additives, medical applications as well as industrial catalysis. A broad array of techniques is utilized to study nanoparticles, but they tend to average information over a large collection of particles. Electron microscopy remains the most important technique since it provides information at the level of single particles. As the level of resolution has approached the atomic scale, with the wide spread deployment of aberration correction, we can do a lot more than determine particle size distributions. This symposium aims at highlighting the properties of nanoparticles as determined from electron microscopy and related techniques. Contributions highlight novel synthesis techniques to prepare nanoparticles, especially those that combine organic and inorganic materials. We highlight the essential role of computational modelling through molecular dynamics simulations and density functional theory that help us in understanding the properties of nanoparticles.

P07 Advanced Characterization of Energy-Related Materials

ORGANIZERS: Meng Gu, Chongmin Wang,
Katherine Jungjohann, Judith Yang

Room 276 • America's Center

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
THURSDAY 8:30 AM and 1:30 PM
10:00 AM POSTER SESSION

Energy-related materials are key to the sustainable development of modern society. This symposium covers the aspect of energy generation, capture, conversion, storage, and efficiency. The topics include but are not limited to materials for: batteries, solar energy, fuel cells, thermoelectrics, ferroelectrics, piezoelectrics, and catalysts. Characterization methods are rapidly developing that are providing heretofore new fundamental understanding of structure-property relationships. Microscopy and spectroscopy capabilities for studying energy materials has moved beyond the static imaging for structural and chemical analysis, into real-time operando studies. The use of electron microscopy for understanding growth, phase transformations, reaction and degradation mechanisms, and electron-beam induced processes for these materials highlights the key interest to the community and will develop strategies for future technologies. Contributions include areas relevant to energy-related materials structure, property measurement, advanced characterization such as three-dimensional microscopy, EDS, EELS, in situ environmental and external probing, as well as failure analysis for energy storage and conversion materials.

P08 Geological Sample Characterization Using Various Imaging Modalities

ORGANIZERS: Lori A. Hathon, K.N. (Bobby) Hooghan,
Michael J. Jercinovic, Bradley T. DeGregorio

Room 262 • America's Center

MONDAY 1:30 PM
3:00 PM POSTER SESSION
TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION
WEDNESDAY 8:30 AM and 10:30 AM

This symposium is a forum for the exchange of information and knowledge regarding the combined use of multiple imaging and microanalysis tools for the characterization of geological samples. Invited papers include those involving quantitative image interpretation, the integration of multiple imaging and microanalysis techniques for estimation

of rock and mineral properties, innovative solutions to long standing technical challenges for imaging/analysis/sample preparation, and applications of machine learning (deep learning) using image data. Target attendees include engineers and scientists from all levels of analytical expertise in geology-related backgrounds, including oil and gas industry, earth science, and planetary science.

P09 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

ORGANIZERS: M. Grace Burke, Bryan D. Miller,
Arthur T. Motta

Room 265 • America's Center

THURSDAY 8:30 AM, 1:30 PM, and 3:30 PM
10:00 AM POSTER SESSION

Materials used in nuclear power systems are subjected to extreme environmental conditions that can strongly affect their performance over many years of plant operation. The focus of this symposium is how the application of advanced characterization methods can be used to examine materials-related issues common to nuclear power systems. A broad range of topics related to characterization of low alloy steels, austenitic stainless steel, Ni-Cr alloys, and zirconium are presented at this symposium.

P10 Diamonds: From the Origins of the Universe to Quantum Sensing in Materials and Biological Science Applications

ORGANIZERS: Nestor J. Zaluzec, Aidan Martin

Room 125 • America's Center

TUESDAY 8:30 AM, 10:30 AM, and 1:30 PM
3:00 PM POSTER SESSION

On this 75th Diamond Anniversary of the Microscopy Society of America, we will revisit the microstructure and spectroscopy of diamonds as well as the development of the diamond knife as a tool in microscopy. Invited speakers discuss topics that range from nano-diamonds and the origins of solar systems, color centers in native diamonds, engineered ultrananocrystalline diamond as layered coatings, excitonic defects in diamond for quantum computing, and sensors in bio-systems. Using optical, electron and atom probe techniques presents current research using both imaging and associated spectrometers to explore questions ranging from the micro to the nanoscale. Contributed papers on the use and characterization of diamonds in all its forms and at all scales in Materials and Life Sciences are presented.

Special Educational Opportunities

X90 **Microscopy in the Classroom: Strategies for Education and Outreach**

ORGANIZERS: Alyssa Waldron, Dave Becker

Room 131 • America's Center

TUESDAY 8:30 AM
3:00 PM POSTER SESSION

Local educators and registered conference attendees are invited to participate in presentations, roundtable discussions, and demonstrations of effective strategies for microscopy outreach and education from K-12 and beyond. This session will show how microscopy in education serves as an important learning tool for inspiring our future STEM professionals. Those involved in microscopy education or educational outreach are encouraged to submit a paper about their successful program or lesson for platform or poster presentation.

X91 **Family Affair**

ORGANIZERS: Elaine Humphrey, Janet Schwarz

Room 124 • America's Center

WEDNESDAY 1:30 PM

The exciting world of microscopy opens up for attendees' family and friends. This session includes:

- Some new Microscopic Explorations
- A mystery to solve using microscopy
- Materials science and biological science

X92 **A Project MICRO Workshop**

ORGANIZERS: Elaine Humphrey, Caroline Schooley

MSA MegaBooth • Exhibit Hall 4-5 • America's Center

The Project MICRO workshop has its venue in the MSA MegaBooth all week after the Exhibit Hall opens. Visit the Outreach booth every day to see how to set up different stations in a classroom, and share your experiences with how you have fun with microscopy outreach. See different microscope systems for use in a classroom, in action; peruse the books suitable for elementary school age children, and put your name into a draw for the daily door prize.

The Technologists' Forum is a committee dedicated to the growth and development of technologists within the Microscopy Society of America. The Forum organizes a symposium, special topics/lecture workshops, and roundtable discussions and an exhibit booth at the annual M&M meeting. A semiannual newsletter, website, and bulk e-mailer are used to increase contact among its members and expand their participation to MSA. Forum services that are available to members include the Microscopy Facilities Directory. The Forum also sponsors the Professional Technical Staff Awards; it is a competitive program to encourage participation of the technologists at the annual meeting.

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

ORGANIZERS: Janice G Pennington, Frank Macaluso

Room 132 • America's Center

TUESDAY, AUGUST 8 8:30 AM

Thinning of tissue in vitreous ice so that macromolecular complexes may be viewed in their native environment for cryo-tomography may be accomplished by cryo-FIB milling (Focused Ion Beam Milling) or vitreous cryo-sectioning. Both techniques require expensive equipment and are technically challenging. This forum focuses on the practical aspects of these techniques so the attendee have an understanding of the basic process for each technique as well as each techniques strengths and limitations. Vitreous cryo-sections have been the method of choice for thinning cells to 500nm or less but cryo-focused ion beam milling has become popular because samples are free of sectioning artifacts like compression and crevasses. Cryo-FIB samples may be milled into wedges, lamellas or the lift-out technique may be used to place the lamella on a TEM grid. The techniques may be combined to trim down bulk samples in the cryo-microtome before cryo-FIB milling a lamella. Recent developments in micromanipulator assisted cryo-sectioning have improved the quality of vitreous sections for tomography.

X31 Tech Forum: Atomic Force Microscopy for Imaging and Materials/Biomaterials Properties: Characterization of Surfaces, Films, and Interfaces

ORGANIZER: Caroline A Miller

Room 132 • America's Center

TUESDAY, AUGUST 8 1:30 PM

This symposium, focused on Atomic Force Microscopy

(AFM), is a forum for the exchange of ideas and knowledge on the characterization of materials/ biomaterials. Invited papers include those utilizing AFM instrumentation and force spectroscopy techniques for characterization of structure-function relationships and materials properties of surfaces, films and interfaces. Specifically, topics including force spectroscopy, fast scanning, conductive tip, or new imaging methodologies are of interest. Target attendees have a variety of backgrounds from engineering and/or scientific disciplines at all levels of analytical expertise.

X32 Tech Forum: Developing and Applying Light Sheet Imaging Technology to the Study of Dynamic Biological Systems

ORGANIZER: Caroline A Miller

Room 132 • America's Center

TUESDAY, AUGUST 8 10:30 AM

Light sheet microscopy, also known as Selective Plane Illumination Microscopy (SPIM), has emerged in recent years as the technique of choice to capture dynamic biological processes over multiple spatial and temporal scales. The unique parallelized "sheet" illumination strategy of SPIM enables high imaging speed, high signal to noise ratio, and reduced photo-induced damage. I review recent work in our own lab in implementing SPIM with nonlinear excitation, and in applying SPIM to a variety of in vivo imaging applications. I describe our current work in extending and combining SPIM with other imaging approaches to achieve synchronous volumetric imaging, at cellular resolution, over mesoscopic-scaled volume regions, to observe dynamic processes such as the blood flow in embryonic beating hearts and brain-wide neuronal activity in small live animals.

ROUNDTABLE DISCUSSION: "Handling Big Data"

Christine A. Brantner, Leader, FOM FIG (Facility Operation and Management Focused Interest Group)

Room 242 • America's Center

MONDAY, AUGUST 7 12:15 PM

Please join us to hear what our panelists and our members say about how they deal with large data sets in their labs. We expect a lively discussion sharing experiences to help others solve problems that we have tackled in our lab.

The physical sciences and biological sciences tutorials serve mainly as educational tools for attendees of the annual Microscopy & Microanalysis meeting by affording a select number of researchers to give extended lectures on practical aspects of certain microscopy techniques, methods, and computations. Generally focused on cutting-edge and/or immediately relevant microscopy, these tutorials give speakers opportunities to venture well beyond the cursory introductory material of platform presentations, which provides attendees with an in-depth and practical understanding of a given technique.

Physical Sciences Tutorials

ORGANIZER: D.N. Leonard, Oak Ridge National Laboratory

One Continuing Education Microscopy Unit (CEMU) is available for each Physical Sciences Tutorial attended (fee \$10/members; \$50/non-members; register and pay at Registration Desk)

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

INSTRUCTORS: Stephen Jesse, Sergei Kalinin, Oak Ridge National Laboratory

Room 126 • America's Center

WEDNESDAY, AUGUST 9 8:30 AM

Topics to be covered:

- Increasing bandwidth, control, and resolution of microscopes using customized data acquisition hardware
- Multivariate analysis for mining spectral-imaging data to map functional properties
- Microscopy in the cloud – utilizing high performance computing infrastructure for advanced large scale analysis
- Microscopy in a crowd – building environments for collaborative data analysis and processing

X41 Entrepreneurship in the Microscopy Community

INSTRUCTOR: Thomas Kelly, CAMECA Instruments

Moderator: Bob Hirche, ICMAS

Room 126 • America's Center

WEDNESDAY, AUGUST 9 1:30 PM

Several entrepreneurs from the microscopy community will be in attendance for a round table Q&A with tutorial attendees on topics including, but not limited to:

- Instrumentation development and commercialization
- Practical steps to take when starting your own microscopy based business

- Panel discussion on business start-up best practices
- Role of local affiliated microscopy societies in bringing microscopists and businesses together

Biological Sciences Tutorials

ORGANIZER: Tommi A. White, University of Missouri

One Continuing Education Microscopy Unit (CEMU) is available for each Biological Sciences Tutorial attended (fee \$10/members; \$50/non-members; register and pay at Registration Desk).

X42 CryoEM with Phase Plates

INSTRUCTOR: Radostin Danev, Max Planck Institute of Biochemistry

Room 126 • America's Center

TUESDAY, AUGUST 8 8:30 AM

Topics covered:

- Introduction to phase plates
- Setting up cryo-tomography and single particle data acquisition with a phase plate
- Processing of phase plate single particle data

X43 Practical Strategies for Cryo-CLEM Experiments

INSTRUCTOR: Cheri Hampton, Emory University

Room 126 • America's Center

TUESDAY, AUGUST 8 1:30 PM

Topics covered:

- Available methodologies for Correlative Light and Electron Microscopy (CLEM)
- Emphasis on cryo-fLM paired with cryo-EM/ET
- Practical considerations and troubleshooting for biological sample preparation
- Applications for virus-host interactions and virus structure including bacterial and mammalian systems

X44 Freeze Fracture, Deep-Etch & 3D Anaglyphs

INSTRUCTOR: Robyn Roth, Washington University

Room 126 • America's Center

WEDNESDAY, AUGUST 9 10:30 AM

Topics covered:

- Freeze fracture
- Deep-Etch
- 3D Anaglyphs

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Scientific Program Information

Monday, August 7, 2017



PLENARY LECTURES AND AWARDS

SESSION CHAIRS:

Ian M. Anderson, MSA President
Masashi Watanabe, MAS President
David Larson, IFES President
Jay A. Potts, M&M 2017 Program Chair

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

- 8:30 AM OPENING WELCOME:**
Ian M. Anderson, MSA President,
Masashi Watanabe, MAS President
David Larson, IFES President
- 8:45 AM 1 (INVITED) *Imaging Cellular Structure and Dynamics from Molecules to Organisms***; Professor Eric Betzig;
Janelia Research Campus
- 9:45 AM MAS Awards Presentation**
- 10:00 AM IFES Awards Presentation**
- 10:15 AM Coffee Break, Ballroom Foyer**
- 10:45 AM MSA Awards Presentation**
- 11:00 AM M&M Meeting Awards Presentation**
- 11:15 AM 2 (INVITED) *Detecting Massive Black Holes via Attometry: Gravitational Wave Astronomy Begins***; Keith Riles; University of Michigan, Ann Arbor

A

ANALYTICAL SCIENCES SYMPOSIA—MONDAY AFTERNOON

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

SESSION CHAIRS:

Hendrix Demers, McGill University, Canada
Philippe Pinard, Oxford Instruments NanoAnalysis

PLATFORM SESSION

Monday 1:30 PM • Room: 121

- 1:30 PM 3 (INVITED) *Recent Advances of the Open Source MULTEM Program to Provide Accurate and Fast Electron Microscopy Simulations***; IP Lobato Hoyos, J Verbeeck, S Van Aert; University of Antwerp, Belgium
- 2:00 PM 4 *Creation of an XAS and EELS Spectroscopy Resource within the Materials Project Using FEFF9***; AK Dozier; CDC-National Institute for Occupational Safety and Health; K Persson; University of California, Berkeley; SP Ong; University of California, San Diego; K Mathew; University of California, Berkeley; C Zheng, C Chen; University of California, San Diego; J Kas, F Vila; University of Washington, et al.

- 2:15 PM 5 *Stereographic Methods for 3D Characterization of Dislocations***; BP Eftink, GT Gray, SA Maloy; Los Alamos National Laboratory
- 2:30 PM 6 (INVITED) *EMsoft: Open Source Software for Electron Diffraction/Image Simulations***; S Singh, F Ram, M De Graef; Carnegie Mellon University

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

SESSION CHAIRS:

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

PLATFORM SESSION

Monday 1:30 PM • Room: 127

- 1:30 PM 7 (INVITED) *Site Specific Cryo-FIB Preparations Aimed at In Situ Cryo-Electron Tomography***; J Mahamid, J Arnold, JM Plitzko; Max Planck Institute of Biochemistry, Germany
- 2:00 PM 8 *Multi-Modal SEM/FIB-SEM for Precise Targeting of Cell-Cell Junctions in Human Pancreatic Islets***; JW Hughes, MS Joens, JA Fitzpatrick, DW Piston; Washington University in St. Louis
- 2:15 PM 9 *3D Microanalysis of Porous Copper Using FIB-Tomography in Combination with X-ray Computed Tomography***; A Wijaya; Materials Center Leoben Forschung GmbH, Austria; B Eichinger; Infineon Technologies, Austria AG; J Rosc, B Sartory; Materials Center Leoben Forschung GmbH, Austria; M Mischitz; Infineon Technologies Austria AG; R Brunner; Materials Center Leoben Forschung GmbH, Austria
- 2:30 PM 10 *Potential of Application Focused Ion Beam in Forensic Science Area***; M Kotrly; Institute of Criminalistics, Czech Republic
- 2:45 PM 11 *In Situ TEM Analyses over FIB Lamellae - Investigating High Temperature Conversion of Solution Processed Mo-Precursor to MoS₂ Semiconductor Films***; A Pokle, M Canavan, D Daly; Trinity College Dublin, Ireland; O Gomes, M Marinkovic; Evonik Resource Efficiency GmbH, Germany; V Wagner; Jacobs University Bremen, Germany; V Nicolosi; Trinity College Dublin, Ireland

Scientific Program

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

SESSION CHAIR:

Robert Keller, National Institute of Standards and Technology

PLATFORM SESSION

Monday 1:30 PM • Room: 124

- 1:30 PM 12 (INVITED) *Low Accelerating Voltage Scanning Transmitted Electron Microscope: Imaging, Diffraction, X-ray Microanalysis, and Electron Energy-Loss Spectroscopy at the Nanoscale*; H Demers, N Brodusch, R Gauvin; McGill University, Canada
- 2:00 PM 13 *On-Axis Transmission Kikuchi Diffraction for Orientation Mapping of Nanocrystalline Materials in the SEM*; E Brodu, E Bouzy, J-J Fundenberger; Laboratoire d'Etude des Microstructures et de Mécanique des Matériaux, France
- 2:15 PM 14 *The Influence of Microscope and Specimen Parameters on the Spatial Resolution of Transmission Kikuchi Diffraction*; GC Sneddon; University of Sydney, Australia; PW Trimby; Oxford Instruments Nanoanalysis; JM Cairney; University of Sydney, Australia
- 2:30 PM 15 *Crystallographic Orientation Image Mapping with Multiple Detector Configurations at 30 – 300 kV*; JD Sugar; Sandia National Laboratories; JT McKeown; Lawrence Livermore National Laboratory; DC Bufford, JR Michael; Sandia National Laboratories
- 2:45 PM 16 *Three-Dimensional Analysis of Cracks by Focused Ion Beam and Transmission Kikuchi Diffraction*; M Abbasi; SK Innovation, Korea; H-U Guim; Korea Basic Science Institute; I Park, R Ayer, Y Ro; SK Innovation, Korea

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

SESSION CHAIR:

Thomas Kelly, CAMECA Instruments

PLATFORM SESSION

Monday 1:30 PM • Room: 263

- 1:30 PM 17 (INVITED) *A Personal Retrospective on the Origin of the Time-of-Flight Atom Probe*; DF Barofsky; Oregon State University
- 2:00 PM 18 (INVITED) *My Life with Erwin: The Beginning of an Atom-Probe Legacy*; JA Panitz; The University of New Mexico

- 2:30 PM 19 (MSA POSTDOCTORAL SCHOLAR) *Field Emission Microscopy to Study the Catalytic Reactivity of Binary Alloys at the Nanoscale*; C Barroo, L Jacobs, N Gilis, SV Lambeets; Université libre de Bruxelles, Belgium; S Owczarek; University of Wrocław, Poland; Y De Decker, T Visartde Bocarmé; Université libre de Bruxelles, Belgium

- 2:45 PM 20 *Enabling Atom Probe Analyses of New Materials Classes with Vacuum-Cryo-Transfer Capabilities*; SS Gerstl, S Tacke; ETH Zurich, Switzerland; Y-S Chen; University of Oxford, United Kingdom; J Wagner; University of Stuttgart, Germany; R Wepf; University of Queensland, Australia

A18.1 Anniversary Session—Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

Paul Carpenter, Washington University in St. Louis

Heather Lowers, U.S. Geological Survey

Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION

Monday 1:30 PM • Room: 264

- 1:30 PM 21 (INVITED) *Historical and Current Importance of Electron Probe Microanalysis in Space Sciences, A Retro- and Forward-Looking Perspective*; BL Jolliff, PK Carpenter; Washington University in St. Louis
- 2:00 PM 22 *Seven Decades of Trans-Atlantic Cooperation in the Development of EPMA*; J Fournelle; University of Wisconsin, Madison
- 2:15 PM 23 *There and Back Again: An Unfinished Tale - XEDS in the AEM*; NJ Zaluzec; Argonne National Laboratory
- 2:30 PM 24 (INVITED) *Focused Ion Beams for Imaging, Analysis, and Fabrication – Where did They Come From and Where are They Going?*; JA Notte; Carl Zeiss Microscopy, LLC

B

BIOLOGICAL SCIENCES SYMPOSIA—MONDAY AFTERNOON

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

SESSION CHAIRS:

Bernard Heymann, National Institutes of Health
Esther Bullitt, Boston University
Alasdair Steven, National Institutes of Health

PLATFORM SESSION

Monday 1:30 PM • Room: 123

- 1:30 PM 25 (INVITED) *Gina Sosinsky - Excellence in Science, Scholarship, and Humanity*; E Bullitt; Boston University; T Ruiz; University of Vermont
- 1:45 PM 26 (INVITED) *Unraveling the Molecular Details of the Cell-ECM Interface: 3D Structures of Membrane-Embedded Integrin Complexes*; X-P Xu, KL Anderson, MF Swift, N Volkmann, D Hanein; Sanford-Burnham-Prebys Medical Discovery Institute
- 2:15 PM 27 (INVITED) *Structure of the C. Elegans Innexin-6 Gap Junction Channel*; A Oshima, K Tani, Y Fujiyoshi; Nagoya University, Japan
- 2:45 PM 28 *Single Molecule and Single Cell Analysis of HER2 Receptors in Breast Cancer Cells Using Liquid Phase Scanning Transmission Electron Microscopy*; N de Jonge; INM – Leibniz Institute for New Materials, Germany; DB Peckys; Saarland University, Germany; S Wiemann; German Cancer Research Center

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

SESSION CHAIR:

David Entenberg, Albert Einstein College of Medicine

PLATFORM SESSION

Monday 1:30 PM • Room: 122

- 1:30 PM 29 (INVITED) *Smart Microscopy for Multi-Scale Developmental Biology in Real-Time*; J Huisken; Morigridge Institute for Research
- 2:00 PM 30 *Multi-Scale Time-Lapse Intravital Imaging of Soft Tissues to Map Single Cell Behavior*; JM Pastoriza, Y Wang; Albert Einstein College of Medicine; MS Sosa, J Aguirre-Ghiso; Icahn School of Medicine at Mount Sinai; JS Condeelis, MH Oktay, D Entenberg; Albert Einstein College of Medicine
- 2:15 PM 31 *Combining Novel Probes and High Resolution Imaging to Dissect Mitochondrial Function in Living Systems*; KA Pena, M Larsen, M Calderon, M Tsang, SC Watkins; University of Pittsburgh; MP Bruchez; Carnegie Mellon University; CM St Croix; University of Pittsburgh

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

P

PHYSICAL SCIENCES SYMPOSIA—MONDAY AFTERNOON

P03.1 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Xiaoqing Pan, University of California, Irvine

PLATFORM SESSION

Monday 1:30 PM • Room: 274

- 1:30 PM 33 (INVITED) *Imaging Point Defects in Complex Oxides Using Quantitative STEM*; H Kim, J Zhang, S Stemmer; University of California, Santa Barbara
- 2:00 PM 34 *Influence of Substrate Temperature and Dopant Distribution at Two-Dimensionally Doped Superconducting La_2CuO_4 Interfaces*; YE Suyolcu, Y Wang, F Baiutti, G Gregori, G Cristiani, W Sigle, J Maier, G Logvenov; Max Planck Institute for Solid State Research, Germany, et al.
- 2:15 PM 35 *Bayesian Statistical Model for Imaging of Single La Vacancies in LaMnO_3* ; J Feng, A Kvit, C Zhang, D Morgan, P Voyles; University of Wisconsin, Madison
- 2:30 PM 36 (INVITED) *Utilizing Atom Probe Tomography for 3D Quantification of Point Defects*; BP Gorman, G Burton, DR Diercks; Colorado School of Mines

P06.1 Nanoparticles: Synthesis, Characterization, and Applications

SESSION CHAIR:

Thomas W. Hansen, Technical University of Denmark

PLATFORM SESSION

Monday 1:30 PM • Room: 265

- 1:30 PM 37 (INVITED) *Nanoparticles in the ETEM: From Gas-Surface Interactions of Single Objects to Collective Behavior of Nanocatalysts*; T Epicer; National Institute of Applied Sciences of Lyon, France
- 2:00 PM 38 *Aberration-Corrected STEM Study of Shape Controlled Metallic Core-Shell Nanoparticles for Catalytic Applications*; J Wang, N Lu; The University of Texas, Dallas; Y Xia; Georgia Institute of Technology; MJ Kim; The University of Texas, Dallas

Scientific Program

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

2:30 PM 40 *Pt/CeO₂-ZnO Nanowire Single-Atom Catalysts for Water-Gas Shift Reaction*; J Xu, Y Song, J Liu; Arizona State University

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

P08.1 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:

Lori Hathon, University of Houston

Kultaransingh (Bobby) Hooghan, Weatherford Laboratories

PLATFORM SESSION

Monday 1:30 PM • Room: 262

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

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

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

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

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

A

ANALYTICAL SCIENCES POSTER SESSIONS – MONDAY AFTERNOON

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 1

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

POSTER # 2

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

POSTER # 3

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

POSTER # 4

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

POSTER # 5

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

POSTER # 6

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

POSTER # 7

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

POSTER # 8

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

POSTER # 9

3:00 PM 55 *High-Throughput Large Volume SEM Workflow Using Sparse Scanning and In-Painting Algorithms Inspired by Compressive Sensing*; F Boughrobel, P Potocek, M Hovorka, L Strakoš, J Mitchels, T Vystavěl, B Lich; Thermo Fisher Scientific, T Dahmen; German Research Centre for Artificial Intelligence, et al.

POSTER # 10

3:00 PM 56 *Implementation of Sparse Image Acquisition in a Conventional Scanning Transmission Electron Microscope*; MA Tanner, S Hwang, CW Han, SV Venkatakrishnan, CA Bouman, V Ortolan; Purdue University

POSTER # 11

3:00 PM 57 *In-Chamber Reel-to-Reel System for Random-Access Volume Electron Microscopy*; S Mikula; Max-Planck Institute of Neurobiology, Germany

POSTER # 12

3:00 PM 58 *The Usage of Modern Data Science in Segmentation and Classification: Machine Learning and Microscopy*; MG Andrew, S Bhattiprolu, D Butnaru, J Correa; Carl Zeiss Microscopy

POSTER # 13

3:00 PM 59 *Reliable Event Detection for Incomplete and Streaming (S)TEM Images*; SM Reehl, B Stanfill; Pacific Northwest National Laboratory; D Ries, M Johnson; Iowa State University; L Mehdi, N Browning, L Bramer; Pacific Northwest National Laboratory

POSTER # 14

3:00 PM 60 *Quantifying Feature Uncertainty in Sub-Sampled Low-Dose (S)TEM Images*; B Stanfill, S Reehl; PNNL; M Johnson; Iowa State University; N Browning, L Mehdi, L Bramer; Pacific Northwest National Laboratory

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 15

3:00 PM 61 *Open Source Software for Quantitative X-ray Microanalysis: OpenMicroanalysis*; H Demers; McGill University, Canada; P Pinard; Oxford Instruments NanoAnalysis; S Richter; RWTH Aachen University, Germany; R Gauvin; McGill University, Canada

POSTER # 16

3:00 PM 62 *Quantification of Thin Specimens in a Scanning Transmission Electron Microscope at Low Accelerating Voltage Using the f-ratio Method*; N Brodusch, H Demers, R Gauvin; McGill University, Canada

POSTER # 17

3:00 PM 63 *On-Line Digital-Darkfield TEM Determination of Nanocrystal 3D-Lattices*; PB Fraundorf; University of Missouri, St. Louis

POSTER # 18

3:00 PM 64 *A Semi-Automated Workflow for Segmenting Contents of Single Cardiac Cells from Serial-Block-Face Scanning Electron Microscopy Data*; A Hussain, E Hanssen, V Rajagopal; University of Melbourne, Australia

POSTER # 19

3:00 PM 65 *Detection of Protein Secondary Structure Patterns from 3D Cryo-TEM Maps at Medium Resolution – Combining the Best of SSETracer and VolTrac*; C Spillers, W Wriggers, J He; Old Dominion University

POSTER # 20

3:00 PM 66 *Gesture-Based Control of ImageJ Using Leap Sensors*; R Brookes; BT Plc; BC Breton, DM Holburn; University of Cambridge, England; NH Caldwell; University of Suffolk

POSTER # 21

3:00 PM 67 *The Dragonfly Macro Engine for Executing Recorded Tasks in Image Processing and Visualization*; M Gendron, N Piche, M Marsh; Object Research Systems

POSTER # 22

3:00 PM 68 *Eye Gaze Pattern Analysis of Whole Slide Image Viewing Behavior in PathEdEx Platform*; I Ersoy, M Kovalenko, C-R Shyu, R Hammer, D Shin; University of Missouri, Columbia

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 23

3:00 PM 69 *Non-Destructive Imaging of Extended Defects in III-nitride Thin Film Structures Using Electron Channeling Contrast Imaging*; N-K Gunasekar, M Nouf-Alleghiani, D Thomson, E Pascal, B Hourahine, C Trager-Cowan; University of Strathclyde, Scotland

POSTER # 24

3:00 PM 70 *Focused Ion Beam (FIB) Based Tomography of Dislocations Using Electron Channeling Contrast Imaging (ECCI)*; S Balachandran; Michigan State University; Z Radha; University of Michigan, Ann Arbor; D Colbry, MA Crimp; Michigan State University

POSTER # 25

3:00 PM 71 *Investigating Defect Contrast in $\text{Ge}_x\text{Si}_{1-x}/\text{Si}$ Epitaxial Structures Using Electron Channeling Contrast Imaging*; J Tessmer, M DeGraef, Y Picard; Carnegie Mellon University

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS – MONDAY AFTERNOON CONTINUED

POSTER # 26

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

POSTER # 27

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

POSTER # 28

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

POSTER # 29

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

POSTER # 30

3:00 PM **76** (INVITED) *Synthesis and Characterization of Mg Obtained by Mechanical Alloying and Doped with Al₂O₃ and Y₂O₃*; C Fernando Marquez; National Autonomous University of Mexico; EA Juárez Arellano; University of Papaloapan, Mexico; J Reyes Gasga; National Autonomous University of Mexico

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 31

3:00 PM **77** *Applications, Technical Challenges, and Recent Implementation of a UHV/Cryogenic Specimen Transfer System for Atom Probe Tomography*; RM Ulfing, TF Kelly, TJ Prosa, J Shepard; CAMECA Instruments Inc.; B Gault, L Stephenson; Max-Planck-Institut für Eisenforschung GmbH, Germany; D von Gunten, U Maier; Ferrovac GmbH, et al.

POSTER # 32

3:00 PM **78** *Interlaboratory Study: Laser-Assisted Atom Probe Tomography (APT) of a Phosphorous-Doped Silicon Specimen*; AJ Akey, DC Bell; Harvard University

POSTER # 33

3:00 PM **79** *Nanoscale Chiral Recognition Using Field Ion and Field Emission Microscopy*; N Gilis; Université libre de Bruxelles, Belgium; J Prakash; Indian Institute of Technology; C Barroo, T Visartde Bocarmé; Université libre de Bruxelles, Belgium

POSTER # 34

3:00 PM **80** *Laser-Induced Reversion of δ' Precipitates in an Al-Li Alloy*; M Khushaim; Taibah University, Saudi Arabia; R Gemma; Tokai University, Japan; T Al-Kassab; King Abdullah University of Science and Technology, Saudi Arabia

A18.P1 Anniversary Session: Celebrating 50 Years of Microanalysis

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 35

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

POSTER # 36

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

POSTER # 37

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

POSTER # 38

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

POSTER # 39

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

POSTER # 40

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

POSTER # 41

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

POSTER # 42

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

POSTER # 43

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

POSTER # 44

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

B

BIOLOGICAL SCIENCES POSTER SESSIONS – MONDAY AFTERNOON

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 45

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

POSTER # 46

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

POSTER # 47

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

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

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 48

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

POSTER # 49

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

POSTER # 50

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

POSTER # 51

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

POSTER # 52

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

P

PHYSICAL SCIENCES POSTER SESSIONS – MONDAY AFTERNOON

P03.P1 Advanced Microscopy and Microanalysis of Complex Oxides

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 53

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

POSTER # 54

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

POSTER # 55

3:00 PM 101 *Solid State Transition from γ to α -Al₂O₃ Induced by SPEX Mechanical Milling*; FD Cortes Vega, P Martinez Torres, S Borjas Garcia, J Zarate Medina; Universidad Michoacana de San Nicolas de Hidalgo, Mexico

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS–

MONDAY AFTERNOON CONTINUED

POSTER # 56

3:00 PM **102** *Molybdenum Oxide Structures Synthesized by Microwave Technique and its Phase Transformation by Thermal Treatment*; CE Ornelas, F Paraguay-Delgado; Centro de Investigación en Materiales Avanzados SC; J Lara-Romero; Universidad Michoacana de San Nicolas de Hidalgo, Mexico

POSTER # 57

3:00 PM **103** *Microstructure Patterns by Switching Spectroscopy Piezo-Response Force Microscopy of Lead Free Perovskite-Type Polycrystalline Thin Films.*; GM Herrera-Pérez, O Solis-Canto, J Holguin-Momaca, S Olive-Mendez, E Guerrero-Lestarjette, G Tapia-Padilla, A Reyes-Rojas, LE Fuentes-Cobas; Centro de Investigación en Materiales Avanzados, S.C., Mexico

POSTER # 58

3:00 PM **104** *Microstructural and Mechanical Behavior in the Al_2O_3 Alloy Modified With Addition of CeO_2* ; JD Franco-Madrid; Centro de Investigación en Materiales Avanzados, Mexico; CG Garay-Reyes, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; CG Nava-Dino, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 59

3:00 PM **105** *Correlating Surface Roughness and Binder Erosion to Tint Retention of Coatings*; PY Eastman, M Koback, J Gu, MB Clark, J Ngunjiri, J Reffner, C Valente; The Dow Chemical Company

POSTER # 60

3:00 PM **106** *Honeycomb Networks of Metal Oxides from Self-Assembling PS-PMMA Block Copolymers*; F Barrows; Northwestern University; P Nealey; Argonne National Laboratory; T Segal-Peretz; Technion-Israel Institute of Technology, Israel; L Stan, J Elam, A Mane; Argonne National Laboratory; E Porath; University of Chicago; A Petford-Long; Argonne National Laboratory, et al.

P06.P1 Nanoparticles: Synthesis, Characterization, and Applications

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 61

3:00 PM **107** *Contributions of Support Effect to Impregnated Cobalt CeO_2 and SiO_2 Catalysts*; Z Liu, R Wang; The University of Alabama

POSTER # 62

3:00 PM **108** *Investigation of Nanoparticle Reactions with Laser Heating by In Situ TEM*; T Isik, S Kundu, IE Gunduz; Purdue University; V Ortalan; Purdue University

POSTER # 63

3:00 PM **109** *Tungsten and Bismuth Nanoparticles for X-ray Computed Tomography*; VN Joshi; Nanoprobes, Inc.orporated

POSTER # 64

3:00 PM **110** *Electrospray as a Sample Preparation Tool for Electron Microscopic Investigations: Toward Quantitative Evaluation of Nanoparticles*; J Mielke; BAM Federal Institute for Materials Research and Testing, Germany; P Dohányosová; Ramen S.A., Belgium; P Müller; BASF SE; S López; Ramen S.A., Belgium; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany

POSTER # 65

3:00 PM **111** *The Stability of High Metal-Loading Pt/Fe_2O_3 Single-Atom Catalyst under Different Gas Environment*; S Duan; Arizona State University; R Wang; University of Science and Technology Beijing; J Liu; Arizona State University

POSTER # 66

3:00 PM **112** *On the Morphologies and Photocatalytic Properties of TiO_2 Nanoparticles Synthesized by Pulsed-Laser Decomposition of Titanium Tetraisopropoxide*; M Mozael, Z Dong, BH Kear; Rutgers University; JF Al-Sharab; Northwestern State University; SD Tse; Rutgers University

POSTER # 67

3:00 PM **113** *Photo-Mediated Seedless Synthesis of Silver Nanoparticles Using CW-Laser and Sunlight Irradiation*; F Félix-Domínguez, RC Carrillo-Torres, JA González, J Hernández-Paredes, R Sánchez-Zeferino, ME Álvarez-Ramos; Universidad de Sonora, Mexico

POSTER # 68

3:00 PM **114** *Elemental Distribution Analysis of Core/Shell Nanocrystals with STEM/EDX*; JT Held, K Hunter, UR Kortshagen, KA Mkhoyan; University of Minnesota

POSTER # 69

3:00 PM 115 *Sample Preparation and Analysis of Aggregated 'Single Atom Alloy' Nanoparticles by Atom Probe Tomography*; C Barroo; Université libre de Bruxelles, Belgium; AJ Akey; Harvard University; J Shan, M Flytzani-Stephanopoulos; Tufts University; DC Bell; Harvard University

POSTER # 70

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

POSTER # 71

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

POSTER # 72

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

POSTER # 73

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

POSTER # 74

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

POSTER # 75

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

P08.P1 Geological Sample Characterization Using Various Imaging Modalities

POSTER SESSION

Monday 3:00 PM • Room: Exhibit Hall

POSTER # 76

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

POSTER # 77

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

POSTER # 78

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

POSTER # 79

3:00 PM 125 *Requirements for a Comprehensive Geological Analysis Solution*; M EDS; M Hiscock; Oxford Instruments

POSTER # 80

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

POSTER # 81

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

POSTER # 82

3:00 PM 128 *Study of Morphological Changes of the Lime Putties During Maturing by SEM/ESEM*; E Navrátilová, V Neděla; Institute of Scientific Instruments of the CAS

Notes

[illegible]

Scientific Program Information

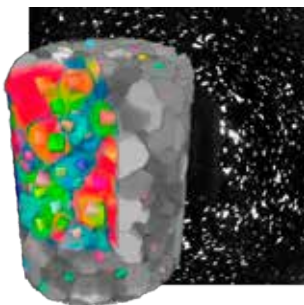
Tuesday, August 8, 2017

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M&M 2017
**MICROSCOPY &
MICROANALYSIS**
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X72.1 MAS 50th Anniversary Lecture in the Analytical Sciences

Complimentary coffee, tea, and handheld breakfast item provided.

SESSION CHAIR:

Masashi Watanabe, President, Microanalysis Society

PLATFORM SESSION

Tuesday 7:30 AM • Room: 275

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

A

ANALYTICAL SCIENCES SYMPOSIA—TUESDAY MORNING

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

SESSION CHAIR:

Volkan Oralkan, Purdue University

PLATFORM SESSION

Tuesday 8:30 AM • Room: 260

- 8:30 AM 129 (INVITED)** *Implementing Sub-Sampling Methods for Low-Dose (Scanning) Transmission Electron Microscopy (S/TEM)*; ND Browning, A Stevens, L Kovarik, A Liyu, L Mehdi, B Stanfill, S Reehl, L Bramer; Pacific Northwest National Laboratories
- 9:00 AM 130** *Compressively Sensed Video Acquisition in Transmission Electron Microscopy*; BW Reed, ST Park, RS Bloom, DJ Masiel; IDES, Inc
- 9:15 AM 131 (INVITED)** *Super-Resolution Electron Microscopy Using Multi-Resolution Data Fusion*; CA Bouman; Purdue University
- 9:45 AM 132** *Resolution Versus Error for Computational Electron Microscopy*; L Luzzi, A Stevens; Pacific Northwest National Laboratory; H Yang; Lawrence Berkeley National Laboratory; ND Browning; Pacific Northwest National Laboratory

Scientific Program

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

SESSION CHAIRS:

Hendrix Demers, McGill University, Canada
Philippe Pinard, Oxford Instruments NanoAnalysis

PLATFORM SESSION

Tuesday 8:30 AM • Room: 121

- 8:30 AM 133 (INVITED)** *Electron Microscopy (Big and Small) Data Analysis With the Open Source Software Package HyperSpy*; F de la Peña, T Ostasevicius; University of Cambridge, England; VT Fauske; Simula Research Laboratory; P Burdet; University of Cambridge, England; P Jokubauskas; University of Warsaw, Poland; M Nord; University of Glasgow, Scotland; M Sarahan; SuperSTEM, E Prestat; University of Manchester, United Kingdom, et al.
- 9:00 AM 134** *Mapping Data with Heavily Overlapped Spectral Features*; P Kikongi; Université de Sherbrooke, Canada; H Demers, R Gauvin; McGill University, Canada; R Gosselin, N Braidy; Université de Sherbrooke, Canada
- 9:15 AM 135** *The Fluorescence Correction of Multilayer Materials for Quantitative X-ray Microanalysis*; Y Yuan, H Demers, R Gauvin; McGill University, Canada
- 9:30 AM 136 (INVITED)** *Standard Bundles Simplify Standards-Base Quantification in NIST DTSA-II*; NW Ritchie, MJ Mengason, DE Newbury; National Institute of Standards and Technology

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 8:30 AM • Room: 127

- 8:30 AM 137 (INVITED)** *Building with Ions in the Helium Ion Microscope*; OS Ovchinnikova; Oak Ridge National Laboratory
- 9:00 AM 138** *Nanofabrication Limits in Layered Ferroelectric Semiconductors via He-Ion Beam*; H Hysmith, A Belianinov, MJ Burch, AV Levlev, V Iberi, MA Susner, MA McGuire, P Maksymovych; Oak Ridge National Laboratory, et al.

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA–

TUESDAY MORNING CONTINUED

9:15 AM **139** *Rapid Screening of Nanoporous Structures in SiO₂ Catalyst Particles via Helium Ion Microscopy*; MJ Burch, AV Ievlev, H Hysmith; Oak Ridge National Laboratory; K Mahady, PD Rack; University of Tennessee; L Luo; ExxonMobil Chemical Company; A Belianinov; Oak Ridge National Laboratory; S Yakolev; ExxonMobil Chemical Company, et al.

9:30 AM **140** *A Plan-View TEM Specimen Preparation Method Using Focused Ion Beam*; L-H Lee, C-H Yu, Y-T Hong, C-Y Wen; National Taiwan University

9:45 AM **141** *Targeted Ion Milling of Ex Situ Lift-Out FIB Specimens*; CS Bonifacio, MJ Campin, P Nowakowski, M Boccabella; E.A. Fischione Instruments Inc.; LA Giannuzzi; EXpressLO LLC.; PE Fischione; E.A. Fischione Instruments Inc.

A07.1 Materials Characterization Using Atomic-Scale EDX/EELS Spectroscopy

SESSION CHAIR:

Ping Lu, Sandia National Laboratories

PLATFORM SESSION

Tuesday 8:30 AM • Room: 261

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

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

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

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

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

SESSION CHAIR:

Robert R. Keller, National Institute of Standards and Technology

PLATFORM SESSION

Tuesday 8:30 AM • Room: 124

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

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

9:15 AM **148** *Characterization of Porous, TiO₂ Nanoparticle Films Using On-Axis TKD in SEM – A New Nano-Analysis Tool for a Large-Scale Application*; N Wollschläger; BAM Federal Institute for Materials Research and Testing, Germany; L Palasse; Bruker Nano GmbH; I Häusler, E Ortel; BAM Federal Institute for Materials Research and Testing, Germany; K Dirscherl; Danish Fundamental Metrology Institute; V-D Hodoroba; BAM Federal Institute for Materials Research and Testing, Germany

9:30 AM **149** (INVITED) *Applications of Multivariate Statistical Methods to Analysis of Electron Backscatter Diffraction and Transmission Kikuchi Diffraction Datasets*; AJ Wilkinson, Y Zayachuk, DM Collins; University of Oxford, United Kingdom; R Korla; University of Oxford, United Kingdom and Indian Institute of Technology Hyderabad

A11.2 Anniversary Session: Instrumentation of Atom Probe: 50 Years and Counting

SESSION CHAIR:

David Larson, CAMECA Instruments

PLATFORM SESSION

Tuesday 8:30 AM • Room: 263

- 8:30 AM 150 (INVITED) *The Pulsed-Laser Atom Probe: A Review of Its Development and Initial Applications*; GL Kellogg; Retired
- 9:00 AM 151 (INVITED) *Evolution of Atom Probe Data Collection Toward Optimized and Fully Automated Acquisition*; TJ Prosa, DA Reinhard, HG Saint Cyr, I Martin, KP Rice, Y Chen, DJ Larson; CAMECA Instruments, Inc.
- 9:30 AM 152 (IFES STUDENT SCHOLAR) *On the Multiple Event Detection in Atom Probe Tomography*; Z Peng, B Gault; Max-Planck-Institut für Eisenforschung GmbH, Germany; MW Ashton; University of Florida; SB Sinnott; Pennsylvania State University; P-P Choi; Max-Planck-Institut für Eisenforschung GmbH, Germany; Y Li; Ruhr-Universität Bochum, Germany; D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany
- 9:45 AM 153 (M&M STUDENT SCHOLAR) *Simplifying Observation of Hydrogen Trapping in Atom Probe Tomography*; Y-S Chen, D Haley, PA Bagot, MP Moody; University of Oxford, United Kingdom

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

SESSION CHAIR:

Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION

Tuesday 8:30 AM • Room: 130

- 8:30 AM 154 (INVITED) *Control of Radiation Chemistry During Liquid Cell TEM to Synthesize Transition Metal and Bimetallic Nanoparticles*; TJ Woehl; University of Maryland
- 9:00 AM 155 *Time Lapse Liquid Phase Scanning Transmission Electron Microscopy of Nanoparticles*; N de Jonge, A Verch, J Hermannsdörfer; INM – Leibniz Institute for New Materials, Germany; KP de Jong, J Zečević; Utrecht University, Netherlands

- 9:15 AM 156 *Probing Dynamic Phase Transformations of Hydrated Iron Oxide Nanoparticles with In Situ Scanning Transmission Electron Microscopy*; R Hufschmid, KM Krishnan; University of Washington; ND Browning; Pacific Northwest National Laboratory
- 9:30 AM 157 *Capturing Dynamics in Liquids with High-Speed CMOS Cameras – Opportunities and Challenges*; SW Chee, A Datta, U Anand, D Loh, U Mirsaidov; National University of Singapore
- 9:45 AM 158 *Stroboscopic High-Duty-Cycle GHz Time-Resolved Microscope: Toward Hardware Implementation and Commissioning*; J Qiu, SS Baturin, Y Li, C Jing, A Kanareykin, SV Baryshev; Euclid TechLabs; BW Reed, D Masiel; Integrated Dynamic Electron Solutions, et al.

A18.2 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

Julie Chouinard, University of Oregon

Paul Carpenter, Washington University in St. Louis

Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION

Tuesday 8:30 AM • Room: 264

- 8:30 AM 159 (INVITED) *Micro X-ray Fluorescence: A Personal Perspective of 30 Years*; GJ Havrilla; Los Alamos National Laboratory
- 9:00 AM 160 *New Developments in Compositional Stage Mapping by EPMA and Micro-XRF*; P Carpenter; Washington University in St. Louis
- 9:15 AM 161 *Five Dimensional X-ray Imaging with the Color X-ray Camera*; J Davis, J Schmidt, M Huth; PNDetector GmbH, Germany; R Hartmann; PNSensor GmbH, Germany; H Soltan; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany
- 9:30 AM 162 *Considerations for the Acquisition of Very Large Area EDS Spectral Image Mosaics*; SM Seddio; Thermo Fisher Scientific; PK Carpenter; Washington University in St. Louis
- 9:45 AM 163 *Progress in X-ray Mapping in Electron Microscopes Toward Single-Atom Analysis*; M Watanabe; Lehigh University

Scientific Program

B

BIOLOGICAL SCIENCES SYMPOSIA—TUESDAY MORNING

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

SESSION CHAIRS:

Bernard Heymann, National Institutes of Health
Esther Bullitt, Boston University School of Medicine
Alasdair Steven, National Institutes of Health

PLATFORM SESSION

Tuesday 8:30 AM • Room: 123

- 8:30 AM **164** *Probing the Molecular Basis for the Lateral Flexibility of Tight Junction Strands*; ES Krystofiak, J Zhao, A Ballesteros Morcillo; National Institute on Deafness and Other Communication Disorders; CM Van Itallie; National Heart, Lung, and Blood Institute; R Cui; National Institute on Deafness and Other Communication Disorders; JM Anderson; National Heart, Lung, and Blood Institute; C Fenollar Ferrer; National Institute of Neurological Disorders and Stroke, B Kachar; National Institute on Deafness and Other Communication Disorders
- 9:00 AM **165** *STORM and TEM Identify the Cardiac Ephapse: An Intercalated Disk Nanodomain with Previously Unanticipated Functions in Cardiac Conduction*; R Veeraraghavan, GS Hoeker; Virginia Tech Carilion Research Institute; AA Laviada; Imperial College London, England; X Wan, I Deschenes; Case Western Reserve University; J Smyth; Virginia Tech Carilion Research Institute; J Gorelik; Imperial College London, England, et al.
- 9:30 AM **166** (INVITED) *Galactose Induces Formation of Chains of the Retinal Adhesion Protein, Retinoschisin*; B Heymann, C Vijayasathy; National Institutes of Health; R Huang; Howard Hughes Medical Institute; A Dearborn, PA Sieving, AC Steven; National Institutes of Health

B07.1 Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems

SESSION CHAIR:

James Fitzpatrick, Washington University in St. Louis

PLATFORM SESSION

Tuesday 8:30 AM • Room: 122

8:30 AM **167** (INVITED) *CLEM, 1+1=3*; P Verkade; University of Bristol, United Kingdom

9:00 AM **168** *Integrated Microscopy: Highly Accurate Light-Electron Image Correlation Anywhere on a Sample*; M Haring, N Liv, CA Zonneville, A Narvaez, L Voortman, P Kruit, J Hoogenboom; Delft University of Technology, Netherlands

9:15 AM **169** *Minimal Resin Embedding of Multicellular Specimens for Targeted FIB-SEM Imaging*; A Steyer, N Schieber, P Machado; European Molecular Biology Laboratory, Germany; S Markert, C Stigloher; University of Wuerzburg, Germany; Y Schwab; European Molecular Biology Laboratory, Germany

9:30 AM **170** *Multi-Color Electron Microscopy by Element-Guided Identification of Cells, Organelles and Molecules*; M Scotuzzi; Delft University of Technology, Netherlands; J Kuipers; University Medical Center Groningen, Netherlands; D Wensveen; Delft University of Technology, Netherlands; P de Boer, N Pirozzi; University Medical Center Groningen, Netherlands; K Hagen; Delft University of Technology, Netherlands; B Giepmans; University Medical Center Groningen, Netherlands, J Hoogenboom; Delft University of Technology, Netherlands

9:45 AM **171** (M&M STUDENT SCHOLAR) *A Correlative Cryo-Fluorescence and CryoSEM Approach for Visualizing Nanomaterials in Glioblastoma Tissue*; A DiCorato, T O'Halloran, D Joester; Northwestern University

P

PHYSICAL SCIENCES SYMPOSIA—TUESDAY MORNING

P01.1 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Moon J. Kim, University of Texas, Dallas

PLATFORM SESSION

Tuesday 8:30 AM • Room: 267

- 8:30 AM **173** (INVITED) *Characterization of Semiconductor Materials Using Electron Holography*; L Zhou; Ames Laboratory; Z Gan; Intel Corporation; M-G Han; Brookhaven National Laboratory; DJ Smith, MR McCartney; Arizona State University
- 9:00 AM **174** *Observation and Analysis of an Electrically Active Layer at the Core-Shell Interface of a GaN Nanowire by Advanced Electron Microscopy*; S Yazdi; Rice University; T

Kasama, JB Wagner; Technical University of Denmark; R Ciechonski; GLO-AB; RE Dunin-Borkowski; Forschungszentrum Jülich, Germany; E Ringe; Rice University

- 9:15 AM **175** *2D Junction Profiling on Semiconductor Device Reliability Fail*; Y-Y Wang, J Nxumalo, A Katnani, D Ioannou, J Brown, K Bandy, M Macdonald; Globalfoundries Inc.; J Bruley; IBM
- 9:30 AM **176** *Investigating Ionic Transport Anisotropy in Oxygen-Deficient Lanthanum Cobaltites via STEM and First Principles Theory*; AY Birenbaum; Oak Ridge National Laboratory; L Qiao; University of Manchester, United Kingdom; M Biegalski, V Cooper, A Borisevich; Oak Ridge National Laboratory
- 9:45 AM **177** *Differential Phase-Contrast Imaging with Reduced Dynamical Diffraction Effect*; A Nakamura, Y Kohno; JEOL, Ltd., Japan; H Sasaki; Furukawa Electric, Ltd.; N Shibata; The University of Tokyo, Japan

P03.2 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Elizabeth Dickey, North Carolina State University

PLATFORM SESSION

Tuesday 8:30 AM • Room: 274

- 8:30 AM **178** (INVITED) *Dissecting Electronic Structure of a New Line Defect in NdTiO₃ by EELS*; KA Mkhoyan; University of Minnesota
- 9:00 AM **179** *Probing Disorder in MBE-Grown Oxide Films Using Quantitative STEM*; H Kim, S Raghavan, O Shoron, S Stemmer; University of California, Santa Barbara
- 9:15 AM **180** *Oxide Epitaxy with Large Symmetry Mismatch: Bronze-phase VO₂ on SrTiO₃*; H Sims; Vanderbilt University; X Gao, S Lee, JA Nichols, TL Meyer, TZ Ward; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; MF Chisholm; Oak Ridge National Laboratory, et al.
- 9:30 AM **181** (M&M STUDENT SCHOLAR) *Compositional Ordering and Polar Nano-Regions: Physical Effects of Sn Alloying in SrTiO₃ Thin Films*; ED Grimley; North Carolina State University; T Wang, B Jalan; University of Minnesota; JM LeBeau; North Carolina State University
- 9:45 AM **182** (M&M STUDENT SCHOLAR) *Identification and Quantification of Boron Dopant Sites in Antiferromagnetic Cr₂O₃ Films by Electron*

Energy Loss Spectroscopy; C Sun; University of Wisconsin, Madison; M Street; University of Nebraska; R Jacobs; University of Wisconsin, Madison; C Binek; University of Nebraska; D Morgan, P Voyles; University of Wisconsin, Madison

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

SESSION CHAIR:

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

PLATFORM SESSION

Tuesday 8:30 AM • Room: 266

- 8:30 AM **183** (INVITED) *Quantitative STEM: Comparative Studies of Composition and Optical Properties of Semiconductor Quantum Structures*; A Rosenauer, FF Krause, K Müller-Caspary, E Goldmann, F Jahnke; University of Bremen, Germany; M Paul, M Jetter, P Michler; University of Stuttgart, Germany, et al.
- 9:00 AM **184** (INVITED) *Correlative Transmission Electron Microscopy of Highly Perfect Fe₃O₄ Nanocubes*; A Kovács, P Diehle; Forschungszentrum Jülich, Germany; T Maeda; Kyushu University, Japan; J Caron; Forschungszentrum Jülich, Germany; J Muro-Cruces, AG Roca; Consejo Superior de Investigaciones Científicas, Spain; J Arbiol, J Nogués; CSIC and Barcelona Institute of Science and Technology, Spain, et al.
- 9:30 AM **185** *Observing Nanoscale Orbital Angular Momentum in Plasmon Vortices with Cathodoluminescence*; J Hachtel; Oak Ridge National Laboratory; SY Cho; New Mexico State University; R Davidson; U.S. Naval Research Laboratory; M Chisholm, JC Idrobo; Oak Ridge National Laboratory; R Haglund, S Pantelides; Vanderbilt University, B Lawrie; Oak Ridge National Laboratory
- 9:45 AM **186** *Cathodoluminescence Mapping of Defect Regions in Cadmium Sulfide Nanowires*; O Cretu, C Zhang, D Golberg; National Institute for Materials Science, Japan

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA-

TUESDAY MORNING CONTINUED

P06.2 Nanoparticles: Synthesis, Characterization, and Applications

SESSION CHAIR:

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

PLATFORM SESSION

Tuesday 8:30 AM • Room: 265

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

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

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

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

9:45 AM **191** *Development of Two-Dimensional Polycrystalline Co₃O₄ Hierarchical Structures and Pt_{1/2}D-Co₃O₄ Single-atom Catalysts*; Y Cai; Arizona State University; Y Guo; East China University of Science and Technology; J Liu; Arizona State University

P07.1 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Chongmin Wang, Pacific Northwest National Laboratory

PLATFORM SESSION

Tuesday 8:30 AM • Room: 276

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

9:00 AM **193** (INVITED) *In Situ Nanoscale Imaging and Spectroscopy of Energy Storage Materials*; RR Unocic, RL Sacci, X Sang, KA Unocic, GM Veith, NJ Dudley, KL More; Oak Ridge National Laboratory

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

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

P08.2 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:

Lori Hathon, University of Houston

Bobby Hooghan, Weatherford Laboratories

PLATFORM SESSION

Tuesday 8:30 AM • Room: 262

8:30 AM **196** (INVITED) *Application of Low-Voltage FESEM and TEM to the Study of Mineral and Organic-Matter Components in Unconventional Gas Shales, With a Focus on Organic Pores Structure*; PL Smith, T Zhang; University of Texas, Austin

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

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

9:30 AM **199** *Microstructural Analysis of the Transformation of Organic Matter During Artificial Thermal Maturation of the Upper Cretaceous Boquillas (Eagle Ford) Formation, Texas, USA*; K Hooghan; Weatherford Laboratories; WK Camp; Anadarko Petroleum Corporation; W Knowles, TE Ruble; Weatherford Laboratories

9:45 AM **200** *Organic Matter Characterization in Shales: A Systematic Empirical Protocol*; KN Hooghan; Weatherford Laboratories; L Hathon, M Myers; University of Houston; ML Dixon; Weatherford Laboratories

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 8:30 AM • Room: 125

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

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

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

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

T

BIOLOGICAL SCIENCES TUTORIAL – TUESDAY MORNING

X42.1 CryoEM with Phase Plates

SESSION CHAIR:

Tommi White, University of Missouri, Colombia

PLATFORM SESSION

Tuesday 8:30 AM • Room: 126

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

O

MICROSCOPY OUTREACH SESSIONS – TUESDAY MORNING

X90.1 Microscopy in the Classroom: Strategies for Education and Outreach

SESSION CHAIRS:

Alyssa Waldron, Bergen County Academies
Dave Becker, Bergen County Academies

PLATFORM SESSION

Tuesday 8:30 AM • Room: 131

8:30 AM **206** (INVITED) *Perspectives on Atomic-Force Microscopy Education*; NA Burnham; Worcester Polytechnic Institute

9:00 AM **207** *Online Microscope Simulators for Training and Outreach*; C Fuery, J Whiting; Australian Microscopy & Microanalysis Research Facility; B Cribb; University of Queensland; J Williams; Thermo Fisher Scientific; J Cairney; University of Sydney, Australia

9:15 AM **208** *Using Virtual Reality (VR) for Education in Nanoscience*; S Kim; 2LuxMedia; M Kim, A Klick; University of Texas, Dallas

TF

TECHNOLOGISTS' FORUM SESSIONS – TUESDAY MORNING

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

SESSION CHAIRS:

Janice G Pennington, University of Wisconsin, Madison
Frank Macaluso, Albert Einstein College of Medicine

PLATFORM SESSION

Tuesday 8:30 AM • Room: 132

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

9:00 AM **210** (INVITED) *Cryo-FIB Milling and Lift-Out for Preparation of Specimens for Cryo-TEM*; MJ Zachman, JM Noble, LF Kourkoutis; Cornell University

Scientific Program

TF TECHNOLOGISTS' FORUM SESSIONS—TUESDAY MORNING

- 9:30 AM **211** (INVITED) *Electron Cryotomography of Vitreous Cryosections and Cryo-Focused Ion Beam Milled Lamellae*; MT Swulius, SK Mageswaran; Caltech; GJ Jensen; California Institute of Technology

A ANALYTICAL SCIENCES SYMPOSIA—TUESDAY MORNING CONTINUED

A02.2 Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy

SESSION CHAIR:
Volkan Ortolan, Purdue University

PLATFORM SESSION
Tuesday 10:30 AM • Room: 260

- 10:30 AM **212** *Spatial Resolution Smaller Than the Pixel Size? Yes We Can!*; L Strueder; PNSensor GmbH, Germany; J Davis; PNDetector; R Hartmann, P Holl; PNSensor GmbH, Germany; S Ihle; PNDetector GmbH, Germany; D Kalok; PNSensor GmbH, Germany; H Soltan; PNDetector GmbH, Germany
- 10:45 AM **213** *Design and Development of Coded Aperture Compressive Sensing Acquisition for High Frame Rate TEM Imaging*; L Kovarik, A Stevens, A Liyu; Pacific Northwest National Laboratory; J Davidson, R Bilhorn; Direct Electron, LP; N Browning; Pacific Northwest National Laboratory
- 11:00 AM **214** *Phase Imaging: A Compressive Sensing Approach*; SG Schneider; Leibniz Institute for Solid State and Materials Research Dresden, Germany; A Stevens, ND Browning; Pacific Northwest National Laboratory; D Pohl, K Nielsch, B Rellinghaus; Leibniz Institute for Solid State and Materials Research Dresden, Germany
- 11:15 AM **215** (M&M STUDENT SCHOLAR) *Acquisition of STEM Images by Adaptive Compressive Sensing*; W Xie, Q Feng, R Srinivasan; The Ohio State University; A Stevens, ND Browning; Pacific Northwest National Laboratory
- 11:30 AM **216** *Controlling the Reaction Process in Operando STEM by Pixel Sub-Sampling*; BL Mehdi, A Stevens, L Kovarik, A Liyu, B Stanfill, S Reehl, L Bramer, ND Browning; Pacific Northwest National Laboratory

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

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

PLATFORM SESSION
Tuesday 10:30 AM • Room: 121

- 10:30 AM **217** *tomviz: Providing Advanced Electron Tomography by Streamlining Alignment, Reconstruction, and 3D Visualization*; Y Jiang, E Padgett; Cornell University; MD Hanwell, C Quammen, C Harris, S Waldon; Kitware Inc; DA Muller; Cornell University, R Hovden; University of Michigan
- 10:45 AM **218** *Pycroscopy – An Open Source Approach to Microscopy and Microanalysis in the Age of Big Data and Open Science*; S Somnath, CR Smith, S Jesse, N Laanait; Oak Ridge National Laboratory
- 11:00 AM **219** *The ImageJ Ecosystem: An Open and Extensible Platform for Biomedical Image Analysis*; CT Rueden, KW Eliceiri; University of Wisconsin, Madison
- 11:15 AM **220** *Gesture-Based Control of Scanning Electron Microscopes Using Leap Sensors*; S Cater; BT Plc; BC Breton, DM Holburn; University of Cambridge, England; NH Caldwell; University of Suffolk, England
- 11:30 AM **221** *MIPAR™: 2D and 3D Image Analysis Software Designed by Materials Scientists, for All Scientists*; JM Sosa, DE Huber, BA Welk, HL Fraser; The Ohio State University
- 11:45 AM **222** *A Specific Image Processing Code in MatLab to Perform Advanced Nodularity and Nodule Count Analysis of Austempered Ductile Iron Castings*; B Cetin; FNSS Defense Systems, Inc., Turkey; H Kurtuldu; Baskent University, Turkey; G Durkaya, K Davut; Atılım University, Turkey

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

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

PLATFORM SESSION
Tuesday 10:30 AM • Room: 127

10:30 AM 223 *A Comparison of Current and Emerging Ion and Laser Beam Techniques for High Throughput Material Removal*; S Subramaniam; Intel Corporation; MP Echlin; University of California, Santa Barbara; K Muthur, K Johnson; Intel Corporation

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

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

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

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

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

SESSION CHAIR:

Jian-Min Zuo, University of Illinois, Urbana-Champaign

PLATFORM SESSION

Tuesday 10:30 AM • Room: 261

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

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

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

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

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

SESSION CHAIR:

Shirin Kaboli, University of Nevada, Las Vegas

PLATFORM SESSION

Tuesday 10:30 AM • Room: 124

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

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

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

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

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA-

TUESDAY MORNING CONTINUED

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

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

SESSION CHAIRS:

Baptiste Gault, Max-Planck Institute for Iron Research GmbH, Germany

Arun Devaraj, Pacific Northwest National Laboratory

PLATFORM SESSION

Tuesday 10:30 AM • Room: 263

- 10:30 AM **237** (INVITED) *Correlating Irradiation-Induced Solute Clustering with Changes of Hardness in Low and High Flux Reactor Pressure Vessel Steels*; JM Hyde; National Nuclear Laboratory; KB Wilford; Rolls Royce
- 11:00 AM **238** *Exploring Artifact Signals in Atom Probe Mass Spectra*; F Meisenkothen, EB Steel; National Institute of Standards and Technology
- 11:15 AM **239** *Field Evaporation Behavior of Ternary Compound Semiconductor $\text{In}_x\text{Al}_{1-x}\text{N}$* ; B Mazumder, S Broderick; University at Buffalo; J Peralta; Universidad Andres Bello, Chili; H Foronda, JS Speck; University of California, Santa Barbara; K Rajan; University at Buffalo
- 11:30 AM **240** (INVITED) *Recent Reconstruction Developments in IVAS*; BP Geiser; CAMECA Instruments Inc; F Vurpillot; Groupe de Physique des Matériaux; Y Chen, KP Rice; CAMECA Instruments Inc; S Wright; EDAX; DA Reinhard, G Sobering, RM Ulfig; CAMECA Instruments Inc, et al.

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

SESSION CHAIR:

Libor Kovarik, Pacific Northwest National Laboratory

PLATFORM SESSION

Tuesday 10:30 AM • Room: 130

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

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

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

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

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

A18.3 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

Julie Chouinard, University of Oregon;

Paul Carpenter, Washington University in St. Louis

PLATFORM SESSION

Tuesday 10:30 AM • Room: 264

- 10:30 AM **246** *Historical Development of the CAMECA EPMA*; C Henderson, A-S Robbes, MP Moret; CAMECA; D Larson; CAMECA Inc.; K Baxter; AMETEK do Brasil, Ltda.
- 10:45 AM **247** *History of JEOL Microbeam Analysis: High Accuracy Analyses for Scientific and Industrial Work from the Centimeter to Nanometer Scale*; H Takahashi, H Yamada, S Notoya, M Takakura, T Murano; JEOL, Ltd. Japan; V Robertson, P McSwiggen; JEOL USA, Inc.
- 11:00 AM **248** *EDAX – More Than 50 Years of Influence on Microanalysis*; PP Camus, T Nylese; EDAX Inc.
- 11:15 AM **249** *50 Years of Microanalysis: A Little History of Who's Who, A Perspective from Bruker*; T Juzwak; Bruker Nano Analytics
- 11:30 AM **250** *The Magic That Turns a Tiny Cloud of Electrons Into An X-ray Spectrum*; RB Mott; PulseTor LLC

11:45 AM 251 *SEM/EDS Trace Analysis: Limits Imposed by Fluorescence of the Detector*; DE Newbury, NW Ritchie, M Mengason, K Scott; National Institute of Standards and Technology

B

BIOLOGICAL SCIENCES SYMPOSIA-

TUESDAY MORNING CONTINUED

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

SESSION CHAIRS:

Deborah Kelly, Virginia Tech
Elizabeth Wright, Emory University

PLATFORM SESSION

Tuesday 10:30 AM • Room: 120

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

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

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

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

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

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

SESSION CHAIR:

Matthew Joens, Washington University in St. Louis

PLATFORM SESSION

Tuesday 10:30 AM • Room: 122

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

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

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

P

PHYSICAL SCIENCES SYMPOSIA-

TUESDAY MORNING CONTINUED

P01.2 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Michael Gribelyuk, GlobalFoundries Inc.

PLATFORM SESSION

Tuesday 10:30 AM • Room: 267

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

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

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA –

TUESDAY MORNING CONTINUED

- 11:15 AM **263** *Phase and Atomic Displacement Profiles Within Crystals Measured and Simulated Using the Self-Interference of Split HOLZ Lines*; M Norouzpour, R Herring; University of Victoria, Canada
- 11:30 AM **264** *How to Avoid Artifacts in Nanobeam Diffraction Strain Measurements*; B Fu, M Gribelyuk, FH Baumann, Y-Y Wang; GlobalFoundries Inc.
- 11:45 AM **265** *Strain Measurement of 3D Structured Nanodevices by EBSD*; WA Osborn, LH Friedman, M Vaudin; National Institute of Standards and Technology

P03.3 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Xiaoqing Pan, University of California, Irvine

PLATFORM SESSION

Tuesday 10:30 AM • Room: 274

- 10:30 AM **266** (INVITED) *Interfacial Coupling and Polarization of Perovskite ABO_3 Heterostructures*; Y Zhu; Brookhaven National Laboratory
- 11:00 AM **267** *ELNES Spectrum Unmixing and Mapping for Oxide/Oxide Interfaces*; S Lu; Arizona State University; K Kormondy, T Ngo, E Ortmann; University of Texas, Austin; T Aoki; Arizona State University; A Posadas, J Ekerdt, A Demkov; University of Texas, Austin, et al.
- 11:15 AM **268** *Identifying Novel Polar Distortion Modes in Engineered Magnetic Oxide Superlattices*; S GHosh; Vanderbilt University; A Choquette, S May; Drexel University; M Oxley, A Lupini; Oak Ridge National Laboratory; S Pantelides; Vanderbilt University; A Borisevich; Oak Ridge National Laboratory
- 11:30 AM **269** (INVITED) *High Resolution Studies of Oxide Multiferroic Interfaces in the Aberration-Corrected STEM*; J Grandal, JI Beltran; Universidad Complutense de Madrid, Spain; G Sanchez-Santolino; University of Tokyo, Japan; F Gallego, J Tornos; Instituto de Ciencia de Materiales de Madrid – CSIC, Spain; M Cabero, C Leon; Universidad Complutense de Madrid, Spain, F Mompean; Instituto de Ciencia de Materiales de Madrid – CSIC, Spain, et al.

P04.2 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices

SESSION CHAIR:

Quentin M. Ramasse, SuperSTEM, UK

PLATFORM SESSION

Tuesday 10:30 AM • Room: 266

- 10:30 AM **270** (INVITED) *Using Advanced STEM Techniques to Unravel Key Issues in the Development of Next-Generation Nanostructures for Energy Storage*; JG Lozano, E Liberti, K Luo, GT Martinez, MJ Roberts, AI Kirkland, PD Nellist, PG Bruce; University of Oxford, United Kingdom
- 11:00 AM **271** *Revealing the Bonding of Nitrogen Impurities in Monolayer Graphene*; JC Idrobo; Oak Ridge National Laboratory; C Su, J Li, J Kong; Massachusetts Institute of Technology
- 11:15 AM **272** *Exchange of Re and Mo Atoms in MoS_2 driven by Scanning Transmission Electron Microscopy*; S Yang; Oak Ridge National Laboratory; W Sun, Y Zhang; Vanderbilt University; Y Gong; Beihang University, China; MF Chisholm; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; W Zhou; University of Chinese Academy of Sciences
- 11:30 AM **273** *Atomic Defects and Edge Structure in Single-Layer $Ti_3C_2T_x$ MXene*; X Sang; Oak Ridge National Laboratory; D Yilmaz; University of Pennsylvania; Y Xie; Oak Ridge National Laboratory; M Alhabeb, B Anasori; Drexel University; X Li, K Xiao, PR Kent; Oak Ridge National Laboratory, et al.
- 11:45 AM **274** *Movement and Imaging of Single-Atom Dopants in Silicon*; BM Hudak, J Song, PC Snijders, AR Lupini; Oak Ridge National Laboratory

P06.3 Nanoparticles: Synthesis, Characterization, and Applications

SESSION CHAIR:

Abhaya Datye, University of New Mexico

PLATFORM SESSION

Tuesday 10:30 AM • Room: 265

- 10:30 AM **275** (INVITED) *Growth Dynamics, Stacking Sequence, and Interlayer Coupling in Few-Layer Graphene Revealed by In Situ SEM*; Z-J Wang; Fritz Haber Institute of the Max Planck Society, Germany; G Eres; Oak Ridge

National Laboratory; F Ding; Hong Kong Polytechnic University; R Schloegl, MG Willinger; Fritz Haber Institute of the Max Planck Institute, Germany

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

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

11:30 AM 278 *Wet-Chemical Synthesis of Electrochromic WO_3 and $W_xMo_{1-x}O_3$ Nanomaterials with Phase and Morphology Control*; S Tripathi, K Ghosh; Indian Institute of Science; A Roy; Kyushu University, Japan; AK Singh, N Ravishankar; Indian Institute of Science

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

P07.2 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Katie Jungjohann, Sandia National Laboratories

PLATFORM SESSION

Tuesday 10:30 AM • Room: 276

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

11:00 AM 281 *MoS_2 - S_8 Composite Cathodes for Long Cycle Life High Performance Li-S Batteries Studied by FESEM and High-Resolution AEM*; VP Oleshko; National Institute of Standards and Technology; PT Dirlam, AG Simmonds, TS Kleine; University of Arizona; CL Soles; National Institute of Standards and Technology; J Pyun; University of Arizona

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

11:30 AM 283 *Operando Injection of Oxygen Ions to Organometal Halide Perovskite ($CH_3NH_3PbI_3$) Under In Situ Electrical Biasing STEM-EELS*; HJ Jung; Northwestern University; D Kim; Korea Advanced Institute of Science and Technology; S Kim; Northwestern University; B Shin; Korea Advanced Institute of Science and Technology; VP Dravid; Northwestern University

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

P08.3 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIR:

Bradley De Gregorio, U.S. Naval Research Laboratory

PLATFORM SESSION

Tuesday 10:30 AM • Room: 262

10:30 AM 285 (INVITED) *The Application of Auger Spectroscopy in Planetary Science: Elemental Analysis of Presolar Silicate Grains*; C Floss; Washington University in St Louis

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

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

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA –

TUESDAY MORNING CONTINUED

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

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

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 10:30 AM • Room: 125

10:30 AM 290 (INVITED) *TEM Study of Amorphous Carbon with Fully sp^3 -Bonded Structure*; J Wen; Argonne National Laboratory; Z Zeng; Center for High Pressure Science and Technology Advanced Research; L Yang; Carnegie Institution of Washington; Q Zeng; Center for High Pressure Science and Technology Advanced Research, China; DJ Miller; Argonne National Laboratory; W Yang, H-K Mao; Carnegie Institution of Washington

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

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

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

TF

TECHNOLOGISTS' FORUM SESSIONS –

TUESDAY MORNING CONTINUED

X32.1 Tech Forum: Light Sheet Microscopy

SESSION CHAIR:

Caroline A Miller, Indiana University/Purdue University Indianapolis

PLATFORM SESSION

Tuesday 10:30 AM • Room: 132

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

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

MSA Distinguished Scientist Awardee Lectures

12:15 - 1:15 PM • Room 123

Lunch served to first 100 participants

DISTINGUISHED SCIENTIST - PHYSICAL

Nestor J. Zaluzec,
Argonne National Laboratory
Make Every Electron Count

DISTINGUISHED SCIENTIST - BIOLOGICAL

David W. Piston,
Washington University in St. Louis
The Quest to Measure Transient Biomolecular Interactions in vivo

A

ANALYTICAL SCIENCES SYMPOSIA—TUESDAY AFTERNOON

A02.3 Compressive Sensing, Machine Learning, and Advanced Computation in Microscopy

SESSION CHAIR:

Andrew Stevens, Pacific Northwest National Laboratory

PLATFORM SESSION

Tuesday 1:30 PM • Room: 260

- 1:30 PM 296 *An Information Theoretic Approach for Creating 3D Spatial Images from 4D Time Series Data*; W Wriggers, J Kovacs, F Castellani, PT Vernier, DJ Krusienski; Old Dominion University
- 1:45 PM 297 *Computer Vision Techniques Applied to the Reconstruction of the 3D Structure of Dislocations*; E Oveisi, S de Zanet, P Fua, C Hébert; Ecole Polytechnique Fédérale de Lausanne, Switzerland
- 2:00 PM 298 *A Framework to Learn Physics from Atomically Resolved Images*; L Vlcek; Oak Ridge National Laboratory; AB Maksov; University of Tennessee; M Pan; Huazhong University of Science and Technology, China; S Jesse, SV Kalinin, RK Vasudevan; Oak Ridge National Laboratory
- 2:15 PM 299 *Denosing Electron-Energy Loss Data Using Non-Local Means Filters*; N Mevenkamp, B Berkels; RWTH Aachen University, Germany; M Duchamp; Nanyang Technological University, Singapore
- 2:30 PM 300 *Compressive Classification for TEM-EELS*; W Hao, A Stevens; Pacific Northwest National Laboratory; H Yang; Lawrence Berkeley National Laboratory; M Gehm; Duke University; ND Browning; Pacific Northwest National Laboratory
- 2:45 PM 301 *A Method for Separating Crystallographically Similar Phases in Steels Using EBSD and Machine Learning*; J Goulden; Oxford Instruments; K Mehnert, K Thomsen; ST Development ApS, Denmark; H Jiang; Oxford Instruments

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

SESSION CHAIRS:

Keana Scott, National Institute of Standards and Technology

Nabil Bassim, McMaster University, Canada

Assel Aitkaliyeva, University of Florida

PLATFORM SESSION

Tuesday 1:30 PM • Room: 127

- 1:30 PM 302 (INVITED) *Sample Preparation for Nano-Mechanical Testing on Radioactive Materials*; P Hosemann, D Frazer, A Reichardt, H Vo, C Howard; University of California, Berkeley
- 2:00 PM 303 *Novel Setup for High-Performance Simultaneous 3D EBSD and 3D EDS Acquisition*; R Vána, J Dluhoš, L Hladík; TESCAN Brno, s.r.o., Česká republika; J Lindsay, J Goulden; Oxford Instruments
- 2:15 PM 304 *Developments in Large Volume 3D Analysis via P-FIB: EBSD & EDS*; J Lindsay; Oxford Instruments NanoAnalysis; T Burnett; University of Manchester, United Kingdom; J Goulden; Oxford Instruments NanoAnalysis; P Frankel, A Garner; University of Manchester, United Kingdom; B Winiarski; Thermo Fisher Scientific (Formerly FEI); PJ Withers; University of Manchester, United Kingdom
- 2:30 PM 305 *Automated 3D Block Preparation Procedure for Focused Ion Beam 3D analyses*; XL Zhong, PJ Withers, X Zhang, SB Lyon, TL Burnett, X Zhou, MG Burke; University of Manchester, United Kingdom
- 2:45 PM 306 *A Comparison of Ga FIB and Xe-Plasma FIB of Complex Al Alloys*; A Ernst, M Wei, M Aindow; University of Connecticut

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA–

TUESDAY AFTERNOON CONTINUED

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

SESSION CHAIR:

Nikhilesh Chawla, Arizona State University

PLATFORM SESSION

Tuesday 1:30 PM • Room: 121

- 1:30 PM 307 *Secondary Ion Mass Spectrometry in the TEM: Isotope Specific High-Resolution Correlative Imaging*; L Yedra, S Eswara, D Dowsett, QH Hoang, T Wirtz; Advanced Instrumentation for Ion Nano-Analytics, Luxembourg Institute of Science and Technology
- 1:45 PM 308 *Application of Serial Sectioning Microscopy to Additively Manufactured Metallic Samples*; M Chapman, JM Scott; UES Inc.; E Schwalbach, M Groeber, S Donegan, M Uchic; U.S. Air Force Research Laboratory
- 2:00 PM 309 (INVITED) *Solidification in 4D: From Dendrites to Eutectics*; Y Sun; Northwestern University; A Shahani; University of Michigan; J Gibbs; Los Alamos National Laboratory; A Cecen, S Kalidindi; Georgia Institute of Technology; X Xiao; Argonne National Laboratory
- 2:30 PM 310 *3D Imaging of Titanium Alloys Multi-Layered Structures (MLS) Via X-ray Microscopy*; S Prikhodko; University of California, Los Angeles; M Norouzi Rad; Carl Zeiss Microscopy LLC; P Markovsky, D Savvakini; G.V. Kurdyumov Institute for Metal Physics, Ukraine; N Julian; University of California, Los Angeles; O Ivasishin; G.V. Kurdyumov Institute for Metal Physics, Ukraine
- 2:45 PM 311 *Multimodal 3D Time-Lapse Studies of Corrosion Pitting and Corrosion-Fatigue Behavior in 7475 Aluminum Alloys*; TJ Stannard; Arizona State University; H Bale; Carl Zeiss X-ray Microscopy; T Chengattu, S Niverty, J Williams; Arizona State University; X Xiao; Argonne National Laboratory; A Merkle; Carl Zeiss X-ray Microscopy; E Lauridsen; Xnovo Technology ApS, Denmark, et al.

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

SESSION CHAIR:

Ping Lu, Sandia National Laboratories

PLATFORM SESSION

Tuesday 1:30 PM • Room: 261

- 1:30 PM 312 (INVITED) *Fundamental Limit to Single-Atom Analysis by STEM-EDX Spectroscopy*; M Watanabe; Lehigh University; RF Egerton; University of Alberta, Canada
- 2:00 PM 313 (INVITED) *Atomistic Understanding of Structural Evolution in AlNiCo Alloys Using Advanced AC-STEM*; L Zhou, W Tang; Ames Laboratory; P Lu; Sandia National Laboratories; I Anderson, M Kramer; Ames Laboratory
- 2:30 PM 314 (MSA POSTDOCTORAL SCHOLAR) *Mapping the Chemistry Within, and the Strain Around, Al-Alloy Precipitates at Atomic Resolution by Multi-Frame Scanning Transmission Electron Microscopy*; L Jones; University of Oxford, United Kingdom; S Wenner, M Nord, PH Ninive; Norwegian University of Science and Technology; OM Løvvik, C Marioara; SINTEF, Norway; R Holmestad; Norwegian University of Science and Technology; P Nellist; University of Oxford, United Kingdom
- 2:45 PM 315 *From Nanometer to Atomic Resolution X-ray EDS Analysis of Al in Ni-Rich Layered Oxide Li-Ion Cathodes*; P Mukherjee; Rutgers University; P Lu; Sandia National Laboratory; N Faenza, N Pereira, GG Amatuucci, F Cosandey; Rutgers University

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

SESSION CHAIR:

Shirin Kaboli, University of Nevada, Las Vegas

PLATFORM SESSION

Tuesday 1:30 PM • Room: 124

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

2:00 PM 317 (INVITED) *Analytical STEM-in-SEM: Towards Rigorous Quantitative Imaging*; J Holm; National Institutes of Standards and Technology

2:30 PM 318 (INVITED) *Advancing Correlative STEM Analysis Methods for FE-SEM*; DC Bell; Harvard University; M Shibata, N Erdman; JEOL, USA Inc.

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 1:30 PM • Room: 263

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

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

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

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

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

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

SESSION CHAIR:

Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION

Tuesday 1:30 PM • Room: 130

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

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

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

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

2:45 PM 328 *In Situ Imaging and Spectroscopy of Particles in Liquid*; X-Y Yu, B Arey; Pacific Northwest National Laboratory

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA–

TUESDAY AFTERNOON CONTINUED

A17.1 Biological Soft X-ray Tomography

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 1:30 PM • Room: 122

- 1:30 PM 329 (INVITED) *The National Center for X-ray Tomography: Status Update*; G McDermott, R Boudreau, J-H Chen, A Ekman, MA Le Gros, TE Plautz, CA Larabell; University of California, San Francisco
- 2:00 PM 330 (INVITED) *Cryo Soft X-ray Tomography and Other Techniques at Diamond Light Source*; MC Darrow, M Harkiolaki, MC Spink, I Luengo, M Basham, EM Duke; Diamond Light Source, United Kingdom
- 2:15 PM 331 (INVITED) *Correlation of Soft X-ray Tomography with Fluorescence Microscopy in Biological Study*; L-J Lai, Z-J Lin, C-C Hsieh, Y-J Su, D-J Wang, S-Y Chiang, G-C Yin; National Synchrotron Radiation Research Center, Taiwan

A18.4 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 1:30 PM • Room: 264

- 1:30 PM 333 (INVITED) *Advances in Atomic-Resolution and Molecular-Detection EELS*; OL Krivanek, N Dellby, TC Lovejoy; Nion; RF Egerton; University of Alberta, Canada; P Rez; Arizona State University
- 2:00 PM 334 (INVITED) *Quantitative Aspects of 3D Chemical Tomography in the Scanning Transmission Electron Microscope*; AA Herzing; National Institute of Standards and Technology
- 2:30 PM 335 (INVITED) *The Many Connections Between Atom Probe and Electron Microscopy*; TF Kelly; CAMECA Instruments, Inc.

B

BIOLOGICAL SCIENCES SYMPOSIA–TUESDAY AFTERNOON

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

SESSION CHAIRS:

Elizabeth Wright, Emory University
Teresa Ruiz, University of Vermont

PLATFORM SESSION

Tuesday 1:30 PM • Room: 120

- 1:30 PM 336 (INVITED) *Staphylococcus aureus Pathogenicity Islands: Hijackers on the Bacteriophage Assembly Pathway*; T Dokland, JL Kizziah; University of Alabama, Birmingham; AD Dearborn; National Institute for Arthritis and Musculoskeletal and Skin Diseases; KA Manning; University of Alabama, Birmingham; EA Wall, L Klenow, LK Parker, GE Christie; Virginia Commonwealth University
- 2:00 PM 337 *Deformation of the S. aureus Cell Envelope Due to Surface Adhesion*; J Gu, T Chou, M Libera; Stevens Institute of Technology
- 2:15 PM 338 *Exploring Cellular Morphology of Thermoplasma Acidophilum by Cryo-Electron Tomography with Volta Phase Plate*; Y Fukuda, F Beck, I Nagy, R Danev, W Baumeister; Max Planck Institute of Biochemistry, Germany
- 2:30 PM 339 (INVITED) *The Use of Cryotomography to Study the Complex Morphological Remodeling of Membranes in Bacteria*; E Tocheva; Universite de Montreal, Canada

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 1:30 PM • Room: 123

- 1:30 PM 340 *Graphene Enclosure Facilitates Single-Molecule Analysis of ErbB₂ Receptors in Intact, Hydrated Eukaryotic Cells by Electron Microscopy*; IN Dahmke, A Verch; INM – Leibniz Institute for New Materials, Germany; R Weatherup; Lawrence Berkeley National Laboratory;

S Hofmann; University of Cambridge, England; N de Jonge; INM – Leibniz Institute for New Materials, Germany

- 1:45 PM 341** *Therapeutic Engineered Hydrogels Postpone Capsule Formation at the Host-Implant Interface*; KA Harmon; University of South Carolina School of Medicine; BA Lane, JF Eberth; University of South Carolina; MJ Yost; Medical University of South Carolina; HI Friedman; University of South Carolina School of Medicine; RL Goodwin; University of South Carolina School of Medicine, Greenville

- 2:00 PM 342** (INVITED) *Correlative Light, Electron, and Ion Microscopy for the Study of Urinary Tract Infection Pathogenesis*; JA Fitzpatrick, MS Joens, VP O'Brien, SJ Hultgren; Washington University in St. Louis

- 2:30 PM 343** *Monitoring the Exocytosis and Full Fusion of Insulin Granules in Pancreatic Islet Cells via Graphene Liquid Cell-Transmission Electron Microscopy*; E Firlar, S Shafiee, M Ouy, Y Xing, D Lee, A Chan, S Afelik, R Shahbazian-Yassar; University of Illinois, Chicago, et al.

- 2:45 PM 344** *Identification and Characterization of Reconstituted Synuclein-Alpha, Amyloid-Beta and Tau Fibrils by Immunogold Negative Staining Electron Microscopy*; M Reichelt, TW Bainbridge, R Corpuz, SH Lee, JA Ernst, O Foreman, M Sagolla, JK Atwal; Genentech, et al.

- 2:00 PM 347** *EBIC-Enabled NanoManipulators – Investigating Dislocations in mc-Solar Cells*; P Hamer; University of Oxford, United Kingdom; M Hiscock, J Lindsay; Oxford Instruments; D Tweddle; University of Oxford, United Kingdom; T Martin; Bristol University; P Wilshaw; University of Oxford, United Kingdom

- 2:15 PM 348** *STEM EBIC Mapping of the Metal-Insulator Transition in Thin-Film NbO₂*; WA Hubbard; University of California, Los Angeles; T Joshi; West Virginia University; M Mecklenburg; University of South Carolina; B Zutter; University of California, Los Angeles; P Borisov; West Virginia University; D Lederman; University of California Santa Cruz; BC Regan; University of California, Los Angeles

- 2:30 PM 349** *Imaging of Electric Fields at the GaN/Ni Interface Using Electron Beam Induced Current in a Scanning Transmission Electron Microscope*; Z Warecki; University of Maryland; V Oleshko; National Institute of Standards and Technology; A Armstrong, K Collins, AA Talin; Sandia National Laboratories; J Cumings; University of Maryland

- 2:45 PM 350** *In Situ Nanoprobe Tools for Fault Localization and Defect Characterization*; AJ Smith, A Rummel, M Kemmler, K Schock, S Kleindiek; Kleindiek Nanotechnik GmbH, Germany

P

PHYSICAL SCIENCES SYMPOSIA – TUESDAY AFTERNOON

P01.3 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Jayhoon Chung, Texas Instruments Inc.

PLATFORM SESSION

Tuesday 1:30 PM • Room: 267

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

P03.4 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Jiyan Dai, The Hong Kong Polytechnic University

PLATFORM SESSION

Tuesday 1:30 PM • Room: 274

- 1:30 PM 351** (INVITED) *Interface and Surface Local Atomic Structures of Lithium Ion Battery Oxides*; Y Ikuhara; University of Tokyo, Japan
- 2:00 PM 352** (MSA POSTDOCTORAL SCHOLAR) *Utilizing High-Temperature Atomic-Resolution STEM and EELS to Determine Reconstructed Surface Structure of Complex Oxide*; W Xu, PC Bowes, ED Grimley, DL Irving, JM LeBeau; North Carolina State University

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIUM – TUESDAY AFTERNOON CONTINUED

2:15 PM 353 (M&M STUDENT SCHOLAR) *Aberration-Corrected STEM Imaging and EELS Mapping of BaTiO₃/SrTiO₃ Interfacial Defects*; H Wu, S Lu; Arizona State University; P Ponath; University of Texas, Austin; T Aoki; Arizona State University; JG Ekerdt, AA Demkov; University of Texas, Austin; MR McCartney, DJ Smith; Arizona State University

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

2:45 PM 355 *Probing Electronic Structure of BaSnO₃ by EELS Analysis and Ab Initio Calculations*; H Yun, M Topsakal, A Prakash, C Leighton, B Jalan, R Wentzcovitch, KA Mkhoyan, JS Jeong; University of Minnesota

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

SESSION CHAIR:

Valeria Nicolosi, Trinity College Dublin, Ireland

PLATFORM SESSION

Tuesday 1:30 PM • Room: 266

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

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

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

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

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

P06.4 Nanoparticles: Synthesis, Characterization, and Applications

SESSION CHAIR:

Thomas W. Hansen, Technical University of Denmark

PLATFORM SESSION

Tuesday 1:30 PM • Room: 265

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

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

2:15 PM 362 *Epitaxial Quantum Dot Superlattices: From Synthesis to Characterization to Electronic Structure*; BH Savitzky; Cornell University; R Hovden; University of Michigan; K Whitham, T Hanrath, LF Kourkoutis; Cornell University

2:30 PM 363 *Atomic Electron Tomography: Probing 3D Structure and Material Properties at the Single-Atom Level*; Y Yang; University of California, Los Angeles; C-C Chen; National Sun Yat-sen University, Taiwan; MC Scott; University of California, Berkeley; C Ophus; Lawrence Berkeley National Laboratory; R Xu, A Pryor Jr., L Wu; University of California, Los Angeles, F Sun; University at Buffalo, et al.

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

P07.3 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Judith Yang, University of Pittsburgh

PLATFORM SESSION

Tuesday 1:30 PM • Room: 276

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

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

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

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

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

P08.4 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:

Bradley De Gregorio, U.S. Naval Research Laboratory
Kultaransingh (Bobby) Hooghan, Weatherford Laboratories

PLATFORM SESSION

Tuesday 1:30 PM • Room: 262

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

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

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

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

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA – TUESDAY AFTERNOON CONTINUED

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

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

SESSION CHAIRS:

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

PLATFORM SESSION

Tuesday 1:30 PM • Room: 125

- 1:30 PM **375** (INVITED) *The Enigmatic Origin of Meteoritic Nanodiamonds – An Approach with Atom-Probe Tomography*; PR Heck; The Field Museum of Natural History
- 2:00 PM **376** *Did Nanodiamonds Rain from the Sky as Woolly Mammoths Fell in Their Tracks Across North America 12,900 Years Ago?*; TL Daulton, S Amari; Washington University in St Louis; AC Scott; Royal Holloway University of London, United Kingdom; M Hardiman; University of Portsmouth; N Pinter; University of California, Davis; RS Anderson; Northern Arizona University
- 2:15 PM **377** *Multimodal Analysis of Diamond Crystals and Layers Using RISE Microscopy*; R Váňa, J Dluhoš; TESCANA Brno, s.r.o., Česká republika; M Varga, C Schmid; TU Darmstadt; A Kromka; Czech Academy of Sciences, v.v.i.
- 2:30 PM **378** *Use of C-C and C-N Molecular Emissions in Laser-Induced Breakdown Spectroscopy Data to Determine Diamond Provenance*; CE McManus; Materialytics, LLC; J Dowe; Analytical Data Services; NJ McMillan; New Mexico State University

TF

TECHNOLOGISTS' FORUM SESSION – TUESDAY AFTERNOON

X31.1 Tech Forum: Atomic Force Microscopy for Imaging and Materials/Biomaterials Properties: Characterization of Surfaces, Films, and Interfaces

SESSION CHAIR:

Caroline A Miller, Indiana University/
Purdue University Indianapolis

PLATFORM SESSION

Tuesday 1:30 PM • Room: 132

- 1:30 PM **379** (INVITED) *Atomic Force Microscopy: A Multifunctional Tool for Materials Characterization in Shared Resource Centers*; BB Massani; University of Arizona
- 2:15 PM **380** (INVITED) *Applications of Atomic Force Microscopy in Biological Research*; J Wallace; Indiana University – Purdue University Indianapolis

T

BIOLOGICAL SCIENCES TUTORIAL – TUESDAY AFTERNOON

X43.1 Practical Strategies for Cryo-CLEM Experiments

SESSION CHAIR:

Tommi White, University of Missouri, Colombia

PLATFORM SESSION

Tuesday 1:30 PM • Room: 126

- 1:30 PM **345** (INVITED) *Practical Strategies for Cryo-CLEM Experiments*; CM Hampton; Emory University

A

ANALYTICAL SCIENCES POSTER SESSIONS–

TUESDAY AFTERNOON

A06.P1 Bridging Length Scales with 2D, 3D, and 4D Multiscale/ Multimodal Microscopy

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 83

3:00 PM 381 *Electron Ptychography: From 2D to 3D reconstructions*; S Gao; Nanjing University; F Zhang; Southern University of Science and Technology, China; AI Kirkland; University of Oxford, United Kingdom; X Pan; University of California, Irvine; P Wang; Nanjing University, China

POSTER # 84

3:00 PM 382 *Symmetry-Breaking Nanoregions in Single-Phase High Entropy Alloys Determined Using Scanning Convergent Beam Electron Diffraction*; Y-T Shao, J-M Zuo; University of Illinois, Urbana-Champaign

POSTER # 85

3:00 PM 383 *Multiscale Microstructural Analysis of Austempered Ductile Iron Castings*; K Davut; Atilim University, Metal Forming Center of Excellence, Ankara, Turkey; A Yalcin; Atilim University, Ankara, Turkey; B Cetin; FNSS Defense Systems Co Inc, Ankara, Turkey

POSTER # 86

3:00 PM 384 *3D Nanotomography of Porous Polymer Composite Using FIB/HIM and FIB/SEM*; D Wei; Carl Zeiss Microscopy, LLC; S Kraemer; Harvard University; C Cao; Carl Zeiss Microscopy, Ltd.; C Huynh; Carl Zeiss Microscopy, LLC

POSTER # 87

3:00 PM 385 *Accelerating 3D Microstructure Acquisition via Fully Automated Serial Sectioning*; LT Nguyen, DJ Rowenhorst; U.S. Naval Research Laboratory

POSTER # 88

3:00 PM 386 *A Robust 3D Scanning Technique for SEM*; G Moldovan; point electronic GmbH, Germany

POSTER # 89

3:00 PM 387 *Correlative Imaging of Murine Pulmonary Valve Extracellular Matrix*; Y Liu; The Ohio State University; Y-U Lee, CK Breuer; Nationwide Children's Hospital; DW McComb; The Ohio State University

POSTER # 90

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

POSTER # 91

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

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 92

3:00 PM 390 *Microstructure and Hardness of $Al_{2.24}O_{-0.25}Mg$ Alloy After Plastic Deformation*; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; IK Gómez-Barraza; Universidad Autónoma de Chihuahua, Mexico; MA Ruiz-Esparza-Rodríguez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; JP Flores-De-los-Ríos, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R-MS Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 93

3:00 PM 391 *Effect of Mg Addition and Solution Heat Treatment Time on Microstructure and Hardness of $Al_{2.24}O_{-0.25}Mg$ Alloy*; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; IK Gómez-Barraza; Universidad Autónoma de Chihuahua, Mexico; MA Ruiz-Esparza-Rodríguez, I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; JP Flores-De-Los-Rios, MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS— TUESDAY AFTERNOON CONTINUED

POSTER # 94

3:00 PM **392** *Characterization of Partitioning in a Medium-Mn Third-Generation AHSS*; JT Benzing; Vanderbilt University; J Bentley; Microscopy and Microanalytical Sciences; JR McBride; Vanderbilt University; D Ponge; Max-Planck-Institut für Eisenforschung, Germany; J Han; Chungnam National University, Korea; D Raabe; Max-Planck-Institut für Eisenforschung, Germany; J Wittig; Vanderbilt University

POSTER # 95

3:00 PM **393** *Microscopic Analyses of 316 L Stainless Steel Powder from Additive Layer Manufacturing Process*; HM Davies; Swansea University, United Kingdom; S Mehmood; Ulster University, Northern Ireland; A Khaliq; KU Leuven; SA Ranjha; University of Nebraska

POSTER # 96

3:00 PM **394** *EDS-Lite, Quantitative Energy Dispersive Spectroscopy of Light Elements*; VL St. Jeor; Cargill Incorporated

POSTER # 97

3:00 PM **395** *STEM SI Warp: A Digital Micrograph Script Tool for Warping the Image Distortions of Atomically Resolved Spectrum Image*; Y Wang, U Salzberger, V Srot, W Sigle, P van Aken; Max Planck Institute for Solid State Research, Germany

POSTER # 98

3:00 PM **396** *Simplifying Electron Beam Channeling in STEM*; RJ Wu, A Mittal, ML Odlyzko, A Mkhoyan; University of Minnesota

POSTER # 99

3:00 PM **397** *Layer Count Mapping of Multilayer Hexagonal Boron Nitride Thin Films*; N Cross, A Mohsin, L Liu, G Gu; University of Tennessee; G Duscher; Oak Ridge National Laboratory

POSTER # 100

3:00 PM **398** *Determining the Electron Density and Volume Expansion at Grain Boundaries Using Electron Energy-Loss Spectroscopy*; P Nandi, E Hoglund; University of Virginia; X Sang, R Unocic; Oak Ridge National Laboratory; J Howe; University of Virginia

POSTER # 101

3:00 PM **399** *Microstructural Characterization of Hardened AISI 4140 Using CrN/CSi Coatings*; JL Bernal; TecNM/Instituto Tecnológico de Orizaba,

Mexico; AI Martínez, EE Vera; Universidad Politécnica de Pachuca, Mexico; S Borjas; Universidad Michoacana de San Nicolas de Hidalgo, Mexico

A10.P2 Advances in Scanning Electron Microscopy: Transmission Modes and Channeling Effects

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 102

3:00 PM **400** *10kfps Transmission Imaging in a 196 Beam SEM*; W Zuidema, S Rahangdale, P Keijzer; Delft University of Technology, Netherlands; AH Wolters, BN Giepmans; University Medical Center Groningen, Netherlands; JP Hoogenboom, P Kruit; Delft University of Technology, Netherlands

POSTER # 103

3:00 PM **401** *Measurement of Vortex Beam Phase by Electron Holography*; K Harada, K Niitsu, K Shimada, YA Ono, D Shindo; CEMS

POSTER # 104

3:00 PM **402** *Development of a Fountain Detector for Spectroscopy of Secondary Electrons in SEM*; T Agemura, H Iwai, T Sekiguchi; National Institute for Materials Science, Japan

POSTER # 105

3:00 PM **403** *Non-Diffractive Electron Bessel Beams for Scanning Electron Microscopy in Transmission Mode Using Direct Phase Masks*; S Hettler, M Dries; Karlsruhe Institute of Technology, Germany

POSTER # 106

3:00 PM **404** (M&M STUDENT SCHOLAR) *Applications of Forward Modeling to Refinement of Grain Orientations*; S Singh; Carnegie Mellon University; A Leff, M Taheri; Drexel University; M De Graef; Carnegie Mellon University

POSTER # 107

3:00 PM **405** *EBSD – A Powerful Tool for the Analysis of Magnetic Materials*; D Hohs, T Grubesa, D Schuller, T Bernthaler, D Goll, G Schneider; Materials Research Institute

POSTER # 108

3:00 PM **406** *2015 NIST Workshop on Analytical Transmission Scanning Electron Microscopy*; RR Keller; National Institute of Standards and Technology

POSTER # 109

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

POSTER # 110

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

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 111

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

POSTER # 112

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

POSTER # 113

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

POSTER # 114

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

POSTER # 115

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

POSTER # 116

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

POSTER # 117

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

POSTER # 118

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

A18.P2 Anniversary Session: Celebrating 50 Years of Microanalysis

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 119

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

POSTER # 120

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

POSTER # 121

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

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS – TUESDAY AFTERNOON CONTINUED

POSTER # 122

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

POSTER # 123

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

POSTER # 124

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

POSTER # 125

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

POSTER # 126

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

POSTER # 127

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

POSTER # 128

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

B

BIOLOGICAL SCIENCES POSTER SESSIONS – TUESDAY AFTERNOON

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 129

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

POSTER # 130

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

POSTER # 131

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

POSTER # 132

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

POSTER # 133

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

POSTER # 134

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

POSTER # 135

3:00 PM 433 *Electron Microscopy and Tomography on Endocytosis of Macrophages*; I Ratnayake, P Ahrenkiel; South Dakota School of Mines and Technology; N Thiex, A Hoppe; South Dakota State University

B07.P1 Bridging the Gap: Technologies and Methods for Correlative Light and Charged Particle Microscopy of Biological Systems

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 136

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

POSTER # 137

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

POSTER # 138

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

POSTER # 139

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

POSTER # 140

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

POSTER # 141

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

POSTER # 142

3:00 PM 440 (M&M STUDENT SCHOLAR) *The Atmospheric Scanning Electron Microscope (ASEM) Observes the Axonal Compartmentalization and Microtubule Formation in Neurons*; T Kinoshita; Soka University; C Sato; National Institute of Industrial Science and Technology, Japan; S Nishihara; Soka University

POSTER # 143

3:00 PM 441 *Multi-Color Electron Microscopy by Element-Guided Identification of Cells, Organelles and Molecules*; M Scotuzzi; Delft University of Technology, Netherlands; J Kuipers; University of Technology, Netherlands; P de Boer, N Pirozzi; University Medical Center Groningen, Netherlands; K Hagen; Delft University of Technology, Netherlands; B Giepmans; University Medical Center Groningen, Netherlands; J Hoogenboom; Delft University of Technology, Netherlands

This paper will be presented in B07.1 (Tuesday, 9:30 AM).

POSTER # 144

3:00 PM 442 *Using New 3D CLEM Imaging Technique to Investigate the Effects of Substrate Mechanics on Cellular Uptake of Nanoparticle*; Y-C Chuang, W-Y Yen, L Zhang, W Bahou, M Simon, M Rafailovich, C-C Chang; Stony Brook University

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 145

3:00 PM 443 *MacCallum's Triangle – Is It Rheumatic? Is It Traumatic? Or Is It Both?*; S Siew; Michigan State University

POSTER # 146

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

POSTER # 147

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

Scientific Program

B

BIOLOGICAL SCIENCES POSTER SESSIONS— TUESDAY AFTERNOON CONTINUED

POSTER # 148

3:00 PM **446** *Glutamine Addiction: An Achilles Heel for MYC-Overexpressing Breast Cancer*; E Jiang, A Waldron; Bergen County Academics

POSTER # 149

3:00 PM **447** (INVITED) *Nanomaterial-Based Receptor Conjugates for Capture and Rapid Detection of Salmonella Enteritidis*; K Cousin, B Tiimob, D Baah, C Fermin, T Samuel, W Abdela; Tuskegee University

POSTER # 150

3:00 PM **448** *In Vivo Formation of Ce-Phosphate Nanoparticles Following Intratracheal Instillation of CeCl₃: Subcellular Sites, Nanostructures, Precipitation Mechanisms and Nanoparticle 3D-Alignment*; UM Graham, C Wang, AK Dozier, JE Fernback; National Institute for Occupational Safety and Health; L Drummy, K Mahalingam; U.S. Air Force Research Laboratory; RM Molina, NV Konduru; Harvard T.H. Chan School of Public, et al.

POSTER # 151

3:00 PM **449** *Calcium Co-Localization with In Vivo Cerium Phosphate Nanoparticle Formation After Intratracheal Instillation Dosing with CeCl₃ or CeO₂ NPs*; UM Graham, JE Fernback, C Wang, AK Dozier; National Institute for Occupational Safety and Health; L Drummy, K Mahalingam; U.S. Air Force Research Laboratory; RM Molina, N Konduru; Harvard T.H. Chan School of Public Health, et al.

POSTER # 152

3:00 PM **450** *Micro-Morphological Characterization of In Vivo Diatoms Using ESEM*; E Tihlaříková, V Neděla; Institute of Scientific Instruments of the CAS, Czech Republic; M Fránková; Institute of Botany of the CAS

POSTER # 153

3:00 PM **451** *The Process of Setting Up an Electron Microscopy Laboratory for Clinical Services*; RA Radabaugh; West Virginia University; JA King; Louisiana State University Health Sciences Center

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 154

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

POSTER # 155

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

POSTER # 156

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

POSTER # 157

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

POSTER # 158

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

POSTER # 159

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

POSTER # 160

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

POSTER # 161

3:00 PM **459** *3D Printed Optics*; H Osman; Indiana University School of Medicine

POSTER # 162

3:00 PM 460 *Graphic User Interface for Reliable and Repeatable Quantification of Neuron Morphology and Microstructural Analysis*; J La, B Mason, T Donaldson, C Yelleswarapu; University of Massachusetts, Boston

POSTER # 163

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

POSTER # 164

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

POSTER # 165

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

POSTER # 166

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

POSTER # 167

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

POSTER # 168

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

P

PHYSICAL SCIENCES POSTER SESSIONS- TUESDAY AFTERNOON

P03.P2 Advanced Microscopy and Microanalysis of Complex Oxides

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 169

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

POSTER # 170

3:00 PM 468 *Epitaxial Growth and Atomic-Scale Investigation of Dielectric Ca_{1.46}Nb_{1.11}Ti_{1.38}O₇ Thin Films*; X-W Jin; Xi'an Jiaotong University, China; Y-H Chen; Nanjing University of Posts & Telecommunications, China; L Lu, S-B Mi, H Wang; Xi'an Jiaotong University, China; C-L Jia; Forschungszentrum Jülich, Germany

POSTER # 171

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

POSTER # 172

3:00 PM 470 *Influence of Bulk Polarization and Surface Polarity on Surface Reconstructions and Related Local Properties of Multiferroic BiFeO₃ Film*; L Jin; Research Centre Jülich; P Xu; ETH Zürich, Switzerland; Y Zeng; Research Centre Jülich, Xi'an Jiaotong University, China, Tsinghua University, China; L Lu; Xi'an Jiaotong University, China; J Barthel; Research Centre Jülich, RWTH Aachen University, Germany; T Schulthess; ETH Zürich, Switzerland; RE Dunin-Borkowski; Research Centre Jülich, H Wang; Xi'an Jiaotong University, China, et al.

POSTER # 173

3:00 PM 471 *The Interactions of Ferroelectric Domain Walls and Crystallographic Defects in the PbTiO₃ Films*; X Ma; Chinese Academy of Sciences

POSTER # 174

3:00 PM 472 *Atomic Level Structural Modulations at the Negatively Charged Domain Walls in BiFeO₃ Films*; X Ma; Chinese Academy of Sciences

POSTER # 175

3:00 PM 473 *Zr-Doped Al₂O₃ Grain Boundary and Interfacial Microstructure*; Z Liu; Kennametal, Inc.

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS— TUESDAY AFTERNOON CONTINUED

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 176

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

POSTER # 177

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

POSTER # 178

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

POSTER # 179

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

POSTER # 180

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

POSTER # 181

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

POSTER # 182

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

POSTER # 183

3:00 PM 481 *Revealing the Bonding of Nitrogen Impurities in Monolayer Graphene*; Juan Carlos Idrobo¹; Oak Ridge National Laboratory; C Su, J Li, J Kong; Massachusetts Institute of Technology

POSTER # 184

3:00 PM 482 *Hidden Defects and Unexpected Properties of Graphene — How Advanced TEM Contributes to Materials Development*; B Butz, C Dolle, F Niekkel, A Mittelberger, E Spiecker, K Weber, B Meyer, D Waldmann; Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, et al.

POSTER # 185

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

POSTER # 186

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

P06.P2 Nanoparticles: Synthesis, Characterization, and Applications

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 187

3:00 PM 485 *Morphological and Structural Analysis of Magnetic Support Produced from Magnetite (Fe₃O₄) Nanoparticles and Recycled Polyamide*; LG Santos; State University of Londrina, Brazil; JC Spadotto; Pontifical Catholic University of Rio de Janeiro, Brazil; DF Valezi, M Fontana, CLB Guedes; State University of Londrina, Brazil; IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil; E Di Mauro; State University of Londrina, Brazil

POSTER # 188

3:00 PM 486 *Influence of Microstructure on the Magnetic Properties of Goethite (α -FeOOH);* DF Valezi; State University of Londrina, Brazil; JC Spadotto; Pontifical Catholic University of Rio de Janeiro, Brazil; LG Santos, JPT Baú; State University of Londrina, Brazil; CE Carneiro; Western Bahia Federal University, Brazil; DA Zaia; State University of Londrina, Brazil; ACS da Costa; State University of Maringá, Brazil; IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil, et al.

POSTER # 189

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

POSTER # 190

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

POSTER # 191

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

POSTER # 192

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

Chihuahua, Mexico; R Martínez-Sánchez, C Carreño-Gallardo; Centro de Investigación en Materiales Avanzados S.C., Mexico

POSTER # 193

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

POSTER # 194

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

POSTER # 195

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

POSTER # 196

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

POSTER # 197

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

POSTER # 198

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

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS–

TUESDAY AFTERNOON CONTINUED

P07.P1 Advanced Characterization of Energy-Related Materials

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 199

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

POSTER # 200

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

POSTER # 201

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

POSTER # 202

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

POSTER # 203

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

POSTER # 204

3:00 PM 502 *Real-time Observation of Sintering Process of Carbon-Supported Platinum Nanoparticles*

in Oxygen and Water Through Environment TEM; L Luo, Y Shao, C Wang; Pacific Northwest National Laboratory

POSTER # 205

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

POSTER # 206

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

POSTER # 207

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

POSTER # 208

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

POSTER # 209

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

POSTER # 210

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

POSTER # 211

3:00 PM 509 *A Comparative TEM Study of Soot Particles Derived from Used Diesel and Gasoline Engine Oils*; A Janssen; The University of Manchester, United Kingdom; L Felisari; BP Technology Centre; MA Kulzick; BP Corporate Research Centre; G Burke; The University of Manchester, United Kingdom

P08.P2 Geological Sample Characterization Using Various Imaging Modalities

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 212

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

POSTER # 213

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

POSTER # 214

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

POSTER # 215

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

POSTER # 216

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

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 217

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

POSTER # 218

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

POSTER # 219

3:00 PM 517 (INVITED) *Microstructural Characterization of Polycrystalline Diamond Sintered at Ultrahigh Pressures*; EG Minnaar, J Neethling, J Westraadt; Centre for High-Resolution Transmission Electron Microscopy

Scientific Program



MICROSCOPY OUTREACH POSTER SESSION-

TUESDAY AFTERNOON

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

POSTER SESSION

Tuesday 3:00 PM • Room: Exhibit Hall

POSTER # 220

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

POSTER # 221

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

POSTER # 222

3:00 PM 520 *Sensitivity of TEM data on Lightspeed to Camera-Length's Voltage Variation*; P Fraundorf, D Osborn, T McBroom; University of Missouri, St. Louis

Scientific Program Information

Wednesday, August 9, 2017





ANNIVERSARY LECTURE

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

Complimentary coffee, tea, and handheld breakfast item provided.

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 7:30 AM • Room: 275

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

A

ANALYTICAL SCIENCES SYMPOSIA – WEDNESDAY MORNING

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

SESSION CHAIR:

Andrew Stevens, Pacific Northwest National Laboratory

PLATFORM SESSION

Wednesday 8:30 AM • Room: 260

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

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

9:15 AM 523 (M&M STUDENT SCHOLAR) *Data Clustering and Scanning Precession Electron Diffraction for Microanalysis*; BH Martineau, DN Johnstone, JF Einsle, PA Midgley, AS Eggeman; University of Cambridge, England

9:30 AM 524 *Combining a Convolutional Neural Network and Watershed Segmentation for Identifying U-Bearing Particles in Secondary Ion Mass Spectrometry Images*; JG Tarolli, BE Naes, D Willingham; Pacific Northwest National Laboratory

Scientific Program

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

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

SESSION CHAIR:

Arno Merkle, Carl Zeiss X-ray Microscopy, Inc.

PLATFORM SESSION

Wednesday 8:30 AM • Room: 121

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

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

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

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

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

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

Wednesday, August 9

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA-

WEDNESDAY MORNING CONTINUED

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

SESSION CHAIR:

Mark Oxley, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 8:30 AM • Room: 261

- 8:30 AM **532** (INVITED) *Absolute-Scale Comparison with Simulation for Quantitative Energy-Dispersive X-ray Spectroscopy in Atomic-Resolution Scanning Transmission Electron Microscopy*; SD Findlay; Monash University, Australia; Z Chen; Cornell University; M Weyland; Monash University, Australia; X Sang, W Xu, JH Dycus, JM LeBeau; North Carolina State University, LJ Allen; University of Melbourne, Australia
- 9:00 AM **533** *Numerical Modeling of Specimen Geometry for Quantitative Multiple Detector EDS*; W Xu, JH Dycus, JM LeBeau; North Carolina State University
- 9:15 AM **534** *Probing the Effects of Electron Channelling on EDX Quantification*; KE MacArthur; Forschungszentrum Jülich, Germany; HG Brown, SD Findlay; Monash University, Australia; LJ Allen; University of Melbourne, Australia
- 9:30 AM **535** *Improving Atomic-Scale Elemental Mapping Resolution of STEM-EDS Through Optimizing Experimental Conditions*; P Lu; Sandia National Laboratories; R Yuan, JM Zuo; University of Illinois, Urbana-Champaign
- 9:45 AM **536** *A Combined Atomic-Resolution STEM and First-Principles Approach Towards Understanding the Origins of the First Solar-System Solids*; T Zega, V Manga; University of Arizona; K Watanabe; Hitachi High Technologies Corporation, Japan; K Domanik, P Mane; University of Arizona; A Hanawa, H Inada, J Howe; Hitachi High Technologies Corporation, Japan, et al.

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

SESSION CHAIRS:

Kazu Suenaga, National Institute of Advanced Industrial Science and Technology, Japan

David Muller, Cornell University

PLATFORM SESSION

Wednesday 8:30 AM • Room: 132

- 8:30 AM **537** (INVITED) *Applications of High Precision STEM Imaging to Structurally Complex Materials*; J Feng, C Zhang, D Zhou, Z Xu, D Morgan, P Voyles; University of Wisconsin, Madison
- 9:00 AM **538** *Mapping Picometer Scale Periodic Lattice Distortions with Aberration-Corrected Scanning Transmission Electron Microscopy*; BH Savitzky, I El Baggari; Cornell University; AS Admasu, J Kim, S-W Cheong; Rutgers University; R Hovden; University of Michigan; LF Kourkoutis; Cornell University
- 9:15 AM **539** *Atomic Resolution Imaging of $\text{YAlO}_3\text{:Ce}$ in the Chromatic and Spherical Aberration Corrected PICO Transmission Electron Microscope*; L Jin, KW Urban, CL Jia, J Barthel; Research Center Juelich, Germany
- 9:30 AM **540** *Three-Dimensional Point Defect Imaging by Large-Angle Illumination STEM*; R Ishikawa; The University of Tokyo, Japan; SJ Pennycook; National University of Singapore; AR Lupini; Oak Ridge National Laboratory; SD Findlay; Monash University, Australia; N Shibata, Y Ikuhara; The University of Tokyo, Japan
- 9:45 AM **541** *Atomap - Automated Analysis of Atomic Resolution STEM Images*; M Nord; Norwegian University of Science and Technology, Norway; PE Vullum; SINTEF; I MacLaren; University of Glasgow, Scotland; T Tybell, R Holmestad; Norwegian University of Science and Technology, Norway

A09.1 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

SESSION CHAIR:

Owen K. Neill, Washington State University

PLATFORM SESSION

Wednesday 8:30 AM • Room: 264

- 8:30 AM **542** *Current Status of ISO/TC 202 – Microbeam Analysis*; P Camus; EDAX, Inc.; D Meier; McCrone Associates; R Marinenko; National Institute of Standards and Technology
- 8:45 AM **543** (INVITED) *Creating and Using Secondary Reference Materials for EPMA and LA-ICPMS*; JW Singer; Rensselaer Polytechnic Institute
- 9:15 AM **544** (INVITED) *Natural and Synthetic Glass and Crystal Reference Materials for Trace Element Microanalysis*; WO Nachlas; Syracuse University
- 9:45 AM **545** *Use of Mineral Reference Standards in EPMA: Instrumental Calibration, Standards Comparison, and Quality Control*; PK Carpenter; Washington University; EP Vicenzi; Museum Conservation Institute

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

SESSION CHAIR:

Robert Keller, National Institute of Standards and Technology

PLATFORM SESSION

Wednesday 8:30 AM • Room: 124

- 8:30 AM **546** (INVITED) *Automated Serial Section Large-Field Transmission-Mode Scanning Electron Microscopy (tSEM) for Volume Analysis of Hippocampus Ultrastructure*; JM Mendenhall, M Kuwajima, KM Harris; University of Texas
- 9:00 AM **547** *Improved Image Quality in SEM Imaging of Thin Tissue Sections*; W Zuidema, JP Hoogenboom; Delft University of Technology, Netherlands; P Kruit; Delft University of Technology, Netherlands
- 9:15 AM **548** (INVITED) *Electron Channelling Contrast Imaging (ECCI): An Amazing Tool for Observations of Crystal Lattice Defects in Bulk Samples*; S Zaefferer; Max Planck Institute for Iron Research, Germany
- 9:45 AM **549** *Applications of Electron Channeling Contrast Imaging (ECCI) in Failure Analysis of In-Situ Synchrotron X-ray Diffraction Deformation Experiments*; SS Kaboli, PP Burnley; University of Nevada, Las Vegas

A13.1 Applications of Atom Probe Tomography

SESSION CHAIR:

Mattias Thuvander, Chalmers University of Technology, Sweden

PLATFORM SESSION

Wednesday 8:30 AM • Room: 263

- 8:30 AM **550** (INVITED) *Application of Atom Probe Tomography to Nitride Semiconductors*; RA Oliver, F Tang, S Bennett; University of Cambridge, England; TL Martin, PA Bagot, GD Smith, MP Moody; University of Oxford, United Kingdom
- 9:00 AM **551** *Correlated Transmission Electron Microscopy and Atom Probe Tomography Study of Boron Distribution in BGaN*; B Bonef, R Cramer, F Wu, JS Speck; University of California, Santa Barbara
- 9:15 AM **552** (INVITED) *Exploration of Doped Semiconductors at the Atomic Scale*; A Rodil, C Krammel, R Plantenga, S Koelling, P Koenraad; Eindhoven University of Technology, Netherlands
- 9:45 AM **553** *Correlative Transmission EBSD-APT Analysis of Grain Boundaries in Cu(In,Ga)Se₂ and Cu₂ZnSnSe₄ Based Thin-Film Solar Cells*; T Schwarz, G Stechmann, B Gault; Max-Planck-Institut für Eisenforschung GmbH, Germany; O Cojocaru-Mirédin; RWTH Aachen University, Germany; P-P Choi; Korea Advanced Institute of Science and Technology; A Redinger, S Siebentritt; University of Luxembourg, D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany

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

SESSION CHAIR:

Andrew M. Minor, University of California, Berkeley

PLATFORM SESSION

Wednesday 8:30 AM • Room: 131

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

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA –

WEDNESDAY MORNING CONTINUED

- 9:00 AM **555** *In Situ Elastic Strain Mapping via EBSD of Micro-Sized Specimens*; MJ McLean, WA Osborn; National Institute of Standards and Technology
- 9:15 AM **556** *In Situ Strain Mapping of Planar Slip in 304 Stainless Steel*; TC Pekin; University of California, Berkeley; C Gammer; Austrian Academy of Sciences; J Ciston, C Ophus; Lawrence Berkeley National Laboratory; AM Minor; University of California, Berkeley
- 9:30 AM **557** (INVITED) *In Situ TEM Fracture Testing for Shallow Ion Irradiated Layers*; JP Wharry; Purdue University; KH Yano; Boise State University

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

SESSION CHAIR:

Raymond Unocic, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 8:30 AM • Room: 130

- 8:30 AM **558** (INVITED) *Visualization of Electrochemical Reaction Dynamics in Liquids Using TEM*; W Zheng, Z Zeng, H Zheng; Lawrence Berkeley National Laboratory
- 9:00 AM **559** *Multi-Modal Characterization of New Battery Technologies by Operando ec-STEM*; BL Mehdi, J Chen, A Stevens; Pacific Northwest National Laboratory; C Park; Florida State University; L Kovarik, AV Liyu, W Henderson, J-G Zhang; Pacific Northwest National Laboratory, et al.
- 9:15 AM **560** *Using Scanning Transmission X-ray Microscopy to Reveal the Origin of Lithium Compositional Spatiodynamics in Battery Materials*; J Lim, Y Li; Stanford University; DH Alsem; Hummingbird Scientific; H So, SC Lee; Stanford University; P Bai, DA Cogswell; Massachusetts Institute of Technology, X Liu; Stanford University, et al.
- 9:30 AM **561** *Visualization of Peptide-Peptide Interactions in FET Biosensors with Liquid-Cell TEM*; L Xing, M-S Hsiao, A Islam, N Bedford, R Martineau, Y Ngo, S Kim, L Drummy; U.S. Air Force Research Laboratory

A17.2 *Biological Soft X-ray Tomography*

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 8:30 AM • Room: 122

- 8:30 AM **562** *PSF Corrected Reconstruction in Soft X-ray Tomography (SXT)*; AA Ekman, TE Plautz, J-H Chen, G McDermott, MA LeGros, C Larabell; University of California, San Francisco
- 8:45 AM **563** *High Resolution Soft X-ray Tomography of Large Samples By Focal Series Projections*; J Otón; Centro Nacional de Biotecnología, Spain; E Pereiro, JJ Conesa; ALBA Light Source; FJ Chichón; Centro Nacional de Biotecnología, Spain; JL Carrascosa; Instituto Madrileño de Estudios Avanzados en Nanociencia Spain; JM Carazo; Centro Nacional de Biotecnología, Spain
- 9:00 AM **564** *Development of a Commercial Laboratory Scale Soft X-ray Microscope*; T McEnroe; SiriusXT; F O'Reilly; University College Dublin, Ireland; P Sheridan, J Howard, R Byrne, A O'Connor, D Rogers, C Rogers; SiriusXT, et al.
- 9:15 AM **565** *Progress Toward Automatic Segmentation of Soft X-ray Tomograms Using Convolutional Neural Networks*; TE Plautz, R Boudreau, J-H Chen, AA Ekman, MA LeGros, G McDermott, CA Larabell; University of California, San Francisco
- 9:30 AM **566** (INVITED) *Soft X-ray Tomography: Filling the Gap Between Light and Electrons for Imaging Hydrated Biological Cells*; LM Collinson, M-C Domart, R Carzaniga, M Razi; Francis Crick Institute, United Kingdom; P Guttmann, G Schneider; Helmholtz-Zentrum Berlin für Materialien und Energie GmbH; E Pereiro; ALBA Synchrotron Light Source, Spain, S Tooze; Francis Crick Institute, United Kingdom, et al.

B

BIOLOGICAL SCIENCES SYMPOSIA – WEDNESDAY MORNING

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

SESSION CHAIRS:

Teresa Ruiz, University of Vermont
Deborah Kelly, Virginia Tech

PLATFORM SESSION

Wednesday 8:30 AM • Room: 120

- 8:30 AM 567 (INVITED) *Structural Analysis of the Helicobacter Pylori Pore-Forming Toxin, VacA*; MD Ohi, TL Cover, NJ Foegeding, TM Pyburn; Vanderbilt University
- 9:00 AM 568 *Capturing Near Atomic Resolution Snapshots of the Ribosome Assembly Process Using Direct Electron Detectors*; J Ortega, A Razi; McGill University, Canada
- 9:15 AM 569 *Spatial Organization of the Ccq1-Tpz1-Poz1 Telomere Complex*; HW Scott; Case Western Reserve University; J-K Kim, C Yu, L Huang, F Qiao; University of California, Irvine; D Taylor; Case Western Reserve University
- 9:30 AM 570 (INVITED) *Structural Studies that Define Regulatory Interactions within the Mitochondrial Fission Machinery*; RW Clinton, CA Francy, JA Mears; Case Western Reserve University

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

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 8:30 AM • Room: 123

- 8:30 AM 571 (INVITED) *3D Virtual Histology and its Potential Contributions to Science*; KC Cheng; Pennsylvania State University
- 9:00 AM 572 *Effect of Gamma Irradiation on Autophagic Flux in Glioblastoma Cells That Express LC3B-eGFP-mCHERRY*; LS Yasui, V Bui, A Latgnotha; Northern Illinois University
- 9:15 AM 573 (INVITED) *Super-Resolution Imaging of the Kidney Glomerulus in Health and Disease Conditions*; HY Suleiman, R Roth, JH Miner; Washington University; AS Shaw; GenenTech

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

P

PHYSICAL SCIENCES SYMPOSIA – WEDNESDAY MORNING

P01.4 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Esther Chen, GlobalFoundries Inc.

PLATFORM SESSION

Wednesday 8:30 AM • Room: 267

- 8:30 AM 576 (INVITED) *Epitaxial Growth of ZnO Monolayer on Graphene: The Thinnest Metal Oxide Semiconductor*; H-K Hong, J Lee, NY Kim, S Son, JH Kim; Ulsan National Institute of Science and Technology, Korea; R Erni; Empa – Swiss Federal Laboratories for Materials Science and Technology; Z Lee; Ulsan National Institute of Science and Technology, Korea
- 9:00 AM 577 *Strain Coupling During Lithiation of a Fe₃O₄/SrTiO₃ Epitaxial Thin Film*; S Hwang, Q Meng; Brookhaven National Laboratory; P-F Chen; Academia Sinica; K Kisslinger, Y Zhu, EA Stach; Brookhaven National Laboratory; Y-H Chu; National Chiao Tung University, Taiwan; D Su; Brookhaven National Laboratory
- 9:15 AM 578 *Directly Identifying Phase Segregation in 2D Quaternary Alloys*; J Hachtel; Oak Ridge National Laboratory; S Susarla, V Kochat; Rice University; C Tiwary; Rice University; P Ajayan; Rice University; JC Idrobo; Oak Ridge National Laboratory
- 9:30 AM 579 *Cross-Sectional STEM Imaging and Spectroscopy of Devices with Embedded 2D Materials*; RJ Wu, D Reifsnnyder Hickey, A Mkhoyan; University of Minnesota

Scientific Program

Wednesday, August 9

P

PHYSICAL SCIENCES SYMPOSIA –

WEDNESDAY MORNING CONTINUED

- 9:45 AM 580 *Dielectric Breakdown Along C-Axis Boundaries in Magnetoelectric Cr₂O₃ for Spintronic Devices*; C Sun, Z Song, A Rath; University of Wisconsin, Madison; M Street, W Echtenkamp; University of Nebraska; J Feng; University of Wisconsin, Madison; C Binek; University of Nebraska, D Morgan; University of Wisconsin, Madison, et al.

P03.5 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Xihan Sang, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 8:30 AM • Room: 274

- 8:30 AM 581 (INVITED) (MSA POSTDOCTORAL SCHOLAR) *Interaction Between Ferroelectric Polarization and Defects in BiFeO₃ Thin Films*; L Li, L Xie, Y Zhang; University of California, Irvine; X Cheng, Z Hong; University of Pennsylvania; C Adamo, C Heikes, D Schlom; Cornell University, et al.
- 9:00 AM 582 *Understanding the Effect of Doping and Epitaxial Strain on the Ferroelectric Polarization of Layered Perovskite Thin Films*; M Campanini; Swiss Federal Laboratories for Materials Science and Technology; M Trassin, C Ederer; ETH Zurich, Switzerland; R Erni, MD Rossell; Swiss Federal Laboratories for Materials Science and Technology
- 9:15 AM 583 *Transmission Electron Microscopy and First-Principles Study on Highly Strained BiFeO₃ grown on LaAlO₃*; I-T Bae; Binghamton University; A Kovács; Forschungszentrum Juelich; HJ Zhao, J Íñiguez; Luxembourg Institute of Science and Technology; S Yasui; Tokyo Institute of Technology; T Ichinose, H Naganuma; Tohoku University
- 9:30 AM 584 (INVITED) *STEM-EELS Investigation of Charge and Strain Distributions in Perovskite Oxide Thin Films*; A Gloter; CNRS - Université Paris-Sud; X Li, G Tieri; CNRS - Université Paris-Sud; M Marinova; CNRS; D Preziosi, V Garcia, S Fusil, A Barthelémy; CNRS - Thales Research and Technology, France et al.

P04.4 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices

SESSION CHAIR:

Jordi Arbiol, Barcelona Institute of Science and Technology, Spain

PLATFORM SESSION

Wednesday 8:30 AM • Room: 266

- 8:30 AM 585 (INVITED) *Real-Time In Situ Investigation of III-V Nanowire Growth Using Custom-Designed Hybrid Chemical Vapor Deposition-TEM*; K Thelander, LR Wallenberg, AR Persson, M Tornberg, D Jacobsson, C Hetherington; Lund University, Sweden; J Gustafsson; Spectral Solutions, S Dogel; Hitachi High-Technology, Canada
- 9:00 AM 586 *Size-Dependent Stability of Iron Oxide Evaluated Through In Situ Heating Experiments*; C Bonifacio Fittz, H Majidi, K van Benthem; University of California, Davis
- 9:15 AM 587 *Multi-Modal Processing of Graphene Towards Precisely Controlled Fabrication of a Nanoelectronic Device Using the Helium Ion Microscope and the TOF-SIMS*; S Kim, AV Ievlev, IV Vlassiuk, MJ Burch, X Sang, C Brown, RR Unocic, A Belianinov; Oak Ridge National Laboratory, et al.
- 9:30 AM 588 *Graphitization and Growth of Free-Standing Nanocrystalline Graphene Using In Situ Transmission Electron Microscopy*; CNS Kumar, VS Chakravadhanula, A Riaz, S Dehm1, D Wang, X Mu, R Krupke, C Kuebel; Karlsruhe Institute of Technology, Germany
- 9:45 AM 589 *Nanoscale Thermometry for 2D Materials*; X Hu, P Yasaei, JR Jokissari, S Ögüt, A Salehi, RF Klie; University of Illinois, Chicago

P07.4 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Meng Gu, The Dow Chemical Company

PLATFORM SESSION

Wednesday 8:30 AM • Room: 276

- 8:30 AM 590 (INVITED) *In Situ TEM Study of the Hydrogen Effect on the Interface Between Al and Its Oxide at Room and Elevated Temperature*; D Xie, M Li, Z Shan; Xi'an Jiaotong University, China
- 9:00 AM 591 (INVITED) *Measuring the Phase Transformation Kinetics Under Non-Equilibrium Conditions from Time-Resolved High-Resolution TEM Images*; R Sharma; National Institute of Standards and Technology; Z Hussiani; Center for Nanoscale Science and Technology; PAA Lin, B Natarajan; National Institute of Standards and Technology
- 9:30 AM 592 *In Situ TEM Observations of Oxygen Surface Dynamics in CeO₂ Cubes*; EL Lawrence, SL Chang, PA Crozier; Arizona State University
- 9:45 AM 593 *In Situ Observation of Cooling in a Bismuth Telluride and Bismuth-Antimony Telluride Nanoscale Heterojunction*; M Mecklenburg, WA Hubbard, B Vareskic, B Zutter; University of California, Los Angeles; S Aloni; Lawrence Berkeley National Laboratory; BC Regan; University of California, Los Angeles

P08.5 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 8:30 AM • Room: 262

- 8:30 AM 594 (INVITED) *High-Resolution Imaging of Short-Range Order Materials (Allophane) with Aberration Corrected TEM and Direct Electron Detection*; TG Sharp, SL Chang; Arizona State University
- 9:00 AM 595 *Electron Energy Loss Near Edge Structures as a Tool to Elucidate Natural and Artificial Minerals Structures*; T Dennenwaldt, F Nabiei, DT Alexander; Ecole Polytechnique Fédérale de Lausanne, Switzerland; J Badro; Université Paris Sorbonne; P Gillet, H Piet, C Hébert; Ecole Polytechnique Fédérale de Lausanne, Switzerland

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

- 9:30 AM 597 *Optimization of Specimen Preparation Methods for Cryo-Electron Microscopy of Oil-in-Water Emulsions*; DH Anjum, S Medina, AR Behzad, SA Tabatabai, T Leiknes; King Abdullah University of Science & Technology, Saudi Arabia

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

T

PHYSICAL SCIENCES TUTORIAL–

WEDNESDAY MORNING

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

SESSION CHAIR:

Donovan Leonard, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 8:30 AM • Room: 126

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

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA – WEDNESDAY MORNING

A01.1 Vendor Symposium

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 10:30 AM • Room: 125

- 10:30 AM 600** *Probing the Element Distribution at the Organic-Inorganic Interface Using EDS*; M Falke, A Kaepfel; Bruker Nano GmbH, Germany; B Yu; Bruker Nano Analytics Division; T Salge; Natural History Museum, London; R Terborg; Bruker Nano GmbH, Germany
- 10:45 AM 601** *ZEISS Crossbeam – Advancing Capabilities in High Throughput 3D Analysis and Sample Preparation*; T Volkenandt, F Pérez-Willard, M Rauscher; Carl Zeiss Microscopy GmbH, Germany; PM Anger; Carl Zeiss Microscopy, LLC
- 11:00 AM 602** *A Dedicated Backscattered Electron Detector for High-Speed Imaging and Defect Inspection*; M Schmid, A Liebel, R Lackner, D Steigenhöfer, A Niculae, H Soltan; PNDetector GmbH, Germany
- 11:15 AM 603** *Large Area 3D Structural Characterization by Serial Sectioning Using Broad Ion Beam Argon Ion Milling*; P Nowakowski, ML Ray, PE Fischione; E.A. Fischione Instruments
- 11:30 AM 604** *New Scios Cryo™ - Dedicated FIB/SEM for Advanced Cryo-Lamella Preparation in Structural Biology*; JM Mitchels, D van Rossum, A Rigort; Thermo Fisher Scientific
- 11:45 AM 605** *Advances in Serial-Section Broad-Ion-Beam Tomography*; T Hosman, S Coyle; Gatan Inc; M Hassel-Shearer, JA Hunt; Gatan, Inc; A Gholinia, P Withers; University of Manchester, United Kingdom

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

SESSION CHAIR:

Rowan Leary, University of Cambridge, United Kingdom

PLATFORM SESSION

Wednesday 10:30 AM • Room: 260

- 10:30 AM 606** *3D Deconvolution for Cryo-Scanning Transmission Electron Tomography*; B Waugh, SG Wolf, S Rubin; Weizmann Institute of Science, Israel; E Branlund, J Sedat; University of California, San Francisco; M Elbaum; Weizmann Institute of Science, Israel
- 10:45 AM 607** *Scanning Electron Microscope Point Spread Function Determination Through the Use of Particle Dispersions*; MD Zotta, E Lifshin; SUNY Polytechnic Institute
- 11:00 AM 608** *Viability of Point Spread Function Deconvolution for SEM*; MC Nevins; Rochester Institute of Technology; MD Zotta; Nanojehm; RK Hailstone; Rochester Institute of Technology; E Lifshin; SUNY Polytechnic Institute
- 11:15 AM 609** (M&M STUDENT SCHOLAR) *GENFIRE: A Generalized Fourier Iterative Reconstruction Algorithm for High-Resolution 3D Electron and X-ray Imaging*; AP Pryor, Y Yang, A Rana, M Gallagher-Jones, J Zhou, YH Lo; University of California, Los Angeles; G Melinte; Institut de Physique et Chimie des Matériaux de Strasbourg, France; JA Rodriguez; University of California, Los Angeles, et al.
- 11:30 AM 610** *Auto-Encoders for Noise Reduction in Scanning Transmission Electron Microscopy*; JP Buban, S-Y Choi; Korea Institute of Materials Science
- 11:45 AM 611** *Dragonfly SegmentationTrainer - A General and User-Friendly Machine Learning Image Segmentation Solution*; N Piche, I Bouchard, M Marsh; Object Research Systems, Canada

Wednesday, August 9

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

SESSION CHAIR:

James Evans, Pacific Northwest National Laboratory

PLATFORM SESSION

Wednesday 10:30 AM • Room: 121

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

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

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

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

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

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 10:30 AM • Room: 132

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

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

11:15 AM **618** *Evaluation of Aberration-Corrected Optical Sectioning for Exploring the Core Structure of $\frac{1}{2}[111]$ Screw Dislocations in BCC Metals*; D Hernandez-Maldonado; SuperSTEM, United Kingdom; R Gröger; Academy of Sciences of the Czech Republic; QM Ramasse; SuperSTEM, United Kingdom; PB Hirsch, PD Nellist; University of Oxford, United Kingdom

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

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

SESSION CHAIR:

Owen K. Neill, Washington State University

PLATFORM SESSION

Wednesday 10:30 AM • Room: 264

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

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

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

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

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

WITHDRAWN

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA – WEDNESDAY MORNING CONTINUED

A13.2 Applications of Atom Probe Tomography

SESSION CHAIR:

Michael Moody, University of Oxford, United Kingdom

PLATFORM SESSION

Wednesday 10:30 AM • Room: 263

- 10:30 AM 625** *Nanoscale Chemical Imaging of Coking Mechanisms in a Zeolite ZSM-5 Crystal by Atom Probe Tomography*; JD Poplawsky; Oak Ridge National Laboratory; JE Schmidt; Utrecht University, Netherlands; B Maxumder, W Guo; Oak Ridge National Laboratory; D Fu, O Attila, M de Winter, F Meirer; Utrecht University, Netherlands, et al.
- 10:45 AM 626** *Atom Probe Tomography of Human Tooth Enamel and the Accurate Identification of Magnesium and Carbon in the Mass Spectrum*; A La Fontaine, J Cairney; University of Sydney, Australia
- 11:00 AM 627** *Distinguishing Meteoritic Nanodiamonds from Amorphous Carbon Using Atom-Probe Tomography*; JB Lewis; Washington University; D Isheim; Northwestern University; C Floss; Washington University; D Seidman; Northwestern University
- 11:15 AM 628** *Atomic Elemental Tomography of Heavy Element Biomaterials*; X Wang; McMaster University, Canada; RM Schofield, MH Nesson; University of Oregon; A Devaraj; Pacific Northwest National Laboratory
- 11:30 AM 629** (IFES STUDENT SCHOLAR) *Metallic Nanoshell for Three-Dimensional Chemical Mapping of Low Conductive Materials with Pulsed-Voltage Atom Probe Tomography*; V Adineh; Monash University, Australia; R Marceau; Deakin University, Australia; J Fu; Monash University, Australia
- 11:45 AM 630** *Nanoscale Chemical Variations at Boundaries in a $\text{BaCe}_{0.8}\text{Y}_{0.2}\text{O}_{3-\delta}$ – $\text{Ce}_{0.8}\text{Y}_{0.2}\text{O}_{3-\delta}$ Dual Phase Hydrogen Separation Membrane*; G Burton, D Diercks, B Gorman; Colorado School of Mines

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

SESSION CHAIR:

Sanjit Bhowmick, Bruker Corporation

PLATFORM SESSION

Wednesday 10:30 AM • Room: 131

- 10:30 AM 631** (INVITED) *Investigation of Grain Growth and Deformation in Nanocrystalline Metals Through In Situ TEM Mechanical Testing and Crystallographic Orientation Mapping*; CM Barr, DC Bufford, K Hattar; Sandia National Laboratories
- 11:00 AM 632** *Development of Quantitative In Situ TEM Nanomechanical Testing for Polymers*; NR Velez, FI Allen; University of California, Berkeley / Lawrence Berkeley National Laboratory; MA Jones, GF Meyers; The Dow Chemical Company; AM Minor; University of California, Berkeley / Lawrence Berkeley National Laboratory
- 11:15 AM 633** (M&M STUDENT SCHOLAR) *Nanoindentation on Graphene-Encapsulated Single Cells*; J Li, C Zheng, B Liu, Y Kim, J Li, W Yan, J Fu; Monash University, Australia
- 11:30 AM 634** (INVITED) *In Situ Mechanical Testing of Contacts Between Nanoscale Bodies: Measuring the Load-Dependence of Contact Area.*; SB Vishnubhotla; University of Pittsburgh; R Chen; University of California, Merced; SR Khanal; University of Pittsburgh; X Hu, A Martini; University of California, Merced; TD Jacobs; University of Pittsburgh

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

SESSION CHAIR:

Mike Marko, Wadsworth Center

PLATFORM SESSION

Wednesday 10:30 AM • Room: 127

- 10:30 AM 635** (INVITED) *Detection of Isolated Metal Ions on Ferritin by Single-Particle Cryo-STEM Reconstruction*; N Elad, G Bellapadrona, L Houben, I Sagi, M Elbaum; Weizmann Institute of Science, Israel
- 11:00 AM 636** (INVITED) (M&M STUDENT SCHOLAR) *Dose-Efficient Cryo-STEM Imaging of Whole Cells Using the Electron Microscope Pixel Array Detector*; KA Spoth, KX Nguyen, DA Muller, LF Kourkoutis; Cornell University

- 11:30 AM **637** *Cryo-STEM Tomography with Inpainting*; A Stevens, ND Browning; Pacific Northwest National Laboratory
- 11:45 AM **638** *Electron Beam Sources Using InGaN Semiconductor Photocathodes for Single-Shot Imaging Electron Microscope*; T Nishitani, A Narita; Nagoya University, Japan; S-I Kitamura, T Tomita; JEOL Ltd., Japan; T Meguro, H Iijima; Tokyo University of Science; S Fuchi; Aoyama Gakuin University, Japan, M Tabucchi; Nagoya University, Japan, et al.

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

SESSION CHAIR:

Libor Kovarik, Pacific Northwest National Laboratory

PLATFORM SESSION

Wednesday 10:30 AM • Room: 130

- 10:30 AM **639 (INVITED)** *Operando and Multimodal Studies of Speciation and Activity of Pt Catalysts During the Hydrogenation of Ethylene*; E Stach; Brookhaven National Laboratory; S Zhou; University of Illinois, Urbana-Champaign; Y Li; Stony Brook University; D Liu, Y-M Liu; University of Illinois, Urbana-Champaign; J Liu; Stony Brook University; D Zakharov; Brookhaven National Laboratory, Q Wu; Stony Brook University, et al.
- 11:00 AM **640 (MSA POSTDOCTORAL SCHOLAR)** *In Situ Characterization of Catalytic Reactions Promoted by Localized Surface Plasmon Resonance Energy*; C Wang, W-CD Yang, D Sil, A Agrawal, R Sharma; National Institute of Standards and Technology
- 11:15 AM **641** *In Situ TEM Observation of MultiLayer Graphene Formation from CO on Cobalt Nanoparticles at Atmospheric Pressure*; PJ Kooyman; University of Cape Town; GM Bremmer; Leiden University, Netherlands; E Zacharaki, AO Sjästad; University of Oslo; V Navarro; Netherlands Organisation for Applied Scientific Research; JW Frenken; Leiden University, Netherlands
- 11:30 AM **642** *Atomic Scale Environmental Transmission Electron Microscopy Study of the Surface Mobility of Ceria Nanocubes*; M Bugnet; Centre National de la Recherche Scientifique, France; SH Overbury, Z Wu; Oak Ridge National Laboratory; FC Aires, T Epicier; Centre National de la Recherche Scientifique, France
- 11:45 AM **643** *Room Temperature CO Dissociation on Selective Edges of Gold Nanoparticles*; W-CD Yang, C Wang, R Sharma; National Institute of Standards and Technology

A17.3 Biological Soft X-ray Tomography

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 10:30 AM • Room: 122

- 10:30 AM **644** *Chromatin Reorganization During Viral Infection*; V Aho, M Myllys; University of Jyväskylä, Finland; CA Larabell; Lawrence Berkeley National Laboratory; M Vihinen-Ranta; University of Jyväskylä, Finland
- 10:45 AM **645** *Multimodal Imaging and Soft X-ray Nanotomography to Optimize Algal-Based Lipid Feedstocks*; C Smallwood, W Chrisler; Pacific Northwest National Laboratory; J-H Chen; Lawrence Berkeley National Laboratory; E Patello; Pacific Northwest National Laboratory; R Boudreau, M Le Gros; Lawrence Berkeley National Laboratory; JE Evans; Pacific Northwest National Laboratory
- 11:00 AM **646** *Near-Edge Absorption Soft X-ray Nanotomography of Cells Incubated with Nanoparticles*; JJ Conesa; ALBA Synchrotron Light Source, Spain; J Oton; Spanish National Center for Biotechnology, Spain; E Pereiro; ALBA Synchrotron Light Source, Spain; FJ Chichon, JL Carrascosa; Spanish National Center for Biotechnology, Spain
- 11:15 AM **647 (INVITED)** *Sorting Out the JUNQ: The Spatial Nature of Protein Quality Control*; EM Sontag; Stanford University; J-H Chen, G McDermott; University of California, San Francisco; D Gestaut; Stanford University; C Larabell; University of California, San Francisco; J Frydman; Stanford University
- 11:45 AM **648** *Quantitative 3D Analysis of Structural Organization of Normal and Tumor Cells*; CA Larabell, MA Le Gros; University of California, San Francisco

Scientific Program

B

BIOLOGICAL SCIENCES SYMPOSIA– WEDNESDAY MORNING

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

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 10:30 AM • Room: 120

- 10:30 AM **649** *Evolution and Fate of the Residual Body of *Toxoplasma gondii* revealed by FIB-SEM series*; M Attias, KR Miranda, W De Souza; Universidade Federal do Rio de Janeiro, Brazil
- 10:45 AM **650** (INVITED) *Revealing the Native Molecular Architecture of the Nuclear Periphery Using Cryo- Focused Ion Beam Milling, Light Microscopy, and Electron Tomography*; E Villa, R Watanabe, R Buschauer, V Lam, K Khanna; University of California, San Diego; J Singla, F Alber; University of Southern California
- 11:15 AM **651** *Cryo-FIB Milling Reveals Complex Vesicular Architecture in Photosynthetic Bacteria*; JM Noble; Cornell University; J Lubieniecki, JM Plitzko, H Engelhardt, W Baumeister; Max Planck Institute of Biochemistry, Germany; LF Kourkoutis; Cornell University
- 11:30 AM **652** *Amorphous Solid Phase Deposition of Ions and Phosphate within Eukaryotic Mitochondrial Matrices – Imaging and Characterization by CryoSTEM Tomography and Energy-Dispersive X-ray Spectroscopy*; SG Wolf, Y Mutsafi, T Ilani, M Elbaum, D Fass; Weizmann Institute of Science, Israel
- 11:45 AM **653** *In Situ Liquid Cell Electron Microscopy: An Evolving Tool for Biomedical and Life Science Applications*; MJ Dukes; Protochips, Inc; C Varano, DF Kelly; Virginia Tech Carilion Research Institute

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

SESSION CHAIRS:

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

PLATFORM SESSION

Wednesday 10:30 AM • Room: 123

- 10:30 AM **654** (MSA POSTDOCTORAL SCHOLAR) *Phantoms Models to Characterize Influenza Hemagglutinin-Based Vaccines*; DM McCraw, AK Harris; National Institutes of Health
- 10:45 AM **655** (INVITED) *The Role of Electron Microscopy in Pediatric Pathology*; EP Wartchow; Children's Hospital Colorado
- 11:15 AM **656** *Mobile Image Analysis for Microscopic Images of Seeds*; K Gao, M Warmund, T White, R Angelovici, F Bunyak; University of Missouri, Columbia
- 11:30 AM **657** *Centriole Mediated Neurogenesis of OSN in Fish*; SK De, SK Sarkar; Vidyasagar University, India
- 11:45 AM **658** (M&M STUDENT SCHOLAR) *Molecular Consequences of Cardiac Valve Development as a Result of Altered Hemodynamics*; V Menon, L Junor, JF Eberth; University of South Carolina School of Medicine; SM Ford; University Hospitals, Rainbow Babies and Children's Hospital; MT McPheeters, MW Jenkins; Case Western Reserve University; M Belhaj, JD Potts; University of South Carolina School of Medicine

Wednesday, August 9

P

PHYSICAL SCIENCES SYMPOSIA –

WEDNESDAY MORNING

P01.5 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Moon J. Kim, University of Texas, Dallas

PLATFORM SESSION

Wednesday 10:30 AM • Room: 267

- 10:30 AM **660** *Structure and Chemistry of Oxide Surface Reconstructions in III-Nitrides Observed Using STEM-EELS*; JH Dycus, KJ Mirrieles, ED Grimley, R Dhall; North Carolina State University; R Kirste, S Mita; Adroit Materials, Inc.; Z Sitar, R Collazo; North Carolina State University, et al.
- 10:45 AM **661** *Field Emission from Zinc Oxide Nanobelt*; A Asthana, YK Yap; Michigan Technological University; RS Yassar; University of Illinois, Chicago
- 11:00 AM **662** *High Spatial Resolution Energy Dispersive X-ray Spectroscopy and Atom Probe Tomography Study of Indium Segregation in N-Polar InGaN Quantum Wells*; M Catalano; University of Texas, Dallas; B Bonef, C Lund, UK Mishra, S Keller; University of California, Santa Barbara; MJ Kim; University of Texas, Dallas
- 11:15 AM **663** *Detailed In Situ Observations of Electromigration in Aluminum Wires*; M Mecklenburg; University of Southern California; B Zutter, WA Hubbard; University of California, Los Angeles; S Aloni; Lawrence Berkeley National Laboratory; BC Regan; University of California, Los Angeles
- 11:30 AM **664** *Direct Observation of Oxygen Movement in Graphene Oxide-Based Resistive Switching Memory*; S Kim; Northwestern University; JC Kim, HY Jeong; Ulsan National Institute of Science and Technology, Korea
- 11:45 AM **665** *Point and Extended Defects in Ultra Wide Band Gap β -Ga₂O₃ Interfaces*; JM Johnson, S Krishnamoorthy, S Rajan, J Hwang; The Ohio State University

P02.1 TEM/STEM/EELS/SNOM of Ultralow-Energy Excitations

SESSION CHAIRS:

Ian MacLaren, University of Glasgow, Scotland

Phil Batson, Rutgers University

PLATFORM SESSION

Wednesday 10:30 AM • Room: 261

- 10:30 AM **666** *Optical Spectroscopy at High Spatial Resolution with Fast Electrons*; LH Tizei, S Meuret, N Bonnet; Laboratoire de Physique des Solides, France; F Treussart; Laboratoire Aimé Cotton, France; B Daudin, B Gayral; Institut Nanosciences et Cryogénie-CEA, France, The Laboratory for Quantum Photonics, Electronics and Engineering, France; R Bourrellier, A Tararan; Laboratoire de Physique des Solides, France, et al.
- 11:00 AM **667** *Mapping “Broken” Dark Modes Using Cathodoluminescence in a Scanning Electron Microscope*; AC Liu; Monash University, Australia; DE Gomez; RMIT University, Australia; T Coenen; DELMIC B.V., Netherlands
- 11:15 AM **668** *Near-Field Mid-Infrared Plasmonics in Complex Nanostructures with Monochromated Electron Energy Loss Spectroscopy*; J Hachtel; Oak Ridge National Laboratory; R Davidson; U.S. Naval Research Laboratory; R Haglund, S Pantelides; Vanderbilt University; B Lawrie, JC Idrobo; Oak Ridge National Laboratory
- 11:30 AM **669** *Interaction Between Relativistic Electrons and Mesoscopic Plasmonic Tapers*; S Guo, N Talebi, W Sigle; Max Planck Institute for Solid State Research, Germany; C Lienau; Carl von Ossietzky University of Oldenburg, Germany; A Campos, M Kociak; Université Paris Sud; M Esmann, SF Becker; Carl von Ossietzky University of Oldenburg, Germany, et al.

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA-

WEDNESDAY MORNING CONTINUED

P03.6 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

James LeBeau, North Carolina State University

PLATFORM SESSION

Wednesday 10:30 AM • Room: 274

- 10:30 AM **670** *Measuring the Cation and Oxygen Atomic Column Displacement at Picometer Precision*; Y Wang; Max Planck Institute for Solid State Research, Germany; L Jones; University of Oxford, United Kingdom; B Berkels; RWTH Aachen University, Germany; W Sigle, P van Aken; Max Planck Institute for Solid State Research, Germany
- 10:45 AM **671 (INVITED)** *Atomic Mapping of Domain Configurations in Ferroelectric Thin Films*; X Ma; Chinese Academy of Sciences, China
- 11:15 AM **672** *Correlating Local Chemistry and Local Cation Displacements in the Relaxor Ferroelectric PMN*; MJ Cabral; North Carolina State University; S Zhang; University of Wollongong, Australia; JT Chi, BJ Reich, EC Dickey, JM LeBeau; North Carolina State University
- 11:30 AM **673** *Atomic-Scale Investigations of Domain Walls in Polycrystalline BiFeO₃*; G Drazic; National Institute of Chemistry in Ljubljana, Slovenia; A Bencan; Jozef Stefan Institute, Slovenia; D Damjanovic; Swiss Federal Institute of Technology; T Rojac; Jozef Stefan Institute, Slovenia
- 11:45 AM **674** *Multimodal Chemical and Functional Imaging of Nanoscale Transformations in Ferroelectric Thin Films*; AV Ievlev, CC Brown, P Maksymovych, SV Kalinin, OS Ovchinnikova; Oak Ridge National Laboratory

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

SESSION CHAIR:

Marta D. Rossell, Swiss Federal Laboratories for Materials Science and Technology

PLATFORM SESSION

Wednesday 10:30 AM • Room: 266

- 10:30 AM **675 (INVITED)** *Probing Strain-Induced Phenomena in Low Dimensionality Multiferroic Oxides*; C Magén; Universidad de Zaragoza, Spain; R Guzmán; Institut de Ciència de Materials de Barcelona, ICMAB-CSIC; S Farokhipoor; University of Groningen, Netherlands; L Maurel, E Langenberg; Universidad de Zaragoza, Spain; J Iñiguez; Luxembourg Institute of Science and Technology; S Venkatesan; Ludwig-Maximilians-Universität München, Germany, AR Lupini; Oak Ridge National Laboratory, et al.
- 11:00 AM **676** *Atomic Scale Structure and Defects in 2D GaSe Films and Van der Waals Interface*; JM Johnson, CH Lee, S Krishnamoorthy, S Rajan, J Hwang; The Ohio State University
- 11:15 AM **677** *Ge Nanowires: Sn Catalysts and Ge/Ge_{1-x}Sn_x Core-Shell Structures*; AF Marshall, G Chan, AC Meng, M Braun, PC McIntyre; Stanford University
- 11:30 AM **678 (M&M STUDENT SCHOLAR)** *Structural and Magnetic Characterization of B20 Skyrmion Thin Films and Heterostructures Using Aberration-Corrected Lorentz TEM and Differential Phase Contrast STEM*; BD Esser, AS Ahmed, RK Kawakami, DW McComb; The Ohio State University
- 11:45 AM **679** *Lorentz TEM Image Simulations of Dzyaloshinskii Domain Walls Under an In-Plane Magnetic Field*; MP Li, M De Graef, V Sokalski; Carnegie Mellon University

Wednesday, August 9

P07.5 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Raymond R. Unocic, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 10:30 AM • Room: 276

- 10:30 AM **680** (INVITED) *Integrating Novel Microscopy into Battery Research: From Atomic Resolution to In Situ and Functional Imaging*; M Chi, C Ma, A Lupini, K More; Oak Ridge National Laboratory; C Nan; Tsinghua University, China; J Sakamoto; University of Michigan; N Dudney; Oak Ridge National Laboratory
- 11:00 AM **681** *Atomic-Scale Characterization of Electrode Materials in Lithium/Sodium-Ion Batteries by STEM*; L Gu; Institute of Physics, Chinese Academy of Sciences
- 11:15 AM **682** *New Full-Range Electron Tomography Procedure for Accurate Quantification of Surfaces, Curvature, and Porosity in Energy-Related Nanomaterials*; E Padgett, R Hovden, JA Da Silva, T Hanrath, DA Muller; Cornell University
- 11:30 AM **683** *Revealing the Nanoscale Structure and Chemistry of Intact Solid-Liquid Interfaces in Electrochemical Energy Storage Devices by Cryo-FIB Lift-Out and Cryo-STEM*; MJ Zachman, Z Tu, LA Archer, LF Kourkoutis; Cornell University
- 11:45 AM **684** (MSA POSTDOCTORAL SCHOLAR) *Identifying and Engineering the Stacking Sequence in CVD Grown Few-Layer MoS₂ via Aberration-Corrected STEM*; A Yan; University of California, Berkeley; W Chen; Illinois Institute of Technology; C Ophus, J Ciston; Lawrence Berkeley National Laboratory; CH Merino, A Zettl; University of California, Berkeley

P08.6 Geological Sample Characterization Using Various Imaging Modalities

SESSION CHAIRS:

Lori Hathon, University of Houston
Kultaransingh (Bobby) Hooghan, Weatherford Laboratories

PLATFORM SESSION

Wednesday 10:30 AM • Room: 262

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

- 10:45 AM **686** *Enhancing Petrographic Analysis Through Data Fusion*; N Vito, C Burt, E Goergen; Thermo Fisher Scientific
- 11:00 AM **687** *Correlating Complementary Data for Improving Electron Backscatter Diffraction (EBSD) Microstructural Characterization of Geological Materials*; MM Nowell, SW Wallace, J Rafaelsen, TL Nylese, R de Kloe, SI Wright; EDAX, Inc.
- 11:15 AM **688** *Advancements in Minerals Identification and Characterization in Geo-Metallurgy: Comparing E-Beam and Micro-X-ray-Fluorescence Technologies*; S Scheller, R Tagle; Bruker Nano GmbH, Germany; G Gloy; Bruker Pty Ltd.; M Barraza, A Menzies; Universidad Católica del Norte, Chile
- 11:30 AM **689** *In Situ Contact Angle Measurements of Supercritical CO₂ Brine, and Sandstone Cores Using Micro-CT Imaging*; LE Dalton, D Crandall, A Goodman; U.S. Department of Energy's National Energy Technology Laboratory
- 11:45 AM **690** *Imaging and Analytical Approaches for Characterization of Soil Mineral Weathering*; A Dohnalkova, L Kovarik, B Arey, T Varga, M Miller; Pacific Northwest National Laboratory

T

BIOLOGICAL SCIENCES TUTORIAL – WEDNESDAY MORNING

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

SESSION CHAIR:

Tommi White, University of Missouri, Colombia

PLATFORM SESSION

Wednesday 10:30 AM • Room: 126

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

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA – WEDNESDAY AFTERNOON

A01.2 Vendor Symposium

SESSION CHAIRS:

Paul Voyles, University of Wisconsin, Madison

Esther Bullitt, Boston University School of Medicine

PLATFORM SESSION

Wednesday 1:30 PM • Room: 125

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

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

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

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

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

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

SESSION CHAIR:

Eric Stach, Brookhaven National Laboratory

PLATFORM SESSION

Wednesday 1:30 PM • Room: 260

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

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

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

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

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

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

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

SESSION CHAIRS:

Jim Ciston, Lawrence Berkeley National Laboratory

David Muller, Cornell University

PLATFORM SESSION

Wednesday 1:30 PM • Room: 132

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

1:45 PM 702 (M&M STUDENT SCHOLAR) *Enhanced Resolution from Full-Field Ptychography with an Electron Microscope Pixel Array Detector*; Y Jiang, Y Han, Z Chen, V Elser, DA Muller; Cornell University

2:00 PM 703 *Quantitative Relation Between Differential Phase Contrast Images Obtained by Segmented and Pixelated Detectors*; T Seki, G Sánchez-Santolino, R Ishikawa, Y Ikuhara, N Shibata; The University of Tokyo, Japan

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

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

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

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

SESSION CHAIR:

Owen K. Neill, Washington State University

PLATFORM SESSION

Wednesday 1:30 PM • Room: 264

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

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

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

2:30 PM 710 *Practical Utilization of Uranium-Containing Particulate Test Samples for SEM/EDS and SIMS Automated Particle Analysis Method Validation*; MS Wellons, M DeVore, RM Rogers, J Hewitt; Savannah River National Laboratory; TL Williamson, TJ Tenner; Los Alamos National Laboratory; T Darroudi; Clemson University

A13.3 Applications of Atom Probe Tomography

SESSION CHAIR:

Mattias Thuvander, Chalmers University of Technology, Sweden

PLATFORM SESSION

Wednesday 1:30 PM • Room: 263

1:30 PM 711 (INVITED) *3DAP/TEM Study of Precipitation Hardened Magnesium Alloys*; T Sasaju, T Ohkubo, K Hono; National Institute for Materials Science, Japan

2:00 PM 712 *Atom Probe Tomography and Analytical Scanning Transmission Electron Microscopy of Rapid Solidification Microstructures in Al-Cu Alloy Thin Films*; JM Wiezorek, KW Zweieracker, C Liu; University of Pittsburgh; I Martin, T Prosa, DJ Larson; CAMECA Instruments, Inc.

2:15 PM 713 *On the Dose Rate Dependence of Cr Clustering in Ion-Irradiated Fe-18Cr Alloys*; E Anderson; University of Michigan; R Odette, N Almirall; University of California, Santa Barbara; S Tumey; Lawrence Livermore National Laboratory; E Marquis; University of Michigan

2:30 PM 714 (MSA POSTDOCTORAL SCHOLAR) *Recent Progress of Correlative Transmission Electron Microscopy and Atom Probe Tomography for Materials Characterization*; W Guo; Oak Ridge National Laboratory

2:45 PM 715 (M&M STUDENT SCHOLAR) *In-Process Precipitation During Laser Additive Manufacturing Investigated by Atom Probe Tomography*; P Kürnsteiner; Max-Planck-Institut für Eisenforschung GmbH, Germany; MB Wilms, A Weisheit; Fraunhofer Institute for Laser Technology; P Barriobero-Vila; Vienna University of Technology; EA Jägle, D Raabe; Max-Planck-Institut für Eisenforschung GmbH, Germany

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA – WEDNESDAY AFTERNOON CONTINUED

A14.3 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:

Tevis Jacobs, University of Pittsburgh

PLATFORM SESSION

Wednesday 1:30 PM • Room: 131

- 1:30 PM 716 (INVITED) *Imaging the Structural Evolution in Nanocrystalline Metals During Mechanical Deformation*; C Kuebel; Karlsruhe Institute of Technology, Germany; A Kobler; Zeiss Microscopy; A Kashiwar, H Hahn; Karlsruhe Institute of Technology, Germany
- 2:00 PM 717 *Micro-Mechanical In Situ Measurements in Thin Film Systems Regarding the Determination of Residual Stress, Fracture Properties and Interface Toughness*; R Konetschnik; Montanuniversität Leoben, Austria; D Kozic, HP Gänser; Materials Center Leoben Forschung GmbH, Austria; D Kiener; Montanuniversität Leoben, Austria; R Brunner; Materials Center Leoben Forschung GmbH, Austria
- 2:15 PM 718 *STEM Characterization of the Deformation Substructure of a NiCoCr Equiatomic Solid Solution Alloy*; J Miao, CE Slone, TM Smith, C Niu; The Ohio State University; H Bei; Oak Ridge National Laboratory; M Ghazisaeidi; The Ohio State University; GM Pharr; Texas A&M University, MJ Mills; The Ohio State University
- 2:30 PM 719 (INVITED) *The Role of Bcc Mg/Nb Interfaces in Nanocomposite Deformation Observed via In Situ Mechanical Testing in TEM*; Y Chen, N Li; Los Alamos National Laboratory; S Yadav; Indian Institute of Technology, Madras; X Liu, JK Baldwin, R Hoagland; Los Alamos National Laboratory; J Wang; University of Nebraska, Lincoln, N Mara; Los Alamos National Laboratory

A15.2 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:

Mike Marko, Wadsworth Center

PLATFORM SESSION

Wednesday 1:30 PM • Room: 127

- 1:30 PM 720 (INVITED) *New Strategies for Improving CryoEM Single Particle Analysis in EMAN2.2*; SJ Ludtke, T Durmaz, M Chen, JM Bell; Baylor College of Medicine
- 2:00 PM 721 (INVITED) *Towards High Resolution in Cryo-Electron Tomography, STEM, and Cryo-EM*; S Pfeffer, M Khoshouei, R Danev; Max-Planck Institute of Biochemistry, Germany; F Förster; Utrecht University, Netherlands
- 2:30 PM 722 (INVITED) *Going Deeper in Cryo Electron Tomography with Neural Networks*; M Chen, W Dai, SY Sun, MF Schmid, W Chiu, SJ Ludtke; Baylor College of Medicine

A16.6 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:

Guangwen Zhou, Binghamton University

PLATFORM SESSION

Wednesday 1:30 PM • Room: 130

- 1:30 PM 723 (INVITED) *Spatio-Temporally Resolved In Situ Transmission Electron Microscopy of the Dynamics of Nanostructured Materials*; TW Hansen, P Liu; Technical University of Denmark; J Madsen; Department of Physics; P Schlexer; University of Milano-Bicocca; B Sebök; Technical University of Denmark; J Schiøtz; Department of Physics; JB Wagner; Technical University of Denmark
- 2:00 PM 724 *Visualizing Redox Chemistry in Oxide Surfaces at Atomic-Resolution*; M Ek; Haldor Topsoe A/S; QM Ramasse; SuperSTEM, United Kingdom; L Arnarson, PG Moses; Haldor Topsoe A/S; C Kisielowski; Lawrence Berkeley National Laboratory; JR Jinschek; The Ohio State University; S Helveg; Haldor Topsoe A/S
- 2:15 PM 725 *Surface Dynamics Associated with Redox Processes on TiO₂ Nanoparticles*; Q Liu, S Chang, P Crozier; Arizona State University
- 2:30 PM 726 *Model "Alloy" Specimens for MEMS-Based Closed-Cell Gas-Reactions*; LF Allard, HM Meyer III, DK Hensley; Oak Ridge National Laboratory; WC Bigelow; University of Michigan; KA Unocic; Oak Ridge National Laboratory

Wednesday, August 9

B

BIOLOGICAL SCIENCES SYMPOSIA- WEDNESDAY AFTERNOON

B02.1 Microstructure Characterization of Food Systems

SESSION CHAIRS:

Jinping Dong, Cargill Minneapolis R&D Centre
Joël Wallecan, Cargill Minneapolis R&D Centre

PLATFORM SESSION

Wednesday 1:30 PM • Room: 121

- 1:30 PM **727** *Applications of X-ray Micro Computed Tomography Technology in Food Research*; AD Lape, V St. Jeor, J Johnson, P Smith; Cargill
- 1:45 PM **728** (INVITED) *Food Structure, Its Formation and Breakdown*; J. L. L. L. L.; University of Birmingham, United Kingdom
- 2:15 PM **729** (INVITED) *Understanding the Effect of Processing on the Structure of Plant Cell Walls as a Mean to Design Novel Clean Label Ingredients*; J Dong; Cargill Minneapolis R&D Centre; K Moelants; Cargill R&D Centre, Europe; T Lipkie, A Steinbach; Cargill Minneapolis R&D Centre; J Mazoyer; Centre of Expertise Texture
- 2:45 PM **730** (INVITED) *The Effect of Bran Reduction on Protein Secondary Structure in Intermediate Wheatgrass (Thinopyrum Intermedium) Dough*; C Gajadeera; University of Minnesota; A Marti; University of Milan; BP Ismail; University of Minnesota

B05.1 Pharmaceuticals and Medical Science

SESSION CHAIR:

Bridget Carragher, New York Structural Biology Center

PLATFORM SESSION

Wednesday 1:30 PM • Room: 123

- 1:30 PM **731** *Revealing the Iron Oxides Mineral Core in Ferritin due to the Variations in the H and L Subunits*; S Narayanan, E Firlar, S Shafiee, K He, R Shahbazian-Yassar, T Shokuhfar; University of Illinois, Chicago
- 1:45 PM **732** (INVITED) *Structure of the Insulin Receptor in Complex with Insulin Using Single Particle Cryoem Analysis*; G Scapin; Merck & Co, Inc.; V Dandey, Z Zhang; New York Structural Biology Center; W Prossie; Merck & Co, Inc.

- 2:15 PM **733** *Visualizing the Protein Corona: A Qualitative and Quantitative Approach Towards the Nano-Bio-Interface*; I Lieberwirth; Max Planck Institute for Polymer Research, Germany

- 2:30 PM **734** (INVITED) (MSA POSTDOCTORAL SCHOLAR)

Conformational Changes in HIV-1 Env Trimer Induced by a Single CD4 as Revealed by Cryo-EM; P Acharya; New York Structural Biology Center AND National Institutes of Health; Q Liu; National Institutes of Health; X Ma, M Lu; Yale University; VP Dandey, ET Eng, WJ Rice, C Wigge; New York Structural Biology Center, et al.

P

PHYSICAL SCIENCES SYMPOSIA- WEDNESDAY AFTERNOON

P01.6 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Michael Gribelyuk, GlobalFoundries Inc.

PLATFORM SESSION

Wednesday 1:30 PM • Room: 267

- 1:30 PM **736** (INVITED) *Advances in Elemental Electron Tomography for the State-of-the-Art Semiconductor Devices and Circuits Characterization and Failure Analysis*; B Fu, M Gribelyuk, FH Baumann, C Fang, W Zhao, E Chen, I Brooks; GlobalFoundries Inc.
- 2:00 PM **737** *Automated STEM/EDS Metrology Characterization of 3D NAND Devices*; Z Zhong, J Roller, O Bidiuk, J Blackwood, M Verheijen, O Ugurlu, J Donald; Thermo Fisher Scientific
- 2:15 PM **738** *Toward Automated S/TEM Metrology of Advanced CMOS Devices: Journey to Obtain a Precise and Accurate Measurement*; W Weng; GlobalFoundries Inc.; H Tan; Thermo Fisher Scientific; A Katnani; GlobalFoundries Inc.
- 2:30 PM **739** *Quantitative Electron Energy Loss Spectroscopy (EELS) Analysis of Flowable CVD Oxide for Shallow Trench Isolation of FinFET Integration*; J Li, J Bruley, R Conti, M Belyansky, S Metha, J Strane; IBM Research; L Tai; IBM System, L Jiang; IBM Research, et al.

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA –

WEDNESDAY AFTERNOON CONTINUED

- 2:45 PM **740** *Manganese Segregation Behavior in Damascene Metal Lines*; G Lian, M Ali, S Boettcher; IBM Inc.

P02.2 TEM/STEM/EELS/SNOM of Ultralow Energy Excitations

SESSION CHAIR:

Phil Batson, Rutgers University

PLATFORM SESSION

Wednesday 1:30 PM • Room: 261

- 1:30 PM **741** (INVITED) *Understanding Imaging and Energy-Loss Spectra Due to Phonon Excitation*; LJ Allen; University of Melbourne, Australia; HG Brown; Monash University, Australia; BD Forbes; University of Melbourne, Australia; NR Lugg; The University of Tokyo, Japan; SD Findlay; Monash University, Australia
- 2:00 PM **742** *Localized Signals in Vibrational STEM-EELS*; C Dwyer, T Aoki, P Rez, L-YS Chang; Arizona State University; TC Lovejoy, OL Krivanek; Nion Co.
- 2:15 PM **743** *Investigating Molecule-Plasmon Interactions in Chemically-Functionalized Metal Nanoparticles Using Monochromated EELS*; P Abellan; SuperSTEM, United Kingdom; PZ El-Khoury; Pacific Northwest National Laboratory; FS Hage; SuperSTEM, United Kingdom; J Cotton; University of Leeds; AG Joly, WP Hess; Pacific Northwest National Laboratory; R Brydson; University of Leeds; QM Ramasse; SuperSTEM, United Kingdom
- 2:30 PM **744** (INVITED) *Chemical Nano-Imaging with Tip-Enhanced Vibrational Spectroscopy*; EA Muller, MB Raschke; University of Colorado

P03.7 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Lin-Ze Li, University of California, Irvine

PLATFORM SESSION

Wednesday 1:30 PM • Room: 274

- 1:30 PM **745** (INVITED) *In Situ Observation of Cu Filaments Evolution in SiO₂ Layer*; Z Zhang, F Yuan, C Liu, F Zhou, HM Yau, W Lu, X Qiu; The

Hong Kong Polytechnic University, H-SP Wong; Stanford University, et al.

- 2:00 PM **746** *Partial Ferroelastic Domain Mediated Ferroelectric Domain Switching*; Y Zhang, L Li; University of California, Irvine; Y Chu; National Chiao Tung University, Taiwan; X Pan; University of California, Irvine
- 2:15 PM **747** *In Situ Transmission Electron Microscopy Study of Oxygen Vacancy Ordering and Dislocation Annihilation in Undoped and Sm-Doped CeO₂ Ceramics During Redox Processes*; Y Ding, Y Chen, KC Pradel, M Liu, ZL Wang; Georgia Institute of Technology
- 2:30 PM **748** (M&M STUDENT SCHOLAR) *In Situ STEM-EELS Observation of Ferroelectric Switching of BaTiO₃ Film on GaAs*; L Hong; University of Illinois, Chicago; D Huber; The Ohio State University; R Contreras-Guerrero, R Droopad; Texas State University; RF Klie; University of Illinois, Chicago
- 2:45 PM **749** (M&M STUDENT SCHOLAR) *Emergent Phase Coherence of Stripe Order in Manganites Revealed with Cryogenic Scanning Transmission Electron Microscopy*; I El Baggari, BH Savitzky, R Hovden; Cornell University; AS Admasu, J Kim, S-W Cheong; Rutgers University; LF Kourkoutis; Cornell University

P05.1 Imaging and Spectroscopy of Beam Sensitive Materials

SESSION CHAIR:

Ray Egerton, University of Alberta, Canada

PLATFORM SESSION

Wednesday 1:30 PM • Room: 266

- 1:30 PM **750** (INVITED) *TEM Investigations of Peptoid Structures*; KH Downing, X Jiang, RN Zuckermann, NP Balsara; Lawrence Berkeley National Laboratory
- 2:00 PM **751** (M&M STUDENT SCHOLAR) *Determining Nanoscale Molecular Ordering in Semiconducting Polymers*; GA Calderon Ortiz, M Zhu, J Hwang; The Ohio State University
- 2:15 PM **752** *Nanobeam Scanning Diffraction for Orientation Mapping of Polymers*; KC Bustillo; Lawrence Berkeley National Laboratory; O Panova; University of California, Berkeley; XC Chen; Lawrence Berkeley National Laboratory; CJ Takacs; Stanford University; J Ciston, C Ophus; Lawrence Berkeley National

Laboratory; N Balsara, AM Minor; University of California, Berkeley

2:30 PM 753 *4D Imaging of Polymer Electrolyte Membrane Fuel Cell Cathodes by Scanning X-ray Microscopy*; J Wu, A Hitchcock; McMaster University, Canada; M Lerotic; 2nd Look Consulting; D Shapiro; Lawrence Berkeley National Laboratory; V Berejnov, D Susac, J Stumper; Automotive Fuel Cell Cooperation Corporation

2:45 PM 754 *Three Dimensional Microstructure Characterization of Polypropylene Blends*; J-C Lin, Y Huang, J Harris, W Brandon, MA Jones; The Dow Chemical Company

P07.6 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Langli Luo, Pacific Northwest National Laboratory

PLATFORM SESSION

Wednesday 1:30 PM • Room: 276

1:30 PM 755 (INVITED) *In Situ TEM Study of Phase Evolution in Individual Battery Materials*; K Karki, H Zhang, Y Huang, MS Whittingham; Binghamton University; EA Stach; Brookhaven National Laboratory; G Zhou; Binghamton University

2:00 PM 756 (INVITED) *Pre-Irradiation Characterization of Radiation Resistant Nanocrystalline and Ultrafine-grained Austenitic Steels*; H Wen; Idaho State University, Idaho National Laboratory; R Carnahan, A Hoffman, I Robin, M Wilding; Idaho State University

2:15 PM 757 *Systematic Transmission Electron Microscopy Study Investigating Lithium and Magnesium Intercalation in Vanadium Oxide Polymorphs*; A Mukherjee, HD Yoo, G Nolis; University of Illinois, Chicago; J Andrews, S Banerjee; Texas A&M University; J Cabana, RF Klie; University of Illinois, Chicago

2:30 PM 758 *The Intermediate State of the Layered $\rightarrow$ Spinel Phase Transformation in $\text{LiNi}_{0.80}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ Cathode*; H Zhang; University of Binghamton

2:45 PM 759 *S/TEM Study of Fading Mechanism of Lithium Transition Metal Oxide Cathode for Lithium Ion Battery*; C Wang, P Yan, J Zheng, J-G Zhang; Pacific Northwest National Laboratory

T

PHYSICAL SCIENCES TUTORIAL–

WEDNESDAY AFTERNOON

X41.1 Entrepreneurship in the Microscopy Community

SESSION CHAIR:

Donovan Leonard, Oak Ridge National Laboratory

PLATFORM SESSION

Wednesday 1:30 PM • Room: 126

1:30 PM 735 (INVITED) *Entrepreneurship in Microscopy: Lessons from a Journey*; TF Kelly; CAMECA Instruments, Inc

O

MICROSCOPY OUTREACH SESSION–

WEDNESDAY AFTERNOON

X91.1 Family Affair

SESSION CHAIRS:

Elaine Humphrey, University of Victoria, Canada
Janet Schwarz, University of Vermont

PLATFORM SESSION

Wednesday 1:30 PM • Room: 124

1:30 PM 759.5 *Family Affair*; E Humphrey, University of Victoria, Canada

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS— WEDNESDAY AFTERNOON

A01.P1 Vendor Symposium

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 223

3:00 PM 760 *Development of Multiple New 120 kV Transmission Electron Microscope Configurations Applicable for a Wide Range of Fields*; K Tamura, T Fujii, H Mise, I Nagaoki, K Kageyama, A Wakui, M Shirai, H Matsumoto; Hitachi High-Technologies Corporation, Japan, et al.

POSTER # 224

3:00 PM 761 *A New Core Facility for Electron and Ion Microscopy at the University of Arizona*; TJ Zega, BB Massani, Y-J Chang, K Domanik, K Nebesny, P Wallace, N Armstrong, E Corral; University of Arizona, et al.

POSTER # 225

3:00 PM 762 *In Situ Thermal Shock of Lunar and Planetary Materials Using A Newly Developed MEMS Heating Holder in A STEM/SEM*; J Howe; Hitachi High-Technologies America, Inc.; MS Thompson; NASA Johnson Space Center; S Dogel; Hitachi High-Technologies Canada, Inc.; K Ueda, T Matsumoto, H Kikuchi; Hitachi High-Technologies Corporation, Japan; M Reynolds, H Hosseinkhannazer; Norcada Inc, et al.

POSTER # 226

3:00 PM 763 *High Spatial Resolution and Wide Range EDS Analysis with FE-SEM*; S Takeuchi, Y Hashimoto, M Sasajima, K Hosoya, Y Dan; Hitachi High-Technologies Corporation, Japan; S Miyasaka; Horiba Ltd.; S Yamaguchi; Oxford Instruments KK

POSTER # 227

3:00 PM 764 *Application of Temperature Controlled Stage in Atmospheric Scanning Electron Microscopy*; M Sakaue, S Miyoshi, Y Ominami; Hitachi High-Technologies Corporation, Japan

POSTER # 228

3:00 PM 765 *High Performance Silicon Drift Detectors*; A Pahlke, T Eggert, R Fojt, M Fraczek, L Höllt, J Knobloch, N Miyakawa, J Rumpff; KETEK GmbH, et al.

POSTER # 229

3:00 PM 766 *Improved Pump Down Time with Evactron® Turbo Plasma™ Cleaning*; E Kosmowska, M Cable, B Armbruster, R Vane; XEI Scientific, Inc.

POSTER # 230

3:00 PM 767 *A Compact High Solid Angle EDX Detector System for SEM and TEM*; A Schöning, R Lackner, A Bechteler, A Liebel, A Niculae, H Soltan; PNDetector GmbH, Germany

POSTER # 231

3:00 PM 768 *Improved Characterization of Steel Samples by SEM/EDS Through the Use of a Silicon Drift Detector*; J Konopka; Thermo Fisher Scientific

POSTER # 232

3:00 PM 769 *X Ray Fluorescence Analysis in an Electron Microscope: Improved Spotsizes of Polycrystalline X-ray Optics at the IfG Modular X Ray Source (iMOXS/2®)*; M Menzel, A Bjeoumikhov; IfG - Institute for Scientific Instruments GmbH, Germany

A05.P1 Advances in FIB Instrumentation and Applications in Materials and Biological Sciences

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 234

3:00 PM 771 *Focused Ion Beam Prepared Cross-Sectional Transmission Electron Microscopy Preparation on CaGe₂ on Ge(111) Grown By Molecular Beam Epitaxy*; RE Williams, J Xu, A Hanks, A Ahmed, IV Pinchuk, DW McComb, R Kawakami, J Katoch; The Ohio State University

POSTER # 235

3:00 PM 772 *Cross Sectional Analysis of Cation Doped Transition Metal Oxide Mesoporous Catalyst Materials*; S Poges, B Dutta, H Khanna, E Moharrer, M Aindow, SL Suib; University of Connecticut

POSTER # 236

3:00 PM 773 *TEM Specimen Preparation for In Situ Heating Experiments Using FIB*; S Vijayan; University of Connecticut; JR Jinschek; The Ohio State University; S Kujawa, J Greiser; FEI Company; M Aindow; University of Connecticut

POSTER # 237

3:00 PM 774 *Ga⁺ and Xe⁺ FIB Milling and Measurement of FIB Damage in Aluminum*; B Van Leer, A Genc, R Passey; Thermo Fisher Scientific

POSTER # 238

3:00 PM 775 *Applications of an In Situ Low Energy Argon Ion Source for Improvement of TEM and SEM Sample Quality*; A Prokhodtseva, J Mulders, T Vystavěl; Thermo Fisher Scientific

POSTER # 239

3:00 PM 776 *Accurate Removal of Implanted Gallium and Amorphous Damage from TEM Specimens after Focused Ion Beam (FIB) Preparation*; P Nowakowski, CS Bonifacio, MJ Campin, ML Ray, PE Fischione; E.A. Fischione Instruments

POSTER # 240

3:00 PM 777 *Narrow-Beam Argon Ion Milling of Carbon-Supported Ex Situ Lift-Out FIB Specimens*; MJ Campin, CS Bonifacio; E.A. Fischione Instruments, Inc; HH Kang; GlobalFoundries Inc.; P Nowakowski, M Boccabella, PE Fischione; E.A. Fischione Instruments, Inc

POSTER # 241

3:00 PM 778 *Towards Automatic Lamella Thinning Using Live Thickness Measurements and Smart End-Point Detection*; T Volkenandt, F Pérez-Willard, M Rauscher; Carl Zeiss Microscopy GmbH, Germany; PM Anger; Carl Zeiss Microscopy, LLC

POSTER # 242

3:00 PM 779 *Optimizing Van der Waals Forces for FIB Ex Situ Lift Out*; LA Giannuzzi; EXpressLO LLC; T Clark; The Pennsylvania State University

POSTER # 243

3:00 PM 780 *A Novel Approach in Sample Preparation of Li Content Materials for TEM Research*; S-C Liou, C-F Lin, W-A Chiou, G Rubolff; University of Maryland

POSTER # 244

3:00 PM 781 *FIB/SEM Imaging of Microbial Induced Calcite Precipitation in Sandy Soil*; L Li, K Wen; Jackson State University; C Li; Inner Mongolia University of Technology; F Amini; Jackson State University

POSTER # 245

3:00 PM 782 *Investigating 3D Printing with Microscopy and Spectroscopy Techniques*; BW Arey, CA Barrett, I Arslan, Z Kennedy, M Warner; Pacific Northwest National Laboratory; H Schroder; Bruker Company

POSTER # 246

3:00 PM 783 *Analysis of Void Volume in Composite Electrode of All-Solid-State Lithium-Ion Battery Employing FIB-SEM and Union Operation Image Processing*; Y Yamamoto, Y Iriyama, S Muto; Nagoya University, Japan

A08.P1 Advances and Applications of Aberration-Corrected Electron Microscopy

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 246A

3:00 PM 783.5 *A Novel Strategy to Effectively Characterize FinFET Device by Multidirectional Comprehensive Analytical TEM in Semiconductor Wafer-foundries*; WW Zhao, B Fu, Y Wei, I Brooks; GlobalFoundries Inc., U.S. Inc.

POSTER # 247

3:00 PM 784 *Development of Compact Cs/Cc Corrector with Annular and Circular Electrodes*; T Kawasaki, R Yoshida, T Kato; Japan Fine Ceramics Center; T Nomaguchi, T Agemura; Hitachi High-Technologies; T Kodama; Meijo University; M Tomita; Vacuum Device Inc.; T Ikuta; Osaka Electro-Communication University

POSTER # 248

3:00 PM 785 *Performance of Low-kV Aberration-Corrected STEM with Delta-Corrector and CFEG in Ultrahigh Vacuum Environment*; K Suenaga; National Institute of Advanced Industrial Science and Technology, Japan; K Kimoto; National Institute for Materials Science, Japan; M Mukai, Y Kohno, S Morishita, T Sasaki; JEOL, Ltd.

POSTER # 249

3:00 PM 786 *Phase Retrieval Quantitative Comparison Between Tilt-Series Imaging in TEM and Position-Resolved Coherent Diffractive Imaging in STEM*; E Liberti; Diamond Light Source; G Martinez, C O'Leary, P Nellist, A Kirkland; University of Oxford, United Kingdom

POSTER # 250

3:00 PM 787 *A Novel Method for Higher Order Aberration Correction in Electron Microscopes*; S Hoque, H Ito; Hitachi High-Technologies Corporation, Japan; A Takaoka, R Nishi; Osaka University, Japan

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS – WEDNESDAY AFTERNOON CONTINUED

POSTER # 251

3:00 PM **788** *Analysis of Phase Difference Variations for Strong Dynamical Objects Using Wigner Distribution Deconvolution Ptychography*; GT Martinez; University of Oxford, United Kingdom; H Yang; Lawrence Berkeley National Laboratory; PD Nellist; University of Oxford, United Kingdom

POSTER # 252

3:00 PM **789** *A Comparison of Phase-Retrieval Algorithms for Focused-Probe Electron Ptychography*; GT Martinez; University of Oxford, United Kingdom; MJ Humphry; Phasefocus; PD Nellist; University of Oxford, United Kingdom

A09.P1 Standards, Reference Materials, and Their Applications in Quantitative Microanalysis

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 253

3:00 PM **790** *Measuring Carbon in Steel Using Calibration Curves on the Microprobe; Failed Cap Screw Study*; RP Grant, JM Rodelas, DF Susan, NR Sorensen, JR Michael; Sandia National Laboratories

POSTER # 254

3:00 PM **791** *Inspection Tool for Testing an Electron Beam in an Objective Lens of Electron Microscope*; C Han, J-M Jeong, S-C Lee, J-G Kim; Korea Basic Science Institute, Korea

POSTER # 255

3:00 PM **792** *Collection Efficiency of the Twin EDS Detectors for Quantitative X-ray Analysis on a New Probe-Corrected TEM/STEM*; J Howe; Hitachi High-Technologies America, Inc.; T Ramprasad; University of Arizona; A Hanawa, H Inada; Hitachi High Technologies, Corporation; J Jimenez; Hitachi High Technologies America, Inc.; D Hoyle; Hitachi High Technologies Canada Inc.; E Voelkl; Hitachi High Technologies America Inc., T Zega; University of Arizona

POSTER # 256

3:00 PM **793** *Focused Interest Group on Microanalytical Standards (FIGMAS): An Update*; OK Neill; Washington State University; A vonderHandt; University of Minnesota; JM Allaz; University of Colorado

POSTER # 257

3:00 PM **794** *Rare Earth Orthophosphate Reference Materials from Na_2CO_3 - MoO_3 Flux: New Synthetic Procedures and Trace Element Determinations*; JW Singer, DJ Cherniak; Rensselaer Polytechnic Institute

POSTER # 258

3:00 PM **795** *Microprobe Analysis of Pu-Ga Standards*; AD Wall, JP Romero, D Schwartz; Los Alamos National Laboratory

A13.P1 Applications of Atom Probe Tomography

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 259

3:00 PM **796** *Nanoscale Investigation of Belgian Chocolate by Atom Probe Tomography*; C Barroo; Université libre de Bruxelles, Belgium; AJ Akey, DC Bell; Harvard University

POSTER # 260

3:00 PM **797** *Field Evaporation Characteristics in Hafnium Carbides*; F Vogel, S Ngai, C Smith, GB Thompson; University of Alabama

POSTER # 261

3:00 PM **798** *Improving Local Electrode Performance by Tesla Coil Electric Discharges*; D Isheim; Northwestern University; A Akey; Harvard University; SS Gerstl; ETH Zurich, Switzerland

POSTER # 262

3:00 PM **799** *Sensitivity Analysis of Laser Effect on Mg-Gd-Er Alloy*; R Hu; Nanjing University of Science and Technology; X Zheng, W Du; Beijing University of Technology; G Sha; Nanjing University of Science and Technology

POSTER # 263

3:00 PM **800** *Atom Probe Tomography Quantification of Alloy Fluctuations in $(\text{Al}, \text{In}, \text{Ga})\text{N}$* ; B Bonef; University of California, Santa Barbara; M Laurent; University of California, Davis; S Keller, UK Mishra; University of California, Santa Barbara

POSTER # 264

3:00 PM 801 *Identifying Nanometer-Scale Clustering in InAlAsSb Random Alloys Using Atom Probe Tomography*; NA Kotulak, K Knipling, LC Hirst, S Tomasulo, J Abell; U.S. Naval Research Laboratory; M Gonzalez; Sotera Defense Solutions, Inc.; MK Yakes, JR Meyer; U.S. Naval Research Laboratory, et al.

A16.P1 *In Situ* and Operando Characterization of Material Processes in Liquids and Gases

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 265

3:00 PM 802 *In Situ Analytical Microscopy of Asphaltene Aggregation and Growth*; NJ Zaluzec; Argonne National Laboratory; A Janssen; University of Manchester, United Kingdom; MA Kulzick; BP Corporate Research Center; MG Burke; University of Manchester, United Kingdom

POSTER # 266

3:00 PM 803 *Study of Alkali Halide Solid Solutions by Scanning Electron Microscopy and X-ray Diffraction*; R Rodriguez-Mijangos, O Hernández-Negrete, RC Carrillo-Torres, FJ Carrillo-Pesqueira, ME Alvarez-Ramos, J Hernández-Paredes; Universidad de Sonora, Mexico

POSTER # 267

3:00 PM 804 *In Situ TEM Observation of Water Splitting*; JA Rodriguez Manzo, NJ Salmon, DH Alsem; Hummingbird Scientific

POSTER # 268

3:00 PM 805 *Electrochemical Measurements During In Situ Liquid-Electrochemical TEM Experiments*; E Fahrenkrug; University of Michigan; DH Alsem, NJ Salmon; Hummingbird Scientific; S Maldonado; University of Michigan

POSTER # 269

3:00 PM 806 *Water Vapor in Closed-Cell In Situ Gas Reactions: Initial Experiments*; KA Unocic; Oak Ridge National Laboratory; AK Datye; University of New Mexico; WC Bigelow; University of Michigan; LF Allard; Oak Ridge National Laboratory

POSTER # 270

3:00 PM 807 *Manipulation and Immobilization of Nanostructures for In Situ STEM*; AW Robertson, BL Mehdi, L Kovarik, ND Browning; Pacific Northwest National Laboratory

POSTER # 271

3:00 PM 808 *In Situ S/TEM Reduction Reaction of Calcined Cu/BEA-Zeolite Catalyst*; KA Unocic; Oak Ridge National Laboratory; DA Ruddy; National Renewable Energy Laboratory; TR Krause; Argonne National Laboratory; S Habas; National Renewable Energy Laboratory

B

BIOLOGICAL SCIENCES POSTER SESSIONS – WEDNESDAY AFTERNOON

B02.P1 Microstructure Characterization of Food Systems

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 272

3:00 PM 809 *Imaging and Characterization of Metallic Antioxidants in Plant Based Food Using Energy Dispersive Spectroscopy*; TL Nylese; EDAX, Inc.

POSTER # 273

3:00 PM 810 *Biochar from Alpaca Manure, The Basics*; DR Sutton, OM Vierrether; Sutton at Home Alpaca; KE Anderson; DKPE Engineering; CA Wisner; Missouri University of Science and Technology

B05.P1 Pharmaceuticals and Medical Science

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 274

3:00 PM 811 *Electron Microscopy and Spectroscopy of Citrate Induced Calcium Oxalate Crystal Structure and Hydration State Changes, and Implications for Kidney Stones*; DJ Banner, E Firlar, JK Finlay, R Shahbazian-Yassar, T Shokuhfar; The University of Illinois, Chicago

POSTER # 275

3:00 PM 812 *Rotavirus Double and Triple Layered Viral Particles: Correlative Characterization Using Electron Microscopy, Disc Centrifuge and Capillary Electrophoresis*; A Miseur, P Blain, A Coppens, C Chapelle, C Hens, G Delpierre, M Deschuyteneer; GSK Vaccines

Scientific Program

B

BIOLOGICAL SCIENCES POSTER SESSIONS – WEDNESDAY AFTERNOON CONTINUED

POSTER # 276

3:00 PM **813** *Methylene Blue Loaded PLGA Nanoparticles: Combined Emulsion, Drug Release Analysis and Photodynamic Activity*; C Gutierrez-Valenzuela, R Rodríguez-Córdova, Y Hernández-Giottonini, P Guerrero-Germán, A Lucero-Acuña; Universidad de Sonora, Mexico

POSTER # 277

3:00 PM **814** (M&M STUDENT SCHOLAR) *Alginate Microcapsule Technology and Impacts on Cell Therapy Development*; M Belhaj, V Menon; School of Medicine, University of South Carolina; B Rohrer; Medical University of South Carolina and Ralph H Johnson VA Medical Center; J Potts; School of Medicine, University of South Carolina

POSTER # 278

3:00 PM **815** *Cryogenic Transmission Electron Microscopy (Cryo-TEM) Reveals Morphological Changes of Liposomal Doxorubicin During In Vitro Release*; Y Wu, P Petrochenko; Food and Drug Administration; FC Szoka; University of California; S Manna, B Koo, N Zheng, W Jiang, J Zheng; Food and Drug Administration

POSTER # 279

3:00 PM **816** *Quantification and Identification of Visible and Subvisible Particulates from Elastomeric Components Contributing to the Total Particle Count of Pharmaceutical Products*; E McPherson, C Bingham, D Carter, W Toomey, M Scofield, R Pulvirenti; Luitpold Pharmaceuticals

en Materiales Avanzados S.C., Mexico; FC Robles Hernández; University of Houston; JM Herrera Ramírez; Centro de Investigación en Materiales Avanzados S.C., Mexico

POSTER # 282

3:00 PM **819** *Using Negative Staining TEM to Study Structure/Function Relationships of Cystic Fibrosis Host-Adapted Opportunistic Pathogen Pseudomonas Aeruginosa*; DL Chance, TP Mawhinney; University of Missouri

POSTER # 283

3:00 PM **820** *Three-dimensional Visualization of Ion Nanodomains in Subcellular Compartments*; W Girard-Dias, W De Souza, K Miranda; Federal University of Rio de Janeiro, Brazil

POSTER # 284

3:00 PM **821** *Large Area, High-resolution Multilayered Imaging Approach Using Block-Face SEM: Identification of Neuro-degeneration in Mouse Model of 22q11 Deletions Syndrome*; CA Brantner, P Mistry, L Matsiyevskiy, C Bryan, D Meechan, TM Maynard, A Popratiloff; The George Washington University

POSTER # 285

3:00 PM **822** *The Tolerance of Chromium (VI) by Delftia Acidovorans*; H Zuo, H Dong; Miami University

POSTER # 286

3:00 PM **823** *Characterizing the Intracellular Trafficking of Helicobacter Pylori VacA*; NJ Foegeding, T Cover, M Ohi; Vanderbilt University

B08.P2 Utilizing Microscopy for Research and Diagnosis of Diseases in Humans, Plants, and Animals

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 280

3:00 PM **817** *Nanoparticles for Detection, Diagnostics, and Targeting Using Hyperspectral Imaging*; D Baah, B Tiimob, K Cousin, W Abdela, T Samuel, C Fermin; Tuskegee University

POSTER # 281

3:00 PM **818** *The Effect of Fullerene Soot on the Mechanical Properties of Chitosan*; O Velázquez Meraz, A Tejeda Ochoa, JE Ledezma Sillas, C Carreño Gallardo; Centro de Investigación

P

PHYSICAL SCIENCES POSTER SESSIONS— WEDNESDAY AFTERNOON

P01.P1 Characterization of Semiconductor Materials and Devices

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 287

3:00 PM **824** *An Application of High-Resolution Dual-Lens Dark-Field Electron Holography in Strain Analysis for Nanometer Semiconductor Device in Wafer-foundries*; WW Zhao, Y-Y Wang, B Fu; GlobalFoundries Inc.

POSTER # 288

3:00 PM **825** *Electron Tomography Study on Nanoscale HfO_x/AlO_y-Based Resistive Switching Device*; J Zhang; Hewlett Packard Enterprise Labs; P Ercius; Lawrence Berkeley National Laboratory; P Zhang, J Luo; Nanolab Technologies Inc; K Kim, M Zhang, RS Williams; Hewlett Packard Enterprise Labs

POSTER # 289

3:00 PM **826** *Image Simulation and Analysis to Predict the Sensitivity Performance of a Multi-Electron Beam Critical Dimension Metrology Tool*; M Mukhtar, B Thiel; State University of New York Polytechnic Institute

POSTER # 290

3:00 PM **827** *Structural Switch of AlN Sputtered Thin Films from (101) to (002) Orientation, Driven by the Growth Kinetics*; A Taurino, MA Signore; National Council for Research; M Catalano, MJ Kim; University of Texas, Dallas

POSTER # 291

3:00 PM **828** *Finding Unstrained 10-nm Lattice Defects in Silicon, Given 1011 Per Cubic Centimeter*; J Roberts, D Osborn, P Fraundorf; University of Missouri-St Louis

POSTER # 293

3:00 PM **830** *Novel FIB-less Fabrication of Electrical Devices for In Situ Biasing*; R Dhall, JH Dycus, M Cabral, E Grimley, W Xu; North Carolina State University; J Damiano; Protochips Inc; JM LeBeau; North Carolina State University

POSTER # 294

3:00 PM **831** *Photoemission Electron Microscopy as a New Tool to Study the Electronic Properties of 2D Crystals and Inhomogeneous Semiconductors*; T Ohta, M Berry, Sandia National Laboratories; K Keyshar; Rice University; JM Kephart; Colorado State University; TE Beechem; Sandia National Laboratories; R Vajtai, P Ajayan; Rice University, AD Mohite; Los Alamos National Laboratory, et al.

POSTER # 295

3:00 PM **832** *Temperature-Dependent Signals in STEM Electron Beam-Induced Current (EBIC) Imaging*; WA Hubbard, ER White; University of California, Los Angeles; M Mecklenburg; University of South California; BC Regan; University of California, Los Angeles

POSTER # 296

3:00 PM **833** *High Contrast SEM Observation of Semiconductor Dopant Profile Using TripleBeam® System*; Y Aizawa, T Sato, T Sunaoshi, H Matsumoto, T Agemura, S Torikawa, I Nakatani, M Kiyohara; Hitachi High-Tech Science Corporation

POSTER # 297

3:00 PM **834** *Advanced Characterization of Emerging Semiconductor Devices Using Low Energy, Broad Ion Beam Argon Milling*; P Nowakowski; E A Fischione Instruments; J Sagar; Oxford Instruments; ML Ray, PE Fischione; E A Fischione Instruments

P02.P1 TEM/STEM/EELS/SNOM of Ultralow Energy Excitations

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 298

3:00 PM **835** *STEM-EELS Evaluation of the Dependence of Localized Surface Plasmon Linewidth on the Size of Au Nanoparticles*; J Wei, J Xu; Arizona State University; X Bai; Chinese Academy of Science; J Liu; Arizona State University

POSTER # 299

3:00 PM **836** *Predicting the Electronic Structure of CeO₂ Grain Boundaries for Comparison with Atomic Resolution EELS*; T Boland, P Rez, P Crozier; Arizona State University

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS–

WEDNESDAY AFTERNOON CONTINUED

POSTER # 300

3:00 PM **837** *EELS Investigation of Al_2O_3 at 30 keV and Below; First Results of Alumina's Structural Sensitivity to a Low-Energy Electron Beam*; T Sunaoshi, M Shirai, S Okada, K Kaji; Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies, America

POSTER # 301

3:00 PM **838** *Energy Filtered STEM Imaging at 30kV and Below – A New Window into the Nano-World?*; T Sunaoshi, M Shirai, S Okada, K Kaji; Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies, America

POSTER # 302

3:00 PM **839** (M&M STUDENT SCHOLAR) *Probing Interfacial and Surface Effects with Vibrational Electron Energy Loss Spectroscopy*; K Venkatraman, Q Liu, K March, P Rez, P Crozier; Arizona State University

POSTER # 303

3:00 PM **840** *Ultrahigh Resolution of Electron Energy Loss Spectroscopy by a Monochromated Titan TEM: Towards Challenging Nanomaterials Characterization*; S Lopatin, B Cheng; King Abdullah University of Science & Technology, Saudi Arabia; W-T Liu, M-L Tsai; National Tsing Hua University, Taiwan; J-H He; King Abdullah University of Science & Technology, Saudi Arabia; A Chuvilin; CIC nanoGUNE, Ikerbasque, Spain

POSTER # 304

3:00 PM **841** (M&M STUDENT SCHOLAR) *Monochromated EELS and Optical Spectroscopy of Layered Carbon Nitrides*; DM Haiber, PA Crozier; Arizona State University

P03.P3 Advanced Microscopy and Microanalysis of Complex Oxides

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 305

3:00 PM **842** *Direct Polarity Determination of Ferroelectric $Ca_{0.28}Ba_{0.72}Nb_2O_6$ Single Crystal by Combined Defocused Convergent Beam Electron Diffraction and Simulation*; X He; University of Missouri at Columbia; L Gu; Chinese Academy of Sciences

POSTER # 306

3:00 PM **843** *Simultaneous Structural and Electrical Analysis of Vanadium Dioxide Using In Situ TEM*; H Ghassemi, B Jacobs; Protochips Inc; H Asayesh-Ardakani, W Yao; University of Illinois, Chicago; L Giannuzzi; Expresslo; R Shahbazian-Yassar; University of Illinois, Chicago

POSTER # 307

3:00 PM **844** *Study of Ytria-Tantala Binary Using Scanning Transmission Electron Microscopy*; D Park, CA Macauley, A Fernandez, C Levi; University of California, Santa Barbara

POSTER # 308

3:00 PM **845** *Supper Lattice Structure Transformation Based on Nonstoichiometric Bismuth Oxychloride*; S WU; Chongqing University, China; Oak Ridge National Laboratory; J Sun; Chongqing University, China; S Yang; Oak Ridge National Laboratory

POSTER # 309

3:00 PM **846** *Multimodal Imaging of Cation Disorder and Oxygen Deficiency in ABX_3 Phase Separation in Double Perovskite Oxides*; SR Spurgeon, PV Sushko, A Devaraj, Y Du, T Droubay, SA Chambers; Pacific Northwest National Laboratory

POSTER # 310

3:00 PM **847** *In Situ Observation of Phase Separation in High-Temperature Superconductor $La_{2-x}Sr_xCuO_4$* ; JS Jeong, W Wu, G Yu, M Greven, KA Mkhoyan; University of Minnesota

POSTER # 311

3:00 PM **848** *Modulating the Redox Equilibrium of Silver Using Electron Beams*; H Sheng, J Wen, L Wang, DJ Miller; Argonne National Laboratory; H Zheng, S Jia, F Cao, H Liu; Wuhan University, China, et al.

Wednesday, August 9

POSTER # 312

3:00 PM 849 *Formation of Single-Atom-Thick Copper Oxide Monolayers*; K Yin; Southeast University; Y-Y Zhang; Vanderbilt University; Y Zhou, L Sun; Southeast University; MF Chisholm; Oak Ridge National Laboratory; ST Pantelides; Vanderbilt University; W Zhou; Oak Ridge National Laboratory

POSTER # 313

3:00 PM 850 *Structural and Electronic Properties of Ti Doped ZnO: XRD, TEM, EELS and Ab Initio Simulations*; R Medlín, J Minár, P Šutta, W Khan, O Šipr, P Novák, M Netřvalová; University of West Bohemia, Czech Republic

POSTER # 314

3:00 PM 851 *Characterization of the Molecular Crystal L-Alaninium Oxalate by Raman Microscopy, Optical Microscopy and X-ray Powder Diffraction*; FJ Carrillo-Pesqueira, RC Carrillo-Torres, O Hernández-Negrete, ME Alvarez-Ramos, J Hernández-Paredes; Universidad de Sonora, Mexico

P04.P2 Advanced Microscopy and Microanalysis of Low-Dimensional Structures and Devices

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 315

3:00 PM 852 *Ambient Dependent Formation of Zn_2SiO_4 and SiO_2 from Core-Shell $ZnO@SiO_2$* ; S Tripathi; Indian Institute of Science; A Roy; Kyushu University, Japan; N Ravishankar; Indian Institute of Science

POSTER # 316

3:00 PM 853 *Probing Two-dimensional $(Bi,Sb)_2Te_3$ /h-BN Heterostructures Using Complementary S/TEM and Simulation Techniques*; D Reifsnnyder Hickey; University of Minnesota; JS Lee; The Pennsylvania State University; RJ Wu; University of Minnesota; N Samarth; The Pennsylvania State University; KA Mkhoyan; University of Minnesota

POSTER # 317

3:00 PM 854 *Atomic Study of Hybrid Spintronic Heterostructures: $Co_2FeAl_{0.5}Si_{0.5}/Ge(111)$* ; Z Nedelkoski; University of York, United Kingdom; D Kepaptsoglou; SuperSTEM, United Kingdom; B Kuerbanjiang; University of York, United Kingdom; QM Ramasse; SuperSTEM, United Kingdom; A Ghasemi, C Love, S Cavill; University of York, United Kingdom; K Hamaya; Osaka University, et al.

POSTER # 318

3:00 PM 855 *In Situ Heating Study of $2H-MoTe_2$ to Mo_6Te_6 NW Phase Transition*; Q Wang, H Zhu, C Zhang, R Addou, K Cho, RM Wallace, MJ Kim; The University of Texas, Dallas

POSTER # 319

3:00 PM 856 *Quantification of Electron Beam Heating Effect in TEM*; H Guo, P Zhou, D Natelson, J Lou; Rice University

POSTER # 320

3:00 PM 857 *Structural and Compositional Analysis of Core/Shell QDs by Transmission Electron Microscopy Techniques*; N Fernández-Delgado, M Herrera, J Pizarro, PL Galindo; University of Cádiz, Spain; PJ Rodríguez-Cantó, R Abargues; Intenanomat S.L.; JP Martínez-Pastor; University of Valencia, Spain; SI Molina; University of Cádiz, Spain

POSTER # 321

3:00 PM 858 *Electron Probe Microanalysis of Electrospun Nd_2O_3 Nanofibers Doped with Ce/Zn*; SS Johnson, RO Broomfield, GY Woodland, JG Breitzer, DE Autrey, S Han, Z Luo; Fayetteville State University

POSTER # 322

3:00 PM 859 *Identification of Tin Whisker Growth on Tin Plated Copper Substrate*; A Knight, H Aglan; Tuskegee University; D Burdick; The Boeing Company

POSTER # 323

3:00 PM 860 *Microscopic Analysis of Tin Whisker Growth on Tin Plated Copper Microchip Leads*; A Rochester; Tuskegee University; D Burdick; The Boeing Company; H Aglan; Tuskegee University

POSTER # 324

3:00 PM 861 *Interfacial Strain Mapping and Chemical Analysis of Strained-Interface Heterostructures by Nanodiffraction and Electron Energy-Loss Spectroscopy*; WJ Bowman; Massachusetts Institute of Technology; S Schweiger, R Pfenniger; ETH Zürich, Switzerland; E Izadi; Arizona State University; A Darbal; AppFive LLC; JL Rupp; ETH Zürich, Switzerland; PA Crozier; Arizona State University

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS–

WEDNESDAY AFTERNOON CONTINUED

P06.P3 Nanoparticles: Synthesis, Characterization, and Applications

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 325

3:00 PM **862** *Characterization of Cu-30Mo Alloys Synthesized by Mechanical Alloying*; O Hernández, A Medina, S Borjas, L Bejar; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Bernal; TecNM Instituto Tecnológico de Orizaba; J Vega; Universidad Michoacana de San Nicolás de Hidalgo, Mexico

POSTER # 326

3:00 PM **863** *Microstructural Changes in Aluminum Mechanically Milled Sintered by Conventional Method and Induction*; JM Mendoza-Duarte; Centro de Investigación en Materiales Avanzados, Mexico; FC Robles-Hernandez; University of Houston; C Carreño-Gallardo, I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 327

3:00 PM **864** (M&M STUDENT SCHOLAR) *Structure and Function of Nano-Sized InSb Precipitate Embedded in an Al Alloy*; Y Zhang, X Gao, NV Medhekar, L Bourgeois; Monash University, Australia

POSTER # 328

3:00 PM **865** *Aluminum Sintering in Air Atmosphere Using High Frequency Induction Heating*; JM Mendoza-Duarte; Centro de Investigación en Materiales Avanzados, Mexico; FC Robles-Hernandez; University of Houston; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 329

3:00 PM **866** *Photo-Induced Solution Deposition of Silver Nanoparticles on a Tb₃+ Doped SiO₂-GeO₂-Na₂O Glass*; F Félix-Domínguez, JA González-Olmos, RA Íñiguez-Palomares, J Alvarado-Rivera, RC Carrillo-Torres, E Álvarez; Universidad de Sonora, Mexico

POSTER # 330

3:00 PM **867** *Synthesis of Neodymium Hydroxide Nanoparticles with CTAB at Low Temperature*; P Martínez-Torres, SE Borjas-García; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; N Gómez-Ortiz; Centro de Investigaciones en Óptica A.C. Mexico; N Dasgupta-Schubert; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Pichardo-Molina; Centro de Investigaciones en Óptica A.C., Mexico; DR García-Zavala; Instituto Tecnológico de Morelia, Mexico

POSTER # 331

3:00 PM **868** *Synthesis of Mesoporous Zirconia by Using Alkoxide Precursor and Triethanolamine as Hydrolysis Stabilizer*; SE Borjas García, PG Martínez Torres; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; N Gómez Ortiz; Centro de Investigaciones en Óptica A.C., Mexico; N Dasgupta-Schubert, G Viramontes Gamboa; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Bernal Ponce; Instituto Tecnológico de Orizaba, Mexico; A Medina Flores; Universidad Michoacana de San Nicolás de Hidalgo, Mexico; JL Pichardo Molina; Centro de Investigaciones en Óptica A.C., Mexico, et al.

POSTER # 332

3:00 PM **869** *Synthesis and Characterizations of Amorphous Manganese Oxide Particles and Platelets for the Application of Rechargeable Lithium Batteries*; JF Al-Sharab; Northwestern State University; Y Yang; Rutgers University

POSTER # 333

3:00 PM **870** *Ordering of Nanoparticles Along Concentric Nanoings Observed in Al-Cu-Fe Alloy*; H Hampikian, B Kothe, C Li; Clarion University; M Caputo; Youngstown State University

P07.P2 Advanced Characterization of Energy-Related Materials

POSTER SESSION

Wednesday 3:00 PM • Room: Exhibit Hall

POSTER # 334

3:00 PM 871 *The Influence of pH Control of the Reaction Solution in the Growth of ZnO Films by CBD Technique for Solar Cell Applications*; F Vásquez-M, Universidad Tecnológica Tula-Tepeji, Hidalgo, Mexico; A Garcia-Barrientos, Universidad Autónoma de San Luis Potosí, Mexico; JL Bernal; Instituto Tecnológico de Orizaba, Mexico; R Ambrosio; Benemerita Universidad Autonoma De Puebla, Mexico; R Balderas; Universidad Autónoma de San Luis Potosí, Mexico; R Ramírez-Bon; CINVESTAV-IPN Unidad Queretaro, Mexico

POSTER # 335

3:00 PM 872 *Understanding Hollow Metal Oxide Nanomaterial Formation with In Situ Transmission Electron Microscopy*; L Yu, R Han; University of Kentucky; X Sang, J Liu; Oak Ridge National Laboratory; A Patel; University of Kentucky; K Page; Oak Ridge National Laboratory; BS Guiton; University of Kentucky

POSTER # 336

3:00 PM 873 *Electron Microscopy of Heterostructure for Solar Energy Recovery: ZnO Nanowires and Co₃O₄ Nanoparticles*; O Cigarroa-Mayorga, JE Neri; Instituto Politecnico Nacional ESFM; C Kisielowski; Lawrence Berkeley National Laboratory Molecular Foundry; HA Calderon; Instituto Politecnico Nacional, Mexico

POSTER # 337

3:00 PM 874 *Asymmetric Phase Transition Pathways During Li/Na Migration in Materials*; S Chen; Harbin Institute of Technology, China; P Gao; Peking University

POSTER # 338

3:00 PM 875 *Microstructural Evolution and Oxidation Behavior of T91/T92 Steel upon Long-Term Steam Test*; K Shin, H Ma; Changwon National University, Korea; Y He; KEPCO Research Institute

POSTER # 339

3:00 PM 876 *Investigating the Electrochemical Reversibility of Transition Metal Oxide Conversion Materials Through STEM-EELS*; FC Castro, VP Dravid; Northwestern University

POSTER # 340

3:00 PM 877 *Highly Nonconductive Li-Ion Battery Components Successfully Imaged at Very Low Accelerating Voltages*; S Freitag, C Berger, J Gelb; Carl Zeiss Microscopy GmbH, Germany; C Weissenberger, T Bernthaler; Aalen University, Germany

POSTER # 341

3:00 PM 878 *Microstructure and Chemical Composition Analysis of Additive Manufactured Ni-Mn-Ga Parts Sintered in Different Conditions*; M Caputo, CV Solomon; Youngstown State University

POSTER # 342

3:00 PM 879 *Breaking the Time Barrier in Kelvin Probe Force Microscopy: Fast Free Force Reconstruction Using the G-Mode Platform*; L Collins, SV Kalinin, S Jesse; Oak Ridge National Laboratory

POSTER # 343

3:00 PM 880 *ToF-SIMS Investigations of Tip-Surface Chemical Interactions in Atomic Force Microscopy on a Combined AFM/ToF-SIMS Platform*; CC Brown; University of Tennessee; AV Ievlev, P Maksymovych, SV Kalinin, OS Ovchinnikova; Oak Ridge National Laboratory

POSTER # 344

3:00 PM 881 *Ion Beam Induced Current Measurements of Solar Cells with Helium*; Z Nedelkoski; University of York, UK; D Kepaptsoglou; SuperSTEM Laboratory, UK; B Kuerbanjiang; University of York, UK; QM Ramasse; SuperSTEM Laboratory, UK; A Ghasemi, C Love, S Cavill; University of York, UK, K Hamaya; Osaka University, Japan

POSTER # 345

3:00 PM 882 *Cathodoluminescence Measurements of CdTe in Transmission Electron Microscope*; W-CD Yang, Y Yoon, BH Gaury, PM Haney, N Zhitenev, R Sharma; National Institute of Standards and Technology

Notes

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Scientific Program Information

Thursday, August 10, 2017



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X70.1 MSA 75th Anniversary Lecture in the Biological Sciences

Complimentary coffee, tea, and handheld breakfast item provided.

SESSION CHAIR:

Michael Marko, Immediate Past President,
Microscopy Society of America

PLATFORM SESSION

Thursday 7:30 AM • Room: 275

- 7:30 AM 957 (INVITED)** *Development of High-Resolution TEM for Imaging Native, Radiation-Sensitive Biological Macromolecules*; Robert M. Glaeser; Lawrence Berkeley National Laboratory, University of California, Berkeley

A

ANALYTICAL SCIENCES SYMPOSIA—THURSDAY MORNING

A01.3 Vendor Symposium

SESSION CHAIRS:

Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University

PLATFORM SESSION

Thursday 8:30 AM • Room: 125

- 8:30 AM 883** *Automated Image Analysis Using a Tabletop Low Voltage TEM*; M Columb-Delsuc, G Kylberg, M Ryner, I-M Sintorn; Vironova AB, Sweden
- 8:45 AM 884** *Progress in a New Method of Thickness Measurement by X-ray Analysis in TEM*; S Lozano-perez; University of Oxford, United Kingdom; P Pinard, J Holland, PJ Statham, JT Sagar; Oxford Instruments Nanoanalysis
- 9:00 AM 885** *Developments in Reel-to-Reel Electron Microscopy Infrastructure*; CS Own, MF Murfitt, LS Own, J Cushing; Voxa
- 9:15 AM 886** *Numerical Procedures to Determine Potential Distribution from Electronic Field Vectors Observed in Differential Phase Contrast (DPC) Imaging*; A Ishizuka, M Oka, K Ishizuka; HREM Research Inc., Japan; T Seki, N Shibata; The University of Tokyo, Japan
- 9:30 AM 887** *Wide Field-of-View Reflection-Mode Ptychographic Imaging Microscope with Tabletop 12.7 nm High Harmonic Illumination*; M Tanksalvala, CL Porter, M Gerrity; University of Colorado; GP Miley; Northwestern University; X Zhang; Kapteyn-Murnane Laboratories; CS Bevis, ER Shanblatt, R Karl; University of Colorado, et al.

Scientific Program

- 9:45 AM 888** *A New SEM Column Combining Ultra-High Resolution and Flexible Scanning*; P Sytař, J Jiruše, A Závodný; TESCAN Brno s.r.o., Czech Republic

A03.2 Big, Deep, and Smart Data in Microscopy

SESSION CHAIR:

Sergei Kalinin, Oak Ridge National Laboratory

PLATFORM SESSION

Thursday 8:30 AM • Room: 260

- 8:30 AM 889 (INVITED)** *Robust Nanostructure from High Throughput Powder Diffraction Data*; S Billinge; Columbia University
- 9:00 AM 890** *Statistical Analyses of Electron Nanodiffraction Patterns to Examine Order and Structural Variability in Amorphous Materials*; AC Liu, ED Bojesen; Monash University, Australia; P Harrowell; University of Sydney, Australia; TC Petersen; Monash University, Australia
- 9:15 AM 891** *Multivariate Statistical Analysis of a Multimodal Diffraction and X-ray Spectral Series Data Set*; PG Kotula, MH Van Benthem; Sandia National Laboratories
- 9:30 AM 892 (INVITED)** *Leveraging First Principles Modeling and Machine Learning for Microscopy Data Inversion*; MK Chan; Argonne National Laboratory

A08.4 Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS:

Lena Kourkoutis, Cornell University
David J. Smith, Arizona State University

PLATFORM SESSION

Thursday 8:30 AM • Room: 132

- 8:30 AM 893 (INVITED)** *Electron Microscopy with Structured Electrons*; BJ McMorran; University of Oregon; P Ercius; Lawrence Berkeley National Laboratory; TR Harvey; University of Oregon; M Linck; Corrected Electron Optical Systems GmbH, Germany; C Ophus; Lawrence Berkeley National Laboratory; J Pierce; University of Oregon
- 9:00 AM 894** *Three-Dimensional Confocal Imaging Using Coherent Elastically Scattered Electrons*; C Zheng; Monash University, Australia; L Sorin; FEI Electron Optics; Y Zhu; Hong Kong Polytechnic University; J Etheridge; Monash University, Australia

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA—

THURSDAY MORNING CONTINUED

- 9:15 AM 895** *Sub-Nanometer-Resolution Magnetic Field Observation Using Aberration-Corrected 1.2-MV Holography Electron Microscope with Pulse Magnetization System*; T Tanigaki, T Akashi, A Sugawara, K Miura, J Hayakawa; Hitachi, Ltd.; K Niitsu; RIKEN, Japan; T Sato; Hitachi High-Technologies Corporation, Japan, X Yu; RIKEN, Japan, et al.
- 9:30 AM 896** *Aberration Corrected Lorentz Microscopy to Investigate Magnetic Domain Walls in Co-Pt Nano-Chessboards*; I Kashyap; Carnegie Mellon University; JA Floro; University of Virginia; YM Jin; Michigan Technological University; M De Graef; Carnegie Mellon University
- 9:45 AM 897** *New STEM/TEM Objective Lens for Atomic Resolution Lorentz Imaging*; N Shibata; The University of Tokyo, Japan; Y Kohno, S Morishita; JEOL, Ltd., Japan

A13.4 Applications of Atom Probe Tomography

SESSION CHAIR:

Michael Moody, University of Oxford, United Kingdom

PLATFORM SESSION

Thursday 8:30 AM • Room: 263

- 8:30 AM 898** *Atom Probe Tomography Studies of the Initiation of Localized Corrosion in Aluminum Alloy 2024*; R Parvizi, RK Marceau; Deakin University, Australia; AE Hughes; CSIRO, Australia; P Cizek; Deakin University, Australia; AM Glenn; CSIRO, Australia; MY Tan, M Forsyth; Deakin University, Australia
- 8:45 AM 899** *Degradation Mechanism of Molds for Precision Glass Molding*; Z Peng, M Rohwerder; Max-Planck-Institut für Eisenforschung GmbH, Germany; M Friedrichs; Fraunhofer Institute for Production Technology, Germany; P-P Choi, B Gault, T Meiners; Max-Planck-Institut für Eisenforschung GmbH, Germany; H Kreilkamp, F Klocke; Fraunhofer Institute for Production Technology, Germany, et al.
- 9:00 AM 900** *Atom Probe Characterization of Oxide Layers Formed on Polycrystalline Nickel Based Superalloys*; MT Lapington, DJ Crudden, RC Reed, MP Moody, PA Bagot; University of Oxford, United Kingdom
- 9:15 AM 901** *Microstructures and Properties of As-Cast AlCrFeMnV, AlCrFeTiV, and AlCrMnTiV*

High Entropy Alloys; KE Knipling; U.S. Naval Research Laboratory; PU Narayana; Thomas Jefferson High School for Science and Technology; LT Nguyen; U.S. Naval Research Laboratory

- 9:30 AM 902 (M&M STUDENT SCHOLAR)** *Linking Experimental Solute Segregation Specificity in Nanocrystalline Alloys to Computational Predictions*; X Zhou, GB Thompson; University of Alabama
- 9:45 AM 903** *Improved Atom Probe Methodology for Studying Carbon Redistribution in Low-Carbon High-Ms Lath Martensitic Steels*; L Morsdorf, B Gault, D Ponge; Max-Planck-Institut für Eisenforschung, Germany; CC Tasan; Massachusetts Institute of Technology; D Raabe; Max-Planck-Institut für Eisenforschung, Germany

A14.4 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:

Nan Li, Los Alamos National Laboratory

PLATFORM SESSION

Thursday 8:30 AM • Room: 131

- 8:30 AM 904 (INVITED)** *Microstructural and Nanomechanical Characterization of In Situ He Implanted and Irradiated Fcc Materials*; P Hosemann; University of California, Berkeley; D Kaoumi, C Zheng; North Carolina State University; D Frazer; University of California, Berkeley
- 9:00 AM 905** *In Situ Study of Mechanical Testing and Fracture Process of Glassy Polystyrene Grafted Nanoparticle Assembly: Impact of Film Thickness and Strain Rate*; M-S Hsiao; U.S. Air Force Research Laboratory; Y Jiao; UES, Inc.; R Wheeler; U.S. Air Force Research Laboratory; J Lefebvre, S Bhowmick; Bruker Corporation; RA Vaia, LF Drummy; U.S. Air Force Research Laboratory
- 9:15 AM 906** *Characterization of Dislocations in Single-Crystalline Ag₃Sn Intermetallic Alloys*; H Yu, Y Sun, S-W Lee; University of Connecticut; PC Canfield; Iowa State University; M Aindow; University of Connecticut
- 9:30 AM 907 (INVITED)** *In Situ Deformation of Various Micro/Nanoscaled Samples in the Transmission Electron Microscope: Experimental Results and Pitfalls*; R Sarkar; Arizona State University; C Ebner; University of Vienna, Austria; J Rajagopalan; Arizona State University; C Rentenberger; University of Vienna, Austria

A15.3 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:

Radostin Danev, Max Planck Institute for Biochemistry, Germany

PLATFORM SESSION

Thursday 8:30 AM • Room: 127

- 8:30 AM **908** *Phase Contrast Single Particle Analysis at Atomic Resolutions.*; M Khoshouei, R Danev; Max-Planck Institute of Biochemistry, Germany; M Radjainia; Thermo Fisher Scientific (formerly FEI); W Baumeister; Max-Planck Institute of Biochemistry, Germany
- 8:45 AM **909** (M&M STUDENT SCHOLAR) *Efficient Cryo-EM: Measuring Effects of Particle Orientation in Electron Microscopy*; K Naydenova, CJ Russo; Medical Research Council Laboratory of Molecular Biology, UK
- 9:00 AM **910** (INVITED) *Streptavidin Monolayer-Crystal Affinity Grids: A Step Toward Controlling What Happens During Cryo-EM Sample Preparation*; RM Glaeser, B-G Han; Lawrence Berkeley National Laboratory; JH Cate; University of California, Berkeley

SUBSTITUTION:

- 9:00 AM **910** *New Methods for CryoEM Sample Preparation*; B Carragher; New York Structural Biology Center
- 9:30 AM **911** (INVITED) *Ion Channel in Lipid Nanodisc by Single Particle Cryo-Em - Pushing the Technology Limit*; D Asarnow, E Palovcak, Y Gao, D Julius; University of California, San Francisco; Y Cheng; Howard Hughes Medical Institute, University of California, San Francisco

A16.7 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:

Guangwen Zhou, Binghamton University

PLATFORM SESSION

Thursday 8:30 AM • Room: 130

- 8:30 AM **912** (INVITED) *In Situ Field Emission of Carbon Nanotubes in Oxygen Using Environmental TEM and the Influence of the Imaging Electron Beam*; AL Koh; Stanford University; E Gidcumb, O Zhou; University of North Carolina, Chapel Hill; R Sinclair; Stanford University

- 9:00 AM **913** (INVITED) *In Situ Observation of Shape Transformation and Surface Oxidation of Pd Nanocrystals*; A Yoon; University of Illinois, Urbana-Champaign; P-H Lu; Forschungszentrum Jülich, Germany; Z-W Shan; Xi'an Jiaotong University, China; J-M Zuo; University of Illinois, Urbana-Champaign
- 9:15 AM **914** *In Situ Imaging and Spectroscopy of the Carbon Deposition Mechanism on Ni/CeO₂ Solid Oxide Fuel Cell Anode Catalyst*; EL Lawrence, PA Crozier; Arizona State University
- 9:30 AM **915** *The Effect of Gas on Image Quality and Resolution in In Situ Scanning Transmission Electron Microscopy*; Y Zhu, ND Browning; Pacific Northwest National Laboratory
- 9:45 AM **916** *Evaluation of Environmental Imaging for 200kV Field Emission Cs-Corrected Analytical Scanning and Transmission Electron Microscope for Multi-User Facilities*; H Inada, T Yotsuji, H Muto, H Matsumoto, M Konno; Hitachi High-Technologies Corporation, Japan

A18.5 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

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

PLATFORM SESSION

Thursday 8:30 AM • Room: 264

- 8:30 AM **917** *Advances in (and a Brief History of) Cathodoluminescence Microscopy*; DJ Stowe, M Bertilson, JA Hunt; Gatan, Inc.
- 8:45 AM **918** (INVITED) *Optimisation of Soft X-ray Spectroscopy at Room and Liquid Nitrogen Temperatures*; CM MacRae, NC Wilson, A Torpy; CSIRO, Australia
- 9:15 AM **919** *Integration of Quantitative Compositional Mapping and Image Processing Routines: A Powerful Approach to Petrologic Investigations*; TM Hahn, PK Carpenter, BL Jolliff; Washington University in St. Louis
- 9:30 AM **920** (INVITED) *Analysis of Multi-Signal Hyperspectral Datasets Collected by EPMA*; NC Wilson, CM MacRae, A Torpy; CSIRO, Australia

Scientific Program

B

BIOLOGICAL SCIENCES SYMPOSIA – THURSDAY MORNING

B02.2 Microstructure Characterization of Food Systems

SESSION CHAIRS:

Jinping Dong, Cargill Minneapolis R&D Centre
Joël Wallecan, Cargill Minneapolis R&D Centre

PLATFORM SESSION

Thursday 8:30 AM • Room: 121

- 8:30 AM 921 *Understanding pH-Induced Softening of Feta Cheese During Storage at the Ultrastructural Level – A Structure-Function Case Study*; AH Vollmer, NN Youssef, JA Powell, X Qi, DJ McMahon; Utah State University
- 8:45 AM 922 (INVITED) *Bimodal Force Spectroscopy as a Technique to Determine the Young's Moduli of Protein Fibrils and Nanoparticles*; OG Jones; Purdue University
- 9:15 AM 923 (INVITED) *Raman Microspectroscopy and Its Role in Solving Today's Food Industry Challenges*; S Zbylut; General Mills International / Medallion Labs
- 9:45 AM 924 *What Went Wrong? Forensics & Food Microstructural Characterization*; VL St. Jeor; Cargill Incorporated

B03.1 Imaging the Biology of Cells and Tissues: Just Do It Right

SESSION CHAIR:

Jay Potts, University of South Carolina

PLATFORM SESSION

Thursday 8:30 AM • Room: 122

- 8:30 AM 925 (INVITED) *Characterizing an Ionic Liquid as a Biological Fixative in Fluorescence Microscopy*; LA Trinh, F Cutrale, SE Fraser; University of Southern California; JP Kilcrease; Hitachi High Technologies America, Inc.; E Rosa-Molinar; University of Kansas
- 9:00 AM 926 (MSA POSTDOCTORAL SCHOLAR) *Label-Free Imaging of Stem Cell Adhesion and Dynamic Tracking of Boundary Evolution Using Photonic Crystal Enhanced Microscopy (PCEM)*; Y Zhuo, JS Choi; University of Illinois, Urbana-Champaign; T Marin; Research Park in University of Illinois, Urbana-Champaign; H Yu, BA Harley, BT Cunningham; University of Illinois, Urbana-Champaign

- 9:30 AM 927 *High-Speed / Long-Time, High-Resolution / Large-Fields In Vivo Imaging by 4K / 8K CMOS Sensors Without Trade-Off Factors*; S Nishimura; Jichi Medical University and The University of Tokyo, Japan

P

PHYSICAL SCIENCES SYMPOSIA – THURSDAY MORNING

P01.7 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Jayhoon Chung, Texas Instruments Inc.

PLATFORM SESSION

Thursday 8:30 AM • Room: 267

- 8:30 AM 928 *Accretion Detection via Scanning Acoustic Microscopy in Microelectronic Components - Considering Symmetry Breaking Effects*; E Grünwald, R Hammer, J Rosc, B Sartory, R Brunner; Materials Center Leoben Forschung GmbH, Austria
- 8:45 AM 929 *Unraveling the Crystal Structure of All-Inorganic Halide Perovskites Using CBED and Electron Ptychography*; R dos Reis, H Yang, C Ophus, T Shalapska, G Bizarri, D Perrodin, P Ercius, J Ciston; Lawrence Berkeley National Laboratory, et al.
- 9:00 AM 930 *Nanometer-Scale Resolved Cathodoluminescence Imaging: New Insights into GaAs/AlGaAs Core-Shell Nanowire Lasers*; M Müller, P Veit; Otto-von-Guericke-University Magdeburg, Germany; B Loitsch, J Winnerl, S Matich; Technical University of Munich, Germany; F Bertram; Otto-von-Guericke-University Magdeburg, Germany; G Koblmüller, JJ Finley; Technical University of Munich, Germany, et al.
- 9:15 AM 931 *Heterovalent ZnTe/GaSb and ZnSe/GaAs grown by Molecular Beam Epitaxy*; BD Tracy, M Lassise, Y-H Zhang, DJ Smith; Arizona State University
- 9:30 AM 932 *On the Effects of Column Occupancy and Static Atomic Disorder on the Analysis of Chemical Ordering in $Ga(P_{(1-x)}Bi_x)$ Compounds*; A Beyer, L Nattermann, K Volz; Philipps-Universität Marburg, Germany
- 9:45 AM 933 *TEM characterization of GaSb Grown on Single Crystal Offcut Silicon (001)*; H Porter, M Steer, A Craven, D McGrouther, I Thayne, I MacLaren; University of Glasgow, Scotland

P02.3 TEM/STEM/EELS/SNOM of Ultralow-Energy Excitations

SESSION CHAIR:

Ian MacLaren, University of Glasgow, Scotland

PLATFORM SESSION

Thursday 8:30 AM • Room: 261

- 8:30 AM **934** (INVITED) *Exploring Vibrational and Valence Loss Spectra from Oxide Nanoparticles*; PA Crozier, Q Liu, K Venkatraman, DM Haiber, WJ Bowman, K March, P Rez; Arizona State University
- 9:00 AM **935** *Detecting Sub Bandgap Energies in CIGS with Electron Energy-Loss Spectroscopy*; J Deitz, P Paul, A Arehart; The Ohio State University; S Karki, S Marsillac; Old Dominion University; T Grassman, D McComb; The Ohio State University
- 9:15 AM **936** *Local Mapping of Bandgap Electronic State in $\text{Pr}_x\text{Ce}_{1-x}\text{O}_{2-\delta}$: Elucidating Enhancement and Mechanism of Grain Boundary Electrical Conductivity*; WJ Bowman; Massachusetts Institute of Technology; E Sediva; ETH Zürich, Switzerland; T Aoki; Arizona State University; JL Rupp; ETH Zürich, Switzerland; PA Crozier; Arizona State University
- 9:30 AM **937** *Understanding Guided Light Modes in Oxide Nanoparticles with Monochromated EELS*; Q Liu; Arizona State University; SC Quillin, DJ Masiello; University of Washington; PA Crozier; Arizona State University
- 9:45 AM **938** *Ultra-High Energy Resolution EELS*; T Lovejoy, N Bacon, A Bleloch, N Dellby, M Hoffman, O Krivanek; Nion

P03.8 Advanced Microscopy and Microanalysis of Complex Oxides

SESSION CHAIR:

Peng Wang, University of Nanjing, China

PLATFORM SESSION

Thursday 8:30 AM • Room: 274

- 8:30 AM **939** (INVITED) *Intricate Physics of Coherent Electron Beam/Oxide Materials Interaction Revealed By 4D Inline Holography—Electron Ptychography*; H Xin; Brookhaven National Laboratory; X Zhong, J Lin, Z Liao, J Zhu; Tsinghua University, China; X Huang; Brookhaven National Laboratory

- 9:00 AM **940** *Measuring Orbital Angular Momentum (OAM) and Torque Transfer from Polarization Vortices with the Electron Microscopy Pixel Array Detector*; KX Nguyen, Y Jiang, MC Cao, P Purohit; Cornell University; AK Yadav; University of California, Berkeley; J Junquera; University of Cantabria, Spain; MW Tate; Cornell University; R Ramesh; University of California, Berkeley, et al.

- 9:15 AM **941** *Measuring Ferroelectric Order Parameters at Domain Walls and Vortices in Hexagonal Manganites with Atomic Resolution STEM*; ME Holtz; Cornell University; K Shapovalov; Universite de Bordeaux, France; J Mundy, CS Chang; Cornell University; D Meier; Norwegian University of Science and Technology; A Cano; Universite de Bordeaux, France; DA Muller; Cornell University

- 9:30 AM **942** (INVITED) *Quantifying Local Structure of Complex Oxides Using Accurate and Precise Scanning Transmission Electron Microscopy*; JM LeBeau, M Cabral, JH Dycus, ED Grimley; North Carolina State University; S Zhang; University of Wollongong, Australia; EC Dickey; North Carolina State University

P05.2 Imaging and Spectroscopy of Beam Sensitive Materials

SESSION CHAIR:

Andre Mkhoyan, University of Minnesota

PLATFORM SESSION

Thursday 8:30 AM • Room: 266

- 8:30 AM **943** (INVITED) *Automated Image Acquisition and Analysis of Beam Sensitive Samples*; E Stach, DN Zakharov, Y Lin, S Yoo; Brookhaven National Laboratory; G Resch; Nexperion, Austria
- 9:00 AM **944** *Way to Reduce Electron Dose in Pseudo Atomic Column Elemental Maps by 2D STEM Moiré Method*; Y Kondo, K-I Fukunaga, E Okunishi, N Endo; JEOL, Ltd., Japan
- 9:15 AM **945** *Electron Beam-Induced Object Excitations at Atomic Resolution - Minimization and Exploitation*; C Kisielowski; Lawrence Berkeley National Laboratory, HA Calderon; UPALM-Zacatenco, México, D F; S Helveg; Haldor Topsoe A/S, Denmark; P Specht; University of California, Berkeley

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA–

THURSDAY MORNING CONTINUED

9:30 AM 946 *Reducing Electron Beam Damage with Multipass Transmission Electron Microscopy*; C Ophus; Lawrence Berkeley National Laboratory; T Juffman, SA Koppell, BB Klopfer; Stanford University; R Glaeser; Lawrence Berkeley National Laboratory; MA Kasevich; Stanford University

9:45 AM 947 *Overcoming the Challenges of Beam-Sensitivity in Fuel Cell Electrodes*; DA Cullen, BT Sneed, KL More; Oak Ridge National Laboratory

P07.7 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Katie Jungjohann, Sandia National Laboratories

PLATFORM SESSION

Thursday 8:30 AM • Room: 276

8:30 AM 948 (INVITED) *Tuning the Outward to Inward Swelling in Lithiated Silicon Nanotubes Via Surface Oxide Coating*; J Wang; Zhejiang University, China; H Luo; Georgia Institute of Technology; Y Liu; North Carolina State University; Z Zhang; Zhejiang University, China; SX Mao; University of Pittsburgh; C Wang; Pacific Northwest National Laboratory; T Zhu; Georgia Institute of Technology

9:00 AM 949 *Comparison of Spinel and Monoclinic Crystal Structures of γ - Al_2O_3 for Simulation of Electron Energy Loss Spectra*; HO Ayoola, CS Bonifacio, Q Zhu; University of Pittsburgh; D Su; Brookhaven National Laboratory; JJ Kas, JJ Rehr; University of Washington, Seattle; E Stach; Brookhaven National Laboratory, WA Saidi; University of Pittsburgh, et al.

9:15 AM 950 *Visualization of Phase Evolution of Ternary Spinel Transition Metal Oxides (CuFe_2O_4) During Lithiation*; EA Stach; Brook Haven National Laboratory; ES Takeuchi, AC Marschilok, KJ Takeuchi, CA Cama, J Li; Stony Brook University

9:30 AM 951 *On the Detection Limits of Li K X-rays Using Windowless Energy Dispersive Spectrometer (EDS)*; P Hovington, V Timoshevskii, S Bessette; Hydro-Quebec; S Burgess, P Statham; Oxford Instruments NanaoAnalysis; H Demers, R Gauvin; McGill University, Canada, K Zaghib; Hydro-Quebec

9:45 AM 952 *3D Characterization of Silicon Based Electrode Material for Advanced Lithium-Ion Storage Technologies*; T Vorauer, J Rosc; Materials Center Leoben Forschung GmbH, Austria; PH Jouneau, P Bayle-Guillemaud; University Grenoble Alpes, France; B Fuchsbichler, S Koller; Varta Micro Innovation GmbH; R Brunner; Materials Center Leoben Forschung GmbH, Austria

P09.1 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS:

M. Grace Burke, University of Manchester, United Kingdom
Bryan Miller, Naval Nuclear Laboratory

PLATFORM SESSION

Thursday 8:30 AM • Room: 265

8:30 AM 953 (INVITED) *Revealing Nanometre-Scaled Solutes Clusters in Neutron Irradiated Low Alloy Steels*; JJ Lim; UK Atomic Energy Authority; MG Burke; University of Manchester, United Kingdom

9:00 AM 954 (INVITED) *Investigating the Influence of Zircaloy-4 Grain Orientation on Oxide Corrosion Films Formed in an Autoclave Environment*; GA Lucadamo, JA Gruber; Naval Nuclear Laboratory

9:30 AM 955 *The Corrosion of Secondary Phase Precipitates in Zircaloy in Superheated Water*; I MacLaren, KJ Annand; University of Glasgow, Scotland; M Gass; AMEC Foster Wheeler, UK

9:45 AM 956 *Microstructural Characterization of Pu-Zr Fuels*; A Aitkaliyeva; University of Florida; CA Papesch; Idaho National Laboratory

A

ANALYTICAL SCIENCES POSTER SESSIONS – THURSDAY MORNING

A03.P1 Big, Deep, and Smart Data in Microscopy

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 346

10:00 AM 958 *What Can We Learn from the Shapes of Secondary Electron Puddles on Direct Electron Detectors?*; A Datta, SW Chee; National University of Singapore; B Bammes, L Jin; Direct Electron, LP; D Loh; National University of Singapore, Singapore

POSTER # 347

10:00 AM 959 *Rapid Measurement of I-V Curves via Complete Information Acquisition*; S Somnath, P Maksymovych, S Kalinin, S Jesse, R Vasudevan; Oak Ridge National Laboratory

POSTER # 348

10:00 AM 960 *Separation of Hard to Distinguish Phases in Automated Feature Analysis*; M Hiscock, S Burgess, C Lang; Oxford Instruments

POSTER # 349

10:00 AM 961 (INVITED) *Understanding and Exploiting the Interaction of Electron Beams with Low-Dimensional Materials – From Controlled Atomic-Level Manipulation to Circumventing Radiation Damage*; T Susi, A Mittelberger, C Kramberger, C Mangler, C Hofer, TJ Pennycook, J Kotakoski, JC Meyer; University of Vienna, Austria

POSTER # 350

10:00 AM 962 *Supervised Component Analysis for EELS Mapping*; S Wang; Micron Technology, Inc.

POSTER # 351

10:00 AM 963 *Processing a Five Dimensional X-ray Image: Big Data Challenges and Opportunities*; J Davis, J Schmidt, M Huth; PNDetector GmbH, Germany; R Hartmann; PNSensor GmbH, Germany; H Soltan; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany

POSTER # 352

10:00 AM 964 *Inter-Phase Relationships Revealed in 3-Dimensional Orientation Spaces*; R Krakow, RJ Bennett, DN Johnstone, PA Midgley, R Hielscher; TU Chemnitz; CM Rae; University of Cambridge, United Kingdom

POSTER # 353

10:00 AM 965 *In Situ Transmission Electron Microscopy Graphene Liquid Cell on Chemical Sodiation of Nickel Oxide Nanoparticle*; Fj Mweta, JH Chang, HK Seo, SJ Kim, JY Cheong, I-D Kim, J Yuk, JY Lee; Korea Advanced Institute of Science and Technology, Korea

A08.P2 Advances and Applications of Aberration-Corrected Electron Microscopy

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 354

10:00 AM 966 *Depth-Dependent Contrast in Probability-Current Imaging from Channeling in Crystalline Materials*; Z Chen, KX Nguyen, CS Chang, MC Cao, DA Muller; Cornell University

POSTER # 355

10:00 AM 967 *Better Contrast for Imaging Defects by ABF*; P Gao; Peking University, China

POSTER # 356

10:00 AM 968 *Z-Contrast Imaging for Elemental Analysis: Single Atoms to Clusters*; MC Akatay, W Sinkler, SI Sanchez, SA Bradley; Honeywell UOP

POSTER # 357

10:00 AM 969 *Facet Selective Growth of Iridium Chains/Wires of Single-Atom Width on the {10-10} Surfaces of ZnO Nanowires*; J Xu, Y Song, H Wu, J Liu; Arizona State University

POSTER # 358

10:00 AM 970 *Z-Contrast Imaging of Incommensurately Modulated Structure in Plagioclase Feldspars*; H Xu, S Jin; University of Wisconsin, Madison

POSTER # 359

10:00 AM 971 *Atomic Resolution Microscopy of Clathrate-I Type Borosilicides*; R Ramlau, W Jung, Y Grin; Max-Planck-Institut für Chemische Physik fester Stoffe, Germany

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS–

THURSDAY MORNING CONTINUED

A13.P2 Applications of Atom Probe Tomography

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 360

10:00 AM **972** *Atom Probe Tomography of Reduced Phases in Apollo 16 Regolith Sample 61501,22*; P Gopon; University of Oxford, United Kingdom; M Spicuzza; University of Wisconsin; TF Kelly, DA Reinhard, TJ Prosa, DJ Larson; CAMECA Instruments, Inc.; J Fournelle; University of Wisconsin, Madison

POSTER # 361

10:00 AM **973** *An Atom Probe Tomography Study of Ni-Cr-Al-Ti High-Temperature Oxidation*; TL Barth, EA Marquis; University of Michigan, Ann Arbor

POSTER # 362

10:00 AM **974** *The Supersaturation and Transient Volume Measurement for Nucleation, Growth, Coarsening in a Concentrated Ni-Based Superalloy*; S-I Baik; Northwestern University

POSTER # 363

10:00 AM **975** *Nanoscale Phase Separation in $Al_{0.5}CoCrFeNi(Cu)$ High Entropy Alloys as Studied by Atom Probe Tomography*; KE Knippling; U.S. Naval Research Laboratory; JL Tharpe, PK Liaw; The University of Tennessee

POSTER # 364

10:00 AM **976** *Influence of Ni, Mo and Mn Content on the G-Phase Precipitation and Spinodal Decomposition of Aged Duplex Stainless Steels*; R Badyka, C Pareige; Centre National de la Recherche Scientifique, Université et INSA de Rouen; S Sallet, C Domain; EDF R&D

POSTER # 365

10:00 AM **977** *Investigation of Novel Phase Transformation Mechanisms in Titanium Alloys Using Atom Probe and Aberration-Corrected Scanning Transmission Electron Microscope*; Y Zheng; The Ohio State University; T Alam, R Banerjee; University of North Texas; HL Fraser; The Ohio State University

A14.P1 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 366

10:00 AM **978** *An Analysis of Nanoindentation in a NiCoAlFeMo High Entropy Alloy Produced by Sintering*; CD Gómez-Esparza, CA Rodríguez-González; Universidad Autónoma de Ciudad Juárez Mexico; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 367

10:00 AM **979** *Effect of Ti and W Additions on the Microstructural Behavior of a Nanocrystalline CoCrFeMoNi High Entropy Alloy*; CD Gómez-Esparza, H Camacho-Montes; Universidad Autónoma de Ciudad Juárez, Mexico; I Estrada-Guel, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico; CA Rodríguez-González; Universidad Autónoma de Ciudad Juárez, Mexico

POSTER # 368

10:00 AM **980** *Mechanical Behavior on Microstructure of B4C Particles Reinforced 2024 Aluminum Matrix Composite Obtained by Mechanical Milling*; C Carreño-Gallardo, I Estrada-Guel, M Herrera-Ramírez, R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados S.C., Mexico; C López-Meléndez; Universidad La Salle Chihuahua, Mexico

POSTER # 369

10:00 AM **981** *Microstructure and Superconductivity of Bi/Ni Bilayers Prepared by Pulsed Laser Deposition*; L Liu; Pontificia Universidade Católica do Rio de Janeiro, Brazil; Y Xing, D Franceschini; Universidade Federal Fluminense, Brazil; G Solórzano; Pontificia Universidade Católica do Rio de Janeiro, Brazil

POSTER # 370

10:00 AM **982** *Correlated EBSD and High Speed Nanoindentation Mapping*; E Hintsala, J Risan, R Dietrich, R Nay; Bruker Corporation

POSTER # 371

10:00 AM **983** *In Situ Study of High-Temperature Mechanical Properties of Carbon Nanotube Scaffolds*; S Bhowmick; Bruker Corporation; CS Tiwary; Rice University; S Asif; Bruker Corporation; PM Ajayan; Rice University

Thursday, August 10

POSTER # 372

10:00 AM 984 *TEM Study of Polycrystalline Co-Ni-Ga for Applications of Shape Memory Alloys*; M Sánchez-Carrillo; Universidad Tecnológica de Chihuahua Sur, Mexico; JP Flores-de-los-Ríos; Universidad Autónoma de Chihuahua, Mexico; HJ Morales-Rodríguez; Universidad Tecnológica de Chihuahua Sur, Mexico; J Ramos-Cano; Universidad Autónoma de Coahuila, Mexico; A Santos-Beltrán, V Gallegos-Orozco; Universidad Tecnológica de Chihuahua Sur, Mexico

POSTER # 373

10:00 AM 985 *Study of Nanostructured NiCrMo Base Alloy Applied via LVOF Thermal Spray*; VG Gallegos-Orozco, A Santos-Beltran; Universidad Tecnológica de Chihuahua Sur, Mexico; M Santos; Centro de Investigación en Materiales Avanzados, Mexico; H Morales-Rodríguez, I Ronquillo-Ornelas, R Carbajal-Sanchez; Universidad Tecnológica de Chihuahua Sur Mexico; C Modesto; Universidad Tecnológica de Chihuahua Sur, Mexico; V Orozco; Centro de Investigación en Materiales Avanzados, Mexico, et al.

POSTER # 374

10:00 AM 986 *Microstructural Characterization of Inconel 718 for Aeronautical Use*; A Martinez; Centro de Investigación en Materiales Avanzados, Mexico, MT Santoyo, O Vazquez; Instituto Tecnológico de Morelia, Mexico; JM Herrera; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 375

10:00 AM 987 *Influence of Salt Fluxes on Recycled Al Nanocomposites Reinforced with TiO₂ Nanoparticles Produced in Liquid State*; A Santos-Beltran, V Gallegos-Orozco, H Morales-Rodríguez, M Sanchez-Carrillo; Universidad Tecnológica de Chihuahua Sur, Mexico; I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; C Modesto-Acosta; Universidad Tecnológica de Chihuahua Sur, Mexico

POSTER # 376

10:00 AM 988 *Improved Understanding of Material Behavior Using Correlative In Situ Techniques*; MJ Cordill, J Kreith; Erich Schmid Institute of Material Science, Austria; M Winhold, M Leitner, CH Schwalb; GETec Microscopy GmbH, Austria

POSTER # 377

10:00 AM 989 *Comparative Study between Vickers and Knoop Micro-hardness of Ultra High Temperature Ceramics*; N Seetala, A Simpson, C Provo; Grambling State University; L Matson; Air Force Laboratory; H Lee; UES, Inc.

POSTER # 378

10:00 AM 990 *Effect of Build Orientation on the Mechanical Properties and Fracture Behavior of ABS Produced by Fused Deposition Modeling*; F Akasheh, A Rochester, H Aglan; Tuskegee University

POSTER # 379

10:00 AM 991 *Technique for In Situ Meso-Scale Uniaxial Mechanical Testing in the SEM*; C Spellman, V Verma, A Arzoumanidis, Z Zanzinger; Psylotech, Inc

POSTER # 380

10:00 AM 992 *Low-Cost Functionalized Pseudoboehmite/Aluminum Substrates for The Analysis of Nanoparticles by SEM*; MM Martinez-Garcia, PE Cardoso-Avila, N Gomez-Ortiz, JL Pichardo-Molina; Centro de Investigaciones en Optica AC, Mexico

A15.P1 Pushing the Limits of Cryo-TEM: Development and Applications

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 381

10:00 AM 993 *Relating Sampling Anisotropy to Resolution Anisotropy in Cryo-EM Maps*; PR Baldwin, YZ Tan, ET Eng, CS Potter, B Carragher; New York Structural Biology Center

POSTER # 382

10:00 AM 994 *Hole-Free Phase Plate Energy Filtering Imaging of Graphene: Toward Quantitative Hole-Free Phase Plate Imaging in a TEM*; M Malac; National Institute for Nanotechnology, Canada, NRC and University of Alberta, Canada; E Kano; University of Alberta, Canada; M Hayashida; National Institute for Nanotechnology, Canada; M Kawasaki, S Motoki; JEOL, USA Inc.; RF Egerton; University of Alberta, Canada; I Ishikawa, Y Okura; JEOL, Ltd., Japan, et al.

Scientific Program

A

ANALYTICAL SCIENCES POSTER SESSIONS–

THURSDAY MORNING CONTINUED

POSTER # 383

10:00 AM 995 *Cryo-FIB Lift-Out Sample Preparation Using a Novel Cryo-gripper Tool*; AJ Smith; Kleindiek Nanotechnik GmbH, Germany; T Laugks; Max Planck Institute of Biochemistry, Germany; S Kleindiek; Kleindiek Nanotechnik GmbH, Germany; S Albert; Max Planck Institute of Biochemistry, Germany; MP Johnson, WH Wood; University of Sheffield; BD Engel, W Baumeister; Max Planck Institute of Biochemistry, Germany, et al.

POSTER # 384

10:00 AM 996 *Design of a High Capacity Puck Storage System for Cryo-EM Grids in a Facility Setting*; A Estevez, C Arthur, A Rohou, C Ciferri; Genentech

POSTER # 385

10:00 AM 997 *Self-Blotting Nanowire Grids for Cryo-EM Sample Preparation*; H Wei, Z Zhang, V Dandey; A Raczkowski; B Carragher, CS Potter; New York Structural Biology Center

POSTER # 386

10:00 AM 998 *Studying the Effects of Interfacial Coupling in $\text{La}_{0.5}\text{Sr}_{0.5}\text{CoO}_{3-\delta}$ Thin Films on SrTiO_3 Using In Situ Cooling Experiments*; X Rui; University of Illinois, Chicago; J Walter, C Leighton; University of Minnesota; RF Klie; University of Illinois, Chicago

POSTER # 387

10:00 AM 999 *Distinguish Coexistence of Nanoemulsion and Liposome in Propofol by Cryogenic Transmission Electron Microscopy (cryo-TEM)*; Y Wu, P Petrochenko, JH Myung, S Manna, B Koo, S Choi, D Kozak, J Zheng; Food and Drug Administration

A16.P2 *In Situ* and Operando Characterization of Material Processes in Liquids and Gases

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 388

10:00 AM 1000 *The Effects of Impurities on Crystal Growth Rate in an Isothermal Continuous-Flow Reactor Using a Photomicroscopic Method*; L-D Shiau; Chang Gung University, Taiwan

POSTER # 389

10:00 AM 1001 *In Situ Observation of Rh-CaTiO₃ Catalysts During Reduction and Oxidation Treatments By Transmission Electron Microscopy*; S Dai; University of California, Irvine; S Zhang, M Katz; University of Michigan; G Graham, X Pan; University of California, Irvine

POSTER # 390

10:00 AM 1002 *Temperature Measurement in a TEM Using Electron Diffraction of Amorphous Films*; M Hayashida, K Cui; National Institute for Nanotechnology, Canada; M Malac; marek malac@gmail.com

POSTER # 391

10:00 AM 1003 *Formation of Swiss-Cheese-Like Nanostructure of $\alpha\text{-Fe}_2\text{O}_3$ by Reduction*; W Zhu; Binghamton University; J Winterstein, R Sharma; National Institute of Standards and Technology; G Zhou; Binghamton University

POSTER # 392

10:00 AM 1004 *In Situ Study of Dynamics of CuAu Alloy Nanoparticles on Oxide Supports*; W Gao; University of California, Irvine; M Colombo; Istituto Italiano di Tecnologia; S Dai, S Zhang, G Graham, X Pan; University of California, Irvine

POSTER # 393

10:00 AM 1005 *In Situ TEM Study on Size-Dependent Thermal Stability of Nickel Filled Silica Nano-Opals*; P Moradifar, Y Liu, J Russell, T Mallouk, J Badding, N Alem; University of Pennsylvania

POSTER # 394

10:00 AM 1006 *Addressing In Situ Challenges Using Integrated Hardware and Software*; BK Miller, S Mick; Gatan Inc

Thursday, August 10

POSTER # 395

10:00 AM 1007 (M&M STUDENT SCHOLAR) *Atomic-Scale Relaxation Dynamics in the Supercooled Liquid State of a Metallic Glass Nanowire by Electron Correlation Microscopy*; P Zhang; University of Wisconsin, Madison; Z Liu, J Schroers; Yale University; PM Voyles; University of Wisconsin, Madison

POSTER # 396

10:00 AM 1008 *Three-Dimensional Analyses of Degradation in PEMFCs*; T Daio; Osaka University; I Narita; Osaka Kyoiku University, Japan; K Suganuma; Osaka University, Japan

POSTER # 397

10:00 AM 1009 *The Stability of Sapphire in the Presence of Water: An Environmental TEM Study*; J Carpena-Núñez; National Research Council; D Zakharov; Brookhaven National Laboratory; AE Islam, G Sargent; UES, Inc.; EA Stach; Brookhaven National Laboratory; B Maruyama; U.S. Air Force Research Laboratory

POSTER # 398

10:00 AM 1010 *Atomic-Resolution Characterization of Surface Structures and Metal-Support Interfaces on Nanostructured Pt/CeO₂ Catalysts Performing CO Oxidation*; J Vincent, PA Crozier; Arizona State University

POSTER # 399

10:00 AM 1011 *Understanding Redox Effects on Supported Bimetallic Particles*; CE Kliewer; ExxonMobil

B

BIOLOGICAL SCIENCES POSTER SESSIONS – THURSDAY MORNING

B03.P1 Imaging the Biology of Cells and Tissues: Just Do It Right

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 400

10:00 AM 1012 *Nanoscale Observation of Intact Biological Specimens in Water with High-Contrast Imaging by Scanning Electron-Assisted Dielectric-impedance Microscopy*; T Ogura, T Okada; National Institute of Advanced Industrial Science and Technology

POSTER # 401

10:00 AM 1013 *Morphological and Production Changes in Planktonic and Biofilm Cells Monitored Using SEM and Raman Spectroscopy*; K Hrubanova, V Krzyzanek, O Samek, R Skoupy, M Šiler, J Ježek; Institute of Scientific Instruments of the CAS, v.v.i., Czech Republic; S Obruča; Brno University of Technology, Czech Republic, P Zemanek; Institute of Scientific Instruments of the CAS, v.v.i., Czech Republic

POSTER # 402

10:00 AM 1014 *Large-Area Ultrastructural Analysis on Alteration of Synaptic Vesicles in the 835MHz Radiofrequency-Exposed Cerebral Cortex of Mice Brain Using Limitless Panorama and 3D Electron Tomography*; H-J Kim; Korea Basic Science Institute; JH Kim, D-H Yu; Dankook University, Korea; AR Je, S Choi, H-S Kweon; Korea Basic Science Institute; HR Kim; Dankook University, Korea, YH Huh; Korea Basic Science Institute

POSTER # 403

10:00 AM 1015 *Advantages of Using a Variable Pressure Serial Block Face Scanning Electron Microscope for 3D Volume Analyses*; CS López; Oregon Health & Science University; C Bouchet-Marquis; Thermo Fisher Scientific; M Williams; Oregon Health & Sciences University

POSTER # 404

10:00 AM 1016 *Developing a Training Module in Rigor and Reproducibility in Imaging Sciences*; AM Medina-Lopez, H Shinogle-Decker, N Martinez-Rivera, E Rosa-Molinar; The University of Kansas

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS – THURSDAY MORNING

P01.P2 Characterization of Semiconductor Materials and Devices

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 405

10:00 AM **1017** *Radial Interference Contrast in In Situ SEM Observation of Metal Oxide Semiconductor Film Crystallization*; K Shigeto; Hitachi High-Technologies Corporation, Japan; T Kizu, K Tsukagoshi, T Nabatame; National Institute for Materials Science, Japan

POSTER # 406

10:00 AM **1018** *Analysis of Amorphous-to-Crystalline Germanium Stack with Cs-Corrected Analytical STEM*; DH Anjum; King Abdullah University of Science & Technology, Saudi Arabia; KH Lee; Nanyang Technological University, Singapore; G Zhou; University of British Columbia, Canada; Q Zhang, N Wei; King Abdullah University of Science & Technology; GM Xia; University of British Columbia, Canada; CS Tan; Nanyang Technological University, Singapore, X Zhang; King Abdullah University of Science & Technology, Saudi Arabia

POSTER # 407

10:00 AM **1019** *Growth of ZnO Thin Films Synthesized By Chemical Routes for Optoelectronic Applications*; R Sánchez-Zeferino, ME Álvarez-Ramos, RC Carrillo-Torres, S Munguia-Rodríguez, JA Gonzalez, G Saavedra-Rodríguez; Universidad de Sonora, Mexico

POSTER # 408

10:00 AM **1020** *Assessing Hexagonal Boron Nitride Crystal Quality by Defect Sensitive Etching*; T Hoffman, Y Zhao, S Liu; Kansas State University; N Khan; Georgia Gwinnett College; M Twigg, N Bassim; McMaster University, Canada; J Edgar; Kansas State University

POSTER # 409

10:00 AM **1021** *Exploring the Structural and Electronic Properties of Nanowires at Their Mechanical Limits*; B Ozdol; Lawrence Berkeley National Laboratory; C Gammer; Austrian Academy of Sciences; L Zeng; Chalmers

University of Technology, Sweden; S Bhowmick; Hysitron Inc; T Nordqvist, P Krogstrup; Niels Bohr Institute, Denmark; AM Minor, U Dahmen; Lawrence Berkeley National Laboratory, et al.

POSTER # 410

10:00 AM **1022** *Mapping Anti-phase Domains by Polarity Sensitive Orientation Imaging Using Electron Backscatter Diffraction*; N-K Gunasekar, S Vespucci; University of Strathclyde, Scotland; A Vilalta-Clemente; University of Oxford, United Kingdom; H Jussila; Aalto University, Finland; A Winkelmann; Bruker Nano GmbH, Germany; G Nolze; BAM; N Subramaniam; Aalto University, Finland, AJ Wilkinson; University of Oxford, United Kingdom, et al.

POSTER # 411

10:00 AM **1023** *Transmission Electron Microscopy of Vertically Stacked ErAs-InAs Semimetal - Quantum Dot Nanocomposite Heterostructures Grown on GaAs(001) Substrates*; K Mahalingam, YZ Zhang, KG Eyink, J Peoples, B Urwin, L Grazulis, M Hill; U.S. Air Force Research Laboratory

POSTER # 412

10:00 AM **1024** *Correlation of Etch Pits and Dislocations in As-grown and Thermal-Cycle-Annealed HgCdTe(211) Films*; M Vaghayenagar; Arizona State University; RN Jacobs, JD Benson, AJ Stoltz, LA Almeida; U.S. Army Development and Engineering Command; DJ Smith; Arizona State University

P05.P1 Imaging and Spectroscopy of Beam Sensitive Materials

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 413

10:00 AM **1025** *Characterization of Fluorescence-Tagged Polymeric Particles Using Confocal Laser Scanning Microscopy and Three-Dimensional Structured Illumination Microscopy*; X Wang, M Wei; Nalco Water, An Ecolab Company

POSTER # 414

10:00 AM **1026** *Polymer Imaging in SEM – Charge, Damage and Coating-Free.*; P Wandrol; Thermo Fisher Scientific; M Slouf; Institute of Macromolecular Chemistry ASCR, Czech Republic

POSTER # 415

10:00 AM 1027 *The Structure and Electronic States of Self-Assembled C60 Crystals*; T Ramprasad; University of Arizona; J Howe; Hitachi High Technologies America, Inc.; Tj Gnanaprakasa; University of Arizona; A Hanawa; Hitachi High Technologies Inc., Japan; J Jiminez; Hitachi High Technologies America, Inc.; K Muralidaran, Tj Zega; University of Arizona

POSTER # 416

10:00 AM 1028 *Investigation of the Nature of Capping Layer Materials for FIB-SEM Preparation: Implications for the Study of Carbonaceous Material in Extraterrestrial Samples*; P Haenecour, TJ Zega; The University of Arizona; JY Howe; Hitachi High-Technologies America, Inc.; P Wallace; The University of Arizona; C Floss; Washington University in St. Louis; T Yada; Institute of Space and Astronautical Science, Japan

POSTER # 417

10:00 AM 1029 *Characterization of BiVO₄ Powders and Thin Films by Electron Microscopy and Electron Energy Loss Spectroscopy*; HA Calderon; Instituto Politecnico Nacional, Mexico; FM Toma, JK Cooper, ID Sharp, P Ercius; Lawrence Berkeley National Laboratory; OE Cigarroa- Mayorga, E Neri; Instituto Politecnico Nacional, Mexico

POSTER # 418

10:00 AM 1030 *Convenient Optics for High Dispersion Small Angle Electron Diffraction with Highly Coherent Low Dose Illumination*; M Kawasaki; JEOL USA, Inc.; M Shiojiri, K Nishio; Kyoto Institute of Technology, Japan

POSTER # 419

10:00 AM 1031 *Transmission Electron Microscope Observation of Charge Distribution on Insulating Thin Films by Hydro-Carbon Deposition*; K Harada, K Shimada, K Niitsu; RIKEN, Japan; T Katsuta; Vacuum Device Inc.; T Ohno; Tecnex Lab; D Shindo; RIKEN, Japan

POSTER # 420

10:00 AM 1032 *Accelerating Voltage and Probe Current Dependence of Electron Beam Drilling Rates for Silicon Crystal*; N Endo, Y Kondo; JEOL, Ltd., Japan

POSTER # 421

10:00 AM 1033 *Expanding the Depth of Field for Imaging with Low keV Electrons: High-Resolution Surface Observations of Nanostructured LaB₆ Using Low keV Secondary and Backscattered Electrons*; T Sunaoshi, S Okada, K Kaji;

Hitachi High-Technologies Corporation, Japan; E Voelkl; Hitachi High Technologies America; R Ramachandran, T Salguero; University of Georgia

POSTER # 422

10:00 AM 1034 *Non-Invasive Morphological and Elemental Analysis of Ivory Plate for Artworks Authentication Using ESEM and EDS*; E Tihlaříková, V Neděla; Institute of Scientific Instruments of the CAS, Czech Republic; J Hradilová; Academy of Fine Arts in Prague; D Hradil; Institute of Inorganic Chemistry of the CAS, Czech Republic

POSTER # 423

10:00 AM 1035 *Microgel Swelling Studied by Cryo-SEM*; J Liang, F Teng, T Chou, M Libera; Stevens Institute of Technology

POSTER # 424

10:00 AM 1036 *Scientific Analysis of NPAR Processing of EBSD Results for Beam-Sensitive Materials*; PP Camus, SI Wright, MM Nowell; EDAX Inc.; R de Kloe; EDAX B.V.

POSTER # 425

10:00 AM 1037 *SEM/EDS Analysis of Cell Phone Cover Glass Facilitated by the Use of a Silicon Drift Detector*; J Konopka; Thermo Fisher Scientific

POSTER # 426

10:00 AM 1038 *Treading Lightly – Achieving Spectroscopy and Elemental Maps of Beam Sensitive Specimens in the SEM*; SR Burgess, J Holland, JT Sagar; Oxford Instruments Nanoanalysis

POSTER # 427

10:00 AM 1039 *Damage-less Chemical State Analysis by Using Soft X-ray Emission Spectroscopy in Low Voltage SEM*; Y Sakuda; JEOL Ltd., Japan; M Ishizaki, T Togashi; Yamagata University, Japan; S Asahina, M Takakura, H Takahashi; JEOL Ltd., Japan; M Kurihara; Yamagata University, Japan

POSTER # 428

10:00 AM 1040 *Imaging Hydrated Nanostructured Zeolite X Using Single-Electron-Detection Camera*; S Chen, S Don, SL Chang; Arizona State University

POSTER # 429

10:00 AM 1041 *Low Dose Characterization of Diamondoid Carbon Nanofibers by Transmission Electron Microscopy*; S Juhl, X Li, J Badding, N Alem; The Pennsylvania State University

Scientific Program

P

PHYSICAL SCIENCES POSTER SESSIONS— THURSDAY MORNING CONTINUED

POSTER # 430

10:00 AM **1042** *Exposing Advanced Building Strategies of Strongly Iron-Enriched Incisors*; V Srot, B Bussmann, J Deuschle; Max Planck Institute for Solid State Research, Germany; B Pokorny; Environmental Protection College + Institute ERICo, Velenje, Slovenian Forestry Institute, M Watanabe; Lehigh University; PA van Aken; Max Planck Institute for Solid State Research, Germany

POSTER # 430A

10:00 AM **1042.5** *Application of Electron Counting to Electron Energy-loss Spectroscopy and Implications for Low-Dose Characterization*; JL Hart, AC Lang, AC Leff; Drexel University; P Longo, C Trevor, R Twesten; Gatan; ML Taheri; Drexel University

P07.P3 Advanced Characterization of Energy-Related Materials

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 431

10:00 AM **1043** *Development of Quantitative Techniques with Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) for Li Characterization in High Energy Batteries*; S Bessette; Hydro-Quebec and McGill University, Canada; P Hovington, C Kim; Hydro-Quebec; R Gauvin, H Demers; McGill University, Canada; K Zaghib; Hydro-Quebec

POSTER # 432

10:00 AM **1044** *Electron Tomography of PEM Fuel Cell Catalyst Coarsening on Alternate Carbon Supports*; BT Sneed, DA Cullen, KS Reeves, KL More; Oak Ridge National Laboratory

POSTER # 433

10:00 AM **1045** *Direct Observation of Hafnia Structural Phase Transformations*; BM Hudak; University of Kentucky; SW Depner; University of Buffalo; GR Waetzig, S Banerjee; Texas A&M University; BS Guiton; University of Kentucky

POSTER # 434

10:00 AM **1046** *Annealing Effects on TiO₂ Photocatalytic Degradation of Methylene Blue*; R Catabay, S Fowler; Portland State University; A Leng; Lincoln High School; J Jiao; Portland State University

POSTER # 435

10:00 AM **1047** *TEM Analysis of CsPbBr₃ Nanocrystals: Challenges and Perspectives*; M Brennan, M Kuno, S Rouvimov; University of Notre Dame

POSTER # 436

10:00 AM **1048** *Monochromated Electron Energy-Loss Spectroscopy of Lead-Free Halide Perovskite Semiconductors*; JA Alexander, ET McClure, PM Woodward, DW McComb; The Ohio State University

POSTER # 437

10:00 AM **1049** *Structural Change of a Cu/ZnO Catalyst Under Methanol Observed by ETEM*; H Chi, C Bonifacio, C Andolina; University of Pittsburgh; E Stach; Brookhaven National Laboratory; G Vesper, J Yang; University of Pittsburgh

POSTER # 438

10:00 AM **1050** *A 4D Framework for Probing Structure-Property Relationships in Lithium Ion Batteries*; J Gelb; San Jose State University; D Finegan; University College London, UK; M McNeil; San Jose State University; D Brett, PR Shearing; University College London, United Kingdom

POSTER # 439

10:00 AM **1051** *Calculation of the Electric Field Based on Average Momentum Transfer Using Pixelated Electron Detector in STEM*; W Gao, C Addiego, X Pan; University of California, Irvine

POSTER # 440

10:00 AM **1052** *Nanoscale Imaging of Subsurface Oxygen Formation on Rhodium Catalysts*; SV Lambeets, C Barroo; Université libre de Bruxelles, Belgium; S Owczarek; University of Wrocław, Poland; E Genty, N Gilis, T Visart de Bocarmé; Université libre de Bruxelles, Belgium

POSTER # 441

10:00 AM **1053** *Microstructure and Crystallographic Determination of Nanoporous Catalysts*; C Barroo; Université libre de Bruxelles, Belgium; T Egle, AJ Akey, DC Bell; Harvard University; J Biener; Lawrence Livermore National Laboratory

POSTER # 442

10:00 AM **1054** *Corrosion Analysis of Electrical Connectors Using SEM*; J Ford, H Aglan, A Ludwick; Tuskegee University

P09.P1 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

POSTER SESSION

Thursday 10:00 AM • Room: Exhibit Hall

POSTER # 443

10:00 AM **1055** *EBSD and TEM Microstructural Studies of New Fuel Cladding in Generation-IV Sodium-Cooled Fast Nuclear Reactors*; P Nowakowski, BS Bonifacio, MJ Campin, ML Ray, PE Fischione; E.A. Fischione Instruments; S Mathieu; Université de Lorraine, France

POSTER # 444

10:00 AM **1056** *Assessment of Corrosion Resistance of Candidate Alloys for Accident Tolerant Fuel Cladding Under Reactor Conditions*; S Rouvimov, S Grdanovska; University of Notre Dame

POSTER # 445

10:00 AM **1057** *Structural Characterization of Fission Products in Irradiated TRISO Fuels Using Transmission Kikuchi Diffraction, Transmission Electron Microscopy, and Synchrotron X-ray Absorption Spectroscopy*; RL Seibert; Illinois Institute of Technology; CM Parish, JD Hunn, CA Baldwin, KA Terrani; Oak Ridge National Laboratory; J Terry; Illinois Institute of Technology

POSTER # 446

10:00 AM **1058** *Identification of Fluorescent Material Using FE-SEM/EDS and a Variable Pressure Secondary Electron Detector*; H Ajo, D DiPrete; Savannah River National Laboratory

POSTER # 447

10:00 AM **1059** *He⁺ Irradiation Induced Cracking and Exfoliation of the Surface of Ti₃AlC₂*; H Shen; China Academy of Engineering Physics

POSTER # 448

10:00 AM **1060** *Measurement of Irradiation-Induced Swelling in Stainless Steels with a New Transmission Electron Microscopy Method*; L He; University of Wisconsin, Madison; H Xu; University of Tennessee; L Tan; Oak Ridge National Laboratory; PM Voyles, K Sridharan; University of Wisconsin, Madison

POSTER # 449

10:00 AM **1061** *Defect Characterization in Irradiated Nanocrystalline Materials via Automated Crystal Orientation Mapping*; PK Suri, JE Nathaniel; Drexel University; CM Barr; Drexel University, Sandia National Laboratories; JK Baldwin; Los Alamos National Laboratory; K Hattar; Sandia National Laboratories; ML Taheri; Drexel University

POSTER # 450

10:00 AM **1062** *Surface Morphology Analysis of Ti-6Al-4V, V-4Ti-5Cr, and Molybdenum Exposed to Low Power Nd: YAG Laser*; H Aglan, A Kumar, K Muir; Tuskegee University; A Hassanein; Purdue University

POSTER # 451

10:00 AM **1063** *Discontinuous Precipitation in Aged Welded Joints of High Cr-Ni Superalloy*; JC Spadotto, G Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil

POSTER # 452

10:00 AM **1064** *Morphological Evolution and Coalescence of γ' Precipitates*; CG Garay-Reyes; Centro de Investigación en Materiales Avanzados, Mexico; SE Hernández-Martínez, JL Hernández-Rivera, JJ Cruz-Rivera; Universidad Autónoma de San Luis Potosí, Mexico; MC Maldonado-Orozco; Universidad Autónoma de Chihuahua, Mexico; I Estrada-Guel; Centro de Investigación en Materiales Avanzados, Mexico; HJ Dorantes-Rosales; Instituto Politécnico Nacional, Mexico; R Martínez-Sánchez; Centro de Investigación en Materiales Avanzados, Mexico

POSTER # 453

10:00 AM **1065** *Microstructure Evolution of Ti Tritides During Aging*; HFW H.F. Wang, SMP S.M. Peng, HHS H.H. Shen, XSZ X.S. Zhou; China Academy of Engineering Physics

POSTER # 454

10:00 AM **1066** *STEM Imaging and Phase Mapping of Precipitation in Alloy 718 Using an Electron Microscope Pixel Array Detector*; CA Wade; The University of Manchester, United Kingdom; E Yucelen, S Sluyterman, B Freitag; Thermo Fisher Scientific; G Burke; The University of Manchester, United Kingdom

Scientific Program

P PHYSICAL SCIENCES POSTER SESSIONS – THURSDAY MORNING CONTINUED

POSTER # 455

10:00 AM 1067 *Microstructure Evolution of Ni-Base Superalloy 625: From Conventional Thermomechanical Processed to Selective Laser Melting Processed*; C Labre; Pontifical Catholic University of Rio de Janeiro, Brazil; AL Pinto; Brazilian Center of Research in Physics; IG Solórzano; Pontifical Catholic University of Rio de Janeiro, Brazil

POSTER # 456

10:00 AM 1068 *Microstructural Study of the Heat-Treated 17-4PH Stainless Steel Parts Prepared by Selective Laser Melting*; Y Sun, M Aindow, RJ Hebert; University of Connecticut

POSTER # 457

10:00 AM 1069 *Precipitation in an Irradiated 625 Plus Alloy*; L-J Yu, E Marquis; University of Michigan

POSTER # 458

10:00 AM 1070 *Auger Electron Spectroscopy Analysis of Pit Initiation at MnS Nano-Inclusions in Carbon Steel*; JG Newman, JS Hammond; Physical Electronics; BH Davis, Z Suo, R Avci; Montana State University; DF Paul; Physical Electronics; I Beech; University of Oklahoma

POSTER # 459

10:00 AM 1071 *Microstructural Characterization of Irradiated and Hydrurate Zr-2.5%Nb AND Zr – 1%Nb*; C Vazquez, AM Fortis, PB Bozzano, RA Versaci; Centro Atómico Constituyentes, Argentina



X71.1 MSA 75th Anniversary Lecture in the Physical Sciences

SESSION CHAIR:

Ian M. Anderson, President, Microscopy Society of America

PLATFORM SESSION

Thursday 12:15 PM • Room: 275

12:15 PM 1132 (INVITED) *Smarter Than an iPhone: The Emergence of the Modern Electron Microscope*; Ondrej L. Krivanek; Nion R&D, Arizona State University

A ANALYTICAL SCIENCES SYMPOSIA – THURSDAY AFTERNOON

A01.4 Vendor Symposium

SESSION CHAIRS:

Paul Voyles, University of Wisconsin, Madison
Esther Bullitt, Boston University

PLATFORM SESSION

Thursday 1:30 PM • Room: 125

- 1:30 PM 1073** *Hardware and Software Advances in Commercially Available Atom Probe Tomography Systems*; RM Ulfig, TJ Prosa, Y Chen, KP Rice, I Martin, DA Reinhard, BP Gieser, E Oltman; CAMECA Instruments, Inc., et al.
- 1:45 PM 1074** *Atom Probe Tomography with the Easier to Operate EIKOS™*; KP Rice, Y Chen, RM Ulfig, D Lenz, J Bunton, M van Dyke, DJ Larson; CAMECA Instruments, Inc.
- 2:00 PM 1075** *Development of an X-ray Based Spectroscopy MicroXRF System with LA-ICP-MS Capabilities: Trace-Level Microns-scale Mapping and Femtogram Detection Sensitivity*; S Lau, SJ Lewis, W Yun, B Stripe, J Kirz, A Lyon, D Reynolds, RI Spink; Sigray, Inc.
- 2:15 PM 1076** *Improving Sensitivity and Productivity with High Count Rate X-ray Spectrum Images*; SR Burgess, M Hiscock, P Pinard; Oxford Instruments Nanoanalysis

- 2:30 PM **1077** *3D Mapping Grain Morphology and Grain Orientations by Laboratory Diffraction Contrast Tomography*; L Lavery; Carl Zeiss X-ray Microscopy; N Gueninchault; Xnovo Technology, Denmark; H Bale, C Holzner; Carl Zeiss X-ray Microscopy; F Bachmann, E Lauridsen; Xnovo Technology, Denmark

- 2:45 PM **1078** *Silicon Drift Detectors: Limitations for Throughput and Resolution*; J Rafaelsen; EDAX, Inc.

A03.3 Big, Deep, and Smart Data in Microscopy

SESSION CHAIR:

Eric Stach, Brookhaven National Laboratory

PLATFORM SESSION

Thursday 1:30 PM • Room: 260

- 1:30 PM **1079** *Accurate Diffraction Peak Identification for Scanning Electron Nanodiffraction Based on Automated Image Processing and Feature Detection*; R Yuan, Y Meng; University of Illinois, Urbana-Champaign; J Zhang; Intel Corporation; J-M Zuo; University of Illinois, Urbana-Champaign
- 1:45 PM **1080** (INVITED) *Autonomous Experimentation Applied to Carbon Nanotube Synthesis*; B Maruyama; U.S. Air Force Research Laboratory
- 2:15 PM **1081** *G-Mode – Full Information Capture Applied to Scanning Probe Microscopy*; S Somnath, SV Kalinin, S Jesse; Oak Ridge National Laboratory
- 2:30 PM **1082** *Combinatorial Microscopy in Liquids with Low Energy Electrons*; E Strelcov, H Guo, A Yulaev; National Institute of Standards and Technology; J Wang, N Appathurai, S Urquhart; CLS; J Vinson, S Sahu; National Institute of Standards and Technology, et al.
- 2:45 PM **1083** *Physic-Based Image Reconstruction of SiC Grain Boundaries*; A Ziabari; Purdue University; JM Rickman; Lehigh University; JP Simmons; Air Force Research Lab; CA Bouman; Purdue University

A08.5 Advances and Applications of Aberration-Corrected Electron Microscopy

SESSION CHAIRS:

Ben McMorran, University of Oregon

David Muller, Cornell University

PLATFORM SESSION

Thursday 1:30 PM • Room: 132

- 1:30 PM **1084** (INVITED) *Low-Voltage TEM/STEM for Imaging and Spectroscopy of Low-Dimensional Materials*; K Suenaga; National Institute for Advanced Industrial Science and Technology, Japan
- 2:00 PM **1085** (INVITED) *A New Detection Scheme for Van Der Waals Heterostructures, Imaging Individual Fullerenes Between Graphene Sheets, and Controlling the Vacuum in Scanning Transmission Electron Microscopy*; G Argentero, K Mustonen, R Mirzayev, A Mittelberger, T Susi, GT Leuthner; University of Vienna, Austria; Y Cao; University of Manchester, United Kingdom, M Monazam; University of Vienna, Austria, et al.
- 2:30 PM **1086** (MSA POSTDOCTORAL SCHOLAR) *Etching and Mending of Graphene Edges by Cu and Pt Atoms*; E Kano; University of Tsukuba, Japan; A Hashimoto, M Takeguchi; National Institute for Materials Science, Japan
- 2:45 PM **1087** *Quantification of Low Voltage Images of 2-Dimensional Materials in Aberration-Corrected Scanning Transmission Electron Microscopy*; MP Oxley; Oak Ridge National Laboratory; NG Cross, G Duscher; University of Tennessee; LJ Allen; University of Melbourne, Australia; MF Chisholm; Oak Ridge National Laboratory

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA–

THURSDAY AFTERNOON CONTINUED

A14.5 Nanomechanical Characterization of Materials Using Microscopy and Microanalysis Techniques

SESSION CHAIR:

Khalid Hattar, Sandia National Laboratories

PLATFORM SESSION

Thursday 1:30 PM • Room: 131

- 1:30 PM **1088** (INVITED) *Coupling Quantitative Dislocation Analysis with In Situ Loading Techniques: New Insight into Deformation Mechanisms*; ML Taheri, G Vetterick, AC Leff; Drexel University; M Marshall; Sandia National Laboratories; JK Baldwin, A Misra; Los Alamos National Laboratory; K Hattar; Sandia National Laboratories
- 2:00 PM **1089** *Characterization of Dislocation Plasticity in Rhenium Using In Situ TEM Deformation*; JE Sabisch, AM Minor; University of California, Berkeley
- 2:15 PM **1090** *In Situ TEM Investigation of the Deformation Mechanisms and Microstructural Changes in Ultrafine-Grained Non-Textured Aluminum Film Using Automated Crystal Orientation Mapping*; E Izadi, P Peralta, J Rajagopalan; Arizona State University
- 2:30 PM **1091** (INVITED) *Understanding Heterogeneous Deformation in Polycrystalline Al 6061 by In Situ SEM Deformation and HREBSD Characterization*; J Yoo; Georgia Institute of Technology; J Carroll, J Emery; Sandia National Laboratories; J Kacher; Georgia Institute of Technology

A15.4 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIR:

Radostin Danev, Max Planck Institute for Biochemistry, Germany

PLATFORM SESSION

Thursday 1:30 PM • Room: 127

- 1:30 PM **1092** (INVITED) *Lessons Learned from Using a Cs-Corrected, Energy-Filtered, Phase-Plate TEM for Single-Particle CryoEM*; A Cheng, E Eng, W Rice, L Kim; New York Structural Biology Center; M Alink; Thermo Fisher

Scientific; CS Potter, B Carragher; New York Structural Biology Center

- 2:00 PM **1093** (INVITED) *Development of High-Resolution Transmission Electron Microscopes for Analysis of Biomolecular Structure*; S Motoki, T Kaneko, H Iijima, Y Shimizu, I Ishikawa, Y Ohkura; JEOL, Ltd., Japan
- 2:30 PM **1094** *Electrostatic Zach Phase Plates for Transmission Electron Microscopy: Status and Future Investigations*; M Obermair, S Hettler, M Dries, D Gerthsen; Karlsruhe Institute of Technology, Germany
- 2:45 PM **1095** (INVITED) *Contamination and Charging of Amorphous Thin Films Suitable as Phase Plates for Phase-Contrast Transmission Electron Microscopy*; S Hettler, P Hermann, M Dries, M Obermair, D Gerthsen; Karlsruhe Institute of Technology, Germany; M Malac; National Institute for Nanotechnology, Canada

A16.8 In Situ and Operando Characterization of Material Processes in Liquids and Gases

SESSION CHAIR:

Libor Kovarik, Pacific Northwest National Laboratory

PLATFORM SESSION

Thursday 1:30 PM • Room: 130

- 1:30 PM **1096** *Constructing a Predictive Model of Copper Oxidation from Experiment and Theory*; CM Andolina, MT Curnan, Q Zhu, WA Saidi, JC Yang; University of Pittsburgh
- 1:45 PM **1097** *Multi-Scale Red-Ox Dynamics of Active Metal Catalysts Revealed by a Combination of In Situ Scanning and Transmission Electron Microscopy*; R Farra, J Cao, A Rinaldi, E Willinger, X Huang; Fritz Haber Institute of the Max Planck Society, Germany; M Greiner; Max Planck Institute for Chemical Energy Conversion; R Schloegl, MG Willinger; Fritz Haber Institute of the Max Planck Society, Germany
- 2:00 PM **1098** *In Situ S/TEM Observation of Hydrogen Bubbles Formation and Evolution in Aluminium Nanoparticles*; Y Liu; North Carolina State University; T Zhu; Georgia Institute of Technology

- 2:15 PM 1099** *Atomic-Scale Investigation on the Structure Evolution of the MnCr_2O_4 Nano-Octahedron in a Stainless Steel in Corrosion Environment by In Situ Ex-Environment TEM Observations*; Y Zhou, B Zhang, S Zheng, X Ma; Shenyang National Laboratory for Materials Science, Chinese Academy of Sciences, China
- 2:30 PM 1100** *New Approaches to In Situ Heating in FIB/SEM Systems*; L Novák, M Wu, P Wandrol; Thermo Fisher Scientific; M Kolíbal; Central European Institute of Technology - Brno University of Technology; T Vystavěl; Thermo Fisher Scientific
- 2:45 PM 1101** *Modified Transport-of-Intensity Approach for Mapping In Situ Magnetic Induction*; C Phatak, V Brajuskovic, F Barrows, A Petford-Long; Argonne National Laboratory

A18.6 Anniversary Session Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

Julie Chouinard, University of Oregon
Paul Carpenter, Washington University in St. Louis

PLATFORM SESSION

Thursday 1:30 PM • Room: 264

- 1:30 PM 1102 (INVITED)** *Materials Analysis Using Secondary Ion Mass Spectrometry: Challenges and Opportunities*; AV Walker; University of Texas, Dallas
- 2:00 PM 1103** *High Spatial Resolution Spectroscopy in a FE-SEM: X-ray Microanalysis and Electron Energy-Loss Spectroscopy*; H Demers, N Brodus, R Gauvin; McGill University, Canada
- 2:15 PM 1104** *The f-ratio Quantification Method for X-ray Microanalysis with a Field Emission SEM Applied to Multi-Elements Specimen*; C Teng, H Demers, N Brodus, R Gauvin; McGill University, Canada
- 2:30 PM 1105 (INVITED)** *Incorporation of an Amptek Silicon Drift Detector into a Wavelength Dispersive Spectrometer (WDS) Replacing the Gas Flow Proportional Counter*; R Wuhrer; Western Sydney University; K Moran; Moran Scientific Pty Ltd., Australia

B

BIOLOGICAL SCIENCES SYMPOSIA –

THURSDAY AFTERNOON

B03.2 Imaging the Biology of Cells and Tissues: Just Do It Right

SESSION CHAIR:

Eduardo Rosa-Molinar, University of Kansas

PLATFORM SESSION

Thursday 1:30 PM • Room: 122

- 1:30 PM 1106 (INVITED)** *Gold Nanoparticle Technology to Address Variability in EM Labeling*; RD Powell, VN Joshi, FR Furuya, W Liu, JW Dubendorff, JF Hainfeld; Nanoprobes, Inc.; E Rosa-Molinar; University of Kansas
- 2:00 PM 1107 (INVITED)** *FRIL is for the Tenacious: Maintaining Rigor and Reproducibility*; JE Rash, T Yasumura, KG Vanderpool; Colorado State University; N Martinez-Rivera, E Rosa-Molinar; University of Kansas; JI Nagy; University of Manitoba, Canada
- 2:30 PM 1108** *Comparison of 3D Cellular Imaging Techniques Using Scanned Electron Probes*; RD Leapman, EL McBride, A Rao, G Zhang, Q He, MD Guay; National Institutes of Health; ID Pokrovskaya, B Storrie; University of Arkansas for Medical Sciences, et al.

B05.2 Pharmaceuticals and Medical Science

SESSION CHAIR:

Bridget Carragher, New York Structural Biology Center

PLATFORM SESSION

Thursday 1:45 PM • Room: 123

- 1:45 PM 1109** *The Microstructure of Pharmaceutical Materials Revealed by Scanning Electron Diffraction*; DN Johnstone, PA Midgley; University of Cambridge, United Kingdom
- 2:00 PM 1110** *Multi-Linear Regression Model to Predict the Electron Stability of Poorly Soluble Active Pharmaceutical Ingredients*; M S'ari, A Brown, N Hondow, R Brydson; University of Leeds, United Kingdom; H Blade, L Hughes, S Cosgrove; AstraZeneca

Scientific Program

B

BIOLOGICAL SCIENCES SYMPOSIA–

THURSDAY AFTERNOON CONTINUED

- 2:15 PM **1111** *Real-Time Imaging of Protein Therapeutics Using Liquid Cell EM*; LM DiMemmo; Bristol-Myers Squibb Company; AC Varano; Virginia Tech; J Haulenbeek; Bristol-Myers Squibb Company; MJ Dukes; Protochips, Inc; SP Piccoli; Bristol-Myers Squibb Company; DF Kelly; Virginia Tech
- 2:30 PM **1112** (INVITED) *Obtaining 3 Å Resolution Structures of Biomedical Targets at 200 keV*; MA Herzik, M Wu; The Scripps Research Institute; ME Matyskiela, PP Chamberlain; Celgene Corporation; GC Lander; The Scripps Research Institute

P

PHYSICAL SCIENCES SYMPOSIA–

THURSDAY AFTERNOON

P01.8 Characterization of Semiconductor Materials and Devices

SESSION CHAIR:

Esther Chen, Global Foundries

PLATFORM SESSION

Thursday 1:30 PM • Room: 267

- 1:30 PM **1113** *Structural and Chemical Assessment of InAs/AlGaAs Quantum Dot Structures for Enlarged Bandgap Intermediate Band Solar Cells*; M Catalano, A Taurino, M Lomascolo, A Creti; National Council for Research; V Tasco, A Passaseo; Consiglio Nazionale delle Ricerche, Italy; MJ Kim; University of Texas, Dallas
- 1:45 PM **1114** *HAADF-STEM Study of MBE-Grown Dirac Semimetal Cd_3As_2* ; S S.Rezaie, H Kim, T Schumann, M Goyal, S Stemmer; University of California, Santa Barbara
- 2:00 PM **1115** *Thickness-Dependent Defect Evolution in $GaAs_{0.92}Sb_{0.08}/GaAs$ Heterostructures*; A Gangopadhyay, A Maros, N Faleev, D Smith; Arizona State University
- 2:15 PM **1116** *Phase Identification of III-N Thin Films Grown by Molecular Beam Epitaxy and Migration Enhanced Epitaxy Using Precession Electron Diffraction*; E Ortega; University of Texas, San Antonio; YL Casallas-Moreno;

Instituto Politécnico Nacional, Mexico; M López-López; Centro de Investigación y de Estudios Avanzados, Mexico; A Ponce; University of Texas, San Antonio

- 2:30 PM **1117** *Nanoscale Structure-Property Relationship in Amorphous Hydrogenated Boron Carbide for Low-k Dielectric Applications*; S Im; The Ohio State University; MM Paquette, M Belhadj-Larbi, P Rulis; University of Missouri, Kansas City; R Sakidja; Missouri State University; J Hwang; Ohio State University
- 2:45 PM **1118** *HAADF STEM and PL Characterization of Monolayer-Thick GaN/(Al,Ga)N Quantum Wells for Deep UV Optoelectronics Applications*; AA Toropov, E Evropeytsev, VN Jmerik, DV Nechaev, SV Ivanov; Ioffe Institute, Russia; S Rouvimov; University of Notre Dame

P05.3 Imaging and Spectroscopy of Beam Sensitive Materials

SESSION CHAIR:

Osamu Terasaki, Korea Advanced Institute of Science and Technology

PLATFORM SESSION

Thursday 1:30 PM • Room: 266

- 1:30 PM **1119** (INVITED) *Recent Advances on Imaging Porous Frameworks by Electron Microscopy Methods*; AA Mayoral; University of Zaragoza, Spain; II Diaz; Instituto de Catálisis y Petroleoquímica, CSIC, Spain; JE Readman; University of Central Lancashire, United Kingdom
- 2:00 PM **1120** (INVITED) *Structure Determination of Molecular Sieve Nanoparticles with Electron Microscopy and Powder X-ray Diffraction*; X Zhang, JA Thakkar, J Zha; Pennsylvania State University
- 2:30 PM **1121** *Characterization of MEL Defects in 2-Dimensional MFI Nanosheets*; P Kumar, H Zhang, N Rangnekar, M Tsapatsis, A Mkhoyan; University of Minnesota, Twin Cities
- 2:45 PM **1122** *Low-Dose and In-Painting Methods for (Near) Atomic Resolution STEM Imaging of Metal Organic Frameworks (MOFs)*; BL Mehdi, AJ Stevens; Pacific Northwest National Laboratory; P Moeck; Portland State University; A Dohnalkova, A Vjunov, JL Fulton, DM Camaioni; Pacific Northwest National Laboratory, OK Farha; Northwestern University, et al

P07.8 Advanced Characterization of Energy-Related Materials

SESSION CHAIR:

Judith Yang, University of Pittsburgh

PLATFORM SESSION

Thursday 1:30 PM • Room: 276

1:30 PM **1123** (INVITED) *Designing Catalysts for Meeting the DOE 150°C Challenge for Exhaust Emissions*; C Carrillo, H Xiong, AT DeLaRiva, D Kunwar, EJ Peterson, SR Challa; University of New Mexico; G Qi, M Wiebenga; General Motors Global R&D, et al.

2:00 PM **1124** *Computationally Assisted STEM and EXAFS Characterization of Tunable Rh/Au and Rh/Ag Bimetallic Nanoparticle Catalysts*; SD House, CS Bonifacio; University of Pittsburgh; J Timoshenko; Stony Brook University; P Kunal, H Wan, Z Duan, H Li; University of Texas, Austin, JC Yang; University of Pittsburgh, et al.

2:15 PM **1125** *3D Imaging of Nanoalloy Catalysts at Atomic Resolution*; J Zhou, Y Yang, Z Zhao; University of California, Los Angeles; C Ophus, P Ercius; Lawrence Berkeley National Laboratory; Y Huang, J Miao; University of California, Los Angeles

2:30 PM **1126** *Unveiling the Atomistic Processes of the Accelerated Decomposition of 8.5 mol% Y_2O_3 -stabilized ZrO_2 by Environmental TEM*; B Butz, AL Koh, R Sinclair; Stanford University

2:45 PM **1127** *TEM Characterization of Heterojunctions for Photocatalytic Application: ZrO_2 - TiO_2 and CuO/ZrO_2 - TiO_2* ; D Guerrero-Areque, R Gomez; Universidad Autonoma Metropolitana Iztapalapa, Mexico; HA Calderon; Instituto Politecnico Nacional, Mexico

P09.2 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS:

Bryan Miller, Naval Nuclear Laboratory

Djamel Kaoumi, North Carolina State University

PLATFORM SESSION

Thursday 1:30 PM • Room: 265

1:30 PM **1128** (INVITED) *Understanding Corrosion of 304 Stainless Steels Using Atom Probe Tomography*; K Fisher, EA Marquis; University of Michigan

2:00 PM **1129** (INVITED) *Dynamic Secondary Ion Mass Spectrometry (SIMS) Imaging of Materials for the Nuclear Industry: Historical Perspectives and Recent Advances*; G McMahon; University of Manchester, United Kingdom; B Miller; Naval Nuclear Laboratory; G Burke; University of Manchester, United Kingdom

2:30 PM **1130** *Characterization of Corrosion Films on Austenitic Stainless Steels Exposed to High-Temperature Deaerated Water*; JK Heuer, MJ Stiger; Naval Nuclear Laboratory

2:45 PM **1131** *EBS and TEM Analysis of the Heat Affected Zone of Laser Welded AISI 304/308 Stainless Steel*; K Mao; Purdue University; Y Wu; Center for Advanced Energy Studies; JP Wharry; Purdue University

A

ANALYTICAL SCIENCES SYMPOSIA –

THURSDAY AFTERNOON CONTINUED

A01.5 Vendor Symposium

SESSION CHAIRS:

Paul Voyles, University of Wisconsin, Madison

Esther Bullitt, Boston University

PLATFORM SESSION

Thursday 3:30 PM • Room: 125

3:30 PM **1133** *Development of Fast Pixelated STEM Detector and its Applications Using 4-Dimensional Dataset*; R Sagawa; JEOL, Ltd., Japan; H Yang; Lawrence Berkeley National Laboratory; L Jones; University of Oxford, United Kingdom; M Simson, M Huth, H Soltau; PNDetector GmbH, Germany; PD Nellist; University of Oxford, United Kingdom, Y Kondo; JEOL, Ltd., Japan

3:45 PM **1134** *Stable and Flexible Side-Entry Stage for Nion STEMs*; MT Hotz, G Corbin, N Delby, TC Lovejoy, G Skone; Nion; J-D Blazit, M Kociak, O Stephan; Université Paris Sud XI, et al.

4:00 PM **1135** *STEM and TEM: Disparate Magnification Definitions and a Way Out*; E Voelkl; Hitachi High Technologies America; D Hoyle; Hitachi High-Technology Canada; J Howe; Hitachi High Technologies America; H Inada, T Yotsuji; Hitachi High-Technologies Corporation, Japan

Scientific Program

A

ANALYTICAL SCIENCES SYMPOSIA—

THURSDAY AFTERNOON CONTINUED

- 4:15 PM **1136** *Advanced 4D STEM Imaging with the pnCCD (S)TEM Camera*; R Ritz, M Huth, M Simson, J Schmidt; PNDetector GmbH, Germany; H Ryll; PNSensor GmbH, Germany; H Soltau; PNDetector GmbH, Germany; L Strüder; PNSensor GmbH, Germany, H Yang; University of Oxford, United Kingdom, et al.
- 4:30 PM **1137** *Advantages of Direct Detection and Electron Counting for Electron Energy Loss Spectroscopy Data Acquisition and the Quest of Extremely High-Energy Edges Using EELS*; JL Hart, A Lang; Drexel University; RD Twisten; Gatan Inc; ML Taheri; Drexel University

A15.5 Pushing the Limits of Cryo-TEM: Development and Applications

SESSION CHAIRS:

Mike Marko, Wadsworth Center

Radostin Danev, Max Planck Institute for Biochemistry

PLATFORM SESSION

Thursday 3:30 PM • Room: 127

- 3:30 PM **1138** (INVITED) *Improving Detectors for Cryo-Electron Microscopy*; PE Mooney; Gatan, Inc
- 4:00 PM **1139** (INVITED) *On-the-Fly Image Quality Evaluation for Single-Particle Analysis Cryo-Electron Microscopy*; L Yu; Thermo Fisher Scientific; E Franken; Thermo Fisher Scientific; A Voigt, F Grollios, P Tiemeijer, S Reijntjens; Thermo Fisher Scientific
- 4:30 PM **1140** *Accurate Cryo-EM Characterizations of Polypeptoid Vesicles*; X Jiang; Lawrence Berkeley National Laboratory; J Sun; Qingdao University of Science and Technology, China; RN Zuckermann; Lawrence Berkeley National Laboratory; NP Balsara; University of California, Berkeley; KH Downing; Lawrence Berkeley National Laboratory
- 4:45 PM **1141** *The Future of Direct Electron Detection in Cryo-TEM*; G Van Duinen, L Yu, E Franken, M Kuijper, H Roeven, B Janssen; Thermo Fisher Scientific

A18.7 Anniversary Session: Celebrating 50 Years of Microanalysis

SESSION CHAIRS:

Paul Carpenter, Washington University in St. Louis

Heather Lowers, U.S. Geological Survey

Edward Vicenzi, Museum Conservation Institute

PLATFORM SESSION

Thursday 3:30 PM • Room: 264

- 3:30 PM **1142** (INVITED) *Characterizing the Effectiveness of Atomic Layer Deposited Coatings for the Prevention of Glass Disease*; ME Hiebert, RJ Phaneuf; University of Maryland; E Vicenzi; Smithsonian Institution
- 4:00 PM **1143** *Testing a New Electron Microprobe and Developing New Analytical Protocols*; JM Allaz; University of Colorado, Boulder
- 4:15 PM **1144** *Characterization of Complex Industrial Specimens by Hyperspectral EPMA Mapping*; A Torpy, NC Wilson, CM MacRae; CSIRO, Australia
- 4:30 PM **1145** *EPMA and Quantitative EDS of Rare Earth Elements in Geochronological Reference Materials*; HA Lowers; U.S. Geological Survey; NW Ritchie; National Institute of Standards and Technology; DT Adams; U.S. Geological Survey
- 4:45 PM **1146** *Quantitative Electron Probe Microanalysis of Fe at Low Accelerating Voltage Using the $L\alpha$ and $L\beta$ X-ray Lines*; AG Moy, JH Fournelle; University of Wisconsin, Madison

B

BIOLOGICAL SCIENCES SYMPOSIA–

THURSDAY AFTERNOON CONTINUED

B03.3 Imaging the Biology of Cells and Tissues: Just Do It Right

SESSION CHAIR:

Michael Stanley, Chroma Technology

PLATFORM SESSION

Thursday 3:30 PM • Room: 122

- 3:30 PM **1147** *Biofilm Structure of Geobacter Sulfur Reducers by Helium Ion Microscopy*; A Belianinov, MC Halsted, MJ Burch, K Songkil, ST Retterer; Oak Ridge National Laboratory
- 4:00 PM **1148** (INVITED) *Statistical Design of Experiments to Ensure “Rigor and Reproducibility” in Imaging Sciences*; VN Joshi, RD Powell; Nanoprobes, Inc.; E Rosa-Molinari; University of Kansas

B05.3 Pharmaceuticals and Medical Science

SESSION CHAIR:

Jason R. Mantei, Baxter Healthcare

PLATFORM SESSION

Thursday 3:30 PM • Room: 123

- 3:30 PM **1149** (INVITED) *Digital Radiography/Computed Tomography of Medical Devices*; JM Troedel; Baxter International
- 4:00 PM **1150** *4D Laboratory X-ray Microscopy for the In Situ Investigation of Drug Release in a Push-Pull Osmotic Pump Tablet*; H Bale, W Harris, A Merkle; Carl Zeiss Microscopy
- 4:15 PM **1151** (INVITED) *Solving Contaminant and Unexpected Material Problems in Drugs and Medical Devices Using Microscopy Methods – An Overview*; DL Joslin; McCrone Associates
- 4:45 PM **1152** *Determining the Number of Components for Multivariate Curve Resolution: Case Study Using Raman Mapping of Pharmaceutical Tablets*; C Fauteux-Lefebvre, F B. Lavoie, M-J Colbert; Universite de Sherbrooke, Canada; J-M Guay; Pfizer Global Supply; R Gosselin; Universite de Sherbrooke, Canada

P

PHYSICAL SCIENCES SYMPOSIA–

THURSDAY AFTERNOON CONTINUED

P05.4 Imaging and Spectroscopy of Beam Sensitive Materials

SESSION CHAIR:

Prashant Kumar, University of Minnesota

PLATFORM SESSION

Thursday 3:30 PM • Room: 266

- 3:30 PM **1153** (INVITED) *Direct Detection Image Detector and Electron Counting – A New Tool for High-resolution Imaging of Metal-Organic Frameworks*; M Pan; Gatan, Inc.
- 4:00 PM **1154** *Revealing the Structure of Graphitic Carbon Nitride Through Low-Dose TEM Using a Direct Electron Detector*; DM Haiber, PA Crozier; Arizona State University
- 4:15 PM **1155** *Determining Optical Absorption Coefficients in Beam Sensitive Materials Using Monochromated Electron Energy-Loss Spectroscopy*; JA Alexander, FJ Scheltens; The Ohio State University; LF Drummy, MF Durstock; U.S. Air Force Research Laboratory; FS Hage, QM Ramasse; SuperSTEM, UK; DW McComb; Ohio State University
- 4:30 PM **1156** (INVITED) *Damage by Induced Electric Field in Beam-Sensitive Materials*; N Jiang; Arizona State University

P09.3 Application of Advanced Characterization Methods to Examine Materials Used in Nuclear Power Systems

SESSION CHAIRS:

Gene Lucadamo, Naval Nuclear Laboratory
Ian MacLaren, University of Glasgow, Scotland

PLATFORM SESSION

Thursday 3:30 PM • Room: 265

- 3:30 PM **1157** (INVITED) *Microstructure Characterization of Ion-Irradiated Ferritic/Martensitic HT9 Steel*; D Kaoumi, C Zheng; North Carolina State University

Scientific Program

P

PHYSICAL SCIENCES SYMPOSIA-

THURSDAY AFTERNOON CONTINUED

- 4:00 PM **1158** *Using In Situ TEM Triple Ion Beam Irradiations to Study the Effects of Deuterium, Helium, and Radiation Damage on TPBAR Components*; C Taylor, B Muntifering, C Snow; Sandia National Laboratories; D Senor; Pacific Northwest National Laboratory; K Hattar; Sandia National Laboratories
- 4:15 PM **1159** *Combining Transmission Kikuchi Diffraction and Scanning Transmission Electron Microscopy for Irradiated Materials Studies*; CM Parish, K Wang, PD Edmondson, KA Terrani, X Hu; Oak Ridge National Laboratory; RL Seibert; Illinois Institute of Technology; Y Katoh; Oak Ridge National Laboratory
- 4:30 PM **1160** (M&M STUDENT SCHOLAR) *A Snapshot of the Microstructural Evolution of Alloy 800H Under Heavy Ion Irradiation*; E Anderson, E Marquis; University of Michigan

Thursday, August 10

Last Name	First Initial	Presentation #
Aarholt	T	133
Aarons	J	360
Abargues	R	857
Abbasi	M	16
Abdela	W	447
Abdela	W	817
Abell	J	801
Abellan	P	743
Abis	L	39
Abratis	M	621
Abreu-Faria	G	73
Acehan	D	454
Acharya	P	734
Adam	G	89
Adamo	C	581
Adams	D	887
Adams	D	1145
Addiego	C	1051
Addou	R	855
Adineh	V	629
Admasu	A	538
Admasu	A	749
Afelik	S	343
Agarwal	N	39
Agemura	T	402
Agemura	T	784
Agemura	T	833
Aglan	H	859
Aglan	H	860
Aglan	H	905
Aglan	H	1054
Aglan	H	1062
Agrawal	A	640
Aguirre-Ghiso	J	30
Aharonovich	I	203
Ahl	J	183
Ahmad	N	187
Ahmad	R	497
Ahmed	A	678
Ahmed	A	771
Aho	V	644
Ahrenkiel	P	433
Aier	S	437
Aindow	M	189
Aindow	M	306
Aindow	J	518
Aindow	M	518
Aindow	M	772
Aindow	M	773

Last Name	First Initial	Presentation #
Aindow	M	906
Aindow	M	1069
Aires	F	642
Aitkaliyeva	A	956
Aizawa	Y	833
Ajayan	P	578
Ajayan	P	831
Ajayan	P	983
Ajo	H	1058
Akashch	F	905
Akashi	T	895
Akatay	M	968
Akey	A	78
Akey	A	115
Akey	A	796
Akey	A	798
Akey	A	1053
Akkaladevi	N	427
Aksyuk	V	226
Alam	T	977
Alber	F	650
Albert	S	995
Alberto	G	276
Alcantar-Pena	J	292
Alem	N	469
Alem	N	1005
Alem	N	1041
Alexander	C	286
Alexander	D	595
Alexander	J	1048
Alexander	J	1155
Algarabel	P	675
Alhabeb	M	273
Alharbi	N	424
Ali	M	740
Alink	M	1092
Al-Kassab	T	80
Allard	L	188
Allard	L	726
Allard	L	806
Allaz	J	793
Allaz	J	1143
Allen	L	532
Allen	L	534
Allen	F	632
Allen	L	704
Allen	L	741
Allen	L	1087
Alloyeau	D	187

Last Name	First Initial	Presentation #
Almeida	L	1024
Almirall	N	713
Aloni	S	593
Aloni	S	663
Alsem	D	560
Alsem	D	804
Alsem	D	805
Al-Sharab	J	112
Al-Sharab	J	869
Althahban	S	39
Alvarado-Rivera	J	866
Alvarez	E	492
Álvarez	E	866
Alvarez-Ramos	M	464
Alvarez-Ramos	M	803
Alvarez-Ramos	M	851
Álvarez-Ramos	M	113
Álvarez-Ramos	M	487
Álvarez-Ramos	M	493
Álvarez-Ramos	M	1019
Amano	H	638
Amari	S	376
Amatucci	G	315
Amini	F	781
Anand	U	157
Anasori	B	273
Anderson	K	26
Anderson	J	164
Anderson	I	313
Anderson	R	376
Anderson	E	713
Anderson	K	810
Anderson	E	1160
Andolina	C	1049
Andrew	M	58
Andrew	M	685
Andrews	J	757
Angelovici	R	656
Anger	P	778
Anger	P	601
Anjum	D	597
Anjum	D	1018
Ankem	S	414
Annand	K	955
Aoki	T	267
Aoki	T	353
Aoki	T	742
Aoki	T	936
Aoyama	Y	419

Last Name	First Initial	Presenta- tion #
Appathurai	N	1082
Arbiol	J	184
Archer	L	683
Arehart	A	935
Arellano-Jimenez	M	292
Arenal	R	293
Arey	B	328
Arey	B	690
Arey	B	782
Argentero	G	1085
Armbruster	B	432
Armbruster	B	766
Armstrong	A	349
Armstrong	N	761
Arnason	L	724
Arnold	J	7
Aronova	M	1108
Arsian	I	275
Arsian	I	782
Arthur	C	996
Arzoumanidis	A	991
Asahina	S	97
Asahina	S	438
Asahina	S	1039
Asarnow	D	911
Asayesh-Ardakani	H	843
Ashton	M	152
Asif	S	983
Asthana	A	661
Attias	M	649
Attila	O	625
Atwal	J	344
Auciello	O	292
Auer	M	436
Auer	M	612
Austin	D	437
Autrey	D	858
Avci	R	1072
Avishai	N	463
Avramescu	A	183
Ayalon	G	344
Ayer	R	16
Ayoola	H	949
Azough	F	145
Baah	D	447
Baah	D	817
Baba	M	47
Baba	N	47
Baba	M	49

Last Name	First Initial	Presenta- tion #
Baba	N	49
Bachmann	F	1077
Back	T	491
Bacon	N	938
Badding	J	1005
Badding	J	1041
Badro	J	595
Badyka	R	976
Bae	M	260
Bae	I	583
Baek	D	143
Baek	D	616
Bagot	P	153
Bagot	P	550
Bagot	P	900
Bah	A	203
Bahou	W	442
Bai	P	560
Bai	X	835
Baik	S	974
Bainbridge	T	344
Baiutti	F	34
Balachandran	S	70
Balachandran	S	233
Baldwin	J	719
Baldwin	P	993
Baldwin	C	1057
Baldwin	J	1061
Bale	H	311
Bale	H	1077
Bale	H	1150
Ballesteros Morcillo	A	164
Balsara	N	750
Balsara	N	752
Balsara	N	1140
Baluch	D	95
Bammes	B	958
Bandy	K	834
Banerjee	P	420
Banerjee	S	757
Banerjee	R	977
Banerjee	S	1045
Banks	K	389
Banner	D	811
Baran	J	145
Bare	S	625
Barker	D	435
Barnard	A	291
Barnard	J	499

Last Name	First Initial	Presenta- tion #
Barnum	A	54
Barofsky	D	17
Barr	C	631
Barr	C	1061
Barraza	M	688
Barrett	C	782
Barriobero-Vila	P	715
Barroo	C	19
Barroo	C	79
Barroo	C	115
Barroo	C	796
Barroo	C	1052
Barroo	C	1053
Barrows	F	106
Barrows	F	1101
Bar-Sadan	M	356
Barth	T	973
Barthel	J	470
Barthel	J	539
Barthelemy	A	584
Baryshev	S	158
Basham	M	330
Bassim	N	476
Bassim	N	1020
Baturin	S	158
Baú	J	486
Baum	K	519
Baumann	F	264
Baumann	F	736
Baumeister	W	338
Baumeister	W	651
Baumeister	W	908
Baumeister	W	995
Baxter	K	246
Bayati	M	477
Bayle-Guillemaud	P	952
Bazant	M	560
Beaumont	S	499
Bechteler	A	767
Beck	F	338
Becker	S	669
Bedford	N	561
Beebe	T	117
Beech	I	1072
Beechem	T	831
Begon-Lours	L	228
Behzad	A	597
Bei	H	718

Last Name	First Initial	Presentation #
Bejar	L	862
Béjar Gómez	L	868
Beleggia	M	994
Belhadj-Larbi	M	1117
Belhaj	M	658
Belhaj	M	814
Belianinov	A	138
Belianinov	A	139
Belianinov	A	587
Belianinov	A	881
Belianinov	A	1147
Belianninov	A	575
Bell	D	78
Bell	D	115
Bell	D	318
Bell	J	720
Bell	D	796
Bell	D	1053
Bellapadrona	G	635
Belle	M	170
Belle	M	388
Bellinger	M	518
Beltran	J	269
Belyansky	M	739
Bencan	A	673
Benedetti	M	614
Bennett	S	550
Bennett	R	964
Benson	J	1024
Bentley	J	392
Benzing	J	392
Berejnov	V	753
Berg	M	831
Berger	C	877
Berkels	B	299
Berkels	B	670
Berkels	B	697
Bernal	J	399
Bernal	J	862
Bernal Ponce	J	868
Bernier	N	261
Berthaler	T	405
Berthaler	T	877
Berthier	R	664
Bertilson	M	917
Bertram	F	930
Bessette	S	951
Bessette	S	1043
Betzig	E	1

Last Name	First Initial	Presentation #
Bevis	C	887
Bewick	A	693
Beyer	A	932
Bhatia	V	146
Bhatnagar	J	444
Bhattiprolu	S	43
Bhattiprolu	S	58
Bhowmick	S	983
Bhowmick	S	990
Bhowmick	S	1021
Bibes	M	584
Bidiuk	O	737
Biegalski	M	176
Biener	J	1053
Bigelow	W	726
Bigelow	W	806
Bilhorn	R	213
Billinge	S	889
Binek	C	182
Binek	C	580
Bingham	C	816
Birch	M	448
Birch	M	449
Birenbaum	A	176
Bishop	J	203
Bishop	J	371
Bizarri	G	929
Bjeoumikhov	A	769
Black	C	417
Blackwood	J	737
Blade	H	1110
Blain	P	812
Blanco	M	276
Blazit	J	1134
Bleloch	A	938
Bloom	R	130
Bloom	R	692
Boccabella	M	141
Boccabella	M	777
Bocher	L	584
Boettcher	S	740
Bojesen	E	890
Boland	T	836
Bonef	B	551
Bonef	B	662
Bonef	B	800
Bonifacio	C	141
Bonifacio	C	776
Bonifacio	C	777

Last Name	First Initial	Presentation #
Bonifacio	C	949
Bonifacio	C	1049
Bonifacio	B	1055
Bonifacio	C	1124
Bonifacio Fittz	C	586
Bonnet	N	666
Boona	I	528
Booth	C	432
Borghetti	P	276
Borisevich	A	176
Borisevich	A	268
Borisevich	A	699
Borisov	P	348
Borjas	S	399
Borjas	S	862
Borjas Garcia	S	101
Borjas García	S	868
Borjas-García	S	867
Borsa	T	72
Bose	M	287
Botton	G	142
Bouchard	I	611
Bouchet-Marquis	C	1015
Boudreau	R	329
Boudreau	R	466
Boudreau	R	565
Boudreau	R	645
Boughrobel	F	55
Bouman	C	56
Bouman	C	131
Bouman	C	1083
Bourgeois	L	617
Bourgeois	L	864
Bourrellier	R	666
Bourret	E	929
Bouzy	E	13
Bowes	P	352
Bowling	A	445
Bowman	W	530
Bowman	W	861
Bowman	W	934
Bowman	W	936
Boya	R	359
Bozzano	P	1067
Bradley	S	188
Bradley	S	968
Braet	F	259
Braet	F	615
Braidy	N	134

Last Name	First Initial	Presentation #
Brain	J	448
Brain	J	449
Brajuskovic	V	1101
Bramer	L	59
Bramer	L	60
Bramer	L	129
Bramer	L	216
Brandon	W	754
Branlund	E	606
Brantner	C	821
Braun	M	677
Breitzer	J	858
Bremmer	G	641
Brennan	M	1047
Brennecka	G	99
Breton	B	66
Breton	B	220
Brett	D	1050
Breuer	C	387
Brindley	M	256
Brintlinger	T	476
Brocchi	E	118
Broderick	S	239
Broderick	S	410
Broderick	S	413
Brodu	E	13
Brodusch	N	12
Brodusch	N	62
Brodusch	N	1103
Brodusch	N	1104
Brookes	R	66
Brooks	C	93
Brooks	C	429
Brooks	C	431
Brooks	I	531
Brooks	I	736
Broomfield	R	858
Brow	R	72
Brown	J	389
Brown	H	534
Brown	C	587
Brown	C	620
Brown	C	674
Brown	H	704
Brown	H	741
Brown	J	834
Brown	C	880
Brown	A	1110
Browning	N	53

Last Name	First Initial	Presentation #
Browning	N	59
Browning	N	60
Browning	N	129
Browning	N	132
Browning	N	156
Browning	N	213
Browning	N	214
Browning	N	215
Browning	N	216
Browning	N	280
Browning	N	300
Browning	N	559
Browning	N	637
Browning	N	698
Browning	N	807
Browning	N	915
Browning	N	1122
Bruce	P	270
Bruchez	M	31
Bruley	J	739
Bruley	J	834
Brun	N	700
Brunner	R	9
Brunner	R	717
Brunner	R	928
Brunner	R	952
Bryan	C	821
Brydson	R	743
Brydson	R	1110
Buban	J	610
Buechley	C	881
Buehler	M	519
Bufford	D	15
Bufford	D	631
Bugnet	M	142
Bugnet	M	642
Bui	V	572
Bullitt	E	25
Bullitt	E	253
Bullock	E	516
Bunton	J	1073
Bunton	J	1074
Bunyak	F	389
Bunyak	F	458
Bunyak	F	656
Burch	M	138
Burch	M	139
Burch	M	587
Burch	M	881

Last Name	First Initial	Presentation #
Burch	M	1147
Burdet	P	133
Burdick	D	859
Burdick	D	860
Burgess	K	289
Burgess	S	951
Burgess	S	960
Burgess	S	1038
Burgess	S	1076
Burke	G	509
Burke	M	305
Burke	M	802
Burke	M	953
Burke	G	1066
Burke	G	1129
Burnett	T	304
Burnett	T	305
Burnett	T	528
Burnett	T	614
Burnham	N	206
Burnley	P	549
Burt	C	686
Burton	G	36
Burton	G	630
Buschauer	R	650
Bussmann	B	574
Bussmann	B	1042
Bustillo	K	365
Bustillo	K	752
Butnaru	D	58
Butz	B	482
Butz	B	1126
Bylund	T	734
Byrne	R	564
Cabana	J	757
Cabero	M	269
Cable	M	432
Cable	M	766
Cabral	M	672
Cabral	M	830
Cabral	M	942
Cabrera	G	354
Cai	Y	191
Cairney	J	14
Cairney	J	146
Cairney	J	207
Cairney	J	626
Calderon	M	31
Calderon	H	873

Last Name	First Initial	Presentation #
Calderon	H	945
Calderon	H	1029
Calderon	H	1127
Calderon Ortiz	G	751
Caldwell	N	66
Caldwell	N	220
Cama	C	950
Camacho-Montes	H	979
Camaioni	D	1122
Camp	W	199
Campanini	M	582
Campbell	G	90
Campin	M	141
Campin	M	776
Campin	M	777
Campin	M	1055
Campos	A	669
Camus	P	83
Camus	P	248
Camus	P	542
Camus	P	1036
Canavan	M	11
Canfield	P	906
Cano	A	941
Cantor	R	81
Cao	M	358
Cao	Y	359
Cao	C	384
Cao	M	705
Cao	F	848
Cao	M	940
Cao	M	966
Cao	Y	1085
Cao	J	1097
Caputo	M	870
Caputo	M	878
Carabasse	C	664
Carazo	J	563
Carbajal-Sanchez	R	985
Cardoso-Avila	P	992
Caricato	A	202
Carillo	R	492
Carnahan	R	756
Carneiro	C	486
Caron	J	133
Caron	J	184
Carpaena-Núñez	J	491
Carpaena-Núñez	J	1009
Carpenter	P	21

Last Name	First Initial	Presentation #
Carpenter	M	81
Carpenter	P	84
Carpenter	P	85
Carpenter	P	162
Carpenter	P	545
Carpenter	P	919
Carragher	B	734
Carragher	B	993
Carragher	B	997
Carragher	B	1092
Carrascosa	J	332
Carrascosa	J	563
Carrascosa	J	646
Carreño Gallardo	C	818
Carreño-Gallardo	C	489
Carreño-Gallardo	C	490
Carreño-Gallardo	C	863
Carreño-Gallardo	C	980
Carrillo	C	1123
Carrillo-Pesqueira	F	487
Carrillo-Pesqueira	F	803
Carrillo-Pesqueira	F	851
Carrillo-Sanchez	M	985
Carrillo-Torres	R	113
Carrillo-Torres	R	464
Carrillo-Torres	R	487
Carrillo-Torres	R	493
Carrillo-Torres	R	803
Carrillo-Torres	R	851
Carrillo-Torres	R	866
Carrillo-Torres	R	1019
Carroll	J	1091
Carter	D	816
Carzaniga	R	566
Casallas-Moreno	Y	1116
Casey	P	367
Castellani	F	296
Castillo	S	464
Castillo	J	492
Castro	F	876
Catabay	R	1046
Catalano	M	202
Catalano	S	584
Catalano	M	662
Catalano	M	827
Catalano	M	1113
Catanese	M	454
Catanese	M	455
Cate	J	910

Last Name	First Initial	Presentation #
Cater	S	220
Cattaneo	S	39
Cavill	S	854
Cazottes	S	235
Cecen	A	309
Cetin	B	222
Cetin	B	383
Chai	Y	745
Chakravadhanula	V	588
Challa	S	1123
Chamberlain	P	1112
Chambers	S	846
Chan	L	100
Chan	A	343
Chan	H	366
Chan	G	677
Chan	C	831
Chance	D	819
Chandra	V	519
Chang	J	195
Chang	S	291
Chang	C	442
Chang	W	484
Chang	J	504
Chang	J	505
Chang	S	592
Chang	S	594
Chang	S	725
Chang	L	742
Chang	Y	761
Chang	C	941
Chang	J	965
Chang	C	966
Chang	S	1040
Chapelle	C	812
Chapman	M	308
Chatak	P	434
Chatterjee	D	121
Chatterjee	D	497
Chawla	N	311
Chawla	N	1160
Chee	S	157
Chee	S	958
Chen	C	4
Chen	Y	20
Chen	J	122
Chen	S	123
Chen	Y	151
Chen	Y	153

Last Name	First Initial	Presentation #
Chen	Y	240
Chen	P	245
Chen	J	329
Chen	Y	361
Chen	C	363
Chen	Y	415
Chen	J	466
Chen	Y	468
Chen	Z	532
Chen	J	559
Chen	J	562
Chen	J	565
Chen	P	577
Chen	L	581
Chen	Y	617
Chen	R	634
Chen	J	645
Chen	J	647
Chen	W	684
Chen	Z	702
Chen	Z	704
Chen	Y	719
Chen	M	720
Chen	M	722
Chen	E	736
Chen	Y	747
Chen	X	752
Chen	S	874
Chen	Z	966
Chen	S	1040
Chen	Y	1073
Chen	Y	1074
Cheng	N	254
Cheng	D	259
Cheng	N	428
Cheng	S	467
Cheng	S	467
Cheng	K	571
Cheng	X	581
Cheng	B	840
Cheng	Y	911
Cheng	A	1092
Chengattu	T	311
Chenot	E	373
Cheong	J	195
Cheong	J	504
Cheong	J	505
Cheong	S	538
Cheong	S	749

Last Name	First Initial	Presentation #
Cheong	J	965
Cherniak	D	794
Chi	J	672
Chi	M	680
Chi	H	1049
Chiang	W	122
Chiang	S	331
Chiaromonti	A	513
Chichon	F	332
Chichon	F	646
Chichón	F	563
Chiou	W	506
Chiou	W	780
Chisholm	M	180
Chisholm	M	185
Chisholm	M	229
Chisholm	M	272
Chisholm	C	324
Chisholm	M	849
Chisholm	M	1087
Chiu	W	722
Chmielewski	A	187
Cho	S	185
Cho	K	855
Choi	P	152
Choi	K	457
Choi	P	553
Choi	S	610
Choi	P	899
Choi	J	926
Choi	S	999
Choi	S	1014
Choksi	T	41
Choquette	A	268
Chou	T	337
Chou	T	1035
Chrisler	W	645
Christen	J	183
Christen	J	930
Christeson	G	373
Christie	G	336
Christoffersen	R	288
Chu	Y	577
Chu	Y	746
Chuang	Y	442
Chuang	G	734
Chueh	W	560
Chuvilin	A	840
Chyasnavichyus	M	138

Last Name	First Initial	Presentation #
Ciechonski	R	174
Ciferri	C	996
Cigarroa- Mayorga	O	1029
Cigarroa-Mayorga	O	873
Ciston	J	556
Ciston	J	619
Ciston	J	684
Ciston	J	696
Ciston	J	752
Ciston	J	929
Cizek	P	898
Claeys	P	373
Clark	M	105
Clark	T	779
Clinton	R	570
Cockell	C	373
Coelho	J	367
Coenen	T	667
Cogswell	D	560
Cojocar-Miréidin	O	553
Colbert	M	1152
Colbry	D	70
Colijn	H	624
Collazo	R	660
Colliex	C	584
Collins	D	149
Collins	K	349
Collins	L	879
Collinson	L	566
Colombo	M	1004
Columb-Delsuc	M	883
Condeelis	J	30
Conesa	J	563
Conesa	J	646
Conley	J	437
Conti	R	739
Contreras-Guerrero	R	748
Coolen	M	373
Cooper	V	176
Cooper	D	261
Cooper	D	664
Cooper	J	1029
Coppens	A	812
Corbin	G	1134
Cordero	Z	74
Cordes	N	52
Cordes	N	527
Cordill	M	988
Corpuz	R	344

Last Name	First Initial	Presentation #
Corral	E	761
Correa	J	58
Cortes Vega	F	101
Cosandey	F	315
Cosgrove	S	1110
Cossairt	O	613
Costa	G	510
Cottom	J	743
Cousin	K	447
Cousin	K	817
Cover	T	567
Cover	T	823
Coyle	S	605
Cramer	R	551
Crandall	D	689
Craven	A	417
Craven	A	933
Crawford	P	437
Creti	A	1113
Cretu	O	186
Cribb	B	207
Crimp	M	70
Crimp	M	232
Crimp	M	233
Cristiani	G	34
Croce	M	81
Crooks	R	1124
Crosby	K	43
Cross	S	74
Cross	N	397
Cross	N	1087
Crozier	P	530
Crozier	P	592
Crozier	P	725
Crozier	P	836
Crozier	P	839
Crozier	P	841
Crozier	P	861
Crozier	P	914
Crozier	P	934
Crozier	P	936
Crozier	P	937
Crozier	P	1010
Crozier	P	1154
Crudden	D	900
Cruz-Rivera	J	1064
Cui	R	164
Cui	K	1002
Cullen	D	1044

Last Name	First Initial	Presentation #
Cullen	D	1161
Cummings	J	194
Cummings	J	349
Cunningham	B	926
Curnan	M	1096
Cushing	J	418
Cushing	J	885
Cutrale	F	925
da Costa	A	486
Da Silva	J	682
Dagan	M	320
Dagan	M	321
Dahmen	T	55
Dahmen	U	929
Dahmen	U	1021
Dahmke	I	340
Dai	W	722
Dai	J	745
Dai	S	1001
Dai	S	1004
Daio	T	1008
Dallago	M	614
Dalton	L	689
Daly	D	11
Damiano	J	830
Damjanovic	D	673
Dan	Y	763
Dandey	V	732
Dandey	V	734
Dandey	V	997
Danev	R	172
Danev	R	338
Danev	R	721
Danev	R	908
Darbal	A	530
Darbal	A	861
Darroudi	T	710
Darrow	M	330
Dasgupta-Schubert	N	867
Dasgupta-Schubert	N	868
Datta	A	157
Datta	A	958
Datye	A	806
Datye	A	1123
Daudin	B	666
Daulton	T	376
Davidson	R	185
Davidson	J	213
Davidson	R	668

Last Name	First Initial	Presentation #
Davies	T	39
Davies	H	393
Davis	J	161
Davis	J	212
Davis	B	491
Davis	A	598
Davis	B	691
Davis	J	963
Davis	B	1072
Davut	K	222
Davut	K	383
De Andrade	V	1160
de Boer	P	441
De Carlo	F	1160
de Cortalezzi	M	477
De Decker	Y	19
De Feudis	M	202
De Graef	M	6
De Graef	M	147
De Graef	M	404
De Graef	M	596
De Graef	M	679
De Graef	M	896
De Gregorio	B	374
de Jong	K	155
De Jong	K	243
de Jonge	N	28
de Jonge	N	155
de Jonge	N	340
de Kloe	R	687
de Kloe	R	1036
de la Peña	F	133
De Souza	W	649
De Souza	W	820
de Winter	M	625
de Zanet	S	297
Dearborn	A	166
Dearborn	A	336
Dearborn	A	430
Deb	P	475
DeGraef	M	71
DeGraef	M	234
Dehm	G	554
Dehm1	S	588
Deitz	J	935
DeLaRiva	A	1123
Delby	N	1134
Delise	W	519
Deljoo	B	189

Last Name	First Initial	Presentation #
Dellby	N	333
Dellby	N	938
Delle Piane	C	87
Dellith	J	621
Delpierre	G	812
Demarest	J	739
Demers	H	12
Demers	H	61
Demers	H	62
Demers	H	134
Demers	H	135
Demers	H	951
Demers	H	1043
Demers	H	1103
Demers	H	1104
Demkov	A	267
Demkov	A	353
Denes	P	696
Deng	B	434
Deng	H	477
Dennenwaldt	T	595
Depner	S	1045
Deschenes	I	165
Deschuyteneer	M	812
Dettelbach	R	519
Deuschle	J	574
Deuschle	J	1042
Devaraj	A	628
Devaraj	A	846
DeVore	M	710
Dhall	R	230
Dhall	R	660
Dhall	R	830
Di Mauro	E	485
Di Mauro	E	486
Diaz	I	1119
Dickey	E	672
Dickey	E	942
DiCorato	A	171
Diehle	P	184
Dieing	T	480
Diercks	D	36
Diercks	D	99
Diercks	D	416
Diercks	D	630
Dietrich	R	982
DiMemmo	L	1111
Dimitratos	N	39
Ding	F	479

Last Name	First Initial	Presentation #
Ding	Y	747
DiPrete	D	1058
Dirlam	P	281
Dirscherl	K	148
Dixon	C	39
Dixon	M	44
Dixon	M	200
Dluhoš	J	303
Dluhoš	J	377
Dobigeon	N	700
Dogel	S	585
Dogel	S	762
Dohányosová	P	110
Dohnalkova	A	690
Dohnalkova	A	1122
Dokland	T	336
Dokland	T	430
Dolle	C	482
Domain	C	976
Domanik	K	287
Domanik	K	536
Domanik	K	761
Domart	M	566
Don	S	1040
Donald	J	737
Donaldson	T	460
Donegan	S	308
Dong	Z	112
Dong	S	354
Dong	J	729
Dong	H	822
Donval	G	133
Dorantes-Rosales	H	1064
dos Reis	R	619
dos Reis	R	696
dos Reis	R	929
Dotson	R	372
Douillard	T	235
Dowe	J	378
Downing	C	367
Downing	K	750
Downing	K	1140
Dowsett	D	227
Dowsett	D	307
Dozier	A	4
Dozier	A	448
Dozier	A	449
Dravid	V	245
Dravid	V	283

Last Name	First Initial	Presentation #
Dravid	V	369
Dravid	V	503
Dravid	V	876
Drazic	G	673
Dries	M	403
Dries	M	1094
Dries	M	1095
Droopad	R	748
Droubay	T	846
Drummy	L	448
Drummy	L	449
Drummy	L	561
Drummy	L	990
Drummy	L	1155
Druz	A	734
Dryfe	R	359
Du	J	245
Du	W	799
Du	Y	846
Duan	S	111
Duan	Z	1124
Duarte-Zamorano	R	487
Dubail	S	235
Dubendorff	J	1106
Duchamp	M	299
Dudley	N	193
Dudney	N	680
Duke	E	330
Duke	E	566
Dukes	M	653
Dukes	M	1111
Duley	M	452
Dunin-Borkowski	R	174
Dunin-Borkowski	R	184
Dunin-Borkowski	R	470
Dunlap	B	232
Dunlap	D	323
Durkaya	G	222
Durmaz	T	720
Durstock	M	1155
Duscher	G	229
Duscher	G	397
Duscher	G	1087
Dutrow	G	770
Dutta	M	500
Dutta	B	772
Dwyer	C	291
Dwyer	C	742
Dycus	J	230

Last Name	First Initial	Presentation #
Dycus	J	532
Dycus	J	533
Dycus	J	660
Dycus	J	709
Dycus	J	830
Dycus	J	942
Dye	L	91
Earl	J	528
Eastman	P	105
Eberhardt	S	500
Eberle	A	43
Eberth	J	341
Eberth	J	658
Ebner	C	907
Echlin	M	223
Echtenkamp	W	580
Edelmann	R	452
Ederer	C	582
Edgar	J	1020
Edgett	K	370
Edgett	K	372
Edmondson	P	1159
Eftink	B	5
Egerton	R	312
Egerton	R	333
Egerton	R	994
Eggeman	A	483
Eggeman	A	523
Eggert	T	765
Egle	T	1053
Eichinger	B	9
Eigler	S	482
Einsle	J	523
Eisenbach	M	363
Ek	M	724
Ekerdt	J	267
Ekerdt	J	353
Ekeya	R	437
Ekman	A	329
Ekman	A	466
Ekman	A	562
Ekman	A	565
El Baggari	I	538
El Baggari	I	616
El Baggari	I	749
Elad	N	635
Elam	J	106
Elbaum	M	606
Elbaum	M	635

Last Name	First Initial	Presentation #
Elbaum	M	652
Eliceiri	K	219
Eljarrat	A	133
El-Khoury	P	743
Ellerbrock	C	86
Elser	V	702
Elser	V	705
Elwood Madden	A	371
Elwood Madden	M	371
Emery	J	1091
Endo	N	419
Endo	N	944
Endo	N	1032
Eng	E	734
Eng	E	993
Eng	E	1092
Engel	B	995
Engelhardt	H	651
England	M	279
Entenberg	D	30
EPICIER	T	37
Epicier	T	642
Ercius	P	363
Ercius	P	696
Ercius	P	825
Ercius	P	893
Ercius	P	929
Ercius	P	1029
Ercius	P	1125
Erdman	N	97
Erdman	N	258
Erdman	N	318
Eres	G	479
Erni	R	576
Erni	R	582
Ernst	A	306
Ernst	J	344
Ersoy	I	68
Ersoy	I	458
Esmann	M	669
Esser	B	478
Esser	B	678
Estevez	A	996
Estrada-Guel	I	75
Estrada-Guel	I	104
Estrada-Guel	I	390
Estrada-Guel	I	391
Estrada-Guel	I	489
Estrada-Guel	I	490

Last Name	First Initial	Presentation #
Estrada-Guel	I	863
Estrada-Guel	I	865
Estrada-Guel	I	978
Estrada-Guel	I	979
Estrada-Guel	I	980
Estrada-Guel	I	987
Estrada-Guel	I	1064
Eswara	S	307
Etheridge	J	894
Evans	J	645
Evropeytsev	E	1118
Eyink	K	1023
Eyraud	F	170
Facey	S	465
Faenza	N	315
Fahey	A	623
Fahrenkrug	E	805
Fahy	K	564
Faleev	N	1115
Falke	M	600
Fang	C	736
Farha	O	1122
Farjami	S	90
Farokhipoor	S	675
Farra	R	1097
Fass	D	652
Fauske	V	133
Fauteux-Lefebvre	C	1152
Felisari	L	509
Félix-Domínguez	F	113
Félix-Domínguez	F	493
Félix-Domínguez	F	866
Feng	J	35
Feng	Q	215
Feng	J	537
Feng	J	580
Fenollar Ferrer	C	164
Fera	A	91
Fermin	C	447
Fermin	C	817
Fernandez	A	844
Fernández-Delgado	N	857
Fernando Marquez	C	76
Fernback	J	448
Fernback	J	449
Ferreira	P	496
Ferrier	N	48
Ferrier	N	613
Ferrière	L	373

Last Name	First Initial	Presentation #
Fey	D	370
Fey	D	372
Findlay	S	532
Findlay	S	534
Findlay	S	540
Findlay	S	704
Findlay	S	741
Finegan	D	1050
Finlay	J	811
Finley	J	930
Firlar	E	343
Firlar	E	731
Firlar	E	811
Fischione	P	141
Fischione	P	175
Fischione	P	603
Fischione	P	776
Fischione	P	777
Fischione	P	1055
Fisher	M	427
Flsher	K	1128
Fitch	J	354
Fitzpatrick	J	8
Fitzpatrick	J	342
Fitzpatrick	D	439
Flores	K	420
Flores-De-Los-Rios	J	391
Flores-De-los-Ríos	J	390
Flores-de-los-Ríos	J	425
Flores-de-los-Ríos	J	984
Floro	J	896
Floss	C	285
Floss	C	511
Floss	C	627
Floss	C	1028
Flytzani-Stephanopoulos	M	115
Foegeding	N	567
Foegeding	N	823
Fojt	R	765
Fontana	J	254
Fontana	M	485
Forbes	B	741
Ford	S	658
Ford	J	1054
Foreman	O	344
Foronda	H	239
Förster	F	721
Forsyth	M	898

Last Name	First Initial	Presentation #
Fortana	J	428
Fortis	A	1067
Fournelle	J	124
Fournelle	J	426
Fournelle	J	622
Fournelle	J	972
Fournelle	J	1146
Fowler	S	1046
Fowlie	J	584
Fox-Urbe	L	461
Fraczek	M	765
Franceschini	D	981
Franco-Madrid	J	104
Francy	C	570
Frankel	P	304
Franken	E	1139
Franken	E	1141
Fránková	M	450
Franks	J	258
Fraser	H	221
Fraser	S	925
Fraser	H	977
Fraundorf	P	63
Fraundorf	P	96
Fraundorf	P	512
Fraundorf	P	520
Fraundorf	P	828
Frazer	D	302
Frazer	D	904
Freakley	S	39
Frechero	M	228
Frederix	P	695
Freer	R	145
Freitag	S	480
Freitag	C	526
Freitag	S	877
Freitag	B	1066
French	M	74
Frenkel	A	639
Frenkel	A	1124
Frenken	J	641
Friedman	L	265
Friedman	H	341
Friedrichs	M	899
Frydman	J	647
Fu	B	264
Fu	B	531
Fu	D	625
Fu	J	629

Last Name	First Initial	Presentation #
Fu	J	633
Fu	B	736
Fu	B	824
Fua	P	297
Fuchi	S	638
Fuchsichler	B	952
Fuentes-Cobas	L	103
Fuery	C	207
Fujii	G	421
Fujii	T	760
Fujiyoshi	Y	27
Fukuda	Y	338
Fukunaga	K	944
Fullwood	D	232
Fulton	J	1122
Fundenberger	J	13
Furnival	T	133
Furuya	F	279
Furuya	F	1106
Fusil	S	584
Gajadeera	C	730
Gajda	G	188
Gajdardziska-Josifovska	M	244
Galindo	P	857
Galkin	V	255
Gallagher-Jones	M	609
Gallego	F	269
Gallegos-Orozco	V	425
Gallegos-Orozco	V	984
Gallegos-Orozco	V	985
Gallegos-Orozco	V	987
Gamble	J	98
Gammer	C	556
Gammer	C	1021
Gan	Z	173
Gangopadhyay	A	1115
Gänser	H	717
Ganti	S	691
Gao	X	180
Gao	S	381
Gao	K	656
Gao	X	864
Gao	P	874
Gao	Y	911
Gao	P	967
Gao	W	1004
Gao	W	1051
Garay-Reyes	C	75

Last Name	First Initial	Presentation #
Garay-Reyes	C	104
Garay-Reyes	C	390
Garay-Reyes	C	391
Garay-Reyes	C	1064
Garboczi	E	513
Garbowski	T	43
Garcia	V	584
García	S	276
García Espinoza	M	868
Garcia-Hernandez	M	269
García-Zavala	D	867
Gariglio	S	584
Garlow	J	346
Garmannslund	A	133
Garner	A	304
Garten	L	100
Garvin	J	370
Garvin	J	372
Gass	M	955
Gastaminza	P	332
Gates	B	1122
Gaudiello	J	739
Gaudillo	M	770
Gault	B	77
Gault	B	152
Gault	B	320
Gault	B	321
Gault	B	412
Gault	B	553
Gault	B	899
Gault	B	903
Gaury	B	882
Gauvin	R	12
Gauvin	R	61
Gauvin	R	62
Gauvin	R	134
Gauvin	R	135
Gauvin	R	951
Gauvin	R	1043
Gauvin	R	1103
Gauvin	R	1104
Gayral	B	666
Ge	J	229
Gebhardt	C	373
Gehm	M	300
Geim	A	359
Geim	A	1085
Geiser	B	240
Geiser	B	415

Last Name	First Initial	Presentation #
Gelb	J	529
Gelb	J	877
Gelb	J	1050
Gemma	R	80
Genc	A	774
Gendron	M	67
Geng	H	734
Genty	E	1052
Gerrity	M	887
Gerstl	S	20
Gerstl	S	416
Gerstl	S	798
Gerthsen	D	1094
Gerthsen	D	1095
Gestaut	D	647
Gewirth	A	639
Ghasemi	A	854
Ghassemi	H	843
Ghatak	S	434
Ghazisaeidi	M	718
Gholinia	A	605
GHosh	S	268
Ghosh	K	278
Giannuzzi	L	141
Giannuzzi	L	779
Giannuzzi	L	843
Gibbs	J	309
Gibert	M	584
Gidcumb	E	912
Giepmans	B	400
Giepmans	B	441
Gieser	B	1073
Gilis	N	19
Gilis	N	79
Gilis	N	1052
Gillet	P	595
Girard-Dias	W	820
Giuliano	E	389
Glaeser	R	910
Glaeser	R	946
Glaeser	R	957
Glenn	A	898
Glick	B	613
Glinskii	O	50
Glinskii	V	50
Gloter	A	584
Gloter	A	584
Gloy	G	688
Gnanaprakasa	T	1027

Last Name	First Initial	Presentation #
Godaliyadda	D	48
Goergen	E	686
Goetze	B	455
Gogotsi	Y	273
Goguen	J	513
Golberg	D	186
Goldberger	J	478
Goldmann	E	183
Goldsmith	C	444
Goldstein	M	92
Goll	D	405
Gomes	O	11
Gomez	D	667
Gomez	R	1127
Gómez	E	276
Gómez Ortiz	N	868
Gómez-Barraza	I	390
Gómez-Barraza	I	391
Gómez-Esparza	C	978
Gómez-Esparza	C	979
Gomez-Ortiz	N	992
Gómez-Ortiz	N	867
Gong	Y	272
Gonzalez	J	464
Gonzalez	M	801
Gonzalez	J	1019
González	J	113
González	J	492
González-Olmos	J	866
Goodge	B	143
Goodge	B	616
Goodman	A	689
Goodwin	R	94
Goodwin	R	341
Gopon	P	972
Gorbachev	R	359
Gorelik	J	165
Goriparti	S	194
Goriparti	S	324
Gorman	B	36
Gorman	B	99
Gorman	B	100
Gorman	B	416
Gorman	B	630
Gosselin	R	134
Gosselin	R	1152
Goto	K	373
Goulden	J	301
Goulden	J	303

Last Name	First Initial	Presentation #
Goulden	J	304
Goulden	J	693
Gourdie	R	165
Goyal	M	1114
Grabowski	B	320
Grabowski	K	623
Graff	T	288
Graham	U	448
Graham	U	449
Graham	S	685
Graham	G	1001
Graham	G	1004
Grandal	J	269
Granke	L	445
Grant	R	790
Grassman	T	935
Gray	G	5
Grazulis	L	1023
Grdanovska	S	1056
Greeley	J	41
Greenwood	J	98
Gregori	G	34
Greiner	M	1097
Greiser	J	773
Greven	M	847
Gribelyuk	M	264
Gribelyuk	M	736
Grigorieva	I	359
Grill	A	739
Grimley	E	181
Grimley	E	352
Grimley	E	660
Grimley	E	830
Grimley	E	942
Grin	Y	971
Groeber	M	308
Gröger	R	618
Grollios	F	1139
Groopman	E	623
Gros	M	613
Gruber	J	954
Grubesa	T	405
Gruner	S	358
Gruner	S	705
Gruner	S	940
Grünwald	E	928
Gu	J	105
Gu	J	337
Gu	G	397

Last Name	First Initial	Presentation #
Gu	L	681
Gu	L	842
Guay	M	1108
Guay	J	1152
Guedes	C	485
Gueninchault	N	1077
Guerrero-Areque	D	1127
Guerrero-Germán	P	813
Guerrero-Lestarjette	E	103
Guim	H	16
Guiton	B	872
Guiton	B	1045
Gulick	S	373
Gulsoy	E	48
Gunasekar	N	69
Gunasekar	N	1022
Gundlach	D	226
Gunduz	I	108
Guo	Y	191
Guo	H	327
Guo	W	625
Guo	S	669
Guo	H	856
Guo	H	1082
Gustafsson	J	585
Gutierrez	C	452
Gutierrez-Valenzuela	C	813
Guttmann	P	566
Guzmán	R	675
Guzman-Luna	V	461
H.F. Wang	H	1065
H.H. Shen	H	1065
Haam	Y	260
Haas	B	261
Haas	B	511
Habas	S	808
Hachtel	J	185
Hachtel	J	578
Hachtel	J	668
Hackley	P	42
Haenecour	P	1028
Hage	F	144
Hage	F	743
Hage	F	1155
Hagen	K	441
Haglund	R	185
Haglund	R	668
Hahn	T	85
Hahn	H	716

Last Name	First Initial	Presentation #
Hahn	T	919
Haiber	D	841
Haiber	D	934
Haiber	D	1154
Haigh	S	359
Hailstone	R	424
Hailstone	R	608
Hainfeld	J	279
Hainfeld	J	1106
Halbig	C	482
Haley	D	153
Hallet	B	372
Halsted	M	1147
Hamad	A	458
Hamaya	K	854
Hamer	P	347
Hammer	R	68
Hammer	R	928
Hammond	J	1072
Hampikian	H	870
Hampton	C	256
Hampton	C	345
Han	C	41
Han	C	56
Han	M	173
Han	M	346
Han	Y	358
Han	J	392
Han	Y	475
Han	Y	702
Han	Y	705
Han	C	791
Han	S	858
Han	R	872
Han	B	910
Hanawa	A	536
Hanawa	A	761
Hanawa	A	792
Hanawa	A	1027
Hanchar	J	707
Hanein	D	26
Haney	P	882
Hanks	A	478
Hanks	A	771
Hanrath	T	362
Hanrath	T	682
Hansen	T	723
Hanssen	E	64
Hanwell	M	217

Last Name	First Initial	Presentation #
Hao	W	300
Hao	S	503
Harada	K	401
Harada	K	895
Harada	K	1031
Hardiman	M	376
Haring	M	168
Harkiolaki	M	330
Harley	B	926
Harmon	K	341
Harris	C	217
Harris	K	546
Harris	A	654
Harris	J	754
Harris	W	1150
Harrison	K	194
Harrison	K	324
Harrowell	P	890
Hart	J	947
Hart	J	1137
Hartmann	R	161
Hartmann	R	212
Hartmann	R	963
Haruta	T	97
Harvey	R	510
Harvey	T	893
Hashimoto	Y	763
Hashimoto	A	1086
Hashizume	T	225
Hassanein	A	1062
Hassel-Shearer	M	605
Hatcherian	J	42
Hathon	L	44
Hathon	L	46
Hathon	L	200
Hattar	K	631
Hattar	K	1061
Hattar	K	1158
Hatzoglou	C	319
Haulenbeek	J	1111
Häusler	I	148
Havrilla	G	81
Havrilla	G	159
Hayakawa	J	895
Hayashida	M	994
Hayashida	M	1002
He	Q	39
He	J	65
He	S	198

Last Name	First Initial	Presentation #
He	K	282
He	K	369
He	K	731
He	J	840
He	X	842
He	Y	875
He	L	1060
He	Q	1108
Hebert	R	1069
Hébert	C	297
Hébert	C	508
Hébert	C	595
Heck	P	375
Heikes	C	581
Heiligenstein	J	170
Heiligenstein	X	170
Heiligenstein	X	388
Held	J	114
Helveg	S	724
Helveg	S	945
Henderson	K	52
Henderson	C	246
Henderson	W	280
Henderson	K	527
Henderson	W	559
Henkelman	G	1124
Hens	C	812
Hensley	D	726
Heredia-Cancino	J	493
Hereld	M	613
Herkenhoff	K	372
Hermann	P	1095
Hermannsdörfer	J	155
Hernandez	C	530
Hernández	O	862
Hernández-Giottonini	Y	813
Hernandez-Maldonado	D	618
Hernández-Martínez	S	1064
Hernández-Negrete	O	803
Hernández-Negrete	O	851
Hernández-Paredes	J	113
Hernández-Paredes	J	461
Hernández-Paredes	J	803
Hernández-Paredes	J	851
Hernández-Rivera	J	1064
Herrera	M	857
Herrera	J	986
Herrera Ramírez	J	488

Last Name	First Initial	Presentation #
Herrera Ramírez	J	818
Herrera-Pérez	G	103
Herrera-Ramírez	M	489
Herrera-Ramírez	M	490
Herrera-Ramírez	M	980
Herring	R	263
Herzik	M	1112
Herzing	A	334
Hess	W	743
Hetherington	C	585
Hettler	S	403
Hettler	S	1094
Hettler	S	1095
Heuer	J	1130
Hewitt	J	710
Heydari	E	370
Heymann	B	166
Heymann	J	254
Hiebert	M	1142
Hielscher	R	964
Hikita	Y	143
Hill	M	1023
Hintsala	E	982
Hirsch	P	618
Hirst	L	801
Hiscock	M	125
Hiscock	M	347
Hiscock	M	960
Hiscock	M	1076
Hitchcock	A	753
Hladík	L	303
Hoagland	R	719
Hoang	Q	307
Hodoroaba	V	110
Hodoroaba	V	116
Hodoroaba	V	148
Hodoroaba	V	276
Hodoroaba	V	284
Hoeker	G	165
Hofbauer	F	695
Hofer	C	961
Hoffman	A	756
Hoffman	M	938
Hoffman	T	1020
Hofmann	S	340
Hoglund	E	398
Hohs	D	405
Holburn	D	66
Holburn	D	220

Last Name	First Initial	Presentation #
Holcomb	M	354
Holguin-Momaca	J	103
Holl	P	212
Holland	J	884
Holland	J	1038
Höllt	L	765
Holm	J	317
Holm	J	407
Holmestad	R	262
Holmestad	R	314
Holmestad	R	522
Holmestad	R	541
Holtz	M	117
Holtz	M	475
Holtz	M	941
Holzner	C	1077
Holzweber	M	116
Honda	Y	638
Hondow	N	1110
Hong	Y	140
Hong	H	576
Hong	Z	581
Hong	L	748
Hono	K	711
Hoogenboom	J	168
Hoogenboom	J	400
Hoogenboom	J	441
Hoogenboom	J	547
Hooghan	K	44
Hooghan	K	199
Hooghan	K	200
Hoppe	A	433
Hoque	S	787
Hosemann	P	302
Hosemann	P	904
Hoshino	A	454
Hosman	T	605
Hosoya	K	763
Hosseinkhannazer	H	762
Hotz	M	1134
Houben	L	356
Houben	L	635
Hourahine	B	69
Hourahine	B	147
House	S	361
House	S	1124
Hovden	R	217
Hovden	R	362
Hovden	R	538

Last Name	First Initial	Presentation #
Hovden	R	616
Hovden	R	682
Hovden	R	749
Hovington	P	951
Hovington	P	1043
Hovorka	M	55
Howard	C	302
Howard	J	564
Howe	J	398
Howe	J	536
Howe	J	761
Howe	J	762
Howe	J	792
Howe	J	1027
Howe	J	1028
Howe	J	1135
Hoyle	D	792
Hoyle	D	1135
Hradil	D	1034
Hradilová	J	1034
Hrubanova	K	515
Hrubanova	K	1013
Hsiao	M	561
Hsiao	M	990
Hsieh	C	331
Hsu	W	484
Hu	M	277
Hu	X	326
Hu	G	467
Hu	X	589
Hu	X	634
Hu	R	799
Hu	X	1159
Huang	R	166
Huang	C	354
Huang	L	569
Huang	Y	754
Huang	Y	755
Huang	X	939
Huang	X	1097
Huang	Y	1125
Huape-Padilla	E	425
Hubbard	W	348
Hubbard	W	366
Hubbard	W	593
Hubbard	W	663
Hubbard	W	832
Huber	R	81
Huber	D	86

Last Name	First Initial	Presentation #
Huber	D	221
Huber	D	748
Hudak	B	274
Hudak	B	1045
Hufschmid	R	156
Hughes	J	8
Hughes	J	257
Hughes	A	898
Hughes	L	1110
Huh	Y	462
Huh	Y	1014
Huisken	J	29
Hultgren	S	342
Humphrey	S	1124
Humphry	M	789
Hunn	J	1057
Hunt	J	605
Hunt	J	917
Hunter	K	114
Hunter	A	233
Hupp	J	1122
Huseni	Z	519
Hussain	A	64
Hussiani	Z	591
Hutchings	G	39
Huth	M	161
Huth	M	701
Huth	M	963
Huth	M	1133
Huth	M	1136
Hutson	M	94
Huxley	V	50
Huynh	C	384
Huynh	C	455
Hwang	S	56
Hwang	H	143
Hwang	I	484
Hwang	S	577
Hwang	J	665
Hwang	J	676
Hwang	J	706
Hwang	J	751
Hwang	J	1117
Hyde	J	237
Hysmith	H	138
Hysmith	H	139
Iberi	V	138
Ichinose	T	583
Idrobo	J	185

Last Name	First Initial	Presentation #
Idrobo	J	578
Idrobo	J	668
Idrobo	J	699
Ievlev	A	138
Ievlev	A	139
Ievlev	A	587
Ievlev	A	674
Ievlev	A	880
Ihle	S	212
Iijima	H	638
Iijima	H	1093
Ikuhara	Y	351
Ikuhara	Y	540
Ikuhara	Y	703
Ikuta	T	784
Ilani	T	652
Im	S	1117
Inada	H	536
Inada	H	761
Inada	H	792
Inada	H	916
Inada	H	1135
Íñiguez	J	675
Íñiguez	J	583
Íñiguez-Palomares	R	866
Ioannou	D	834
Iriyama	Y	783
Irving	D	352
Irving	D	660
Isaacs	M	499
Isaza Merino	C	488
Isheim	D	627
Isheim	D	798
Ishigami	M	476
Ishikawa	R	540
Ishikawa	R	703
Ishikawa	I	994
Ishikawa	I	1093
Ishimaru	M	501
Ishizaki	M	1039
Ishizuka	A	886
Ishizuka	K	886
Isik	T	108
Islam	A	491
Islam	A	561
Islam	A	1009
Ismail	R	279
Ismail	B	730
Ito	H	787

Last Name	First Initial	Presentation #
Ivanov	S	1118
Ivasishin	O	310
Iwai	H	402
Iwasawa	Y	419
Iyengar	I	133
Izadi	E	861
Izadi	E	1090
Jacobs	L	19
Jacobs	R	182
Jacobs	T	634
Jacobs	B	843
Jacobs	R	1024
Jacobson	N	510
Jacobsson	D	585
Jaeger	W	201
Jaeger	W	1021
Jafari	T	189
Jäggle	E	715
Jahnke	F	183
Jalan	B	181
Jalan	B	355
Jang	S	462
Janssen	A	509
Janssen	A	802
Janssen	B	1141
Je	A	1014
Jeelani	S	494
Jenkins	M	658
Jensen	G	211
Jeon	M	368
Jeong	J	355
Jeong	J	791
Jeong	H	829
Jeong	J	847
Jesse	S	138
Jesse	S	218
Jesse	S	298
Jesse	S	575
Jesse	S	587
Jesse	S	879
Jesse	S	881
Jesse	S	959
Jesse	S	1081
Jetter	M	183
Ježek	J	1013
Jia	C	467
Jia	C	468
Jia	C	470
Jia	C	539

Last Name	First Initial	Presentation #
Jia	S	848
Jiang	Y	217
Jiang	N	241
Jiang	H	301
Jiang	E	446
Jiang	S	478
Jiang	Y	702
Jiang	Y	705
Jiang	L	739
Jiang	X	750
Jiang	W	815
Jiang	Y	940
Jiang	X	1140
Jiang	N	1156
Jiao	J	54
Jiao	J	120
Jiao	J	437
Jiao	Y	990
Jiao	J	1046
Jimenez	J	792
Jiminez	J	1027
Jin	R	361
Jin	X	468
Jin	L	470
Jin	L	539
Jin	N	560
Jin	Y	896
Jin	L	958
Jin	S	970
Jing	C	158
Jing	H	467
Jinschek	J	724
Jinschek	J	773
Jiruše	J	694
Jiruše	J	888
Jmerik	V	1118
Joens	M	8
Joens	M	342
Joester	D	171
Johnson	M	59
Johnson	M	60
Johnson	K	223
Johnson	J	665
Johnson	J	676
Johnson	I	696
Johnson	J	706
Johnson	J	727
Johnson	S	858
Johnson	M	995

Last Name	First Initial	Presentation #
Johnstone	D	133
Johnstone	D	357
Johnstone	D	483
Johnstone	D	522
Johnstone	D	523
Johnstone	D	964
Johnstone	D	1109
Jokisaari	J	326
Jokissari	J	589
Jokubauskas	P	133
Jolliff	B	21
Jolliff	B	919
Joly	A	743
Jones	R	94
Jones	L	314
Jones	L	360
Jones	L	364
Jones	H	373
Jones	M	632
Jones	L	670
Jones	L	701
Jones	M	754
Jones	L	1133
Jose Yacaman	M	292
Joshi	V	109
Joshi	V	279
Joshi	T	348
Joshi	V	436
Joshi	V	495
Joshi	V	1106
Joshi	V	1148
Joslin	D	1151
Jouneau	P	952
Juárez Arellano	E	76
Juffman	T	946
Juhl	S	1041
Julian	N	310
Julius	D	911
Jung	J	195
Jung	H	283
Jung	W	971
Jungjohann	K	194
Jungjohann	K	324
Junin	C	438
Junor	L	94
Junor	L	658
Junquera	J	940
Jussila	H	1022
Juzwak	T	249

Last Name	First Initial	Presentation #
K	K	497
Kaboli	S	549
Kachar	B	164
Kacher	J	325
Kacher	J	1091
Kaepfel	A	600
Kageyama	K	760
Kah	L	370
Kaira	C	1160
Kaji	K	837
Kaji	K	838
Kaji	K	1033
Kalidindi	S	309
Kalinin	S	298
Kalinin	S	674
Kalinin	S	879
Kalinin	S	880
Kalinin	S	959
Kalinin	S	1081
Kalok	D	212
Kaluskar	K	410
Kamasawa	N	439
Kanareykin	A	158
Kaneko	K	184
Kaneko	T	1093
Kang	H	777
Kano	E	994
Kano	E	1086
Kantzios	C	1160
Kaoumi	D	904
Kaoumi	D	1157
Kapteyn	H	887
Karki	K	755
Karki	S	935
Karl	R	887
Kas	J	4
Kas	J	949
Kasama	T	174
Kasevich	M	946
Kashiwar	A	716
Kashyap	I	896
Kassim	Y	50
Kataoka	Y	97
Katnagallu	S	320
Katnagallu	S	321
Katnani	A	738
Katnani	A	834
Kato	T	784
Katoch	J	771

Last Name	First Initial	Presentation #
Katoch	Y	1159
Katsuta	T	1031
Katz	M	1001
Kawakami	R	678
Kawakami	R	771
Kawasaki	M	438
Kawasaki	T	784
Kawasaki	M	994
Kawasaki	M	1030
Ke	Z	256
Kear	B	112
Keijzer	P	400
Keller	L	288
Keller	R	406
Keller	S	662
Keller	S	800
Kellogg	G	150
Kelly	T	77
Kelly	T	335
Kelly	M	530
Kelly	D	653
Kelly	T	735
Kelly	T	972
Kelly	T	1073
Kelly	D	1111
Kemmler	M	350
Kemner	K	613
Kennedy	M	370
Kennedy	M	372
Kennedy	Z	782
Kent	P	273
Kent	P	363
Kepaptsoglou	D	145
Kepaptsoglou	D	854
Kephart	J	831
Kerns	R	233
Key	J	325
Keyshar	K	831
Khaliq	A	393
Khan	W	850
Khan	N	1020
Khanal	S	634
Khanna	K	650
Khanna	H	772
Khestanova	E	359
Khoshouei	M	721
Khoshouei	M	908
Khushaim	M	80
Kiely	C	39

Last Name	First Initial	Presentation #
Kiener	D	717
Kikongi	P	134
Kikuchi	H	762
Kilcrease	J	244
Kilcrease	J	925
Kim	H	33
Kim	M	38
Kim	H	179
Kim	C	195
Kim	I	195
Kim	S	195
Kim	M	202
Kim	M	208
Kim	S	208
Kim	D	283
Kim	S	283
Kim	S	369
Kim	J	408
Kim	S	408
Kim	I	504
Kim	C	505
Kim	I	505
Kim	S	505
Kim	J	538
Kim	S	561
Kim	J	569
Kim	J	576
Kim	N	576
Kim	S	587
Kim	Y	633
Kim	M	662
Kim	J	749
Kim	J	791
Kim	K	825
Kim	M	827
Kim	J	829
Kim	S	829
Kim	M	855
Kim	S	881
Kim	I	965
Kim	S	965
Kim	H	1014
Kim	H	1014
Kim	J	1014
Kim	C	1043
Kim	L	1092
Kim	M	1113
Kim	H	1114
Kimoto	K	785

Last Name	First Initial	Presentation #
Kimura	T	501
King	J	451
Kinoshita	T	440
Kirby	M	94
Kirchlechner	C	554
Kirilov	O	226
Kirkland	A	270
Kirkland	A	381
Kirkland	A	786
Kirste	R	660
Kirz	J	1075
Kisielowski	C	724
Kisielowski	C	873
Kisielowski	C	945
Kisslinger	F	482
Kisslinger	K	577
Kitamura	S	638
Kiyohara	M	833
Kizu	T	1017
Kizziah	J	336
Kizziah	J	430
Kjeang	E	500
Kleindiek	S	350
Kleindiek	S	995
Kleine	T	281
Klenow	L	336
Klick	A	208
Klie	R	326
Klie	R	589
Klie	R	748
Klie	R	757
Klie	R	998
Kliewer	C	1011
Klocke	F	899
Klopfer	B	946
Knight	A	859
Knipling	K	801
Knipling	K	901
Knipling	K	975
Knobloch	J	765
Knowles	W	199
Knuffman	B	226
Koback	M	105
Kobler	A	716
Kobl Müller	G	930
Kochat	V	578
Kociak	M	666
Kociak	M	669
Kociak	M	1134

Last Name	First Initial	Presentation #
Kodama	T	784
Koelling	S	552
Koenraad	P	552
Koh	A	912
Koh	A	1126
Kohnno	Y	177
Kohnno	Y	785
Kohnno	Y	897
Kolibal	M	1100
Koller	S	952
Kolli	R	414
Kolmakov	A	327
Kolmakov	A	1082
Kondo	Y	419
Kondo	Y	701
Kondo	Y	944
Kondo	Y	1032
Kondo	Y	1133
Kondo	Y	1136
Konduru	N	448
Konduru	N	449
Kone	J	122
Konetschnik	R	717
Kong	J	481
Konno	M	916
Konomi	M	760
Konopka	J	768
Konopka	J	1037
Koo	B	815
Koo	B	999
Kööp	L	598
Kooyman	P	641
Koppa	M	323
Koppell	S	946
Korajczyk	P	613
Korla	R	149
Kormondy	K	267
Kortshagen	U	114
Kosmowska	E	766
Koster	S	77
Kotakoski	J	961
Kotakoski	J	1085
Kothe	B	870
Kotrly	M	10
Kotula	P	891
Kotulak	N	801
Kourkoutis	L	143
Kourkoutis	L	210
Kourkoutis	L	362

Last Name	First Initial	Presentation #
Kourkoutis	L	538
Kourkoutis	L	616
Kourkoutis	L	636
Kourkoutis	L	651
Kourkoutis	L	683
Kourkoutis	L	749
Kovacs	J	255
Kovacs	J	296
Kovács	A	184
Kovács	A	583
Kovalenko	M	68
Kovarik	L	129
Kovarik	L	213
Kovarik	L	216
Kovarik	L	280
Kovarik	L	559
Kovarik	L	690
Kovarik	L	807
Kozak	D	999
Kozic	D	717
Kraemer	S	384
Kraemer	S	411
Krakow	R	964
Kramberger	C	961
Kramberger	C	1085
Kramer	M	313
Krammel	C	552
Krause	F	183
Krause	T	808
Kreilkamp	H	899
Kreith	J	988
Krezoski	G	370
Kring	D	373
Krishnamoorthy	S	665
Krishnamoorthy	S	676
Krishnan	K	156
Krivanek	O	333
Krivanek	O	742
Krivanek	O	938
Krivanek	O	1132
Krivanek	O	1134
Krogstrup	P	1021
Kromka	A	377
Kruit	P	168
Kruit	P	400
Kruit	P	547
Krupke	R	588
Krusienski	D	296

Last Name	First Initial	Presentation #
Krystofiak	E	164
Krzyzanek	V	515
Krzyzanek	V	1013
Kuebel	C	277
Kuebel	C	498
Kuebel	C	588
Kuebel	C	716
Kuerbanjiang	B	854
Kuijper	M	1141
Kuipers	J	441
Kujawa	S	773
Kulzick	M	509
Kulzick	M	802
Kumar	P	368
Kumar	C	588
Kumar	A	1062
Kumar	P	1121
Kumari	S	354
Kunal	P	1124
Kundmann	M	423
Kundu	S	108
Kuno	M	1047
Kunwar	D	1123
Kuraganti	V	356
Kurihara	M	1039
Kürnstener	P	715
Kurtuldu	H	222
Kuwajima	M	546
Kuznetsova	L	279
Kvit	A	35
Kweon	H	1014
Kwon	J	462
Kwong	P	734
Kylberg	G	883
La	J	460
La Fontaine	A	626
Laanait	N	218
Labre	C	1068
Lackner	R	602
Lackner	R	767
Laeveren	D	614
Lafond	C	235
Lai	B	197
Lai	L	331
Lam	T	160
Lam	P	452
Lam	V	650
LaManna	J	122
Lambeets	S	19

Last Name	First Initial	Presentation #
Lambeets	S	1052
Lampert	L	437
Lander	G	1112
Lane	B	341
Lang	A	947
Lang	C	960
Lang	A	1137
Langenberg	E	675
Langlois	C	235
Lape	A	727
Lapington	M	900
Larabell	C	329
Larabell	C	466
Larabell	C	562
Larabell	C	565
Larabell	C	644
Larabell	C	647
Larabell	C	648
Lara-Romero	J	102
Larsen	M	31
Larson	D	151
Larson	D	240
Larson	D	246
Larson	D	712
Larson	D	972
Larson	D	1073
Larson	D	1074
Lassise	M	931
Latgnotha	A	572
Latychevskaia	T	484
Lau	S	123
Lau	J	158
Lau	S	1075
Laugks	T	995
Laurent	M	800
Lauretta	D	761
Lauridsen	E	311
Lauridsen	E	1077
Lavagnino	Z	295
Lavery	L	1077
Laviada	A	165
Lavoie	B	1152
Lawrence	E	592
Lawrence	E	914
Lawrie	B	185
Lawrie	B	668
Lazarov	V	854
Le Gros	M	329
Le Gros	M	645

Last Name	First Initial	Presentation #
Le Gros	M	648
Le Mouélic	S	370
Leapman	R	1108
Leary	R	483
Leary	R	499
LeBeau	J	181
LeBeau	J	230
LeBeau	J	352
LeBeau	J	354
LeBeau	J	525
LeBeau	J	532
LeBeau	J	533
LeBeau	J	660
LeBeau	J	672
LeBeau	J	709
LeBeau	J	830
LeBeau	J	942
Lederman	D	348
Ledezma Sillas	J	488
Ledezma Sillas	J	818
Lee	G	73
Lee	S	126
Lee	L	140
Lee	H	180
Lee	S	180
Lee	J	195
Lee	D	343
Lee	S	344
Lee	Y	387
Lee	K	439
Lee	S	457
Lee	S	457
Lee	G	462
Lee	P	463
Lee	A	499
Lee	J	504
Lee	J	505
Lee	S	560
Lee	J	576
Lee	Z	576
Lee	C	676
Lee	S	791
Lee	J	853
Lee	S	906
Lee	J	965
Lee	H	989
Lee	K	1018
Leenheer	A	194
Leenheer	A	324

Last Name	First Initial	Presentation #
Lefebvre	J	990
Leff	A	404
Leff	A	947
LeGros	M	466
LeGros	M	562
LeGros	M	565
Leighton	C	355
Leighton	C	998
Leiknes	T	597
Leitner	M	695
Leitner	M	988
Leng	A	1046
Lenz	D	1073
Lenz	D	1074
Leon	C	228
Leon	F	256
Leon	C	269
Leonard	D	74
Lercher	J	1122
Lerotic	M	753
Leuthner	G	1085
Levi	C	844
Levin	B	117
Lewis	S	123
Lewis	J	627
Lewis	S	1075
Li	W	122
Li	J	144
Li	Y	152
Li	Y	158
Li	W	197
Li	X	273
Li	H	420
Li	J	481
Li	Q	503
Li	Y	503
Li	Y	560
Li	L	581
Li	X	584
Li	M	590
Li	J	633
Li	J	633
Li	Y	639
Li	M	679
Li	N	719
Li	J	739
Li	L	746
Li	C	781
Li	L	781

Last Name	First Initial	Presentation #
Li	C	870
Li	J	950
Li	X	1041
Li	H	1124
Lian	G	740
Liang	F	197
Liang	W	365
Liang	J	1035
Liao	Z	939
Liaw	P	975
Libera	M	337
Libera	M	1035
Liberti	E	270
Liberti	E	786
Lich	B	55
Lieb	A	695
Liebel	A	602
Liebel	A	767
Lieberwirth	I	733
Liebscher	C	412
Liebscher	C	554
Lienau	C	669
Lifshin	E	607
Lifshin	E	608
Lim	J	560
Lim	J	953
Lin	J	271
Lin	Z	331
Lin	J	477
Lin	C	484
Lin	C	506
Lin	P	591
Lin	Y	666
Lin	J	754
Lin	C	780
Lin	J	939
Lin	Y	943
Linck	M	893
Lind	E	437
Lindner	T	120
Lindsay	J	303
Lindsay	J	304
Lindsay	J	347
Liou	S	506
Liou	S	780
Lipkie	T	729
Lipp	M	96
Lipp	M	512
Liu	J	40

Last Name	First Initial	Presentation #
Liu	Z	46
Liu	C	90
Liu	Z	107
Liu	J	111
Liu	Y	122
Liu	H	142
Liu	J	191
Liu	L	242
Liu	Z	271
Liu	H	277
Liu	N	286
Liu	Y	387
Liu	L	397
Liu	J	414
Liu	M	467
Liu	Z	473
Liu	D	474
Liu	X	560
Liu	B	633
Liu	D	639
Liu	J	639
Liu	Y	639
Liu	A	667
Liu	C	712
Liu	X	719
Liu	P	723
Liu	Q	725
Liu	Q	734
Liu	C	745
Liu	M	747
Liu	J	835
Liu	Q	839
Liu	W	840
Liu	H	848
Liu	J	872
Liu	A	890
Liu	Q	934
Liu	Q	937
Liu	Y	948
Liu	J	969
Liu	L	981
Liu	Y	1005
Liu	Z	1007
Liu	S	1020
Liu	Y	1098
Liu	W	1106
Liv	N	168
Liyu	A	129
Liyu	A	213

Last Name	First Initial	Presentation #
Liyu	A	216
Liyu	A	280
Liyu	A	559
Lloyd	N	519
Lo	Y	609
Lobato Hoyos	I	3
Lodge	M	476
Lodico	J	366
Loeffler	M	288
Lofi	J	373
Logvenov	G	34
Loh	D	157
Loh	D	958
Loitsch	B	930
Lomascolo	M	1113
Longo	P	947
Lopatin	S	840
López	S	110
López	C	1015
López-López	M	1116
López-Meléndez	C	489
López-Meléndez	C	490
López-Meléndez	C	980
López-Miranda	I	487
Lou	J	856
Love	C	854
Lovejoy	T	333
Lovejoy	T	742
Lovejoy	T	938
Lovejoy	T	1134
Løvvik	O	314
Lowers	H	1145
Lowery	C	373
Loyola	C	410
Lozano	J	270
Lozano-Perez	S	364
Lozano-perez	S	884
Lu	N	38
Lu	L	39
Lu	D	143
Lu	S	267
Lu	P	313
Lu	P	315
Lu	S	353
Lu	Y	412
Lu	L	467
Lu	L	468
Lu	L	470
Lu	P	535

Last Name	First Initial	Presentation #
Lu	M	734
Lu	W	745
Lu	P	913
Lubieniecki	J	651
Lucadamo	G	954
Lucero-Acuña	A	813
Ludtke	S	720
Ludtke	S	722
Ludwick	A	1054
Luengo	I	330
Lugg	N	741
Lund	C	662
Luo	L	139
Luo	K	270
Luo	L	502
Luo	J	825
Luo	Z	858
Luo	H	948
Lupini	A	268
Lupini	A	274
Lupini	A	540
Lupini	A	675
Lupini	A	680
Lupini	A	699
Luscher	D	527
Lusso	P	734
Luzi	L	132
Ly	T	119
Lyden	D	454
Lyon	A	123
Lyon	S	305
Lyon	A	1075
Ma	C	277
Ma	C	680
Ma	X	734
Ma	H	875
Ma	X	1099
Maar	D	519
MacArthur	K	133
MacArthur	K	360
MacArthur	K	534
Macaulley	C	844
Macdonald	M	834
Machado	P	169
Machen	A	427
MacIno	M	39
MacLaren	I	417
MacLaren	I	541
MacLaren	I	933

Last Name	First Initial	Presentation #
MacLaren	I	955
MacRae	C	87
MacRae	C	124
MacRae	C	204
MacRae	C	423
MacRae	C	918
MacRae	C	920
MacRae	C	1144
Madsen	J	723
Maeda	G	47
Maeda	G	49
Maeda	M	97
Maeda	T	184
Magén	C	675
Mageswaran	S	211
Mahady	K	139
Mahalingam	K	448
Mahalingam	K	449
Mahalingam	K	1023
Mahamid	J	7
Maier	J	34
Maier	U	77
Majidi	H	586
Majumdar	P	41
Maksov	A	298
Maksymovych	P	138
Maksymovych	P	674
Maksymovych	P	880
Maksymovych	P	959
Malac	M	994
Malac	M	1002
Malac	M	1095
Maldonado	S	805
Maldonado-Orozco	M	75
Maldonado-Orozco	M	104
Maldonado-Orozco	M	390
Maldonado-Orozco	M	391
Maldonado-Orozco	M	1064
Mallouk	T	1005
Maloy	S	5
Mamedov	S	45
Mancini	G	887
Mane	A	106
Mane	P	287
Mane	P	536
Manga	V	536
Mangler	C	961
Mangler	C	1085
Mangum	J	100

Last Name	First Initial	Presentation #
Manna	S	815
Manna	S	999
Manner	V	527
Manning	K	336
Manning	K	430
Manto	M	41
Manukyan	K	190
Manzoni	A	564
Mao	H	290
Mao	S	948
Mao	K	1131
Mara	N	719
Marceau	R	629
Marceau	R	898
March	K	291
March	K	839
March	K	934
Maria	J	99
Marin	T	926
Marinenko	R	542
Marinkovic	M	11
Marinova	M	584
Marioara	C	314
Marioara	C	522
Markert	S	169
Markovsky	P	310
Marks	L	119
Maros	A	1115
Marquardt	K	596
Marquis	E	322
Marquis	E	713
Marquis	E	973
Marquis	E	1070
Marquis	E	1071
Marquis	E	1128
Marschilok	A	950
Marsh	M	67
Marsh	M	611
Marshall	A	677
Marsillac	S	935
Marti	A	730
Martin	I	151
Martin	A	203
Martin	T	347
Martin	T	550
Martin	L	619
Martin	I	712
Martin	I	1073
Martineau	B	133

Last Name	First Initial	Presentation #
Martineau	B	523
Martineau	R	561
Martines	R	444
Martinez	G	270
Martinez	J	418
Martinez	G	701
Martinez	G	786
Martinez	G	788
Martinez	G	789
Martinez	A	986
Martínez	A	399
Martinez Torres	P	101
Martínez Torres	P	868
Martínez-Franco	E	489
Martínez-Franco	E	490
Martinez-Garcia	M	992
Martínez-Pastor	J	857
Martinez-Rivera	N	1016
Martinez-Rivera	N	1107
Martínez-Sánchez	R	75
Martínez-Sánchez	R	104
Martínez-Sánchez	R	390
Martínez-Sánchez	R	391
Martínez-Sánchez	R	489
Martínez-Sánchez	R	490
Martínez-Sánchez	R	863
Martínez-Sánchez	R	865
Martínez-Sánchez	R	978
Martínez-Sánchez	R	979
Martínez-Sánchez	R	980
Martínez-Sánchez	R	1064
Martínez-Torres	P	867
Martini	A	634
Martino	M	202
Martra	G	116
Martra	G	276
Maruyama	B	491
Maruyama	B	1009
Masiel	D	130
Masiel	D	158
Masiel	D	692
Masiello	D	937
Mašin	D	514
Mason	K	88
Mason	B	460
Mass	J	117
Massani	B	379
Massani	B	761
Mathew	K	4

Last Name	First Initial	Presentation #
Mathieu	S	1055
Matich	S	930
Matsiyevskiy	L	821
Matson	L	989
Matsubara	S	225
Matsumoto	H	760
Matsumoto	T	762
Matsumoto	H	833
Matsumoto	H	916
Matthew	M	491
Matyskiela	M	1112
Maurel	L	675
Mawhinney	T	819
Maxumder	B	625
May	S	268
Maynard	T	821
Mayoral	A	1119
Mazoyer	J	729
Mazumder	B	239
Mazumder	B	319
Mazzucco	S	133
Mburu	S	414
McBride	J	392
McBride	E	1108
McBroom	T	520
McCarthy	C	564
McCartney	M	173
McCartney	M	267
McCartney	M	353
McClelland	J	226
McClure	E	1048
McComb	D	86
McComb	D	387
McComb	D	434
McComb	D	478
McComb	D	528
McComb	D	624
McComb	D	678
McComb	D	771
McComb	D	935
McComb	D	1048
McComb	D	1155
McCraw	D	654
McDermott	G	329
McDermott	G	466
McDermott	G	562
McDermott	G	565
McDermott	G	647
McEnroe	T	564

Last Name	First Initial	Presentation #
McFadzean	S	417
McGehee	W	226
McGrouther	D	933
McGuinness	C	367
McGuire	M	138
McGuire	E	367
McIntosh	K	81
McIntyre	P	677
McKeown	J	15
McKeown	J	90
McLean	M	555
McMahon	D	921
McMahon	G	1129
McManus	C	378
McMillan	N	378
McMorran	B	893
McNeil	M	1050
McPheeters	M	658
McPherson	E	816
McSwiggen	P	247
Mears	J	570
Mecklenburg	M	231
Mecklenburg	M	348
Mecklenburg	M	593
Mecklenburg	M	663
Mecklenburg	M	832
Medhekar	N	617
Medhekar	N	864
Medina	S	597
Medina	A	862
Medina Flores	A	868
Medina-Lopez	A	1016
Medina-Monares	J	487
Medlín	R	850
Medrano-Prieto	H	75
Meduri	K	120
Meduri	K	437
Meechan	D	821
Meenakshisundaram	S	39
Meguro	T	638
Mehdi	L	59
Mehdi	L	60
Mehdi	L	129
Mehdi	B	216
Mehdi	L	280
Mehdi	B	559
Mehdi	B	807
Mehdi	B	1122
Mehmood	S	393

Last Name	First Initial	Presentation #
Mehnert	K	301
Mehta	H	280
Meier	D	542
Meier	D	941
Meijerink	M	243
Meiners	T	412
Meiners	T	899
Meirer	F	625
Meiron	O	356
Meisenkothen	F	238
Melinte	G	609
Mellet	C	373
Mendenhall	J	546
Mendoza-Duarte	J	863
Mendoza-Duarte	J	865
Meng	Y	192
Meng	Q	577
Meng	Y	619
Meng	A	677
Meng	Y	696
Meng	Y	1079
Mengason	M	136
Mengason	M	251
Menon	V	658
Menon	V	814
Menzel	M	769
Menzies	A	688
Merino	C	684
Merkle	A	311
Merkle	A	529
Merkle	A	1150
Mermoux	M	291
Metha	S	739
Meuret	S	666
Mevenkamp	N	299
Meyer	T	180
Meyer	B	482
Meyer	J	801
Meyer	J	961
Meyer	J	1085
Meyer III	H	726
Meyers	G	632
Meza Meza	J	488
Mi	S	467
Mi	S	468
Miao	J	363
Miao	L	469
Miao	J	609
Miao	J	696

Last Name	First Initial	Presentation #
Miao	J	718
Miao	J	1125
Michael	J	15
Michael	J	316
Michael	J	790
Michels	T	226
Michler	P	183
Mick	S	1006
Midgley	P	357
Midgley	P	483
Midgley	P	499
Midgley	P	521
Midgley	P	522
Midgley	P	523
Midgley	P	964
Midgley	P	1109
Mielke	J	110
Migunov	V	133
Mikula	S	57
Miley	G	887
Miller	D	242
Miller	D	290
Miller	K	371
Miller	M	690
Miller	D	848
Miller	B	1006
Miller	B	1129
Milligan	C	41
Mills	M	718
Minár	J	850
Miner	J	573
Minitti	M	370
Minnaar	E	517
Minor	A	556
Minor	A	632
Minor	A	696
Minor	A	752
Minor	A	1021
Minor	A	1089
Mintz	K	429
Mintz	K	431
Miranda	K	649
Miranda	K	820
Mirkin	C	245
Mirrielees	K	660
Mirsaidov	U	157
Mirzayev	R	1085
Mischitz	M	9
Mise	H	760

Last Name	First Initial	Presentation #
Miseur	A	812
Mishra	R	228
Mishra	U	662
Mishra	U	800
Mistry	P	821
Mita	S	660
Mitchels	J	55
Mitchels	J	453
Mitchels	J	604
Mitra	D	279
Mitra	S	503
Mittal	A	396
Mittelberger	A	482
Mittelberger	A	961
Mittelberger	A	1085
Miura	K	895
Miyakawa	N	765
Miyasaka	S	763
Miyoshi	S	764
Mizoguchi	T	145
Mkhoyan	K	114
Mkhoyan	K	178
Mkhoyan	K	355
Mkhoyan	A	368
Mkhoyan	A	396
Mkhoyan	A	579
Mkhoyan	K	847
Mkhoyan	K	853
Mkhoyan	A	1121
Modesto	C	985
Modesto-Acosta	C	987
Moeck	P	1122
Moelants	K	729
Moghimian	P	465
Moharrerri	E	772
Mohite	A	831
Mohsin	A	397
Molas	G	664
Moldovan	G	386
Molina	R	448
Molina	R	449
Molina	S	857
Molinari	M	145
Mompean	F	269
Monazam	M	1085
Monier	E	700
Moody	M	153
Moody	M	320
Moody	M	321

Last Name	First Initial	Presentation #
Moody	M	550
Moody	M	900
Mook	B	324
Mooney	P	1138
Moradifar	P	1005
Morales	M	435
Morales-Rodriguez	H	985
Morales-Rodriguez	H	987
Morales-Rodríguez	H	425
Morales-Rodríguez	H	984
Moran	K	1105
More	K	193
More	K	680
More	K	1044
More	K	1161
Moret	M	246
Morgan	D	35
Morgan	D	182
Morgan	J	373
Morgan	D	537
Morgan	D	580
Morgan	M	704
Morishita	S	785
Morishita	S	897
Moriya	Y	97
Morris	R	288
Morsch	M	259
Morsdorf	L	903
Moses	P	724
Moshin	A	242
Mostovoy	M	675
Mothes	W	734
Motoki	S	994
Motoki	S	1093
Mott	R	250
Moy	A	426
Moy	A	1146
Mozael	M	112
Mu	X	588
Mueller	K	280
Mueller	K	559
Muir	K	1062
Mukai	M	785
Mukasyan	A	190
Mukherjee	P	315
Mukherjee	A	326
Mukherjee	D	469
Mukherjee	A	757
Mukhtar	M	826

Last Name	First Initial	Presentation #
Mulders	J	775
Muller	D	117
Muller	D	217
Muller	D	358
Muller	D	475
Muller	D	636
Muller	D	682
Muller	D	702
Muller	D	705
Muller	E	744
Muller	D	940
Muller	D	941
Muller	D	966
Müller	P	110
Müller	M	183
Müller	M	930
Müller-Caspary	K	183
Mundy	J	941
Munguia-Rodríguez	S	1019
Muñoz	M	269
Muntifering	B	1158
Muralidaran	K	1027
Muralidharan	K	536
Murano	T	247
Murfitt	M	418
Murfitt	M	885
Murnane	M	887
Muro-Cruces	J	184
Murphy	N	491
Mustonen	K	1085
Muthur	K	223
Muto	S	783
Muto	H	916
Mutsafi	Y	652
Mweta	F	965
Myers	M	44
Myers	M	46
Myers	M	200
Myllys	M	644
Myung	K	462
Myung	J	999
Nabatame	T	1017
Nabiei	F	595
Nachlas	W	544
Naes	B	524
Naganuma	H	583
Nagaoki	I	760
Naginey	T	701

Last Name	First Initial	Presentation #
Nagoshi	M	82
Nagy	I	338
Nagy	J	1107
Nail	C	664
Najarian	M	770
Najm	M	500
Nakamura	A	177
Nakamura	R	501
Nakatani	I	833
Nakayama	C	97
Nakley	L	510
Nan	C	680
Nandi	P	398
Narayana	P	901
Narayanan	R	121
Narayanan	R	497
Narayanan	S	731
Narbey	S	284
Narita	A	638
Narita	I	1008
Narvaez	A	168
Nashed	Y	48
Natarajan	B	591
Natelson	D	856
Nathaniel	J	1061
Nattermann	L	932
Nava-Dino	C	75
Nava-Dino	C	104
Navarro	V	641
Navrátilová	E	128
Navrátilová	E	514
Nay	R	982
Naydenova	K	909
Nealey	P	106
Nebesny	K	761
Nechaev	D	1118
Neděla	V	128
Neděla	V	450
Neděla	V	514
Neděla	V	1034
Nedelkoski	Z	854
Neethling	J	517
Neill	O	793
Nelayah	J	187
Nellist	P	270
Nellist	P	314
Nellist	P	360
Nellist	P	364

Last Name	First Initial	Presentation #
Nellist	P	618
Nellist	P	701
Nellist	P	786
Nellist	P	788
Nellist	P	789
Nellist	P	1133
Nellist	P	1136
Nematollahi	A	320
Neri	J	873
Neri	E	1029
Nesson	M	628
Netrvalová	M	850
Neugebauer	J	320
Nevins	M	608
Newbury	D	136
Newbury	D	205
Newbury	D	251
Newbury	D	422
Newcomb	W	254
Newman	M	437
Newman	J	1072
Ng	A	476
Ngai	S	797
Ngo	T	267
Ngo	Y	561
Ngunjiri	J	105
Nguyen	K	117
Nguyen	K	358
Nguyen	L	385
Nguyen	C	474
Nguyen	K	636
Nguyen	K	705
Nguyen	L	901
Nguyen	K	940
Nguyen	K	966
Nicholls	R	701
Nichols	J	180
Nicolosi	V	11
Nicolosi	V	367
Niculae	A	602
Niculae	A	767
Niekil	F	482
Nielsch	K	53
Nielsch	K	214
Niitsu	K	401
Niitsu	K	895
Niitsu	K	1031
Ning	Y	198

Last Name	First Initial	Presentation #
Ninive	P	314
Nishi	R	787
Nishihara	S	440
Nishimura	S	927
Nishio	K	1030
Nishitani	T	638
Nittler	L	286
Niu	C	718
Niverty	S	311
Noble	J	210
Noble	J	651
Nogués	J	184
Noheda	B	675
Noirot	P	613
Noked	M	506
Nolis	G	757
Nolze	G	1022
Nomaguchi	T	784
Nord	M	133
Nord	M	262
Nord	M	314
Nord	M	541
Nordqvist	T	1021
Norouzi Rad	M	310
Norouzpour	M	263
Notoya	S	247
Notte	J	24
Nouf-Allehiani	M	69
Novacek	J	453
Novák	P	850
Novák	L	1100
Novoselov	K	359
Nowakowski	P	141
Nowakowski	P	175
Nowakowski	P	603
Nowakowski	P	776
Nowakowski	P	777
Nowakowski	P	1055
Nowell	M	415
Nowell	M	687
Nowell	M	708
Nowell	M	1036
Nunn	N	291
Nuzzo	R	639
Nxumalo	J	834
Nylese	T	248
Nylese	T	687
Nylese	T	809
Obayomi	S	95

Last Name	First Initial	Presentation #
Oberdorfer	C	322
Oberdorfer	C	411
Oberdörster	G	449
Oberholzer	J	343
Oberlin	T	700
Obermair	M	1094
Obermair	M	1095
O'Brien	V	342
O'Brien Johnson	G	120
Obruča	S	1013
Ocampo-Torres	R	373
O'Connor	A	564
Odette	R	411
Odette	R	713
Odlyzko	M	396
Ogura	T	1012
Ögüt	S	589
Oh	I	408
Oh	S	1123
O'Halloran	T	171
Ohi	M	567
Ohi	M	823
Ohkubo	M	421
Ohkubo	T	711
Ohkura	Y	1093
Ohnishi	I	419
Ohno	T	1031
Ohnuma	T	409
Ohta	T	831
Oikawa	T	438
Oka	M	886
Okada	S	837
Okada	S	838
Okada	T	1012
Okada	S	1033
Oktay	M	30
Okugawa	M	501
Okunishi	E	419
Okunishi	E	944
Okura	Y	994
O'Leary	C	786
Oleshko	V	226
Oleshko	V	281
Oleshko	V	349
Olive-Mendez	S	103
Oliver	R	550
Olsson	E	1021
Oltman	E	1073
Ominami	Y	764

Last Name	First Initial	Presentation #
Ong	S	4
Ono	Y	401
Ophus	C	363
Ophus	C	482
Ophus	C	556
Ophus	C	619
Ophus	C	684
Ophus	C	696
Ophus	C	752
Ophus	C	893
Ophus	C	929
Ophus	C	946
Ophus	C	1125
Opila	R	117
O'Reilly	F	564
Orfino	F	500
Orlov	A	639
Ornelas	C	102
Orozco	V	985
Orsborn	J	73
Ortalan	V	41
Ortalan	V	56
Ortalan	V	108
Ortega	J	568
Ortega	E	1116
Ortega Aguilar	E	292
Ortel	E	116
Ortel	E	148
Ortel	E	276
Ortiz-Rascón	E	487
Ortmann	E	267
Osawa	E	291
Osborn	D	96
Osborn	W	265
Osborn	D	512
Osborn	D	520
Osborn	W	555
Osborn	D	828
Oshima	A	27
Osman	H	51
Osman	H	459
Ostasevicius	T	133
Oswald	F	284
Oton	J	646
Otón	J	563
Ouy	M	343
Ovchinnikova	O	137
Ovchinnikova	O	138
Ovchinnikova	O	139

Last Name	First Initial	Presentation #
Ovchinnikova	O	587
Ovchinnikova	O	674
Ovchinnikova	O	880
Ovchinnikova	O	881
Oveisi	E	297
Overbury	S	642
Owczarek	S	19
Owczarek	S	1052
Own	C	418
Own	L	418
Own	C	885
Own	L	885
Oxley	M	268
Oxley	M	1087
Ozdol	B	1021
Ozkaya	D	360
Ozkaya	D	364
Padgett	E	217
Padgett	E	682
Paganin	D	704
Page	K	872
Pahlke	A	765
Palaniappan	K	50
Palasse	L	148
Palovcak	E	911
Pan	M	298
Pan	X	381
Pan	X	581
Pan	X	746
Pan	X	1001
Pan	X	1004
Pan	X	1051
Panitz	J	18
Panitz	J	599
Panova	O	752
Pantelides	S	180
Pantelides	S	185
Pantelides	S	228
Pantelides	S	268
Pantelides	S	271
Pantelides	S	272
Pantelides	S	668
Pantelides	S	849
Panzenböck	M	526
Papesch	C	956
Paquette	M	1117
Paraguay-Delgado	F	102
Páral	J	694
Pardo	J	675

Last Name	First Initial	Presentation #
Pareige	C	976
Parish	C	1057
Parish	C	1159
Park	I	16
Park	S	130
Park	I	260
Park	J	358
Park	S	367
Park	B	408
Park	B	457
Park	J	475
Park	C	559
Park	S	692
Park	D	844
Parker	S	145
Parker	L	336
Parlett	C	499
Parviainen	S	319
Parviainen	S	321
Parvizi	R	898
Pascal	E	69
Pascal	E	147
Passaseo	A	1113
Passey	R	224
Passey	R	774
Pastoriza	J	30
Patak	A	515
Patel	A	872
Patello	E	645
Patterson	B	52
Patterson	B	527
Paul	M	183
Paul	P	935
Paul	D	1072
Paul-Gilloteaux	P	388
Peck	S	95
Peck	J	434
Peckys	D	28
Pekin	T	556
Pekin	T	696
Pellegrino	F	116
Pena	K	31
Peña	F	499
Pence	H	445
Peng	Z	152
Peng	Z	412
Peng	H	477
Peng	S	1065
Peng	Z	899

Last Name	First Initial	Presentation #
Pennycook	S	228
Pennycook	S	269
Pennycook	S	540
Pennycook	T	701
Pennycook	T	961
Pennycook	T	1085
Peoples	J	1023
Peralta	J	239
Peralta	J	410
Peralta	P	1090
Perea	D	414
Pereira	N	315
Pereira-Hernandez	X	1123
Pereiro	E	332
Pereiro	E	563
Pereiro	E	566
Pereiro	E	646
Perez-Berna	A	332
Perez-Cruz	L	373
Pérez-Willard	F	601
Pérez-Willard	F	778
Perrodin	D	929
Persson	K	4
Persson	A	585
Peter	S	439
Peterek	M	453
Peters	P	209
Petersen	T	704
Petersen	T	890
Peterson	E	1123
Petford-Long	A	106
Petford-Long	A	1101
Petrochenko	P	815
Petrochenko	P	999
Pettit	D	418
Pfeffer	S	721
Pfenninger	R	861
Phaneuf	R	1142
Pharr	G	718
Phatak	C	48
Phatak	C	106
Phatak	C	1101
Phillips-Lander	C	371
Picard	Y	71
Picard	Y	234
Piccoli	S	1111
Pichardo Molina	J	868
Pichardo-Molina	J	867
Pichardo-Molina	J	992

Last Name	First Initial	Presentation #
Piche	N	67
Piche	N	611
Pickersgill	A	373
Pierce	J	893
Pierson	J	209
Piet	H	595
Pinard	P	61
Pinard	P	884
Pinard	P	1076
Pinchuk	I	771
Pinter	N	376
Pinto	A	1068
Pipalia	N	436
Pirozzi	N	441
Piston	D	8
Piston	D	257
Piston	D	295
Piston	D	456
Pizarro	J	857
Plank	H	695
Plantenga	R	552
Plautz	T	329
Plautz	T	562
Plautz	T	565
Plemper	R	256
Plitzko	J	7
Plitzko	J	651
Plitzko	J	995
Podlesak	D	81
Poelchau	M	373
Poges	S	772
Pohl	D	53
Pohl	D	214
Poitel	S	508
Pokle	A	11
Pokorny	B	574
Pokorny	B	1042
Pokorski	J	463
Pokrovskaya	I	1108
Ponath	P	353
Ponce	A	1116
Ponge	D	392
Ponge	D	903
Poplawsky	J	625
Popratiloff	A	821
Porath	E	106
Porter	C	887
Porter	H	933
Posadas	A	267

Last Name	First Initial	Presentation #
Potocek	P	55
Potter	C	734
Potter	C	993
Potter	C	997
Potter	C	1092
Potts	J	658
Potts	J	814
Powell	R	279
Powell	J	921
Powell	R	1106
Powell	R	1148
Pradel	K	747
Prakash	J	79
Prakash	A	355
Prestat	E	133
Prestat	E	359
Preziosi	D	584
Prikhodko	S	310
Prokhodtseva	A	775
Prosa	T	77
Prosa	T	151
Prosa	T	415
Prosa	T	712
Prosa	T	972
Prosa	T	1073
Prosise	W	732
Provo	C	989
Prunier	H	187
Pryor	A	609
Pryor Jr	A	696
Pryor Jr.	A	363
Pulvirenti	R	816
Purohit	P	358
Purohit	P	705
Purohit	P	940
Pyburn	T	567
Pyka	G	614
Pyun	J	281
Qi	X	921
Qi	G	1123
Qian	W	474
Qiao	L	176
Qiao	Q	228
Qiao	F	569
Qin	G	198
Qin	Z	519
Qiu	J	158
Qiu	X	745
Quammen	C	217

Last Name	First Initial	Presentation #
Quillin	S	937
Raabe	D	152
Raabe	D	320
Raabe	D	392
Raabe	D	412
Raabe	D	553
Raabe	D	715
Raabe	D	899
Raabe	D	903
Rabeneck	D	444
Rabin	M	81
Rack	P	139
Raczkowski	A	997
Radabaugh	R	451
Radermacher	M	93
Radermacher	M	429
Radermacher	M	431
Rades	S	116
Rades	S	276
Rades	S	284
Radha	Z	70
Radjainia	M	908
Radnik	J	284
Radoman-Shaw	B	510
Rae	A	373
Rae	C	964
Rafaelsen	J	687
Rafaelsen	J	1078
Rafailovich	M	442
Raghavan	S	179
Rahangdale	S	400
Rahman	Z	288
Rajagopal	V	64
Rajagopalan	J	907
Rajagopalan	J	1090
Rajan	K	239
Rajan	K	410
Rajan	K	413
Rajan	S	665
Rajan	S	676
Ram	F	6
Ramachandran	R	1033
Ramasse	Q	144
Ramasse	Q	145
Ramasse	Q	618
Ramasse	Q	724
Ramasse	Q	743
Ramasse	Q	854
Ramasse	Q	1155

Last Name	First Initial	Presentation #
Ramesh	R	940
Ramirez	A	73
Ramlau	R	971
Ramos	M	118
Ramos-Cano	J	984
Ramprasad	T	792
Ramprasad	T	1027
Rana	A	609
Rangari	V	494
Rangnekar	N	1121
Ranjha	S	393
Rao	A	1108
Raposo	G	170
Raposo	G	388
Raschke	M	744
Rash	J	1107
Rasmussen	C	373
Rath	A	580
Ratnayake	I	433
Rauscher	M	601
Rauscher	M	778
Ravishankar	N	278
Ravishankar	N	507
Ravishankar	N	852
Ray	M	175
Ray	M	603
Ray	M	776
Ray	M	1055
Razi	M	566
Razi	A	568
Readman	J	1119
Rebolledo-Vieyra	M	373
Redinger	A	553
Reed	B	130
Reed	B	158
Reed	B	692
Reed	R	900
Reehl	S	59
Reehl	S	60
Reehl	S	129
Reehl	S	216
Reenaas	T	262
Reeves	K	1044
Reffner	J	105
Regan	B	231
Regan	B	348
Regan	B	366
Regan	B	593

Last Name	First Initial	Presentation #
Regan	B	663
Regan	B	832
Regunath	A	497
Rehr	J	4
Rehr	J	949
Reich	B	672
Reichardt	A	302
Reichert	M	344
Reifsnnyder Hickey	D	579
Reifsnnyder Hickey	D	853
Reinhard	D	151
Reinhard	D	240
Reinhard	D	415
Reinhard	D	972
Reinhard	D	1073
Reis	M	496
Rellinghaus	B	53
Rellinghaus	B	214
Rentenberger	C	907
Resch	G	943
Retterer	S	1147
Reyes Gasga	J	76
Reyes-Rojas	A	103
Reynolds	D	123
Reynolds	M	762
Reynolds	D	1075
Reyntjens	S	1139
Rez	P	333
Rez	P	742
Rez	P	836
Rez	P	839
Rez	P	934
Rezaie	S	1114
Riaz	A	588
Ribeiro	F	41
Rice	k	151
Rice	K	240
Rice	K	415
Rice	C	454
Rice	C	455
Rice	W	734
Rice	K	1073
Rice	K	1074
Rice	W	1092
Richman	C	456
Richter	S	61
Rickman	J	1083
Ricolleau	C	187

Last Name	First Initial	Presentation #
Riedel	J	86
Ries	D	59
Rigort	A	604
Riles	K	2
Riller	U	373
Rinaldi	A	1097
Ringe	E	174
Risan	J	982
Ritchie	N	136
Ritchie	N	251
Ritchie	N	422
Ritchie	N	1145
Ritz	R	1136
Ro	Y	16
Robbes	A	246
Roberts	M	270
Roberts	J	828
Robertson	D	244
Robertson	V	247
Robertson	V	519
Robertson	A	807
Robin	E	261
Robin	I	756
Robinson	H	72
Robinson	M	452
Robinson	J	476
Robles Hernández	F	818
Robles-Hernandez	F	863
Robles-Hernandez	F	865
Roca	A	184
Rochester	A	860
Rochester	A	905
Rodelas	J	790
Rodil	A	552
Rodriguez	M	332
Rodriguez	J	609
Rodríguez	J	73
Rodríguez Manzo	J	804
Rodríguez-Cantó	P	857
Rodríguez-Córdova	R	813
Rodríguez-González	C	978
Rodríguez-González	C	979
Rodríguez-Mijangos	R	803
Roeven	H	1141
Rogers	C	564
Rogers	D	564
Rogers	R	710
Rohou	A	996

Last Name	First Initial	Presentation #
Rohrer	G	530
Rohrer	B	814
Rohwerder	M	899
Rojac	T	673
Roldan	M	228
Rolland	N	319
Roller	J	737
Rollin	D	444
Romero	J	795
Ronquillo-Ornelas	I	985
Rooney	A	359
Roos	D	519
Root	D	435
Rosa-Molinar	E	436
Rosa-Molinar	E	925
Rosa-Molinar	E	1016
Rosa-Molinar	E	1106
Rosa-Molinar	E	1107
Rosa-Molinar	E	1148
Rosc	J	9
Rosc	J	928
Rosc	J	952
Rose	T	620
Rosenauer	A	183
Rossell	M	582
Rossignol	E	253
Rost	C	99
Roth	R	573
Roth	R	659
Rouleau	C	325
Rouviere	J	261
Rouvimov	S	190
Rouvimov	S	1047
Rouvimov	S	1056
Rouvimov	S	1118
Rowenhorst	D	385
Rowland	S	370
Roy	A	278
Roy	A	852
Rubbles	T	232
Rubin	S	606
Ruble	T	199
Rubloff	G	506
Rubloff	G	780
Ruddy	D	808
Rueden	C	219
Rui	X	998
Ruiz	T	25

Last Name	First Initial	Presentation #
Ruiz	T	93
Ruiz	T	429
Ruiz	T	431
Ruiz-Esparza-Rodríguez	M	390
Ruiz-Esparza-Rodríguez	M	391
Rulis	P	1117
Rummel	A	350
Rumpff	J	765
Rupp	J	861
Rupp	J	936
Russell	J	1005
Russo	C	909
Ryll	H	1136
Ryner	M	883
Saab-Rincon	G	461
Saavedra-Rodríguez	G	1019
Sabirianov	R	363
Sabisch	J	1089
Sacci	R	193
Sagar	J	175
Sagar	J	884
Sagar	J	1038
Sagawa	R	701
Sagawa	R	1133
Sagawa	R	1136
Sagi	I	635
Sagolla	M	344
Sahu	T	503
Sahu	S	1082
Saidi	W	949
Saidi	W	1096
Saiki	A	438
Saillet	S	976
Saint Cyr	H	151
Sakamoto	S	49
Sakamoto	J	680
Sakaue	M	764
Sakidja	R	1117
Sakuda	Y	1039
Salafranca	J	228
Salamero	J	170
Salamero	J	388
Salehi	A	589
Salek	S	89
Salge	T	600
Salguero	T	1033
Salmon	N	560

Last Name	First Initial	Presentation #
Salmon	N	804
Salmon	N	805
Salzberger	U	395
Samali	B	89
Samarth	N	853
Samek	O	1013
Sampath	W	831
Samuel	T	447
Samuel	T	817
Sanchez	S	188
Sanchez	S	968
Sanchez-Carrillo	M	987
Sánchez-Carrillo	M	425
Sánchez-Carrillo	M	984
Sanchez-Santolino	G	228
Sanchez-Santolino	G	269
Sánchez-Santolino	G	703
Sánchez-Zeferino	R	113
Sánchez-Zeferino	R	1019
Sang	X	193
Sang	X	273
Sang	X	398
Sang	X	532
Sang	X	587
Sang	X	872
Sanon	K	519
Santamaria	J	228
Santamaria	J	269
Santos	L	485
Santos	L	486
Santos	M	985
Santos-Beltran	A	985
Santos-Beltran	A	987
Santos-Beltrán	A	425
Santos-Beltrán	A	984
Santoyo	M	986
Santulli	G	455
Sarahan	M	133
Sargent	G	491
Sargent	G	1009
S'ari	M	1110
Sarkar	R	907
Sartory	B	9
Sartory	B	928
Sarwar	M	360
Sasajima	M	763
Sasaju	T	711
Sasaki	H	177

Last Name	First Initial	Presentation #
Sasaki	T	419
Sasaki	H	704
Sasaki	T	785
Sato	H	373
Sato	C	440
Sato	T	833
Sato	T	895
Sattelkov	J	695
Savage	T	512
Savitzky	B	362
Savitzky	B	538
Savitzky	B	616
Savitzky	B	749
Savvakini	D	310
Sawada	H	417
Scapin	G	732
Schaal	M	188
Schaffer	M	995
Scheffell	A	621
Scheid	O	765
Scheller	S	688
Scheltens	F	528
Scheltens	F	1155
Scherer	N	613
Schieber	N	169
Schimpke	T	183
Schiøtz	J	723
Schlexer	P	723
Schloegl	R	479
Schloegl	R	1097
Schlom	D	581
Schmid	C	377
Schmid	M	602
Schmid	M	722
Schmidt	J	161
Schmidt	U	480
Schmidt	J	519
Schmidt	J	625
Schmidt	J	963
Schmidt	J	1136
Schneider	S	53
Schneider	W	124
Schneider	S	214
Schneider	G	405
Schneider	G	566
Schock	K	350
Schofield	R	628
Schöning	A	767

Last Name	First Initial	Presentation #
Schroder	H	782
Schroers	J	1007
Schuller	D	405
Schulthess	T	470
Schumacher	P	144
Schumann	T	1114
Schwab	Y	169
Schwalb	C	695
Schwalb	C	988
Schwalbach	E	308
Schwarm	S	414
Schwartz	D	795
Schwarz	T	553
Schwarzkopf	A	226
Schweiger	S	861
Schwoebel	P	323
Scotfield	M	816
Scott	K	251
Scott	J	308
Scott	M	363
Scott	A	376
Scott	H	569
Scott	J	622
Scotuzzi	M	441
Searle	S	432
Sebök	B	723
Sedat	J	606
Seddio	S	84
Seddio	S	162
Sediva	E	936
Seetala	N	989
Segal-Peretz	T	106
Seibert	R	1057
Seibert	R	1159
Seidman	D	627
Seki	T	703
Seki	T	886
Sekiguchi	T	402
Sen	C	434
Senor	D	1158
Seo	H	195
Seo	H	505
Seo	H	965
Sha	G	799
Shafiee	S	343
Shafiee	S	731
Shahani	A	309
Shahbazian-Yassar	R	343

Last Name	First Initial	Presentation #
Shahbazian-Yassar	R	731
Shahbazian-Yassar	R	811
Shahbazian-Yassar	R	843
Shalapska	T	929
Shallcross	S	482
Shami	G	259
Shan	J	115
Shan	Z	590
Shan	Z	913
Shanblatt	E	887
Shao	Y	382
Shao	Y	502
Shapiro	D	560
Shapiro	D	753
Shapovalov	K	941
Sharma	R	591
Sharma	R	640
Sharma	R	643
Sharma	R	882
Sharma	R	1003
Sharp	T	594
Sharp	I	1029
Shattuck	D	519
Shaw	A	573
Shearing	P	1050
Sheehan	P	476
Shen	H	1059
Shenderova	O	291
Sheng	H	242
Sheng	H	848
Shepard	J	77
Sheridan	P	564
Shiau	L	1000
Shibata	N	177
Shibata	M	258
Shibata	M	318
Shibata	M	519
Shibata	N	540
Shibata	N	703
Shibata	N	704
Shibata	N	886
Shibata	N	897
Shichi	H	225
Shigeto	K	1017
Shiki	S	421
Shimada	K	401
Shimada	K	1031
Shimizu	Y	1093

Last Name	First Initial	Presentation #
Shin	D	68
Shin	J	195
Shin	B	283
Shin	J	505
Shin	K	875
Shinada	H	895
Shinde	S	613
Shindo	D	401
Shindo	D	895
Shindo	D	1031
Shinogle-Decker	H	1016
Shiojiri	M	438
Shiojiri	M	1030
Shirai	M	760
Shirai	M	837
Shirai	M	838
Shirey	S	516
Shokuhfar	T	343
Shokuhfar	T	731
Shokuhfar	T	811
Shoron	O	179
Shyu	C	68
Siebentritt	S	553
Sieving	P	166
Siew	S	443
Sigle	W	34
Sigle	W	395
Sigle	W	669
Sigle	W	670
Signore	M	827
Sil	D	640
Šiler	M	1013
Simmonds	A	281
Simmons	J	1083
Simões	S	496
Simon	M	442
Simpson	A	989
Sims	H	180
Simsek	A	765
Simson	M	701
Simson	M	1133
Simson	M	1136
Sinclair	R	912
Sinclair	R	1126
Singer	J	543
Singer	J	794
Singh	S	6
Singh	S	147

Last Name	First Initial	Presentation #
Singh	S	234
Singh	A	278
Singh	S	404
Singh	A	497
Singh	S	596
Singh	S	1160
Singla	J	650
Sinkler	W	968
Sinnott	S	152
Sintorn	I	883
Šipr	O	850
Sitar	Z	660
Sjåstad	A	641
Skalický	J	236
Skoko	D	564
Skone	G	1134
Skoupy	R	515
Skoupy	R	1013
Skylaris	C	360
Slanec	T	445
Slater	T	359
Slingeland	D	42
Slone	C	718
Slouf	M	1026
Sluyterman	S	1066
Smallwood	C	645
Smilowitz	H	495
Smit	J	373
Smith	D	173
smith	p	196
Smith	C	218
Smith	D	267
Smith	A	350
Smith	D	353
Smith	E	516
Smith	G	550
Smith	T	718
Smith	P	727
Smith	C	797
Smith	D	931
Smith	A	995
Smith	D	1024
Smith	D	1115
Smyth	J	165
Sneddon	G	14
Sneddon	G	146
Sneed	B	1044
Sneed	B	1161

Last Name	First Initial	Presentation #
Snijders	P	274
Snoeck	E	675
Snow	C	1158
So	H	560
Soberanes	Y	461
Sobering	G	240
Sokalski	V	679
Soler	R	554
Soles	C	226
Soles	C	281
Solis-Canto	O	103
Solomon	C	878
Solorzano	G	118
Solórzano	I	485
Solórzano	I	486
Solórzano	G	981
Solórzano	G	1063
Solórzano	I	1068
Soltau	H	161
Soltau	H	212
Soltau	H	602
Soltau	H	701
Soltau	H	767
Soltau	H	963
Soltau	H	1133
Soltau	H	1136
Somnath	S	218
Somnath	S	959
Somnath	S	1081
Son	S	576
Song	Y	40
Song	J	274
Song	Z	580
Song	Y	969
Songkil	K	1147
Sontag	E	647
Soplop	N	454
Sorensen	N	790
Sorin	L	894
Sorrentino	A	332
Sosa	M	30
Sosa	J	86
Sosa	J	221
Sosa	J	528
Sotelo-Mundo	R	461
Spadotto	J	485
Spadotto	J	486
Spadotto	J	1063
Specht	P	945

Last Name	First Initial	Presentation #
Speck	J	239
Speck	J	319
Speck	J	551
Spellman	C	991
Spicuzza	M	972
Spiecker	E	482
Spillers	C	65
Spink	R	123
Spink	M	330
Spink	R	1075
Spoth	K	636
Spurgeon	S	846
Sridharan	K	1060
Srinivasan	R	215
Srot	V	395
Srot	V	465
Srot	V	574
Srot	V	1042
St Croix	C	31
St. Jeor	V	394
St. Jeor	V	727
St. Jeor	V	924
Stach	E	577
Stach	E	639
Stach	E	755
Stach	E	943
Stach	E	949
Stach	E	950
Stach	E	1009
Stach	E	1049
Stalla	D	389
Stan	L	106
Stanfill	B	59
Stanfill	B	60
Stanfill	B	129
Stanfill	B	216
Stannard	T	311
Statham	P	884
Statham	P	951
Stauffer	C	120
Stechmann	G	553
Steel	E	238
Steele	A	226
Steele	A	286
Steer	M	933
Steigenhöfer	D	602
Steinbach	A	729
Steiner	S	434
Stejskal	P	236

Last Name	First Initial	Presentation #
Stemmer	S	33
Stemmer	S	179
Stemmer	S	1114
Stephan	O	584
Stephan	O	666
Stephan	O	1134
Stephenson	L	77
Steven	A	166
Steven	A	254
Steven	A	428
Stevens	A	53
Stevens	A	129
Stevens	A	132
Stevens	A	213
Stevens	A	214
Stevens	A	215
Stevens	A	216
Stevens	A	280
Stevens	A	300
Stevens	A	559
Stevens	A	637
Stevens	A	698
Stevens	A	1122
Steyer	A	169
Stiger	M	1130
Stigloher	C	169
Stoltz	A	1024
Stone	G	469
Storrie	B	1108
Stowe	D	917
Strakoš	L	55
Strane	J	739
Strassburg	M	183
Strauss	J	256
Street	M	182
Street	M	580
Strelcov	E	226
Strelcov	E	327
Strelcov	E	1082
Stripe	B	123
Stripe	B	1075
Stroud	R	286
Stroud	R	289
Stroud	R	374
Stroud	R	476
Stroud	R	511
Strout	G	371
Strüder	L	161
Strüder	L	701

Last Name	First Initial	Presentation #
Strüder	L	963
Strüder	L	1136
Strueder	L	212
Strunz	T	695
Stumper	J	753
Su	Y	331
Su	C	481
Su	D	577
Su	D	949
Subramaniam	S	223
Subramaniam	N	1022
Suenaga	K	271
Suenaga	K	666
Suenaga	K	785
Suenaga	K	1084
Suga	M	97
Suga	M	258
Suganuma	K	1008
Sugar	J	15
Sugawara	A	895
Suguihiro	N	118
Suib	S	189
Suib	S	772
Suleiman	H	573
Sun	C	182
Sun	W	272
Sun	Y	309
Sun	F	363
Sun	H	514
Sun	C	580
Sun	S	722
Sun	J	845
Sun	L	849
Sun	Y	906
Sun	Y	1069
Sun	J	1140
Sunaoshi	T	833
Sunaoshi	T	837
Sunaoshi	T	838
Sunaoshi	T	1033
Sundar	V	691
Sunde	J	522
Suo	Z	1072
Suri	P	1061
Susac	D	753
Susan	D	790
Susarla	S	578
Sushko	P	846
Susi	T	961

Last Name	First Initial	Presentation #
Susi	T	1085
Susner	M	138
Šutta	P	850
Sutton	D	810
Suyolcu	Y	34
Swift	M	26
Swindle	T	761
Swulius	M	211
Sytař	P	694
Sytař	P	888
Szoka	F	815
Tabatabai	S	597
Tabucchi	M	638
Tacke	S	20
Tagle	R	688
Taheri	M	404
Taheri	M	947
Taheri	M	1061
Taheri	M	1137
Tai	L	739
Taillon	J	133
Takacs	C	752
Takahashi	H	247
Takahashi	H	1039
Takakura	M	247
Takakura	M	1039
Takaoka	A	787
Takeguchi	M	1086
Takeuchi	S	226
Takeuchi	S	763
Takeuchi	E	950
Takeuchi	K	950
Talebi	N	669
Talin	A	349
Tamura	K	760
Tan	H	738
Tan	M	898
Tan	Y	993
Tan	C	1018
Tan	L	1060
Tanaka	Y	82
Tang	W	313
Tang	F	550
Tang-Siegel	G	431
Tanguay	R	98
Tani	K	27
Tanigaki	T	895
Taniguchi	S	554
Taniyama	A	554

Last Name	First Initial	Presentation #
Tanksalvala	M	887
Tanner	M	56
Tapia-Padilla	G	103
Tappan	B	527
Tararan	A	666
Tarolli	J	524
Tasan	C	903
Tasco	V	1113
Tate	M	358
Tate	M	705
Tate	M	940
Taurino	A	202
Taurino	A	827
Taurino	A	1113
Taylor	D	569
Taylor	C	1158
Tear	S	854
Tejeda Ochoa	A	818
Tence	M	584
Tencé	M	700
Tencé	M	1134
Teng	F	1035
Teng	C	1104
Tenner	T	710
Terborg	R	600
Terborg	R	621
Terrani	K	1057
Terrani	K	1159
Terry	J	1057
Tessmer	J	71
Tessmer	J	234
Tezuka	S	47
Tezuka	S	49
Thakkar	J	1120
Thanachayanont	C	438
Tharpe	J	975
Thayne	I	933
Theis	W	363
Thelander	K	585
Thiel	B	826
Thiex	N	433
Thomas	M	117
Thomas	C	439
Thomas-Keprta	K	418
Thompson	M	288
Thompson	M	762
Thompson	G	797
Thompson	G	902
Thompson	W	685

Last Name	First Initial	Presentation #
Thomsen	K	301
Thomson	D	69
Tian	M	229
Tiemeijer	P	1139
Tieri	G	584
Tihlaříková	E	450
Tihlaříková	E	1034
Tiimob	B	447
Tiimob	B	817
Tikoo-Schantz	S	373
Timoshenko	J	1124
Timoshevskii	V	951
Tiwary	C	578
Tiwary	C	983
Tizei	L	666
Tocheva	E	339
Togashi	T	1039
Tokura	Y	895
Toma	F	1029
Tomasulo	S	801
Tomioka	N	373
Tomioka	Y	895
Tomita	T	638
Tomita	M	784
Tomkins	A	204
Toomey	W	816
Tooze	S	566
Topsakal	M	355
Torikawa	S	833
Tornberg	M	585
Tornos	J	269
Toropov	A	1118
Torpy	A	87
Torpy	A	204
Torpy	A	423
Torpy	A	918
Torpy	A	920
Torpy	A	1144
Torres-Pardo	A	584
Totary-Jain	H	455
Toth	M	203
Tracy	B	931
Trager-Cowan	C	69
Trager-Cowan	C	147
Trager-Cowan	C	1022
Trampert	P	55
Trappen	R	354
Trassin	M	582
Tratnyek	P	120

Last Name	First Initial	Presentation #
Treussart	F	666
Trevor	C	947
Trimby	P	14
Trimby	P	146
Trimby	P	693
Trinh	L	925
Tripathi	S	278
Tripathi	S	507
Tripathi	S	852
Triscone	J	584
Troedel	J	1149
Tsai	M	840
Tsang	M	31
Tsapatsis	M	368
Tsapatsis	M	1121
Tse	S	112
Tsukagoshi	K	1017
Tu	Z	683
Tuma	L	236
Tumey	S	713
Turner	J	474
Turner	B	691
Tveit	E	117
Tweddle	D	347
Twosten	R	947
Twosten	R	1137
Twigg	M	1020
Tybell	T	541
Tyliszczak	T	560
Uchic	M	308
Ueda	K	762
Ugurlu	O	737
Ukibe	M	421
Ulfig	R	77
Ulfig	R	240
Ulfig	R	1073
Ulfig	R	1074
Unčovský	M	236
Unocic	K	193
Unocic	R	193
Unocic	R	273
Unocic	R	325
Unocic	R	398
Unocic	R	587
Unocic	K	726
Unocic	K	806
Unocic	K	808
Urban	K	539
Uriza-Vega	E	489

Last Name	First Initial	Presentation #
Uriza-Vega	E	490
Urquhart	S	1082
Urrutia-Fucugauchi	J	373
Urwin	B	1023
Uryu	K	454
Uryu	K	455
Ustione	A	257
Vaghayenagar	M	1024
Vaia	R	990
Vajtai	R	831
Valente	C	105
Valentine	B	42
Valezi	D	485
Valezi	D	486
Van Aert	S	3
van Aken	P	34
van Aken	P	395
van Aken	P	465
van Aken	P	574
van Aken	P	669
van Aken	P	670
van Aken	P	1042
Van Bentham	M	891
van Benthem	K	586
van Duin	A	273
Van Duinen	G	1141
Van Dyke	M	1073
van Dyke	M	1074
van Helvoort	A	357
van Helvoort	A	522
van Herle	J	508
Van Itallie	C	164
Van Leer	B	224
Van Leer	B	774
van Rossum	D	604
Van Zegbroeck	B	72
Vaña	R	303
Vaña	R	377
VanBommel	S	370
Vanderpool	K	1107
Vane	R	432
Vane	R	766
Varambhia	A	360
Varambhia	A	364
Varano	C	653
Varano	A	1111
Varela	M	228
Varela	M	269
Varela	B	424

Last Name	First Initial	Presentation #
Vareskic	B	593
Varga	M	377
Varga	T	690
Vaskovicova	N	515
Vasudevan	R	298
Vasudevan	R	959
Vatanparast	M	262
Vaudin	M	265
Vazquez	O	986
Vazquez	C	1067
Veeraraghavan	R	165
Vega	J	862
Veit	P	183
Veit	P	930
Veith	G	193
Velázquez Meraz	O	818
Velez	N	632
Velicky	M	359
Venkatakrishnan	S	56
Venkatesan	S	675
Venkatraman	K	839
Venkatraman	K	934
Vera	E	399
Verbeeck	J	3
Verch	A	155
Verch	A	340
Verheijen	M	737
Verkade	P	167
Verma	V	991
Vernier	P	296
Versaci	R	1067
Veser	G	1049
Vespucci	S	1022
Viana	F	496
Vicenzi	E	160
Vicenzi	E	545
Vicenzi	E	1142
Vieira	M	496
Vierrether	O	810
Vigil-Fowler	D	230
Vihinen-Ranta	M	644
Vijayan	S	773
Vijayasathya	C	166
Vila	F	4
Vila	F	81
Vilalta-Clemente	A	1022
Villa	A	498
Villa	E	650
Villegas	J	228

Last Name	First Initial	Presentation #
Vincent	J	1010
Vinson	J	1082
Viramontes Gamboa	G	868
Visartde Bocarmé	T	19
Visartde Bocarmé	T	79
Visartde Bocarmé	T	1052
Vishnubhotia	S	634
Vito	N	686
Vjunov	A	1122
Vlassiouk	I	587
Vlcek	L	298
Vo	H	302
Voelkl	E	792
Voelkl	E	837
Voelkl	E	838
Voelkl	E	1033
Voelkl	E	1135
Vogel	F	797
Vogelgesang	R	669
Voigt	A	1139
Volkenandt	T	529
Volkenandt	T	601
Volkenandt	T	778
Volkman	N	26
Vollmer	A	921
Volz	K	932
von Gunten	D	77
vonderHandt	A	793
Voortman	L	168
Voortmann	L	42
Vorauer	T	952
Voyles	P	35
Voyles	P	182
Voyles	P	537
Voyles	P	580
Voyles	P	697
Voyles	P	1007
Voyles	P	1060
Vullum	P	262
Vullum	P	541
Vurpillot	F	240
VURPILLLOT	F	319
Vurpillot	F	321
Vystavěl	T	55
Vystavěl	T	236
Vystavěl	T	775
Vystavěl	T	1100
Wade	C	1066
Wadhwa	M	287

Last Name	First Initial	Presentation #
Waetzig	G	1045
Wagner	V	11
Wagner	J	20
Wagner	J	174
Wagner	H	229
Wagner	J	723
Wakui	A	760
Waldmann	D	482
Waldon	S	217
Waldron	A	446
Walker	A	1102
Wall	E	336
Wall	A	795
Wallace	C	258
Wallace	S	287
Wallace	J	380
Wallace	S	687
Wallace	P	761
Wallace	R	855
Wallace	P	1028
Wallenberg	L	585
Walls	M	133
Walter	J	998
Walters	D	527
Walters	R	801
Wan	X	165
Wan	H	1124
Wandrol	P	1026
Wandrol	P	1100
Wang	Y	30
Wang	Y	34
Wang	J	38
Wang	C	41
Wang	R	107
Wang	R	111
Wang	T	181
Wang	G	187
Wang	Q	202
Wang	L	242
Wang	Y	264
Wang	W	277
Wang	D	331
Wang	Y	343
Wang	P	381
Wang	Y	395
Wang	C	448
Wang	C	449
Wang	Q	457
Wang	H	468

Last Name	First Initial	Presentation #
Wang	H	470
Wang	Z	479
Wang	D	498
Wang	W	498
Wang	C	502
Wang	Z	508
Wang	D	588
Wang	X	628
Wang	C	640
Wang	C	643
Wang	Y	670
Wang	J	719
Wang	Z	747
Wang	C	759
Wang	W	761
Wang	Y	824
Wang	Y	834
Wang	J	848
Wang	L	848
Wang	Q	855
Wang	C	948
Wang	J	948
Wang	S	962
Wang	X	1025
Wang	J	1082
Wang	Y	1123
Wang	K	1159
Ward	A	74
Ward	T	180
Warecki	Z	194
Warecki	Z	349
Warmund	M	656
Warner	M	782
Wartchow	E	655
Watanabe	M	163
Watanabe	M	312
Watanabe	K	536
Watanabe	M	574
Watanabe	R	650
Watanabe	M	1042
Watkins	S	31
Watkins	S	258
Waugh	B	606
Weatherup	R	340
Weber	H	482
Weber	K	482
Weckhuysen	B	625
Wei	M	306
Wei	D	384

Last Name	First Initial	Presentation #
Wei	Y	531
Wei	J	835
Wei	H	997
Wei	N	1018
Wei	M	1025
Weisheit	A	715
Weissenberger	C	877
Welk	B	221
Wellons	M	710
Wells	P	411
Wen	C	140
Wen	J	242
Wen	J	290
Wen	H	756
Wen	K	781
Wen	J	848
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Xu	W	352
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Xu	W	532
Xu	W	533
Xu	Z	537
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Yang	W	643
Yang	H	696
Yang	H	701
Yang	H	788
Yang	S	845
Yang	Y	869
Yang	W	882
Yang	H	929
Yang	J	949
Yang	J	1049
Yang	J	1096
Yang	J	1124
Yang	Y	1125
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Zhang	Z	745
Zhang	Y	746
Zhang	H	755
Zhang	H	758
Zhang	J	759
Zhang	J	825
Zhang	M	825
Zhang	P	825
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Zhang	S	1004
Zhang	P	1007
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Zhang	B	1099
Zhang	G	1108
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Zhao	H	583
Zhao	W	736
Zhao	W	824
Zhao	Y	1020
Zhao	Z	1125
Zheng	C	4
Zheng	H	365
Zheng	L	365
Zheng	H	558
Zheng	W	558
Zheng	C	633
Zheng	J	759

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Zheng	J	815
Zheng	N	815
Zheng	H	848
Zheng	C	894
Zheng	C	904
Zheng	Y	977
Zheng	J	999
Zheng	S	1099
Zheng	C	1157
Zhitenev	N	226
Zhitenev	N	882
Zhong	X	305
Zhong	Z	737
Zhong	X	939
Zhou	L	173
Zhou	W	272
Zhou	X	305
Zhou	L	313
Zhou	J	354
Zhou	J	363
Zhou	D	537
Zhou	J	609
Zhou	S	639
Zhou	T	734
Zhou	F	745
Zhou	G	755
Zhou	W	849
Zhou	Y	849
Zhou	P	856
Zhou	X	902
Zhou	O	912
Zhou	G	1003
Zhou	G	1018
Zhou	X	1065
Zhou	Y	1099
Zhou	J	1125
Zhu	Y	158
Zhu	Y	266
Zhu	S	325
Zhu	Y	346
Zhu	Y	577
Zhu	Y	739
Zhu	M	751
Zhu	H	855
Zhu	Y	894
Zhu	Y	915
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Testing Equipment

Benchmark Technologies	T-117	
FemtoTools AG		1231
HIROX-USA, Inc.		313
IFG / Fischer Technology		224
Kammrath and Weiss		211
NT-MDT AMERICA, INC		132
Olympus America, Inc.		219
PROTO		320
Zygo Corporation		324

Transmission Electron Microscopes (TEM)

Applied Physics Technologies, Inc.	616
Direct Electron, LP	730
Hitachi High Technologies America, Inc.	623
HREM Research, Inc.	932
Integrated Dynamics Engineering IDE	1032
JEOL USA, Inc.	708
NanoMEGAS USA	1618
Photo Electron Soul, Inc.	126
Protochips, Inc.	924
Scientific Instruments & Applications, Inc.	1230
Thermo Fisher Scientific (formerly FEI)	1318

Vacuum Equipment

Duniway Stockroom Corp.	1229
Electron Microscopy Sciences	1110
Synergy Systems Corporation	210
Technotrade International Inc.	1030

Vacuum Evaporators

Ladd Research	920
SPI Supplies	520
Technotrade International Inc.	1030

Vibration Isolation Systems

Herzan, LLC	209
Integrated Dynamics Engineering IDE	1032
TMC	324

WDS Detectors & Systems

Bruker Corporation	1308
EDAX	324
Oxford Instruments	724
Rigaku Americas Corp.	218

X-ray Analysis Equipment

Angstrom Scientific Inc.	1210
EDAX	324
Finger Lakes Instrumentation	125
IFG / Fischer Technology	224
International Centre for Diffraction Data (ICDD)	1329
Olympus America Inc.	219
Oxford Instruments	724
Phenom-World B.V.	430
Physical Electronics	229
PNDetector GmbH	1429
PROTO	320
Rigaku Americas Corp.	218
SEC CO., Ltd	417

> Exhibitor List by Booth (As of 7/1/17)

BOOTH	EXHIBITOR NAME
T-111	Syntek Co., Ltd.
T-117	Benchmark Technologies
T-119	Beijing Zhongjingkeyi Technology Co., Ltd.
115	Wolfram Research, Inc.
118	Nanomechanics, Inc.
121	Voxa
124	FLIR Systems
125	Finger Lakes Instrumentation
126	Photo Electron Soul, Inc.
129	Nanosurf, Inc.
130	Vibration Engineering Consultants
131	DECTRIS Ltd
132	NT-MDT Spectrum Instruments
204	Nion Company
209	Herzan, LLC
210	Synergy Systems Corporation
211	Kammrath and Weiss
212	Quantum Detectors
213	HORIBA Scientific
214	Pace Technologies
217	Barnett Technical Services
218	Rigaku Americas Corp.
219	Olympus America Inc
220	Physics Today
223	UES, Inc.
224	IFG - Fischer Technologies
225	Applied Beams LLC
226	Seiwa Optical America, Inc
229	Physical Electronics
231	SCIENION US, Inc.
232	Park Systems, Inc.
304	Microscopy Society of America MegaBooth
309	Amptek, Inc.
311	Microscopy Innovations, LLC
313	HIROX-USA, Inc.
317	Renishaw Inc.
318	Royal Microscopical Society
320	PROTO

BOOTH	EXHIBITOR NAME
323	Vitatech Electromagnetics LLC
324	CAMECA Instruments, Inc.
324	Edax/Ametek
324	TMC
324	Zygo Corporation
329	Analitex
330	Coxem Co., Ltd
331	EXpressLO LLC
417	SEC Co. Ltd. c/o Nanolimages, LLC
418	IMC19 Congress c/o Arinex Pty Ltd
420	PIE Scientific LLC
429	Nanoscience Instruments
430	Phenom-World
504	Gatan, Inc.
514	Keyence Corporation of America
517	Digital Surf SARL
519	IDES, Inc
520	SPI Supplies
613	J. Kraft Microscopy Services, Inc.
614	Tousimis
616	Applied Physics Technologies, Inc.
623	Hitachi High Technologies America, Inc.
708	JEOL USA, Inc.
720	Hysitron, Inc.
724	Oxford Instruments
730	Direct Electron, LP
820	Boeckeler Instruments Inc.
830	Hummingbird Scientific
908	Leica Microsystems
916	Advanced Microscopy Techniques Corp.
920	Ladd Research
924	Protochips, Inc.
929	Raith America, Inc.
932	HREM Research, Inc.
1010	Cambridge University Press
1015	Springer

BOOTH	EXHIBITOR NAME
1018	Carl Zeiss Microscopy, LLC
1019	Denton Vacuum, LLC
1030	Technotrade International, Inc.
1031	WITec Instruments Corp
1032	Integrated Dynamics Engineering
1108	XEI Scientific, Inc.
1109	Electron Microscopy Sciences
1110	Electron Microscopy Sciences
1129	TVIPS GmbH
1130	ibss Group, Inc.
1131	Norcada, Inc.
1209	Rave Scientific
1210	Angstrom Scientific, Inc.
1211	IXRF Systems, Inc.
1212	Kleindiek Nanotechnik
1214	Objects Research Systems
1222	Fischione Instruments
1229	Duniway Stockroom Corp.
1230	Scientific Instruments & Applications, Inc.
1231	FemtoTools AG
1232	FOM Networks, Inc.
1308	Bruker Corporation
1309	Ted Pella Inc.
1318	FEI Company
1318	Thermo Fisher Scientific (formerly FEI)
1329	International Centre for Diffraction Data (ICDD)
1330	PNDetector GmbH
1331	SmarAct, Inc.
1412	Thermo Fisher Scientific
1429	PNSensor GmbH
1430	Wiley
1508	Tescan USA
1618	NanoMEGAS USA
1622	Keysight Technologies
1626	E. Fjeld Co, Inc.
1630	iLab Solutions, part of Agilent Technologies
1632	Ephemeron Labs

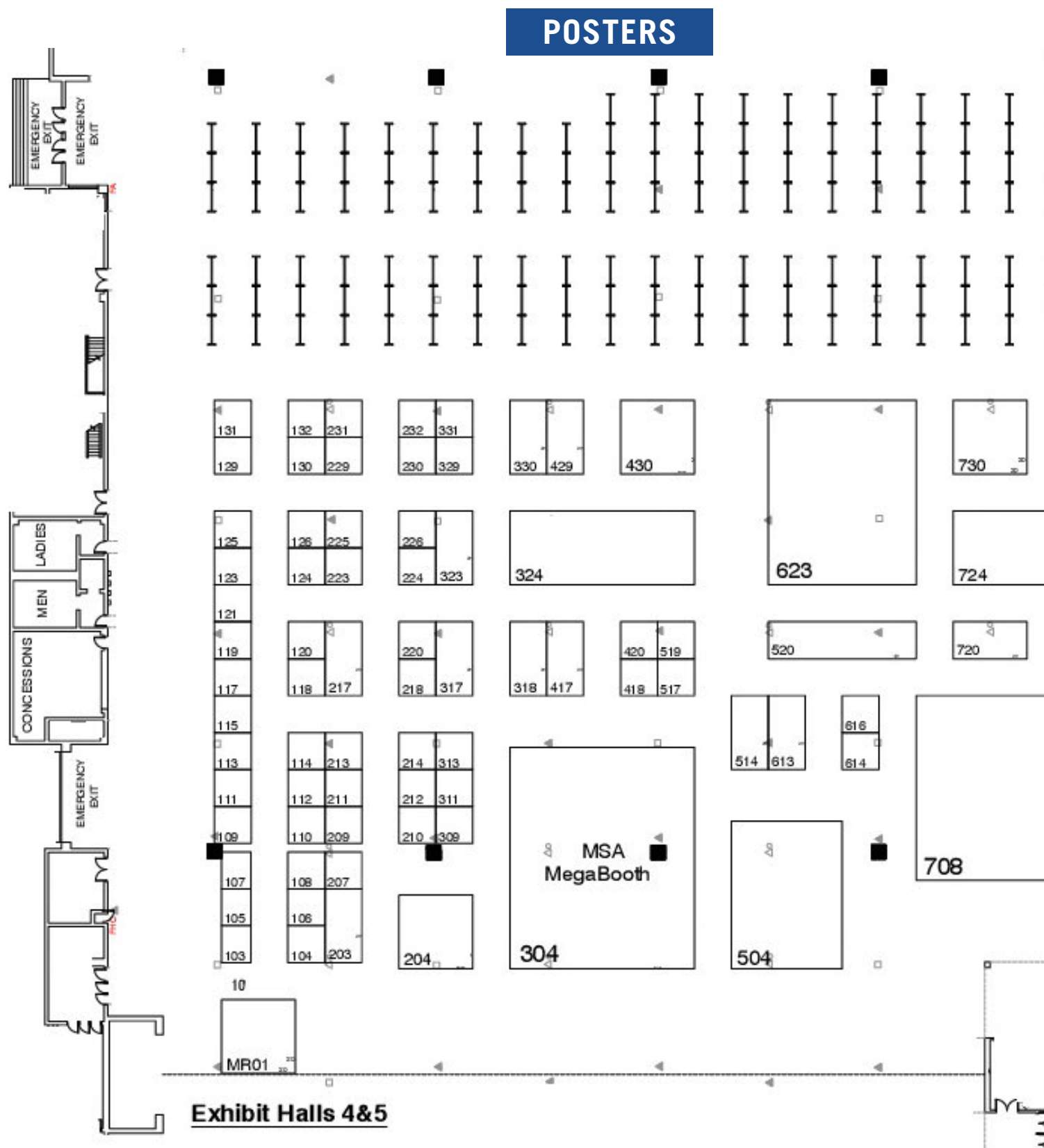
> Exhibitor List by Name *(As of 7/1/17)*

EXHIBITOR NAME	BOOTH
Advanced Microscopy Techniques Corp.	916
Amptek, Inc.	309
Analitex	329
Angstrom Scientific Inc.	1210
Applied Beams LLC	225
Applied Physics Technologies, Inc.	616
Barnett Technical Services	217
Beijing Zhongjingkeyi Technology Co., Ltd	T-119
Benchmark Technologies	T-117
Boeckeler Instruments Inc.	820
Bruker Corporation	1308
Cambridge University Press	1010
CAMECA Instruments, Inc.	324
Carl Zeiss Microscopy, LLC	1018
Coxem Co., Ltd	330
DECTRIS Ltd.	131
Denton Vacuum, LLC	1019
Digital Surf	517
Direct Electron, LP	730
Duniway Stockroom Corp.	1229
E. Fjeld Co, Inc.	1626
EDAX	324
Electron Microscopy Sciences	1109
Electron Microscopy Sciences	1110
Ephemeron Labs	1632
EXpressLO, LLC	331
FEI Company	1318
FLIR Systems	124
FemtoTools AG	1231
Finger Lakes Instrumentation	125
Fischione Instruments	1222
FOM Networks, Inc.	1232
Gatan, Inc.	504
Herzan, LLC	209
HIROX-USA, Inc.	313
Hitachi High Technologies America, Inc.	623
HORIBA Scientific	213
HREM Research, Inc.	932

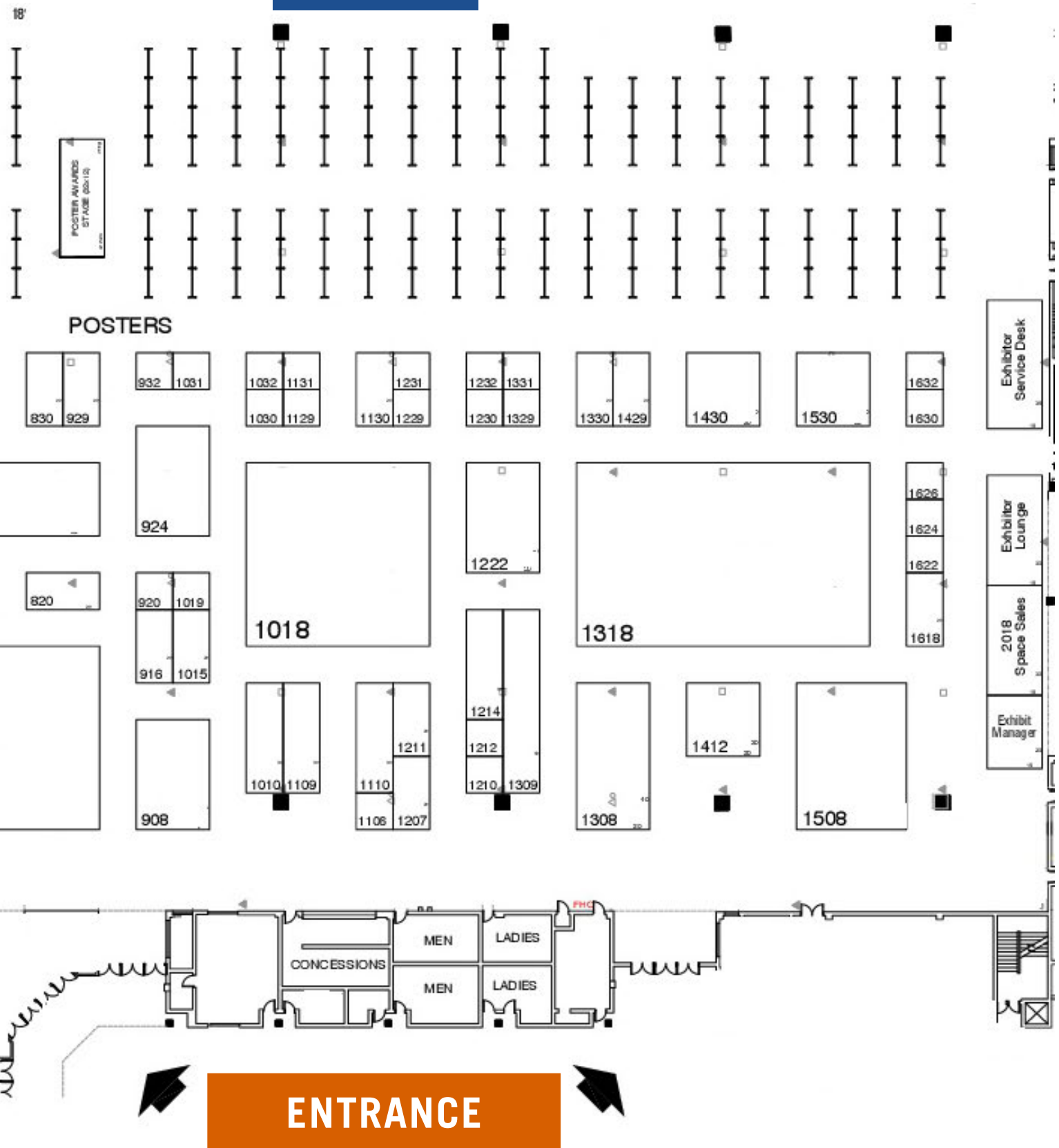
EXHIBITOR NAME	BOOTH
Hummingbird Scientific	830
Hysitron, Inc.	720
ibss Group, Inc.	1130
IDES, Inc.	519
IFG - Fischer Technologies	224
iLab Solutions	1630
IMC19 Congress c/o Arinex Pty Ltd	418
Integrated Dynamics Engineering IDE	1032
International Centre for Diffraction Data (ICDD)	1329
IXRF Systems, Inc.	1211
J. Kraft Microscopy Services, Inc.	613
JEOL USA, Inc.	708
Kammrath and Weiss	211
Keyence Corporation of America	514
Keysight Technologies	1622
Kleindiek Nanotechnik	1212
Ladd Research	920
Leica Microsystems	908
Microscopy Innovations, LLC	311
Microscopy Society of America MegaBooth	304
Nanomechanics, Inc.	118
NanoMEGAS USA	1618
Nanoscience Instruments	429
Nanosurf, Inc.	129
Nion Company	204
Norcada, Inc.	1131
NT-MDT Spectrum Instruments	132
Object Research Systems	1214
Olympus	219
Oxford Instruments	724
Pace Technologies	214
Park Systems, Inc.	232
Phenom-World	430
Photo Electron Soul, Inc.	126
Physical Electronics	229

EXHIBITOR NAME	BOOTH
Physics Today	220
PIE Scientific, LLC	420
PNDetector GmbH	1429
PNSensor GmbH	1330
PROTO	320
Protochips, Inc.	924
Quantum Detectors Ltd.	212
Raith America, Inc.	929
Rave Scientific	1209
Renishaw, Inc.	317
Rigaku Americas Corp.	218
Royal Microscopical Society	318
SCIENION US, Inc.	231
Scientific Instruments & Applications, Inc.	1230
SEC CO., Ltd	417
Seiwa Optical America, Inc.	226
SmarAct, Inc.	1331
SPI Supplies	520
Springer	1015
Synergy Systems Corporation	210
Syntek Co., Ltd.	T-111
Technotrade International Inc.	1030
Ted Pella Inc.	1309
Tescan USA	1508
Thermo Fisher Scientific	1412
Thermo Fisher Scientific (formerly FEI)	1318
TMC	324
Tousimis	614
TVIPS GmbH	1129
UES, Inc.	223
Vibration Engineering Consultants	130
Vitatch Electromagnetics, LLC	323
Voxa	121
Wiley	1430
WITec Instruments Corp.	1031
Wolfram	115
XEI Scientific, Inc.	1108
Zygo Corporation	324

> Exhibit Hall Diagram (As of 7/1/17)



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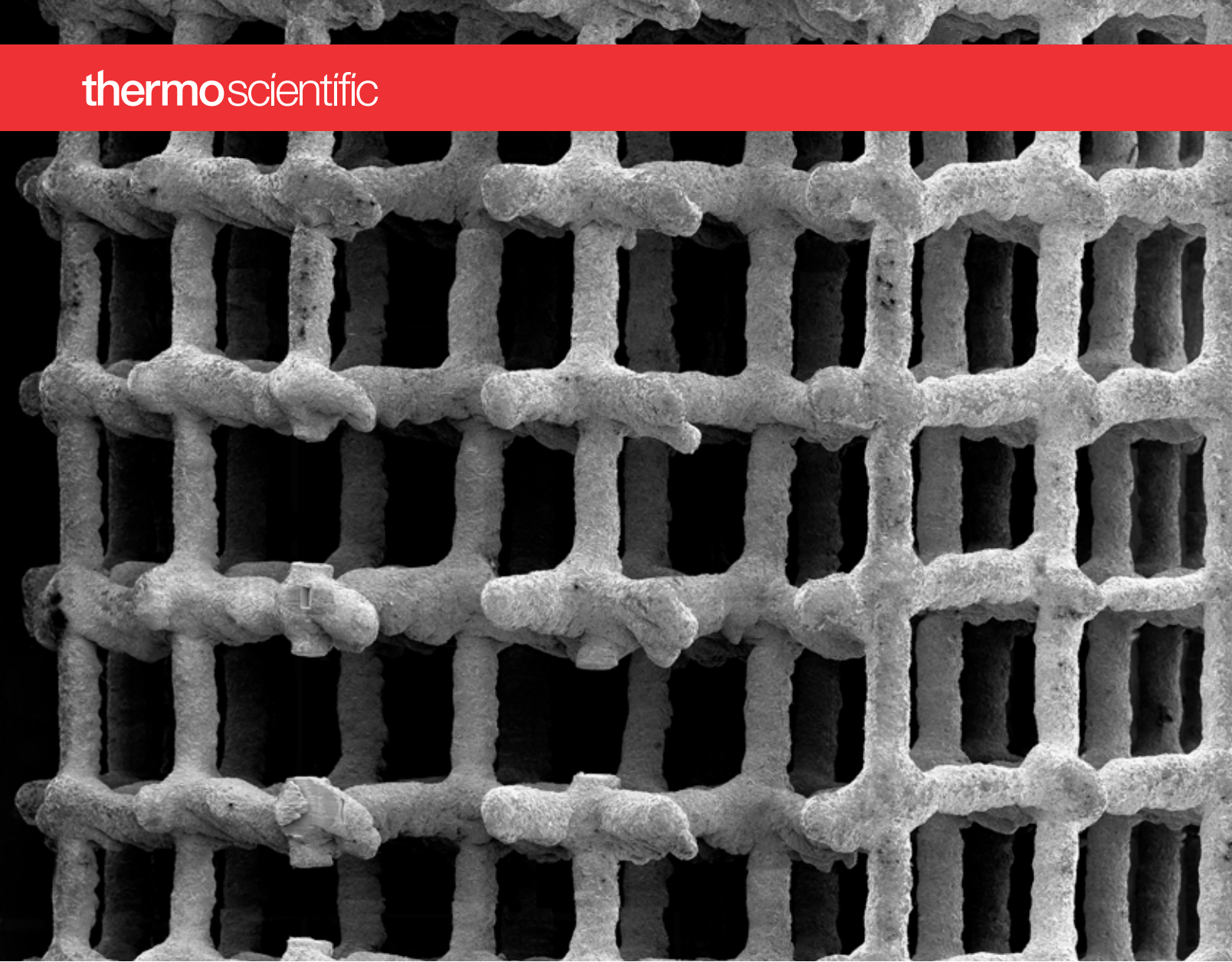
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A scanning electron micrograph (SEM) showing a highly porous, three-dimensional grid-like structure. The structure consists of interconnected vertical and horizontal ridges, forming a series of rectangular and square openings. The surface of the ridges appears rough and textured. The background is dark, making the light-colored structure stand out.

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