Onsite Program Guide & Exhibitor Information

M&M2023
MICROSCOPY & MICROANALYSIS

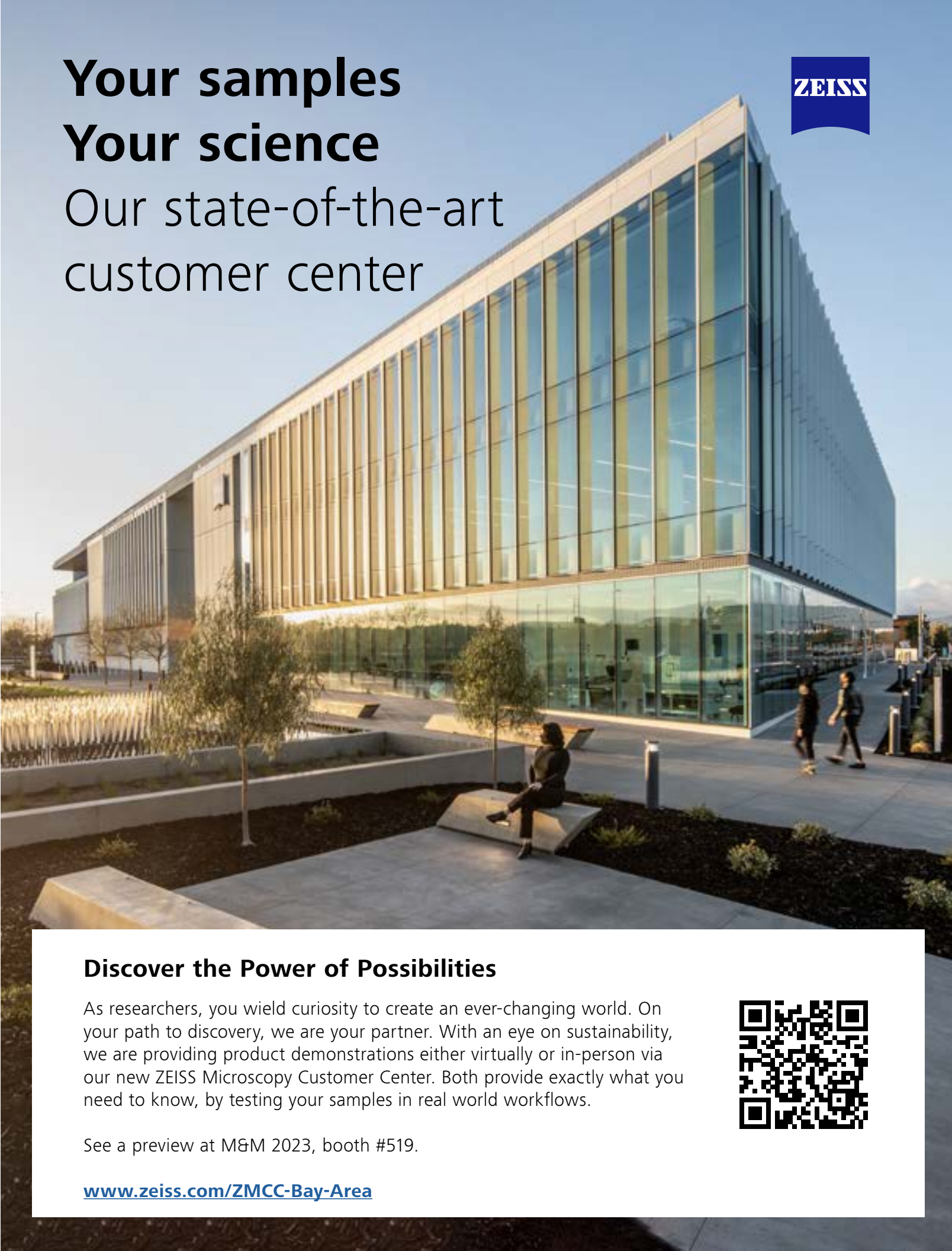
Minneapolis, MN • July 23-27

As of July 18, 2023

www.microscopy.org/MandM/2023

MSA Microscopy Society of America

MAS Microanalysis Society



Discover the Power of Possibilities

As researchers, you wield curiosity to create an ever-changing world. On your path to discovery, we are your partner. With an eye on sustainability, we are providing product demonstrations either virtually or in-person via our new ZEISS Microscopy Customer Center. Both provide exactly what you need to know, by testing your samples in real world workflows.

See a preview at M&M 2023, booth #519.

www.zeiss.com/ZMCC-Bay-Area

Table of Contents

COVER IMAGES, left to right:

Fungus on butterfly wing by Vijayasankar Raman, University of Mississippi, Oxford, MS

Dinosaur bone by Bernardo Cesare, University of Padova, Padova, Italy

Neuromuscular junctions by Akanksha Bhatnagar, Drexel University, Philadelphia, PA

Radiolarian by Elizabeth King, NUANCE Center, Northwestern University, Evanston, IL

QUESTIONS?

TECHNICAL MEETING CONTENT:
2023 Program Chair
Ru-Ching Hsia, Carnegie Institution for Science
MM2023ProgramChair@microscopy.org

EXHIBITS & EXHIBITORS:
Exhibits Manager
doreen@corcexpo.com

SPONSORS & SPONSORSHIPS:
Sponsorship Manager
mary@corcexpo.com

GENERAL:
Meeting Manager
meetingmanager@microscopy.org

ARE YOU A MEMBER?

Join Today and Save on M&M 2023 Registration Fees!

MSA Microscopy Society of America

Visit **http://microscopy.org** to join the Microscopy Society of America online, or for more information about the benefits of MSA membership.

MAS Microanalysis Society

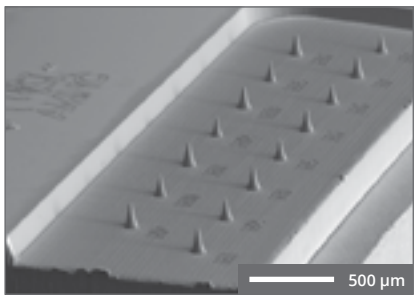
Visit **http://the-mas.org** to find out the benefits of MAS membership.

microPREP™ PRO

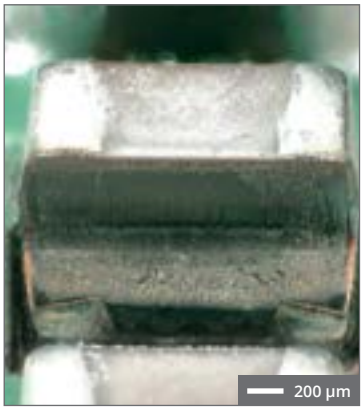
High-Speed Sample Preparation

Poster Session
A08.P1

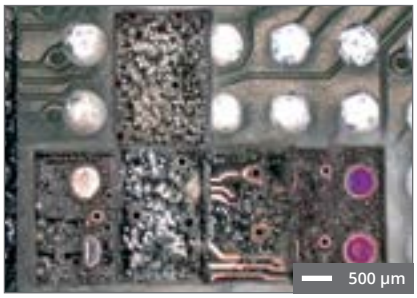
Tuesday
3-5 pm



Preparing APT tips directly from your specimen



Cutting cross-sections within minutes



Delayering hidden structures assisted by circuit layout overlays

M & M: Booth # 1212

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M&M2023 Letter from the Presidents

On behalf of the Microscopy Society of America and the Microanalysis Society, we are pleased to invite you to join us, in-person, July 23-July 27, 2023, for Microscopy & Microanalysis 2023 in Minneapolis, MN. Known for its parks, lakes, and its many cultural landmarks like the Walker Art Center and adjacent Minneapolis Sculpture Garden, Minneapolis also prides itself on a vibrant craft brewery scene and its wide variety of restaurants. Minneapolis has so much to offer and is the perfect place to hold M&M 2023.

The Program Committee, led by Ru-Ching Hsia, James LeBeau, and Anette von der Handt, has developed an exciting group of symposia, spanning advances in instrumentation and techniques development, as well as applications in the analytical, biological, and physical sciences.

The main meeting will be preceded by the ever-popular Sunday Short Courses and five Pre-Meeting Congresses. Students and early-career professionals are especially encouraged to participate in the MSA Student Council's 7th Annual Pre-Meeting Congress that highlights outstanding work by student and postdoctoral fellow attendees. Join us Sunday evening to officially kick off the meeting at the Opening Welcome Reception and reconnect with colleagues and meet new friends. On Monday morning, the Plenary Session kicks off the scientific program with an exciting set of lectures in Physical and Biological science by Dr. Stefanie Milam, Deputy Project Scientist for Planetary Science, James Webb Space Telescope (JWST), Astrochemistry Laboratory at the NASA Goddard Space Flight Center and Dr. Karin Sauer, Professor and Chair, Department of Biological Sciences, Binghamton University, Co-Director, Binghamton Biofilm Research Center (BBRC), and Co-Director, Microbial Biofilms REU , and the presentation of the M&M meeting awards and awards from the sponsoring societies.

In addition to the strong scientific program, what sets the M&M meeting apart is the Exhibit Hall, the world's largest annual microscopy exhibition, which showcases the latest instrumentation and accessories. Don't miss the highly popular vendor tutorials, held Monday through Wednesday after hours in the Exhibit Hall. Other educational opportunities throughout the week include focused biological and physical science tutorials, educational outreach programs, and our Technologists' Forum special and roundtable sessions.

M&M 2023 is the premier meeting to attend to stay abreast of the latest technologies, hear about new developments in applications across all areas of microscopy and microanalysis, and most importantly, network with colleagues.

We look forward to being Together Again for M&M 2023!

MSA Microscopy Society of America

Andrew Minor
University of California, Berkeley
Lawrence Berkeley National Laboratory
President, Microscopy Society of America

MAS Microanalysis Society

Patrick Camus, Retired
President of Microanalysis Society

Future Meeting Dates

July 27-July 31, 2025
SALT LAKE CITY, UT

August 2-August 6, 2026
MILWAUKEE, WI

August 1-August 4, 2027
PITTSBURGH, PA

M&M2023 Sponsors

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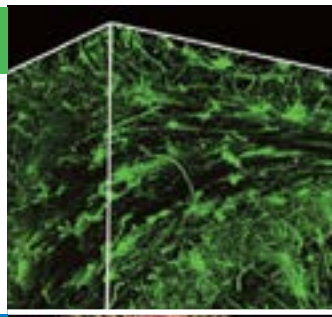
For decades, researchers have relied on DiATOME Diamond Knives superior quality, reliability, and durability. And with proper use, they require far less resharpening than any other knife, making them economical as well. Resharpened DiATOME knives undergo the same stringent optical checking and sectioning test as new knives. The same flawless quality is guaranteed.

Applications are numerous and include sectioning of hard or soft industrial samples, embedded biological samples, alternating ultrathin/semithin, and frozen hydrated samples. Please see our website for a complete applications guide.

NEUROSCIENCE



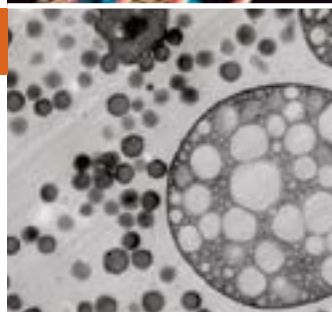
Micro-Optical Sectioning Tomography to Obtain a High-Resolution Atlas of the Mouse Brain Anan Li, Hui Gong, Bin Zhang, Qingdi Wang, Cheng Yan, Jingpeng Wu, Qian Liu, Shaoqun Zeng, Qingming Luo

Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics–Huazhong University of Science and Technology, Wuhan 430074, P. R. China.

CRYO

A single slice of a tomogram of an aldehyde fixed and sucrose infiltrated cryosection with a 3D reconstruction. Erik Bos and Peter J. Peters, Netherlands Cancer Institute, Amsterdam. (see: J. Lefman, P. Zhang, T. Hirai, RM. Weis, J. Juliani, D. Bliss, M. Kessel, E. Bos, P.J. Peters, S. Subramaniam: Three-dimensional electron microscopic imaging of membrane invaginations in Echerichia coli overproducing the chemotaxis receptor Tsr. J. Bacteriol. 2004 Aug; 186(15): 5052-61.)

MATERIALS



ABS, stained with OsO_4, sectioned at room temperature with the ultra sonic knife, section thickness 50nm. Note the almost perfect spherical shape of the large rubber particles and the preservation of the inclusions inside. Also the smaller dense rubber particles are well preserved. B.Vastenhout, Dow Benelux N.V. Terneuzen, The Netherlands.

Ultra-Wet 35° • Ultra-Dry 35° • Ultra-Semi 35° • Ultra Maxi 35°
Ultra Jumbo 35° • Ultra Sonic 35° Ultra ATS 35° Ultra-AFM 35°
Ultra-Wet 45° • Ultra Jumbo 45° • Cryo 25° • Cryo Immuno 35°
Cryo-Dry 35° • Cryo-Wet 35° • Cryo-Dry 45° • Cryo-Wet 45°
Cryo-AFM Histo 45° • Histo Jumbo 45° • Histo-Cryo Dry 45°
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email: info@diatomeknives.com

M&M2023 Registration Information cont.

If you are not a current member of MSA or MAS (i.e., expired member or non-member), your M&M 2023 registration fee will include a membership fee for the society/societies of your choice, unless otherwise noted. Your total registration fee for M&M 2023 will be the base registration rate + your selected membership fee – see charts below. Membership status does not include or affect any additional purchases, such as Short Courses or PMCs.

Non-Members and Expired Members: Select **one option from CHART A** and **one option from CHART B** to get your total registration rate for 2023.

CHART A – M&M 2023 Onsite Registration Rates (all rates in USD)

	After June 9, 2023
Full Meeting	$906
Full Meeting – Student	$240
Full Meeting – Post-Doctoral Researcher	$384
Full Meeting – Emeritus Member* *(requires Emeritus membership in MSA or MAS)*	$270
Partial Meeting – One Day	$468
Pre-Meeting Congresses* *(separate registration required)*	$283
Pre-Meeting Congresses – Student* *(separate registration required)*	$135
Sunday Short Course* *(separate registration required)*	$335
Sunday Short Course – Student* *(separate registration required)*	$135

*This registration rate will not include a membership fee.

CHART B – 2023 Membership Dues Chart (all rates in USD)

MEMBERSHIP TYPE	MSA	MAS	JOINT MEMBERSHIP WITH MSA & MAS
Regular Member	$70	$40	$100
Student Member	$20	$10	$20
Emeritus Member	Free	Free	Free
Honorary Member	Free	Free	Free

For more information on membership with MSA, visit https://www.microscopy.org/join/
For more information on membership with MAS, visit https://the-mas.org/membership/members/

Cancellation and Refund Policy

Refund requests will be honored (less $65 processing fee) if received in writing by **June 21, 2023**. No refunds will be given after June 21, 2023. Membership fees will not be included in the refund. Please contact the Registration Department at mmregistration@microscopy.org with any questions.

Essential Meeting Information

M&M2023

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 Plenary Talk (Monday morning). For detailed listings of all awards, criteria, and award winners, please visit https://www.microscopy.org/awards/index.cfm.

Cancellation and Refund Policy

Refund requests received prior to July 21, 2023 will be honored less a $65 administrative fee. No refunds will be issued for cancellations (for any reason) received on or after July 21, 2023, and no refunds will be issued on-site in Minneapolis. E-mail: MMRegistration@microscopy.org.

Food for Purchase

Inexpensive, portable breakfast and snack items are available for purchase in the convention center on the exhibit/registration 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).

Minneapolis & Regional Visitor Information

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

Internet & E-mail

Free wireless internet is available for M&M attendees in the Minneapolis Convention Center. 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, go to page 20.

Job & Resume Postings / Placement Office *(see MSA MegaBooth info on Page 20)*

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 2024 – Meeting & City Information

Stop by for advance information on the 2024 M&M Meeting in Cleveland, Ohio! The 2024 table is located in the main registration area and has visitor guides, maps, and other important information.

MSA MegaBooth [Booth # 1427]

See complete details on Page 20

Check out all that MSA has to offer its members and M&M attendees: Free Internet Café, book display from scientific publishers, and updated information on the Certification Board. Check out recent editions of Microscopy Today, learn about Project MICRO, and join the Technologists' Forum.

Proceedings

Conference Proceedings will be available in a digital online format only. All Full Meeting registrations include a access to the proceedings online. The proceedings will be linked on the meeting platform an included in and email sent to all paid registrants.

MAS Booth

MAS has a membership and information booth located in the main registration foyer. Sign up for membership, get information on Society events at or after the M&M Meeting, and talk with MAS members and stakeholders to learn how to get involved!

Smoking Policy:

M&M 2023 is a smoke-free meeting. If you wish to smoke, you will need to go outside (street level).

Tote Bags

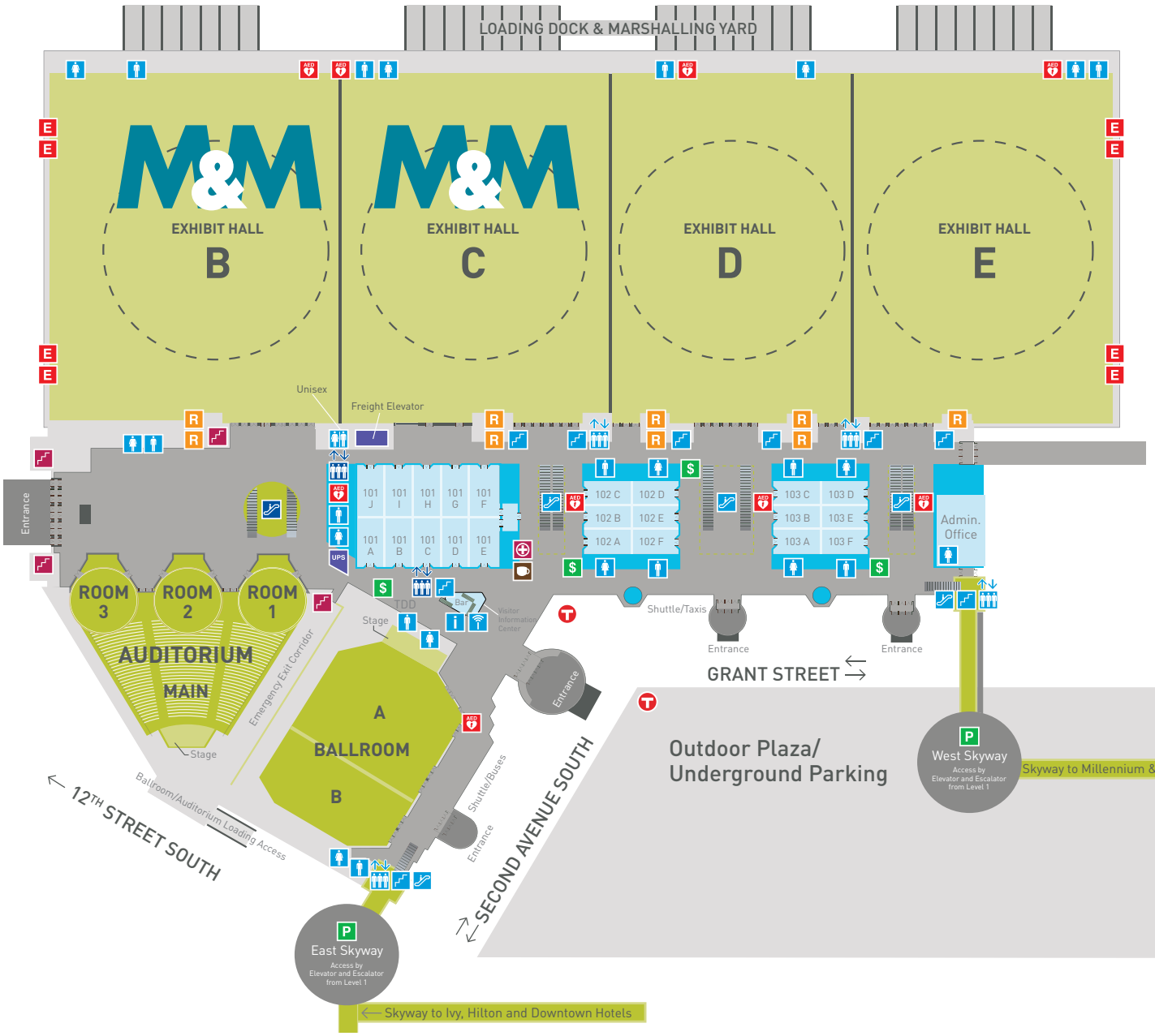
All non-Exhibitor Meeting Registrants are entitled to a meeting tote bag. Bags are distributed in the registration area.

Volunteer Room

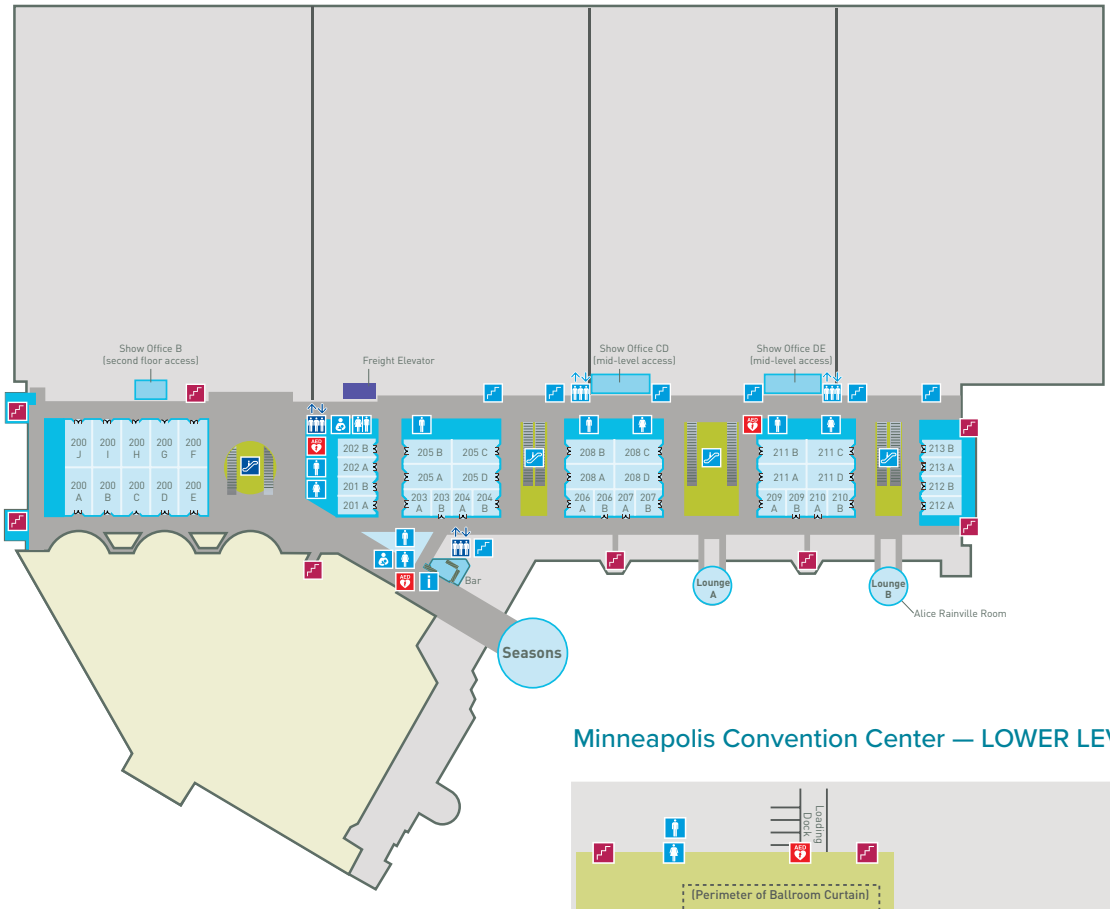
The volunteer & student bursary office is in Room M101C on the mezzanine level. Check in here for volunteer assignments and sign-outs.

M&M2023 Venue Maps

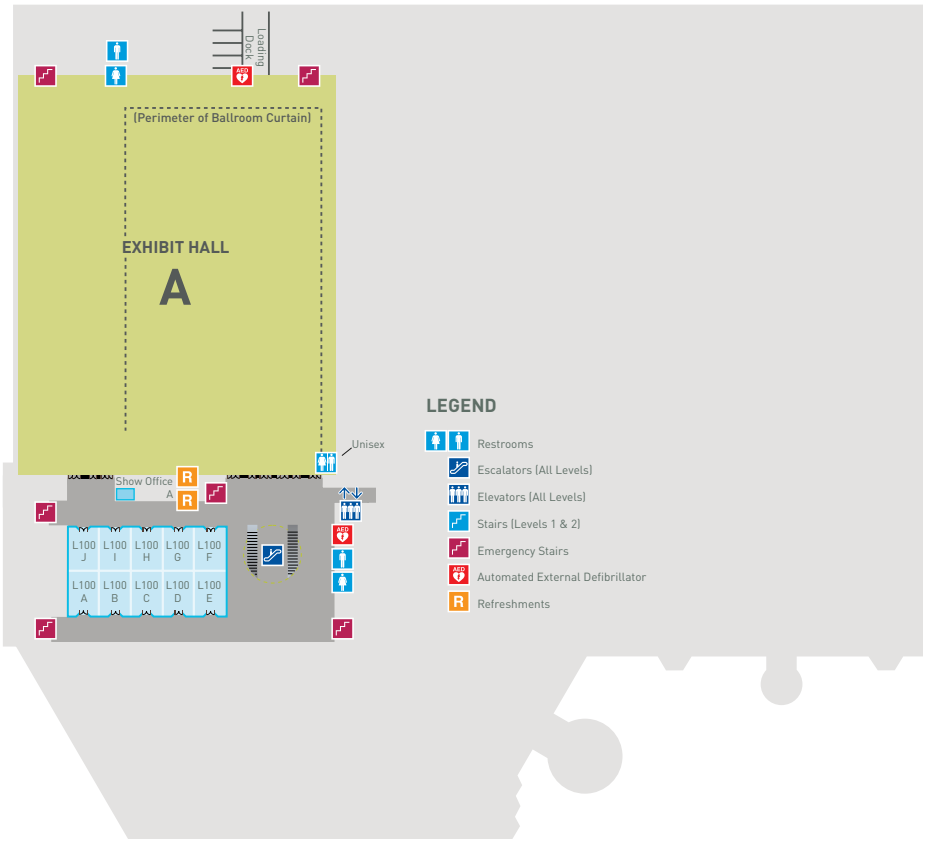
Minneapolis Convention Center — LEVEL 1



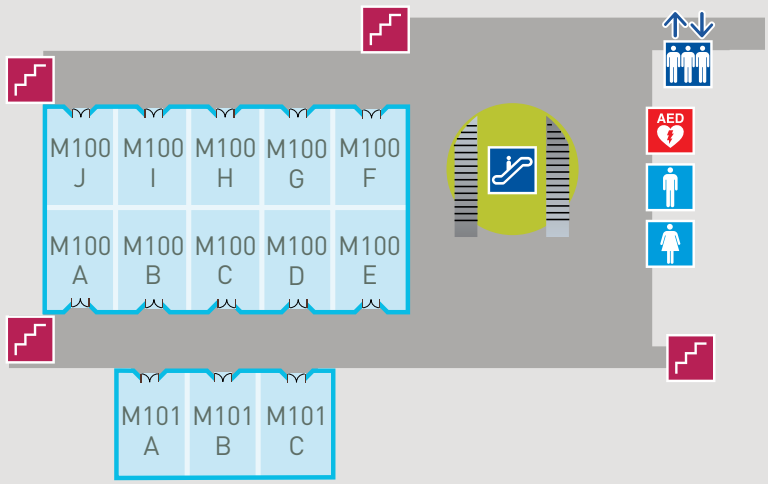
Minneapolis Convention Center — LEVEL 2



Minneapolis Convention Center — LOWER LEVEL



Minneapolis Convention Center — MEZZANINE LEVEL



LEGEND

- Restrooms
- Escalators (All Levels)
- Elevators (All Levels)
- Stairs (Levels 1 & 2)
- Emergency Stairs
- Automated External Defibrillator

M&M 2023 Sunday Evening Welcome Reception

Hilton Minneapolis – Grand Ballroom ABC (3rd Level)
Sunday, July 23, 2023
6:30 PM - 8:30 PM

Drink tickets are included in all full meeting, non-exhibitor registrations. Be sure to pick up your drink ticket at the Tote Bag room located in the registration area in the Minneapolis Convention Center.

Additional tickets: $50 each for adults; $25 each for children 12 and under.

Enjoy Midwest inspired bites and local brews while catching up with friends and colleagues. After the reception, grab some old and new friends and head out to one of Minneapolis' numerous pubs, microbreweries, or wine bars to continue the fun!

MAS Microanalysis Society

MAS Social Event – for MAS Members Only!

Wednesday, July 26, 2023
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, July 26 – immediately following the MAS Business Meeting.

MSA Microscopy Society of America

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.

Thank You to Our Sustaining Members

(As of July 18, 2023)

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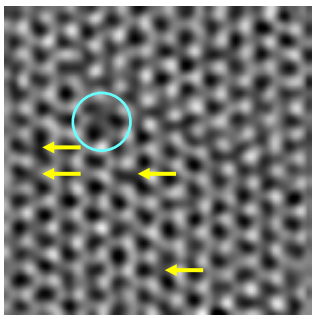
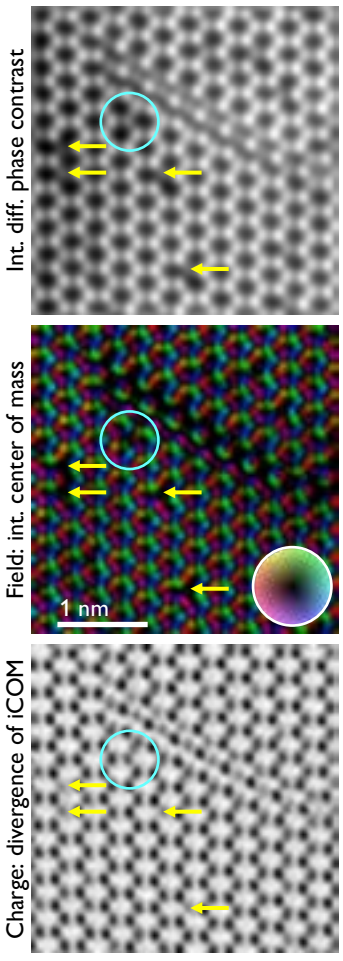
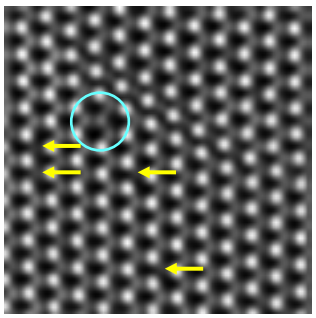


Fast 4D-STEM (67k diff. patt./s)



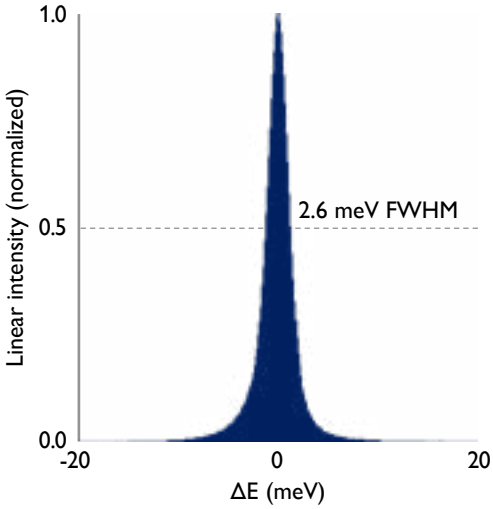
MAADF



V substitution
S vacancies (not all marked)

MoS_2 monolayer with defects: Nion HERMES at 60 kV with DECTRIS ARINA detector.

Sub-3 meV Resolution Vibrational EELS



Zero loss peak: Nion HERMES at 20 kV with Nion IRIS EELS, 1000 spectra of 3 ms, aligned.

Nion HERMES 200

Visit us at booth 1104 to learn more!

www.nion.com

M&M2023 Hotel, Travel, and City Information

Getting To & Around Minneapolis

Voted “Best Airport in America,” the (MSP) Minneapolis–St. Paul International Airport is a centrally located travel hub revered for its ease of check-in, security, and amenities.

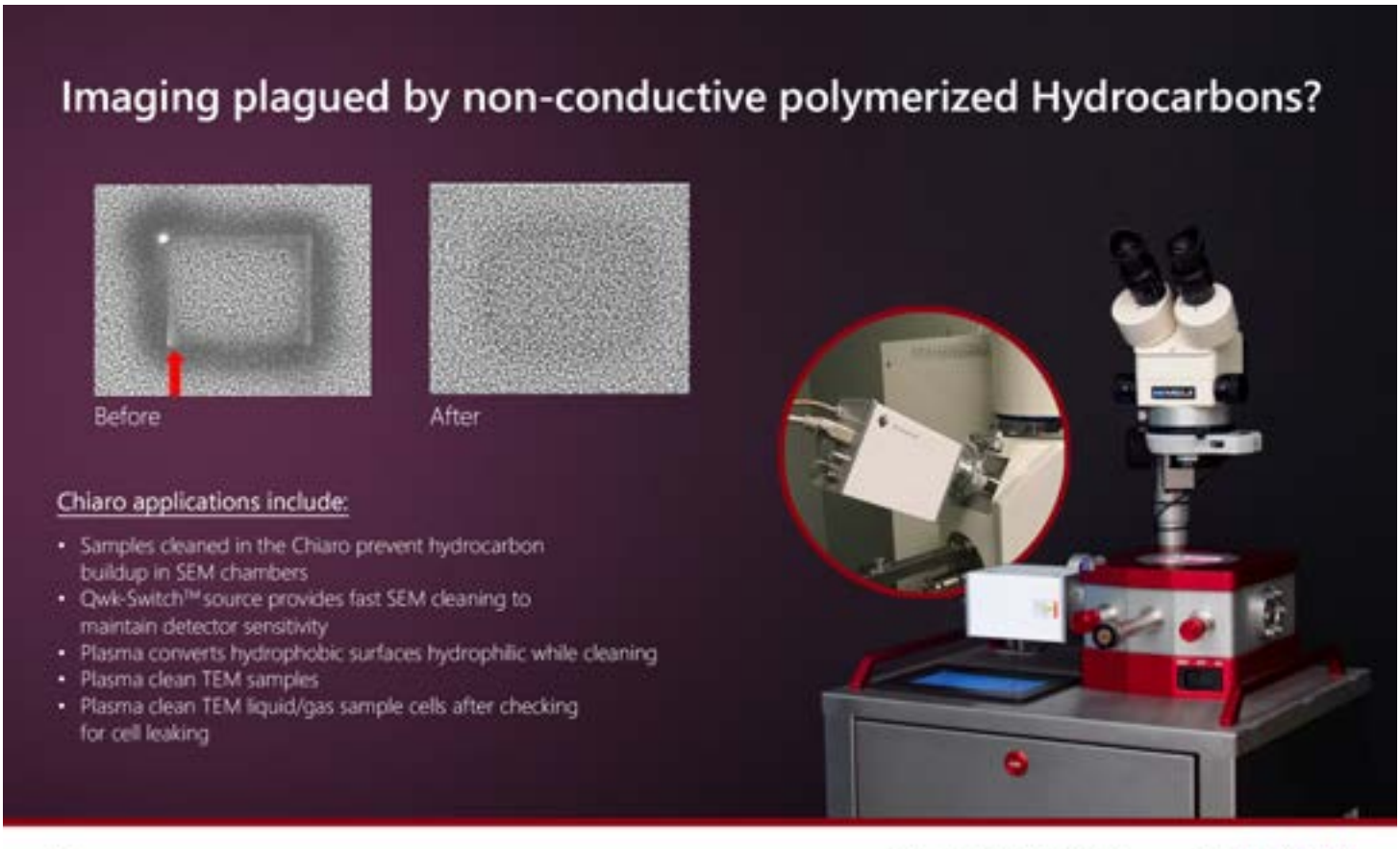
The Minneapolis-St Paul International Airport (MSP) is the country’s 17th busiest travel hub with 34 million passengers passing through each year and 12th busiest for aircraft operations. Compared to other metro areas, only one other U.S. city serves more nonstop markets per capita. The recent arrival of Southwest Airlines offers greater affordability, and MSP’s central location offers a speedy trip (15–30 minutes) to the city.

Ground Transportation

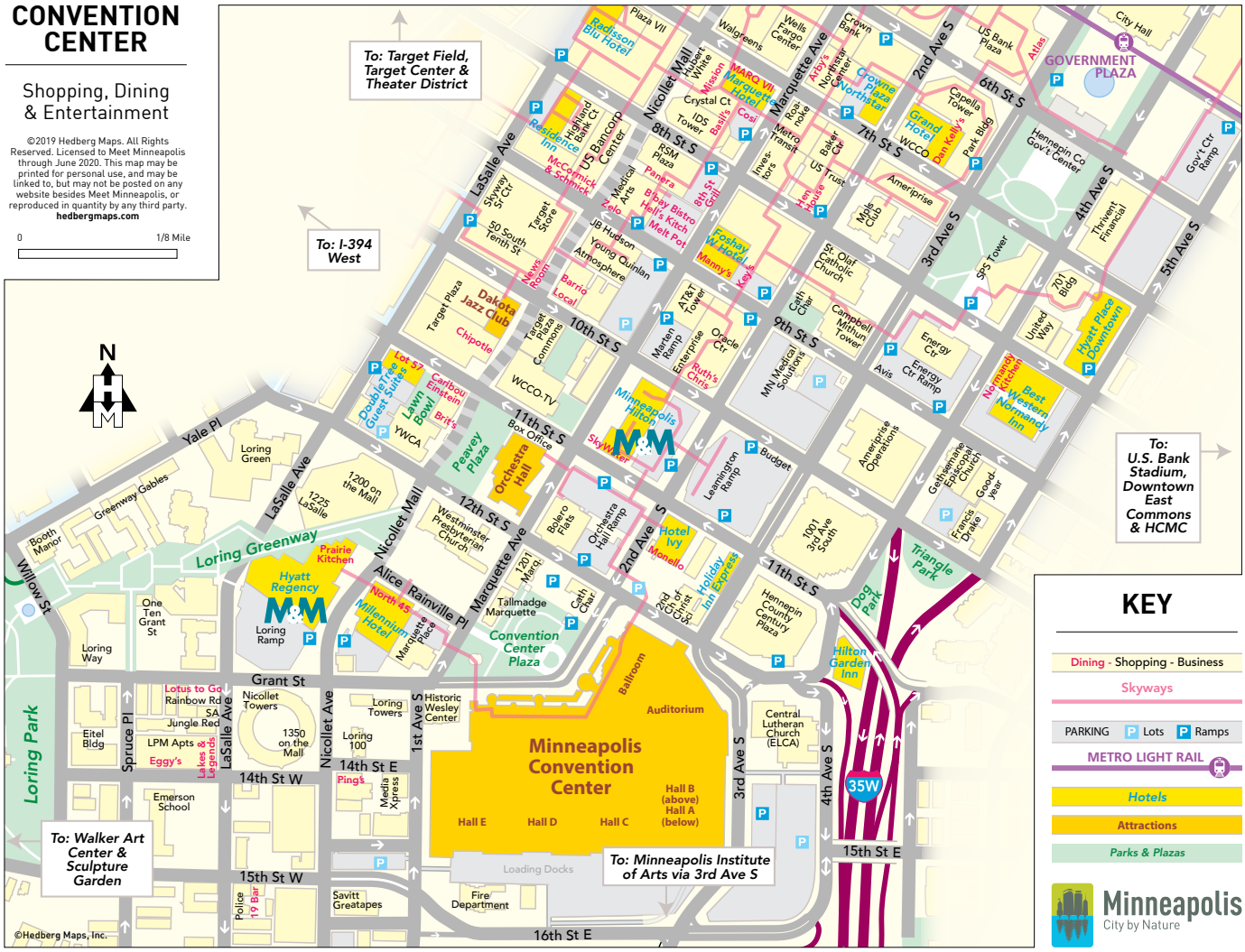
Metro Transit offers fast, frequent service to both downtowns, Mall of America and hundreds of other popular attractions. One-way fare from the airport to downtown Minneapolis is $2.50.

Minneapolis SKYWAY System:

The Minneapolis Skyway System is the largest contiguous system of enclosed, second-level bridges in the world—composed of 9.5 miles of pathways connecting 80 city blocks. Both official M&M 2023 Hotels are connected to the Minneapolis Convention Center via the Skyway.



Hotel, Travel, and City Information cont.



MORE MINNEAPOLIS TRAVEL INFO:

For detailed attraction, tour, dining and travel information for visitors, please go to the Meet Minneapolis website at **https://www.minneapolis.org**

Maps showing details about neighborhoods, downtown, and other areas of the city, including the map above, are available on the Meet Minneapolis website and are downloadable from: **https://www.minneapolis.org/map-transportation/maps/**

M&M2023 Ancillary Meeting Schedule

All events held at Minneapolis Convention Center unless otherwise noted.

Saturday, July 22, 2023

8:00 AM – 5:30 PM	MSA Council	HILTON MINNEAPOLIS

Sunday, July 23, 2023

6:30 PM – 8:00 PM	Symposium Organizers' Reception	OFFSITE

Monday, July 24, 2023

7:15 AM – 8:15 AM	Technologists' Forum Board	L100D
7:15 AM – 8:15 AM	Travel Awards Committee	L100C
7:15 AM – 8:15 AM	MSA Awards + Fellowship Committees	L100E
12:15 PM – 1:15 PM	MAS Meal with a Mentor	L100AB
12:15 PM – 1:15 PM	International Committee	L100H
12:15 PM – 1:15 PM	FIG: PHARMACEUTICAL	L100F
12:15 PM – 1:15 PM	FIG: DIAGNOSTIC & BIOLOGICAL MICROSCOPY	L100G
12:00 PM – 1:30 PM	FIG: FOCUSED ION BEAM	L100D
12:00 PM – 1:30 PM	FIG: ATOM PROBE FIELD ION MICROSCOPY	L100C
3:00 PM – 5:00 PM	MT Editors Meeting	L100F
3:30 PM – 4:30 PM	FIG: 3D EM in the Biological Sciences	L100E
3:30 PM – 5:00 PM	Technologists' Forum Business Meeting	L100C
4:30 PM – 6:00 PM	MSA Book Elements	L100G
5:30 PM – 7:00 PM	Student Mixer & MSA Student Member Meeting	SEASONS, 2ND FLOOR
5:45 PM – 6:45 PM	Vendor Tutorials (Sign up at Vendor Booths)	EXHIBIT HALL

Tuesday, July 25, 2023

7:15 AM – 8:15 AM	MSA Local Affiliated Societies & MAS Affiliated Regional Societies Breakfast	L100D
7:15 AM – 8:15 AM	*Microscopy Today* Editorial Board Meeting	L100F
7:15 AM – 8:15 AM	FIG: Electron Microscopy in Liquids and Gases	L100C
10:00 AM – 12:00 PM	M&M 2024 – Program Planning Meeting	M100C

Ancillary Meeting Schedule cont.

M&M2023

All events held at Minneapolis Convention Center unless otherwise noted.

Tuesday, July 25, 2023 cont.

12:15 PM – 1:15 PM	FIG: FOM FIG Lunch Meeting	L100AB
12:15 PM – 1:15 PM	FIG: Cryo-Preparation	L100F
12:15 PM – 1:15 PM	FIG: Electron Crystallography	L100D
12:15 PM – 1:15 PM	FIG: MicroAnalytical Standards	L100E
12:15 PM – 1:15 PM	MSA Standards Committee Meeting	L100G
3:30 PM – 4:30 PM	MSA Education Committee Meeting	L100F
3:30 PM – 4:30 PM	FIG Business Meeting	L100C
3:30 PM – 7:00 PM	Post-Doc Reception	L100AB
5:45 PM – 6:45 PM	Vendor Tutorials *(Sign up at Vendor Booths)*	EXHIBIT HALL
6:30 PM – 8:30 PM	Presidents' Reception *(Invitation Only)*	OFFSITE

Wednesday, July 26, 2023

7:15 AM – 8:15 AM	MSA Certification Board	L100E
7:15 AM – 8:15 AM	MaM Editorial Board	L100C
7:15 AM – 8:15 AM	MSA Membership Committee	L100D
12:15 PM – 1:15 PM	FIG: EM Tech (formerly Abberation)	L100C
12:15 PM – 1:15 PM	MSA Members' Meeting	M100IJ
5:30 PM – 6:30 PM	Diversity and Inclusion Mixer	SEASONS, 2ND FLOOR
5:30 PM – 6:30 PM	MAS Business Meeting	M100D
6:30 PM – 8:30 PM	MAS Members Social	OFFSITE
6:30 PM	Vendor Tutorials *(Sign up at Vendor Booths)*	EXHIBIT HALL

Thursday, July 27, 2023

8:30 AM – 9:30 AM	M&M Sustaining Members Meeting	L100AB
4:30 PM – 5:30 PM	M&M 2023 Wrap-Up & Debrief	L100AB

MSA
Microscopy Society of America

MegaBooth in the EXHIBIT HALL

Open during all exhibit hall hours.

The **MSA MEGABOOTH** showcases all that MSA membership has to offer. Stop by to learn about MSA and our mission and receive information about the memberships available – Regular, Sustaining (corporate), and Student levels. If you are currently a member, stop by to catch up on all the new society developments and network with your colleagues.

VENDOR TUTORIALS – New this Year! Sign up in the presenting companies booth. These popular sessions are presented on Monday, Tuesday, and Wednesday evenings after the exhibit hall has closed for the day. Don't miss out – advance registration is required!

The **TECHNOLOGISTS' FORUM** (TF) **–** Attention Technologists! Stop by to find out how you can grow and develop your skills, your professional career, and your network by joining the Forum!

The **PLACEMENT OFFICE** is MSA's job-listing service. Post a job, peruse job listings, post a resume and/or find that perfect candidate for your job opening. All for **FREE** during the meeting!

Check out the **BOOK DISPLAY –** publisher-donated books, divided into biological/physical topics. Several new titles added every year! Come and browse the newest titles.

CERTIFICATION BOARD – Find out about MSA's certification program for Electron Microscopy Technologists and how being certified can help you in your next job search!

MICROSCOPY TODAY and ***MICROSCOPY and MICROANALYSIS*** are the society's two publications – one a magazine format, the other a peer-reviewed scientific journal. Information for authors and advertisers is available here.

EDUCATIONAL OUTREACH – Browse the materials and find out how to start an outreach program in your local area. Get details on the special programming at the M&M meeting for educators and kids of all ages.

Visit the updated **Project MICRO** display to learn about this organization's education and outreach goals.

Plenary Session

Monday, July 24, 2023 |
Minneapolis Convention Center—Auditorium

Plenary session begins at 8:30 AM and will feature special awards presentations from the joining societies.

Karin Sauer, PhD

Professor and Chair, Department of Biological Sciences, Binghamton University

Co-Director, Binghamton Biofilm Research Center (BBRC)

Co-Director, Microbial Biofilms REU

Editor-in-Chief, FEMS Microbiology Reviews

Biofilms – Life upon First Contact and Beyond

Stefanie Milam, PhD

Deputy Project Scientist for Planetary Science, James Webb Space Telescope (JWST)

Astrochemistry Laboratory

NASA Goddard Space Flight Center

Revealing the Big and the Small with the James Webb Space Telescope: A Macroscopic Approach to Studying the Solar System

MSA Distinguished Scientist Award

DISTINGUISHED SCIENTIST – PHYSICAL SCIENCES

John Andrew Panitz, University of New Mexico (Emeritus)

MSA Microscopy Society of America

MSA Major Society Award Winners

BURTON MEDAL – PHYSICAL SCIENCES
Joe Patterson, University of California, Irvine

CHUCK FIORI AWARD FOR OUTSTANDING TECHNOLOGIST, PHYSICAL SCIENCES
Matthew Michael Schneider, Los Alamos National Laboratory

HILDEGARD H. CROWLEY AWARD FOR OUTSTANDING TECHNOLOGIST, BIOLOGICAL SCIENCES
Patricia L. Jansma, University of Arizona RII Imaging Core-Optical

MORTON D. MASER DISTINGUISHED SERVICE AWARD
Gail J. Celio, University of Minnesota

MAS Microanalysis Society

MAS Major Society Award Winners

PRESIDENTIAL SCIENCE AWARD
Masashi Watanabe, Lehigh University

PRESIDENTIAL SERVICE AWARD
Thomas Kelly, STEAM Instruments, Inc.

PETER DUNCUMB AWARD FOR EXCELLENCE IN MICROANALYSIS
Niklas Dellby, NION Co.

KURT F.J. HEINRICH AWARD
Anette von der Handt, University of British Columbia

BIRKS – BEST CONTRIBUTED PAPER
Emma Bullock, Carnegie Institution for Science

CASTAING – BEST STUDENT PAPER
Edwin Supple, Colorado School of Mines

COSSLETT – BEST INVITED PAPER
Scott Eckley

MACRES – BEST INSTRUMENTATION/ SOFTWARE PAPER
Tina R. Hill, Bruker AXS, Inc.

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Find us at M&M 2023

Dr. Luca Piazza
Dr. Daniel Stroppa
Dr. Hervé Remigy

dectris.com/arina

Saturday, July 22

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

8:00 AM – 5:30 PM	**MSA Council**	*Hilton Minneapolis Hotel*
8:15 AM – 5:00 PM	**Pre-Meeting Congress**	
	X60 Annual Pre-Meeting Congress for Students, Post-Docs, and Early-Career Professionals in Microscopy & Microanalysis *(Organized by the MSA Student Council)*	
	X61 Advances in Focused Ion Beam Technologies	

Sunday, July 23

8:30 AM – 5:00 PM	**Sunday Short Courses**	
	X10 High Resolution Structure Determination by Cryo-EM	
	X11 Guidelines for Performing 4-D STEM Characterization from the Atomic to >Micrometer Scales: Experimental Considerations, Data Analysis and Simulation	
	X12 Biological EM Sample Processing – Part 2 *(Part 1 offered in 2022 – not a prerequisite)*	
	X13 Cryo-EM for Materials Sciences: Hardware, Applications, and Data Acquisition	
	X14 Transmission Electron Microscopy and Spectroscopy from First Principles	
	X15 Large-Area Hyperspectral Mapping, EBSD/EDS/TKD/STEM, Machine Learning Data Analysis, Oh My!	
8:30 AM – 5:00 PM	**Pre-Meeting Congress**	
	X62 Facilities Management: Skills, Strategies, and Best Practices	
	X63 Imaging in the Pharmaceutical, Biopharmaceutical, and Medical Health Products Industries	
	X64 Hardware and Software Developments in Electron Microscopy	
6:30 PM	**M&M 2023 Welcome Reception**	*Hilton Minneapolis Hotel*
8:00 PM	**Symposium Organizers' Reception**	*Offsite (by invitation only)*

Monday, July 24

7:15 AM – 8:15 AM	**MSA Awards + Fellowship Committees**	
7:15 AM – 8:15 AM	**Technologists' Forum Board**	
7:15 AM – 8:15 AM	**Travel Awards Committee**	
8:30 AM – 12:00 PM	**M&M 2023 Plenary Sessions**	*Auditorium at the MCC*

Opening Welcome

Plenary Talk #1:
Karin Sauer, PhD
Professor and Chair, Department of Biological Sciences, Binghamton University
Co-Director, Binghamton Biofilm Research Center (BBRC)
Co-Director, Microbial Biofilms REU
Editor-in-Chief, FEMS Microbiology Reviews

Biofilms – Life upon First Contact and Beyond

MAS Awards Presentation
MSA Awards Presentation
M&M Meeting Awards Presentation

Plenary Talk #2:
Stefanie Milam, PhD
Deputy Project Scientist for Planetary Science
James Webb Space Telescope (JWST)
Astrochemistry Laboratory
NASA Goddard Space Flight Center

Revealing the Big and the Small with the James Webb Space Telescope: A Macroscopic Approach to Studying the Solar System

Monday, July 24 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**
12:00 PM – 5:30 PM	**Exhibit Hall Open**
12:15 PM – 1:15 PM	**MAS Meal with a Mentor**
12:15 PM – 1:15 PM	**MSA International Committee**
12:15 PM – 1:15 PM	**FIG: Pharmaceutical**
12:15 PM – 1:15 PM	**FIG: Diagnostic & Biological Microscopy**
12:15 PM – 1:15 PM	**FIG: Focused Ion Beam**
12:15 PM – 1:15 PM	**FIG: Atom Probe Field Ion Microscopy**
12:15 PM – 1:15 PM	**FIG: FOM Roundtable**
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**
	A01.1 Microscopic Approach of Materials for Agri-Food Process
	A02.1 Microscopy and Microanalysis for Real World Problem Solving
	A04.1 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A06.1 Learning from Failure: Negative and Null Results in Microscopy
	A07.1 In Memoriam of David Joy: Scanning Electron and Ion Microscopy
	A08.1 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences
	A11.1 Nanoscale Infrared Spectroscopy with Electrons and Photons
	A14.1 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	A15.1 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials
	B01.1 Imaging Approaches for Plant Cell Biology, Agriculture, Ecology and Environment-Related Research
	B04.1 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging
	B09.1 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling
	P03.1 Theory and Applications of Advanced Electron Tomography
	P06.1 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications
	P07.1 Prof. Wilbur C Bigelow Centenary Symposium-In situ Heating and Gas-Reaction Studies in Materials Sciences
	P10.1 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
3:00 PM – 5:00 PM	**Monday Poster Presentations** *Post-Deadline Posters will be presented on this day.*
	A02.P1 Microscopy and Microanalysis for Real World Problem Solving
	A04.P1 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A06.P1 Learning from Failure: Negative and Null Results in Microscopy
	A07.P1 In Memoriam of David Joy: Scanning Electron and Ion Microscopy
	A11.P1 Nanoscale Infrared Spectroscopy with Electrons and Photons
	A15.P1 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials
	B01.P1 Imaging Approaches for Plant Cell Biology, Agriculture, Ecology and Environment-Related Research
	B02.P1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	P03.P1 Theory and Applications of Advanced Electron Tomography
	P06.P1 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications
	P10.P1 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Monday, July 24 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

3:00 PM – 5:00 PM	***Microscopy Today* Editors' Meeting**
3:30 PM – 4:30 PM	**FIG: 3D EM in the Biological Sciences**
3:30 PM – 5:00 PM	**Technologists' Forum Business Meeting**
4:30 PM – 6:00 PM	**MSA Book Elements**
5:00 PM – 5:30 PM	**Student Poster Awards**
5:30 PM – 6:30 PM	**Student Mixer**
5:45 PM – 6:45 PM	**Vendor Tutorials** *(Sign up at individual exhibitors' booths)*

Tuesday, July 25

7:15 AM – 8:15 AM	**MSA Local Affiliated Societies & MAS Affiliated Regional Societies**
7:15 AM – 8:15 AM	***Microscopy Today* Editorial Board Meeting**
7:15 AM – 8:15 AM	**FIG: Electron Microscopy in Liquids & Gases**
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**
	X90.1 Outreach: Microscopy in the Classroom
	A01.2 Microscopic Approach of Materials for Agri-Food Proces
	A02.2 Microscopy and Microanalysis for Real World Problem Solving
	A04.2 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A06.2 Learning from Failure: Negative and Null Results in Microscopy
	A07.2 In Memoriam of David Joy: Scanning Electron and Ion Microscopy
	A08.2 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences
	A11.2 Nanoscale Infrared Spectroscopy with Electrons and Photons
	A14.2 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	A15.2 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials
	B02.1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B04.2 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging
	B09.2 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling
	C05.1 Vendor Symposium
	P03.2 Theory and Applications of Advanced Electron Tomography
	P06.2 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications
	P07.2 Prof. Wilbur C Bigelow Centenary Symposium-In situ Heating and Gas-Reaction Studies in Materials Sciences
	P10.2 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
10:00 AM – 10:30 AM	**Coffee Break in the Exhibit Hall**
10:00 AM – 5:30 PM	**Exhibit Hall Open**
10:00 AM – 12:00 PM	**M&M 2024 Symposium Organizers' Planning Meeting**

Tuesday, July 25 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

10:30 AM – 12:00 PM	**A.M. Symposia & Sessions**
	X90.2 Outreach: Microscopy in the Classroom
	A01.3 Microscopic Approach of Materials for Agri-Food Process
	A02.3 Microscopy and Microanalysis for Real World Problem Solving
	A04.3 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A06.3 Learning from Failure: Negative and Null Results in Microscopy
	A07.3 In Memoriam of David Joy: Scanning Electron and Ion Microscopy
	A08.3 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences
	A11.3 Nanoscale Infrared Spectroscopy with Electrons and Photons
	A14.3 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	A15.3 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials
	B02.2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B06.1 Innovations in Light Microscopy: Revealing the Inner Workings of Life From Single Molecule to Whole Organisms
	B09.3 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling
	C03.1 Correlative and Multimodal Microscopy and Analysis
	C05.2 Vendor Symposium
	P03.3 Theory and Applications of Advanced Electron Tomography
	P06.3 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications
	P07.3 Prof. Wilbur C Bigelow Centenary Symposium-In situ Heating and Gas-Reaction Studies in Materials Sciences
	P10.3 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**
12:15 PM – 1:00 PM	**MSA Distinguished Scientist Awardee Lecture**
12:15 PM – 1:15 PM	***Microscopy Today* Editorial Board**
12:15 PM – 1:15 PM	**FIG: FOM FIG Lunch Meeting**
12:15 PM – 1:15 PM	**FIG: Cryo-Preparation**
12:15 PM – 1:15 PM	**FIG: Electron Crystallography**
12:15 PM – 1:15 PM	**FIG: MicroAnalytical Standards**
12:15 PM – 1:15 PM	**MSA Standards Committee**
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**
	A02.4 Microscopy and Microanalysis for Real World Problem Solving
	A04.4 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A07.4 In Memoriam of David Joy: Scanning Electron and Ion Microscopy
	A08.4 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences
	A11.4 Nanoscale Infrared Spectroscopy with Electrons and Photons
	A14.4 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	A15.4 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials
	B02.3 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B06.2 Innovations in Light Microscopy: Revealing the Inner Workings of Life from Single Molecule to Whole Organisms
	B09.4 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling

Tuesday, July 25 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

1:30 PM – 3:00 PM	**P.M. Symposia & Sessions (Cont'd.)**	
	C03.2 Correlative and Multimodal Microscopy and Analysis	
	C05.3 Vendor Symposium	
	P07.4 Prof. Wilbur C Bigelow Centenary Symposium-In situ Heating and Gas-Reaction Studies in Materials Sciences	
	P10.4 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces	
3:00 PM – 5:00 PM	**Tuesday Poster Presentations**	*Exhibit Hall*
	X90.P1 Outreach—Microscopy in the Classroom	
	A01.P1 Microscopic Approach of Materials for Agri-Food Process	
	A02.P2 Microscopy and Microanalysis for Real World Problem Solving	
	A04.P2 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials	
	A08.P1 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences	
	A14.P1 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens	
	B02.P2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)	
	B04.P1 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging	
	B06.P1 Innovations in Light Microscopy: Revealing the Inner Workings of Life from Single Molecule to Whole Organisms	
	B09.P1 Volume Electron Microscopy in Biological Research—Instrumentation, Sample Preparation and Data Handling	
	P07.P1 Prof. Wilbur C Bigelow Centenary Symposium-In situ Heating and Gas-Reaction Studies in Materials Sciences	
	P10.P2 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces	
3:30 PM – 4:30 PM	**FIG Business Meeting**	
3:30 PM – 4:30 PM	**MSA Education Committee**	
5:00 PM – 5:30 PM	**Student Poster Awards**	*Exhibit Hall Poster Stage*
5:30 PM – 7:00 PM	**Post-Doctoral Researchers' Reception** *(all post-doctoral fellows & researchers welcome!)*	
5:45 PM – 6:45 PM	**Vendor Tutorials** *(Sign up at exhibitors' booths)*	
6:30 PM	**Presidents' Reception** *(Invitation Only)*	*Offsite*

Wednesday, July 26

7:15 AM – 8:15 AM	**MaM Editorial Board**	
7:15 AM – 8:15 AM	**MSA Certification Board**	
7:15 AM – 8:15 AM	**MSA Membership Committee**	
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**	
	X30 Technologists' Forum Symposia: Methods in Tissue Clearing and Expansion to Achieve Improved Resolution	
	X40 Cross-Cut Physical-Biological Tutorial: Need for Speed: Imaging Biological Samples with the 64-Beams FAST-EM	
	A02.5 Microscopy and Microanalysis for Real World Problem Solving	
	A04.5 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials	
	A07.5 In Memoriam of David Joy: Scanning Electron and Ion Microscopy	
	A11.5 Nanoscale Infrared Spectroscopy with Electrons and Photons	
	A13.1 Computational Advances in Electron Microscopy	

Wednesday, July 26 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**	
	A14.5	Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	B02.4	3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B03.1	Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network
	B08.1	Biological Soft X-ray Tomography
	C02.1	Extracting Information from Data: Applications of Artificial Intelligence in Microscopy
	C03.3	Correlative and Multimodal Microscopy and Analysis
	P01.1	Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P04.1	Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing
	P05.1	Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P10.5	Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
10:00 AM – 10:30 AM	**Coffee Break in the Exhibit Hall**	
10:00 AM – 5:30 PM	**Exhibit Hall Open**	
10:30 AM – 12:00 PM	**A.M. Symposia & Sessions (Cont'd.)**	
	X32	Tech Forum: 4D STEM Tips and Techniques [Partnering with A04]
	X41	Physical Tutorial: Specimen Preparation for in-situ Transmission Electron Microscopy Experiments
	A02.6	Microscopy and Microanalysis for Real World Problem Solving
	A03.1	Standards and Reference Materials and their Applications in Quantitative Microanalysis
	A05.1	Advanced Measurement Techniques in (S)TEM-EELS
	A13.2	Computational Advances in Electron Microscopy
	A14.6	Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens
	B02.5	3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B03.2	Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network
	B08.2	Biological Soft X-ray Tomography
	C02.2	Extracting Information from Data: Applications of Artificial Intelligence in Microscopy
	C03.4	Correlative and Multimodal Microscopy and Analysis
	P01.2	Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P04.2	Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing
	P05.2	Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.1	Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P10.6	Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**	
12:15 PM – 1:15 PM	**FIG: Aberration-Corrected Microscopy**	
12:15 PM – 1:15 PM	**MSA Members' Meeting**	
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**	
	X31	Tech Forum: Tech Forum: New and Developing Technologies in Light Microscopy *[Partnering with A06]*
	X42	Biological Tutorial: CryoAPEX: Inception, Growth and Evolution of the Method
	X91	Microscopy Explorations (Outreach)
	A02.7	Microscopy and Microanalysis for Real World Problem Solving
	A03.2	Standards and Reference Materials and their Applications in Quantitative Microanalysis
	A04.6	The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials
	A05.2	Advanced Measurement Techniques in (S)TEM-EELS
	A13.3	Computational Advances in Electron Microscopy
	A14.7	Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Wednesday, July 26 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

1:30 PM – 3:00 PM	**P.M. Symposia & Sessions (Cont'd.)**	
	B05.1	Technical Advances in cryoEM
	B07.1	Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants
	B08.3	Biological Soft X-ray Tomography
	C02.3	Extracting Information from Data: Applications of Artificial Intelligence in Microscopy
	C03.5	Correlative and Multimodal Microscopy and Analysis
	P01.3	Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P04.3	Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing
	P05.3	Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.2	Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P09.1	Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials
3:00 PM – 5:00 PM	**Wednesday Poster Presentations**	*Post-Deadline Posters will be presented on this day*
	A03.P1	Standards and Reference Materials and their Applications in Quantitative Microanalysis
	A05.P1	Advanced Measurement Techniques in (S)TEM-EELS
	B03.P1	Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network
	B05.P1	Technical Advances in cryoEM
	B08.P1	Biological Soft X-ray Tomography
	C02.P1	Extracting Information from Data: Applications of Artificial Intelligence in Microscopy
	C03.P1	Correlative and Multimodal Microscopy and Analysis
	C04.P1	Lens on Diversity in the M&M Community
	P01.P1	Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P04.P1	Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing
	P05.P1	Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P10.P3	Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces
5:00 PM	**Student Poster Awards**	*Exhibit Hall - Poster Area Stage*
5:30 PM – 6:30 PM	**MAS Business Meeting**	
5:30 PM – 6:30 PM	**Diversity and Inclusion Mixer**	
5:45 PM – 6:45 PM	**Vendor Tutorials** *(Sign up at exhibitors' booths)*	
	MAS Members' Social *(See MAS Booth for Details—Offsite)*	

Thursday, July 27

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

8:30 AM – 9:30 AM	**M&M Sustaining Members Meeting**
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**
	A04.7 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials
	A05.3 Advanced Measurement Techniques in (S)TEM-EELS
	A09.1 Analytical Scanning Probe Microscopy
	A10.1 The Road to Atomic Scale Tomography
	A12.1 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-liquid Interfaces
	A13.4 Computational Advances in Electron Microscopy
	B05.2 Technical Advances in cryoEM
	B07.2 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants
	B10.1 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter
	C01.1 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems
	C03.6 Correlative and Multimodal Microscopy and Analysis
	P01.4 Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P02.1 Electron Beam Manipulation of Covalently Bound Materials
	P05.4 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.3 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P09.2 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials
10:00 AM – 12:00 PM	**Coffee Break and Poster Session in the Exhibit Hall**
10:00 AM – 2:00 PM	**Exhibit Hall Open**
10:00 AM – 12:00 PM	**Thursday Poster Presentations**
	A09.P1 Analytical Scanning Probe Microscopy
	A10.P1 The Road to Atomic Scale Tomography
	A12.P1 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-liquid Interfaces
	A13.P1 Computational Advances in Electron Microscopy
	B05.P2 Technical Advances in cryoEM
	B07.P1 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants
	B10.P1 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter
	C01.P1 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems
	C03.P2 Correlative and Multimodal Microscopy and Analysis
	P01.P2 Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P02.P1 Electron Beam Manipulation of Covalently Bound Materials
	P05.P2 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.P1 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P09.P1 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials
12:00 PM	**Student Poster Awards**
12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**

Thursday, July 27 (Cont'd.)

For an up-to-date schedule and meeting room location, please check the meeting website or mobile app.

1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**
	A05.4 Advanced Measurement Techniques in (S)TEM-EELS
	A09.2 Analytical Scanning Probe Microscopy
	A10.2 The Road to Atomic Scale Tomography
	A12.2 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-liquid Interfaces
	A13.5 Computational Advances in Electron Microscopy
	B05.3 Technical Advances in cryoEM
	B07.3 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants
	B10.2 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter
	C01.2 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems
	C03.7 Correlative and Multimodal Microscopy and Analysis
	P01.5 Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P02.2 Electron Beam Manipulation of Covalently Bound Materials
	P05.5 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.4 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P09.3 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials
3:00 PM – 3:30 PM	**Coffee Break**
3:30 PM – 5:30 PM	**Late P.M. Symposia & Sessions**
	A05.5 Advanced Measurement Techniques in (S)TEM-EELS
	A09.3 Analytical Scanning Probe Microscopy
	A10.3 The Road to Atomic Scale Tomography
	A12.3 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-liquid Interfaces
	B05.4 Technical Advances in cryoEM
	B07.4 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants
	B10.3 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter
	C01.3 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems
	P01.6 Revealing the Working Morphology of Energy Materials and Its Impact on Performance
	P02.3 Electron Beam Manipulation of Covalently Bound Materials
	P05.6 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes
	P08.5 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena
	P09.4 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials
4:30 PM – 5:30 PM	**M&M 2023 Wrap-Up & Debrief** *(Invitation only)*

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Monday, July 24

Scientific Program

SESSION CHAIRS:

Andrew Minor, President, Microscopy Society of America

Pat Caymus, President, Microanalysis Society

Ru-Ching Hsia, M&M 2023 Program Chair

MONDAY 8:30 AM – 12:05 PM

MINNEAPOLIS CONVENTION CENTER - MAIN AUDITORIUM

OPENING WELCOME:

Andrew Minor, President, Microscopy Society of America

Pat Caymus, President, Microanalysis Society

Program Chair Welcome Remarks

8:45 AM **1** *Biofilms – Life Upon First Contact and Beyond;* (Invited) **Karin Sauer**

9:50 AM MAS Awards Presentation

10:00 AM Coffee Break

10:45 AM MSA Awards Presentation

11:05 AM M&M Meeting Awards Presentation

11:15 AM **2** *Revealing the Big and the Small with the James Webb Space Telescope: A Macroscopic Approach to Studying the Solar System;* (Invited) **Stefanie Milam**

12:05 PM **Program Chair Closing Remarks**

A Analytical/Instrumentation Sciences Symposia – Monday Afternoon

A01.1 Microscopic Approach of Materials for Agri-Food Process

PLATFORM SESSION

Monday 1:30 PM **Room M-100-J**

1:30 PM **3** *Carbon Dots as a Novel Detection Material for Food Additives and Pesticides: A Mini Review;* (Invited) **Vivechana Agrawal**

2:15 PM **35** *Qualitative assessment of contaminants of emerging concern in the environmental media across Delhi;* **Dhananjay Tripathi**

2:30 PM **46** *Bioeconomy and New Materials: Challenges and Opportunities for Sustainable Agriculture*; (Invited) **Lexlie Rangel**

A02.1 Microscopy and Microanalysis for Real World Problem Solving

PLATFORM SESSION

Monday 1:30 PM **Room 200-A**

1:30 PM **4** *Building a Toolbox for Direct and Indirect Electron Microscopy Imaging of Liquid Crystals and Other Complex Molecular Fluids;* (Invited) **Min Gao**

2:00 PM **21** *A Correlative Approach combining non-destructive High Resolution X-Ray Microscopy with Femtosecond Laser Preparation and FIB/SEM to access deeply buried Features in Parts and Components of New Energy Vehicles;* **Tim Schubert**, Benjamin Tordoff, Timo Bernthaler, Gerhard Schneider

2:15 PM **36** *Use of Spectrum Simulation to Acquire Reliable Scans With a Wavelength Dispersive Spectrometer;* **Philippe Pinard**, Rosie Jones, Lucia Spasevski, Simon Burgess, Peter Statham

2:30 PM **47** *A Comprehensive Examination of Aluminum Oxide (Al2O3) Using Extreme and Near Ultraviolet Laser-Assisted Atom Probe Tomography;* **Jacob Garcia**, Benjamin Caplins, Ann Chiaramonti, Luis Miaja-Avila, Norman Sanford

2:45 PM **62** *Towards On-the-Fly Feedback Loops for Direct Energy Deposition Systems;* **Matthew Olszta**, Lance Hubbard, Nicole Overman, Floyd Hilty, Ankit Roy, Shawn Riechers

A04.1 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials

Monday 1:30 PM **Room 200-B**

1:30 PM **5** *Extending 4D-STEM to Defect and Short-Range Ordering Analysis: Principles, Methodology and Applications;* (Invited) **Jian-Min Zuo**, Haw-Wen Hsiao, Kaijun Yin, Hsu-Chih Ni, Haoyang Ni, Renliang Yuan, Jiong Zhang, Robert Busch Busch

2:00 PM **22** *Deformation Defects Characterization in Short-Range Ordered CrCoNi using Fast Electron Detectors and 4D-STEM;* **Kaijun Yin**, Haw-Wen Hsiao, Rui Feng, Peter K. Liaw, Jian-Min Zuo

2:15 PM **37** *In-situ and Multi-modal 4D-STEM of Core@Shell Nanoparticles Interdiffusion;* **Chuqiao Shi**, Zhihua Cheng, Matthew Jones, Yimo Han

2:30 PM **48** *Disentangling Tilt and Polarization Measurements in 4D-STEM Measurements of a Multilayer By Inversion of a Stacked Bloch Wave Model;* **Steven Zeltmann**, Shang-Lin Hsu, Hamish Brown, Sandhya Susarla, Andrew M Minor, Colin Ophus

2:45 PM **358** *Imaging crystal domains and orientation in block copolymer electrolytes with 4D-STEM;* **Min Chen**, Karen Bustillo, Vivaan Patel, Benjamin Savitzky, Jacqueline Maslyn, Colin Ophus, Xi Jiang, Nitash Balsara, Andrew Balsara

A06.1 Learning from Failure: Negative and Null Results in Microscopy

Monday 1:30 PM **Room M-100-I**

1:30 PM **6** *Installation of New Systems for High-Energy Electron Energy-loss Spectrometry in an Aberration-Corrected Scanning Transmission Electron Microscope;* (Invited) **Masashi Watanabe**, Giulio Guzzinati, Volker Gerheim, Martin Linck, Heiko Müller, Max Haider, Thomas Hoffman, Thomas Isabell, Naoki Isabell, Hidetaka Sawada

2:00 PM **23** *Can We Analyze the Solution Behavior of My Particles with Your cryo-FIB?: Adventures and Lessons Learned;* **Jamie Ford**

2:15 PM **38** *Failure to Fail: Recreating Real-life Nanoparticle Degradation in Model Environments;* **Haoran Yu**, Michael Zachman, David Cullen

2:30 PM **49** *Mistakes and Pitfalls in In Situ TEM Studies;* **Myung-Geun Han**, Yimei Zhu

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Monday Afternoon cont.

A07.1 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

Monday 1:30 PM **Room 200-D**

2:00 PM **24** *Atomic-Scale Secondary-Electron Imaging in the STEM and SEM;* (Invited) **Ray Egerton**, Sooyeon Hwang, Yimei Zhu

2:30 PM **50** *Electron Probe Phase using Defocus in Scanning Electron Microscopy;* **Surya Kamal**, Richard Hailstone

A08.1 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences

Monday 1:30 PM **Room 200-F**

1:30 PM **8** *FIB Milling with Alternative Beams for Microscopy and Microanalysis;* (Invited) **Frances Allen**

2:00 PM **25** *Optimizing Protection for Specimen Preparation on Complex 3D Nanostructures;* **Aleksander Mosberg**, Abinaya Sankaran, Kevin Ryan, Antonius T. J. van Helvoort, Quentin Ramasse

2:15 PM **39** *Large Scale Xe PFIB/SEM Analysis of Shale: Nanometer Resolution Across Millimeters of Rock... What is Still Possible?;* **Annalena Wolff**, Christoph Schrank, Michael Jones

2:30 PM **51** *A Protocol for FIB-Based TEM Specimen Preparation for Nanoscale Microstructural Characterization of Ceramics;* **Sarshad Rommel**, Jessica Maita, Jacob Davis, James Wollmershauser, Boris Feygelson, Seok-Woo Lee, Mark Aindow

2:45 PM **63** *TEM Sample Preparation and Microstructural Characterization of Air Sensitive, µm-scale, Infiltrated MOF-Based Particles;* **Joshua Sugar**, Suzy Vitale, Mohana Shivanna, Vitalie Stavila

A11.1 Nanoscale Infrared Spectroscopy with Electrons and Photons

Monday 1:30 PM **Room M-100-H**

1:30 PM **9** *Single-Atom Vibrational Spectroscopy with Chemical Bonding Sensitivity;* (Invited) **Wu Zhou**, Mingquan Xu, De-Liang Bao, Aowen Li, Shixuan Du, Gang Su, Stephen J. Pennycook, Sokrates Pantelides Pantelides

2:00 PM **26** *Atomic Resolution Mapping of Localized Phonon Modes in Silicon Grain Boundaries;* **Benedikt Haas**, Tara Boland, Christian Elsässer, Arunima Singh, Katia March, Juri Barthel, Christoph Koch, Peter Rez Rez

2:15 PM **40** *The Influence of Local Stoichiometry, Bonding, and Structure on Interface Vibrations;* **Eric Hoglund**, De-Liang Bao, Andrew O'Hara, Md Shafkat Bin Hoque, James Howe, Sokrates Pantelides, Patrick Hopkins, Jordan Hachtel Hachtel

2:30 PM **52** *The Nexus of Electron and Photon Microscopy: TERS in the Atomistic Near-Field;* (Invited) **Vartkess Apkarian**, Joonhee Lee

A14.1 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Monday 1:30 PM **Room 200-C**

1:30 PM **10** *Multidimensional Chemical Imaging of Polyolefin Dispersion Can Coatings Using Time-of-Flight Secondary Ion Mass Spectrometry with Gas Cluster Ion Beam Sputtering;* (Invited) **Paul Vlasak**, Ray Drumright, Joseph Harris, Pacholski Michaeleen, Hanze Ying

2:00 PM **27** *Fundamentals and Applications of Secondary Ion Mass Spectrometry;* (Invited) **Jerry Hunter**

2:30 PM **53** *Hybrid SIMS: Secondary Ion Mass Spectrometry Imaging with High Mass Resolving Power;* (Invited) **Felix Kollmer**, Alexander Pirkl, Julia Zakel, Henrik Arlinghaus, Ewald Niehuis

A15.1 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials

Monday 1:30 PM **Room 200-E**

1:30 PM **11** *Klaus Keil: Meteorites, Microprobes, and Memories;* (Invited) **Timothy McCoy**

2:00 PM **28** *60Fe-60Ni Systematics of Chondrules from Primitive Chondritic Meteorites;* (Invited) **Myriam Telus**, Jasmeet Dhaliwal, Tyler Wickland

2:30 PM **54** *Phosphates – The Role of Aqueous Fluids in the Evolution of Ordinary Chondrite Parent Asteroids;* (Invited) **Elena Dobrica**, Alexander Krot, Adrian Brearley

B Biological Sciences Symposia – Monday Afternoon

B01.1 Imaging Approaches for Plant Cell Biology, Agriculture, Ecology and Environment-Related Research

Monday 1:30 PM **Room M-100-D**

1:30 PM **12** *Dissecting Cell Plate Development During Plant Cytokinesis;* (Invited) **Georgia Drakakaki**, Rosalie Sinclair, Jesse Aaron, Eric Wait, Daniel Cox, John Heddleston, Thomas Wilkop

2:00 PM **29** *Utilization of Imaging Approaches to Understand Chenopodium Quinoa, A Model Plant To Study Salt Stress;* (Invited) **Lucia Acosta-Gamboa**, Kirk Czymmek, Anastasiya Klebanovych, Samuel Kenney, Jared Gordon, Malia Gehan

2:30 PM **55** *The Use of Correlative Micro-CT and XRM to Locate and Identify Dense Structures in Plant Material;* (Invited) **Richard Wuhrer**, Laurel George, Karen Catunda, Daniel Fanna, Ken Moran, Ben Moore

2:45 PM **64** *Lab-based X-ray Microscopy for in situ 3D Visualization of Mycorrhizal Fungal Structures Associated with Roots;* (Invited) **Keith Duncan**, Clara Lebow, Melette DeVore, Dierdra Daniels, Daniela Floss, Armando Bravo, Christopher Topp

B04.1 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging

Monday 1:30 PM **Room M-100-F**

1:30 PM **13** *A Structurally Homogeneous Polymer for High-Isotropy Expansion and Nanoscale Imaging of Biological Ultrastructure;* (Invited) **Ruixuan Gao**

2:00 PM **30** *Scalable Analysis Pipeline for Mapping Brain Cells in Big Microscopy Data;* (Invited) **Iaroslavna Vasylieva**, Megan Smith, Melaina Jacoby, Jessie Scarlet, Eshan Aravind, Alexander Ropelewski, William Klimstra, Ryan Logan, Zachary Logan, Alan Watson

2:30 PM **56** *A New Expansion Microscopy Method Optimized for Microbiology;* (Invited) **Zhangyu Cheng**, Yongxin Zhao

B09.1 Volume Electron Microscopy in Biological Research—Instrumentation, Sample Preparation and Data Handling

Monday 1:30 PM **Room M-100-E**

1:30 PM **14** *Enabling volumeEM: Building a Global Community and Resources;* (Invited) **Kirk Czymmek**, Michele Darrow, Paul Verkade

2:00 PM **31** *Comparison of Heavy Metal Distribution in Mouse Soft Tissue Samples Prepared for Serial Block Face SEM Using Different Protocols;* **Jana Nebesářová**, Eva Ďurinová, František Kitzberger, Radim Skoupy, Jiří Týč

2:15 PM **41** *Elemental Maps to Dye for: Energy Dispersive X-ray Spectrometry Facilitates a Better Understanding of the Contrast Mechanisms in Common Electron Microscopy Stains;* **Louise Hughes**, Errin Johnson, Pedro Machado

2:30 PM **57** *Enhanced FIB-SEM Sample Preparation Methods and Pipeline for Comparative Biology;* (Invited) **Song Pang**

Scientific Program

P Physical Sciences Symposia – Monday Afternoon

P03.1 Theory and Applications of Advanced Electron Tomography

Monday 1:30 PM **Room 200-I**

1:30 PM **15** *Single-Atom Level Determination of 3-Dimensional Surface/Interface Atomic Structures via Deep Learning-Assisted Atomic Electron Tomography;* (Invited) **Yongsoo Yang**, Juhyeok Lee, Chaehwa Jeong, Taegu Lee, Seunghwa Ryu

2:00 PM **32** *Reducing Artifacts in BF and HAADF-STEM Images of Pt/C Fuel Cells using MBIR-ARAR;* **Amir Ziabari**, Obaidullah Rahman, Haoran Yu, Jose D Arregui-Mena, Singanallur Venkatakrishnan, David Cullen

2:15 PM **42** *High-Fidelity 3D Imaging Achieved Through Multislice Electron Tomography Using 4D-STEM;* **Juhyeok Lee**, Moosung Lee, YongKeun Park, Colin Ophus, Yongsoo Yang

2:30 PM **58** *Atomic Resolution Tomography on Simulated Amorphous Silicon Nanoparticles;* **Robert Busch**, Peter Rez, Michael Treacy, Jian-Min Zuo

P06.1 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications

Monday 1:30 PM **Room 200-H**

1:30 PM **16** *Multimodal Characterization of Porosity in Advanced Manufactured and Welded Nuclear Structural Alloys;* (Invited) **Janelle Wharry**, Grayson Nemets, Elliot Marrero Jackson, Jasmyne Emerson, Nate Gehmlich, Maria Okuniewski, Caleb Clement, Keyou Mao Mao

2:00 PM **33** *Multimodal Characterization of Stored Energy and Gas-Filled Cavities in FCC Alloys Irradiated with Spallation Neutrons and High-Energy Protons;* **Timothy Lach**, Maxim N. Gussev, Kinga Unocic, David McClintock

2:15 PM **43** *In-situ Evaluation of Helium Bubble Migration and Coalescence in Tungsten Heavy Alloys;* **Eric Lang**, Schuyler Tyler, William Streit Cunningham, David Sprouster, Jason Trelewicz, Ian McCue, Khalid Hattar

2:30 PM **59** *STEM Analysis of High Burnup Structure in LWR Fuels;* **Chad Parish**, Jesse Werden, Tyler Gerczak, Jason Harp, Casey McKinney, Nathan Capps

2:45 PM *How Can Data Science Enhance Multiscale Analysis of Materials under Radiation Damage?*; **Mitra Taheri**

P07.1 Prof. Wilbur C. Bigelow Centenary Symposium In Situ Heating and Gas-Reaction Studies in Materials Sciences

Monday 1:30 PM **Room 200-G**

1:30 PM **17** *Professor Wilbur C. Bigelow: A Centenary Celebration;* **Lawrence Allard**, Kinga Unocic, Abhaya Datye, John Mansfield

1:45 PM **19** *Fundamental Atomic-scale Dynamics of the Initial Stages of Cu Oxidation: Correlating in situ Environmental Transmission Electron Microscopy with Multi-scale Simulations;* (Invited) **Judith Yang**, Meng Li, Matthew Curnan, Stephen House, Wissam Saidi

2:15 PM **44** *In-Depth Investigations of Graphene Oxide Reduction via in situ TEM Measurements;* **Raul Arenal**, Mario Pelaez-Fernandez, Simon Hettler, Ana Benito, Wolfgang Maser

2:30 PM **60** *Atomistic Understanding of CO and H2 Influence on Pt Sintering in Pt/CeO2;* **Peter Tieu**, Wenjie Zang, Jaeha Lee, Xingxu Yan, Phillip Christopher, Xiaoqing Pan

2:45 PM **66** *Quantification of Gas-Based Charge Compensation by Off-axis Electron Holography in Open-cell Environmental TEM;* **Makoto Schreiber**, Cathal Cassidy

P10.1 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Monday 1:30 PM **Room 200-J**

1:30 PM **18** *Cryo STEM EDS Tomography Probing of Solid Electrolyte Interphase in Rechargeable Batteries;* (Invited) **Chongmin Wang**, Yang He, Lin Jiang, Yaobin Xu

2:00 PM **34** *Low Voltage (10 to 30 keV) CRYO-STEM-EELS: Another Step Toward a Damage-Free Mapping of Li in Beam Sensitive Materials;* **Nicolas Dumaresq**, Nicolas Brodusch, Michel Trudeau, Raynald Gauvin

2:15 PM **45** *The Structural Evolution of Polypeptoid Nanofibers Revealed by 3-D Cryo-TEM;* **Xi Jiang**, Tianyi Yu, Xubo Luo, David Prendergast, Glenn Butterfoss, Behzad Rad, Nitash Balsara, Ronald Zuckermann Zuckermann

2:30 PM **61** *Imagining Nitrogen Fixation at Lithium Interphases Via Cryo-EM;* (Invited) **Yuzhang Li**

A Analytical Sciences Poster Sessions – Monday Afternoon

3:00 PM – 5:00 PM **EXHIBIT HALL**

A02.P1 Microscopy and Microanalysis for Real World Problem Solving

POSTER # 1

67 *Analysis of Smart Card Driving License of the State of Chihuahua, Mexico, through Scanning Electron Microscopy for Recycling/Reuse Purposes;* **A.E. Lui-Chavira**, I. Estrada-Guel, A. Villalobos-Aragón, D. Espejel-García, A. Salas-Moreno, Y.P. Muñiz-Martínez6, C.D. Gómez-Esparza, H. Martínez-Lara, G. Loya-Chavez

POSTER # 2

68 *Characterization of Reverse Osmosis Membranes Under Compaction Utilizing 3D X-ray and 3D FIB Correlative Microscopy;* **Yara Suleiman**, Jishan Wu, Eric Hoek, Sina Shahbazmohamadi

POSTER # 3

69 *Controlled Formation of Honey Carbon Nanotube Thin Films by Tailoring the Ratio of Admixture Concentration and Annealing Time;* **Kaleb Hood**, Md Mehedi Tanim, Zoe Templin, Annie Dao, Feng Zhao, Jun Jiao

POSTER # 4

70 *Detecting and Correcting Piezoelectric-tube Actuator Drift Induced Distortion in Atomic-Resolution Scanning Tunneling Microscope Images from Crystal Surfaces;* **Peter Moeck**, Tyler Bortel, Arthur Baddorf, Rama Vasudevan

POSTER # 5

71 *Evaluation by SEM-EDS of the presence of manufacturing residual materials on Non-Invasive Ventilation (NIV) Masks;* **Guillermina González-Mancera**, Nicolas Mervich-Sigal, Brenda A. Paz-MIchel, Joaquin Morales-García

POSTER # 6

72 *Examination of Dealloying in a Domestic Water Fitting using Light Optical/Scanning Electron Microscopy and Raman Spectroscopy;* **Stephen French**, Gary Johnson, Heather May

POSTER # 7

73 *How to improve soil anti-adhesion by studying the micro relief of the cuticle surface of digging beetles: exploring the Sulcophanaeus batesi pronotum using translucent replicas;* **Lorena Setten**, Victoria Sanchez, Noelia Guillen

POSTER # 8

74 *Influence and Comparison of the Properties of Three Cobalt-Chromium Dental Alloys;* **Cristina Jimenez-Marcos**, Julia Mirza-Rosca, Anca Fratila, Adriana Saceleanu

POSTER # 10

76 *Introduction of Hyperspectral mapping function with a WDS on an EPMA;* **Koki Kato**, Masaru Takakura, Takanori Murano, Shigeru Honda, Vern Robertson, Peter McSwiggen

POSTER # 11

77 *Long-term In-situ X-ray Diffraction Studies on Ordinary Portland Cement Hydration with Correlative X-Ray Mapping;* **Richard Wuhrer**, Daniel Fanna, Qingtao Huang, Laurel George, Zhong Co-Author, Moran

POSTER # 12

78 *Microscopy Methods for Analysis of Silicones;* **Jeremy Beebe**

POSTER # 13

79 *Nanograined zinc alloys with improved mechanical properties prepared by powder metallurgy;* **David Nečas**, Ilona Voňavková, Jan Pinc, Drahomír Dvorský, Jiří Kubásek

POSTER # 14

80 *Nanoindentation tests for characterization of hydroxyapatite thin films;* **Tomas De la Mora Ramírez**, Christopher René Torres San Miguel, Dulce Viridiana Melo Maximo, Noé López Perrusquia, Marco Antonio Doñu Ruiz, Ernesto D. García Bustos, Elvis Coutiño Moreno

POSTER # 15

81 *Particle Orientation Adjustment inside Scanning Electron Microscope: Side View Approach;* **Chunfei Li,** Joshua Craig

POSTER # 16

82 *Preparation and Study of an Expanded Graphite Obtained Through Torch and Microwave-Assisted Heating;* **I. Estrada-Guel**, J.M. Mendoza-Duarte, P. Pizá-Ruíz, A. Santos-Beltrán, C. Carreño-Gallardo, D. Lardizabal-Gutiérrez, C.G. Garay-Reyes, R. Martínez-Sánchez

POSTER # 17

83 *Quantitative analysis of transition metal oxides at low accelerating voltage with the Soft X-ray Emission Spectrometer;* **Masaru Takakura**, Takanori Murano, Shogo Koshiya, Peter McSwiggen, Vern Robertson

POSTER # 18

84 *Responsivity improvement of IR photodetector by using P3HT:PbS-QDs nanocomposite;* **Atef Zekri**, Brahim Aïssa, Said Mansour

POSTER # 19

85 *Structural and Optical Characterization of Green Synthesized β-Bi2O3/SiO2-Ag Nanostructures for Photocatalytic Application;* **Roel González-Montes De Oca**, Maria Guadalupe Yañez-Cruz, Maricela Villanueva-Ibáñez, Rocío Álvarez- García, María de los Ángeles Hernández-Pérez, Marco Antonio Flores- González

POSTER # 20

86 *X-ray maps in WDS and EDS: comparing low voltage and low overvoltage techniques on intermetallic phases;* **John Williard**, Joe Boro

Scientific Program

A Analytical Sciences Poster Sessions – Monday Afternoon cont.

3:00 PM – 5:00 PM **EXHIBIT HALL**

A04.P1 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials

POSTER # 21

87 *4D-STEM Characterization of Microstructural Transformations in Conductive Polymers Used for Li-ion Battery Anodes;* **Hadas Sternlicht**, Tianyu Zhu, Benjamin Savitzky, Colin Ophus, Gao Liu, Andrew Minor

POSTER # 22

88 *4D-STEM on Epitaxial Grown 2D Vertical Heterostructures of twisted WS2;* **Oliver Massmeyer**, Jürgen Belz, Samane Ojaghi, Robin Günkel, Johannes Glowatzki, Max Bergmann, Simonas Krotkus, Michael Heuken, Andreas Beyer, Kerstin Volz

POSTER # 23

89 *Acquisition and Processing of Magnetic Data from LN2 Cooled Perovskite Thin Films Using STEM-DPC;* **Sivert Dagenborg**, Yu Liu, Ingrid Hallsteinsen, Gregory Nordahl, Magnus Nord

POSTER # 24

90 *Adding another Dimension to 4D-STEM with EDX-assisted Crystal Orientation and Phase Mapping;* **Tomáš Morávek**, Robert Hooley, Eduardo Serralta, Narendraraj Chandran, Jing Lu, Raman Narayan

POSTER # 25

91 *Atomic Insights of Interface Polarity in NdNiO2/SrTiO3 Superlattices;* **Chao Yang**, Roberto Ortiz, Yi Wang, Wilfried Sigle, Hongguang Wang, Eva Benckiser, Bernhard Keimer, Peter A. van Aken

POSTER # 26

92 *Effect of Multiple Scattering on Intensity of Central Diffraction Disk in Lorentz 4D-STEM;* **Lijun Wu**, Myung-Geun Han, Yimei Zhu

POSTER # 27

93 *Evaluation of Lattice-Spacing of SiGe/Si by NBD using Two Condenser-lens TEM, Experimental Study about the Effect of Convergence Angle;* **Junji Yamanaka**, Joji Furuya, Kosuke Hara, Keisuke Arimoto

POSTER # 28

94 *Powder Nano-Beam Diffraction in Scanning Electron Microscopy: Possibilities and Limitations for Applications;* **Vladislav Krzyzanek**, Miroslav Slouf, Radim Skoupy, Ewa Pavlova, Kamila Hrubanova

POSTER # 29

95 *Quantification of Potential Drops Across Semiconductor Heterointerfaces Using 4D-STEM;* **Kerstin Volz**, Varun Chejarla, Shamail Ahmed, Andreas Beyer

POSTER # 30

96 *Unveiling Nanoscale Coherent Precipitates and their Strain Fields in NiTiHf-based Shape Memory Alloys Using 4D-STEM;* Eitan Hershkovitz, Yang Yang, Timothy Yoo, Flávia Da Cruz Gallo, Michele Manuel, Honggyu Kim

A06.P1 Learning from Failure: Negative and Null Results in Microscopy

POSTER # 31

97 *Behavior of Ti-doped CoCrFeMoNi High Entropy Alloy;* **Santiago Brito-Garcia**, Cristina Jimenez-Marcos, Julia Mirza-Rosca, Ionelia Voiculescu

POSTER # 32

98 *High Yield Stress Obtained from the Fabrication of a Composite Material, Ti-MWCNTs/Al;* **C. Carreño-Gallardo**, Claudia López, José Ernesto Ledezma, D. Lardizabal-Gutiérrez, José Herrera-Ramirez

POSTER # 33

99 *Influence of Ti Additions on Ni-based Laser Cladded Coatings for Fuel Cells;* **Julia Mirza-Rosca**, Diana Nicoleta Avram, Corneliu Mircea Davidescu, Iosif Hulka, Elena Manuela Stanciu

A07.P1 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

POSTER # 34

100 *Characterization of the Performance of a Thin Si-based Timepix3 Detector at 10-30 keV Electron Energies;* **Tianbi Zhang**, Ben Britton, Kirsty Paton

POSTER # 35

101 *Comparison of Electrochemical Reduction of GO with LiCl and KOH by Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray Spectroscopy (EDS);* **Luis David Arellano Gutierrez**, E.Armando Zaragoza Contreras, Ivan Alziri Estrada Moreno

POSTER # 36

102 *Electron Vortex Beam and Probe Phase in Scanning Electron Microscopy;* **Surya Kamal**, Richard Hailstone

POSTER # 37

103 *NanoMi: Progress on an Open-Source Electron Microscope;* **Makoto Schreiber**, Marek Malac, Mark Salomons, Darren Homeniuk, Sam Ruttiman, Xuanhao Wang, Olivier Adkin-Kaya, Mohammad Kamal, Jesus Alejandro Marin-Calzada, Patrick Price

POSTER # 38

104 *Need for Wavefront Sensing in Scanning Electron Microscopy;* **Surya Kamal**, Richard Hailstone

POSTER # 39

105 *Stability Evaluation of Superconducting X-ray Detectors for SEM-EDS Analyzer;* **Go Fujii**

POSTER # 40

106 *Synthesis by AACVD and Characterization of YSZ-Cr2O3 Nanocomposite Particles for Their Potential Application in Reinforcing Structures;* **Maximiliano Ruelas-Montoya**, Patricia Amézaga-Madrid, C. Carreño-Gallardo

POSTER # 41

107 *Synthesis of Mesoporous Zirconia and Mesoporous Zirconia doped with Yttria by Using Pluronic F-127;* **Salomón Borjas**, Pablo Martínez Torres, Ariosto Medina Flores, Gerardo Rosas Trejo, Sheila Vélez Navarrete, Gonzalo Viramontes Gamboa

POSTER # 42

108 *Ultra-Low Voltage SEM Imaging for Battery Materials;* **Yoichiro Hashimoto**, Yutaka Nagaoka, Shuichi Takeuchi, Shuhei Yabu, Masahiro Sasajima

A11.P1 Nanoscale Infrared Spectroscopy with Electrons and Photons

POSTER # 43

109 *Defect and Disorder Induced Phonon Softening in Boron Arsenide Using STEM-EELS;* **Han-Hsuan Wu**, Hongbin Yang, Chaitanya Gadre, Xingxu Yan, Toshihiro Aoki, Bolin Liao, Zhifeng Ren, Xiaoqing Pan

POSTER # 44

110 *Exploring the Effect of Diffraction Conditions on Off-Axis Phonon EELS;* **Yifan Wang**, Shize Yang, Alec Fischer, Timothy Grotjohn, Fernando Ponce, Peter Crozier

POSTER # 45

111 *Recent Advances in Multimodal Optical-Photothermal Infrared Imaging and Spectroscopy;* **Samuel Tenney**, Sabine Neal

A15.P1 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials

POSTER # 46

112 *A Heideite Clast in the CH3 Chondrite Acfer 182;* **Ryan Ogliore**, Kainen Utt, Paul Carpenter, Alian Wang, Mike Krawczynski

POSTER # 47

113 *Microanalysis of Iron Disproportionation Reaction Products in the Environment of Earth's Lower Mantle;* **Dongyuan Zhou**, Lingfeng Zhou, Bin Chen, Lumin Wang

POSTER # 48

114 *On the Importance of Including all Elements in the EPMA Matrix Correction;* **Aurélien Moy**, John Fournelle, William Nachlas, Michael Dungan, Andrew Locock, Emma Bullock, John Donovan, Henrietta Cathey, Julien Allaz, Anette von der Handt

POSTER # 49

115 *The Presence and Composition of Mn-Rich Chondrule Rims in CO3 Chondrites;* **Jillian Kirk**, Pranvera Hyseni, Fatima Jorge-Chavez, Vanessa Mendoza, Dale Burns, Steven Simon, Myriam Telus

POSTER # 50

116 *Toward the Quantification of Calcium in Mineral Samples by EDS X-ray Microanalysis using the Ca L-Lines;* **Stephen Seddio**

POSTER # 51

117 *X-ray Spectroscopy of Nitrogen in Jarosite, Ammoniojarosite, and other NH4-Bearing Sulfate Minerals;* **William Nachlas**, Simon Bushmaker, Eatai Sasson

Scientific Program

B Biological Sciences Poster Sessions – Monday Afternoon

3:00 PM – 5:00 PM **EXHIBIT HALL**

B01.P1 Imaging Approaches for Plant Cell Biology, Agriculture, Ecology and Environment-Related Research

POSTER # 52

118 *Different Imaging Techniques for the 2 and 3D Characterization of Plant Cell Ultrastructure in the SEM and TEM;* **Bernd Zechmann**

POSTER # 53

119 *Elemental Physical and Chemical Analysis of PM10 by TEM-EDS;* **Roberto Ramirez-Leal**, Martin Cruz-Campas, Glendy Jezabel Leon-Garcia

POSTER # 54

120 *Elimination of Human Error in Critical Point Drying Process in Plant Tissue Preparation for Electron Microscopy;* **Anna Walkiewicz**

POSTER # 55

121 *Low-voltage SEM Imaging of Lignocellulosic Biomass using a Low-cost Methanesulfonate Ionic Liquid;* **Dian Yu**, Patrick Woo, Keryn Lian, Jane Howe

POSTER # 56

122 *Morphological Study of PHA Producing Bacteria;* **Kamila Hrubanova**, Pavlina Sikorova, Kateřina Mrázová, Jana Nebesářová, Stanislav Obruča, Vladislav Krzyzanek

POSTER # 57

123 *Obtention of Phycobiliprotein Nanoparticles from Spirulina (Arthrospira maxima) and its Characterization by FTIR and Microscopic Techniques;* **José Jorge Chanona-Pérez**, Candelaria Galvan Colorado, Benjamín Arredondo-Tamayo, Susana Dianey Gallegos-Cerda, Lizbeth Gonzalez Victoriano, Juan Vicente Méndez Méndez, German Chamorro Cevallos, Jose M Cristobal Luna, Rosa V Garcia Rodriguez,

B02.P1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

POSTER # 59

125 *Exploring the Limits of 2D Template Matching for Detecting Targets in Cellular Cryo-EM Images;* **Kexin Zhang**, Bronwyn Lucas, Nikolaus Grigorieff

POSTER # 60

126 *HDPE/Cherry Tree Fiber Composites: Size Particle Effect in the Flexural Mechanical Properties;* **M.E. Mendoza-Duarte**, A. Vega Rios, E.Armando Zaragoza Contreras, Ivan Alziri Estrada Moreno

POSTER # 61

127 *Helical Reconstruction of the Giant Bacteriophage AR9 Tail at Subnanometer Resolution;* **Olga Sokolova**, Ilia Sirotkin, Andrey Moiseenko, Daria Antonova, Fuxing Wang, Maria Yakunina, Zheng Liu

POSTER # 62

128 *Molecular Structure of a Nodaviral Crown Complex;* **Roma Broadberry**, Hong Zhan, Timothy Grant, Andrea Rebolledo-Viveros, Johan den Boon, Paul Ahlquist

POSTER # 63

129 *New Morphologies of Hib Adhesion Pili;* **Esther Bullitt**, Siriratt Thairatana, Mathew Doran, Ravi Sonani, Edward Egelman

POSTER # 64

130 *Structure of the Streptococcus Pneumoniae 70S Ribosome at 2.9 Å Resolution using Cryo-EM;* **Mohamed Nasef**, Laura Parker, James Kizziah, Terje Dokland

POSTER # 65

131 *The Ebola NP0VP35 Complex Phase Separates into Inclusion Body-like Structures, the Disruption of Which Restricts Viral Infection;* **Chao Wu**

POSTER # 66

132 *Understanding the Roles of tcdE and tcdL during Toxin Secretion in Clostridioides difficile;* **Shannon Kordus**, Ruben Cano Rodriguez, Evan Krystofiak, Natalie Loveridge, Kevin Childress, D. Borden Lacy

POSTER # 67

133 *Workflow for High-resolution Sub-volume Averaging from Heterogenous Viral and Virus-like Assemblies;* **Bryan Sibert**, Joseph Kim, Jae Yang, Adam Hannon-Hatfield, Zunlong Ke, David Garfinkel, Elizabeth Wright

B Physical Sciences Poster Sessions – Monday Afternoon

3:00 PM – 5:00 PM **EXHIBIT HALL**

P03.P1 Theory and Applications of Advanced Electron Tomography

POSTER # 68

134 *An Atlas of Fourier Transforms;* **Miti Shah**, Suk Hyun Sung, Robert Hovden

POSTER # 69

135 *Composition and Oxidation State Changes of NCM Materials over Cycling via Simultaneous EDS-EELS 3D Tomography;* **Jaewhan Oh**, Sunggu Kim, Hye Ryung Byon, Yongsoo Yang

POSTER # 70

136 *Performance of Deep Learning-Based Image Denoising in Image Reconstruction for Various Acquisition Conditions: a Simulated Phantom Study;* **Parisa Asadi**, Andriy Andreyev, Matthew Andrew

P06.P1 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications

POSTER # 71

137 *Microstructural Characterization of Ion Irradiated ODS MA956 Alloy;* **Yu Lu**, Ramprashad Prabhakaran, Yaqiao Wu, Megha Dubey, Lin Shao

POSTER # 72

138 *Visualization of Three-Dimensional Helium Cavity Distribution in an Ion-Irradiated Tungsten Heavy Alloy for Nuclear Fusion Materials;* **James Haag**, Matthew Olszta, Danny Edwards, Weilin Jiang, Wahyu Setyawan

POSTER # 73

65 *Characterization of High-DPA Neutron Irradiated Stainless Steel using Microtensile Testing;* **Brandon Bohanon**, Assel Aitkaliyeva

P10.P1 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

POSTER # 74

140 *Characterization of High Entropy Oxide Thin Film by High-Resolution STEM-EELS;* **Sai Venkata Gayathri Ayyagari**, Leixin Miao, Matthew Webb, John Heron, Nasim Alem

POSTER # 75

141 *Direct Imaging of Co-CUK-1 Framework with H2O Guests;* **Dong-Hwan Yang**, Minjeong Kim, Jinyoung Ko, Hyung Gyu Park, Yousung Jung, Jonghwan Kim, Si-Young Choi

POSTER # 76

142 *Electron-beam Induced Effects on Supported Metal Atoms and Clusters;* **Jingyue Liu**, Timothy Delazzer, Yiwei Yu, Courtney Christensen

POSTER # 77

143 *Exploring Electron Energy-Loss Spectroscopy for the Characterization and Mapping of Structured Fluids;* **Brittany Ford**, David McComb

POSTER # 78

144 *Growth of Cubic Boron Nitride/Diamond Heterostructures: Surface Preparation and Film Nucleation;* **Saurabh Vishwakarma**, Avani Patel, Manuel Gutierrez, Robert Nemanich, David Smith

POSTER # 79

145 *High Resolution Scanning Transmission Electron Microscopy (S/TEM) Investigation of Common Defects in Scandium and Aluminum Alloyed β-Ga2O3;* **Andrew Balog**, Leixin Miao, Saiphaneendra Bachu, Jani Jesenovec, Benjamin Dutton, John McCloy, Nasim Alem

POSTER # 80

146 *High-Resolution Composition Wave Characterization in Cu-Ti Alloys using Aberration Corrected STEM;* **Ronit Sawant**, Shize Yang, Ray Carpenter

POSTER # 81

147 *Impact of Selenium Doping in CdSeTe-based Solar Cells at the Atomic-scale;* **Arashdeep Thind**, John Farrell, Robert Klie

POSTER # 82

148 *Mechanistic Determination of Metal–Organic Framework Degradation under Humid Conditions through ex-situ STEM-PDF;* **Michael Barsoum**, Roberto dos Reis, Omar Farha, Vinayak Dravid

POSTER # 83

149 *Optimal Sample Thickness for Dark-field Vibrational Electron Energy Loss Microscopy;* **Xiaowang Wang**, Chaitanya Gadre, Xingxu Yan, Xiaoqing Pan

POSTER # 84

150 *Self-healing Crystallization via Radiolysis-Driven Constructive Twist in Rutile-TiO2;* **Silu Guo**, Hwanhui Yun, Sreejith Nair, Bharat Jalan, K. Andre Mkhoyan

POSTER # 85

151 *Structural and Chemical Inhomogeneity of Interface Underlying Nonideal Electrical Behavior in Au/β-Ga2O3 Contacts;* **Stephen House**, Luke Lyle, Lisa Porter, Judith Yang

POSTER # 86

152 *Structural complexity and loss of long-range order in theta-Al2O3 as revealed by HAADF and Differential Phase Contrast Imaging;* **Libor Kovarik**, Konstantin Khivantsev, Mark Bowden, Janos Szanyi

POSTER # 87

153 *Structural modification in B-doped AlN ferroelectric films by STEM-DPC;* **Sebastian Calderon**, Elizabeth Dickey

POSTER # 88

154 *The Unique EELS Signature of Point Defects in Cubic Boron Nitride on Diamond;* **Andrew Lang**, David Storm, Sergey Maximenko, Neeraj Nepal, Virginia Wheeler, David Meyer

POSTER # 89

155 *Understanding the Distribution of Rhenium Dopants in Monolayer Molybdenum Disulfide;* **Patrick Hays**, Mohammed Sayyad, Cheng-Lun Wu, Sefaattin Tongay, Sandhya Susarla

POSTER # 90

156 *Unraveling the Covalency of the Ti Oxidation State in Ti3C2Tx via Electron Energy-loss Spectroscopy;* **Amanda Trout**, Asra Hassan, Hilmar Koerner, Jinwoo Hwang, Joshua Kennedy, David McComb

Tuesday, July 25

A Analytical/Instrumentation Sciences Symposia – Tuesday Morning

A01.2 Microscopic Approach of Materials for Agri-Food Process

Tuesday 8:30 AM **Room M-100-J**

8:30 AM **157** *Nanomaterials as a Replacement for Traditional Agrochemicals: Strategies Towards Sustainable Agriculture*; (Invited) **Dhirendra Kumar Tiwari**

9:00 AM **174** *Synthetic Multi-Walled Carbon Nanotubes affects Arabidopsis thaliana growth through Blocking the TOR Signaling Pathway;* **Gladys Juárez Cisneros**, Rogelio Ochoa-Barragán, Dhirendra Kumar Tiwari, Juan Manuel Sánchez-Yáñez, Javier Villegas-Moreno

9:15 AM **191** *Structural Characterization of Mexican Zeolite Doped with Silver Nanoparticles Obtained by Green Routes;* **Daniel Larrañaga Ordaz**, Álvaro de Jesús Ruíz-Baltazar, Simón Yobanny Reyes López, Harald Norbert Böhnel, José Antonio Cervantes Chávez, Marco Antonio Zamora Antuñano

9:30 AM **204** *Engineering Materials at the Atomic Scale for Energy, Environment, and Healthcare Applications*; (Invited) **Chandra Tiwary**

A02.2 Microscopy and Microanalysis for Real World Problem Solving

Tuesday 8:30 AM **Room 200-A**

8:30 AM **158** *From Archeology to the Malaria Parasite, the Exciting Quests of Microscopy;* (Invited) **David Bell**, Hao-Yu Greg Lin, Austin Akey, Stephan Kraemer, Jeffery Borenstein, Jeffery Dvorin, Angela Chang

9:00 AM **175** *Electron Microscopy Characterization of Bursera cuneata Schltdl Residues for its Application as Solid Biofuel;* **Octavio-Alejandro Castillo-Tera**, Mario Morales-Máximo, Luis Bernardo López-Sosa, José Herrera-Ramirez

9:15 AM **192** *Electron Microscopy Characterization of Stubble Residues (Zea Mays) as a Solid Biofuel;* **Cindy Morales**, Mario Morales-Máximo, Luis Bernardo López-Sosa, Armando López-Miranda

9:30 AM **205** *Optimal Diverse Biological Sample Preparation Methods for 2D and 3D Electron Microscopy Imaging;* (Invited) **Feng-Xia Liang**

A04.2 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials

Tuesday 8:30 AM **Room 200-B**

8:30 AM **222** *Interferometric 4D-STEM Imaging of Rotational and Dilational Reconstruction in Moiré Superlattices;* (Invited) **Madeline Van Winkle**, Isaac Craig, Nathanael Kazmierczak, Stephen Carr, Medha Dandu, Colin Ophus, Karen Bustillo, Jim Ciston, Archana Ciston, D. Kwabena Bediako

9:00 AM **176** *Moiré Magnification of Charge Density Wave Dislocations using 4D-STEM;* **Suk Hyun Sung**, Noah Schnitzer, Abha Dabak-Wakankar, Ismail El Baggari, Lena Kourkoutis, Robert Hovden

9:15 AM **193** *Using 4D-STEM to Map 3D Morphologies of 2D Materials;* **Adan Mireles**, Chuqiao Shi, Bongki Shin, Suk Hyun Sung, Colin Ophus, Yimo Han, Robert Hovden, Kibum Kang, Jeongwon Kang

9:30 AM **206** *Structural Study of Hydrated Organic Mixed Ionic Electronic Conductors Using Cryogenic 4D-STEM;* **Yael Tsarfati**, Karen Bustillo, Benjamin Savitzky, Colin Ophus, Iain McCulloch, Alberto Salleo, Andrew Minor

9:45 AM **221** *Combined 4D-STEM and EELS for Mapping Chemical-Structural Heterogeneity in Cathode Materials;* **Robert Busch**, Saran Pidaparthy, Daniel Abraham, Jian-Min Zuo

A06.2 Learning from Failure: Negative and Null Results in Microscopy

Tuesday 8:30 AM **Room M-100-I**

8:30 AM **159** *Bending Needles and Breaking Wires: Useful Failures in Nanowire Probing;* (Invited) **Aleksander Mosberg**, Antonius T. J. van Helvoort, Quentin Ramasse

9:00 AM **177** *Geometric Failures in the Preparation a STEM/TEM Sample with a FIB/SEM;* **Marc Castagna**, Samuel Klahn

9:15 AM **194** *Lessons Learned From Failed TEM Sample Preparation Attempts Using a Focused Ion Beam;* **Suzy Vitale**, Joshua Sugar

A07.2 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

Tuesday 8:30 AM **Room 200-D**

8:30 AM **160** *Contributions of David Joy to Electron Microscopy at the NIH (ca. 1980-2020);* (Invited) **Richard Leapman**

9:00 AM **178** *Automated SEM Acquisitions and Segmentation with AI;* (Invited) **Sabrina Clusiau**, Nicolas Piché, Benjamin Provencher, Mike Strauss, Raynald Gauvin

9:30 AM **208** *David Joy's Invaluable Contribution to Modern Scanning (Transmission) Electron Microscopy and Analysis;* **Nicolas Brodusch**, Raynald Gauvin

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Tuesday Morning cont.

A08.2 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences

Tuesday 8:30 AM **Room 200-F**

8:30 AM **161** *Developments in cryo-FIB Sample Preparation: Targeting in Cryo-Lift-Out Preparation of Tissues and Machine Learning Models for Fully Automated On-Grid Lamella Preparation;* (Invited) **Sven Klumpe**, Oda Schiøtz, Christoph Kaiser, Marina Luchner, Johann Brenner, Jürgen Plitzko

9:00 AM **179** *A Multi-Scale Understanding of the Three-Dimensional Microstructure of the Cornea Using Oxygen Plasma Focused Ion Beam, Scanning Transmission Electron Microscopy and Micro-CT Techniques;* **Valerie Brogden**, Mollie Scanagatta-Long, Hiro Uehara, Angela Lin

9:15 AM **195** *Keeping Cool During Lift-Out — An Elegant Solution for Preparing Samples in Cryo-FIB;* **Andrew Smith**, Lorenz Lechner, Stefan Strähle, Stephan Kleindiek

9:30 AM **209** *Cryo-FIB and Synchrotron SAXS/WAXS Studies of Confined Crystallization of PDMS in Tubular Network Block Copolymer Morphologies;* **Vivek Subramanian**, Ken Wu, Xueyan Feng, Esther H. R. Tsai, Ruipeng Li, Guillaume Freychet, Mikhail Zhernenkov, Anindito Sen, Avery Sen, Edwin Thomas

9:45 AM **223** *Compressive Cryo FIB-SEM Tomography;* **Daniel Nicholls**, Jack Wells, Alex Robinson, Amirafshar Moshtaghpour, Maryna Kobylynska, Roland Fleck, Professor Kirkland, B. Layla Mehdi, Nigel Mehdi

A11.2 Nanoscale Infrared Spectroscopy with Electrons and Photons

Tuesday 8:30 AM **Room M-100-H**

8:30 AM **162** *Recent Advances in Spatially-Resolved Spectroscopy Combining Photon and Monochromated Electron Beams in a STEM;* (Invited) **Odile Stéphan**, Yves Auad, Steffi Woo, Marcel Tencé, Jean-Denis Blazit, Xiaoyan Li, Alberto Zobelli, Michael Walls, Luiz Walls, Mathieu Kociak

9:00 AM **180** *Infrared Correlative Nanoscopy with Unprecedented Spectral Coverage;* **Artem Danilov**, Tobias Gokus, Paul Suman, Andreas Huber

9:15 AM **196** *Ultra-High Resolution EELS Analysis and STEM Imaging at 20 keV;* **Tracy Lovejoy**, Niklas Dellby, Steven Quillin, Ondrej Krivanek, Petr Hrncirik, Andreas Mittelberger, Benjamin Plotkin-Swing

9:30 AM **210** *Simulations of Phonon Spectroscopy in the Impact Scattering Regime – Advances and Applications;* (Invited) **Paul Zeiger**, Juri Barthel, Leslie Allen, Jan Rusz

A14.2 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Tuesday 8:30 AM **Room 200-C**

8:30 AM **163** *Solar Energy from a Big Picture Perspective to Nanoscale Insights via TOF-SIMS;* (Invited) **Steven Harvey**, Steve Johnston, john Mosely, Andrew Norman, Brian Gorman, Kai Zhu, Joe berry, Joey Luther, Mowafak Luther

9:00 AM **181** *O2 vs. Ar Gas Cluster Ion Beam Sources for ToF-SIMS Depth Profiling of Thick Polymer and Metal Film Samples;* (Invited) **Christine Mahoney**, Christine Mahoney, Kaveh Adib, Ruchi Yongsunthon

9:30 AM **211** *Influence of 0.5wt%Graphene Addition on Mechanical Performance of Alumina-Graphene Nanocomposite;* **Solomon Hanson Duntu**, Iftikhar Ahmad, Mohammad Islam, Solomon Boakye-Yiadom

224 *Imaging of Light Elements at the Nanometer Scale using fibTOF;* **Lex Pillatsch**, Valentine Riedo-Grimaudo, James Whitby, Menglong Liu, Peter Broekmann

A15.2 Iaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials

Tuesday 8:30 AM **Room 200-E**

8:30 AM **164** *Vapor Phase Metasomatism on the Aubrite Parent Body Evidenced by the Volatile-Bearing Sulfide Djerfisherite;* (Invited) **Zoë Wilbur**, Timothy McCoy, Corrigan Cari, Jessica Barnes

9:00 AM **182** *Results of the Preliminary Analyses of Asteroid Ryugu Regolith Samples Returned by the Hayabusa2 Mission;* (Invited) **Michael Zolensky**

9:30 AM **212** *Discovery of Keilite (Fe,Mg-sulfide) in Type 3 Enstatite Chondrites – Influence of Metamorphic Temperature on Formation;* **Emma Bullock**, Timothy McCoy, Corrigan Cari

9:45 AM **225** *Hyperspectral Cathodoluminescence and Quantitative EPMA Mapping of Angrite Northwest Africa 15507;* **Heather Lowers**, Jay Thompson, Paul Carpenter, Zoë Wilbur, Anthony Irving

B Biological Sciences Symposia – Tuesday Morning

B02.1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

Tuesday 8:30 AM **Room M-100-D**

8:30 AM **165** *Cryo-EM Structure of Human Tumor Suppressor Protein Pdcd4 bound to the Ribosome;* (Invited) **Jailson Brito Querido**, Masaaki Sokabe, Irene Díaz-López, Yuliya Gordiyenko, Philipp Zuber, Yifei Du, Lucas Albacete-Albacete, Christopher S. Fraser, V. S. Fraser

9:00 AM **183** *A 3.2 Å Structure of the PriA/PriB/Replication Fork Complex Reveals Mechanistic Insight into Bacterial DNA Replication Restart;* **Peter Ducos**, Alexander Duckworth, Kenneth Satyshur, James Keck, Timothy Grant

9:15 AM **197** *Structural Analysis of Cancer-Relevant TCR-CD3 and Peptide-MHC Complexes by CryoEM;* **Kei Saotome**, Drew Dudgeon, Kiersten Colotti, Michael Moore, Jennifer Jones, Yi Zhou, Ashique Rafique, John Lin, William Lin, Matthew Franklin

9:30 AM **213** *Capturing Snapshots of Ribonucleotide Reductase Using Cryo-Electron Microscopy;* (Invited) **Catherine Drennan**, Gisele Andree, Patricia Feliciano, Gyunghoon Kang, Talya Levitz, Kelsey Miller, Dana Westmoreland

B04.2 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging

Tuesday 8:30 AM **Room M-100-F**

8:30 AM **166** *An Optimized Optical Clearing Pipeline for Intact 3D Plant Imaging and Visualization of Fluorescent Probes;* (Invited) **Mark Sanders**, Clay Carter, Nadia Kane, Patrick Willey, Erik Solhaug, Rahul Roy

9:00 AM **184** *Autonomous Multiscale Axially Swept Light-Sheet Microscopy;* (Invited) **Kevin Dean**, Zach Marin, Xiaoding Wang, Jinlong Lin, Hazel Borges, Dax Collison

9:30 AM **214** *Cloud Pipelines for Large Scale Lightsheet Image Processing;* (Invited) **Sharmishtaa Seshamani**, Camilo Laiton, Gabor Kovacs, Cameron Arshadi, Anna Grim, Nicholas Lusk, David Feng

B09.2 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling

Tuesday 8:30 AM **Room M-100-E**

8:30 AM **167** *Correlative Live-cell – Volume Electron Microscopy: Bridging Cellular Dynamics to 3D-ultrastructure;* (Invited) **Nalan Liv**

9:00 AM **185** *Sam50 is Associated with Fragmentation and Alterations in Metabolism in Human and Murine Myotubes;* **Andrea Marshall**, Edgar Garza-Lopez, Zer Vue, Larry Vang, Antentor Hinton

9:15 AM **198** *Corelative Light and Electron Microscopic Study on 3D Reconstruction of Lateral Habenula Single Co-releasing GABA-Glutamate Axon Terminals Establishing Converging Synapses for Glutamate or GABA Release;* **Shiliang Zhang**, Alexey Shevelkin, Kevin Yu, Huiling Wang, Marisela Morales

9:30 AM **215** *From Organ to Organelle: Towards a Multimodal 3D Cell Atlas of Plasmodium Mosquito stages using Correlative Light, X-ray and Volume Electron Microscopy;* (Invited) **Nedal Darif**, Jonas Albers, Paolo Ronchi, Liz Duke, Freddy Frischknecht, Yannick Schwab

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Tuesday Morning

C05.1 Vendor Symposia

Tuesday 8:30 AM **Room M-100-G**

8:30 AM **168** *Next Generation Automated Programmable Electron Microscopy Preparation;* **Steven Goodman**, Jeffrey Percival

8:45 AM **173** *Atomic Resolution SE Imaging in a 30-200 keV Aberration-Corrected UHV STEM;* **Ondrej Krivanek**, Michael Hotz, Joel Martis, Tomas Radlicka, Neil Bacon, Niklas Dellby, Harold Hwang, Tracy Lovejoy, Steven Lovejoy, Prastuti Singh

9:00 AM **186** *Data Driven Decision Making: A Machine-Vision Approach to Real-Time Data Collection and Analysis for Transmission Electron Microscopy;* **Yaofeng Guo**, Madelin Dukes, John Damiano

9:15 AM **199** *Two-Factor, Three-Level Factorial Experiments for Optimizing Size of Thiol stabilized Gold Nanoparticles (AuNPs);* **Vishwas Joshi**

9:30 AM **216** *Dynamic CT Imaging in the Laboratory: Characterization of Pore Filling Events in Geological Materials;* **Jan Dewanckele**, Marijn Boone, Wesley De Boever

9:45 AM **226** *Development of a TEM Optical System for the Atomic-Resolution Magnetic-Field-Free Electron Microscope;* **Tatsuhiro Maekawa**, Yuji Kohno, Shigeyuki Morishita, Kazuto Arakawa

P Physical Sciences Symposia – Tuesday Morning

P03.2 Theory and Applications of Advanced Electron Tomography

Tuesday 8:30 AM **Room 200-I**

8:30 AM **169** *Nanoscale Three-Dimensional Charge Density and Electric Field Mapping by Electron Holographic Tomography;* (Invited) **Rafal Dunin-Borkowski**, Fengshan Zheng, Vadim Migunov, Jan Caron, Hongchu Du, Giulio Pozzi

9:00 AM **187** *Measuring 3D Chemistry at 1 nm Resolution with Fused Multi-Modal Electron Tomography;* **Jonathan Schwartz**, Zichao Wendy Di, Yi Jiang, Yiwen Qian, Junsi Gu, Steve Rozeveld, Peter Ercius, Jeffrey A. Fessler, Ting Fessler, Mary Scott

9:15 AM **200** *Towards Three-dimensional Mapping of Skyrmionic Spin Textures in an FeGe Nanodisk Using Off-axis Electron Holography;* **Fengshan Zheng**, Jan Caron, Andrii Savchenko, Weiwei Wang, Thibaud Denneulin, Andras Kovacs, Hongchu Du, Haifeng Du, Nikolai Du, Rafal Dunin-Borkowski

9:30 AM **217** *Imaging and Understanding 3D Nanoscale Magnetic Structures;* (Invited) **Amanda Petford Long**, Vuk Brajuskovic, Yue Li, Arthur McCray, Charudatta Phatak

P06.2 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications

Tuesday 8:30 AM **Room 200-H**

8:30 AM **170** *Application of Atom Probe Tomography to Study Corrosion of Nuclear Materials;* (Invited) **Daniel Schreiber**, Matthew Olszta, Karen Kruska

9:00 AM **188** *A High Resolution Electron Backscatter Diffraction Study of Stress Fields around Hydrides in Zircaloy-4;* **Ben Britton**, Ruth Birch, James Douglas

9:15 AM **201** *Using Laboratory-Based X-ray Tomography for Metrological Measurements of Inertial Confinement Fusion Targets;* **Nikolaus Cordes**, Steven Young, Tana Morrow, Thomas Day, Derek Schmidt, Brian Patterson

9:30 AM **218** *Nanoscale Mapping of Hydrogen Distribution in Nuclear Structural Materials Using Cryogenic Transfer Atom Probe Tomography;* (Invited) **Arun Devaraj**, Dallin Barton, Mark Wirth, Daniel Perea

P07.2 Prof. Wilbur C Bigelow Centenary Symposium In Situ Heating and Gas-Reaction Studies in Materials Sciences

Tuesday 8:30 AM **Room 200-G**

8:30 AM **171** *In-situ TEM Investigation on Redox Mechanisms of Transition Metal Oxides In-situ TEM Investigation on Redox Mechanisms of Transition Metal Oxides*; (Invited) **Dong Su**, Xiaozhi Liu, Yue Pan, Dan Zhou

9:00 AM **189** *In situ (S)TEM Study of Thermal Reduction Synthesis Pathway for Sulfur Containing Titanium MAX Phase to MXene Phase;* **Joseph John Burman**, Mounib Bahri, Ioannis Siachos, Volker Presser, B. Layla Mehdi

9:15 AM **202** *U-Net Implementation for High Throughput Grain Boundary Detection in Bright Field TEM Micrographs: Toward in situ Grain Growth Studies;* **Matthew Patrick**, James Eckstein, Javier Lopez, Silvia Toderas, Alan Ma, Stacey Levine, Katayun Barmak

9:30 AM **219** *Native Intercalant Order in TaS2 Achieved Through In-situ Thermal Heating;* **Nishkarsh Agarwal**, Suk Hyun Sung, Jonathan Schwartz, Noah Schnitzer, Juihung Hung, Ismail El Baggari, Lena Kourkoutis, Liang Qi, Anton Qi, Robert Hovden

9:45 AM **227** *In situ Testing of Ultrathin Diffusion Barriers using Complex Multishell Nanowires;* **Lilian Vogl**, Peter Schweizer, Xavier Maeder, Ivo Utke, Andrew M Minor, Johann Michler

P10.2 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Tuesday 8:30 AM **Room 200-J**

8:30 AM **172** *Interface Induced Emerging Behavior in Ultrathin Ruthenate Heterostructures;* (Invited) **Yimei Zhu**, Zhen Wang, Zeeshan Ali, Mohammad Saghayezhian, Andrew O'Hara, Sokrates Pantelides, Jiandi Zhang

9:00 AM **190** *Revealing the Short and Long-range Structural Distortions at Nb-doped KTaO3;* **Salva Salmani-Rezaie**, Tobias Schwaigert, Sankalpa Hazra, Venkatraman Gopalan, Darrell Schlom, Kaveh Ahadi, David Muller

9:15 AM **203** *Structural Characterization of BaZrS(3-y)Se(y) Perovskite Thin Films via Scanning Transmission Electron Microscopy;* **Tigran Simonian**, Michael Xu, Ida Sadeghi, Jack Van Sambeek, Kevin Ye, Rafael Jaramillo, James LeBeau, Valeria Nicolosi Nicolosi

9:30 AM **220** *Revealing Possible Coherence Limiting Sources in Superconducting Qubit with Advanced Electron Microscopy;* (Invited) **Lin Zhou**, Lin Zhou, Tea-Hoon Kim, Xiaotian Fang, Matt Kramer, Cameron Kopas, Mark Field, Hilal Cansizoglu, Joshua Cansizoglu

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Tuesday Late Morning

A01.3 Microscopic Approach of Materials for Agri-Food Process

Tuesday 10:30 AM **Room M-100-J**

10:30 AM **228** *Water Absorption Kinetics of Zea Mays Seedling using MWCNT as a Growth Promotor;* **Dhirendra Kumar Tiwari**

10:45 AM **246** *Effect of Multi-Walled Carbon Nanotubes and Manganese and Zinc Doped Ferrites on the Development Of Capsicum Annuum;* **Gladys Juárez Cisneros**, Juan Manuel Sánchez-Yáñez, Javier Villegas-Moreno, Dhirendra Kumar Tiwari

11:00 AM **249** *Elemental Microanalysis of Capsicum chinense Plants Treated with Magesium Doped Iron Ferrite Nanopriming;* **Ana Coria Téllez**, Dhirendra Kumar Tiwari, Carolina Ayala, Carlos Arias, Martha Rodríguez

11:15 AM **267** *Characterization of Ricinus communis and Aloe vera extracts using AccuTOF™ DART® Direct Analysis in Real Time Time-of-Flight Mass Spectrometer;* **Dhirendra Kumar Tiwari**, Mayra Guadalupe Barajas Plancarte

11:30 AM **282** *Effect of Zinc Oxide Nanoparticles on Biomass and Photosynthetic Pigments in Avena Sativa*; (Invited) **Neftali Rangel-garcía**, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Gladys Juárez Cisneros, Salomón Borjas

A02.3 Microscopy and Microanalysis for Real World Problem Solving

Tuesday 10:30 AM **Room 200-A**

10:30 AM **229** *Single-Molecule Optical Microscopy Reveals New Polymer Insights at the Nanoscale;* (Invited) **Muzhou Wang**

11:00 AM **250** *Prototype Robotic System for Multimodal Forensics and Failure Analysis;* **Marek Kotrlý**, Jana Boháčová, Josef Uher, Ivana Turkova

11:15 AM **268** *Local Stress Measurements in Polycrystalline Metallic Tensile Specimens Using High Resolution EBSD;* **Tim Ruggles**, Will Gilliland, Philip Noell, Robert Craig, Kaitlynn Fitzgerald, Jay Carroll

11:30 AM **283** *Tribological Evaluation of Boride Layers Formed on an AISI M2 Steel Substrate by the Powder Packing Method;* **Leopoldo García Vanegas**, Milton Elías Espinosa, Marco Antonio Doñu Ruiz, Noé López Perrusquia, Aline Hernández García

11:45 AM **299** *Fruitful TEM Analysis of Hot-dip Galvanized Industrial Steels with Low and High Si Content: Challenges and Solutions;* **Alexey Minenkov**, Martin Arndt, Thomas Mörtlbauer, Günter Hesser, Gerhard Angeli, Heiko Groiss

A04.3 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials

Tuesday 10:30 AM **Room 200-B**

10:30 AM **230** *Imaging Ghosts with 4D-STEM: From Vacancies to Vanishing Dislocations;* (Invited) **Andrew Minor**, Sean Mills, Yang Yang

11:00 AM **251** *Continuous 4D STEM Recording and Visualization for In-Situ Experiments;* **Benjamin Miller**, Bernhard Schaffer, Cory Czarnik

11:15 AM **269** *5D-STEM of Real- and Reciprocal-space Resolved Dynamics in a Metallic Liquid;* **Shuoyuan Huang**, Paul Voyles

11:30 AM **284** *Understanding Nucleation of Mesophase Pitch Tactoids using 4D-STEM;* **Robert Colby**, Kazem Edmond, Daniella Mendez, Stuart Smith

A06.3 Learning from Failure: Negative and Null Results in Microscopy

Tuesday 10:30 AM **Room M-100-I**

10:30 AM **231** *Confessions of a Ptychopath: Detection, Dimensions, Damage and Despair;* (Invited) **Colum O'Leary**, Dillan Chang, Peter Ercius, Peter Nellist, Angus Kirkland, Jianwei Miao

11:00 AM **252** *Barriers to AI-Driven Defect Detection of Microscopy Images in Industrial Nanoelectronics Manufacturing;* **Matthew Hauwiller**, Kurt Loken, TJ Klein, Karen Terry

11:15 AM **270** *Artifact Elimination in Ultrafast Electron Microscopy;* **Spencer Reisbick**, Yimei Zhu

11:30 AM **285** *Diffuse Electron Diffraction Intensities in Concentrated Solid Solutions do not Necessarily Come from Short-Range Order;* **Mingwei Zhang**, Flynn Walsh, Mark Asta, Robert Ritchie, Andrew Minor

A07.3 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

Tuesday 10:30 AM **Room 200-D**

10:30 AM **232** *How Did Low Voltage in the SEM Become the Preferred Route to High Resolution Imaging?*; (Invited) **John Mansfield**

11:00 AM **253** *Limits of Resolutions in the Scanning Electron Microscope;* (Invited) **Andras Vladar**, Kerim Arat

11:30 AM **286** *High-performance Compact Lens-type Energy Analyzer for an Energy Distribution Measurement of a Schottky Electron Source;* **Inyong Park**, Ha Rim Lee, Junhyeok Hawang, Takashi Ogawa, Haewon Jung, Daljae Yun, Jisoo Kim, Sangsun Lee Lee

11:45 AM **300** *Subsampling Methods for Fast Electron Backscattered Diffraction Analysis for SEM;* **Zoë Broad**, Daniel Nicholls, Jack Wells, Amirafshar Moshtaghpour, Alex Robinson, Robert Masters, Louise Hughes, Nigel Browning Browning

A08.3 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences

Tuesday 10:30 AM **Room 200-F**

10:30 AM **233** *Application of FIB-ToF-SIMS to the Search for and Characterisation of Enriched Uranium Particles;* (Invited) William Rickard, Xiao Sun, Matvei Aleshin, Laure Martin, Masturina Kracica, Daniel Oldfield, Denis Fougerouse, Steven Reddy, David Reddy

11:00 AM **254** *5D-TOF-STIM Imaging with a Low-Energy He+ Focused Ion Beam;* Michael Mousley, Dustin Andersen, Tom Wirtz, Santhana Eswara

11:15 AM **271** *Focused Beams for use in EBSD and TKD;* Bartlomiej Winiarski

11:30 AM **287** *Focused Ion Beam Nano-thermometry;* Julia Deitz, Tim Ruggles, Samantha Rosenberg, Mila Lam, Luis Jauregui, John Williard, Daniel Perry, Joe Boro, Wyatt Boro

11:45 AM **301** *GaBiLi - A Novel Focused Ion Beam (FIB) source for Ion Microscopy and Related Workflows for 3D Tomography with a Top-Down FIB from Liquid Metal Alloy Ion Sources (LMAIS);* Torsten Richter, Achim Nadzeyka, Fabian Meyer, Paul Mazarov

A11.3 Nanoscale Infrared Spectroscopy with Electrons and Photons

Tuesday 10:30 AM **Room M-100-H**

10:30 AM **234** *The "Other" Nanoscale Spectroscopy – Tip Enhanced Raman Scattering;* (Invited) **Volker Deckert**, Tanveer Shaik, Tanja Deckert-Gaudig

11:00 AM **255** *Observation of Gas Adsorbates with Time-Resolved Vibrational EELS;* **Yifan Wang**, Peter Crozier

11:15 AM **272** *Vibrational EELS for Solid State Li-ion Batteries: Mapping Li Distributions and Beyond;* **Chaitanya Gadre**, Tom Lee, Ji Qi, Shyue Ping Ong, Xiaoqing Pan

11:30 AM **288** *Theory on the Trail of Vibrational STEM/EELS;* (Invited) **Sokrates Pantelides**

A14.3 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Tuesday 10:30 AM **Room 200-C**

10:30 AM **235** *Complementary Use of Sensitive Nanoscale and Bulk Techniques to Probe Surface and Subsurface Defects in High Volume Manufacturing*; (Invited) **Carol Johnson**, Indra Subedi, Stephen Exarhos, Joseph Roth, Mike Kautzky, Karen Terry

11:00 AM **256** *Mechanisms for Chemical Vapor Deposition Carbon Nanotube Growth by Surface Modification of 316L Stainless Steel;* **Joshua Hancock**, Richard Vanfleet, Felipe Rivera, Brian Jensen

11:15 AM **273** *STEM Study on the Native Amorphous Surface Oxides of Tantalum Film for a Superconducting Qubit;* **Junsik Mun**, Chenyu Zhou, Peter Sushko, Emma Brass, Xiaohui Qu, Mingzhao Liu, Yimei Zhu

11:30 AM **289** *Secondary Electron Imaging on Aberration-Corrected STEM for Characterizing Catalyst Materials;* **Sooyeon Hwang**

11:45 AM **302** *Morphological Analysis of an Organic-Rich Shale: Implication for Potential Gas Energy Generation, Witbank Coalfield, South Africa;* **George Akintola**, joshua Edokpayi, Francis Amponsah-Dacosta, Emmanuel Mhlongo

A15.3 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials

Tuesday 10:30 AM **Room 200-E**

10:30 AM **236** *Preparing for Artemis with ANGSA: The Dissection and Characterization of Previously Unopened and Sealed Double Drive Tube 73001/2;* (Invited) **Juliane Gross**, Andrea Mosie, Ryan Zeigler, Francis McCubbin, Charles Shearer

11:00 AM **257** *Next-Generation Analysis of Very Low-Ti Basalts and Volcanic Glasses in Apollo 17 Double Drive Tube 73001/73002;* (Invited) **Chris Yen**, Paul Carpenter, Bradley Jolliff, Ryan Ogliore, Jeremy Kent, Ryan Zeigler, Juliane Gross, Scott Eckley, Charles Eckley

11:30 AM **290** *Quantitative Microanalysis Explorer: Next-Generation Analytical Tool for Study of Apollo 17 Core 73002,6015-6018;* **Paul Carpenter**, Ryan Ogliore, Angelina Minocha, Chris Yen, Bradley Jolliff

11:45 AM **303** *Comparing Different Approaches to Determining the Bulk Composition and Phase Proportions of Exsolved Oxides;* **Anette von der Handt**, Ian Goan, James Scoates, Nichole Moerhuis

Scientific Program

B Biological Sciences Symposia – Tuesday Late Morning

B02.2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

Tuesday 10:30 AM **Room M-100-D**

10:30 AM **237** *Rubisco in the Alpha-Carboxysome: from Structures to Binding Curves;* (Invited) **Lauren Ann Metskas**, Ryan Gray, Luke Oltrogge, Eesha Deepak, Julia Borden, Davi Ortega, Grant Jensen, David Savage Savage

11:00 AM **258** *Structural Analysis of COPI Pathway in Chlamydomonas reinhardtii;* **Grigory Tagiltsev**, Ron Kelley, Xianjun Zhang, Sagar Khavnekar, Abhay Kotecha, Jürgen Plitzko, John Birggs

11:15 AM **274** *Quantitating Storage Granule Size, Accumulation, And Localization In Rhodobacter Sphaeroides Using Cryo-Electron Tomography And Light Microscopy;* **Daniel Parrell**, Rachelle Lemke, Joseph Olson, Timothy Donohue, Elizabeth Wright

11:30 AM **291** *Toward Plasma Membrane Visual Proteomics: Developing a Correlative Cryo-Electron Tomography Pipeline for Isolated Plasma Membranes;* **Kem Sochacki**, Willy Sun, Dennis Michalak, Prasanthi Kunamaneni, Jenny Hinshaw, Justin Taraska

B06.1 Innovations in Light Microscopy: Revealing the Inner Workings of Life from Single Molecule to Whole Organisms

Tuesday 10:30 AM **Room M-100-F**

10:30 AM **238** *A Statistical Resolution Measure of Fluorescence Microscopy With Finite Photons;* **Yilun Li**, Fang Huang

10:45 AM **247** *Multi-pass Imaging Flow Cytometry;* **Joshua Reynolds**, Yonatan Israel, Mark Kasevich

11:00 AM **259** *Identifying the Mechanism of Glioblastoma Cell Migration in Mouse Brain Slices;* (Invited) **David Odde**, Sarah Anderson

11:30 AM **292** *Elucidating Vaccine Trafficking Mechanisms using Multimodal Imaging;* (Invited) **Brittany Hartwell**

B09.3 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling

Tuesday 10:30 AM **Room M-100-E**

10:30 AM **239** *Ultrastructural Visualization of Resin-embedded Primary Cilia by Serial Section Electron Tomography;* (Invited) **Haixin Sui**, Shufeng Sun

11:00 AM **260** *Decrease in Mouse Skeletal Muscle during Aging is due to Altered Mitochondrial Networks and the MICOS complex;* **Zer Vue**, Edgar Garza-Lopez, Kit Neikirk, Larry Vang, Antentor Hinton

11:15 AM **275** *Integrative Microscopy Approaches Reveal Specialized Signaling Filopodia Promote Morphogen Gradient Formation During Mammalian Development;* (Invited) **Eric Hall**, Elizabeth Cleverdon, Miriam Dillard, Yan Zhang, Daniel Stewart, Randall Wakefield, Shondra Pruett-Miller, Khaled Khairy, Camenzind Khairy, Stacey Ogden

11:45 AM **293** *Hydra Plasma FIB DualBeam for High-Resolution Cryo Auto Slice & View and Reliable Cryo lamella Preparation for Cellular and Tissue Samples;* **Ron Kelley,** Daniela Slamkova, Xianjun Zhang, Abhay Kotecha

C Cross-Cut/Interdisciplinary Sciences Symposia – Tuesday Late Morning

C03.1 Correlative and Multimodal Microscopy and Analysis

Tuesday 10:30 AM **Room L-100-J**

10:30 AM **240** *Development of Cryogenic Techniques for Characterizing Energy Storage Materials in Electrochemical Process;* (Invited) **Minghao Zhang**

11:00 AM **261** *A Cryo-/Liquid Phase Correlative Light Electron Microscopy Workflow to Visualize Crystallization Processes in Graphene Liquid Cells;* **Luco Rutten**, Marit de Beer, Rona Roverts, Elena Macías Sanchéz, Nico Sommerdijk

11:15 AM **276** *Towards Temporal Resolution in Correlative Cryo-Electron Tomography;* **Johann Brenner**, Sven Klumpe, Jürgen Plitzko, Florian Wilfling

11:30 AM **294** *Correlative low-Dose Cryogenic Electron Microscopy and Small Angle Neutron Scattering Studies Reveal Morphological Differences in Fluorinated vs Non-Fluorinated Fire Suppressant Foams;* **Alexis Williams**, Rezawana Islam, Gergely Nagy

11:45 AM **304** *Advanced Cryogenic Light Microscopy Stage to Enable 3D Super-Resolved Cryogenic Correlative Light and Electron Microscopy;* **Davis Perez**, Peter Dahlberg, William Moerner

C05.2 Vendor Symposia

Tuesday 10:30 AM **Room M-100-G**

10:30 AM **241** *Elucidating Surface Properties by Correlative TEM and APT Studies of Ideal Mg Specimens Prepared under Controlled Environments;* **Cecile Bonifacio**, Daniel Perea, Pawel Nowakowski, Mary Ray, Paul Fischione

10:45 AM **248** *Developments in Broad Ion Beam Milling Sample Preparation Instrumentation for Microscopy and Microanalysis Applications;* **Pawel Nowakowski**, Cecile Bonifacio, Mary Ray, Paul Fischione

11:00 AM **262** *Ultra-Short Pulse Laser Ablation for Cross-Section of Auto Body Paints;* **chengge Jiao**, Yuri Rikers, Remco Geurts

11:15 AM **277** *Expanding the Role of Atom Probe Tomography in Semiconductor Manufacturing and R&D – The Initiation of a Project Between CAMECA Instruments Inc. and Imec;* **Robert Ulfig**, David Reinhard, David Larson, Peter Clifton, Olivier Dulac, Claudia Fleischmann, Paul van der Heide

11:30 AM **295** *Arctis WebUI – A Novel Software Concept for Automating Cryo-Lamellae Production;* **Radovan Spurny**, Zuzana Patáková, Matej Dolník, Radim Kříž, John Mitchels, Alexander Rigort, Miloš Hovorka

Scientific Program

P Physical Sciences Symposia – Tuesday Late Morning

P03.3 Theory and Applications of Advanced Electron Tomography

Tuesday 10:30 AM **Room 200-I**

10:30 AM **242** *Biological Electron Cryotomography – Progress and Potential as Illustrated by the Dot/Icm Type IV Secretion System;* (Invited) **Grant Jensen**

11:00 AM **263** *Electron Tomography in Liquids: Characterizing Nanoparticle Self-Assemblies in a Relevant Environment;* **Sara Bals**, Da Wang, Daniel Arenas Esteban, Ajinkya Kadu, Ana Sánchez-Iglesias, Alejandro Gomez-Perez, Jesús Gonzalez Casablanca, Stavros Nicolopoulos, Luis M. Nicolopoulos

11:15 AM **278** *The Structures of Small (< 3 nm), Solubilized Platinum Nanocrystals are Composed of an Ordered Core Surrounded by Mobile Surface Atoms;* (Invited) **Hans Elmlund**, Henry Wietfeldt, Chiara Machello, Cong T.S. Van, Cyril Reboul, Junyoung Heo, Byung Hyo Kim, Sungin Kim, Peter Kim, Jungwon Park

P06.3 Imaging and Micro/Nano Analysis of Materials for Nuclear Applications

Tuesday 10:30 AM **Room 200-H**

10:30 AM **243** *Data Driven in situ TEM: A Path Towards Accurate Characterization of Radiation Damage in Structural Materials;* (Invited) **Kory Burns**, Nan Li, Caitlin Taylor, Mary Scott, Khalid Hattar

11:00 AM **264** *Irradiation Effect on Noble Metal Particles in Water Using In situ Liquid Cell STEM Observation;* **Jaeyoung Heo**, Bruce McNamara, Dongsheng Li, Edgar Buck

11:15 AM **279** *Deep Learning for Automated Quantification of Irradiation Defects in TEM Data: Relating Pixel-level Errors to Defect Properties;* **Rajat Sainju**, Graham Roberts, Brian Hutchinson, Wei-Ying Chen, Qian Yang, Caiwen Ding, Meimei Li, Yuanyuan Zhu Zhu

11:30 AM **296** *In-Situ Transmission Electron Microscopy Study of the Evolution of Extended Defects in Oxide Nuclear Fuels;* (Invited) Kaustubh Bawane, Lingfeng He, Boopathy Kombaiah, J. Matthew mann, Lin Shao, Marat Khafizov, David H. Hurley

P07.3 Prof. Wilbur C. Bigelow Centenary Symposium In Situ Heating and Gas-Reaction Studies in Materials Sciences

Tuesday 10:30 AM **Room 200-G**

10:30 AM **244** *Towards the Renaissance Era in In-Situ/ Electron Microscopy: From Ultrathin (UT) Membrane Fluidic-Cell to Adaptive Sampling and Data Analytics;* (Invited) **Vinayak Dravid**

11:00 AM **265** *In-situ TEM Study: Deactivation Mechanism and Encapsulation Behavior of Metal Nanocatalysts Deposited on Zinc Oxide Nanowires;* **Zhehan Ying**, Jiangyong Diao, Shi Wang, Xiangbin Cai, Hongyang Liu, Ning Wang

11:15 AM **280** *Atmospheric Gas and Heating Transmission Electron Microscopy with Water Vapor Control;* **Hector Hugo Perez Garza**, Dan Zhou, Ronald Spruit, Eva Bladt, Chenyang Lu, Xi Liu, James Carter, Graham Hutchings, Wei Hutchings

11:30 AM **297** *Bridging the Pressure Gap: Gas-Phase Operando Transmission Electron Microscopy;* (Invited) **Patricia Kooyman**

P10.3 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Tuesday 10:30 AM **Room 200-J**

10:30 AM **245** *Revealing Topological Properties of Materials: The New Characterization Frontier in Electron Microscopy;* (Invited) Juan Idrobo

11:00 AM **266** *Thickness-Dependent Layer Stacking Disorder in Low and High Temperature Phase of MoTe2 via STEM Imaging;* **Lopa Bhatt**, James Hart, Elisabeth Bianco, Judy Cha, Lena Kourkoutis

11:15 AM **281** *Investigating Qubits in Silicon Carbide Using Multislice Electron Ptychography;* **Aaditya Bhat**, Colin Gilgenbach, James LeBeau

11:30 AM **298** *Probing Local Phonon Polariton Signals at Edges of Folded Boron Nitride Sheets;* (Invited) **Xingxu Yan**, Jie Li, Chaitanya Gadre, Lei Gu, Ruqian Wu, Xiaoqing Pan

A Analytical/Instrumentation Sciences Symposia – Tuesday Afternoon

A02.4 Microscopy and Microanalysis for Real World Problem Solving

Tuesday 1:30 PM **Room 200-A**

1:30 PM **305** *Review of Practical Problem Solving for Advanced Semiconductor Industry;* (Invited) **Yougui Liao**, Che-chi Lee

2:00 PM **321** *Artifact-Free Preparation of Plan View TEM Specimens and its Application to MRAM Devices;* **Cecile Bonifacio**, Richard Li, Pawel Nowakowski, Mary Ray, Paul Fischione

2:15 PM **334** *Accurate Elemental Mapping of Semiconductor Devices Using EDS – Deconvolving Overlapping Peaks;* **Shangshang Mu**, David Stowe

2:30 PM **345** *SEM Grain Characterization of Metals for Nanoelectronics;* **Matthew Hauwiller**, Charlie Mann, Peter Mach, Karen Terry, Mike Kautzky

2:45 PM **357** *EELS Characterization of Niobium Oxide Memristor Devices;* **Bradley De Gregorio**, Evgeniya Lock, Keith Knipling, Hans Cho

A04.4 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Material

Tuesday 1:30 PM **Room 200-B**

1:30 PM **306** *Robust Imaging of Three-Dimensional Polar Textures using 4D-STEM Diffraction Imaging and Multislice Electron Ptychography;* (Invited) **Yu-Tsun Shao**, Zhen Chen, Chenyu Zhang, Harikrishnan K. P., David Muller

2:00 PM **322** *Quantitative Measurements of Intrinsic Parameters of Spin Textures using 4D- Lorentz STEM;* **Zhen Chen**

2:15 PM **335** *Simultaneous Electrostatic and Magnetic Vector Potential Phase Retrieval Using Electron Ptychography;* **Georgios Varnavides**, Stephanie Ribet, Reed Yalisove, Joel Moore, Colin Ophus, Mary Scott

2:30 PM **346** *Quantitative Electrostatic Potential Mapping in Dense Polycrystalline Functional Materials and Devices;* **Daniel Durham**, Khandker Akif Aabrar, Prasanna Venkat Ravindran, Nestor zaluzec, Liliana Stan, Asif Islam Khan, Suman Datta, Supratik Guha, Charudatta Guha

2:45 PM **359** *Electron Ptychography Simulations for Atomic-Resolution Magnetic Imaging;* **Jeffrey Huang**, Kisung Kang, André Schleife, Pinshane Huang

A07.4 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

Tuesday 1:30 PM **Room 200-D**

1:30 PM **307** *Contributions and Legacy of David C. Joy to Monte Carlo Simulations in Electron and Ion Microscopy;* (Invited) **Hendrix Demers**

2:00 PM **323** *David Joy's Role in Physical Data and Models for Microanalysis;* (Invited) **Nicholas Ritchie**, Dale Newbury

2:30 PM **347** *How David C. Joy Contributed to my Research in Electron Microscopy;* **Raynald Gauvin**

A08.4 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences

Tuesday 1:30 PM **Room 200-F**

1:30 PM **308** *Three-dimensional Imaging and Interface Analysis of Battery Materials via Plasma FIB-SEM;* (Invited) **Minghao Zhang**

2:00 PM **324** *3D Chemical Mapping via P-FIB Tomography and Machine Learning;* **Paul Kotula**, Andrew Polonsky, Daniel Perry, Damion Cummings, Julia Deitz, Joe Boro, Dustin Ellis

2:15 PM **336** *Control of Extended Defect Growth in Perovskite Oxide Thin Films using Nanoscale Patterning;* **Supriya Ghosh**, Fengdeng Liu, Bharat Jalan, K. Andre Mkhoyan

2:30 PM **348** *Generating Nanometer-sized Polymer Wires with SEM/FIB Instrumentation;* **Daewon Kim**, Bezawit. A. Getachew, Yimo Han

2:45 PM **360** *Towards an Accurate 3D Reconstruction of Nano-Porous Structures using FIB Tomography and Monte Carlo Simulations with Machine Learning;* **Martin Ritter**, Trushal Sardhara, Alexander Shkurmanov, Roland Aydin, Christian Cyron

A11.4 Nanoscale Infrared Spectroscopy with Electrons and Photons

Tuesday 1:30 PM **Room M-100-H**

1:30 PM **309** *Strong Coupling and Extreme Anisotropy in Infrared Polaritonic Media;* (Invited) **Joshua Caldwell**

2:00 PM **325** *Analyzing Three-dimensional Tip Near-field Scattering of Infrared Polaritons through Peak Force Scattering-type Near-field Optical Microscopy;* **Xiaoji Xu**

2:15 PM **337** *Nanorod vs Nanotriangle: Which is Better for Infrared Plasmonic Applications?;* Vishal Kumar, Andrew Rossi, Zachary Lawson, Robert Neal, **Jordan Hachtel**, Svetlana Neretina, David Masiello, Jon Camden Camden

2:30 PM **349** *Free Electrons for Infrared Nanophotonics;* (Invited) **F. Javier García de Abajo**

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Tuesday Afternoon cont.

A14.4 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Tuesday 1:30 PM **Room 200-C**

1:30 PM **310** *Analysis of Thin Films and Buried Interfaces by Soft and Hard X-ray Photoemission;* (Invited) **Kateryna Artyushkova**, Jennifer Mann, Sarah Zaccarine

2:00 PM **326** *Unveiling Interplay Between Pt Single-atoms and Well-defined Anatase TiO2 Under Redox Conditions;* **Wenjie Zang**, Jaeha Lee, Peter Tieu, Xingxu Yan, Phillip Christopher, Xiaoqing Pan

2:15 PM **338** *Surface Sensitive Chemical Imaging of Lithium Materials for Battery Applications by Auger Electron Spectroscopy;* **Ashley Maloney**, Mashahiro Terashima, Kazutoshi Mamiya, Shin-Ichi Iida

2:30 PM **350** *Expanded Materials Sample Platforms for Advanced Surface Analysis of Materials;* (Invited) **Jonathan Counsell**, S.J. Coultas, A.J. Roberts, Chris Moffitt

A15.4 Klaus Keil Memorial Symposium: Quantitative Microanalysis of Planetary Materials

Tuesday 1:30 PM **Room 200-E**

1:30 PM **311** *WDS-SD: Next Generation of Wavelength Dispersive Spectrometers (WDS) with a Silicon Drift Detector (SDD) – What Can it Do, Where are We Now and Where is it Going?*; **Richard Wuhrer**, Ken Moran, Michael Matthews

1:45 PM **319** *Can Digital Pulse Processing Really Be 50 Years Old? A Retrospective of EDS Detector/Processor Co-Evolution Over 5 Decades;* **Richard Mott**

2:00 PM *Klaus Keil Video Presentation & Discussion*

B Biological Sciences Symposia – Tuesday Afternoon

B02.3 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

Tuesday 1:30 PM **Room M-100-D**

1:30 PM **312** *Studying the Molecular Mechanisms of Ebola Virus with In Situ Structural Biology;* (Invited) **William Wan**

2:00 PM **327** *The in situ Structural Approach to Reveal the Filovirus Budding Mechanism;* **Reika Watanabe**, Erica Saphire

2:15 PM **339** *Structures, Distributions, and Conformations of SARS-CoV-2 Spike Proteins on Intact Virions by Cryo-EM and Cryo-ET;* **Zunlong Ke**, Joaquin Oton, Kun Qu, Sjors Scheres, John Birggs

2:30 PM **351** *Single Particle Cryo-EM and Cryo-Tomography Resolve Nodavirus RNA Replication Crown Assembly;* **Hong Zhan**, Nuruddin Unchwaniwala, Andrea Rebolledo-Viveros, Janice Pennington, Mark Horswill, Roma Broadberry, Jonathan Myers, Johan den Boon, Timothy den Boon, Paul Ahlquist

2:45 PM **361** *Diversity in Q-Beta Virus-like Particle Cage Assembly via Coat Protein Monomers and AYGG-linked Dimers;* **Thomas Newton**, Liangjun Zhao, M.G. Finn, Misha Kopylov

B06.2 Innovations in Light Microscopy: Revealing the Inner Workings of Life from Single Molecule to Whole Organisms

Tuesday 1:30 PM **Room M-100-F**

1:30 PM **313** *Highly Multiplexed Imaging with Speed and Fluorogenic DNA-PAINT;* (Invited) **Florian Schueder**, Joerg Bewersdorf

2:00 PM **328** *Watching Bacterial Cell Division One Molecule at a Time in Vertical Cells;* (Invited) **Kevin Whitley**, James Grimshaw, Séamus Holden

2:30 PM **352** *Developing an Image Based Deep Learning Approach to Immune Cell Quantification in a Mouse Asthma Model*; (Invited) **Jonathan Boyd**, Nathalie Fuentes, Christine Tkaczyk

2:30 PM **441** *Hot on the Trail of Kinesin-1 with MINFLUX;* **Jessica Matthias**, Jan O. Wolff, Lukas Scheiderer, Tobias Engelhardt, Johann Engelhardt, Stefan Hell

B09.4 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling

Tuesday 1:30 PM **Room M-100-E**

1:30 PM **314** *Three-Dimensional Mitochondria Reconstructions of Murine Cardiac Muscle Changes in Size Across Aging;* (Invited) **Antentor Hinton**, Zer Vue, Andrea Marshall

2:00 PM **329** *Potential Large-area Imaging of Butterfly Wing Scales with Transmission Electron Microscopy;* **Deepan Balakrishnan**, Anupama Prakash, Benedikt Daurer, Justin Ong Jun Kiat, Yong Zi Tan, Antonia Monteiro, N. Duane Loh

2:15 PM **340** *Volume Electron Microscopy Workflows for the study of Large-Scale Neural Connectomics;* **Richard Schalek**, Xiaotang Lu, Jonathan Boulanger-Weill, Neha Karlupia, Yuelong Wu, Shouhong Wang, Nagaraju Dhanyasi, Jeff Lichtman Lichtman

2:30 PM **353** *Developing a Cost-Effective User-Friendly Pipeline for Super-Resolution Volume CLEM;* (Invited) **Lucy Collinson**

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Tuesday Afternoon

C03.2 Correlative and Multimodal Microscopy and Analysis

Tuesday 1:30 PM **Room L-100-J**

1:30 PM **315** *Hybrid Electron Microscope for Multimodal In Situ Measurements;* (Invited) **Renu Sharma**, Wei-Chang David Yang

2:00 PM **330** *A New Correlative Microscopy Platform Integrating AFM with in-situ SEM;* **Kerim Arat**, Stefano Spagna, Hamed Alemansour, Andreas Aman, Luis Montes, Jeffrey Gardiner, Chistian Schwalb, Lukas Stühn, Marion Stühn, Sebastian Siebert

2:15 PM **341** *Application of Spectral Cathodoluminescence to Multi-Modal Research at the Nano-Scale: Case Studies from the UNSW Electron Microscope Unit;* **Karen Privat**, Shery Chang, Toney Fernandez, Jianjun Li, Jialiang Huang, Xiaojing Hao

2:30 PM **354** *Multimodal Imaging of Light Isotope Distributions in Irradiated Materials;* **Xiao-Ying Yu**, Jiyoung Son, Tanguy Terlier, Shawn Riechers, Shalini Tripathi, Gary Sevigny

2:45 PM **362** *Multimodal Imaging of Hydrogen Distributions in Mg2Ni Hydrogen Storage Thin Films;* **Dustin Andersen**, Tom Wirtz, Santhana Eswara

C05.3 Vendor Symposium

Tuesday 1:30 PM **Room M-100-G**

1:30 PM **316** *Characterization of Electrode-based BackScatter Electron Detector for in-situ SEM;* **Grigore Moldovan**, Florian Schumann, Wolfgang Joachimi, Marc Willinger

1:45 PM **320** *High Temperature EDS and EBSD Analysis - Enabling in-situ Heating for Direct Observation of Phase Transformations in the SEM;* **Haithem Mansour**, Simon Burgess, Pat Trimby, Kim Larsen, Jack Donoghue, Jiaqi Xu, Albert Smith

2:00 PM **331** *Latest Improvements on Silicon Drift Detectors for Fast, High Resolution EDX Spectroscopy in Electron Microscopy;* **Adrian Niculae**, Stefan Aschauer, Markus Bornschlegl, Kathrin Hermenau, Klaus Heinzinger, Heike Soltau, Lothar Strueder

2:15 PM **342** *Robotic Preparation of Tissue Specimens for TEM and Volume EM;* **Thomas Strader**, Benjamin August, Ru-Ching Hsia

P Physical Sciences Symposia – Tuesday Afternoon

P07.4 Prof. Wilbur C. Bigelow Centenary Symposium In Situ Heating and Gas-Reaction Studies in Materials Sciences

Tuesday 1:30 PM **Room 200-G**

1:30 PM **317** *The Impact of Artificial Intelligence on In Situ Electron Microscopy;* (Invited) **Peter Crozier**, Adria Marcos-Morales, Matan Leibovich, Sreyas Mohan, Piyush Haluai, Mai Tan, Advait Gilankar, Joshua Vincent, Yifan Vincent, Carlos Fernandez-Granda

2:00 PM **332** *Analytical in situ Gas Transmission Electron Microscopy Enabled with Ultrathin Silicon Nitride Membranes;* **Kunmo Koo**, Paul Smeets, Xiaobing Hu, Vinayak Dravid

2:15 PM **343** *Formation of Pt-Pd 'Janus' Biphasic Particles During High Temperature Aging of Diesel Oxidation Catalysts;* **Stephen Porter**, Chih Han Liu, Hien Pham, Andrew DeLaRiva, Eric Peterson, Stephen House, John Watt, Eleni Kyriakidou, Abhaya Kyriakidou

2:30 PM **355** *Dynamic Evolution of Structure and Chemical Bonding in Atomically Dispersed Catalysts via in situ Electron Microscopy;* (Invited) **Xiaoqing Pan**, Peter Tieu, Sheng Dai, Wenjie Zang

P10.4 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Tuesday 1:30 PM **Room 200-J**

1:30 PM **318** *Tracking Lithiation with Advanced Transmission Electron Microscopy;* (Invited) **Dong Su**, Xincheng Lei, Jiayi Wang, Xuefeng Wang, Lin Gu

2:00 PM **333** *Investigation of Nanoparticle Degradation in Hydrogen Fuel Cell Systems Through Automated Electron Microscopy;* **Lynda Amichi**, Haoran Yu, Michael Zachman, Amir Ziabari, Jose D Arregui-Mena, Laure Guetaz, Thomas David, Zineb Saghi, Adem Saghi, David Cullen

2:15 PM **344** *Direct Observation of Carbon Dioxide Adsorption in Sorbents Consisting of Porous Silicas;* **Wei-Chang David Yang**, Marcus Carter, Renu Sharma

2:30 PM **356** *Revealing the Formation Mechanisms of Covalent Organic Framework Onion Structure;* **Qi Zheng**, Chongqing Yang, Daewon Li, Karen Bustillo, Haimei Zheng

2:45 PM **363** *Revealing Local Ordering in PbSr2S3 Thin Films and its Effect on Optical Properties Utilizing 4DSTEM and EELS Techniques;* **Patricia Meza**, Mercouri Kanatzidis, Roberto dos Reis, Vinayak Dravid

Scientific Program

A Analytical Sciences Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **Exhibit Hall**

A01.P1 Microscopic Approach of Materials for Agri-Food Process

POSTER # 91

364 *Carbon Nanotubes Produced After Forest Fire Oxidized and Functionalized with Fluorescein Isothiocyanate Improve Development of Avena sativa*; **Marco Alemán**, Javier Villegas-Moreno, Gladys Juárez Cisneros, Dhirendra Kumar Tiwari, Jesus Campos García

POSTER # 92

365 *Effect of Multi-Walled Carbon Nanotubes Functionalized With Indol-3-Butyric Acid on the Development of Avena sativa;* **Daniela Fernández Gómez**, Gladys Juárez Cisneros, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Jesus Campos García

POSTER # 93

366 *Effect of Multi-Walled Carbon Nanotubes Functionalized With Kinetin on the Development of Avena sativa*; **Daniela Fernández Gómez**, Gladys Juárez Cisneros, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Mariela Gómez Romero

POSTER # 94

367 *Effect of Natural Carbon Nanotubes Biotransformed by Trichoderma sp on the Development of Zae mayz*; **Nestor Munoz**, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Gladys Juárez Cisneros, Salomón Borjas

POSTER # 95

368 *Effect of Synthetic Carbon Nanotubes Biotransformed by Trichoderma sp. on the Development of Avena sativa*; **Nestor Munoz**, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Gladys Juárez Cisneros, Salomón Borjas

POSTER # 96

369 *Evaluation of Genotoxicity and Compositional Study of Plants Developed with Nanomaterials;* **Ana Coria-Tellez**, Eduardo Zamora Martínez

POSTER # 97

370 *Evaluation of Shrinkage Cellular in Slices Potatoes during its Convective Drying Using SEM and Image Analysis;* **José Jorge Chanona-Pérez**, Stephany Montserrat Gutiérrez Martínez, Josué Hernández-Varela, Susana Dianey Gallegos-Cerda, Juan Vicente Méndez Méndez

POSTER # 98

371 *Impact of Climate Change on Crop Yield Due to Pests and Crop Diseases: Future Projection;* **Karuna Singh**, Bharti Kaushik, Dhirendra Kumar Tiwari

POSTER # 99

372 *Nanomaterials an Overview & Green Synthesis of Zn and Mg Oxide Nanomaterials for Agri-food Production;* **Dhirendra Kumar Tiwari**

POSTER # 100

373 *Nanotechnological Products in Crops of Economic Interest: Evaluation Against Fungal Affectivity;* **Maria Del Carmen Perez Sanchez**

POSTER # 101

374 *Nanotechnology and Their impact in High Yield Production;* **Mercedes Montserrat Martinez**, Lexlie Ireri Rangel Vázquez

POSTER # 102

375 *Rapid Analysis of Chemical Compounds in Curcuma Longa using AccuTOF™ DART® Direct Analysis in Real Time, Time-of-Flight Mass Spectrometer;* **Dhirendra Kumar Tiwari**

POSTER #103

376 *Technological Tools for the Quick Analysis of Experimental Data Obtained in The Agri-Food Process;* **Leslie A. Sanchez Ramirez**, Lexlie Rangel

POSTER # 104

377 *The Oxidation and Functionalization of Multi-walled Carbon Nanotubes with Fluorescein-isothiocyanate Improve Germination and Early Development of Avena sativa*; **Marco Alemán**, Javier Villegas-Moreno, Gladys Juárez Cisneros, Dhirendra Kumar Tiwari, Nicolás Zamudio Durán

POSTER # 105

378 *Vertical Plant Factory*; **Jorge Mendoza**, Rubí Pérez González

POSTER # 106

379 *Zinc Oxide Nanoparticles: An Environmentally Friendly Alternative to Improve Early Germination of Zea Mays*; **Neftali Rangel-García**, Javier Villegas-Moreno, Dhirendra Kumar Tiwari, Gladys Juárez Cisneros, Salomón Borjas

A02.P2 Microscopy and Microanalysis for Real World Problem Solving

POSTER # 107

380 *Analysis of Aluminum-Based Metal Matrix Composite Reinforced with SiC Particles Studied by Scanning Electron Microscopy;* **Johnattan Vargas**, Yamile Cardona-Maya, Andrés E. Zapata, José Ernesto Ledezma, Juan Meza, José Herrera-Ramirez, Cesar Isaza

POSTER # 108

381 *Arsenic Fixation by Aged Ferrihydrite Nanoparticle;* **Erico Freitas**, Taiane Souza, Virginia Ciminelli

POSTER # 109

382 *Detecting Pu in U-bearing Particles by SEM-EDS for Nuclear Safeguards Applications;* **Kimberly Wurth**, Travis Tenner, Benjamin Naes

POSTER # 110

383 *Determining Morphology and Size Distribution of Nano-scale Features in Conductive Ink for use in Aerosol Jet Printing;* **Janet Gbur**, Sylvie Crowell, Mitchell Melander

A Analytical Sciences Poster Sessions – Tuesday Afternoon cont.

POSTER # 111

384 *Evaluation of New Titanium Alloys as Potential Materials for Medical Devices;* **Cristina Jimenez-Marcos**, Julia Mirza-Rosca, Madalina-Simona Baltatu, Petrica Vizureanu

POSTER # 112

385 *Microstructural Characterization of CoCrFeMoNiW Alloy as Candidate for Heavy Vehicules;* **C.D. Gómez-Esparza**, A.E. Lui-Chavira, I. Estrada-Guel, A. Villalobos-Aragón, D. Espejel-García, C. López-Díaz de León, Y.P. Muñiz-Martínez6, H. Martínez-Lara

POSTER # 113

386 *Microstructural Origin of Hardness in Thermite Welded Rails;* **Heshmat Aglan**, Rifat Bin Zakir, Demario Broderick

POSTER # 114

387 *Microstructure of CeO2 Nanoparticles Loaded with Different Amounts of Ag and Their Antimicrobial Activity;* **Limny Perez-Jimenez**, Erik Morales, Francisco Paraguay-Delgado, Laila Muñoz-Castellanos, Lizeth Rojas-Blanco

POSTER # 115

388 *Phase Transformations and Microstructural Study of Bismuth Ferrite Ceramics Obtained by Solid-State Reaction;* **Javier Hernández Paredes**, Juan José López-Rodríguez, Ofelia Hernández-Negrete, Hilda Esparza-Ponce, Felipe Barfusson Dominguez, Víctor E Alvarez Montaño, Francisco Brown Bojórquez

POSTER # 116

389 *Quantitative Imaging using an Automated in-operando micro-CT Workflow: Tracking the Drying and Related Shape-changes of Silica Aerogels;* **Julien Gonthier**, Tilman Rilling, Ernesto Scoppola, Fabian Zemke, Aleksander Gurlo, Peter Fratzl, Wolfgang Wagermaier

POSTER # 117

390 *Structure Evolution in Nature Quasicrystal Formed by Electrical Discharge;* **Guangming Cheng**, Dingxin Fan, Nan Yao

POSTER # 118

391 *The Wormholes Within: A Study of 1, 3, 5-Triamino-2, 4, 6-Trinitrobenzene Crystal Morphology by Micro and Nano-Scale X-Ray Computed Tomography;* **Brian Patterson**, Lindsey Kuettner, Kevin Henderson, John Yeager, Larry Hill

POSTER # 119

392 *Throwing the Kitchen Sink: Various Methods to Quantify Trace Carbon in Steel using an Electron Probe Microanalyzer (EPMA);* **Christian Harris**, Joe Boro, Erin Barrick

POSTER # 120

393 *Visible Light Photocatalysts: Studying Dopant Heterogeneity in Rhodium Doped Strontium Titanate;* **Blake Dorame**, Piyush Haluai, Peter Crozier

A04.P2 The Praxis of 4D-STEM—Extracting Information from Biological and Functional Materials

POSTER # 121

394 *4D STEM Simulation of Defects in Palladium Nanoparticles;* **David Robinson**, Joshua Sugar, Xiaowang Zhou

POSTER # 122

395 *An Electron Computational Ghost Imaging Setup for High Resolution Imaging;* **Vincenzo Grillo**, Paolo Rosi, Lorenzo Viani, Enzo Rotunno, Amir Tavabi, Rafal Dunin-Borkowski, Stefano Frabboni

POSTER # 123

396 *Architecture, Development Cycle, and Governance Considerations in Co-Created Research Software: The Example of py4DSTEM and Analysis of 4D-STEM Data;* **Benjamin Savitzky**, Alexander M Rakowski, Alexandra Bruefach, Stephanie Ribet, Georgios Varnavides, Steven Zeltmann, Tara Mishra, Mary Scott, Andrew Minor, Colin Ophus

POSTER # 124

397 *Characterization of Quantum Emitters and Extended Defects in ZnSe via Multislice Electron Ptychography;* **Xi Chen**, Colin Gilgenbach, James LeBeau

POSTER # 125

398 *Exploring Low-dose and Fast Electron Ptychography using l_0 Regularisation of Extended Ptychographical Iterative Engine;* **Amirafshar Moshtaghpour**, Abner Velazco-Torrejon, Alex Robinson, Professor Kirkland, Nigel Browning

POSTER # 126

399 *MerlinEM, Hybrid Pixel Array Counting Detector for Transmission Electron Microscopy;* **Adriana Klyszejko**, Matus Krajnak

POSTER # 127

400 *Quickly Switchable Angular and Spatially Resolved Cs-corrected STEM;* **Toshihiro Aoki**, Hidetaka Sawada, Chaojie Du, Xiaoqing Pan

POSTER # 128

401 *Resolving the Octahedral Tilting Modulation in Incommensurate Tetragonal Tungsten Bronze by DPC STEM;* Stephen Funni, Peter Ercius, Elizabeth Dickey

Scientific Program

A Analytical Sciences Poster Sessions – Tuesday Afternoon cont.

A08.P1 Advances in Focused Ion Beam Instrumentation, Applications and Techniques in Materials and Life Sciences

POSTER # 129

402 *10 years of LaserFIB: The Latest Developments in a Dual Chamber, 3 Beam FIB-SEM for Large Volume Material Removal and Semi-Automated FIB Integration;* **Benjamin Tordoff**, Cheryl Hartfield, Sebastian Krauss, Lamya Abdellaoui, Stephen Kelly, Hrishikesh Bale

POSTER # 130

403 *Cryo-FIB-SEM Microstructure Characterisation of Lithium-Ion Batteries (LIB) to support carbon neutrality;* **Mark Taylor**

POSTER # 131

404 *Getting The Best Spatial Resolution By Using Low kV EDS in FIB Workflows;* **Daniel Haspel**, Michael Hjelmstad, Simon Burgess, Haithem Mansour

POSTER # 132

405 *Influence of the Laser and Scanner Regimes for Preparing Cross-Sections with Ultra-Short-Pulsed Laser;* **Boris Rottwinkel**, Mónica Navarro López, Thomas Gester

POSTER # 133

406 *Semi-Automated EXLO for Ambient and Cryogenic TEM Specimen Manipulation;* **Ahmed Darwish**, Thomas Dougherty, Brandon Heck, Michael Colletta, Yue Yu, Lena Kourkoutis, Kyle Beggs, Alain Kassab, Alice Dohnalkova, Lucille Giannuzzi

POSTER # 134

407 *TEM in-situ Deformation Study of Magnesium Reinforced with Carbon Nanotubes by Bending Test;* **C. Carreño-Gallardo**, Cesar Isaza, Yamile Cardona-Maya, Juan Rudas, Juan Meza, José Herrera-Ramirez

POSTER # 135

408 *Three-in-one Plan-view TEM Sample Preparation for 3D NAND Abstract;* **Drew Goettler**, Ming Zhang

POSTER # 136

409 *ToF-SIMS on a Xe Plasma FIB: Dos and Don'ts;* **Jamie Ford**

POSTER # 137

410 *Towards an Understanding of Poisoning of Steam Cracking Steels by Alkali Metals;* **Matthew Thorseth**, Paul Vlasak, Mark Davis

POSTER # 138

411 *Using Combination of X-Ray 3D Tomography and FEG-SEM to Perform 3D-FIB Reconstruction in Identified Area to Investigate Effect of Mining Contamination on Scallop Shell Growth;* **Lise Guichaoua**, Stéphanie Bessette, Natalie Reznikov, Raynald Gauvin, Roland Kröger, Bryce Stewart

A14.P1 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

POSTER # 139

412 *Al-Graphite Nanostructures Composites Fabricated by High-Frequency Induction Sintering Method;* **A. Santos-Beltrán**, Veronica Gallegos, mIRIAM Santos-Beltran, Hansel Medrano, Iza Ronquillo-Ornelas, roberto Martínez Sanchez

POSTER # 140

413 *Characteristic core shell structures with composition x = 0.01 (BaTi1-5xNb4xO3) prepared by the barium titanate route and the solid-state route;* **Angel Morales-Robles**, Oscar Armando Gomez, Martín Ortiz-Domínguez, Arturo Cruz-Avilés, Edith Flores, Martha Ofelia Nieto, Teresita de Jesús Cruz, Edgar Cardoso

POSTER # 141

414 *Characterizing Facets on Spherical Particles of Al65Cu25Fe15 Alloy by using Scanning Electron Microscope;* **Joshua Craig**, Chunfei Li

POSTER # 142

415 *Coupling Quantitative Microstructural Measurements to Mechanical Properties Using Correlative Mechanical Microscopy;* **Pat Trimby**, Simon Muntwyler, Roman Mouginot

POSTER # 143

416 *Cross-Correlative Microscopy Study of Five-Fold Twinning at the Surface of Ni-based Films;* **Ilias Bikmukhametov**, Gregory Thompson

POSTER # 144

417 *EDS Chemical Mapping by Unmixing of Spectral Imaging Data;* **Yuka Otake**, Atsuhiro Fujii, Hiroki Kato, Nobuaki Tanabe, Ichiro Ohnishi

POSTER # 145

418 *Microscopy and Microanalysis of Electrochemical Assay of Titanium Metallic Foam;* **Abraham Mejia**, Claudio Aguilar, Jose Solis, Ismeli Alfonso, Victor Castellanos, Georgina Carbajal

POSTER # 146

419 *SEM and EDS Analysis of Ti-13Ta-1Cu Alloy Obtained by Mechanical Alloying;* **Lizbeth Sandoval**, Ariosto Medina Flores, Claudio Aguilar, Salomón Borjas

POSTER # 147

420 *Structural Analysis Enabled by the Invizo 6000® Large Field-of-V-iew Atom Probe;* **Yimeng Chen**, Isabelle Martin, Ty Prosa, Robert Ulfig, Katherine Rice, David Larson, David Reinhard, Dan Lenz, Nick Brewer, Joysurya Basu

POSTER # 148

421 *Superhydrophobic Coatings from Eggshell Waste Micro and Nanoparticles, Surface Characterization Using Image Texture Analysis, Light, and Confocal Microscopy;* **José Jorge Chanona-Pérez**, Lizbeth Gonzalez Victoriano, Benjamín Arredondo-Tamayo, Susana Dianey Gallegos-Cerda, Josué Hernández-Varela, Candelaria Galvan Colorado

POSTER # 149

422 *Terahertz Readable Laser Tags for Information Storage and Traceability;* **Pouria Hoveida**, Adrian Phoulady, Hongbin Choi, Nicholas May, Sina Shahbazmohamadi, Pouya Tavousi

POSTER # 150

423 *Torch Intercalated-Graphite Expansion Under Vacuum: A Comparative Study;* **I. Estrada-Guel**, J.M. Mendoza-Duarte, P. Pizá-Ruíz, Erique Rocha-Rangel, C.D. Gómez-Esparza, C.G. Garay-Reyes, R. Martínez-Sánchez

POSTER # 151

424 *Transmission Electron Microscopy Study on the Process of Gold Nanoporous Film Formation on AAO Substrate by Thermal Treatment;* **Oscar Cigarroa-Mayorga**, Patricia Talamás-Rohana, Salvador Gallardo-Hernández

Scientific Program

B Biological Sciences Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **Exhibit Hall**

B02.P2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

POSTER # 152

425 *Annular Dark Field Imaging with variable angle for improving STEM tomography of Biological Samples*; **Wing Shun Li**

POSTER # 153

426 *Assessing and Maximizing the Quality of 3DEM Structure Data at the Worldwide Protein Data Bank;* **Justin Flatt**, Brian Hudson, Irina Persikova, Yuhe Liang, Chenhua Shao, Ezra Peisach, Jasmine Young, Stephen Burley

POSTER # 154

427 *Beauty Is in the AI of the Beholder;* **Lambertus Alink**, Robert Gheorghita, Kashyap Maruthi, Edward Eng

POSTER # 155

428 *Highlights from the University of Virginia Molecular Electron Microscopy Core;* **Michael Purdy**, Kelly Dryden

POSTER # 156

429 *Image Processing Pipeline for In Situ Structural Characterization of Filaments;* **Matthew Chang**, Amanda Erwin, Shyamal Mosalaganti

POSTER # 157

430 *Modern Tools for In-situ Tomography;* **Misha Kopylov**, Daija Bobe, Reza Paraan, Jake Johnston

POSTER # 158

431 *Morphological Comparison of Primary Neurons Cryo-Preserved Under Varied Conditions;* **Joseph Kim**, Jae Yang, Josephine Mitchell, Lauren English, Jill Wildonger, Erik Dent, Elizabeth Wright

POSTER # 159

432 *Optimizing the Protein Stability in Thick Filament Cryo-Em Sample Preparation using a PEGylation Technique;* **Hosna Rastegarpouyani**, Fatemeh Abbasi Yeganeh, Alimohammad Hojjatian, Kenneth Taylor

POSTER # 160

433 *STEM Tomography of Biological Samples Using Integrated Differential Phase Contrast Imaging Method;* **Xiaoqing He**, Min Su

POSTER # 161

434 *Towards the Visual Proteomics of C. reinhardtii using High-throughput Collaborative in situ Cryo-ET;* **Sagar Khavnekar**, Ron Kelley, Florent Waltz, Xianjun Zhang, Martin Obr, Grigory Tagiltsev, John Birggs, Ben Engel, Jürgen Plitzko, Abhay Kotecha

B04.P1 Development, Challenges and Biomedical Applications of Tissue Clearing, Super-resolution Microscopy and Tissue Imaging

POSTER # 162

435 *11-fold Expansion Microscopy with Universal Molecular Retention Using Magnify;* **Aleksandra Klimas**, Brendan Gallagher, Emma DiBernardo, Zhangyu Cheng, Yongxin Zhao

POSTER # 163

436 *Clearing and Whole Mount Immunohistochemistry for Smooth Muscle Actin Visualization during Regeneration;* **Luke Bollinger,** Chauncey Liffiton, Madison Gamble

POSTER # 164

437 *Optimizing Scanning Bessel Beam Light Sheet Microscopy with Custom-Designed Lens Cap for Expansion Microscopy;* **Chia-Ming Lee**, Xuejiao Tian, Min-Ju Tsai, Bi-Chang Chen

POSTER # 165

438 *Tissue Clearing of Whole-mount Alcian Blue and Eosin Stained Tissue to Investigate Cells Implicated in Regenerative Patterning;* **Luke Bollinger**, Joshua Wilmer

B06.P1 Innovations in Light Microscopy: Revealing the Inner Workings of Life from Single Molecule to Whole Organisms

POSTER # 166

439 *Age and Hormonal Stimulation Affect Tyramine Enrichment and Smooth Muscle Modulation within the Male Mouse Reproductive System;* **Solange Steadman**, Debra Page Baluch

POSTER # 167

440 *Click Chemistry for Visualization of Newly Synthesized RNA and Antibody Labeling on Ultrathin Tissue Sections;* ***Janeth Perez Garza***, Jairo Orea, Linnaea Ostroff

B Biological Sciences Poster Sessions – Tuesday Afternoon cont.

B09.P1 Volume Electron Microscopy in Biological Research – Instrumentation, Sample Preparation and Data Handling

POSTER # 169

442 *An Integrated Solution for the Complete Serial Block-Face Scanning Electron Microscopy Workflow: From Image Acquisition to Data Processing;* **Martin Koban**, Markéta Machálková, Jakub Javůrek

POSTER # 170

443 *Array Tomography of MM-Sized Biosamples: Impact of Resin Formulations on Sample Fidelity and Image Quality;* **Christopher Dell**, Melissa Mikolaj, Kedar Narayan

POSTER # 171

444 *Method Development: Characterization of the Structure of the Thymic Epithelial Cell Network Utilizing Fluorescent Whole Slide Scanning and 3D SEM Array Tomography;* **Leslie Gunther-Cummins**, Maria Lagou, Hillary Guzik, Sophia DesMarais, George Karagiannis, Vera DesMarais, Leslie Gunther-Cummins

POSTER # 172

445 *What Should I Do with My Serial Block-Face Data? Suggestions for Preparing, Analyzing, and Presenting Volume EM Datasets;* **Trace Christensen**, Lindsay Nevalainen, Jeffrey Salisbury

Scientific Program

P Physical Sciences Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **EXHIBIT HALL**

P07.P1 Prof. Wilbur C Bigelow Centenary Symposium In Situ Heating and Gas-Reaction Studies in Materials Sciences

POSTER # 173

446 *Analysis of Thermal Stability and Degradation Behavior for High-Ni NCMA Cathode Materials using Thermal In-Situ STEM-EELS;* **Jong Seok Jeong**, Jungwon Park

POSTER # 174

447 *Effects of Membrane Thickness, Gas Pressure and Electron Dose in Gas Cell Transmission Electron Microscopy;* **Xiaobing Hu**, Kunmo Koo, Paul Smeets, Vinayak Dravid

POSTER # 175

448 *Emission-Based Temperature Mapping with STEM EBIC;* **William Hubbard**, Matthew Mecklenburg, Ho Leung Chan, B. C. Regan

POSTER # 176

449 *Graphene Seals for in situ TEM in Catalysis;* **Anton Bjørnlund**, Hjalte Ambjørner, Tobias Bonczyk, Edwin Dollekamp, Lau Kaas, Sofie Colding-Fagerholt, Kristian Speranza Mølhave, Christian Damsgaard, Stig Helveg, Peter Vesborg

POSTER # 177

450 *In Operando Transmission Electron Microscopy Studies on Diffusion-Induced Phenomena at Dielectric-Electrode Interfaces in Ge2Te3-Based Memristor Devices;* **Krishnamurthy KMahalingam**, Austin Shallcross, Derek Winner, sabyasachi Ganguli, Guru Subramanyam, Cynthia Bowers

POSTER # 178

451 *In Situ Investigation of the Mechanistic Causes of Sintering in Platinum – Aluminum Oxide Catalysts;* **Jacob Smith**, Miaofang Chi, Wenpei Gao

POSTER # 180

453 *Investigation of Cu Species in Dealuminated Beta Zeolite Studied by Operando Closed-Cell Gas Reaction STEM;* **Kinga Unocic**, Stephen Purdy, Lawrence Allard, Gregory B. Collinge, Junyan Zhang, Shivangi N. Borate, Qiyuan Wu, Evan C. Wegener, Nohor Samad, Susan Habas

POSTER # 181

454 *Investigation of Metal-Metal Oxide Interfaces via Real-Time In Situ TEM Heating;* **Ayanthi Thisera**, Alexandra Riddle, Beth Guiton, Matthew Boebinger

POSTER # 182

455 *Nanoparticle Mobility and Coalescence During Sintering of a Ni/MgAl2O4 Methane Steam Reforming Catalyst;* **Abhaya Datye**, Thomas Willum Hansen, Andrew DeLaRiva

P10.P2 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

POSTER # 185

458 *Atomic-Scale Imaging Polypeptoid Crystals with Varying Molecular Side Chains;* **Morgan Seidler**, Tianyi Yu, Xubo Luo, David Prendergast, Ronald Zuckermann, Nitash Balsara, Xi Jiang

POSTER # 186

459 *Domain Orientated Nanoparticle Exsolution in Defect Engineered Stannate Perovskite;* **Yeon-seo Nam**, Hyeji Sim, Yujeong Lee, Daseob Yoon, Junwoo Son, Si-Young Choi

POSTER # 187

460 *Electron Microscopy of Ammonium Urate Crystallization under Tautomerism;* **Hector Calderon**, Francisco C. Robles-Hernandez, WeiWei Tang, Jeffrey Rimmer

POSTER # 188

461 *Elucidating the Role of Nanoscale Organics in Natural Nanocomposite Materials;* **Paul Smeets**, Xiaobing Hu, Vinayak Dravid

POSTER # 189

462 *Exploiting 2D Perovskites for Catalyst Support Applications;* **Dmitri Zakharov**, Lucas Alameda, Kim Kisslinger, Aaron Stein, Anibal Boscoboinik, Judith Yang

POSTER # 190

463 *In-situ Formation of TiC from Titanium/Stearic Acid Powders by Mechanical Alloying Structural and Microstructural Point of View;* **M.L. Camacho-Rios**, Guillermo Herrera-Perez, M.A. Ruiz-Esparza-Rodriguez, Raúl Pérez-Bustamante, Jose Betancourt-Cantera, C. Carreño-Gallardo, D. Lardizabal-Gutiérrez

POSTER # 191

464 *Investigating States of Gas in Water Encapsulated Between Graphene Layers with Transmission Electron Microscopy;* **Ing-Shouh Hwang**, Wei-Hao Hsu

POSTER # 192

465 *Observation Of Al-Cu Interface Instability During Room Temperature Storage;* **Jørgen A Sørhaug**, Per Vullum, Randi Holmestad

POSTER # 193

466 *Phase Imaging Annihilation of Dislocation at Crystal Surface;* **Rodney Herring**

POSTER # 194

467 *Pinning and Depinning of Domain Switching in Ferroelectric HfO2 Freestanding Membrane;* **Kyoung-June Go**, Min-Su Kim, Kyoungjun Lee, Jun Hee Lee, Seung Chul Chae, Si-Young Choi

P Physical Sciences Poster Sessions – Tuesday Afternoon cont.

POSTER # 195

468 *Probing Single In-Donor Emitter Sites in ZnO: Ion-Beam Processing to Overcome Diffraction-Limited Optical Measurements;* **Bethany Matthews**, Kai-mei Fu, Steven Spurgeon, Christian Zimmermann, Ethan Hansen, Vasileios Niaouris

POSTER # 196

469 *Synthesis and Characterization of Perovskite Oxide Reinforced Polymer Nanocomposites;* **Zhiping Luo**, Starfari McClain, Thomas Murray, Richard Harry, Navadeep Shrivastava, Sivasankara Rao Ede, Shaik Zainuddin

POSTER # 197

470 *TEM Observation of the Deterioration and Thermal Recovery Process of Argyrodite-type Solid Electrolytes under Dry-Room-Simulated Condition;* **Hirofumi Tsukasaki**, Shigeo Mori

POSTER # 198

471 *TEM Studies of a New Modulated Structure in Mn2RuSn Alloy and Intermetallic Phases in Fe3+xCo3-xTi2 (x = 0, 1, 2, 3) Alloys;* **Xing-Zhong Li**, Shah Valloppilly

POSTER # 199

472 *Temperature Dependence of Mn5Ge3-Mn11Ge8 Phase Formation in Co-sputtered Thin Films;* **Adriana Alvídrez-Lechuga**, José Holguín-Momaca, Ricardo López Antón, Sion olive-Méndez

Scientific Program

O Outreach Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **EXHIBIT HALL**

X90.P1 Outreach—Microscopy in the Classroom

POSTER # 200

473 *3D Auto fluorescent analysis of the Human Cornea;* **Frank Denaro**, Myla Worthington, T Richard, T Atanda, T Boddy, T Dunham, T Johnson, James Wachira

POSTER # 201

474 *A STEM Training Program Focused on Microscopy;* **Frank Denaro**, Simon Nyaga, Davide Zella, Joseph Bryant, Francesca Benedetti

POSTER # 202

475 *Autofluorescence Microscopy can Reveal the Fine Structure of the Tooth;* **Frank Denaro**, K Howard, J Mack, D Pearson, I Simmons, R Vereen, O Vines

POSTER # 203

476 *Cost-effective Photooxidation Laboratory for Undergraduates;* **Giovanna Grandinetti**, Taylor Metz, Hannah Gove, Rileigh Simpson, Bryce Civin, Amy Santas

POSTER # 204

477 *Histopathological Changes in the Heart of the HIV-1 Transgenic Rat;* **Frank Denaro**, Sumiko Williams, Myla Worthington, Davide Davis, Joseph Bryant

POSTER # 205

478 *Neuromorphological Analysis of the Primate Claustrum;* **Frank Denaro**, R.K. Holmes, I Sofowora, Y. Liadi, T. Solomon, P. Dike, J. Ladow, James Wachira, L.R. Edelstein,

POSTER # 206

479 *Remote Operation of Instruments for Education and Research;* **Fernando Camino**, Armando Rua, Dalice Pinero, Fernando Nieto-Fernandez, Aleida Perez, Kim Kisslinger, Judith Yang

POSTER # 207

480 *Training the Next Generation of HIV/AIDS Researchers;* **Frank Denaro**, Kenneth Samuel, Davide Zella, Francesca Benedetti, Davide Davis, Joseph Bryant

Wednesday, July 26

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Wednesday Morning

A02.5 Microscopy and Microanalysis for Real World Problem Solving

Wednesday 8:30 AM **Room 200-A**

8:30 AM **481** *Reliable Microscopy and Microanalysis Strategies for Real-World Batteries;* (Invited) **Kai He**

9:00 AM **499** *FIB Sample Preparation and Low Dose STEM Characterisation Challenges of Hybrid Organic-Inorganic Perovskite (HOIP) Solar Cells;* **Mounib Bahri**, Felipe Schnaider Tontini, Michel De Keersmaecker, Erin Ratcliff, Neal Armstrong, Nigel Browning

9:15 AM **514** *Characterization of Li-ion Batteries by Scanning Electron Microscopy: Quantification of Chemical Composition Including the Li Content;* **Ute Golla-Schindler**, Estefane BarbosaSa, Christian Weisenberger, Volker Knoblauch, Gerhard Schneider

9:30 AM **529** *Electron Microscopy of Carbon Soots for Battery Applications;* **Francisco C. Robles Hernandez**, Héctor Calderón Benavides, Samprash Risal, Zheng Fan

9:45 AM **545** *Study of Lithiation Dynamics in Primary Particles of Cathode Materials by In-Situ TEM Techniques Applications;* **Arnaud Demortière**, Kevyn Gallegos, Ahmed Yousfi

A04.5 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials

Wednesday 8:30 AM **Room 200-B**

8:30 AM **482** *Optimizing Parameters for High-resolution and Low-dose Electron Ptychography;* (Invited) **Yi Jiang**, Michael Cao, Zhen Chen, Yimo Han

9:00 AM **500** *Three-dimensional Analysis of Nanoscale Dislocation Loops with Multislice Electron Ptychography;* **Colin Gilgenbach**, Xi Chen, Michael Xu, James LeBeau

9:15 AM **515** *3D Sectioning of Rough Interfaces Using Mixed-State Multislice Ptychography, Annular Dark Field, and Integrated Differential Phase Contrast Imaging;* **Shake Karapetyan**, Ta-Kun Chen, Vincent D.-H. Hou, David Muller

9:30 AM **530** *Achieving Super Resolution Ptychography with a Quadrant Detector;* **Xiyue Zhang**, Zhen Chen, Yu-Tsun Shao, Yi Jiang, Ariana Ray, David Muller

9:45 AM **546** *Live Data Processing of 4D STEM Experiments: LiberTEM Meets ARINA Hybrid-Pixel Detector;* **Daniel Stroppa**, Alexander Clausen, Dieter Weber, Elisabeth Müller, Emiliya Pogosyan, Rafal Dunin-Borkowski

A07.5 In Memoriam of David Joy: Scanning Electron and Ion Microscopy

Wednesday 8:30 AM **Room 200-D**

8:30 AM **516** *In the Beginning – A Look at the Origins of Quantitative Electron Microprobe Analysis;* (Invited) Eric Lifshin

9:00 AM **501** *Factors Affecting Martensite Tetragonality During EBSD Analysis;* **Grzegorz Cios**, Aimo Winkelmann, Gert Nolze, Tomasz Tokarski, Marta Gajewska, Łukasz Rychłowski, Piotr Bała

9:15 AM **483** *PyEBSDIndex: Indexing Electron Backscattered Diffraction Patterns on the GPU;* **David Rowenhorst**, Patrick Callahan, Håkon Wiik Ånes

9:30 AM **531** *Low Electron Beam Energy X-ray Microanalysis: The Adventure Continues!;* **Dale Newbury**, Nicholas Ritchie

9:45 AM **547** *Non-Local Means Denoising of EDS Spectra for Rapid Composition Mapping in a Nickel Aluminum Bronze;* **Patrick Callahan**, David Rowenhorst, Dillon Watring

A11.5 Nanoscale Infrared Spectroscopy with Electrons and Photons

Wednesday 8:30 AM **Room M-100-H**

8:30 AM **484** *Pendulum Atomic Force Microscopy for Imaging Fluctuation Dynamics in Correlated Quantum Materials at Millikelvin Temperatures;* (Invited) **Aaron Coe**, Benjamin November, Federico Maccago, Stefan Ulrich, Jennifer Hoffman

9:00 AM **502** *Simulations of Magnon Diffuse Scattering in bcc Fe: The Impact of Temperature on Magnon Detection in STEM;* **José Ángel Castellanos-Reyes,** Paul Zeiger, Anders Bergman, Demie Kepaptsoglou, Quentin Ramasse, Juan Carlos Idrobo, Jan Rusz

9:15 AM **517** *Vibrational Spectroscopy of MnPSe3 in the Scanning Transmission Electron Microscope;* **Alexander Reifsnyder**, Mohamed Nawwar, Jordan Hachtel, Vicky Doan-Nguyen, David McComb

9:30 AM **532** *Imaging Phonon Dynamics at Hetero-Interfaces by Vibrational EELS;* (Invited) **Xiaoqing Pan**, Xingxu Yan, Chaitanya Gadre, Toshihiro Aoki

A13.1 Computational Advances in Electron Microscopy

Wednesday 8:30 AM **Room M-100-B**

8:30 AM **485** *abTEM: A Fast and Flexible Python-based Multislice Simulation Package for Transmission Electron Microscopy;* (Invited) **Jacob Madsen**, Toma Susi

9:00 AM **503** *Fast STEM Simulation Technique to Improve Quality of Inpainted Experimental Images Through Dictionary Transfer;* **Alex Robinson**, Jack Wells, Daniel Nicholls, Amirafshar Moshtaghpour, Miaofang Chi, Angus Kirkland, Nigel Browning

9:15 AM **518** *Streamlining Phantom Tomogram Generation Through Situs and TomoSim Integration;* **Peter Scheible**, Salim Sazzed, Jing He, Willy Wriggers

9:30 AM **533** *Pyxem: A Scalable Mature Python Package for Analyzing 4-D STEM Data;* **Carter Francis**, Paul Voyles

9:45 AM **548** *Fluctuation Component Analysis-Based K-Means Clustering in 4D-STEM of Heterogeneous Materials;* **Hanyu Hou**, Saran Pidaparthy, Haoyang Ni, Jian-Min Zuo

A14.5 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Wednesday 8:30 AM **Room 200-C**

8:30 AM **486** *Mechanical Spectroscopy: Machine Learning and High Speed Nanoindentation for High Throughput Material Evaluation;* (Invited) **Douglas Stauffer**, Eric Hintsala, Bernard Becker, Benjamin Stadnick, Ude Hangen, Moujhuri Sau, Nathan Mara

9:00 AM **504** *Identifying the Microscopic Nature of Two Level System Loss Channels in Acoustic Devices Using X-ray Photoelectron Spectroscopy and Atomic Force Microscopy;* **Rachel Gruenke**, Gitanjali Multani, Oliver Hitchcock, E. Alex Wollack, Erik Szakiel, Christopher Sarabalis, Nathan Lee, Agnetta Cleland, Amir Cleland

9:15 AM **519** *Visible to Mid-IR Spectromicroscopy with Top-Down Illumination and Nanoscale (≈ 10 nm) Resolution;* **Devon Jakob**, Andrea Centrone

9:30 AM **534** *Characterization of Cellulose Aerogel TiO2 Structure and its Photocatalytic Activity by Means of AFM and Super-Resolution Techniques;* **José Jorge Chanona-Pérez**, Susana Dianey Gallegos-Cerda, Josué Hernández-Varela, Stephany Montserrat Gutiérrez Martínez, Carlos Alberto Huerta-Aguilar, Juan Vicente Méndez Méndez

9:45 AM **549** *Nanoendoscopy-AFM for Visualizing Intracellular Nanostructures of Living Cells;* **Keisuke Miyazawa**, Marcos Penedo, Hirotoshi Furusho, Takehiko Ichikawa, Mohammad Shahidul Alam, Kazuki Miyata, Chikashi Nakamura, Takeshi Fukuma Fukuma

Scientific Program

B Biological Sciences Symposia – Wednesday Morning

B02.4 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

Wednesday 8:30 AM **Room M-100-D**

8:30 AM **487** *Dynamin Superfamily Proteins Involved in Membrane Fission and Fusion;* (Invited) **Jenny Hinshaw**, Sarah Nyenhuis, John Jimah, Nidhi Kundu, Jonathan Harrision, Bertram Canagarajah

9:00 AM **505** *Novel ADP State Found in Smooth Muscle Heavy Meromyosin by CryoEM;* **Alimohammad Hojjatian**, Hosna Rastegarpouyani, Dianne Taylor, kenneth taylor

9:15 AM **520** *Tracing Randomly Oriented Filaments in Cryo-Electron Tomography Maps;* **Willy Wriggers**, Salim Sazzed, Peter Scheible, Jing He

9:30 AM **535** *Structure and Arrangement of Non-Myosin Proteins in the Flight Muscle Thick Filament from the Bumble Bee, Bombus ignitus by cryoEM;* **Jiawei Li**, Hamidreza Rahmani, Fatemeh Abbasi Yeganeh, Hosna Rastegarpouyani, Dianne Taylor, Micheal Previs, Neil Wood, Hiroyuki Iwamoto, kenneth Iwamoto

9:45 AM **550** *Structural and Functional Analysis of Flagellar Filaments of Caulobacter crescentus;* **Juan Sanchez**, Eric Montemayor, Nicoleta Ploscariu, Daniel Parrell, Jae Yang, Bryan Sibert, Kai Cai, Elizabeth Wright Wright

B03.1 Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network

Wednesday 8:30 AM **Room M-100-F**

8:30 AM **488** *State of the Art for Machine Learning in Bioimage Analysis;* (Invited) **Kyle Harrington**

9:00 AM **506** *Unsupervised Particle Picking and Clustering in Cryo-EM Micrographs;* **Alireza Nasiri**, Darnell Granberry, Tristan Bepler

9:15 AM **521** *Training Neural Networks with Simulated CryoET Data;* **Carson Purnell**, Jessica Heebner, Matthew Swulius

B08.1 Biological Soft X-ray Tomography

Wednesday 8:30 AM **Room M-100-E**

8:30 AM **489** *Applications of Soft X-ray Tomography for the Direct Observation of Native Cellular Event;* (Invited) **Maria Harkiolaki**, Chidinma Okolo, Archana Jadhav, Kamal Nahas, Thomas Fish, Amy Watts

9:00 AM **507** *Large Volume Imaging Soft X-Ray Tomography of Infected Cells;* **Venera Weinhardt**

9:15 AM **522** *A Laboratory Based Soft X-ray Microscope for 3D Imaging of Whole Cells;* **Kenneth Fahy**, Paul Sheridan, Sergey Kapishnikov, William Fyans, Fergal O'Reilly, Tony McEnroe

9:30 AM **537** *Mitochondrial Reorganization in Herpesvirus-Infected Cells;* **Maija Vihinen-Ranta**, Simon Leclerc, Kari Kunnas, Axel Ekman, Eva Pereiro, Kenneth Fahy, Carolyn Larabell, Venera Weinhardt Weinhardt

9:45 AM **551** *Soft X-ray 3D imaging: A Powerful Tool for Visualizing Virus Infections with Increased Resolution and Field of View;* **Jian-hua Chen**, Bieke Vanslembrouck, Axel Ekman, Valentina Loconte, Venera Weinhardt, Mark Le Gros, Carolyn Larabell

C Cross-Cut/Interdisciplinary Sciences Symposia – Wednesday Morning

C02.1 Extracting Information from Data: Applications of Artificial Intelligence in Microscopy Application of Artificial Intelligence to Microscopy in the Materials and Biological Sciences

Wednesday 8:30 AM **Room M-100-G**

8:30 AM **490** *Autonomous Electron Tomography Reconstruction using Bayesian Optimization;* **William Millsaps**, Jonathan Schwartz, Zichao Wendy Di, Yi Jiang, Robert Hovden

8:45 AM **498** *Advanced Gaussian Processes for Function Approximation, Uncertainty Quantification, and Autonomous Experimentation;* (Invited) **Marcus Noack**

9:15 AM **523** *Resolving the Preferred Orientation Problem in CryoEM Reconstruction with Self-Supervised Deep Learning;* (Invited) **Yuntao Liu**, Jason Hu, Z. Hong Zhou

9:30 AM **538** *Practical and Parsimonious Real-Time Analysis in Materials Microscopy;* (Invited) **Joshua Agar**

C03.3 Correlative and Multimodal Microscopy and Analysis

Wednesday 8:30 AM **Room L-100-J**

8:30 AM **491** *Multimodal Imaging of Nitrogen-fixing Cyanobacteria in the Near-native State;* (Invited) **Vivian Merk**, Bobby Duersch, Steven Soini, Yanqi Luo, Xiaoyang Liu, Si Chen

9:00 AM **508** *Correlative Microscopy for the Identification of Intracellular Nanoparticles and their Cellular Processing;* **Ingo Lieberwirth**, Shen Han, Anke Kaltbeitzel, Gunnar Glasser, Katharina Landfester

9:15 AM **524** *Automation in Cryo-FIB Preparation, from Cellular to Tissue Structural Biology;* (Invited) **Alex de Marco**, Patrick Cleeve, Monica Pia Caggiano, David Dierick

9:30 AM **539** *Depth Correction of 3D SIMS Images of Mammalian Cells with Secondary Ion Images Captures the Effects of Differential Sputtering;* (Invited) **Mary Kraft**, Melanie Brunet, Brittney Gorman

Scientific Program

P Physical Sciences Symposia – Wednesday Morning

P01.1 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Wednesday 8:30 AM **Room 200-I**

8:30 AM **492** *CryoEM and Autonomous Characterization for Investigating Cathode Active Materials and Solid-Solid/Solid-Liquid Interphaces in Energy Storage Devices;* (Invited) **Huolin Xin**, Chunyang Wang, Rui Zhang, Yubin He, Peichao Zou

9:00 AM **509** *Imaging Li Vacancies in a Li-Ion Battery Cathode Material by Depth Sectioning Multi-slice Electron Ptychographic Reconstructions;* **Dasol Yoon**, Yu-Tsun Shao, Yao Yang, Dong Ren, Héctor Abruña, David Muller

9:15 AM **525** *Three-Dimensional Imaging of Surface Structural Transformations on Electrocatalyst Nanoparticles Using Multi-Slice Electron Ptychography;* **Zixiao Shi**, Rui Zeng, Yu-Tsun Shao, Harikrishnan K. P., Dasol Yoon, David Muller, Héctor Abruña

9:30 AM **540** *Atomic-Scale Origin of the Low Grain-Boundary Resistance in Perovskite Solid Electrolyte Li0.375Sr0.4375Ta0.75Zr0.25O3;* **Tom Lee**, Ji Qi, Chaitanya Gadre, Huaixun Huyan, Shu-Ting Ko, Yunxing Zuo, Ruqian Wu, Jian Luo, Shyue Ping Luo, Xiaoqing Pan

9:45 AM **552** *Local Structural Environments in Perovskite Oxide Solid Electrolytes;* **Junghwa Kim**, Kiarash Gordiz, Daniele Vivona, Lambert Hu, Yang Shao-Horn, James LeBeau

P04.1 Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing

Wednesday 8:30 AM **Room 200-F**

8:30 AM **493** *Optical Orientation Mapping of Additively Manufactured Alloys Using Directional Reflectance Microscopy;* (Invited) **Matteo Seita**, Tan Phuc Le, Chenyang Zhu

9:00 AM **510** *High-Throughput EBSD Characterization of Additively Manufactured Microstructures;* **Luis Jauregui**, Tim Ruggles, Elliott Fowler, Dale Cillessen, Kyle Johnson, Shelley Williams, Brad Boyce

9:15 AM **526** *Improving Porosity Analysis in Additive Manufacturing through 3D Resolution Recovery using Deep Learning-Based Reconstruction;* **Yulia Trenikhina**, Hrishikesh Bale, Stephen Kelly

9:30 AM **541** *Non-Human-Biased Microstructure Statistics, with Machine Learning Informed Correlative Electron Microscopy;* (Invited) Marie Charpagne, Siddhant Jadhav

P05.1 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Wednesday 8:30 AM **Room 200-G**

8:30 AM **494** *Irradiation and Corrosion: Friends or Foes?;* (Invited) **Stephen Raiman**

9:00 AM **511** *In-situ Thermal Oxidation of Fusion PFM Tungsten Using Atmospheric Environmental TEM;* **Yuanyuan Zhu**, Rajat Sainju, Lichun Zhang, Weilin Jiang, Wahyu Setyawan, Osman El Atwani

9:15 AM **527** *Analysis of the Degradation Trend in AISI 4140 Steels used in Internal Combustion Engine Components;* **Misael Baez,** Israel Baez, Guillermo Manuel Urriolagoitia, Guillermo Urriolagoitia Sosa, Beatriz Romero, Israel Fernando Barajas Ambriz, Cecilio Garcia Campos

9:30 AM **542** *Atomic Insights into Pitting Corrosion on Metal Surfaces Through Liquid Phase TEM;* **Haimei Zheng**, Xinxing Peng, Junyi Shangguan

P10.5 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Wednesday 8:30 AM **Room 200-J**

8:30 AM **495** *From Microanalysis to Atomic Electron Pair Distribution Function (ePDF): Adding Another Degree of Freedom in Analyzing Nanoscale Materials;* (Invited) **Yang Liu,** Mary Buckett, Geng Bang Jin, Matthew Burch, Alyssa Rosas, Grant Thoma, Andy Steinbach

9:00 AM **512** *Dose-Efficient Structure Mapping of Nano-Crystallites in Organic Solar Cells with Fast 4D-SCED Experiments Using Hybrid Pixel Detector;* **Daniel Stroppa**, Mingjian Wu, Erdmann Spiecker

9:15 AM **528** *A New Low-dose STEM Imaging Mode with Probability Driven Intra-pixel Beam Blanking;* **Lewys Jones**, Jonathan Peters, Bryan Reed, Yu Jimbo, Alexandra Porter, Daniel Masiel

9:30 AM **543** *3D Magnetization Reconstruction for Lorentz Microscopy using Differential Programming;* **Arthur McCray**, Mathew Cherukara, Amanda Petford Long, Charudatta Phatak

9:45 AM **553** *Liquid Electron Microscopy with Non-Aqueous Solvents: Evaluating the Beam-Sample Interactions of Complex Liquid Structures;* **Justin Mulvey**, Aoon Rizvi, Joe Patterson

T Technologists' Forum – Wednesday Morning

X30.1 Technologists' Forum - Methods in Tissue Clearing and Expansion to Achieve Improved Resolution

Wednesday 8:30 AM **Room 200-E**

8:30 AM **496** *Quantitative Cleared Tissue Imaging;* (Invited) Kevin Dean, **Hazel Borges**, Jinlong Lin, Zach Marin

9:00 AM **513** *Considerations for Microscopic Imaging of Whole Organs and Animals;* (Invited) **Alan Watson**, Iaroslavna Vasylieva, Megan Smith

9:30 AM **544** *Considerations for Tissue Clearing Services in a Shared Research Facility;* (Invited) **Patrick Willey**, Mark Sanders, Nadia Kane

CT Cross-Cut/Interdisciplinary Sciences Tutorial – Wednesday Morning

8:30 AM **497** *Need For Speed: Imaging Biological Ultrastructure with the 64-beams FAST-EM;* (Invited) Arent Kievits, Peter Duinkerken, Ben Giepmans, Jacob Hoogenboom

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Wednesday Late Morning

A02.6 Microscopy and Microanalysis for Real World Problem Solving

Wednesday 10:30 AM **Room 200-A**

10:30 AM **554** *In-situ Observation of Chemically Reacted Particles In Gas Atmosphere With an Aberration Corrected STEM/SEM;* (Invited) **Hiroaki Matsumoto**, Takeshi Sato, Keisuke Igarashi, Takahito Hashimoto, Hiromi Inada

11:00 AM **574** *Electron Microscopy of Hierarchically Structured Nano-array Catalysts;* Jingyue Liu, Yiwei Yu, Chunxiang Zhu, Binchao Zhao, Puxian Gao

11:15 AM **589** *Image-Based Characterization of Carbonate Mudrocks to Link Nano-Scale Pore Characteristics to Thermal Maturity;* Shannon Eichmann, Qiushi Sun, David Jacobi, Poorna Srinivasan, Jennifer Rodriguez, Ahmed Nahwi

11:30 AM **602** *High Resolution Electron Microscopy Study of Mesoporous Structure Evolution in ZSM-5 Zeolite;* **Yali Tang**, Charles Kanyi, Mehdi Allahverdi

11:45 AM **618** *Controlling Thermal Gradients during In Situ Transmission Electron Microscopy Heating Experiments;* **Yi-Chieh Yang**, Sriram Vijayan, Thor Bjerregård Sneppen, Joerg Jinschek

A03.1 Standards and Reference Materials and their Applications in Quantitative Microanalysis

Wednesday 10:30 AM **Room M-100-H**

10:30 AM **555** *Epidote Reference Material Development Calibrated for Oxygen Isotope Determination by Secondary Ion Mass Spectrometry (SIMS);* (Invited) **Claudia Roig González**, Chloë Bonamici, Tyler Blum, William Nachlas, Mike Spicuzza

11:00 AM **575** *Development of Preliminary New Reference Concentrations for ATHO-G Major Elements and Lipari Obsidian ID-3506 Trace Elements;* **Stephen Kuehn**

11:15 AM **590** *Evaluating Consensus in Experimental K-ratios from over 40 WDS and EDS Measurement Systems;* **William Nachlas**, Aurélien Moy, Nicholas Ritchie, John Donovan, John Fournelle, Julien Allaz, Renat Almeev, Emma Bullock, Joel Bullock, Karsten Goemann

11:30 AM **603** *Development of Reference Materials for Microanalysis in Geosciences: the Case of Olivine MongOl Sh11-2;* (Invited) **Valentina Batanova**, Alexander Sobolev

A04.6 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials

Wednesday 10:30 AM **Room 200-B**

10:30 AM **630** *Automated Experiment and Big Data Methods in Praxis of 4D STEM;* (Invited) Sergei Kalinin, Rama Vasudevan, Maxim Ziatdinov, Kevin Roccapriore

11:00 AM **650** *Phase Diversity in Ptychographic Reconstructions with a Programmable Phase Plate;* **Stephanie Ribet**, Steven Zeltmann, Georgios Varnavides, Roberto dos Reis, Vinayak Dravid, Colin Ophus

11:15 AM **666** *High-Speed 4D-STEM using Electrostatic Subframing;* **Bryan Reed**, Ruth Bloom, Kazuki Yagi, Daniel Masiel

11:30 AM **680** *Automated Phase and Orientation Mapping of Multiphase, Polycrystalline Hafnia-Zirconia Thin Films Using 4D-STEM;* **Garrett Baucom**, Eitan Hershkovitz, Kartik Sondhi, Toshikazu Nishida, Honggyu Kim

11:45 AM **696** *Magnetic Field Mapping in STEM-DPC by Utilizing Artificial Neural Networks;* **Gregory Nordahl**, Sivert Dagenborg, Magnus Nord

A05.1 Advanced Measurement Techniques in (S)TEM-EELS

Wednesday 10:30 AM **Room 200-D**

10:30 AM **556** *Theory and Simulations of Ultra-Low Energy Loss Spectroscopy at High Spatial Resolution;* (Invited) **Jan Rusz**, Paul Zeiger, José Ángel Castellanos-Reyes, Anders Bergman

11:00 AM **576** *Unveiling Phonon Dispersion Behavior of AlN/GaN Heterostructures using EELS;* **Joaquin E. Reyes-Gonzalez**, Niklas Dellby, Benjamin Plotkin-Swing, Ping Wang, Ayush Pandey, Zetian Mi, Maureen Joel Lagos

11:15 AM **591** *Mapping Phonon Dispersion Surfaces at Nanometer Scale;* **Benedikt Haas**, Guillaume Radtke, Steven Quillin, Tracy Lovejoy, Niklas Dellby, Ondrej Krivanek, Adnan Hammud, Tim Schröder, Christoph Schröder

11:30 AM **604** *Simultaneous HAADF & EELS Data Acquisition for Relative Quantification of Temperature and Thickness Effects on Thermal Diffuse Scattering in STEM;* **Paul Minson**, Felipe Rivera, Richard Vanfleet

11:45 AM **619** *Atomic Structure and Electron Magnetic Circular Dichroism of Individual Rock Salt Structure Antiphase Boundaries in Spinel Ferrites;* **Xiaoyan Zhong**, Zhuo Li

A Analytical/Instrumentation Sciences Symposia – Weds. Late Morning cont.

A13.2 Computational Advances in Electron Microscopy

Wednesday 10:30 AM **Room M-100-B**

10:30 AM **557** *Post-Experiment Forensics and Human-in-the-Loop Interventions in Explainable Autonomous Scanning Transmission Electron Microscopy;* (Invited) **Sergei Kalinin**, Rama Vasudevan, Maxim Ziatdinov, Kevin Roccapriore

11:00 AM **577** *Convolution Neural Networks and Position Averaged Convergent Beam Electron Diffraction for Determining the Structure of 2D Materials;* **Andrew Yankovich**, Magnus Röding, Victor Wåhlstrand Skärström, Alok Ranjan, Eva Olsson

11:15 AM **592** *Atomic Scale Cluster Finding using GIS-Inspired Spatial Statistics;* **Charles Evans,** Elizabeth Dickey

11:30 AM **605** *How to Create Small but Useful Neural Networks;* **Alexander M Rakowski**, Benjamin Savitzky, Matthew L Henderson, Shreyas Cholia, Maria KY Chan, Colin Ophus

11:45 AM **620** *Random Forest Prediction of Crystal Structure from Diffraction Patterns*; **Samuel Gleason**, Alexander M Rakowski, Jim Ciston, Colin Ophus

A14.6 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Wednesday 10:30 AM **Room 200-C**

10:30 AM **558** *Characterizing Surfaces and Interfaces in the Medical Device Industry;* (Invited) **Bill Theilacker**, Anna Belu, Tony Anderson, Reza Jahanbekam

11:00 AM **578** *Surface Characterization of Bacteria, Biofilms and Solid-Liquid Interfaces using Near-Ambient Pressure XPS;* (Invited) **Andreas Thissen**, Paul Dietrich, Francesca Mirabella

11:30 AM **606** *Getting Structural and Compositional Insights into Biological and Beam Sensitive Samples Using Three Complementary Detection Modalities on a Cryo FIB Instrument;* **Olivier De Castro**, Tatjana Taubitz, Antje Biesemeier, Tom Wirtz

11:45 AM **621** *Effective Characterization of Dental Enamel Nanostructures Using Pattern Matching: A Combined TEM and SEM-TKD Study;* **Pat Trimby**, Sandra Piazolo, Mohammed Al-Mosawi, Maisoon Al-Jawad, Stuart Micklethwaite, zabeada Aslam, Aimo Winkelmann

B Biological Sciences Symposia – Wednesday Late Morning

B02.5 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

Wednesday 10:30 AM **Room M-100-D**

10:30 AM **559** *Cryo-EM Analysis of the Clostridioides difficile Transferase Reveals Intoxication Intermediates;* (Invited) **Michael Sheedlo**, Robin Mullard, Eva Grant

11:00 AM **579** *Characterization of Two New Proteins Found in the L. pneumophila Dot/Icm T4SS;* **Jacquelyn Roberts**, Arwen Frick-Cheng, Louise Chang, Clarissa Durie, Henry Styron, Melanie Ohi

11:15 AM **593** *High-Resolution Cryo-EM Structure of Staphylococcus aureus Bacteriophage 80α Portal Protein and SaPI1 Capsid;* **Amarshi Mukherjee**, James Kizziah, Laura Parker, Terje Dokland

11:30 AM **607** *How a Potent Anti-Neuraminidase Monoclonal Antibody Navigates Recent Immune-Evasive Influenza Strains: A Structural Study by Single-Particle CryoEM;* **Ha Dang**, Corey Momont, Kevin Hauser, Fabrizia Zatta, Davide Corti, Gyorgy Snell, Matteo Pizzuto

11:45 AM **622** *Reconstruction of the entire RB43 Bacteriophage by Single Particle Cryo-EM;* **Olga Sokolova**, Rafael Ayala, Maya Street, Andrey Moiseenko, Evgeny Kulikow, Alexander Kuznetsov, Matthias Wolf, Andrey Letarov Letarov

B03.2 Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network

Wednesday 10:30 AM **Room M-100-F**

10:30 AM **560** *Machine Learning Methods in the 3D Analysis of Histopathological Data;* (Invited) **Katarzyna Kedziora**

11:00 AM **580** *Automated Segmentation of 3D Cytoskeletal Filaments From Electron Micrographs with TARDIS;* **Robert Kiewisz**, Gunar Fabig, Thomas Müller-Reichert, Tristan Bepler

11:15 AM **594** *Application of Deep Learning Image Segmentation to Synchrotron Radiation μCT Bone Microstructure Datasets;* **Joshua Taylor,** Medhat Hassan, Janna Andronowski

11:30 AM **608** *Towards Generalizable Organelle Segmentation in Volume Electron Microscopy;* (Invited) **Larissa Heinrich**, Will Patton, Davis Bennett, David Ackerman, Grace Park, John Bogovic, Alyson Petruncio, Jan Funke, Stephan Funke, Aubrey Weigel

B08.2 Biological Soft X-ray Tomography

Wednesday 10:30 AM **Room M-100-E**

10:30 AM **561** *Lewy Body-Like Condensates Sequester Membrane-Bound Organelles;* (Invited) Dragomir Milovanovic, Roberto Sansevrino, Christian Hoffmann, Jian-hua Chen, Johannes Vincent Tromm, Joshua Jackson, Mark Le Gros, Daniele Bano, Carolyn Bano

11:00 AM **581** *Direct Observation of Uptake and Dissolution of Cholesterol Crystals by Macrophages Using Combined Fluorescence and X-ray Microscopy;* **Daniel Wüstner**, Alice Dupont Juhl, Suzana Kozakijevic, Maria Szomek, Tido Willms, Jacob Egebjerg, Katja Thaysen, Stephan Werner, Gerd Werner, Peter Müller

11:15 AM **595** *Correlative Cryo Soft X-ray Tomography and Spectromicroscopy To Study Ca Biomineralization Processes In Frozen Hydrated Whole Cells;* **Andrea Sorrentino**, Francesca Rossi, Giovanna Picone, Emil Malucelli, Ana J. Perez, Stefano Iotti, Eva Pereiro

11:30 AM **609** *Charting Cytoskeleton-Organelle Interplay in Living Cells Through High Resolution 3D Correlative Cryo-Imaging;* **Ivy Wang**, Peter Wing, Michael Schwertner, Martijn van Nugteren, Petros Ligoxygakis, Maria Harkiolaki

11:45 AM **623** *Integration of Laboratory Cryo Soft X-ray Tomography into CLEM Workflows for Multimodal Multiscale Imaging of Bulk Samples;* **Sergey Kapishnikov**, William Fyans, Fergal O'Reilly, Tony McEnroe, Paul Sheridan, Kenneth Fahy

C Cross-Cut/Interdisciplinary Sciences Symposia – Wednesday Late Morning

C02.2 Extracting Information from Data: Applications of Artificial Intelligence in Microscopy Application of Artificial Intelligence to Microscopy in the Materials and Biological Sciences

Wednesday 10:30 AM **Room M-100-G**

10:30 AM **562** *Machine Learning Prediction of Charge State from EELS Spectra of Third Row Transition Metals;* **Samuel Gleason**, Deyu Lu, Jim Ciston

11:00 AM **582** *Marrying Microscopy, Modeling, and Machine Learning;* (Invited) **Maria KY Chan**

11:30 AM **610** *Decoding Spatial Symmetry and EELS Spectroscopic Fine Structures;* (Invited) **Huolin Xin**, Chunyang Wang, Dong Zhu, Zhengran Ji, Mike Hu, Lingli Kong

C03.4 Correlative and Multimodal Microscopy and Analysis

Wednesday 10:30 AM **Room L-100-J**

10:30 AM **563** *Conjoining Simple Supervised and Unsupervised Machine Learning Methods with 4D-STEM to Identify Complex Nanostructures;* **Timothy Yoo**, Eitan Hershkovitz, Xiaofei Pu, Lingfeng He, Honggyu Kim

10:45 AM **572** *A Point Process Analysis Framework for Quantitatively Describing Spatial Patterns from Fluorescence Microscopy Data;* (Invited) **Andrew Soltisz**, Rengasayee Veeraraghavan

11:15 AM **596** *Multi-resolution Cross-modality Image Registration using Unsupervised Deep Learning Approach;* **Daksh Daksh**, Anke Kaltbeitzel, Ingo Lieberwirth, Katharina Landfester

11:30 AM **611** *TEMPL: Correlative Transmission Electron Microscopy and Photoluminescence Assisted by 3D Machine Learning;* **Shery Chang**, Haotian Wen, Christian Dwyer

11:45 AM **624** *Dose and Sampling Requirements for Fused Multi-Modal Electron Tomography;* **Jason Manassa**, Jonathan Schwartz, Yi Jiang, Huihuo Zheng, Jeffrey A. Fessler, Zichao Wendy Di, Robert Hovden

P Physical Sciences Symposia – Wednesday Late Morning

P01.2 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Wednesday 10:30 AM **Room 200-I**

10:30 AM **564** *Electron Microscopy of Electrochemical Degradation in Energy Materials across Multiple Length Scales: Challenges and Opportunities;* (Invited) Jian-Min Zuo, Saran Pidaparthy, Robert Busch, Haoyang Ni, Hanyu Hou, Daniel Abraham

11:00 AM **583** *Revealing the Internal Architecture of Alkaline Fuel Cell Membranes with Cryo-4D-STEM and Cryo-STEM-EELS;* **Danielle Markovich**, Michael Colletta, Yue Yu, Megan Treichel, Jesse Hsu, Bryan Pivovar, Brett Fors, Kevin J. Noonan, Lena Noonan

11:15 AM **597** *Correlative Mapping of Electrolyte-Dependent Microstructural Development in Cathode Materials;* **Wenxiang Chen**, Saran Pidaparthy, Xun Zhan, Chu-Yun Hwang, Zhichu Tang, Jian-Min Zuo, Qian Chen

11:30 AM **612** *Structure and Dynamics of Graphite Intercalation Compounds Analyzed using in situ 4D-STEM;* **Peter Schweizer**, Lilian Vogl, Erdmann Spiecker, Colin Ophus, Andrew Minor

11:45 AM **625** *Probing the "Order" in Complexity: Entropy-engineered Thermoelectric Materials;* **Yukun Liu**, Stephanie Ribet, Hongyao Xie, Roberto dos Reis, Mercouri Kanatzidis, Vinayak Dravid

P04.2 Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing

Wednesday 10:30 AM **Room 200-F**

10:30 AM **565** *On the Role of Interfaces During Metal Additive Manufacturing;* (Invited) **Sophie Primig**

11:00 AM **584** *Gamma Prime Characterization in Additively Manufactured Haynes 282 after One-Step and Two-Step Post-Process Heat Treatments;* **Alivia Mourot,** Sriram Vijayan, Avantika Gupta, Joerg Jinschek, Carolin Fink

11:15 AM **598** *Microstructural and Mechanical Property Differences Resulting from Melt Pool Interactions with the Electron Beam Chamber Environment;* **Katie O'Donnell**, Maria Quintana, Peter Collins

11:30 AM **613** *Microstructural and Nanostructural Evolution in Splat Quenched Stainless Steels;* (Invited) **Luke Brewer**, Zachary Hasenbusch, Andy Deal, Ben Brown, Laurentiu Nastac

P05.2 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Wednesday 10:30 AM **Room 200-G**

10:30 AM **566** *The Physical and Engineering Limits of Coupled In situ TEM Experiments;* **Khalid Hattar**, Ryan Schoell, Eric Lang, Ben Wolf, Thomas Moore, Katherine Jungjohann

10:45 AM **573** *Effect of Dopants, Impurities, and Substrate on Anomalous Crystallization of SiN;* **Calvin Parkin**, Paul Kotula, Jennie Podlevsky, Carlos Chacon, Scott Grutzik, Tesia Janicki, J. Matthew Lane, Hojun Lim, Christopher Lim, Khalid Hattar

11:00 AM **585** *Atomic-Level Insights into the Radiation Damage and Recovery of β-Ga2O3 for High-Performance Semiconductors;* **Hsien-Lien Huang**, Christopher Chae, Jared Johnson, Alexander Senckowski, Shivam Sharma, Uttam Singisetti, Man Hoi Wong, Jinwoo Hwang Hwang

11:15 AM **599** *In Situ TEM Characterization of Elasticity and Crazing Behavior of Polymer Grafted Nanoparticle Thin Films as a Function of Disorder and Radiation Damage;* **Daniel Long**, Kyoungweon Park, Lawrence Drumy

11:30 AM **614** *In situ Irradiation-Corrosion Monitoring of Metals Exposed to Advanced Nuclear Reactor Coolants with Thick-Target Particle-Induced X-Ray Emission Spectroscopy (PIXE);* (Invited) **Franziska Schmidt**, Matthew Chancey, Hyosim Kim, Scott Parker, Peter Hosemann, Yongqiang Wang

P08.1 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

Wednesday 10:30 AM **Room 200-H**

10:30 AM **567** *Multiscale Electric-Field Imaging Of Polarization Vortex Structures in PbTiO3/SrTiO3 Superlattices;* (Invited) **Xiaoqing Pan**

11:00 AM **586** *Translational Symmetry Breaking at Charged Domain Walls in a Layered Perovskite Ferroelectric;* **Hiroshi Nakajima**, Kosuke Kurushima, Hirofumi Tsukasaki, Shigeo Mori

11:15 AM **600** *Direct Observation of Strain-Induced Ferrochiral Transition in Quasi-1D BaTiS3;* **Guodong Ren**, Gwan-Yeong Jung, Huandong Chen, Rama Vasudevan, Andrew Lupini, Miaofang Chi, Jordan Hachtel, Di Xiao, Jayakanth Xiao, Rohan Mishra

11:30 AM **615** *Lattice Anisotropy, Oxygen Octahedral Rotation, and Tunable Magnetic Anisotropy in Patterned SrRuO3 Quantum Structures;* (Invited) **Peter A. van Aken**, Hongguang Wang, G. Laskin, W. He, Hans Boschker, M. Yi, W. Braun, B. Fenk, V. Fenk, Jochen Mannhart

P10.6 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

Wednesday 10:30 AM **Room 200-J**

10:30 AM **568** *Correlation Between Solid Electrolyte Interphase and Li Morphology Revealed by Cryogenic Electron Microscopy;* (Invited) **Yaobin Xu**, Hao Jia, Dingchuan Xue, Ruyue Fang, Ji-Guang Zhang, Sulin Zhang, Wu Xu, Chongmin Wang Wang

11:00 AM **587** *Degradation Mechanism of Si Anode in Sulfide-based All-Solid-State Batteries Revealed by Observation of SEI Layer Using 4D-STEM/Super-EDS;* **Hyeyoung Cho**, Sangjun Kang, Kyong-Ryol Tag, Hyelin Cho, Hyun-woo Gong, Hong-Kyu Kim, Hae-Ryoung Kim, Jae-Pyoung Ahn Ahn

11:15 AM **601** *A New Superstructure in Beam Sensitive Cathode Material Revealed by Multimodal STEM Combining ADF, iDPC and EDX Mapping Techniques;* **Maria Meledina**, Alexander Meledin, Eric G.T. Bosch, Ivan Lazić, Xiaochao Wu, Ulrich Simon, Boy Markus, Bert Freitag, Sorin Freitag, Paolo Longo

11:30 AM **616** *Direct Observation of Zinc Dendrite Growth in Zinc Air Battery by Operando (S)TEM;* **Xiaodong Liu**, Nigel Browning, B. Layla Mehdi

11:45 AM **626** *Development of a Multi-Scale Imaging and Analysis Workflow for Batteries: From Cell Level to Electrode Particle Porosity;* **Wesley De Boever**, Jan Dewanckele

Scientific Program

T Technologists' Forum – Wednesday Late Morning

X32.1 Technologists' Forum - 4D STEM Tips and Techniques

[Partnering with A04]

Wednesday 10:30 AM **Room 200-E**

10:30 AM **569** *Scanning Electron Diffraction: To Precess or not to Precess?;* (Invited) **Tina Bergh**, Randi Holmestad, Emil Frang Christiansen, Elisabeth Thronsen, Gregory Nordahl, Magnus Nord, Antonius T. J. van Helvoort

11:00 AM **588** *Principles and Applications of 4D-STEM Diffraction Imaging for Characterizing Complex Crystalline Materials;* (Invited) **Yu-Tsun Shao**, Jian-Min Zuo, David Muller

11:30 AM **617** *Choosing Detectors and Analysis Software for 4D-STEM;* (Invited) **Steven Zeltmann**, David Muller

PT Physical Sciences Tutorial – Wednesday Late Morning

X41 Physical Sciences Tutorial

Wednesday 10:30 AM **Room M-100-C**

10:30 AM **570** *Specimen Preparation for MEMS-Based in situ Transmission Electron Microscopy Experiments;* (Invited) **Sriram Vijayan**

A Analytical/Instrumentation Sciences Symposia – Wednesday Afternoon

A02.7 Microscopy and Microanalysis for Real World Problem Solving

Wednesday 1:30 PM **Room 200-A**

1:30 PM **627** *Meeting the Ubiquitous Challenges of Hydrocarbon Contamination;* (Invited) **Barbara Armbruster**

2:00 PM **649** *Improved Sample Preparation Technique for Transmission Kikuchi Diffraction (TKD) Analyses Allows Large Area Data Acquisition;* **Pawel Nowakowski**, Cecile Bonifacio, Mary Ray, Paul Fischione

2:15 PM **664** *Analysis of Coronado State Historic Site Artifacts using X-rays;* **Brian Patterson**, Steven Young, James Valdez, Michelle Espy, Alex Edgar, Jack Brett, Michael Pettes, Clay Mathers, Matt Mathers

2:30 PM **678** *Evaluating the Dislocation Structures Involved in Dwell Fatigue Crack Initiation;* **Baris Yavas**, Nadib Akram, Asa Frye, Vasisht Venkatesh, Adam Pilchak, David Furrer, Iuliana Cernatescu, Mark Aindow Aindow

2:45 PM **695** *Self-regulating Oxidation Resistance at Rough Surface of Achromatic Copper;* **Young-Hoon Kim**, Seong-Gon Kim, Seunghun Lee, Miyeon Cheon, Su Jae Kim, Se-Young Jeong, Young-Min Kim

A03.2 Standards and Reference Materials and their Applications in Quantitative Microanalysis

Wednesday 1:30 PM **Room M-100-H**

1:30 PM **628** *What is the Best Way to Extract a k-ratio from an EDS Spectrum?;* (Invited) **Nicholas Ritchie**

2:00 PM **629** *An Optimized Deconvolution Algorithm for Energy-Dispersive X-ray Spectroscopy;* **Jakub Klus**, Stephen Seddio, David Rohde, Petr Hlavenka

2:15 PM **665** *EDS and WDS Analysis of Ni-Si Samples at Low Acceleration Voltages;* **Ralf Terborg**, Silvia Richter

2:30 PM **679** *Methods and Reference Materials used to Calibrate PIXL, the Mars 2020 In Situ XRF Spectrometer;* (Invited) **Chris Heirwegh**

A04.7 The Praxis of 4D-STEM - Extracting Information from Biological and Functional Materials

Wednesday 1:30 PM **Room 200-B**

1:30 PM **828** *Nucleation and Phase Development of Precipitates in Age-Hardenable Aluminium Alloys studied by 4D-STEM;* (Invited) **Randi Holmestad**, Elisabeth Thronsen, Yasuhito Kawahara, Tina Bergh, Jørgen A Sørhaug, Christoph M Hell, Ruben Bjørge, Emil Frang Christiansen, Kenji Christiansen, Calin D. Marioara

2:00 PM **847** *Broadening Application Spectrum of iDPC-STEM Imaging from Beam Sensitive Solid Materials to Biological and Cryo Nano-Particles Using Single Particle Analysis;* **Ivan Lazić**, Maarten Wirix, Daniel Mann, Aikaterini Filopoulou, Max Leo Leidl, Knut Müller-Caspary, Arno Meingast, Anna Carlsson, Felix Carlsson, Carsten Sachse

2:15 PM **863** *Beyond MicroED: Ab Initio Crystal Structures Using 4D-STEM;* **Ambarneil Saha**, Alexander Pattison, Matthew Mecklenburg, Aaron Brewster, Peter Ercius, Jose Rodriguez

2:30 PM **877** *Deciphering the Structure of Amorphous Functional Materials using 4D-STEM;* **Gabriel Calderon Ortiz**, Soohyun Im, Mehrdad Abbasi Gharacheh, Minhazul Islam, Jinwoo Hwang

2:45 PM **893** *Imaging Gas Adsorption in MOFs via 4D-STEM;* **Sarah (Sally) Karstens**, Ryan Murphy, Ever Velasquez, Karen Bustillo, Jeffrey Long, Andrew Minor

A05.2 Advanced Measurement Techniques in (S)TEM-EELS

Wednesday 1:30 PM **Room 200-D**

1:30 PM **631** *Spatial Resolution in Aloof EELS;* (Invited) **Ray Egerton**, Yifan Wang, Peter Crozier

2:00 PM **651** *The Radiation Chemistry of Water inside the Electron Microscope Studied via Electron Energy Loss Spectroscopy;* **Patricia Abellan**, Eric Gautron, Jay LaVerne

2:15 PM **667** *Quasi Instantaneous ELNES Mapping of Multi Element Compounds;* **Daen Jannis**, Nicolas Gauquelin, Maria Meledina, Yuchen Zhao, Yunzhong Chen, Johan Verbeeck

2:30 PM **681** *EELS at Very High Energy Losses - An Opportunity to provide complementary Information to X-ray Absorption Spectroscopy (XAS);* **Sorin Lazar,** Maria Meledina, Claudia Schnohr, Thomas Höche, Peter Tiemeijer, Paolo Longo, Bert Freitag

2:45 PM **697** *Continuous Multiple Pass Electron Counted Spectrum Imaging Optimized for In-Situ Analysis;* **Liam Spillane**, Benjamin Miller, Bernhard Schaffer, Paul Thomas, Ray Twesten, Shelly Michele Conroy

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Weds. Afternoon cont.

A13.3 Computational Advances in Electron Microscopy

Wednesday 1:30 PM **Room M-100-B**

1:30 PM **632** *Data Acquisition and Control of Electron Microscopes;* (Invited) **Chris Meyer**, Niklas Dellby, Tracy Lovejoy, Benedikt Haas, Gwyn Skone, Benjamin Plotkin-Swing, Andreas Mittelberger, Ondrej Krivanek Krivanek

2:00 PM **652** *Deep Learning Approach for High-Accuracy Electron Counting of Direct Electron Detectors at Increased Electron Dose;* **Jingrui Wei**, Kalani Moore, Benjamin Bammes, Barnaby Levin

2:15 PM **668** *How to Count Electrons with Pixelated Semiconductor Detectors;* **Björn Eckert**, Stefan Aschauer, Martin Huth, Petra Majewski, Heike Soltau, Lothar Strueder

2:30 PM **682** *Observation of Simultaneous Successive Twinning Using Atomic Electron Tomography;* (Invited) **Mary Scott**, Philipp Pelz, Kate Groschner, Alexandra Bruefach, Colin Ophus

A14.7 Surface and Subsurface Microscopy and Microanalysis of Physical and Biological Specimens

Wednesday 1:30 PM **Room 200-C**

1:30 PM **633** *Correlative Surface Analysis: Combining XPS, Electron Microscopy, and Other Spectroscopies;* (Invited) **James Lallo**, Tim Nunney, Paul Mack, Robin Simpson, Helen Oppong-Mensah

2:00 PM **653** *Wide Field of View versus High Spatial Resolution and High Sensitivity – the Advantage of Correlative Microscopies (APT, SIMS, EBSD, XRF) for the Analysis of Minerals;* (Invited) **Robert Ulfig**, Steven Reddy, David Saxey, William Rickard, Denis Fougerouse, Mark Pearce, Louise Fisher, Matt Kilburn, David Kilburn, David Larson

2:30 PM **683** *Synthesis and Characterization of Porous Graphite Oxide under a Simple Stirring Process;* **Geraldo Gonzalez-Martinez**, Juan Zarate-Medina, Gerardo Rosas Trejo

2:45 PM **698** *Interfacial Microstructure and Thermal Property of Diamond/Si and 3C-SiC/Si Film;* **Chunyan Zhang**, Yuying Zhang, Chaoying Ni

B Biological Sciences Symposia – Wednesday Afternoon

B05.1 Technical Advances in cryoEM

Wednesday 1:30 PM **Room M-100-D**

1:30 PM **634** *Advances in Microsecond Time-Resolved Cryo-Electron Microscopy;* (Invited) **Ulrich Lorenz**, Gabriele Bongiovanni, Oliver Harder, Sarah Barrass, Marcel Drabbels

2:00 PM **654** *Direct Measurement of Mechanical Properties of Vitreous Ice by Cryo-FIB;* **Heonhwa Choi**, Emre Firlar, Judit Penzes, Adrian Mann, Jason kaelber

2:15 PM **669** *Mass-per-length Measurements Using STEM in SEM;* **Daniel Veghte**, Christian O'Neil, Sean Smrt, Giovanna Grandinetti, Christopher Jaroniec

2:30 PM **684** *Measuring Electron Dose Efficiency in TEM and STEM;* **Mathew Peet**, Richard Henderson, Christopher Russo

B07.1 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants

Wednesday 1:30 PM **Room M-100-F**

1:30 PM **635** *Large-Scale Electron Microscopy to Find Nanoscale Detail in Cancer;* (Invited) **Jessica Riesterer**, Cecilia Bueno, Erin Stempinski, Steven Adamou, Claudia Lopez, Guillaume Thibault, Lucas Pagano, Joseph Grieco, Samuel Grieco, Archana Machireddy

2:00 PM **655** *Lymphatics and The Intestinal Stem Cell Niche: An Ultrastructural and 3D-Immunofluorescence Study*; **Hilda Pasolli**

2:15 PM **670** *Indirect CLEM Identifies Nanoscale Remodeling Associated with Atrial Fibrillation in Diverse Etiologies, Enabling a Unified Therapeutic Approach;* **Louisa Mezache**, Andrew Soltisz, Przemysław Radwański, Gerard Nuovo, Rengasayee Veeraraghavan

2:30 PM **685** *Volume and Large Field of View Electron Microscopy as Tools for Rapid and Detailed Cellular Analysis in Preclinical Therapeutic Testing;* (Invited) **Grahame Kidd**, Emily Benson

B08.3 Biological Soft X-ray Tomography

Wednesday 1:30 PM **Room M-100-E**

1:30 PM **636** *Soft X-ray Tomography Enables New Insights into the Coordinated Division of Organelle-like Symbiont in a Globally Distributed Unicellular Marine Haptophyte Alga;* (Invited) **Kendra Turk-Kubo**, Valentina Loconte, Bieke Vanslembrouck, Wing Kwan Esther Mak, Axel Ekman, Jian-hua Chen, Takeo Horiguchi, Mark Le Gros, Kyoko Le Gros, Jonathan Zehr

2:00 PM **656** *Quantitative Structural Mapping of Insulin Maturation in Beta Cells;* **Kate White**

2:15 PM **671** *Strong Intracellular Signal Inactivation Produces Sharper and More Robust Signaling From Cell Membrane to Nucleus;* **Samuel Isaacson**, Jingwei Ma, Myan Do, Mark Le Gros, Charles Peskin, Carolyn Larabell, Yoichiro Mori

2:30 PM **686** *Analysis and Segmentation of cytoplasm with U-Net;* **Ayse Erozan**, Philipp Lösel, Venera Weinhardt, Vincent Heuveline

2:45 PM **699** *The Role of Soft X-Ray Tomography in Generating Whole-Cell Models;* **Valentina Loconte**, Jian-hua Chen, Bieke Vanslembrouck, Axel Ekman, Mark Le Gros, Carolyn Larabell

C Cross-Cut/Interdisciplinary Sciences Symposia – Wednesday Afternoon

C02.3 Extracting Information from Data: Applications of Artificial Intelligence in Microscopy Application of Artificial Intelligence to Microscopy in the Materials and Biological Sciences

Wednesday 1:30 PM **Room M-100-G**

1:30 PM **637** *EELS Clustering in Strained Nanocrystal using Machine Learning: A Case Study of Core/Shell Nanocrystal with Uniform Grain Boundary Defects;* **Min Gee Cho**, Myounghwan Oh, Colin Ophus, Mary Scott

1:45 PM **646** *Developing Robust Neural Networks for High-Resolution TEM Image Analysis;* **Katherine Sytwu**, Luis Rangel DaCosta, Mary Scott

2:00 PM **657** *Physics-Augmented Machine Learning for Automated and Autonomous Experiments in Microscopy;* (Invited) **Maxim Ziatdinov**

2:30 PM **687** *Extracting High Spatio-Temporal Information using Machine Learning from Pt Nanoparticles in CO Gas Environment;* **Piyush Haluai**, Adria Morales, Matan Leibovich, Mai Tan, Joshua Vincent, Carlos Fernandez-Granda, Peter Crozier

2:45 PM **700** *Discovering the Electron Beam Induced Transition Rates for Silicon Dopants in Graphene With Deep Neural Networks in the STEM;* **Kevin Roccapriore**, Max Schwarzer, Joshua Greaves, Jesse Farebrother, Rishabh Agarwal, Maxim Ziatdinov, Ekin Cubuk, Aaron Courville, Marc Courville, Sergei Kalinin

C03.5 Correlative and Multimodal Microscopy and Analysis

Wednesday 1:30 PM **Room L-100-J**

1:30 PM **638** *Multimodal Analysis of InAs/InGaAlAs Quantum Dots Using Transmission Electron Microscopy and Atom Probe Tomography;* **Yudai Yamaguchi**, Yuya Kanitani, Michinori Shiomi, Mikihiro Yokozeki, Jun Uzuhashi, Tadakatsu Ohkubo, Kazuhiro Hono, Kouichi Akahane, Naokatsu Akahane, Shigetaka Tomiya

1:45 PM **647** *Automated Workflow Development for 3D Chemical Mapping via TriBeam Tomography;* **Andrew Polonsky**, Paul Kotula, Julia Deitz, Daniel Perry, Damion Cummings, Joe Boro, Dustin Ellis

2:00 PM **658** *Effect of Microstructure on Microhardness of Plasma-Sprayed Coating of CaO (5%) Stabilized-Zirconia on Stainless Steels;* **Mohamed Hafez**, Sameh Akila, Mohamed Khedr, Ali Khalil

2:15 PM **672** *Electron Microscopy of 2D/3D ZnAl/ZnSn(OH) Hydrotalcite/Zinc Tin Composite Nanophotocatalyst;* **Hector Calderon**, Guadalupe Romero Ortiz, Enrique Samaniego, Angeles Mantilla, F Tzompantzi, Vicente Garibay Febles

2:30 PM **688** *Temperature Effect on the Synthesis of Composite Material KNNS-Bi2Te3;* **Gerardo Resendiz-Hernandez**, Jesus Eduardo Leal-Perez, Abel Hurtado-Macias

2:45 PM **701** *A High-Speed Rotational Diamond Anvil Cell for In Situ Analysis of Hierarchical Microstructural Evolution of Metallic Alloys during Extreme Shear Deformation;* **Arun Devaraj**, Tingkun Liu, Changyong Park, Stas Sinogeikin

P Physical Sciences Symposia – Wednesday Afternoon

P01.3 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Wednesday 1:30 PM **Room 200-I**

1:30 PM **639** *Imaging Dynamically-Evolving Electrodes for Energy Transformation;* (Invited) **William Chueh**

2:00 PM **659** *Comparison of Structure and Li intercalation Properties in Natural and Artificial Graphite Materials as the Anodes in Li-ion Batteries;* **Ioannis Siachos**, Zachary Ruff, Clare P. Grey, B. Layla Mehdi

2:15 PM **673** *In Situ Observation of Lithium Stripping and Plating Process in an Open-Cell All-Solid-State Lithium Metal Battery;* **Zheng Fan**, Chaoshan Wu, Lihong Zhao, Qing Ai, Samprash Risal, Jun Lou, Yan Yao

2:30 PM **689** *Operando Elemental Imaging Using SIMS: Correlative Structural, Chemical, and Electrochemical Analysis of Solid-State Batteries*; **Luca Cressa**, Yanyan Sun, Dustin Andersen, Maryam Nojambee, Mathieu Gerard, Tom Wirtz, Santhana Eswara

P04.3 Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing

Wednesday 1:30 PM **Room 200-F**

1:30 PM **640** *Slag Formation During Additive Manufacturing of Dispersion-Strengthened Superalloys;* (Invited) **Zachary Cordero**, Wenyuan (Roger) Hou, Donovan Leonard

2:00 PM **660** *Study of Phase-Transformation Behavior in Additive Manufacturing of Nitinol Shape Memory Alloys by In Situ TEM Heating;* **Yi-Chieh Yang**, Jia-Ning Zhu, Thor Bjerregård Sneppen, Alice Fanta, Vera Popovich, Joerg Jinschek

2:15 PM **674** *Graphene Reinforced 316L Stainless Steel Prepared via Laser Powder Bed Fusion;* **Wen Qian**, Maxwyll McConnell, joseph Turner, Xin Chen, Bai Cui

2:30 PM **690** *Characterization of Quasi-continuous Reinforcement Network in the Selective Laser Melted Titanium Matrix Nanocomposite using Correlative FIB-SEM Tomography and STEM;* (Invited) **Yufeng Zheng**, Dian Li, Sydney Fields, Xing Zhang, Rongpei Shi, Yiliang Liao

P05.3 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Wednesday 1:30 PM **Room 200-G**

1:30 PM **641** *Ultrahigh Temperature In Situ Transmission Electron Microscopy Characterization of Capillary Response in Model Bicrystals;* (Invited) **Shen Dillon**, Ryan Schoell, Khalid Hattar

2:00 PM **648** *In situ Observation of Disconnection-Mediated Nucleation of Annealing Twins at Triple Junctions;* **Yuan Tian**, Yutong Bi, Mingjie Xu, Xiaoguo Gong, Jonathan Zimmerman, Eugen Rabkin, Jian Han, David Srolovitz, Xiaoqing Srolovitz

2:15 PM **675** *Thermal Stability of Nanolaminates Containing Thick 3D interfaces: An Ex-situ/In-situ Annealing Study;* **Justin Cheng**, Zezhou Li, Jon Baldwin, Khalid Hattar, Nathan Mara

2:30 PM **691** *Experimental Analysis of Fracture in 6063 Aluminum Alloys Subjected to Accelerated Aging;* **Israel Flores Baez**, Misael Baez, Guillermo Manuel Urriolagoitia Calderon, Guillermo Urriolagoitia Sosa, Beatriz Romero, Israel Fernando Barajas Ambriz, Daniel Sanchez Huerta

2:45 PM **702** *Investigating a Wide Array of Thermally-Driven Events: From Understanding the Temperature-Induced Structure and Morphology Changes of Metal Chalcogenides to Thermolysis-Based Material Generation;* **Eric Formo**, Casey Rowe, John Allen, Jordan Hachtel, Holli Threlkeld, Yassamin Ghafouri, Matthew Bloodgood, Tina Salguero Salguero

P08.2 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

Wednesday 1:30 PM **Room 200-H**

1:30 PM **642** *Probing Local Symmetry Breaking in a Ferroelectric Superconductor;* (Invited) **Susanne Stemmer**, Guomin Zhu, Nicholas Combs, Salva Salmani-Rezaie, Hanbyeol Jeong, Ryan Russel, John Harter

2:00 PM **661** *Role of Substrate Phonon in the Electron-phonon Coupling at FeSe/SrTiO3 Interface;* **Hongbin Yang**, Yinong Zhou, Guangyao Miao, Xiaofeng Xu, Xianghan Xu, Xuetao Zhu, Jiandong Guo, Ruqian Wu, Xiaoqing Wu

2:15 PM **676** *Atomic-Scale Investigations of Self-Assembled Superstructures in Ferroic Materials;* **Shiqing Deng**, Chuanrui Huo, Ye Liu, Jing Zhu, He Qi, Yimei Zhu, Jun Chen

2:30 PM **692** *Ultrafine Ferroelectricity by Oxygen Polyhedral Structure;* (Invited) **Si-Young Choi**

P09.1 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials

Wednesday 1:30 PM **Room 200-J**

1:30 PM **643** *Atomic Resolution Imaging of Phase Transitions in Strongly Correlated Oxides with Continuously Variable Temperature Cryo-STEM;* (Invited) **Noah Schnitzer**, Greg Powers, Berit Goodge, Elisabeth Bianco, Ismail El Baggari, Lena Kourkoutis

2:00 PM **662** *Metal/Insulator Transitions in V2O3 Systems Investigated at the Nanoscale by Spectromicroscopy Techniques Under Cryo-Conditions;* **Odile Stéphan**, Ibrahim Koita, Luiz Tizei, Jean-Denis Blazit, Xiaoyan Li, Nathalie Brun, Etienne Janod, Laurent Cario, Marcel Cario, Laura Bocher

2:15 PM **677** *Phase Modulation of CrCl3 using Atomic-scale Cryogenic STEM;* Hsin-Yun Chao, Miaofang Chi

2:30 PM **693** *The Structure of Charge Density Waves in TaS2 Across Temperature and Dimensionality;* (Invited) Robert Hovden, Suk Sung

T Technologists' Forum – Wednesday Afternoon

X31.1 Technologists' Forum—New and Developing Technologies in Light Microscopy

[Partnering with B06]

Wednesday 1:30 PM **Room 200-E**

1:30 PM **644** *Improving Spatial Analysis of Fluorescence Microscopy Images using Point Process Analysis;* (Invited) **Andrew Soltisz**, Rengasayee Veeraraghavan

2:00 PM **663** *Novel Genetically Encoded Peptide Tags for Correlative Imaging: Lessons Learned;* (Invited) **Claudia Lopez**, Kaylyn Devlin, Erin Stempinski, Kimberly Beatty

2:30 PM **694** *Multichannel Live Cell STED – Dye Combinations and Imaging Techniques for Live Cell Super-resolution Imaging;* (Invited) **Christian Wurm**, Florian Grimm, Mary Grace Velasco, John Waka, Karsten Bahlmann, Jessica Matthias

X42 Biological Sciences Tutorial

Wednesday 1:30 PM **Room M-100-C**

1:30 PM **645** *CryoAPEX: Inception, Growth and Evolution of the Method;* (Invited) **Ranjan Sengupta**, Robert Stahelin, Seema Mattoo

A Analytical/Instrumentation Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

A03.P1 Standards and Reference Materials and their Applications in Quantitative Microanalysis

POSTER # 208

703 *Distinguishing Detrital Mineral Phases in Carbonate Source Rocks to Monitor Eustacy During Deposition using Energy Dispersive Spectroscopy and Back Scatter Electron;* **David Jacobi**, John Longo, Jennifer Rodriguez

POSTER # 209

704 *Quantification of Si, Al, Ti and O Composition in Si/Al Oxide Based Synaptic Resistor Circuits;* **Mingjie Xu**, Dawei Gao, Jian-Guo Zheng, Yong Chen

POSTER # 210

705 *Tephra Community Tools for Archiving Sample Information, Analytical Methods, Samples Geochemistry, and Standards Geochemistry at SESAR and EarthChem;* **Stephen Kuehn**, Marcus Bursik, Andrei Kurbatov, Kerstin Lehnert, Matthew Loewen, Lucia Profeta, Sarah Ramdeen, Kristi Wallace

POSTER # 211

706 *The Holy Trinity of Microanalysis: Standards, K-ratios and Physics;* **John Donovan**, Aurélien Moy, William Nachlas, John Fournelle

POSTER # 212

707 *Theoretical Calculation and Experimental Determination of X-Ray Production Efficiencies for Copper, Zirconium, and Tungsten;* **Ralf Terborg**, Mathias Procop

POSTER # 213

708 *Using Bulk Standards for Quantification of STEM-in-SEM EDX Spectra;* **Nicholas Ritchie**, Andrew Herzing, Vladimir Oleshko

A05.P1 Advanced Measurement Techniques in (S)TEM-EELS

POSTER # 214

709 *Capabilities of a New Compact SEM / STEM Electron Detector for Energy Resolved Scanning Imaging, Reflection Electron Energy Loss Spectroscopy (REELS) and Elastic Peak Electron Spectroscopy (EPES);* **Philippe Staib**

POSTER # 215

710 *Combine 4D STEM and EELS Using a Fast Pixelated Direct Detector with Center Hole;* Martin Huth, Björn Eckert, Stefan Aschauer, Emma Hedley, Peter Nellist, Petra Majewski, Lothar Strueder, Heike Soltau

POSTER # 216

711 *Convexity Constraints on Linear Background Models for Electron Energy-Loss Spectra;* **Wouter Van den Broek**, Daen Jannis, Johan Verbeeck

POSTER # 218

713 *EELS Spectrum Imaging of Ca Segregation at Grain Boundaries in Magnesium Aluminate Spinel;* **Alexander Campos Quiros**, Animesh Kundu, Masashi Watanabe

POSTER # 219

714 *Investigation of Electronic Excitations in Monoclinic HfO2 Studied by Energy-Filtered Transmission Electron Microscopy-Spectrum-Imaging and Momentum-Resolved Electron Energy Loss ω-q Mapping Techniques;* **Sz-Chian Liou**, Vladimir Oleshko, Xun Zhan, GUO-JIAN SHU

POSTER # 220

715 *Mapping Nonlinear Optical Effects in an Integrated Photonics Microresonator;* **Jan-Wilke Henke**, Yujia Yang, F. Jasmin Kappert, Arslan Sajid Raja, Germaine Arend, Guanhao Huang, Armin Feist, Zheru Qiu, Tobias Kippenberg, Claus Ropers

POSTER # 221

716 *Observing Carbon-(k) Near Edge Structure for Various Polymers at High Spatial Resolution with Modern Scanning Transmission Electron Microscopy and Electron Energy Loss Spectroscopy Instrumentation;* **Robert E A Williams**

POSTER # 222

717 *Seeing Cation Dopants in Gd-doped Ceria with STEM-EELS;* **Mai Tan**, Peter Crozier, Shize Yang

Scientific Program

A Analytical/Instrumentation Sciences Posters – Wednesday cont.

A13.P1 Computational Advances in Electron Microscopy

POSTER # 223

718 *Compressed Sensing System For Scanning Probe Microscopy;* **Edward Principe**, Jeffrey Hagen, Brian Kempshall, Kirk scammon

POSTER # 224

719 *Development of an Automated Reciprocal-Space Navigator in a JEOL FEMTUS Platform;* **Surui Huang**, Brian Chen, Aparna Bharati, Martin Harmer, Masashi WATANABE

POSTER # 225

720 *Fourier-Ring Correlation Resolution for Time-Resolved Measurement in Charged Particle Microscopy;* **Oguz Kagan Hitit**, Akshay Agarwal, Vivek Goyal

POSTER # 226

721 *Mapping Atomic Displacements in Perovskite Structures using VecMap;* **Tao Ma**

POSTER # 227

722 *Measuring Three-Dimensional Strain in Nb3Sn Grains by Combining ZOLZ and HOLZ Diffraction;* **Zhaslan Baraissov**, Zeming Sun, Yu-Tsun Shao, Matthias Liepe, David Muller

POSTER # 228

723 *New Features in Landyne 5 - a Software Suite for Materials Characterization and Crystallography by Transmission Electron Microscopy;* **Xing-Zhong Li**

POSTER # 229

724 *Probe Aberration Correction in Scanning Electron Microscopy using Artificial Neural Networks;* **Surya Kamal**, Harshkumar Prajapati, Nathan Cahill, Richard Hailstone

POSTER # 230

725 *Progress in Secondary Electron Yield Mapping in Charged Particle Microscopy;* **Akshay Agarwal**, Leila Kasaei, Albert Schultz, Leonard Feldman, Vivek Goyal

POSTER # 231

726 *Using Realistic Valence Electron Wave functions in 4D-STEM Simulations;* **Mark Oxley**, Wei Luo, Mina Yoon, Miaofang Chi

B Biological Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

B03.P1 Machine Learning in Biological Imaging – How to Train Your Artificial Neural Network

POSTER # 232

727 *An Automated Approach to Synechocystis Cell Analysis in TEM Image Datasets;* **Rebekah White**, Carter Bodinger, Kaitlin Simmons, Latambria Hampton, Qingfang He

POSTER # 233

728 *Appraisal of AlphaFold2-Predicted Models in Cryo-EM Map Interpretation;* **Maytha Alshammari**, Jing He, Willy Wriggers

POSTER # 234

729 *Automated Segmentation of Mitochondria in Virus-Infected Cells using Deep Learning Models;* **Matthijs Schrage**, Mario-Alin Rus, Marre Niessen, Thomas Burgoyne, Katherine Lau

POSTER # 235

730 *Data Driven Approach To Delineate Membrane Structures In Em Images Using Vesselness Filter and Machine Learning Model;* **Suhail Parvaze Pathan**

POSTER # 236

731 *Expert- and Nonexpert-friendly Framework for Deep Learning Image Segmentation Demonstrates Successes Across Applications in vEM, CryoEM, MicroCT and Fluorescence Microscopy;* Nicolas Piché, Jessica Heebner, Benjamin Provencher, Mike Marsh

POSTER # 237

732 *High-Throughput Low-Dose Biomolecule Imaging in Liquid Phase Electron Microscopy;* **Nicolette Shaw**, Tyler Lott, Ariel Petruk, Natalie Hamada, Carmen Andrei, Yibo Liu, Juewen Liu, Germán Sciaini, Kostyantyn Pichugin,

POSTER # 238

733 *Real-time Image Deblurring to Improve Throughput of Serial-Section Volume Electron Microscopy for Neural Connectomic Studies;* **Richard Schalek**, Nadan Parikh, Yuelong Wu, Jeff Lichtman, Donglai Wei

POSTER # 239

734 *Using X-ray Microscopy and Machine Learning to Boost Image Quality in 3D Histology;* **Rosy Manser**, Kedar Narayan, Rachna Parwani

B05.P1 Technical Advances in cryoEM

POSTER # 240

735 *Accounting for the Ewald Spheres in CryoEM Reconstructions and Their Relationship to 3D Fourier Transforms of Focal Series;* **Bernard Heymann**, Alan Merk, Jana Ognjenovic

POSTER # 241

736 *Chamelogator: A Software Tool for Chameleon Data Analysis;* **Ouliana Panova**, Ivan Fong, Miriam Weckener, Paul Thaw, Michele C. Darrow

POSTER # 242

737 *Comparative Analysis of Cryo-Electron Microscopy and Liquid-Electron Microscopy Image Processing Workflows;* **G.M. Jonaid**

POSTER # 243

738 *Cryo-EM Pipeline for Pharmaceutical and Biotechnology Industries;* **Anil Kumar**, Kai Cai, Bryan Sibert, Matthew Larson, Jae Yang, Elizabeth Wright

POSTER # 244

739 *CryoFAST™: Automated Cryo-Electron Microscopy Data Acquisition using Machine Learning Methods;* **Narasimha Kumar**, Elliot Gray, Dmitry Lyumkis, Atousa Mehrani

POSTER # 245

740 *High-Throughput, High-Resolution Data Collection Workflow For Structure-Based Drug Discovery Using Cryo-Transmission Electron Microscopy;* **Abhay Kotecha**, Adrian Koh, Victoria Cushing, Basil Greber

POSTER # 246

741 *Improving Every Image: HexAuFoil® Ultra-Small Hole Sample Supports for CryoEM Reconstructions;* **Claire Naylor**, Russell S. King

POSTER # 247

742 *Maximize Access to Cryo-EM Learning and Research Tools with Web Apps;* **Wen Jiang,** Xiaoqi Zhang, Sakshibeedu Bharath, Daoyi Li

POSTER # 248

743 *Measuring the Effect of Ice Thickness and Microscope Configuration on Resolution in Single Particle Cryo-EM;* **Eugene Chua**, Kasahun Neselu, Bing Wang, William Rice, Clint Potter, Bridget Carragher

POSTER # 249

744 *Microscope Operations at the National Center for CryoEM Access and Training (NCCAT);* **Aygul Ishemgulova**, Jing Wang, Kasahun Neselu, Kashyap Maruthi, Christina Zimanyi, Mahira Aragon, Elina Kopylov, Joshua Mendez, Charlie Dubbeldam, Edward Eng

POSTER # 250

745 *The National Center for CryoEM Access and Training - Establishing a Cross-Facility Honored Training Curriculum;* **Edward Eng**, Christina Zimanyi, Mahira Aragon, Eugene Chua, Elina Kopylov, Charlie Dubbeldam, Jeffrey Kieft, Alex de Marco

POSTER # 251

746 VitroJet: Moving Sample Preparation into the New Era; Maaike Schotman, Rene Henderikx, Bart Beulen, Frank Nijpels

Scientific Program

B Biological Sciences Posters – Wednesday cont.

B08.P1 Biological Soft X-ray Tomography

POSTER # 252

747 *A Laboratory-Based Soft X-ray Microscope for 3D Imaging of Whole Cells_2 Poster;* **Kenneth Fahy**

POSTER # 253

748 *Analysis and Segmentation of Cytoplasm with U-Net_2 Poster;* **Ayse Erozan**

POSTER # 254

749 *Charting Cytoskeleton-Organelle Interplay in Living Cells Through High Resolution 3D Correlative Cryo-Imaging_2 Platform;* **Ivy Wang**

POSTER # 255

750 *Dehydration: An Alternative Specimen Preparation For Soft X-Ray Tomography;* **Anthoula Chatzimpinou**, Charlotta Funaya, David Rogers, Stephen O'Connor, Sergey Kapishnikov, Paul Sheridan, Kenneth Fahy, Venera Weinhardt

POSTER # 256

751 *Development of Full Tilt Tomography in a Laboratory based Soft X-ray Microscope;* **Kenneth Fahy**, Sergey Kapishnikov, William Fyans, Venera Weinhardt, Tony McEnroe, Fergal O'Reilly, Paul Sheridan

POSTER # 257

752 *Soft X-ray 3D Imaging: A Powerful Tool for Visualizing Virus Infections with Increased Resolution and Field of View_2 Poster;* **Jian-hua Chen**

POSTER # 258

753 *Soft X-ray Tomography for Mapping and Quantifying Intracellular Organelle Interactions;* **Valentina Loconte**, Jitin Singla, Angdi Li, Jian-hua Chen, Axel Ekman, Gerry McDermott, Andrej Sali, Mark LeGros, Kate White, Carolyn Larabell

C Cross-Cut/Interdisciplinary Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

C02.P1 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems

POSTER # 259

754 *A Comparison of Image Analysis Tools for Segmentation on SEM Micrographs – Zeiss ZEN Intellesis vs. Thermofisher AVIZO;* **Patrik Jozefovič**, Ondřej Ambrož, Jan Čermák, Sarka Mikmekova, Jiří Man

POSTER # 259.5:

Real Time Machine Learning in Operando Microscopy: Challenges and Opportunities; **Mitra Taheri**

POSTER # 260

755 *Deep Learning Design of Graphene-Reinforced Polyurethane Foams from SEM Microstructure Images and Style-based Generative Adversarial Networks;* **Alemayehu S Admasu**, Devesh Shah, Devesh Upadhyay, Patrick Blanchard

POSTER # 261

756 *Exploring the Emergence of Complex Grain Boundary Structures via Hybrid Probabilistic Generative Model;* Jiadong Dan, Moaz Waqar, Duane Loh, Stephen Pennycook

POSTER # 262

757 *Machine Learning Enhanced Image Segmentation for High-Fidelity STEM Data Analysis;* **Xiner (Lucy) Lu**, Kai He

POSTER # 263

758 *Synthetic Data for Deep Learning: Segmentation of PCB X-Ray Images;* **Adrian Phoulady**, Hongbin Choi, Nicholas May, Sina Shahbazmohamadi, Pouya Tavousi

POSTER # 264

759 *Transfer Learning with Domain Adaptation for Palynological Image Segmentation;* **Weichang Li**, Ali Almadan, Mustafa Al Ibrahim

C Cross-Cut/Interdisciplinary Sciences Posters – Wednesday cont.

C03.P1 Correlative and Multimodal Microscopy and Analysis

POSTER # 265

760 *Correlative Workflow Utilizing Dual Energy 3D X-ray Tomography and 3D FIB Tomography to Identify the Probability of Detection of Defects in Titanium;* **Yara Suleiman**, Sina Shahbazmohamadi, Christopher pelliccione, Iuliana Cernatescu

POSTER # 266

761 *Developing Customizable TEM Membranes for in-situ Experiments of Functional Nanostructures and Thin Films;* **Marthe Linnerud**, Jens Høvik, Ingrid Hallsteinsen, Magnus Nord

POSTER # 267

762 *Electron Microscopy Study of (ZnS)10/(Ni1Fe99)90 Nanowires;* **Wen-An Chiou**, Xu-Xiang Cai, Jiancun Rao, Hong-Ming Lin, Yuh-Jing Chiou, Chung-Kwei Lin

POSTER # 268

763 *Elemental and Crystallographic Analysis of Trapiche Ruby using Micro X-Ray Fluorescence Spectroscopy, X-ray Pole Figure Map, and Low Vacuum Type Field Emission Scanning Electron Microscopy;* **Junji Yamanaka**, Keisuke Arimoto, Takuma Ampo, Yasushi Takahashi

POSTER # 269

764 *Intelligent Ultrashort Pulsed Laser Machining Using Laser-Induced Breakdown Spectroscopy;* **Hongbin Choi**, Adrian Phoulady, Pouria Hoveida, Nicholas May, Sina Shahbazmohamadi, Pouya Tavousi

POSTER # 270

765 *Metallization of DNA Origami Triangles Probed with HAADF-S/TEM, SEM, and AFM: A Correlative Study;* **Krishna Verma**, Tanya Prozorov

POSTER # 271

766 *Methodology for Collecting and Aligning Correlative SEM, CLSM and LOM Images of Bulk Material Microstructure to Create a Large Machine Learning Training Dataset;* **Jan Čermák**, Ondřej Ambrož, Martin Zouhar, Patrik Jozefovič, Sarka Mikmekova

POSTER # 272

767 *Particle Shape influence in Magnetic Behavior of Pure and 3.0% Mn-doped CuO Nanofibers;* **M. Piñón-Espitia**, Guillermo Herrera-Perez, A. Duarte-M ller, Beatriz López-Walle, M.T. Ochoa-Lara

POSTER # 273

768 *Visualizing Nanosecond Transient Electric Fields with Pulsed Electrons;* **Thomas Gage**, Daniel Durham, Ilke Arslan, Haihua Liu, Charudatta Phatak, Supratik Guha

C04.P1 Lens on Diversity in the Microscopy and Microanalysis Community

POSTER # 274

769 *Gauging How Widespread Availability of Smart Phone Cameras by Themselves or in Combination with Magnification Devices Can Displace Optical Microscopes in Grade Level Education;* **Evangeline Formo**, Eric Formo

POSTER # 275

770 *History and Impact of the Annual Women in Microscopy Breakfast;* **Lee Pullan**, Trisha Rice

POSTER # 276

771 *I Feel Seen: Exposing Students to Minority Speakers Fosters Learning and Community Building;* **Maria Solares**, Troy Ott

POSTER # 277

772 *Initial Considerations for Accessibility in Microscopy;* **Allison Boley**

POSTER # 278

773 *Managing Microscopy Research and Education Resources at a Medium-Sized Institution;* **James Wachira**

POSTER # 279

774 *MAS Goldstein Scholarship: Help for Your Degree;* **Abigail Lindstrom**

POSTER # 280

775 *Resisting Radiation Through Tardigrade DSUP;* **Douglas Shattuck**, Benjamin Hurley, Julia Gamitto, Saman Abbas, Markus Buehler, Emily Parker, Sophia Salinas, Grace Gunning

POSTER # 281

776 *Small Steps to Diversify the Electron Microscopy Community;* **Rosa Diaz**

POSTER # 282

777 *The Microscopy Australia Staff Shadowing Scheme: Peer-to-Peer Knowledge Exchange Building a Connected Microscopy Community;* **Karen Privat**, Rhiannon Kuchel, Lisa Yen

POSTER # 283

778 *Use of Basalt Fibers on the Moon—An Outreach Collaboration of Middle and High School Researchers with MIT and JEOL USA;* **Douglas Shattuck**, Haley Talbot, Mia Hubbard, Saman Abbas, Vern Robertson, Markus Buehler

POSTER # 284

779 *What Does a Microscopist Look Like? An Exploration of Vintage Ads and Brochures in Microscopy and Microanalysis;* **Anette von der Handt**

P Physical Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

P01.P1 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

POSTER # 285

780 *3D Multi-modal Elemental Characterization of Li-Ion Battery Components using SEM, EDS and ToF SIMS in the FIB-SEM Tomography;* **Jiří Dluhoš**, Tomáš Šamořil, Václav Ondračka, Martin Sláma, Petr Klímek

POSTER # 286

781 *Atomic-Scale Understanding of New Phase Transition Pathway and Phase Boundary Structures in Layered Oxide Cathodes for Lithium-Ion Batteries;* **Chunyang Wang**, Rui Zhang, Huolin Xin

POSTER # 287

782 *Direct Imaging of Lattice Structure and Formation Kinetics of Metal-Organic Layer Composites;* **Hongguang Wang**, Hang Liu, Qian Song, Elias Klemm, Peter A. van Aken

POSTER # 288

783 *Innovative In-Situ Workflow for Battery Sample Analysis Using Afm-In-Sem;* **Veronika Hegrova,** Radek Dao, Aleksandr Kondrakov, Ute Heinemeyer, Libor Novak, Petr Zakopal, Jan Neuman

POSTER # 289

784 *In-situ Air-Free 4D-STEM Biasing of Model Lithium-Sulfur Batteries;* Hadas Sternlicht, Benjamin Savitzky, Alpesh Shukla, Colin Ophus, Andrew Minor

POSTER # 290

785 *Investigation into Cathode Precursor Material Choice Influence on the Morphology and Electrochemical Performance;* Maksim Sultanov, Jianguo Wen, Yasuo Ito, Arturo Gutierrez, Jason Croy

POSTER # 291

786 *Microstructural Analysis of Pb2CuF6 as a Cathode Material for All-Solid-State Fluoride-ion Batteries;* **Hiroshi Nakajima**, Takeshi Tojigamori, Hirofumi Tsukasaki, Kousuke Noi, Hidenori Miki, Takeshi Abe, Shigeo Mori

POSTER # 292

787 *Structural Characteristics and Phase Evolution of Calcium-Reduced (Sm,Zr)(Fe,Co,Ti)12 Particles;* **Chaoya Han**, Alexander Gabay, George Hadjipanayis, Chaoying Ni

POSTER # 293

788 *The Impact of 3D Microscopy Strategies on Computational Analysis for Battery Research;* Yulia Trenikhina, Stephen Kelly, Roman Buchheit, Sarah Reeb

POSTER # 294

789 *Twinning and Crack Detection in a Layered Cathode Battery Material with High Resolution FESEM and Low Voltage STEM;* **Meysam Naghizadeh**, Raynald Gauvin, Nicolas Dumaresq, Lise Guichaoua, Stéphanie Bessette, Chisu Kim

POSTER # 295

790 *Understanding the Origin of Lithiophilicity Toward Molten Li-Metal Using In-situ Scanning Electron Microscopy (SEM);* **Shirin Kaboli**, Wen Zhu, Daniel Clement, Martin Dontigny, Frédéric Gendron, Kamyab Amouzegar, Ashok Vijh, Abdelfast Guerfi, Michel Trudeau, Andrea Paoelalla

POSTER # 296

791 *Unravelling Li Growth Kinetics in Solid Electrolytes due to Charging Effect under Electron Microscopy;* Tofunmi Ogunfunmi, Xinxing Peng, Qingsong Tu, Yaqian Zhang, KyuJung Jun, Fengyu Shen, Michael Tucker, Gerbrand Ceder, Mary Scott, Yingzhi Sun

P04.P1 Correlative Microanalysis of Rapid Solidification Microstructures in Additive Manufacturing

POSTER # 298

793 *Characterization of Complex Microstructure in the Selective Laser Melted Near-α Ti-6Al-2Sn-4Zr-2Mo Alloy Using Correlative Scanning Electron Microscopy and Scanning Transmission Electron Microscopy;* **Deepak Pillai,** Ahsan Munna, Cameron Tucker, Yiliang Liao, Yufeng Zheng

POSTER # 299

794 *Characterization of Graphene Coatings on 8620 Alloy Additive Manufactured Steel;* **Kaleb Hood**, Sarah Ahmed, Jun Jiao

POSTER # 300

795 *Comparison of PLA and ABS Properties with Different Infill Percentages at 40%, 80% and 100%;* **Gerardo Pérez Mendoza**, Humiko Hernándes Acosta, Alejandro Miranda Cid, Noemí Corro Valdez, Christopher René Torres San Miguel, Jorge Víctor Cortes Suarez, Noé López Perrusquia, Marco Antonio Doñu Ruiz

POSTER # 301

796 *Dispersion of the CrMnFeCoNi and the CrFeWNbMoTaV High Entropy Alloy Powders into an H13 Tool Steel by Mechanical Alloying;* **Raúl Pérez-Bustamante**, J.I. Loredo-Pintor, K.V. Lucio-Collazo, M. García-Guerrero, O.E. Pantoja-Arvizo, R. de-León-Sánchez, J.E. Gómez-Cerda, F. Pérez-Bustamante, M.O. Ramos-Azpeitia,

POSTER # 302

797 *Effect of HIP and Mixture of Rare Earth Elements on the Microstructure and Mechanical Performance of Aged Nanostructured Inconel 718;* Hansel Medrano, A. Santos-Beltrán, Veronica Gallegos, mIRIAM Santos-Beltran, C.G. Garay-Reyes, G. Rodríguez-Cabriales, I. Estrada-Guel, J.S. Castro-Carmona, H. Camacho-Montes, R. Martínez-Sánchez

P Physical Sciences Posters – Wednesday cont.

POSTER # 303

798 *Effect of Mn and Ti Addition on Microstructure and Hardness of 2024 Al Alloy;* **P. A. Guerrero-Seañez,** C.G. Garay-Reyes, A. Martínez-García, X. Atanacio-Sánchez, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 305

800 *Mechanical Properties of PLA with CF Printed at 40%, 80% and 100% Infill Percentages;* **Gerardo Pérez Mendoza**, Humiko Hernándes Acosta, Alejandro Miranda Cid, Noemí Corro Valdez, Dulce Viridiana Melo Maximo, Milton Elías Espinosa, Noé López Perrusquia, Marco Antonio Doñu Ruiz

POSTER # 306

801 *Microstructural Investigations on Selectively Laser Treated Li6.6La3Zr1.6Ta0.4O12 Solid Electrolyte for Solid-State Batteries;* **Pinar Kaya**, David Kolb, Stefan Kreissl, Elias Reisacher, Simon Ruck, Harald Riegel, Volker Knoblauch

POSTER # 307

802 *Microstructure – Mechanical Property Relationship in Pristine and Aged Forsterite as a New Support Material for Solid Oxide Fuel Cells;* **Pinar Kaya**, Volker Knoblauch, Manuel Grudenik, Matthias Meffert, Dagmar Gerthsen, Piero Lupetin, Michael J. Hoffmann

POSTER # 308

803 *Precipitation Behavior and Mechanical Properties in Al-Mg-Si and Al-Mg-Zn Systems Subjected to a T8 Treatment;* **X. Atanacio-Sánchez,** C.G. Garay-Reyes, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez, A. Martínez-García, P. A. Guerrero-Seañez

POSTER # 309

804 *Study of Hot Plastic Deformation in an A356 alloy;* **C.G. Garay-Reyes**, J. D. Franco-Madrid, A. Martínez-García, X. Atanacio-Sánchez, P. A. Guerrero-Seañez, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 310

805 *The Effect of Space Holder Size on the Mechanical Properties of Porous Titanium;* **Armando Tejeda-Ochoa**, Katia Rivera, José Ernesto Ledezma, José Herrera-Ramirez, C. Carreño-Gallardo

P05.P1 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

POSTER # 311

806 *Hydrogen Induced Transition of Failure Mode in Metallic Twinned Nanowires;* **Guangming Cheng**, Nan Yao, Yong Zhu

POSTER # 312

807 *In situ SEM Micromechanical Testing of Engineered Coatings at Elevated Temperatures;* **Eric Hintsala**, Jasmine Johnson, Sanjit Bhowmick, Douglas Stauffer

POSTER # 313

808 *In Situ Tensile and Fracture Behavior of Ultra-thin Amorphous Carbon in TEM;* **Jongchan Yoon**, Younggeun Jang, Kangsik Kim, Jaemin Kim, Seungwoo Son, Zonghoon Lee

POSTER # 314

809 *In-Situ Tem Deformation of High Entropy Alloys;* **Madelyn Payne**, Mingwei Zhang, Velimir Radmilović, Punit Kumar, Andrew M Minor, Mark Asta, Robert Ritchie

POSTER # 315

810 *Mapping the Evolution of Point Defects Formed at a Ni/Cr Bi-metal Interface Under Varied Temperature and Irradiation Using Advanced STEM-based Methods;* **Dongye Liu**, Sean Mills, Andrew M Minor

POSTER # 316

811 *Pearlite Size Effects on Ductility at Cryogenic Temperature via In-Situ Cantilever Loading;* **Jarod Robinson**, Eric Hintsala, Douglas Staffer, Sanjit Bhowmick, Eric Homer, Gregory Thompson

POSTER # 317

812 *Structural Tolerance of Zirconium Diboride under Electron Irradiation through in-situ Convergent Beam Electron Diffraction and Energy-dispersive X-ray Spectroscopy;* **Yucheng Lan**, Maohong Fan

Scientific Program

P Physical Sciences Posters – Wednesday cont.

P10.P3 Advanced Imaging and Spectroscopy for Sensitive Materials and Interfaces

POSTER # 318

813 *A Correlated STEM/APT Study of Multidimensional and Interconnected Multi-element Nanostructures Derived from a Complex Concentrated Oxide;* **Huiming Guo**, Christopher Mead, Marquez Balingit, Soham Shah, Xin Wang, Mingjie Xu, Jack Samaniego, Kandis Abdul-Aziz, Lincoln Lauhon, William Bowman

POSTER # 319

814 *An IR Filter for In-Situ STEM-EDS Heating and Multimodal STEM Experiments in DigitalMicrograph;* **Anahita Pakzad**, Fernando Castro

POSTER # 320

815 *Assessing Critical Dose for Beam-Sensitive Samples Using Low-Dose Counted In-Situ Video;* **Benjamin Miller,** Mingjie Xu, Cory Czarnik

POSTER # 321

816 *Broadband Ultrafast Electron Microscopy Using Electrically Driven Pulse Generation;* **Spencer Reisbick**, Myung-Geun Han, Chuhang Liu, Alexandre Pofelski, Eric Montgomery, Chunguang Jing, Yimei Zhu

POSTER # 322

817 *Development of a Fast Through Focus System Synchronized With Camera Shutter Timing;* **Yuki Ninota**, Bryan Reed, Yu Jimbo, Akihiro Ikeda, Syunsaku Waki, Takumi Nomura, Hiroyuki Tanaka, Hidetaka Sawada

POSTER # 323

818 *Development of a Stable Ultrafast Photoemission Architecture Using In-Situ Nickel Wehnelt Aperture Surface;* **Simon Willis**, David Flannigan

POSTER # 324

819 *Dose-Fractionated EELS Through Multipass In-Situ Spectrum Imaging;* **Andrew Thron**, Liam Spillane, Ray Twesten

POSTER # 325

820 *Electron Ptychography for Investigating Magnetic Textures in Micro- and Nano- Scale Magnets via Lorentz Transmission Electron Microscopy;* **Kayna Mendoza Trujillo**, Yue Li, Ralu Divan, Yi Jiang, Arthur McCray, Charudatta Phatak, Amanda Petford Long

POSTER # 326

821 *Machine Vision Software Enables Normalization of Electron Dose Calibration Between Microscopes and Delivers Accurate Quantifiable Tracking of Electron Dose for In-Situ, Operando, and Dose Sensitive Experiments;* **Madelin Dukes**, Yaofeng Guo, Franklin Walden, Nynke Krans, Kate Marusak, Tim Eldred, John Damiano

POSTER # 327

822 *Mapping Conductivity in the TEM with SEEBIC;* **William Hubbard**, Ho Leung Chan, B. C. Regan

POSTER # 328

823 *Persistent Hot Carrier Diffusion in Boron Arsenide Single Crystals Imaged by Ultrafast Electron Microscopy;* **Usama Choudhry**, Fengjiao Pan, Xing He, Basamat Shaheen, Taeyong Kim, Ryan Gnabasik, Alex Ackerman, Ding-Shyue Yang, Zhifeng Ren, Bolin Liao

POSTER # 329

824 *Rapid-Acquisition FEM – Grappling the Noise;* **Armin Zjajo**, Hongchu Du, Rafal Dunin-Borkowski, Aram Rezikyan, Murray Gibson, Michael Treacy

POSTER # 330

825 *Statistical Control Over Electron Beams Using Coulomb-Correlated Few-Electron States In A Transmission Electron Microscope;* **Rudolf Haindl**, Armin Feist, Till Domröse, Marcel Möller, Sergey Yalunin, Claus Ropers

POSTER # 331

826 *Study of Graphene by Scanning Low Energy Electron Microscopy and Time-of-Flight Spectroscopy;* **Ilona Müllerová**, Ivo Konvalina, Martin Zouhar, Aleš Paták, Benjamin Daniel, Lukáš Průcha, Jakub Piňos, Eliška Materna Mikmeková

POSTER # 332

827 *Ultimate Limits of Transmission Electron Microscopy;* **Christian Dwyer**

Thursday, July 27

A Analytical/Instrumentation Sciences Symposia – Thursday Morning

A05.3 Advanced Measurement Techniques in (S)TEM-EELS

Thursday 8:30 AM **Room 200-D**

8:30 AM **829** *Measuring Phase and Symmetries in STEM-EELS;* (Invited) **Benjamin McMorran**, Cameron Johnson, Amy Turner

9:00 AM **864** *4D Energy-Filtered STEM: A New Approach for Mapping Orbital Transitions;* **Stefan Löffler**, Manuel Ederer

9:15 AM **848** *Tuning of Plasmonic Response in High Aspect-Ratio Au Nanowires through Laser Irradiation: A TEM-EELS Study;* **Raul Arenal**, Mario Pelaez-Fernandez, Bruno Majerus, Romain Dufour, Daniel Funes, Jean-Luc Duvail, Luc Henrard

9:30 AM **878** *Coherent Manipulation of Ultrashort Free Electrons Pulses Via Quantized Electron-Photon Interaction Mediated By Transversely- And Longitudinally-Shaped Optical Fields;* (Invited) **Vincenzo Grillo**

A09.1 Analytical Scanning Probe Microscopy

Thursday 8:30 AM **Room M-100-H**

8:30 AM **830** *High-Fidelity Micro- and Nano-Scale Infrared Spectroscopic Imaging;* (Invited) **Rohit Bhargava**, Kevin Yeh, Seth Kenkel

9:00 AM **849** *Multimodal Nano-IR through Peak Force Infrared (PFIR) Microscopy;* (Invited) **Xiaoji Xu**

9:30 AM **879** *Correlative Nanoscale Topographical, Mechanical, Electrical and Chemical Property Mapping of Polymers and Complex Materials;* (Invited) **Cassandra Phillips**, Chunzeng Li

A10.1 The Road to Atomic Scale Tomography

Thursday 8:30 AM **Room 200-A**

8:30 AM **844** *Introduction to Atomic-Scale Tomography;* **Tom Kelly**, Brian Gorman, Simon Ringer

8:45 AM **850** *The Need for Atomic-Scale Tomography;* (Invited) **Hamish Fraser**, Stoichko Antonov, Tom Kelly, Dierk Raabe

9:15 AM **880** *The TOMO Project – Integrating a Fully Functional Atom Probe in an Aberration-Corrected TEM;* (Invited) **Joachim Mayer**, Juri Barthel, Ashok Vayyala, Rafal Dunin-Borkowski, Maarten Bischoff, Hugo van Leeuwen, Stephan Kujawa, Joe Bunton, Dan Bunton, Tom Kelly

9:45 AM **831** *Integrating APT on TEM: Everything You've Always Wanted to Know about a Cubic Micron, but were Afraid to Ask;* (Invited) **Hugo van Leeuwen**, Stephan Kujawa, Pleun Dona, Hans Persoon, Casper Smit, Ron van den Boogaard, Joe Bunton, Dan Lenz, Maurice Lenz, Erik Ruinemans

A12.1 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-Liquid Interfaces

Thursday 8:30 AM **Room 200-C**

8:30 AM **832** *Investigating and Controlling Material Interfaces using Cryo-FIB/SEM and In-Situ TEM;* (Invited) **John Watt**

9:00 AM **851** *A High-Throughput Method for Bulgeless Liquid Cell Imaging in the Transmission Electron Microscope;* **Tyler Lott**, Ariel Petruk, Nicolette Shaw, Natalie Hamada, Carmen Andrei, Yibo Liu, Juewen Liu, Germán Sciaini Sciaini

9:15 AM **865** *Cryo-Scanning Electron Microscopy Analysis for the Structural Evolution of Cellulose Nanocrystals based Hydrogels;* **Jae-Young Cho**, Emily Grabovac, Ashley Wagner, Sarang P. Gumfekar, Doug Vick, Patrick Price, Darren Makeiff, Marianna Kulka Kulka

9:30 AM **881** *Diving into COVID-19: Visualizing SARS-CoV-2 Patient Proteins using Liquid-Electron Microscopy;* (Invited) Samantha Berry, Liza DiCecco, Jennifer Gray, Jack Boylan, Maria Solares, Deb Kelly

A13.4 Computational Advances in Electron Microscopy

Thursday 8:30 AM **Room M-100-B**

8:30 AM **833** *Semi-Automated Hierarchical Clustering Model for 4D-STEM Datasets;* (Invited) Chuqiao Shi, Nannan Mao, Yao Yang, Jing Kong, Yimo Han

9:00 AM **852** *High Efficiency Compression Algorithm for Four-Dimensional Scanning Transmission Electron Microscopy;* **Hsu-Chih Ni**, Renliang Yuan, Jiong Zhang, Jian-Min Zuo

9:15 AM **866** *4D-STEM Diffuse Scattering Characterization for Detection of Short-Range Ordering – A New Procedure for Pattern and Spatial Distribution Visualization;* **Po-Cheng Kung**, Kaijun Yin, Jian-Min Zuo, Jessica Anne Krogstad

9:30 AM **882** *Imaging Structural Phase Transitions with Higher Order Laue Zones Using 4D-STEM;* (Invited) Magnus Nord, Giulio Guzzinati, Gertjan Koster, Nicolas Gauquelin, Johan Verbeeck

B Biological Sciences Symposia – Thursday Morning

B05.2 Technical Advances in cryoEM

Thursday 8:30 AM **Room M-100-D**

8:30 AM **834** *Towards Cryogenic Soft Landing of Native Protein Complexes;* (Invited) **Michael Westphall**, Austin Salome, Kenneth Lee, Timothy Grant, Joshua Coon

9:00 AM **853** *3D Electron Diffraction of Small Molecules on the MerlinEM Detector;* **Adriana Klyszejko**, Pedro Nunes, Matus Krajnak, Alistair C. Siebert

9:15 AM **867** *In-Line and Off-Axis Electron Holography for the Study of Biological Specimens;* **Elio Karim**, Bumsu Park, Cécile Marcelot, Stéphanie Balor, Sara Bals, Amélie Leforestier, Célia Plisson-Chastang, Christophe Gatel, Pierre-Emmanuel Gatel, Etienne Snoeck

9:30 AM **883** *Overcoming Resolution Loss in Laser Phase Plate Cryo-Electron Microscopy;* (Invited) **Jeremy Axelrod**, Petar Petrov, Jessie Zhang, Shahar Sandhaus, Jonathan Remis, Robert Glaeser, Holger Mueller

B07.2 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants

Thursday 8:30 AM **Room M-100-F**

8:30 AM **835** *Screening Morphological Characteristics of Large Populations of Synaptic Vesicle Clouds and Active Zones from 3D EM Data;* (Invited) **Connon Thomas**, Jordan Anderson, McLean Bolton, Naomi Kamasawa

9:00 AM **854** *Correlative Cryo-FIB and Cryo-ET of Dendritic Spines and Synaptic Connections;* **Erik Anderson**, Steven Ludtke, Christopher Cronkite, Kimberley Fuchs

9:15 AM **868** *Using Cryo-EM to Reconstruct and Inform p53 Clinically-Relevant Mutation Models;* **Maria Solares**, G.M. Jonaid, Deb Kelly

9:30 AM **884** *A Serotonergic Axon-Cilium Synapse Drives Nuclear Signaling to Maintain Chromatin Accessibility;* (Invited) **Shu-Hsien Sheu**, Srigokul Upadhyayula, Yulong Li, Luke Lavis, Harald Hess, Séverine Chaumont-Dubel, David Clapham

B10.1 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter

Thursday 8:30 AM **Room M-100-E**

8:30 AM **836** *Variations of Organic and Inorganic Components across Human Dentin-Enamel Junction Revealed by SEM-EDS;* (Invited) **Rose Wang**, Donggao Zhao, Yong Wang

9:00 AM **855** *The Characterization of Hydroxyapatite and Octa-Calcium Phosphate with Electron Energy Loss Spectroscopy;* **Ya-Hsiang Hsu**, Asra Hassan, Amanda Trout, John Bartlett, Charles Smith, James Simmer, David McComb

9:15 AM **869** *Multi-Modal and Correlative Microscopy Reveals Significant Changes in Composition, Structure and Biomechanical Properties in Dentine and Enamel Exposed to Common Acid Solutions*; **Louise Hughes**, Pedro Machado, Jonathan Moffat, Joshua Lea

9:30 AM **885** *Applications of SEM/FIB to Drive Development and Innovation in the Oral Care Industry;* (Invited) **Shiyou Xu**

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Morning

C01.1 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems

Thursday 8:30 AM **Room M-100-G**

8:30 AM **837** *A Universal Data Synthesizer to Enable AI4TEM;* (Invited) **Huolin Xin**, Chunyang Wang, Zhengran Ji, Mike Hu, Lingli Kong

9:00 AM **856** *Machine Learning-Driven Autonomous Microscopy for Materials and Physics Discovery;* **Yongtao Liu**, Kyle Kelley, Rama Vasudevan, Maxim Ziatdinov, Sergei Kalinin

9:15 AM **870** *Maximizing Modalities: Accelerating Quantitative Multimodal Electron Microscopy;* **Sarah Akers**, Jenna Bilbrey, Bethany Matthews, Ryan Comes, Rajendra Paudel, Steven Spurgeon

9:30 AM **886** *Automatic Operation of Conventional and Innovative Hardware for Electron Microscopy;* (Invited) **Enzo Rotunno**, Vincenzo Grillo

C03.6 Correlative and Multimodal Microscopy and Analysis

Thursday 8:30 AM **Room L-100-J**

8:30 AM **838** *Correlative Microscopy discovers self-healing of AM-build Al-Mg Alloy;* **Bartlomiej Winiarski**, Julie Gheysen, Grzegorz Pyka, Florent Hannard, Mariia Arseenko, Julie Villanova, Adam Brinek, Ali Chirazi, Lin Chirazi, Aude Simar

8:45 AM **845** *Multimodal EELS and EDX Spectroscopy in 2D and 3D for Analysis of Catalysts at the Nanoscale;* **Maria Meledina**, Dileep Krishnan, Cigdem Ozsoy-Keskinbora, Hamed Heidari, Xiaochao Wu, Ulrich Simon, Sorin Lazar, Peter Tiemeijer, Paolo Tiemeijer

9:00 AM **857** *Hierarchical Architecture and Coherence of Cores in Multi-core Iron Oxide Nanoflowers Investigated by Correlative Multiscale Transmission Electron Microscopy;* **Stefan Neumann**, Laura Kuger, Carsten-Rene Arlt, Matthias Franzreb, David Rafaja

9:15 AM **871** *Quantifying Chemical and Structural Order in Scanning Transmission Electron Microscopy (STEM) Datasets Using Spatial Statistics;* Michael Xu, Shaolou Wei, C. Cem Tasan, James LeBeau

9:30 AM **887** *Revealing the 2D Distribution of Lithium in Cathode Materials using the Composition-By-Difference Method;* **Jonathan Lee**, Shangshang Mu, David Stowe

9:45 AM **894** *Trace Element Identification and Quantification in Solar Cell Materials Using Energy Dispersive and Cathodoluminescence Spectroscopy;* **Jonathan Lee**, Shangshang Mu, David Stowe

P Physical Sciences Symposia – Thursday Morning

P01.4 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Thursday 8:30 AM **Room 200-I**

8:30 AM **839** *Probing Catalyst Surfaces at the Atomic-Scale;* (Invited) **Stig Helveg**, Martin Ek, Lars P. Hansen, Fu-Rong Home, Dirk Van Dyck, Christian Kisielowski, Petra Specht, Christian Damsgaard, Joerg Damsgaard

9:00 AM **858** *In situ Environmental TEM Observation of Cu/Cu2O Interface-Modulated Methanol Reaction Dynamics;* **Meng Li,** Matthew Curnan, Stephen House, Wissam Saidi, Goetz Veser, Judith Yang

9:15 AM **872** *In situ Study of Surface Oxygen Exchange and Transport on Ceria at Different Temperatures;* **Mai Tan**, Peter Crozier, Matan Leibovich, Carlos Fernandez-Granda

9:30 AM **888** *In-situ ETEM Observation of Competing Mechanisms for Filamentous Carbon Gasification;* **Monia Nielsen**, Seth March, Rajat Sainju, Chunxiang Zhu, Puxian Gao, Steven Suib, Yuanyuan Zhu

9:45 AM **895** *Linking Atomic and Reactor Scale Plasmon Photocatalysis in Acetylene Hydrogenation with Optically Coupled ETEM;* **Briley Bourgeois**, Claire Carlin, Daniel Angell, Dayne Swearer, Weh-Hui Cheng, Alan Dai, Lin Yuan, Jennifer Dionne Dionne

P02.1 Electron Beam Manipulation of Covalently Bound Materials

Thursday 8:30 AM **Room 200-F**

8:30 AM **840** *Engineering Qubits in Silicon with Atomic Precision;* (Invited) **Michelle Simmons**

9:00 AM **859** *Probing the Atomic-Scale Internal Phases with the Electron Beam of Multiferroic Domain Walls Formed During Dynamics;* **Michele Conroy**, Eoghan O'Connell, Kalani Moore, Lewys Jones, Quentin Ramasse, Sinead Griffin, Colin Ophus

9:15 AM **873** *Single Heteroatom Configurations in Graphene and Diamond;* **Jani Kotakoski**, Alberto Trentino, Georg Zagler, Manuel Längle, Diana Propst, Harriet Ahlgren, Clemens Mangler, Kimmo Mustonen, Toma Mustonen

9:30 AM **889** *Direct Positioning of Point Defects in 3D Materials Using STEM;* (Invited) **Bethany Hudak**, Alexander Markevich, Toma Susi, Andrew Lupini, Rhonda Stroud

P05.4 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Thursday 8:30 AM **Room 200-G**

8:30 AM **841** *The Design of Relativistic Ultrafast Electron Diffraction and Imaging (RUEDI) Facility for Materials in Extremes;* Yoshie Murooka, William Bryan, James Clarke, Michael Ellis, Professor Kirkland, Simon Maskell, Julian McKenzie, B. Layla Mehdi, R. J. Dwayne Mehdi, Timothy Noakes

8:45 AM **846** *In-situ Electrical Discharging Studied within a Transmission Electron Microscope;* Ryan Schoell, Matthew Hopkins, Christopher Moore, Khalid Hattar

9:00 AM **860** *Symbiotic Beams: Using Non-Microscopy Electron Sources to Bring LPTEM's Puzzles into Better Focus;* Wyeth Gibson, Joe Patterson, Justin Mulvey

9:15 AM **874** *Evaluation of Human-Bias in Labeling of Ambiguous Features in Electron Microscopy Machine Learning Models;* **Gabriella Bruno**, Matthew Lynch, Ryan Jacobs, Dane Morgan, Kevin G. Field

9:30 AM **890** *Computer-Vision aided In situ TEM Studies of Microstructure Evolution under Irradiation;* (Invited) **Wei-Ying Chen**, Zhi-Gang Mei, Logan Ward, Brandon Monsen, Vincent Cauilan, Jianguo Wen, Nestor zaluzec, Abdellatif Yacout, Meimei Yacout

P08.3 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

Thursday 8:30 AM **Room 200-H**

8:30 AM **842** *Understanding Oxides in Extreme Environments Via Machine Intelligence;* (Invited) **Steven Spurgeon**

9:00 AM **861** *Characterization of Anisotropic Electric Field Effects on Grain Boundary Structures in Oxide Ceramics;* **William Hahn**, Boyi Qu, Daria Eiteneer, Joseph Wood, Klaus van Benthem

9:15 AM **875** *Strain-Induced Ferromagnetism at LaFeO3/SrTiO3 Interface;* **Menglin Zhu**, Joseph Lanier, Sevim Polat Genlik, Maryam Ghazisaeidi, Fengyuan Yang, Jinwoo Hwang

9:30 AM **891** *Photoinduced Evolution of Lattice Orthorhombicity and Conceivably Enhanced Ferromagnetism in LaMnO3 Membranes;* (Invited) **Yimei Zhu**, Lijun Wu

P Physical Sciences Symposia – Thursday Morning cont.

P09.2 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials

Thursday 8:30 AM **Room 200-J**

8:30 AM **843** *Development of a Stable Cryogenic In Situ Biasing System for Atomic Resolution (S)TEM;* (Invited) **Eva Bladt**, Yevheniy Pivak, Hongyu Sun, Tijn van Omme, Hector Hugo Perez Garza, Shelly Michele Conroy, Leopoldo Molina-Luna

9:00 AM **862** *Liquid Helium TEM Sample Holder with High Stability and Long Hold Times;* **Emily Rennich**, Suk Hyun Sung, Nishkarsh Agarwal, Robert Hovden, Ismail El Baggari

9:15 AM **876** *Ultra-High Energy Resolution EELS and 4D STEM at Cryogenic Temperatures;* **Benjamin Plotkin-Swing,** Andreas Mittelberger, Benedikt Haas, Juan Idrobo, Brent Graner, Niklas Dellby, Michael Hotz, Steven Quillin, Ondrej Quillin, Tracy Lovejoy

9:30 AM **892** *Development of Site Specific Cryogenic Specimen Preparation and Transfer of Frozen Liquids for Complementary High-Resolution Analysis by Scanning Transmission Electron Microscopy and Atom Probe Tomography;* (Invited) **James Douglas**, Ayman A. El-Zoka, Shelly Michele Conroy, Finn Giuliani, Baptiste Gault

A Analytical/Instrumentation Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

A09.P1 Analytical Scanning Probe Microscopy

POSTER # 333

896 *AFM Evaluation of Different-Sized Active Materials and Interface of All-Solid-State Lithium-Ion Batteries;* **Christopher Macey**, Eiji Iida, Akinori Kogure, Takeshi Miyamoto, Hideo Nakajima, Hyosuke Mukohara, Naoki Morimoto, Ryoya Yamasaki, Hirotoshi Yamada,

POSTER # 334

897 *Al-Li-Cu Alloy Preparation by High-energy Ball Milling Sintered Using High Frequency Induction Heating;* **José Mendoza**, M.A. Ruiz-Esparza-Rodriguez, A. Santos-Beltrán, Raúl Pérez-Bustamante, A. Martínez-García, xochitl Atanacio Sanchez, P. A. Guerrero-Seañez, C.G. Garay-Reyes, I. Estrada-Guel, R. Martínez-Sánchez

POSTER # 335

898 *Design of a Multicomponent Alloy for Application in Electronic Components Solder;* **C.G. Garay-Reyes**, Rodolfo Villarreal, A. Martínez-García, X. Atanacio-Sánchez, P. A. Guerrero-Seañez, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 336

899 *Individual Iron and Cobalt Atoms Identification using Atomic Force Microscopy*; **Dingxin Fan**, Pengcheng Chen, James Chelikowsky, Nan Yao

POSTER # 337

900 *Sterical Structure of Molecules Determined by Scanning Probe Microscopy;* **Pengcheng Chen**, Dingxin Fan, Nan Yao

POSTER # 338

901 *Time-Domain Noise in "per-Decade Spectra" from AFM Images of Mica;* **Phil Fraundorf,** Ted Davich, Bishal Nepal

A10.P1 The Road to Atomic Scale Tomography

POSTER # 339

902 *Combining Structure, Chemistry and Properties at the Nanoscale With Correlative Tomography Approaches;* **François Vurpillot**, Williams Lefebvre, Celia Castro

POSTER # 341

904 *Laser Wavelength Dependence on Perovskite Interface Elemental Diffusion During Atom Probe Experiments;* **Jonathan Poplawsky**, Jith Sarker, Manuel Gutierrez, Yimeng Chen

POSTER # 342

905 *Nanoscale Distribution of Alloying Elements in Optimized ZIRLO Using the Invizo 6000;* **Siyu Huang,** Levi Tegg, Jiangtao Qu, Limei Yang, Ingrid McCarroll, Patrick Burr, Julie Cairney

A12.P1 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-Liquid Interfaces

POSTER # 343

906 *Effects of L-arginine and L-aspartic Acid on the Nucleation and Growth Rates of Calcium Oxalate Crystals;* **LieDing Shiau**, YuChao Hsu, LiChun Lin, JiaHao Ye

POSTER # 344

907 *In Situ Atomic-Scale STEM Imaging of Electron-Beam Induced Dynamics at PbS–Pb Solid–Liquid Nanointerfaces;* **Shunsuke Yamashita**, Yuya Inatomi, Yuta Inaba, Mamoru Tanabe, Toshio Nishi, Yoshihiro Kudo

POSTER # 345

908 *Study of the Lithiation Dynamics via in situ TEM Experiments and the Phase-Field Model;* **Ahmed Yousfi**, Arnaud Demortière, Guillaume Boussinot

B Biological Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

B05.P2 Technical Advances in cryoEM

POSTER # 346

909 *An Alternative Approach to Cryo-FIB Lift-out Using a Novel Cooled Nanomanipulator;* **Jakub Javůrek**, Samuel Záchej, Dominik Pinkas, Martina Zánová, Vlada Filimonenko, Rostislav Váňa

POSTER # 347

910 *Automated Continuous Diffraction Tomography with Gatan Direct Detection Electron Counting Cameras: Advantages and Best Practices for Data Acquisition;* **Sahil Gulati**, Anahita Pakzad

POSTER # 348

911 *Cryo-Tomography of Cryo-EXLO Manipulated Yarrowia Lipolytica Yeast;* Ahmed Darwish, Thomas Dougherty, Brandon Heck, Kyle Beggs, Alain Kassab, Alice Dohnalkova, Lucille Giannuzzi

POSTER # 349

912 *Fluorescence-Guided Cryo-Lift-Out Using an Integrated Fluorescence Light Microscope and an Optimized Sample-Needle Attachment Procedure;* **Veronika Vrbovská**, Sven Klumpe, Christopher Thompson, Alexander Rigort, John Mitchels, Tilman Franke, Michaela Müllerová, Anna Kasáková, Miloš Hovorka,

POSTER # 350

913 *High-resolution structure determination at 100kV enabled by new Falcon-C direct Electron Detector;* **Adrian Koh**, Wen Yang, Dimple Karia, Abhay Kotecha, Lingbo Yu

POSTER # 351

914 *Improving Cryo-Electron Tomography Data Quality and Throughput by Streamlining the Workflow;* **Marit Smeets**, Katherine Lau

POSTER # 352

915 *Precise 3D Localization by Integrated Fluorescence Microscopy (iFLM) for Cryo-FIB-milling and In-situ Cryo-ET;* **Jae Yang**, Veronika Vrbovská; Tilman Franke, Bryan Sibert, Matthew Larson, Tom Coomes, Alexander Rigort, John Mitchels, Elizabeth Wright,

POSTER # 353

916 *Tomographic Particle Picking using 2D Single Particle Analysis Tools;* **William Rice**, Huihui Kuang, Bing Wang

POSTER # 353.1

853 *3D Electron Diffraction of Small Molecules on the MerlinEM Detector;* **Adriana Klyszejko**, Pedro Nunes, Matus Krajnak, Alistair C. Siebert

POSTER # 353.2

916.5 *Results from the Quantum C100, a Novel CMOS Detector Optimised for 100 keV Cryo Electron Microscopy;* **Adriana Klyszejko**, Deividas Krukauskas, Mohamed El Sharkawy, Ben Marsh, Tobias Starborg, Jonathan Barnard, Matus Krajnak, Roger Goldsbrough, Angus Kirkland, Liam O'Ryan

B07.P1 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants

POSTER # 354

917 *Antioxidant Activity of Aqueous Extracts from Eucommia ulmoides and Cistanche deserticola: an In Vitro Study;* **Anastasia Arkhipova**, Huan He, Tolbert Osire, Xinyu Zhang, Qixin Zheng, Alla Ramonova

POSTER # 355

918 *Application of Focused Ion Beam and Scanning Electron Microscopy for the Sectioning and Study of Acanthocephalan Hooks;* **Solinus Farrer**, Michael Standing, Felipe Rivera, Omar Amin

POSTER # 356

919 *Compact GHz Ultrasonic Micro-Imager for Cells and Tissues;* **Anuj Baskota**, Justin Kuo, Serhan Ardanuc, Amit Lal

POSTER # 357

920 *Comparative Characterisation of the Expression Profile of Cardiac Kv7.1 Channels Containing Two Rare Genetic Variants;* **Olga Sokolova**, Alexander Pashkov, Maria Karlova, Anastasia Moisenovich, Denis Abramochkin, Elena Zaklyazminskaya

POSTER # 358

921 *Controlling the Biochemistry On-The-Fly and Visualizing Reaction Dynamics during in-situ Liquid Phase TEM: A Strong Tool for Biopharmaceutical Development;* **Hector Hugo Perez Garza**, Hans Radhoe, Evgeniya Pechnikova, Vasilis Papadimitriou, Alejandro Rozene, Hongyu Sun

POSTER # 359

922 *Development of a Cryo-Pre Embedding Immungold Labeling Protocol for the Ultrastructural Localization of PDL1 in Human Tonsils;* **Miriam Baca**, Cecile Chalouni, Hartmut Koeppen, Linda Rangell, Meredith Sagolla, Mike Reichelt

POSTER # 360

923 *Effects of Porosity and Stiffness of Fibroin-based Scaffolds on Osteoblast-like Cell Growth;* **Anastasia Arkhipova**, Tolbert Osire, Alla Ramonova, Kangcheng Xu, Shirou Fan, Ruyi Liu, Xiaoyue Xiao

POSTER # 361

924 *Electron Microscopists going MAD: Overcoming challenges in Mice, Ant, and Drosophila Projects;* **Anurag Sharma**, Hilda Pasolli

POSTER # 362

925 *Imaging the Cellular Distribution of Amino Acid Derivatives of Tricarbonylrhenium(I) 1, 10-orthophenanthroline Compounds;* **Birsen Varisli**, James Wachira, Santosh Mandal

POSTER # 363

926 *In vitro Biofilm Formation by Bacillus subtilis and AR9 phage infection: SEM Study;* **Olga Sokolova**, Yueqi Wang, Tolbert Ozire

B Biological Sciences Posters – Thursday cont.

POSTER # 364

927 *Micro- and Ultrastructure of the Yellow Grouper Epinephelus awoara Scale;* **Zang Peichen**, Zhukova Kristina

POSTER # 365

928 *Microstructural Characterization of Composites of Zinc Nitrate Crosslinked Carboxymethylcellulose Hydrogel and Biogenic Zinc Oxide Nanostructured;* **Roel González-Montes De Oca**, Maricela Villanueva-Ibáñez, Ana Itsel Canales-Mendoza, María de los Ángeles Hernández-Pérez

POSTER # 366

929 *Multi-faceted Return on Investment for Academic Centers and Cores;* **Luisa Amelia Dempere**, Kristy Schepker, Alison Trachet

POSTER # 367

930 *Neuroprotection During Hypoxia using Steroid Analogues;* **Toro-Urrego Nicolas**, Tamara Kobiec, Sofia Bordet, Matilde Otero-Losada, Claudia Mardaraz, carlos Kusnier, Camila Meloni, Rodolfo Kolliker Frers, Juan Pablo Luaces, Francisco Capani

POSTER # 369

932 *Using Low kV STEM Imaging to Remove the Need for Post-Staining in Biological Sample Imaging;* **Eric Formo**, Mary Ard

B10.P1 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter

POSTER # 370

933 *Biofunctionalized Gold Nanoparticles Obtained from Two Different Plant Extracts and Its Chemical and Structural Comparison;* **Roel González-Montes De Oca**, Jarvy Francisco Cruz-Hernández, Diana Lesem García-Rubio, Maricela Villanueva-Ibáñez, Blanca Estela Jaramillo-Loranca

POSTER # 371

934 *Determining the Effect in the Adhesion Between Modified PLA Matrix and Natural Fibers Using SEM and Micro-Raman Spectroscopy;* **Johnattan Vargas**, Roya Akrami, Natalia Marin alzate, Sara Michel Mesa, Guillermo Idarraga, Cesar Isaza, Liu Yang, Juan Meza

POSTER # 372

935 *On the Electron Dose-rate Dependency of Radiation Effects and Total Dose Criteria in ZIF-8 Metal-Organic-Framework (MOF);* **Pritam Banerjee**, Kathrin L. Kollmannsberger, Roland A. Fischer, Joerg Jinschek

POSTER # 373

936 *Preparation and Characterization of Carbon Dots Obtained from Different Low Molar Mass Precursors;* **Erico Freitas**, Everton de Paula, Fabiano Pereira

POSTER # 374

937 *Structural Analysis of Chemically Cross-linked Carboxymethylcellulose Hydrogels added with Phytosynthesized Zinc Oxide Nanoparticles;* **Roel González-Montes De Oca**, Laura Subervier-Ortiz, Jenny Anel Lara-Rodríguez, Maricela Villanueva-Ibáñez, Blanca Estela Jaramillo-Loranca, María de los Ángeles Hernández-Pérez, Victoria Perla Camargo-Pérez

POSTER # 375

938 *Surface Characterization on 5M NaOH Treated Ti-Ta Alloys Exposed to Simulate Body Fluid;* **Julia Mirza-Rosca**, Iosif Hulka, Anca Fratila, Adriana Saceleanu

C Cross-Cut/Interdisciplinary Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

C01.P1 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems

Thursday 3:30 PM **Room M-100-G**

POSTER # 377

940 *Autonomous Multimodal Spectrum Imaging for High Throughput Data Acquisition;* **Liam Spillane**, Bernhard Schaffer, Paul Thomas, Michael Zachman

POSTER # 378

941 *Fast Correction of Astigmatism and Focus in the Scanning Electron Microscope using a GPU-accelerated PC;* **David Holburn**, Bernie Breton, Tim Rowsell

POSTER # 379

942 *Human Centered Design in the Scientific Environment for Accessible Microscope Performance;* **Stephen Kelly**, Naomi Kotwal, Hrishikesh Bale, Benjamin Tordoff

POSTER # 380

943 *Improving Automated TEM Metrology based on AI Few Shot Learning-DRAM Word Line Patterning Layer and Logic NMOS eSD Seam;* **Seungwoo Oh**, Sung Jin Lim, Soon-Gun Lee, SeongHoon Jeong, Changseop Song, Chanwoong Kong, Su-Bong Shon, Hansaem Park, SungHo Lee, Hyunsu Choi

POSTER # 381

944 *Machine Learning Enabled Image Classification for Automated Data Acquisition in the Electron Microscope;* **Carolin Wahl**, Alexandra Day, Vishu Gupta, Roberto dos Reis, Wei-keng Liao, Chad Mirkin, Alok Choudhary, Vinayak Dravid, Ankit Agrawal,

POSTER # 382

945 *Ronchigram Simulation and Aberration Correction Training using Ronchigram.com;* **William Millsaps**, Suk Hyun Sung, Noah Schnitzer, Lena Kourkoutis, Robert Hovden

POSTER # 382.5

1093 *Automated Crystal System Identification from Four-dimensional Scanning Transmission Electron Microscopy Data Using Brain-inspired Artificial Intelligence;* **Carolin Wahl**, Jie Chen, Hengrui Zhang, Wei Liu, Shengtong Zhang, Jiezhong Wu, Chad Mirkin, Vinayak Dravid, Daniel Apley, Wei Chen

C03.P2 Correlative and Multimodal Microscopy and Analysis

POSTER # 383

946 *Effect of Metallographic Pretreatment of TRIP Steel Specimens on Correlative Imaging and Electron Backscatter Diffraction Analysis;* **Ondřej Ambrož**, Patrik Jozefovič, Jan Čermák, Sarka Mikmekova

POSTER # 384

947 *Effect of Sc Addition on Microstructure and Hardness of 2024 Al Alloy;* **P. A. Guerrero-Seañez**, C.G. Garay-Reyes, A. Martínez-García, X. Atanacio-Sánchez, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 385

948 *Electron Microscopy of Volcanic Rocks: from Optical to SEM analysis of Volcanic Rocks and its Mineralogical Constitution;* **Hector Calderon**, Berenice Castañeda, Hugo Martinez

POSTER # 386

949 *High-Frequency Induction Heat Sintering of Al2O3/ Al7075 Composites;* **Raúl Pérez-Bustamante**, Eusebio Cardoso-Lozano, Bertha laura Vargas-Rodríguez, Hugo Arcos-Gutierrez, F. Pérez-Bustamante

POSTER # 387

950 *Influence of TiC Content and Milling Time on the Kinetics of Precipitation of TiC/Al7075 Composites;* **Raúl Pérez-Bustamante**, José Mendoza, D. Lardizabal-Gutiérrez, C.G. Garay-Reyes, I. Estrada-Guel, R. Martínez-Sánchez

POSTER # 388

951 *ITO/Au/ZnS Thin Film Array: ZnS by Thermal Evaporation Sphalerite Ore;* **Alejandra Perales Escobedo**, Hilda Esparza-Ponce, Carla Sánchez González, Juan José López-Rodríguez, Rosa Ruvalcaba Ontiveros

POSTER # 389

952 *Plasma Transferred Arc Cladding of an H13 Tool Steel Modified with a CoCrFeMnNi High Entropy Alloy;* **Raúl Pérez-Bustamante**, Luis-Alberto Cáceres-Díaz, José Antonio Betancourt-Cantera, John Edison-Garcia, M.F. mata-Moreno, F. Pérez-Bustamante, Victor Hugo Mercado-Lemus, José Mendoza

POSTER # 390

953 *Study of B2 Phase in Equiatomic Cantor Alloy CoCrFeMnNi Modified with Al;* **M.A. Ruiz-Esparza-Rodriguez**, C.G. Garay-Reyes, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 391

954 *Synthesis of Mesoporous Cerium Oxide Nanoparticles from Pluronic F127 as Template;* **Salomón Borjas**, José Méndez Montes de Oca, Pablo Martínez Torres, Jesús Vargas Correa, Gerardo Rosas Trejo

P Physical Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

P01.P2 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

POSTER # 392

955 *3D and in situ Imaging of Electrochemical Energy Devices Powered by AI-driven X-ray Microscope Reconstruction Technologies;* **Stephen Kelly**, Yulia Trenikhina, Hrishikesh Bale, Benjamin Tordoff

POSTER # 393

956 *Band-bending Analysis of Metal-Oxide-Semiconductor (MOS) Interface by In Situ Biasing Electron Holography;* **Yuta Fukushima**, Daisuke Mori, Yutaka Terao, Kazuo Yamamoto, Aki Takigawa

POSTER # 394

957 *Benchmarking of In-Situ Electrochemistry and Heating Liquid-Cell Instrumentation and Its Potential for Battery Research;* **Yingjie Yang**, Robert Klie

POSTER # 395

958 *Electron Microscopy of Photocatalyst TiO2/ZnTiO3 with Cu and Co Additions;* **Hector Calderon**, David Ramírez Ortega, Ricardo Gomez, Rodolfo Zanella

POSTER # 396

959 *Investigation of Carbon Products Produced by Catalytic Methane and Ethane Pyrolysis;* **James Poston**, Jarrett Riley, Ranjani Siriwardane, Christopher Attah

POSTER # 397

960 *L10 Ordering in MnAl and FeNi Influenced by Magnetic Field and Strain;* **Chaoya Han**, Brian Lejeune, Xiaoyu Zhang, Chaoying Ni, Laura Lewis

POSTER # 398

961 *Lessons Learned using in-situ TEM liquid corrosion of Al Alloys;* **Khalid Hattar**, Kathryn Small, Laura Merrill, Nancy Missert, Katherine Jungjohann

POSTER # 399

962 *Microstructural Characterization of Biogenic ZnO Nanostructures Synthesized by Two Aqueous Extracts for Energy Production;* **Roel González-Montes De Oca**, Victoria Perla Camargo-Pérez, Marco Antonio Flores-González, Maricela Villanueva-Ibáñez

POSTER # 400

963 *Microstructure of 2D/2D Nanosheets Interface for Improved ORR Electrochemical Kinetics;* **Nasser Hamdan**, Anum Iqbal

POSTER # 401

964 *Observation of Deuterated Double-Perovskite Hydroxide CoSn(OH)6 Nanocubes;* **Zhiping Luo**, Menuka Adhikari, Starfari McClain, Rekha George, Sivasankara Rao Ede, Hui Wu, William Ratcliff, Liurukara Sanjeewa, Cheng Li,

POSTER # 402

965 *Single-Atom Sn-Loaded Exfoliated Layered Titanate Shows Photocatalytic Activity in Hydrogen Generation;* **Tuğçe Üstünel**, Yusuke Ide, Sarp Kaya, Esmail Doustkhah

POSTER # 403

966 *Synthesis of HEAs with Properties Potential of Hydrogen Storage;* **Alfredo Martinez-Garcia**, C.G. Garay-Reyes, X. Atanacio-Sánchez, R. Martínez-Sánchez, P. A. Guerrero-Seañez, I. Estrada-Guel, J.M. Mendoza-Duarte

POSTER # 404

967 *W Deposited PdGa Catalyst with Tailored Hydrogen Adsorption and Reduction;* Jiancun Rao, Guowei Li

P02.P1 Electron Beam Manipulation of Covalently Bound Materials

POSTER # 405

968 *Angular Momentum Transfer from Swift Electrons to Small Spheroidal Nanoparticles in the Dipole Approximation;* **Jorge Briseño-Gómez**, Atzin López-Tercero, José Ángel Castellanos-Reyes, Alejandro Reyes-Coronado

POSTER # 406

969 Fabrication of Atomic-scale Defect Structures within 2D Materials through Automated Electron Beam Control; Matthew Boebinger, Kevin Roccapriore, Ayana Ghosh, Kai Xiao, Andrew Lupini, Maxim Ziatdinov, Sergei Kalinin, Raymond Unocic

POSTER # 407

970 *Heat Transport Properties of Au-Nanoparticles Supported by TiO2: Insights from E(3)-Equivariant Machine Learning Potentials;* **Cuauhtémoc Núñez Valencia**, Jakob Schiøtz, Matthew Helmi Leth Larsen, William Lomholdt, Thomas Willum Hansen

P05.P2 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

POSTER # 408

971 *A Novel Preparation Route for Enhancing Mechanical Properties of High Entropy Alloys;* **Petr Kratochvíl**, Filip Průša, Hana Thürlová

POSTER # 409

972 *An investigation of elastic módulus in Zr doped CoCrFeMoNi HEA by three-point bending;* **Santiago Brito-Garcia**, Cristina Jimenez-Marcos, Julia Mirza-Rosca, Ionelia Voiculescu

POSTER # 410

973 *Electron Microscopy Characterization of Minerals in the K-Na-Al-Si-O System Recovered from High Pressure-Temperature Experiments;* **Jeffrey Pigott**, George Amulele, Tugce Uz, Rachel Margulies, James Van Orman, Jennifer Carter

P Physical Sciences Posters – Thursday cont.

POSTER # 411

974 *Influence of the Al Content on the Microstructure and Mechanical Properties of (CoCrFeNiMn)100-XAlX (X = 5, 10, 16.6) High-Entropy Alloys Prepared of Mechanical Alloying;* **Hana Thürlová**, Tomáš Najser, Petr Kratochvíl, Filip Průša

POSTER # 412

975 *Mechanically Alloyed High-Entropy Alloys Compacted by Spark Plasma Sintering;* **Filip Průša**, Petr Kratochvíl, Hana Thürlová, Miroslav Karlík, Jaroslav Čech, Petr Haušild, Marcello Cabibbo

POSTER # 413

976 *What's the Limit? High Spatial Resolution Analyses of Trace Oxygen in Ta Alloys by EPMA;* **Joe Boro**, Chris Finfrock, Rachel White

P08.P1 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

POSTER # 414

977 *Atomistic mechanism of phase transformations in the Pt-Sn system studied by in-situ TEM;* **Hwanhui Yun**, Delin Zhang, Jian-Ping Wang, Turan Birol, K. Andre Mkhoyan

POSTER # 415

978 *Characterizing TeO2 Formation in CdTe Devices Using Transmission Electron Microscopy;* **John Farrell**, Robert Klie, Manoj Jamarkattel, Ebin Bastola, Michael Heben, Walajabad Sampath

POSTER # 416

979 *Chemical Characterization for III-V Semiconductor Heterostructures Investigated by Aberration-Corrected STEM;* **Rosa Diaz**, Roy D. Peña, Shuang Liang, Michael J. Manfra

POSTER # 417

980 *Defects in Pyrochlore Dy2Ti2O7 Thin Film;* **Yan Xin**, Chengkun Xing, Haidong Zhou, Jian Liu

POSTER # 418

981 *Dopant Mapping of Partially Hydrogenated Vanadium Dioxide using the Energy Loss Near Edge Structure Technique;* **Alexandre Pofelski**, Sunbin Deng, Haoming Yu, Michael Taejoon Park, Haili Jia, Sukriti Manna, Maria KY Chan, Sankaranarayanan Subramanian, Shriram Ramanathan, Yimei Zhu

POSTER # 419

982 *Electron Holography Observation of Magnetic Bubbles and Stripe-Shaped Domains under a Magnetic Field;* **Ken Harada**, Hiroshi Nakajima, Keiko Shimada, Shigeo Mori, Yoshio Takahashi

POSTER # 420

983 Moiré Wavelength and Exciton Engineering through Heterostrain in van der Waals Heterostructures; M. Abir Hossain, Thomas Gage, Jianguo Wen, Priti Kharel, Yue Zhang, Kelly Hwang, Pinshane Huang, Arend van der Zande

POSTER # 421

984 Nanoscale and Wafer Scale Study of Epitaxial Ruthenium Films on Amorphous SiO2 Substrate with van der Waals Graphene Buffer Layer; Kim Kisslinger, Lihua Zhang, Zonghuan Lu, Neha Dhull, Tung-Sheng Kuan, Morris Washington, Toh-Ming Lu, Gwo-Ching Wang

POSTER # 422

985 Nanoscale Electron Energy Loss Spectroscopy (EELS) Study of Phase Transition in Barium Titanate (BaTiO3); Bibash Sapkota, Serdar Ogut, Robert Klie

POSTER # 423

986 Phase Coexistence in Multiferroic BiFeO3 Nano-Needles Driven by Surface Boundary Conditions; Francisco Guzman, Christopher Addiego, Moaz Waqar, Xiaoqing Pan

POSTER # 424

987 Probing local symmetry breaking of EuxSr1-xTiO3 films with HAADF-STEM; Guomin Zhu, Nicholas Combs, Binghao Guo, arda genc, Susanne Stemmer

POSTER # 425

988 Real-space Observation of Polar Nanoregions in a Relaxor Ferroelectric; Hiroshi Nakajima, Satoshi Hiroi, Hirofumi Tsukasaki, Charlotte Cochard, Pierre-Eymeric Janolin, Shigeo Mori

POSTER # 426

989 TEM Study on Epitaxial BiFeO3 Film under Biaxial Tensile Strain; In-Tae Bae, Zachary Lingley, Brendan Foran, Paul Adams, Hanjong Paik

POSTER # 427

990 Understanding inherent structural defects at topological superconductor interfaces using advanced electron microscopy; Rosa Diaz, Tiantian Wang, Michael J. Manfra, Michael Capano

POSTER # 428

991 Vanadium dioxide metal insulator transition characterization with in-situ radio frequency excitation using ultrafast transmission electron microscopy; Alexandre Pofelski, Chuhang Liu, Spencer Reisbick, Myung-Geun Han, Yimei Zhu

P Physical Sciences Posters – Thursday cont.

P09.P1 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials

POSTER # 429

992 *Control of Magnetic Skyrmions in an Exchange Biased van der Waals Ferromagnet;* **Arthur McCray**, Dmitry Lebedev, Sevdenur Arpaci, Suzanne Velthuis, Victor Lopez-Dominguez, Pedram Khalili Amiri, Mark Hersam, Amanda Petford Long, Charudatta Phatak,

POSTER # 430

993 *Development of a Low-Cost, Modular Cryo-Transfer Station for the Side-Entry Transmission Electron Microscope;* **Alexander Reifsnyder**, Andrew Lupini, Jordan Hachtel, David McComb

POSTER # 431

994 *Imaging Modulated Structure in EuAl4 using Cryogenic 4D-STEM;* Haoyang Ni, Miaofang Chi, Jian-Min Zuo

POSTER # 433

996 *Spatially Resolved Moiré Excitons Fine Structure Using Cryogenic Low-Loss EELS;* **Sriram Sankar**, Sandhya Susarla, Patrick Hays

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Thursday Afternoon

A05.4 Advanced Measurement Techniques in (S)TEM-EELS

Thursday 1:30 PM **Room 200-D**

1:30 PM **997** *Nanosecond Temporal Correlations Between Electron Spectroscopies to Explore Excitation Dynamics in Nanomaterials;* (Invited) **Luiz Tizei**

2:00 PM **1018** *Electron-Photon Pairs Enable Contrast Enhanced Cavity Mode Imaging;* **F. Jasmin Kappert**, Armin Feist, Guanhao Huang, Germaine Arend, Yujia Yang, Jan-Wilke Henke, Arslan Sajid Raja, Hugo Lourenco-Martins, Tobias Lourenco-Martins, Claus Ropers

2:15 PM **1031** *Electron Energy-Gain Spectroscopy of Optical Excitations in an Integrated Photonics Microresonator;* **Jan-Wilke Henke**, Arslan Sajid Raja, Armin Feist, Yujia Yang, Germaine Arend, Guanhao Huang, F. Jasmin Kappert, Rui Ning Wang, Tobias Wang, Claus Ropers

2:30 PM **1042** *Structural and Temperature Dependence of Emergent Electronic States in PbSe Quantum Dot Superlattices;* **Eric Hoglund**, Geemin Kim, Mahmut Kavrik, Matt Law, Jordan Hachtel

2:45 PM **1056** *Aluminum Nanoplasmonics Integrated onto Suspended Monolayer Graphene;* **Kenan Elibol**, Peter A. van Aken

A09.2 Analytical Scanning Probe Microscopy

Thursday 1:30 PM **Room M-100-H**

1:30 PM **998** *Photothermal AFM-IR interrogation of Polymeric Materials;* **Greg Haugstad**

1:45 PM **1016** *Vibrational Exciton and Polaron Nano-imaging: New Functional Nano-Imaging for Molecular Electronic, Photonic, and Photovoltaic Materials;* (Invited) **Marcus Raschke**

2:30 PM **1043** *AFM Probe and Optical Based Photothermal Infrared Spectroscopy and Imaging;* (Invited) **Curtis Marcott**

A10.2 The Road to Atomic Scale Tomography

Thursday 1:30 PM **Room 200-A**

1:30 PM **999** *Nanomaterial Transformations Captured by Atomic Resolution 3D Electron Microscopy;* (Invited) **Sara Bals**, Wiebke Albrecht, Ece Arslan Irmak, Kellie Jenkinson, Mikhail Mychinko, Daniel Arenas Esteban, Thomas Altantzis, Sandra Van Aert Van Aert

2:00 PM **1019** *Comparing Methodologies for Achieving Atomic-Scale Tomography;* **Brian Gorman**, Tom Kelly

2:15 PM **1033** *Information-Theory Based Symmetry Classifications of Sets of S/TEM Zone-Axis Images in Support of Nanocrystallography and Discrete Electron Tomography;* **Peter Moeck**

2:30 PM **1044** *Scanning Nanobeam Electron Diffraction for Atomic Scale Tomography;* (Invited) **Megan Holtz**, Andrew Herzing, Brian Gorman

A12.2 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-Liquid Interfaces

Thursday 1:30 PM **Room 200-C**

1:30 PM **1000** *Radiation Chemical Effects at Interfaces;* (Invited) **Jay LaVerne**, Patricia Abellan

2:00 PM **1020** *Towards Unveiling the Mystery of Electron-Liquid Interaction in Liquid-Phase TEM: Implications for Practical Application;* (Invited) **Andreas Hutzler**, Birk Fritsch, Andreas Körner, Thaïs Couasnon, Roberts Blukis, Liane Benning, Michael P.M. Jank, Erdmann Spiecker Spiecker

2:30 PM **1045** *Live-Imaging and Quantification of Complex Nanostructure Hydrodynamic Motion in 3D using Liquid Phase Transmission Electron Microscopy;* **Murat Yesibolati**, Agnese Callegari, Jesús Pineda, Maciej Lisicki, giovanni Volpe, Kristian Speranza Mølhave

A13.5 Computational Advances in Electron Microscopy

Thursday 1:30 PM **Room M-100-B**

1:30 PM **1002** *From Data to Discovery: Maximizing the Value of Experiments with Machine Learning Software;* (Invited) **Maxim Ziatdinov**

2:00 PM **1004** *EMD 1.0 and `emdfile`: an HDF5 / Python interface;* Benjamin Savitzky, Steven Zeltmann, Alexandra Bruefach, Alexander M Rakowski, Mary Scott, Matthew L Henderson, Colin Ophus

2:15 PM **1001** *PyEMAPS: An Open Source Python Package for Transmission Electron Diffraction Simulations and Crystallographic Computing;* **Xiurong Zhu**, Jian-Min Zuo

2:30 PM **1003** *Foundry-ML: a Platform for FAIR Machine Learning in Materials Science;* **Paul Voyles**, Jingrui Wei

2:45 PM **1005** *TomoFlows: Pre-Processing Workflows For Cryo-Electron Tomography;* **Matthew Larson**, Yan Zhuang, Djay Pallavur Naduvakkat, Jae Yang, Bryan Sibert, Elizabeth Wright

B Biological Sciences Symposia – Thursday Afternoon

B05.3 Technical Advances in cryoEM

Thursday 1:30 PM **Room M-100-D**

1:30 PM **1006** Better, faster, cheaper, smarter: advancing cryo-EM; (Invited) Bridget Carragher, Clinton Potter

2:00 PM **1021** Expanding the reach of cryo-EM through open design robotics and remote screening; Mario Borgnia, Steven Zhang, Wyatt Peele, Jonathan Bouvette, Qinwen Huang, Alberto Bartesaghi, Venkata Dandey

2:15 PM **1034** TOMOMAN: Streamlining Cryo-electron tomography and subtomogram averaging workflows using TOMOgram MANager; Sagar Khavnekar, Philipp Erdmann, William Wan

2:30 PM **1046** *Anisotropy in CryoEM Resolution is Dominated by Preferred Orientations, but not Structure Factors: A Study Using a Highly Symmetric Structure;* **Philip Baldwin**, Sriram Aiyer, Timothy Strutzenberg, Dmitry Lyumkis

2:45 PM **1057** *3D Flexible Refinement: Determining Structure and Motion of Flexible Proteins from Cryo-EM;* **Ali Punjani,** David Fleet

B07.3 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants

Thursday 1:30 PM **Room M-100-F**

1:30 PM **1007** Optical and Scanning Electron Microscopy are essential approaches to studying trichome development; (Invited) Eloisa Vendemiatti, Vagner Benedito

2:00 PM **1022** *Ultrastructural Studies of Osrn and Neural Senesence in Fish*; ***Subrata De***, Swaraj Sarkar, Swasti Barman, Gour Maity, SK Samim Hossin

2:15 PM **1035** *Specialized Cellular Domains for Abca1-Mediated Cholesterol Efflux Detected by Quantitative Electron Microscopy;* W. Gray Jerome, Rachel Hart, Stephen Aller, Chongren Tang, Jay Heinecke, W. Sean davidson, Jere Segrest

2:30 PM **1047** *In Vitro Reconstitution in Xenopus laevis Egg Extracts Reveals Molecular Mechanisms That Control B-Type Lamin Assembly;* (Invited) Ross Pedersen, Ru-Ching Hsia, Yixian Zheng

B10.2 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter

Thursday 1:30 PM **Room M-100-E**

1:30 PM **1008** *Coordinated Analysis of Organic Matter-Mineral Relationships in Returned Samples from Asteroid Ryugu;* (Invited) **Rhonda Stroud**, Bradley De Gregorio, Katherine Burgess, Jens Barosch, Larry Nittler, Hikaru Yabuta, Takaaki Noguchi

2:00 PM **1023** *Understanding the Impact of Chlorite Oxidizer on Organic Matter of Source Rocks using Nanoindentation (NI) and Scanning Electron Microscopy (SEM);* **Simrat Singh**, Katherine Hull, Younane Abousleiman

2:15 PM **1036** *3D Biogeochemical Characterization Of Intact Soil Structures;* Odeta Qafoku, Tamas Varga, Anil Battu, Qian Zhao, Arunima Bhattacharjee, Zihua Zhu, Rosalie Chu, Maruti Mudunuru Mudunuru

2:30 PM **1048** *Liquid Transmission Electron Microscopy Imaging of Organic-Inorganic Interfaces: Exploring Hydrated Collagen Mineralization Processes;* Liza-Anastasia DiCecco, Ruixin Gao, Jennifer Gray, Deb Kelly, Eli Sone, Kathryn Grandfield

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Afternoon

C01.2 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems

Thursday 1:30 PM **Room M-100-G**

1:30 PM **1009** *Approach to Ecosystems of Analytical Equipment Based on Integrated Analytical Platform in Transmission Electron Microscope*; (Invited) **Eiji Okunishi,** Masashi Nishikawa, Osamu Hirahara

2:00 PM **1024** *Automated Oblique Tilt Series in STEM;* **Matthew Olszta**, Steven Spurgeon, Kevin Fiedler, Derek Hopkins, Kayla Yano, Christina Doty, Sarah Akers, Nikhil Deshmuk Deshmuk

2:15 PM **1037** *Physics-informed Bayesian Optimization of an Electron Microscope;* **Desheng Ma**, Chenyu Zhang, Yu-Tsun Shao, Zhaslan Baraissov, Cameron Duncan, Adi Hanuka, Auralee Edelen, Jared Maxson, David Maxson

2:30 PM **1049** *Retrofitting and Reconfiguring Existing Microscopes for Digital DPC: An Accessible Approach to Low-Dose Phase Mapping;* (Invited) **Julie Marie Bekkevold**, Jonathan Peters, Tiarnan Mullarkey, Lewys Jones

C03.7 Correlative and Multimodal Microscopy and Analysis

Thursday 1:30 PM **Room L-100-J**

1:30 PM **1010** *Correlative Microscopy Applied to Battery Research;* **Ute Schmidt**, Niklas Biere, Florian Johann, Joshua Lea, Stefan Kreissel, Dominik Zimmer

1:45 PM **1017** *Correlative Nanoscopy and Spectroscopy at Nanoscale;* **Artem Danilov**, Tobias Gokus, Paul Suman, Adrian Cernescu, Andreas Huber

2:00 PM **1025** *Probing Dielectric Breakdown in Single Crystal Hexagonal Boron Nitride;* **Alok Ranjan**, Andrew Yankovich, Kenji Watanabe, Takashi Taniguchi, Eva Olsson

2:15 PM **1038** *Exploring the Dynamics of Grain Growth in Thin Specimens using Laboratory Diffraction Contrast Tomography;* **Varun Venkatesh**, Marcel Chlupsa, Hrishikesh Bale, Jette Oddershede, Ashwin Shahani

2:30 PM **1050** *Spectral CT in the World of Electronics: Moving Toward Failure Free Devices;* **Jan Dewanckele**, Marijn Boone, Denis Van Loo, Wesley De Boever

2:45 PM **1058** *Multimodal Analysis of Concrete and Cementitious Materials;* **Joshua Lea**, Daniel Haspel, Ana Blanco-Alvarez, John Kolawole, Liam Whyte, Matt Hiscock

P Physical Sciences Symposia – Thursday Afternoon

P01.5 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Thursday 1:30 PM **Room 200-I**

1:30 PM **1011** *Operando Electrochemical Liquid-Cell 4D-STEM Studies of Dynamic Evolution of Cu Nanocatalysts for CO2 Reduction;* (Invited) **Yao Yang**, Yu-Tsun Shao, Héctor Abruña, David Muller, Peidong Yang

2:00 PM **1026** *Tracking the Incorporation of Fe into NiO Electrocatalysts during Reaction with Liquid Phase Electron Microscopy and Time-Resolved Elemental Mapping;* (Invited) **Fengli Yang**, Maurico Lopez Luna, Felix Haase, Daniel Escalera López, Aram Yoon, Ali Kosari, Mauro Porcu, Arno Bergmann, Beatriz Bergmann, See Wee Chee

2:30 PM **1051** *Metal electroplating/Stripping and 4D Stem Analysis Revealed by Liquid Phase Transmission Electron Microscopy;* **Hector Hugo Perez Garza**, Eva Bladt, Yevheniy Pivak, Junbeom Park, Dieter Weber, Janghyun Jo, Hongyu Sun, Shibabrata Basak, Rüdiger-A. Basak

2:45 PM **1059** *Spatially Resolved Structural Order in Low-Temperature Liquid Electrolyte;* **Yujun Xie**, Colin Ophus, Peter Ercius, Haimei Zheng

P02.2 Electron Beam Manipulation of Covalently Bound Materials

Thursday 1:30 PM **Room 200-F**

1:30 PM **1012** *AI-Enabled Automation of Atomic Manipulation and Characterization in the STEM;* (Invited) **Kevin Roccapriore**, Matthew Boebinger, Julian Klein, Mads Weile, Frances Ross, Maxim Ziatdinov, Raymond Unocic, Sergei Kalinin Kalinin

2:00 PM **1027** *E-beam Patterning of Atoms in Graphene;* **Stephen Jesse**, Ondrej Dyck, Andrew Lupini, Mina Yoon

2:15 PM **1039** *Challenges for Scaling Up Electron-Beam Manipulation of Lattice Impurities;* **Toma Susi**

2:30 PM **1052** *Real-time Tracking of Atomic Dynamics*; (Invited) **Ryo Ishikawa,** Yu Jimbo, Naoya Shibata, Yuichi Ikuhara

P08.4 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

Thursday 1:30 PM **Room 200-H**

1:30 PM **1014** *Interferometric Imaging of Twisted Trilayer Graphene Moiré Superlattices;* (Invited) **D. Kwabena Bediako**, Isaac Craig, Madeline Van Winkle, Catherine Groschner, Kaidi Zhang, Nikita Dowlatshahi, Takashi Taniguchi, Kenji Watanabe, Sinead Watanabe

2:00 PM **1029** *Direct Observation of Cation Diffusion Driven Surface Reconstruction at Van Der Waals Gaps;* **Wenjun Cui**, Weixiao Lin, Weichao Lu, Chengshan Liu, Zhixiao Gao, Hao Ma, Wen Zhao, Gustaaf Van Tendeloo, Xiahan Van Tendeloo

2:15 PM **1041** *Imaging Charged Domain Walls in van der Waals Ferroelectric α-In2Se3 via 4D-STEM;* **Gillian Nolan**, Edmund Han, Shahriar nahid, Arend van der Zande, Pinshane Huang, André Schleife

2:30 PM **1054** *Endotaxial Polytype Engineering: Enhancement of Incommensurate Charge Density Waves in TaS_2;* **Suk Hyun Sung**, Pat Kezer, Nishkarsh Agarwal, Yin Min Goh, Noah Schnitzer, Ismail El Baggari, Kai Sun, Lena Kourkoutis, John Kourkoutis, Robert Hovden

2:45 PM **1060** *Characterizing Magnetic Skyrmion Ordering and Dis-Ordering in the Presence of Crystalline Dislocations using Lorentz Transmission Electron Microscopy;* **Reed Yalisove**, Peter Meisenheimer, Hongrui Zhang, Rui Chen, Xiang Chen, Robert Birgeneau, Jie Yao, Ramamoorthy Ramesh, Mary Ramesh

P05.5 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Thursday 1:30 PM **Room 200-G**

1:30 PM **1013** *Atom Probe Tomography Measurement of Radiation Enhanced Diffusion;* (Invited) **Kayla Yano**, Aaron Kohnert, Tiffany Kaspar, Hyosim Kim, Sandra Taylor, Yongqiang Wang, Blas Uberuaga, Daniel Schreiber Schreiber

2:00 PM **1028** *Atom-Probe Tomography Studies of Oxidation in NbTiZr Refractory High-Entropy Alloys;* **Keith Knipling**, Patrick Callahan, David Beaudry, Mitra Taheri

2:15 PM **1040** *Stability of Nanotwins under in-situ Cryogenic Micro-Pillar Compression;* **Jarod Robinson**, Eric Hintsala, Eric Homer, Gregory Thompson

2:30 PM **1053** *Popocatepetl Ash Infiltration in Lanthanum-Gadolinium Zirconate Ceramics;* **Ivan Bedoya Trujillo**, Marco Rivera-Gil, Cynthia Guijosa-Garcia, Ravisankar Naraparaju, John Perez-Bedoya, Juan Muñoz Saldaña, Juan zarate-Medina

P09.3 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials

Thursday 1:30 PM **Room 200-J**

1:30 PM **1015** *Analytical Characterization of Functional Materials using Cryo-FIB/SEM and aberration-corrected cryo-STEM;* (Invited) **Robert Klie**

2:00 PM **1030** *Cryogenic 4D-STEM of Semicrystalline Polymers for Energy Applications;* (Invited) **Andrew Minor**

2:30 PM **1055** *Cryogenic FIB and (S)TEM for Energy Storage and Conversion Materials Research;* (Invited) **Michael Zachman**, Alexis Williams, Lena Kourkoutis, David Cullen

A Analytical/Instrumentation Sciences Symposia – Thursday Late Afternoon

A05.5 Advanced Measurement Techniques in (S)TEM-EELS

Thursday 3:30 PM **Room 200-D**

3:30 PM **1061** *Determination of Local Electronic Structure and Optical Response Using Spectroscopy Methods in STEM Assisted by Unsupervised Machine Learning;* (Invited) **Nasim Alem**, Saiphaneendra Bachu, Steffi Woo, Leixin Miao, Benjamin Huet, Joan Redwing, Mathieu Kociak, Luiz Tizei Tizei

4:00 PM **1075** *Measuring Single Atomic Defects in 2D Materials With Off-Axis EELS using Real-Time AI-driven Detection;* **Kevin Roccapriore**, Maxim Ziatdinov, Riccardo Torsi, Joshua Robinson, Sergei Kalinin

4:15 PM **1088** *Imaging of Chemical Structure from low-signal-to-noise EELS Enabled by Diffusion Mapping;* **Michael Colletta**, Ray Chang, Ismail El Baggari, Lena Kourkoutis

4:30 PM **1098** *Advancing EELS into an Unsupervised Quantification Method;* (Invited) **Johan Verbeeck**, Daen Jannis, Wouter Van den Broek, Arno Annys, Zezhong Zhang, Sandra Van Aert

A09.3 Analytical Scanning Probe Microscopy

Thursday 3:30 PM **Room M-100-H**

3:30 PM **1062** *Nanoscale Mechanical Properties of Polymer Composites and their impact on Bulk Material Performance;* (Invited) **Bede Pittenger,** Sergey Osechinskiy, Dalia Yablon, John Thornton, Thomas Mueller

4:00 PM **1076** *Quantifying Electromechanics in Emerging Functional Materials: Electrostatics, Blind Spots and Precision*; (Invited) **Roger Proksch**, Joel Lefever, Ryan Wagner

4:30 PM **1032** *Nanoscale Analytics with AFM Probe-Assisted Techniques;* **Artem Danilov**, Tobias Gokus, Paul Suman, Andreas Huber, Stefan Mastel

A10.3 The Road to Atomic Scale Tomography

Thursday 3:30 PM **Room 200-A**

3:30 PM **1063** *Role of Simulations and Experiments in Analytical Field Ion Microscopy;* (Invited) **Shyam Katnagallu**, Felipe F Morgado, Shalini Bhatt, Leigh Stephenson, Isabelle Mouton, Jörg Neugebauer, Dierk Raabe, Christoph Freysoldt, Baptiste Freysoldt

4:00 PM **1077** *Towards Atomic Scale Tomography Using Correlative Crystallography, Strain Mapping, and Atom Probe Tomography;* **Edwin Supple**, Brian Gorman, Christopher J. K. Richardson, Chomani Gaspe

4:15 PM **1089** *Beyond Atom Mapping in Atom Probe Tomography Using Field Evaporation Energy Loss Spectroscopy;* **François Vurpillot**, Loic Rousseau, Alfred Cerezo, Constantinos Hatzoglou, Baptiste Gault

4:30 PM **1099** *Ab-Initio Simulation of Field Evaporation in Atom Probe Tomography: Enhanced Zone Lines and Mixed-Layer Reconstructed Structures;* **Jiayuwen Qi**, Christian Oberdorfer, Emmanuelle Marquis, Wolfgang Windl

4:45 PM **1108** *Improving Analytical Capability via Simultaneous Voltage and Laser Pulsing in Atom Probe Tomography;* **Ty Prosa**, David Larson, Yimeng Chen, David Reinhard, Isabelle Martin, Robert Ulfig, Michael holman, Jesse Robinson, Dan Robinson

A12.3 New Methods for Accessing the Structure, Chemistry and Effect on Dynamic Processes of Solid-Liquid Interfaces

Thursday 3:30 PM **Room 200-C**

3:30 PM **1064** *What Can Cryo-EM Teach us about Batteries?;* (Invited) **Yuzhang Li**

4:00 PM **1078** *Understanding Interfacial Electrochemical Reactions through in situ ec-STEM and IL-Cryo-STEM;* (Invited) **Raymond Unocic**, John Wang, Wan-Yu Tsai, Yury Gogotsi, Matthew Boebinger, Haoran Yu, David Cullen, Gabriel Veith, Alexis Veith, Michael Zachman

4:30 PM **1100** *Spectrum Imaging of a Lithium Ion Battery Anode Using Thin Fluid Cells;* **Matthew Mecklenburg**, Jared Lodico, Ho Leung Chan, Yueyun Chen, Xin Yi Ling, B. C. Regan

B Biological Sciences Symposia – Thursday Late Afternoon

B05.4 Technical Advances in cryoEM

Thursday 3:30 PM **Room M-100-D**

3:30 PM **1065** *Developing Technologies for Correlative Cryo-Imaging Pipelines;* (Invited) **Elizabeth Wright**, Jae Yang, Bryan Sibert, Matthew Larson, Joseph Kim, Daniel Parrell, Juan Sanchez, Anil Kumar, Kai Kumar

4:00 PM **1079** *National Center for In-situ Tomographic Ultramicroscopy and the Waffle Method: New and Improved;* **Daija Bobe**, Misha Kopylov

4:15 PM **1090** *High-Throughput Correlative Light and Cryo-Electron Microscopy Pipeline using PRIMO Micropatterning, CERES Ice Shield and the METEOR In-Chamber Fluorescence Light Microscope;* **Marit Smeets**, Sabrina Bergkamp, Alexane Caignard, Riddhi Jani, Deniz Daviran, Carsten Sachse

4:30 PM **1101** *Getting the Most out of your Sample from SEM to TEM;* (Invited) **James Naismith**

B07.4 Electron and Light Microscopy Research and Diagnosis of Diseases in Humans, Animals and Plants

Thursday 3:30 PM **Room M-100-F**

3:30 PM **1066** *Low-Cost, In Vivo Optical Microscopy Methods for Examining Cellular Details at the Point of Care;* (Invited) **Dongkyun Kang**

4:00 PM **1080** *MINFLUX Nanoscopy Reveals Ultra-Structural Details of the Synaptonemal Complex;* **Kingsley Boateng**, Reza Rajabi-Toustani, Sasha Kakkassery, Huanyu Qiao

4:15 PM **1091** *Fluorescence In Resin Morphology (FIRM) Imaging Provides Histologic Context for Correlated Immunofluorescence and Electron Microscopy of Tissue Sections*; **Mike Reichelt**, Cecile Chalouni, Miriam Baca, Joshua Webster, Meredith Sagolla

4:30 PM **1102** *Unsupervised Deep Learning Image Segmentation for DNA Double Strand Breaks and Nuclei in Fluorescence Microscopy Images;* Xiao Wang, Paul Inman, Amber Bible, Greeshma Agasthya, Sandra Davern

4:45 PM **1109** *Robotic Optimization of Specimen Preparation Protocol for Astrocytes Seeded on Coverslips for Imaging by Transmission Electron Microscopy (TEM);* Thomas Strader, Benjamin August, Randall Massey, Linghai Kong, Su-Chun Zhang

B10.3 Microscopy and Microanalysis of Interfaces and/or Interactions Among Organic and Inorganic Matter

Thursday 3:30 PM **Room M-100-E**

3:30 PM **1067** *From Micro-plastic to Mano-plastic in Wastewater: A Study of Their Potentials to Impact Biogeochemical Processes Using Electron Microscope;* (Invited) **Linduo Zhao**

4:00 PM **1081** *Blood Clots in Dinosaur Bones: Seemingly Permanent Organic/Mineral Interfaces in Once-Living Structures;* **Mark Armitage**

4:15 PM **1092** *Hierarchically Assembled Bowtie Shaped Hybrid Metamaterials with a Chirality Continuum;* **Prashant Kumar**, Wenqian Xu, Jonathan Schwartz, Robert Hovden, Nicholas Kotov

4:30 PM **1103** *Synthesis of Gold Nanoparticles using Satureja Macrostema Extract and Their Evaluation in MCF-7 Cells;* **Minerva Frutis Murillo**, Joel Edmundo Lopez Meza, Rodrigo Esparza Muñoz, Nicolás Cayetano castro, Gerardo Rosas Trejo

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Late Afternoon

C01.3 Machine Intelligence in Action: Delivering Resilient, Sustainable, and Reconfigurable Microscope Ecosystems

Thursday 3:30 PM **Room M-100-G**

3:30 PM **1068** *A Facility View- Maximising Biological Discovery In Microscopy;* (Invited) **Rebecca Thompson**

4:00 PM **1082** *Automating STEM Aberration Correction via Bayesian Optimization;* **Alexander Pattison**, Marcus Noack, Peter Ercius

4:15 PM **945.5** *Towards Autonomous Electron Microscopy for High-throughput Materials Discovery;* **Carolin Wahl**, Chad Mirkin, Vinayak Dravid

4:30 PM **1104** *Progress Update on the Development of a User Adjustable Pole-piece;* **Patrick McBean**, Germano Motta Alves, Fletcher Thompson, Ryusuke Sagawa, Lewys Jones

4:45 PM **1110** *N-Dimensional Dictionary Learning for Hyperspectral Scanning (Transmission) Electron Microscopy;* **Jack Wells**, Daniel Nicholls, Alex Robinson, Amirafshar Moshtaghpour, Yalin Zheng, Jony Castegna, Nigel Browning

P Physical Sciences Symposia – Thursday Late Afternoon

P01.6 Revealing the Working Morphology of Energy Materials and Its Impact on Performance

Thursday 3:30 PM **Room 200-I**

3:30 PM **1069** *Nanoscale Investigation of Energy Storage Systems By In Situ TEM*; (Invited) **Jungwon Park**

4:00 PM **1083** *Studying Charge Redistribution in Photocatalytic Nanoparticles using In Situ Light Illumination Coupled with Electron Holography;* **Piyush Haluai**, Martha McCartney, Peter Crozier

4:15 PM **1094** *Operando STEM and EELS Study of Oxide Memristor Devices;* **Di Zhang**, Rohan Dhall, Chengyu Song, Jim Ciston, Matthew Schneider, Sundar Kunwar, Michael Pettes, Rodney McCabe, Aiping McCabe

4:30 PM **1105** *Magnetic Crosstie Formation Driven by In-Situ Radio Frequency Excitation;* **Chuhang Liu**, Spencer Reisbick, Myung-Geun Han, Alexandre Pofelski, Yimei Zhu

P02.3 Electron Beam Manipulation of Covalently Bound Materials

Thursday 1:30 PM **Room 200-F**

3:30 PM **1070** *Sculpting 2D Materials: From Atom Vacancies and Pores to Nanoporous Membranes;* (Invited) **Marija Drndic**, Rachael Keneipp, Pia Bhatia, Parisa yasini

4:00 PM **1084** *Fabrication of Atomically Precise Nanopores in 2D Hexagonal Boron Nitride Using Electron and Ion Beam Microscopes;* **Dana Byrne**, Archana Raja, Aleksandr Noy, Jim Ciston, Alex Smolyanitsky, Frances Allen

4:15 PM **1095** Electron Probe Interactions in Single Species Terminated MXenes; (Invited) Francisco Lagunas Vargas, Robert Klie

P05.6 Microscopy and Microanalysis of Materials under Multiple Environmental Extremes

Thursday 3:30 PM **Room 200-G**

3:30 PM **1071** *Synchrotron X-ray Nano-tomography and Multimodal Analysis on Metal - Molten Salt Interactions;* (Invited) **Yu-chen Karen Chen-Wiegart**

4:00 PM **1085** *Elucidating the Role of Cr Migration in Ni-Cr Exposed to Molten FLiNaK via STEM-Based Methods;* **Sean Mills**, Ryan Hayes, Nathan Bieberdorf, Steven Zeltmann, Alexandra Kennedy, Mark Asta, Raluca Scarlat, Andrew M Minor Minor

4:15 PM **1096** *Effect of Al2O3 Nanoparticles in the Antiwear Properties of a Base Vegetal Lubricant;* **M. Moreno-Rios**, N. A. Sanchez-Calva, A. I. Martínez-Pérez

4:30 PM **1106** *In-situ 4D-STEM Study on Grain Boundary Dynamics in Polycrystals;* **Yutong Bi**, Yuan Tian, Mingjie Xu, Evgeniy Boltynjuk, Leonardo Estrada, Horst Hahn, Jian Han, David Srolovitz, Xiaoqing Srolovitz

4:45 PM **1111** *Primary Knock-On Damage Prediction During the Electron Microscopy Characterization oOf Lithium-Containing Materials;* **Ali Jaberi**, Nicolas Brodusch, Jun Song, Raynald Gauvin

P08.5 Atomic Scale Microscopy of Interfaces and Heterostructures with Correlated Phenomena

Thursday 3:30 PM **Room 200-H**

3:30 PM **1072** *Visualizing Polar Distortions and Interface Effects with Multislice Ptychography;* (Invited) **Harikrishnan K. P.,** Yilin Li, Kevin Crust, Aarushi Khandelwal, Yu-Tsun Shao, Zhen Chen, Ruijuan Xu, Harold Hwang, Darrell Hwang, David Muller

4:00 PM **1086** *Observation of Polarization Enhancement at BiFeO3/ La0.7Sr0.3MnO3 Interface;* **Chaojie Du**, Francisco Guzman, Hongbin Yang, Moaz Waqar, Xiaoqing Pan

4:15 PM **1097** *Atomic-Scale Observations of Artificially Engineered Atomic Structure in Vertically Aligned Nanocomposite Films with Emergent Multiferroicity;* **Hongguang Wang,** Run Zhao, Chao Yang, Jiawang Hong, Weiwei Li, Peter A. van Aken

4:30 PM **1107** *Monolayer-Interface-Driven Strain-Free Heteroepitaxy for Single-Crystal Ag Thin Films;* **Seon Je Kim**, Su Jae Kim, Young-Hoon Kim, Min-Hyoung Jung, Hu Young Jeong, Se-Young Jeong, Young-Min Kim

4:45 PM **1112** *Twisted Epitaxial Growth of Gold Nanodiscs Confined in Twisted Bilayer Molybdenum Disulfide;* **Yi Cui,** Robert Sinclair, Yi Cui

P09.4 Advances in Cryogenic Transmission Electron Microscopy and Spectroscopy for Quantum and Energy Materials

Thursday 3:30 PM **Room 200-J**

3:30 PM **1073** *Determining Cryogenic Temperatures in Specimens by Using EELS;* **Abinash Kumar**, Kartik Venkatraman, Jordan Hachtel, Miaofang Chi

3:45 PM **1074** *Revealing Atomic Structure, Strain and Moiré-Exciton Coupling of hBN/WSe2/ WS2 Superlattice at LN2 Temperature by Monochromated EELS and ADF-STEM Imaging;* **Elizaveta Tiukalova**, Yuzhou Zhao, Jihui Yang, Xiaodong Xu, Andrew Lupini, Juan Idrobo

4:00 PM **1087** *Cryogenic Electron Microscopy Challenges to Image the Nanoscale Exciton Density of States;* (Invited) **Sandhya Susarla**

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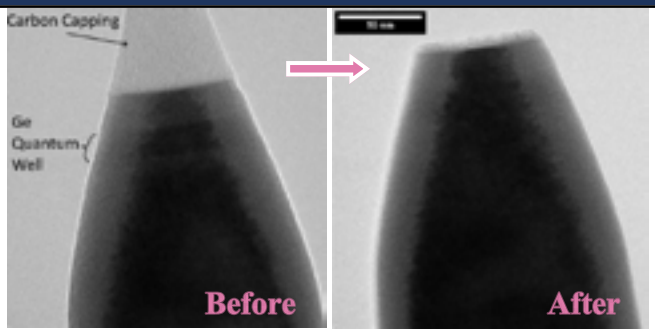

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Sample: semiconductor epilayers with region of interest 20nm beneath the sample surface

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Ferrovac	1238
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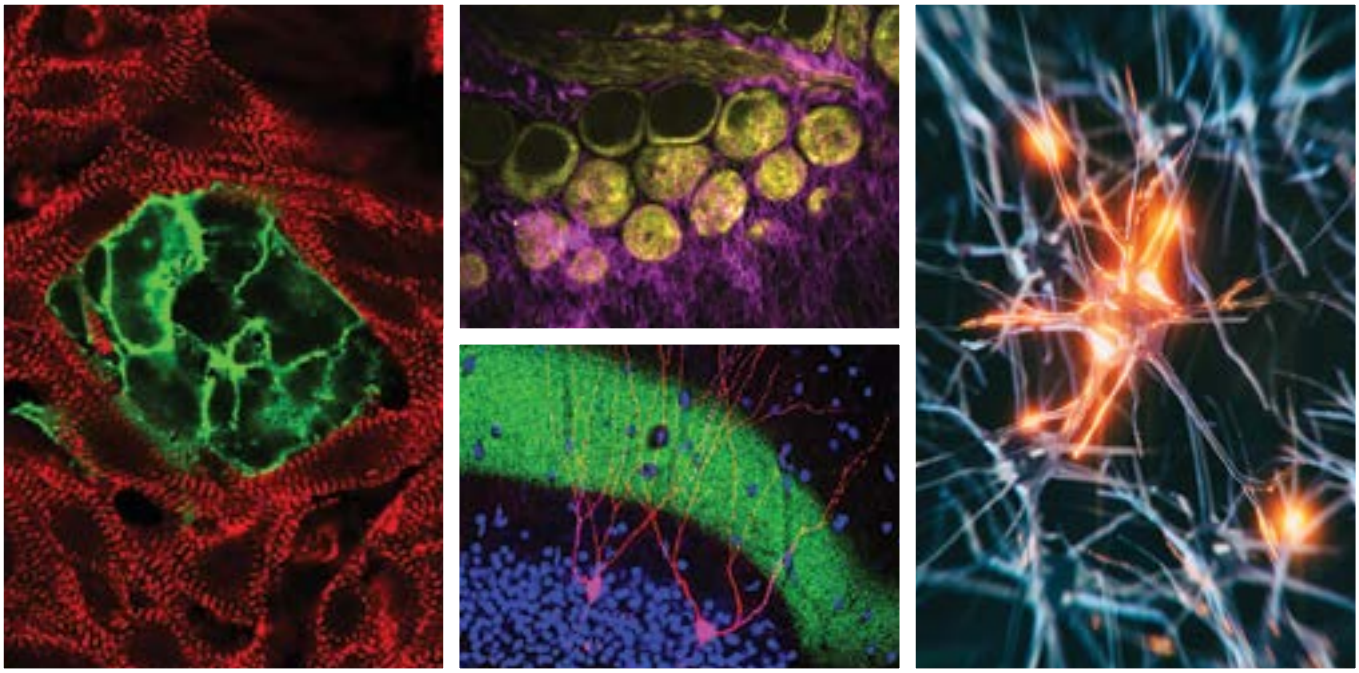

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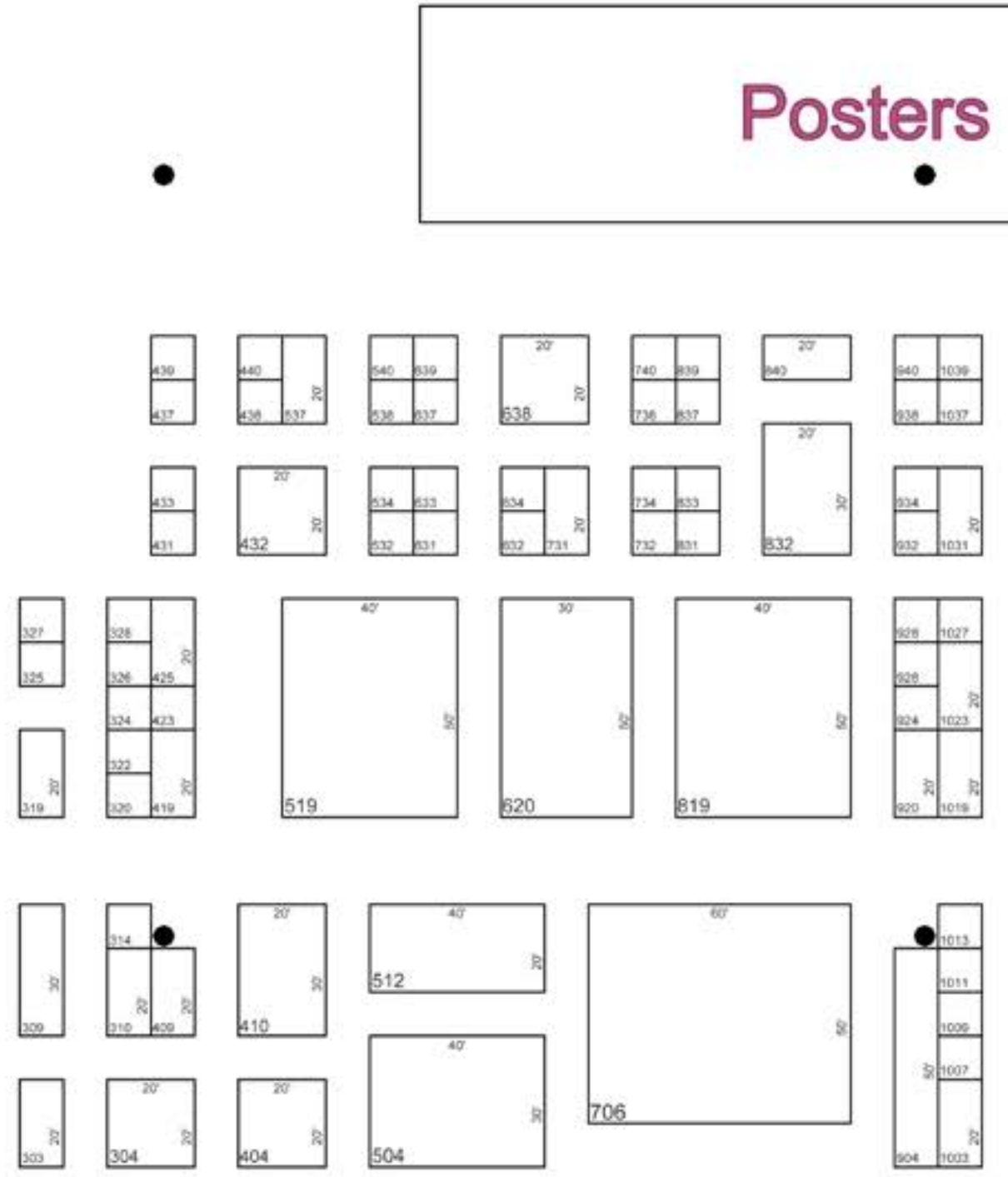

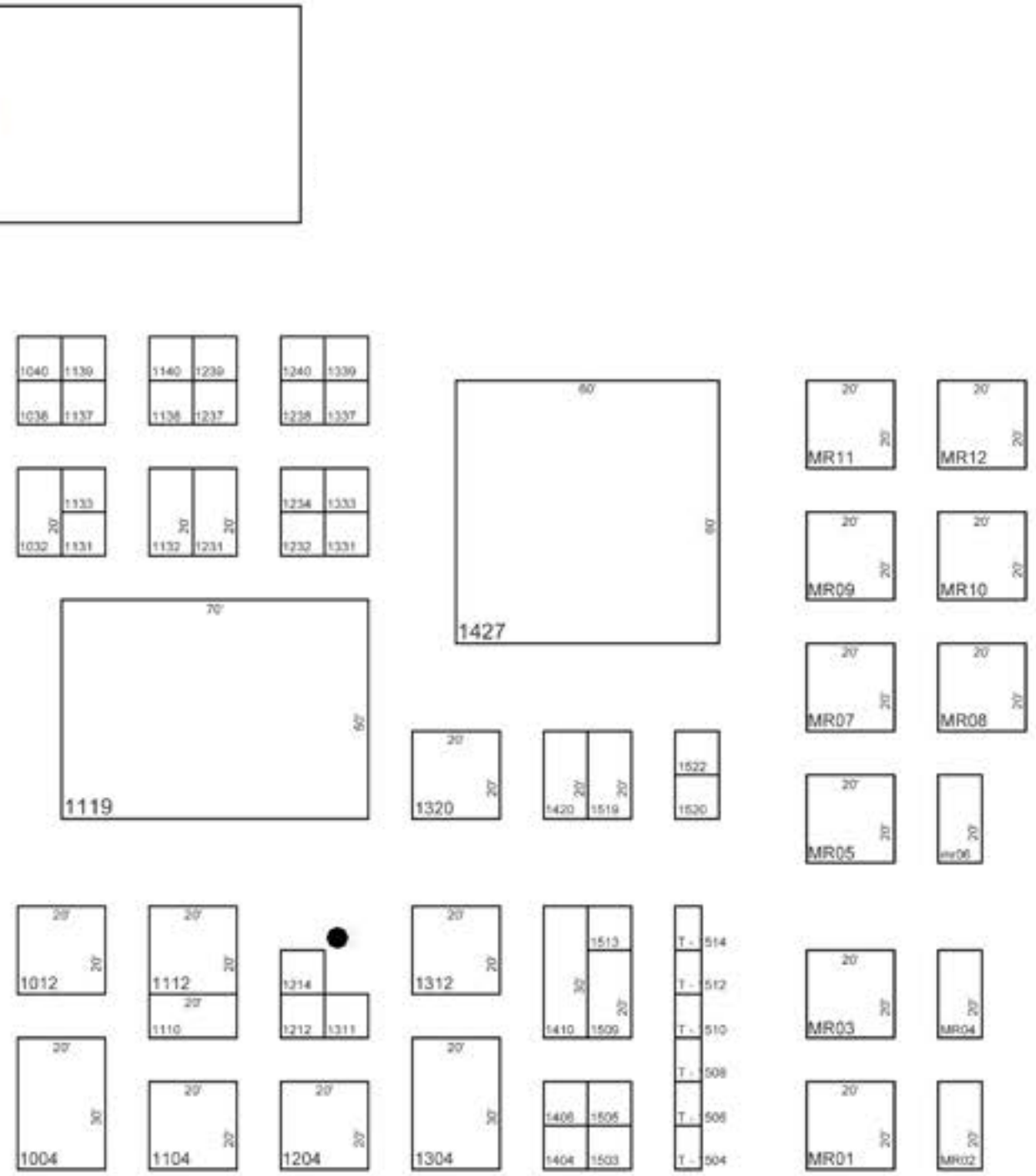
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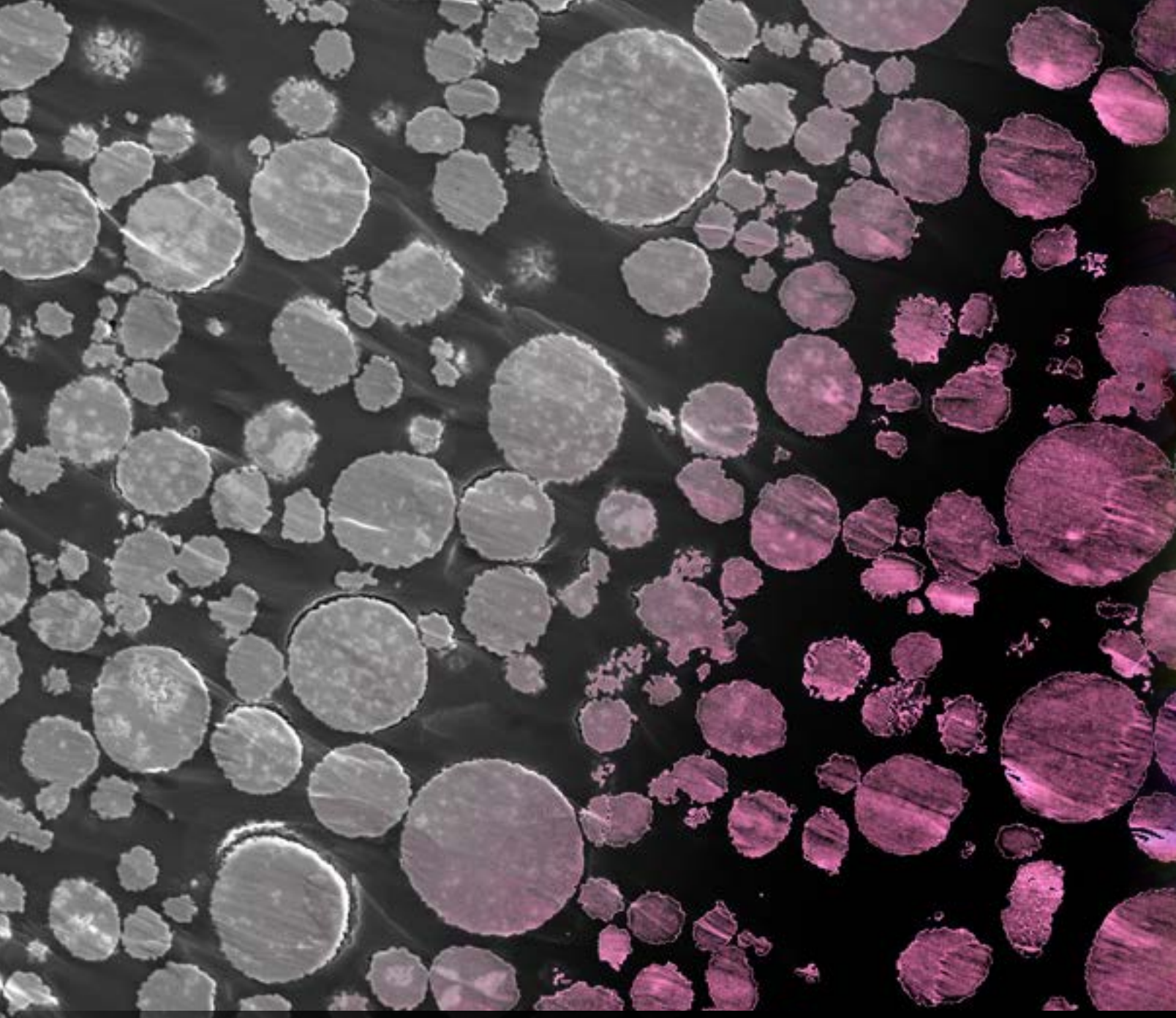

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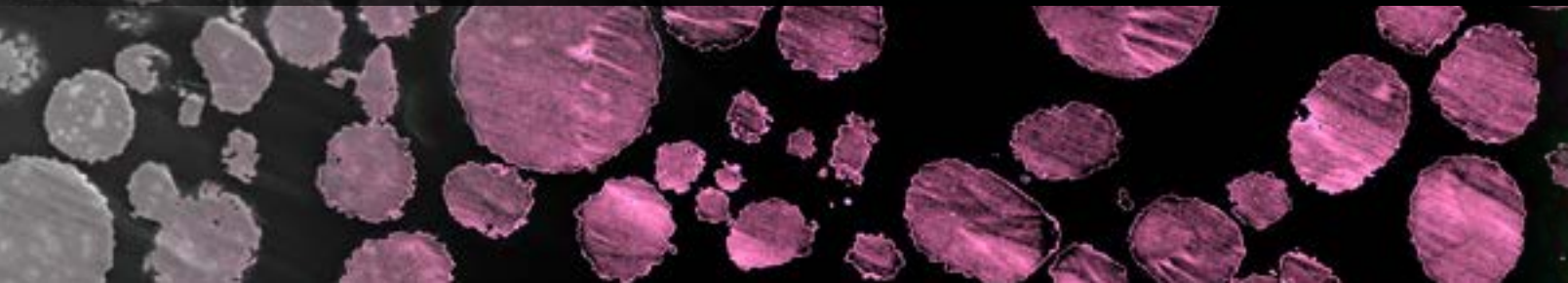

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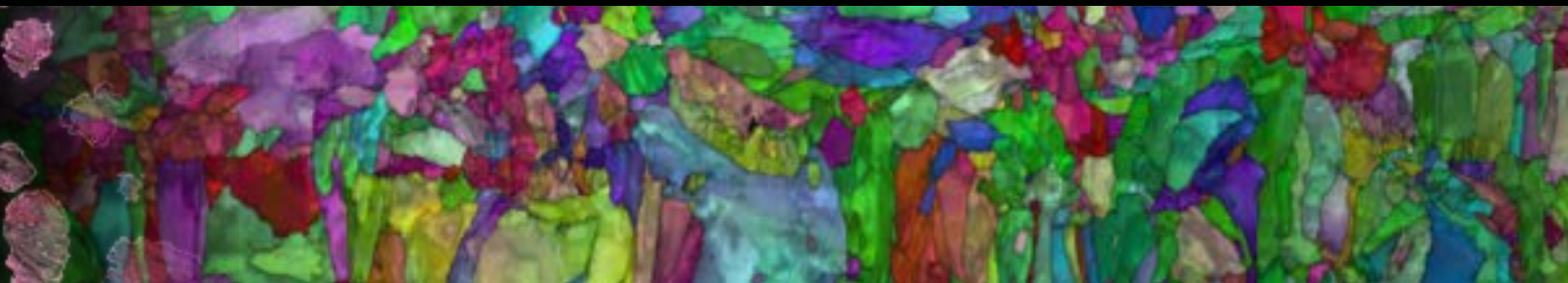

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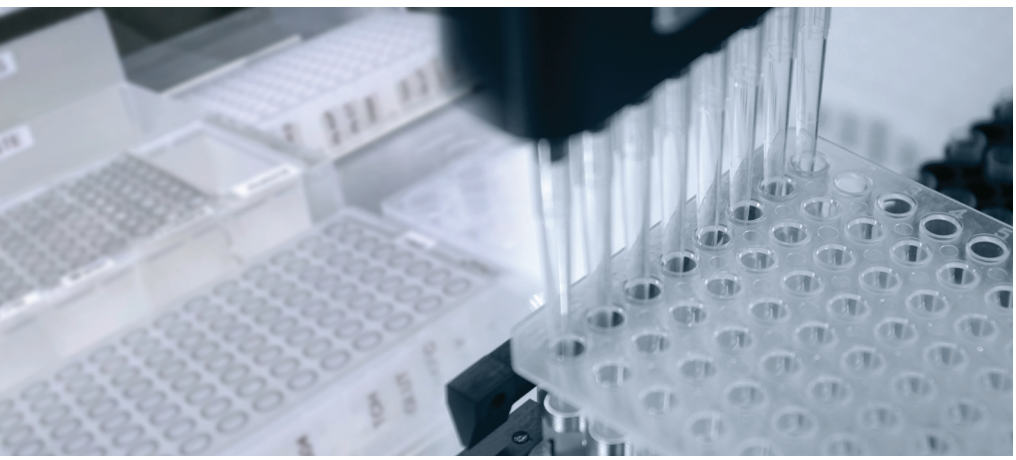

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