M&M 2024

MICROSCOPY & MICROANALYSIS

July 28-August 1 • Cleveland, OH

ifes international field emission society

MAS Microanalysis Society

MSA Microscopy Society of America

LOOK INSIDE FOR:

Plenary Sessions &
Program Highlights
Registration Fees
Special M&M Hotel Rates

Onsite Program Guide & Exhibitor Information

2024

https://mmconference.microscopy.org

It's all new!

DiATOME US is excited to announce the launch of its newly designed website, featuring a fresh look, user-friendly navigation, and a good deal of new content encompassing the complete line of knives, tools, and accessories for the sectioning of biological and materials samples.

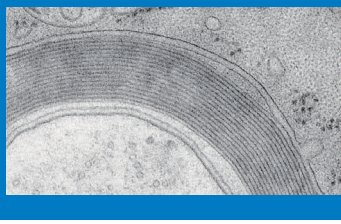
Browse our Complete Selection

DiATOME is the incomparable Diamond Knife for all fields of research. Get the full range of information you need to select the knife for your application. You can also learn about the manufacturing procedures, special characteristics, and quality control that make DiATOME Diamond Knives the premiere diamond knife for ultramicrotomy.

Our world-renowned Diamond Knives include the ultra, histo, and cryo knives in a broad range of types and sizes, as well as the trim 20, trim 45, and trim 90.

Technical Information

Find answers to common questions about our knives, learn about resharpening options, sectioning tips, and browse our micrograph galleries.



New Facility

DiATOME has moved to a larger state-of-the-art facility at the address below. All orders for DiATOME Knives and accessories should be sent to the new address including diamond knives that require resharpening. Please note the fax number has changed but we have two direct phone lines as well to assure someone will always get your call.

Ask us about our NEW Diamond Knives for CEMOVIS

We are pleased to present these newest DiATOME Knives for sectioning vitrified cells and tissues.

ultra Maxi

The ultra 35° knife has demonstrated its usefulness in both biological and materials research. The ultra Maxi is similar but features a larger boat.

- 4.0mm

DiATOME U.S.

314 West Broad Street, Suite 203
Quakertown, PA 18951
Tel: (215) 412-8390 or 215-646-1478
Fax: (267)-730-6091
email: info@diatomeknives.com

www.diatomeknives.com

MICROSCOPY & MICROANALYSIS 2024 Cleveland
July 28-August 1 Cleveland, OH

LOOK FOR US AT BOOTH #920

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Cover Image:

Cupric sulfate by José Manuel Martínez López, Quimica Tech, Juárez, Mexico

QUESTIONS?

TECHNICAL MEETING CONTENT:
2024 Program Chair
James LeBeau, Massachusetts Institute of Technology
MM2024ProgramChair@microscopy.org

EXHIBITS & EXHIBITORS:
Exhibits Manager
anna@corcexpo.com

SPONSORS & SPONSORSHIPS:
Sponsorship Manager
mary@corcexpo.com

REGISTRATION:
Registration Manager
mmregistration@microscopy.org

GENERAL:
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meetingmanager@microscopy.org

ARE YOU A MEMBER?

Join Today and Save on M&M 2024 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.

ifes international field emission society

Visit http://fieldemission.org to learn more about the benefits of IFES membership.

Download the app before you go!

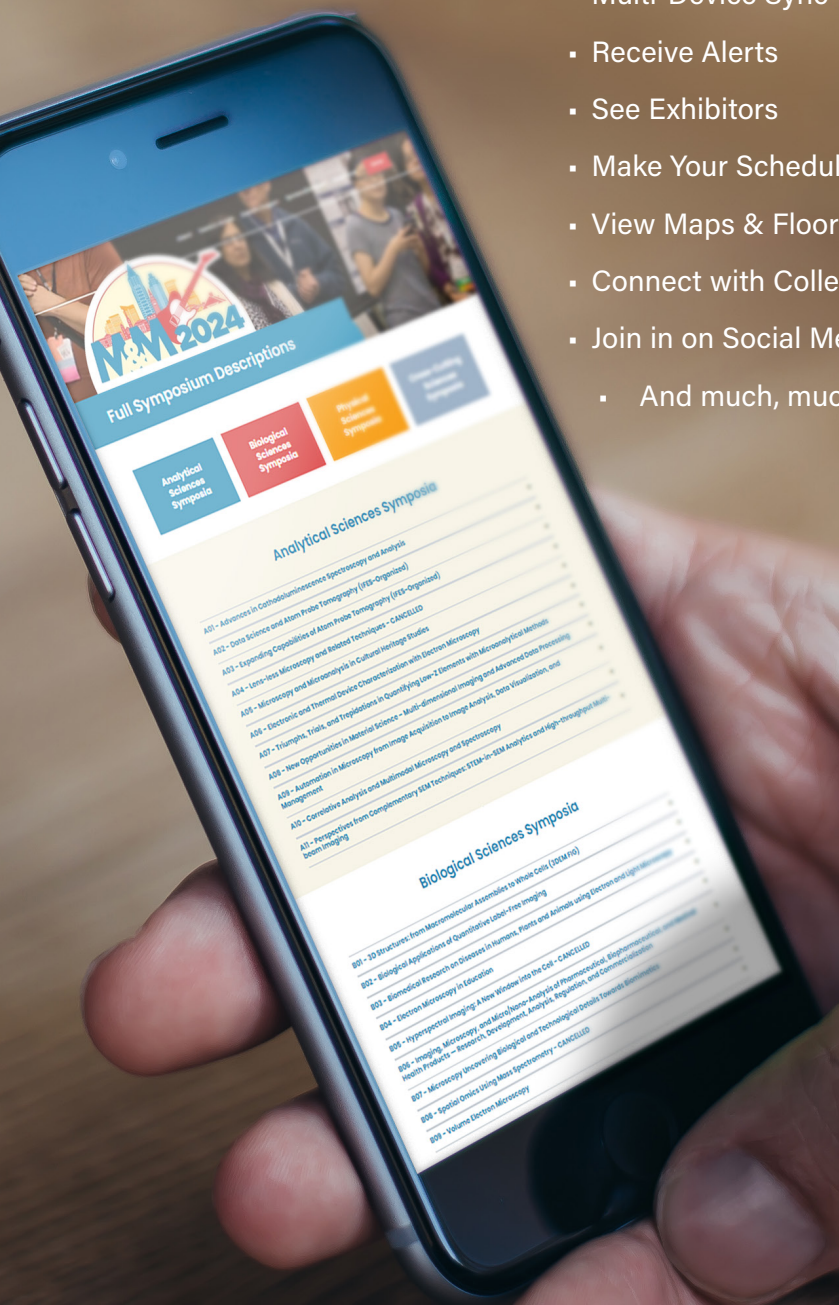
Browse event information and create a personal schedule by tapping on the star next to the presentation titles.

- Receive Up-to-the-Minute Meeting & Presenter Info
- Multi-Device Sync
- Receive Alerts
- See Exhibitors
- Make Your Schedule
- View Maps & Floor Plans
- Connect with Colleagues & Friends
- Join in on Social Media with #MM2024
  - And much, much more!

MICROSCOPY & MICROANALYSIS

Available on the App Store

ANDROID APP ON Google play



M&M2024 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 28-August 1, 2024, for Microscopy & Microanalysis 2024 in Cleveland, OH. Discover the vibrant heartbeat of the Midwest in Cleveland, a city that seamlessly blends rich history with a contemporary flair. Nestled along the shores of Lake Erie, Cleveland invites you to experience a one-of-a-kind journey through its diverse neighborhoods and dynamic cultural scene.

The Program Committee, led by James LeBeau, James Evans, Steven Spurgeon (MAS co-chair), and Francios Vurpillot (IFES co-chair) 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. We encourage you to browse the Call for Papers for complete symposium descriptions and to submit one or more scientific papers for platform or poster presentations.

Experience an unparalleled gathering of industry experts and microscopists at M&M 2024! Prior to the main meeting, immerse yourself in the renowned Sunday Short Courses and four Pre-Meeting Congresses. The MSA Student Council's Annual Pre-Meeting Congress, tailored for students and early-career professionals, highlights outstanding research, fostering collaboration and recognition.

Kickstart the meeting on Sunday evening at the Opening Welcome Reception, a perfect opportunity to reconnect with colleagues and forge new friends. The scientific program begins on Monday morning with the Plenary Session, featuring captivating talks in both Physical and Biological sciences, along with the presentation of prestigious awards from MSA and sponsoring societies.

Beyond the robust scientific program, the M&M meeting distinguishes itself with the world's largest annual microscopy exhibition in the Exhibit Hall, unveiling cutting-edge instrumentation and accessories. Explore the Exhibit Hall and participate in vendor tutorials, held Monday through Wednesday after hours. Don't miss other educational opportunities, including focused tutorials in biological and physical sciences, educational outreach programs, and special sessions like the Technologists' Forum and roundtable discussions.

M&M 2024 continues to be the premier meeting for microscopy and microanalysis where you'll stay abreast of the latest technologies, discover new applications across microscopy and microanalysis, and, most importantly, foster meaningful connections with colleagues. Elevate your professional journey with M&M 2024!

We look forward to being Together Again for M&M 2024!

Jay D. Potts
University of South Carolina, School of Medicine
President, Microscopy Society of America

Patrick Camus
Retired
President, Microanalysis Society

Future Meeting Dates

M&M2025 MICROSCOPY & MICROANALYSIS
July 27-31 • Salt Lake City, Utah

August 2–August 6, 2026
MILWAUKEE, WI

August 1–August 4, 2027
PITTSBURGH, PA

July 30–August 3, 2028
SEATTLE, WA

M&M2024 Sponsors

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Accessibility

If you require special accommodation 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://microscopy.org/Society-Awards-Recipients.

Cancellation and Refund Policy

Refund requests received prior to June 20, 2024 will be honored less a $65 administrative fee. No refunds will be issued for cancellations (for any reason) received on or after June 20, 2024, and no refunds will be issued on-site in Cleveland. 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).

Cleveland & Regional Visitor Information

Stop by the Destination Cleveland booth located inside the Exhibit Hall to pick up local information, including maps, dining guides and tour info, and visitor information on Cleveland and the surrounding areas.

Internet & E-mail

Free wireless internet is available for M&M attendees in the Huntington Convention Center.

Job & Resume Postings / Placement Office

(see MSA MegaBooth info on Page 18)

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 Childcare - Room 7

If you pre-registered for childcare at M&M, please proceed directly to the Childcare room. Drop-in care is on a space available basis. Register here: https://form.jotform.com/KiddieCorp/msakids.

MSA MegaBooth – Booth # 933

See complete details on Page 18

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. You can peruse 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 access to the proceedings online. The proceedings will be linked on the meeting platform and included in an email sent to all paid registrants.

MAS Booth – Booth # 536

MAS has a membership and information booth located in the Exhibit Hall. 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 2024 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 2 on the Concourse level. Check in here for volunteer assignments and sign-outs.

M&M2024 Huntington Convention Center

Unless indicated otherwise, all official conference events are being held at the Huntington Convention Center, located in the downtown district of Cleveland, OH.

- Exhibit Halls
- Ballrooms
- Meeting Rooms
- Exhibit Hall Concessions
- Show Offices
- Starbucks/Au Bon Pain Cafe
- The UPS Store
- Public Restrooms
- Back of House
- Elevators
- Campus Connections to Hilton and Public Auditorium
- Huntington Park Garage Tunnel
- Water Bottle Refill Stations

M&M2024 Registration Information

Onsite Registration Desk

Huntington Convention Center – *Located outside of Hall BC Entrance on the Exhibit Level*

Pick up your badge and materials at the Registration desk according to the schedule below.

The Sunday Welcome Reception starts at 6:30 PM in the Grand Ballroom in the Convention Center on the Ballroom level (take stairs up 1 floor from Registration).

Registration Hours:

Friday, July 26*	8:00 am – 1:00 pm
Friday, July 26	1:00 pm – 6:00 pm
Saturday, July 27	7:00 am – 6:00 pm
Sunday, July 28	7:00 am – 7:00 pm
Monday, July 29	7:00 am – 6:00 pm
Tuesday, July 30	7:00 am – 5:00 pm
Wednesday, July 31	7:00 am – 5:00 pm
Thursday, August 1	7:30 am – 3:00 pm

**Exhibitors Only*

Commercial Exhibition Hours:

Monday, July 29	12:00 pm – 5:30 pm
Tuesday, July 30	10:00 am – 5:30 pm
Wednesday, July 31	10:00 am – 5:30 pm
Thursday, August 1	10:00 am – 2:00 pm

Exhibitor Move-In:

Thursday, July 30*	8:00 am – 5:00 pm
Friday, July 26	8:00 am – 5:30 pm
Saturday, July 27	8:00 am – 5:30 pm
Sunday, July 28	8:00 am – 5:30 pm

**Targeted Island Booths Only*

Exhibitor Move-Out:

Thursday, August 1	2:00 pm – 7:00 pm
Friday, August 2	8:00 am – 5:00 pm

Getting To & Around Cleveland

The Cleveland Hopkins International Airport (CLE) is Northeast Ohio's Gateway to the World. Serving 10 million passengers annually with over 135 daily departures to 38 nonstop destinations, CLE is Northeast Ohio's premier commercial airport. Ten passenger airlines and two all-cargo airlines operate regularly at CLE. The upcoming multi-phase Terminal Modernization Development Program will elevate the travel experience for all through an extensive transformation of terminal and related facilities. It is anticipated to begin in 2025, the Airport's 100th Anniversary, and extend into the next decade.

https://www.clevelandairport.com/

Ground Transportation

Cleveland's Regional Transit Authority (http://www.riderta.com/routes) runs free trolley buses on weekdays. RTA also operates a rail line between Cleveland Hopkins International Airport and Tower City Center every 15 minutes.

Cleveland's transit system is rather substantial with bus, trolley and train lines all throughout the city. Be sure to visit RTA's website or use the Transit App (https://transitapp.com/) to purchase fares and plan trips with real-time arrival information from your phone.

Hotels

All three official M&M Hotels are less than a 10 minute walk to the Huntington Convention Center. If you are staying at the Hilton Cleveland Downtown, you can take the Convention Center Connector.

More Cleveland Travel Info:

For detailed attraction, dining, and travel information for visitors, visit the Destination Cleveland website at **https://www.thisiscleveland.com/**

Maps showing details about neighborhoods, downtown and other areas of the city, including the map above, are available on the Destination Cleveland website and are downloadable from: **https://www.thisiscleveland.com/planning-tools/visitor-resources/maps**

BE PREPARED

at the Huntington Convention Center!

In case of fire, medical emergency, or another emergency situation

Do Not Call 911. Call Building Security at (216) 928-1601 from your cell phone or ext. 1601 from a black house phone.

- Tell them the type of emergency (fire, medical) and the location and level.
- Remain calm and follow directions.
- Use (216) 928-1601 to report any other Security concerns.

Should you encounter a Suspicious Package:

- Do not touch or move the package.
- Move away, locate the nearest house phone, and call Security.
- Do not call 911. Do not use your cell phone. Call ext. 1601 from a black house phone.

In Case of Fire:

Call Security at (216) 928-1601. Tell them the **type of fire** (rubbish, oil, etc.), the **location of the fire**, and the **status** (uncontrolled, etc.).

Other Information:

The Huntington Convention Center's Lost and Found Department may be contacted at (216) 928-1601. Check M&M 2024 registration first for any lost & found items.

M&M 2024 Sunday Evening Welcome Reception

Huntington Convention Center—Grand Ballroom BC, Ballroom Level

Sunday, July 28, 2024 • 6:30 PM – 8:30 PM

One ticket is included with most registrations (see page 8 for details). Additional tickets: $50 each for adults; $25 each for children 12 and under.

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

Step into the heart of Cleveland with our inspired menu and local brews; and catch up with friends and colleagues. After the reception, grab some old and new friends and head out to one of Cleveland's numerous craft breweries or wine bars to continue the fun!

MAS Microanalysis Society

MAS Social Event – for MAS Members Only!

Wednesday, July 31, 2024 • 6:30 PM – 8:30 PM

Stop by the MAS booth in the exhibit hall to check your membership status and pick up your ticket for the MAS social event on Wednesday evening, July 31—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 monetary 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.

M&M2024 Ancillary Meeting Schedule

All events held at Huntington Convention Center of Cleveland unless otherwise noted.

To encourage strong attendance at the Distinguished Scientist Awardee Presentation and the MSA Members Meeting, MSA has decided to remove the lunchtime slots for committee and FIG meetings on the Tuesday and Wednesday schedules to free up time for members to attend these events. Therefore, all committee and FIG meetings originally slated for these times will be rescheduled to morning timeslots.

Saturday, July 27, 2024

8:00 AM – 5:30 PM	MSA Council	

Sunday, July 28, 2024

5:00 PM – 6:00 PM	FIG: Electron Microscopy in Liquids and Gases	
8:30 PM – 10:00 PM	Symposium Organizers' Reception	OFFSITE

Monday, July 29, 2024

7:15 AM – 8:15 AM	Technologists' Forum Board	
7:15 AM – 8:15 AM	Travel Awards Committee	
7:15 AM – 8:15 AM	MSA Awards + Fellowship Committees	
12:15 PM – 1:15 PM	MAS Meal with a Mentor	
12:15 PM – 1:15 PM	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	
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	
5:30 PM – 7:00 PM	Student & Postdoc Mixer	
5:45 PM – 6:45 PM	Vendor Tutorials *(Sign up at Vendor Booths)*	EXHIBIT HALL

Tuesday, July 30, 2024

7:15 AM – 8:15 AM	MSA Local Affiliated Societies & MAS Affiliated Regional Societies Breakfast	
7:15 AM – 8:15 AM	*Microscopy Today Editorial Board Meeting*	
7:15 AM – 8:15 AM	MSA Standards Committee Meeting	
7:15 AM – 8:15 AM	FIG: Electron Crystallography	
7:15 AM – 8:15 AM	FIG: Low Temperature Electron Microscopy	
10:00 AM – 12:00 PM	M&M 2025 - Program Planning Meeting	
12:15 PM – 1:15 PM	MSA Distinguished Scientist Awardee Lectures	
12:15 PM – 1:15 PM	FIG: FOM FIG Lunch Meeting	
3:30 PM – 4:30 PM	MSA Education Committee Meeting	
3:30 PM – 4:30 PM	FIG Business Meeting	
5:30 PM – 6:30 PM	Postdoc Professional Development Event	
5:45 PM – 6:45 PM	Vendor Tutorials *(Sign up at Vendor Booths)*	
6:30 PM – 8:30 PM	Presidents' Reception *(Invitation Only)*	OFFSITE

Wednesday, July 31, 2024

7:15 AM – 8:15 AM	MSA Certification Board	
7:15 AM – 8:15 AM	MaM Editorial Board	
7:15 AM – 8:15 AM	MSA Membership Committee	
7:15 AM – 8:15 AM	FIG: Aberration Corrected Electron Microscopy	
12:15 PM – 1:15 PM	MSA Members' Meeting	
5:30 PM – 6:30 PM	Diversity and Inclusion Mixer	
5:30 PM – 6:30 PM	MAS Business Meeting	
5:45 PM – 6:45 PM	Vendor Tutorials *(Sign up at Vendor Booths)*	
6:30 PM	MAS Members Social—See MAS Booth for Details	OFFSITE

Thursday, August 1, 2024

8:30 AM – 9:30 AM	M&M Sustaining Members Meeting	
12:15 PM – 1:15 PM	FIG: MicroAnalytical Standards	

THANK YOU TO OUR SUSTAINING MEMBERS

(As of June 11, 2024)

Advanced Microscopy Techniques
Applied Physics Technologies
Boeckeler Instruments, Inc.
Bruker Nano Analytics
Carl Zeiss Microscopy, LLC
CEOS GmbH
CryoElectron Microscopy Research Center
Dectris Ltd.
Diatome US
Direct Electron LP
Double Helix Optics
Duniway Stockroom Corp.
EDAX
Electron Microscopy Sciences
EMSIS GmbH
EXpressLO LLC
Gatan
Hitachi High-Tech America, Inc.
HREM Research Inc.
Hummingbird Scientific
ibss Group, Inc.
International Centre for Diffraction Data
JEOL USA, Inc.
Kleindiek Inc.
Ladd Research
Lehigh Microscopy School
Micron, Inc.
Microscopy Innovations LLC
NanoSpective
Nion Co.
Oxford Instruments
Protochips, Inc.
Quantum Design
Scientific Instrumentation Services, Inc.
SEMTech Solutions, Inc.
Ted Pella Inc.
TESCAN
Thermo Fisher Scientific
Tousimis
XEI Scientific, Inc.

M&M 2024 Exhibitor List

M&M2024

3D-Micromac AG
Advanced Microscopy Techniques Corp.
Alemnis AG / Angstrom Scientific Inc
Applied Physics Technologies
Attocube Systems Inc.
AVR Optics
Barnett Technical Services
Bruker Corporation
CAMECA, TMC Ametek
Canadian Centre for Electron Microscopy
Carl Zeiss Microscopy, LLC
CIQTEK Co, Ltd.
Clark-MXR Inc
Collectome LLC
condenZero
ConnectomX Ltd
DECTRIS Ltd
Delong Instruments
DENSsolutions
Diatome US
DigiM Solution LLC
Direct Electron, LP
Dragonfly
Duniway Stockroom Corp.
El-Mul Technologies
Electron Microscopy Sciences / Quorum Technology / Diatome US
Electron Optics Instruments LLC
Euclid TechLabs, LLC
EXpressLO LLC
Ferrovac
Fischione Instruments
Fritsch Milling & Sizing, Inc
Gatan, Inc. / EDAX
h-Bar Instruments
Herzan LLC
Hirox-USA, Inc.
Hitachi High-Tech America, Inc.
HORIBA Scientific
HREM Research Inc.
Hummingbird Scientific
ibss Group, Inc.
Integrated Dynamics Engineering
JASCO
JEOL USA, Inc.
JH Technologies
Kamrath & Weiss GmbH
Keyence Corporation of America
Kitware
Kleindiek Nanotechnik
Kratos Analytical, a Shimadzu Company
Ladd Research
Leica Microsystems
Linkam Scientific Instruments
MAS: The Microanalysis Society
Mel-Build Corporation
Microscopy Innovations, LLC
Midwest Center for Cryo-Electron Tomography
MIPAR Image Analysis Software
MiTeGen
MSA Mega Booth
NanoMEGAS USA
Nanomotion Inc
Nanoscience Instruments
NenoVision
Nion Company
Noble Dome
Norcada, Inc.
NT-MDT America, Inc
Oxford Instruments
Pacific Northwest CryoEM Center
Panasas | VDURA
PIE Scientific LLC
PNDetector GmbH
Point Electronic GmbH
Protochips, Inc.
Quantum Design, Inc
Quantum Detectors
Raith America, Inc.
Rave Scientific
Renishaw Inc
RMC Boeckeler
Royal Microscopical Society
Scientific Bridge
SEC Co. Ltd. | NanoImages
Seron Technologies Inc.
Sigray, Inc.
Simple Origin
SiriusXT Ltd
SmarAct Inc
SPT Labtech
SU Group LLC
SubAngstrom
Supro Instruments Co., Ltd
syGlass, Inc
Ted Pella Inc.
TESCAN
Theia Scientific
Thermo Fisher Scientific
Tousimis
TVIPS GmbH
United Mineral and Chemical Corp.
VEC
VitroTEM
Voxa
XEI Scientific, Inc.
ZEPTOOLS Technology Co., Ltd
ZoNexus LLC

MSA
Microscopy Society of America

MegaBooth in the EXHIBIT HALL

MICROSCOPY & MICROANALYSIS

July 28-August 1 • Cleveland, OH

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. Stop by to catch up on all the new society developments and network with your colleagues.

VENDOR TUTORIALS – 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!

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 29, 2024
Huntington Convention Center – Grand Ballroom AB

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

Ed Boyden, PhD

Professor, Departments of Brain and Cognitive Sciences, Media Arts and Sciences, and Biological Engineering, Y. Eva Tan Professor in Neurotechnology McGovern Institute

Tools for Analyzing and Controlling Biological Systems

C. Wren Carr, PhD

Physicist, Lawrence Livermore National Laboratory

How Microscopy Enabled Laboratory Fusion

MSA Distinguished Scientist Award & Talks

Tuesday, July 30, 2024, 12:15 PM
Huntington Convention Center – Room 5

DISTINGUISHED SCIENTIST – BIOLOGICAL SCIENCES

Jay Jerome, Ph.D., Vanderbilt University

Luck, Obstinance, and the Search for Truth

DISTINGUISHED SCIENTIST – PHYSICAL SCIENCES

J. Murray Gibson, Ph.D., Florida State University

From Dark Rooms to Datacubes— A Microscopy Journey

MSA Microscopy Society of America

MSA Major Society Award Winners

BURTON MEDAL – PHYSICAL SCIENCES
Wu Zhou, University of Chinese Academy of Sciences

ALBERT CREWE AWARD
Michael Zachman, Oak Ridge National Laboratory

CHUCK FIORI AWARD FOR OUTSTANDING TECHNOLOGIST, PHYSICAL SCIENCE
Kathleen B. Reuter, IBM T.J. Watson Research Center

GEORGE PALADE AWARD
Florian Schüder, Yale School of Medicine

MAS Microanalysis Society

MAS Major Society Award Winners

PRESIDENTIAL SCIENCE AWARD
Paul Kotula, Sandia National Laboratory

PRESIDENTIAL SERVICE AWARD
Donovan Leonard, Microsoft Quantum

PETER DUNCUMB AWARD FOR EXCELLENCE IN MICROANALYSIS
Sergei Kalinin, University of Tennessee Knoxville

KURT F.J. HEINRICH AWARD
Shelly Conroy, Imperial College London

BIRKS – BEST CONTRIBUTED PAPER
Sponsored by JEOL USA
Vivek Subramanian - *Cryo-FIB and Synchrotron SAXS/WAXS Studies of Confined Crystallization of PDMS in Tubular Network Block Copolymer Morphologies*

CASTAING – BEST STUDENT PAPER
Sponsored by Cameca
Sarah Anderson - *Identifying the Mechanism of Glioblastoma Cell Migration in Mouse Brain Slices*

COSSLETT – BEST INVITED PAPER
Sponsored by MAS
Claudia Roig González - *Epidote Reference Material Development Calibrated for Oxygen Isotope Determination by Secondary Ion Mass Spectrometry (SIMS)*

MACRES – BEST INSTRUMENTATION/SOFTWARE PAPER
Sponsored by Oxford Instruments
Paul Carpenter - *Quantitative Microanalysis Explorer: Next Generation Analytical Tool for Study of Apollo 17 Core 73002,6015-6018*

Student Scholar Awards

Raleigh & Clara Miller Memorial Scholarship Awardee

Kristaps Kairišs — Heidelberg University

Eric Samuel Memorial Scholarship Awardee

Zoë Broad — University of Liverpool

Student Scholar Awardees –

Sponsored by MSA Microscopy Society of America

Andrew Balog — The Pennsylvania State University
Aviram Bhalla-Levine — University of California, Los Angeles
Kayla Callaway — University of Maryland
Christopher Chae — The Ohio State University
Ho Leung Chan — University of California, Los Angeles
Byeongjun Gil — Seoul National University
Francisco Guzman — UC Irvine
Jeffrey Huang — University of Illinois, Urbana-Champaign
Shake Karapetyan — Cornell University
Taichi Kusumi — The University of Tokyo
Aowen Li — University of Chinese Academy of Sciences
Ting-Ran Liu — University of Southern California
William Millsaps — University of Michigan
Matthew Mosse — Trinity College Dublin
Ruth Parsons — Duke University
Yujie Quan — University of California, Santa Barbara
Hosna Rastegarpouyani — Florida State University
Nicholas Rienstra — University of Wisconsin, Madison
Jeremy Shen — University of Michigan
Saif Siddique — Cornell University
Koudai Tabata — The University of Tokyo
Jonathon Tran — Portland State University

Student Scholar Awardees –

Sponsored by MAS Microanalysis Society

Jack Grimm – Pacific Northwest National Lab
Huiming Guo – University of California, Irvine
Hanyu Hou – University of Illinois at Urbana-Champaign
Ya-Hsiang Hsu – The Ohio State University
Minhazul Islam – The Ohio State University
Zhongmin Long – KIT
Julian Lüken – University of Antwerp
Hannah Matos Pimentel – Florida State University
Patricia Meza – Northwestern University
Ruiying Shu – University of Oxford
Oliver Waszkiewicz – Imperial College London

Robert P. Apkarian Memorial Scholarship Awardees

BIOLOGICAL SCIENCE AWARDEE
Not Awarded This Year

PHYSICAL SCIENCE AWARDEE
Stephanie Ribet – National Center for Electron Microscopy, Lawrence Berkeley National Laboratory

Postdoctoral Scholar Awardees – *Sponsored by* MSA Microscopy Society of America

Paul Chao – Sandia National Laboratories
Jingshan Du – Pacific Northwest National Laboratory
Birk Fritsch – Forschungszentrum Jülich GmbH, Helmholtz-Institut Erlangen-Nürnberg for Renewable Energy (IEK-11)
Zhenjing Liu – Massachusetts Institute of Technology
Allison Mis – Colorado School of Mines
Ganesh Narasimha – Oak Ridge National Laboratory
Suk Hyun Sung – University of Michigan
Yaolong Xing – Korea Institute of Energy Technology
Fehmi Yasin – Oak Ridge National Laboratory
Xiangyu Yin – Argonne National Laboratory
Yang Zhang – Harvard University
Menglin Zhu – Ohio State University

Postdoctoral Scholar Awardees – *Sponsored by* MAS Microanalysis Society

Akshay Agarwal – Boston University
Brian Caffrey – Rosalind Franklin Institute
Liza-Anastasia DiCecco – Pennsylvania State University
Sohail Shah – Idaho National Laboratory

M&M 2024 Professional Technical Staff Awards

Mouad Essani — University of Paris Est Creteil
Victoria Pappas — Northwestern University
Lolita Rotkina — Donald Danforth Plant Science Center
Pengyuan Xiu — Intel Corporation

Friday, July 26–Saturday, July 27

8:00 AM – 5:30 PM	**MSA Council**	*Huntington Convention Center*
9:00 AM – 5:30 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)***	

Sunday, July 28

8:30 AM – 5:00 PM	**Sunday Short Courses**	
	X10 Guidelines for Performing 4D-STEM Characterization from the Atomic to Micrometer Scales: Experimental Considerations, Data Analysis	
	X11 Cryo-EM for Materials Sciences: Hardware, Applications and Data Acquisition	
	X12 Transmission Electron Microscopy and Spectroscopy from First Principles	
	X13 Automated Experiments in Electron Microscopy	
	X14 From Obscure to Clear: A Dive into Tissue Clearing and Expansion Microscopy	
	X15 Focused Ion Beam Theory & Methods	
8:30 AM – 5:00 PM	**Pre-Meeting Congress**	
	X61 Synergy of Hardware Innovations and Computational Breakthroughs in TEM ***(Organized by the MSA Abberation-Corrected Electron Microscopy Data Analysis & Management Focused Interest Groups)***	
	X62 Obtaining Reliable and Relevant Insights in Our *In Situ* Microscopy and Spectroscopy Studies of Reactions in Liquids and Gases: A Discussion on Re-producibility, Robustness and Rigor ***(Organized by the MSA Electron Microscopy in Liquids and Gases Focused Interest Group)***	
5:00 PM – 6:00 PM	**FIG: Electron Microscopy in Liquids and Gases**	
6:30 PM – 8:30 PM	**M&M 2024 Welcome Reception**	*Grand Ballroom BC*
8:30 PM – 10:00 PM	**Symposium Organizers' Reception**	*Offsite (by invitation only)*

Monday, July 29

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 2024 Plenary Sessions**	*Grand Ballroom AB*
	Opening Welcome	
	Plenary Talk #1: **Ed Boyden, PhD** ***Professor, Departments of Brain and Cognitive Sciences, Media Arts and Sciences, and Biological Engineering, Y. Eva Tan Professor in Neurotechnology, McGovern Institute and HHMI*** **Tools for Analyzing and Controlling Biological Systems**	
	MAS Awards Presentation MSA Awards Presentation M&M Meeting Awards Presentation	
	Plenary Talk #2: **C. Wren Carr, PhD** ***Physicist, Lawrence Livermore National Laboratory*** **How Microscopy Enabled Laboratory Fusion**	
12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**	
12:00 PM – 5:30 PM	**Exhibit Hall Open**	

For an up-to-date schedule and meeting room locations, please check **https://mm2024.eventscribe.net/** or the mobile app.

Monday, July 29 (Cont'd.)

12:15 PM – 1:15 PM	**MSA International Committee**
12:15 PM – 1:15 PM	**MAS Meal with a Mentor**
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**
	A02.1 Data Science and Atom Probe Tomography (IFES-Organized)
	A08.1 New Opportunities in Material Science – Multi-dimensional Imaging and Advanced Data Processing *Sponsored by* GATAN EDAX
	A09.1 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management
	A10.1 Correlative Analysis and Multimodal Microscopy and Spectroscopy *Sponsored by* OXFORD INSTRUMENTS
	B02.1 Biological Applications of Quantitative Label-Free Imaging
	B03.1 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy
	B09.1 Volume Electron Microscopy
	C01.1 Emerging 4D STEM Techniques in Materials and Biological Sciences *Sponsored by* JEOL
	C02.1 Facilities Management: Crucial Skills and Strategies
	C06.1 Memorial Symposium: Lena Fitting Kourkoutis
	P02.1 Memorial Symposium: Terence E. Mitchell
	P03.1 Electron Microscopy of Advanced Functional Materials
	P05.1 Advanced Imaging and Spectroscopy Beyond Room Temperature *Sponsored by* GATAN EDAX
	P06.1 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From *In-situ* to Ultrafast
3:00 PM – 5:00 PM	**Monday Poster Presentations** *Post-Deadline Posters will be presented on this day.*
	A02.P1 Data Science and Atom Probe Tomography ***(IFES-Organized)***
	A08.P1 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing
	A10.P1 Correlative Analysis and Multimodal Microscopy and Spectroscopy
	B02.P1 Biological Applications of Quantitative Label-Free Imaging
	B03.P1 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy
	C01.P1 Emerging 4D STEM Techniques in Materials and Biological Sciences
	C07.P1 Lens on Diversity in the Microscopy and Microanalysis Community
	P03.P1 Electron Microscopy of Advanced Functional Materials
	P06.P1 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From *In-situ* to Ultrafast
	P10.P1 *In Situ* and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials
	PDP.P1 Post Deadline Posters
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 – 7:00 PM	**Student & Postdoc Mixer**
5:45 PM – 6:45 PM	**Vendor Tutorials** *(Sign up at individual exhibitors' booths)*

Tuesday, July 30

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	**MSA Standards Committee**
7:15 AM – 8:15 AM	**FIG: EM Data Analysis and Management**
7:15 AM – 8:15 AM	**FIG: Electron Crystallography**
7:15 AM – 8:15 AM	**FIG: Low Temperature Electron Microscopy**
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**
	A02.2 Data Science and Atom Probe Tomography ***(IFES-Organized)***
	A08.2 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing *Sponsored by* GATAN + EDAX
	A09.2 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management
	A10.2 Correlative Analysis and Multimodal Microscopy and Spectroscopy *Sponsored by* OXFORD INSTRUMENTS
	B02.2 Biological Applications of Quantitative Label-Free Imaging
	B03.2 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy
	B09.2 Volume Electron Microscopy
	C01.2 Emerging 4D STEM Techniques in Materials and Biological Sciences *Sponsored by* JEOL
	C02.2 Facilities Management: Crucial Skills and Strategies
	C06.2 Memorial Symposium: Lena Fitting Kourkoutis
	P02.2 Memorial Symposium: Terence E. Mitchell
	P03.2 Electron Microscopy of Advanced Functional Materials
	P05.2 Advanced Imaging and Spectroscopy Beyond Room Temperature *Sponsored by* GATAN + EDAX
	P06.2 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From *In-situ* to Ultrafast
	P07.1 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods
	P09.1 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials *Sponsored by* GATAN + EDAX
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 2025 Symposium Organizers' Planning Meeting**
10:30 AM – 12:00 PM	**A.M. Symposia & Sessions**
	A02.3 Data Science and Atom Probe Tomography ***(IFES-Organized)***
	A08.3 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing *Sponsored by* GATAN + EDAX
	A09.3 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management
	A10.3 Correlative Analysis and Multimodal Microscopy and Spectroscopy *Sponsored by* OXFORD INSTRUMENTS
	B01.1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B03.3 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy
	B09.3 Volume Electron Microscopy
	C01.3 Emerging 4D STEM Techniques in Materials and Biological Sciences *Sponsored by* JEOL
	C02.3 Facilities Management: Crucial Skills and Strategies
	C06.3 Memorial Symposium: Lena Fitting Kourkoutis
	P02.3 Memorial Symposium: Terence E. Mitchell
	P05.3 Advanced Imaging and Spectroscopy Beyond Room Temperature *Sponsored by* GATAN + EDAX

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Tuesday, July 30 (Cont'd.)

10:30 AM – 12:00 PM	**A.M. Symposia & Sessions cont.**	
	P06.3 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From *In-situ* to Ultrafast	
	P07.2 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.2 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	*Sponsored by* GATAN + EDAX
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	**FIG: FOM FIG Lunch Meeting**	
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**	
	A03.1 Expanding Capabilities of Atom Probe Tomography ***(IFES-Organized)***	
	A07.1 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods	*Sponsored by* OXFORD INSTRUMENTS
	A08.4 New Opportunities in Material Science – Multi-dimensional Imaging and Advanced Data Processing	*Sponsored by* GATAN + EDAX
	A09.4 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management	
	A10.4 Correlative Analysis and Multimodal Microscopy and Spectroscopy	*Sponsored by* OXFORD INSTRUMENTS
	B01.2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)	
	B03.4 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy	
	B09.4 Volume Electron Microscopy	
	C01.4 Emerging 4D STEM Techniques in Materials and Biological Sciences	*Sponsored by* JEOL
	C06.4 Memorial Symposium: Lena Fitting Kourkoutis	
	P02.4 Memorial Symposium: Terence E. Mitchell	
	P03.3 Electron Microscopy of Advanced Functional Materials	
	P04.1 Science and Applications of High-Entropy Materials	
	P05.4 Advanced Imaging and Spectroscopy Beyond Room Temperature	*Sponsored by* GATAN + EDAX
	P06.4 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From *In-situ* to Ultrafast	
	P07.3 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.3 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	*Sponsored by* GATAN + EDAX
3:00 PM – 5:00 PM	**Tuesday Poster Presentations**	*Exhibit Hall*
	A08.P2 New Opportunities in Material Science – Multi-dimensional Imaging and Advanced Data Processing	
	A09.P1 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management	
	A10.P2 Correlative Analysis and Multimodal Microscopy and Spectroscopy	
	B01.P1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)	
	B09.P1 Volume Electron Microscopy	
	C01.P2 Emerging 4D STEM Techniques in Materials and Biological Sciences	
	C02.P1 Facilities Management: Crucial Skills and Strategies	
	P01.P1 Innovative Magnetic Imaging	
	P03.P2 Electron Microscopy of Advanced Functional Materials	

Tuesday, July 30 (Cont'd.)

3:00 PM – 5:00 PM	**Tuesday Poster Presentations**	*Exhibit Hall*
	P04.P1 Science and Applications of High-Entropy Materials	
	P09.P1 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	
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 – 6:30 PM	**Postdoc Professional Development Event**	
5:45 PM – 6:45 PM	**Vendor Tutorials** *(Sign up at exhibitors' booths)*	
6:30 PM – 8:30 PM	**Presidents' Reception** *(Invitation Only)*	*Offsite*

Wednesday, July 31

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**	
7:15 AM – 8:15 AM	**FIG: Aberration Corrected Electron Microscopy**	
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**	
	A03.2 Expanding Capabilities of Atom Probe Tomography (IFES-Organized)	
	A07.2 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods	*Sponsored by* OXFORD INSTRUMENTS
	A08.5 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing	*Sponsored by* GATAN + EDAX
	A09.5 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management	
	A10.5 Correlative Analysis and Multimodal Microscopy and Spectroscopy	*Sponsored by* OXFORD INSTRUMENTS
	B01.3 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)	
	B06.1 Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization	
	C01.5 Emerging 4D STEM Techniques in Materials and Biological Sciences	*Sponsored by* JEOL
	C06.5 Memorial Symposium: Lena Fitting Kourkoutis	
	C08.1 Vendor Symposium	
	P02.5 Memorial Symposium: Terence E. Mitchell	
	P03.4 Electron Microscopy of Advanced Functional Materials	
	P04.2 Science and Applications of High-Entropy Materials	
	P05.5 Advanced Imaging and Spectroscopy Beyond Room Temperature	*Sponsored by* GATAN + EDAX
	P07.4 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.4 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	*Sponsored by* GATAN + EDAX
	P11.1 Frontiers in Electron Tomography	
	X40 Computational Microscopy: Label-Free Imaging	
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.)**	
	A03.3 Expanding Capabilities of Atom Probe Tomography (IFES-Organized)	
	A07.3 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods	
	A09.6 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management	
	A10.6 Correlative Analysis and Multimodal Microscopy and Spectroscopy	*Sponsored by* OXFORD INSTRUMENTS

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Wednesday, July 31 (Cont'd.)

10:30 AM – 12:00 PM	**A.M. Symposia & Sessions (Cont'd.)**	
	A11.1	Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging
	B01.4	3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	B06.2	Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization
	C01.6	Emerging 4D STEM Techniques in Materials and Biological Sciences *Sponsored by* JEOL
	C06.6	Memorial Symposium: Lena Fitting Kourkoutis
	C08.2	Vendor Symposium
	P03.5	Electron Microscopy of Advanced Functional Materials
	P04.3	Science and Applications of High-Entropy Materials
	P05.6	Advanced Imaging and Spectroscopy Beyond Room Temperature *Sponsored by* GATAN + EDAX
	P07.5	Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods
	P09.5	Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials *Sponsored by* GATAN + EDAX
	P11.2	Frontiers in Electron Tomography
	X30	Exploring New Methods in Volume Electron Microscopy (vEM) *Technologists Forum Session*
	X41	Diffraction Contract Microscopy: Then and Now
12:00 PM – 1:30 PM	**Lunch Break in the Exhibit Hall**	
12:15 PM – 1:15 PM	**MSA Members' Meeting**	
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**	
	A01.1	Advances in Cathodoluminescence Spectroscopy and Analysis *Sponsored by* GATAN + EDAX
	A06.1	Electronic and Thermal Device Characterization with Electron Microscopy
	A09.7	Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management
	A10.7	Correlative Analysis and Multimodal Microscopy and Spectroscopy *Sponsored by* OXFORD INSTRUMENTS
	A11.2	Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging
	B01.5	3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)
	C03.1	Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques
	C05.1	Correlative Microscopy Using Light, Electron, and X-ray Microscopy
	C08.3	Vendor Symposium
	P01.1	Innovative Magnetic Imaging *Sponsored by* JEOL
	P03.6	Electron Microscopy of Advanced Functional Materials
	P04.4	Science and Applications of High-Entropy Materials
	P07.6	Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods
	P09.6	Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials *Sponsored by* GATAN + EDAX
	P10.1	*In Situ* and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials
	P11.3	Frontiers in Electron Tomography
	X32	Technologists' Forum Roundtable: Tips for Managing an EM Lab *Technologists Forum Session*
3:00 PM – 5:00 PM	**Wednesday Poster Presentations**	*Exhibit Hall*
	A03.P1	Expanding Capabilities of Atom Probe Tomography (IFES-Organized)
	A07.P1	Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods
	A09.P2	Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management
	A10.P3	Correlative Analysis and Multimodal Microscopy and Spectroscopy

Wednesday, July 31 (Cont'd.)

3:00 PM – 5:00 PM	**Wednesday Poster Presentations**	*Exhibit Hall*
	B01.P2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)	
	B04.P1 Electron Microscopy in Education	
	C03.P1 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques	
	C05.P1 Correlative Microscopy Using Light, Electron, and X-ray Microscopy	
	P03.P3 Electron Microscopy of Advanced Functional Materials	
	P07.P1 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.P2 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	
	P11.P1 Frontiers in Electron Tomography	
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)*	
6:30 PM – 8:30 PM	**MAS Members' Social** *(See MAS Booth for Details—Offsite)*	

Thursday, August 1

8:30 AM – 9:30 AM	**M&M Sustaining Members Meeting**	
8:30 AM – 10:00 AM	**A.M. Symposia & Sessions**	
	A01.2 Advances in Cathodoluminescence Spectroscopy and Analysis	*Sponsored by* GATAN EDAX
	A06.2 Electronic and Thermal Device Characterization with Electron Microscopy	
	A10.8 Correlative Analysis and Multimodal Microscopy and Spectroscopy	*Sponsored by* OXFORD INSTRUMENTS
	A11.3 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging	
	B04.1 Electron Microscopy in Education	*Sponsored by* TED PELLA, INC.
	B07.1 Microscopy Uncovering Biological and Technological Details Towards Biomimetics	
	C03.2 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques	
	C04.1 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing	
	C05.2 Correlative Microscopy Using Light, Electron, and X-ray Microscopy	
	P01.2 Innovative Magnetic Imaging	*Sponsored by* JEOL
	P03.7 Electron Microscopy of Advanced Functional Materials	
	P07.7 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.7 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	
	P10.2 *In Situ* and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials	
	P11.4 Frontiers in Electron Tomography	
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**	*Post-Deadline Posters will be presented on this day*
	A01.P1 Advances in Cathodoluminescence Spectroscopy and Analysis	
	A05.P1 Microscopy and Microanalysis in Cultural Heritage Studies	
	A06.P1 Electronic and Thermal Device Characterization with Electron Microscopy	
	A11.P1 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging	

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Thursday, August 1 (Cont'd.)

10:00 AM – 12:00 PM	**Thursday Poster Presentations**	*Post-Deadline Posters will be presented on this day*
	B06.P1 Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization	
	B07.P1 Microscopy Uncovering Biological and Technological Details Towards Biomimetics	
	C03.P2 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques	
	C04.P1 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing	
	P03.P4 Electron Microscopy of Advanced Functional Materials	
	P05.P1 Advanced Imaging and Spectroscopy Beyond Room Temperature	
	P07.P2 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P09.P3 Advances in *In Situ* TEM Characterization of Dynamic Processes in Materials	
	PDP.P2 Post Deadline Posters	
12:00 PM	**Student Poster Awards**	*Exhibit Hall - Poster Area Stage*
12:15 PM – 1:15 PM	**FIG: MicroAnalytical Standards**	
12:00 PM – 1:30 PM	**Lunch Break**	
1:30 PM – 3:00 PM	**P.M. Symposia & Sessions**	
	A05.1 Microscopy and Microanalysis in Cultural Heritage Studies	
	A06.3 Electronic and Thermal Device Characterization with Electron Microscopy	
	A10.9 Correlative Analysis and Multimodal Microscopy and Spectroscopy	*Sponsored by* OXFORD INSTRUMENTS
	A11.4 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging	
	B04.2 Electron Microscopy in Education	*Sponsored by* TED PELLA, INC.
	B07.2 Microscopy Uncovering Biological and Technological Details Towards Biomimetics	
	C03.3 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques	
	C04.2 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing	
	C05.3 Correlative Microscopy Using Light, Electron, and X-ray Microscopy	
	P01.3 Innovative Magnetic Imaging	*Sponsored by* JEOL
	P03.8 Electron Microscopy of Advanced Functional Materials	
	P07.8 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods	
	P10.3 *In Situ* and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials	
3:00 PM – 3:30 PM	**Coffee Break**	
3:30 PM – 5:30 PM	**Late P.M. Symposia & Sessions cont.**	
	A05.2 Microscopy and Microanalysis in Cultural Heritage Studies	
	A11.5 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging	
	B04.3 Electron Microscopy in Education	*Sponsored by* TED PELLA, INC.
	C03.4 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques	
	C04.3 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing	
	C05.4 Correlative Microscopy Using Light, Electron, and X-ray Microscopy	
	P03.9 Electron Microscopy of Advanced Functional Materials	
	P10.4 *In Situ* and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials	

X60 Annual Pre-Meeting Congress for Students, Post-Docs, and Early-Career Professionals in Microscopy and Microanalysis

Organized by the Microscopy Society of America Student Council (StC)

Saturday, July 27, 2024 ▪ 8:30 AM - 5:00 PM

Separate registration required

PROGRAM CHAIR: Yifan Wang, Arizona State University

BIOLOGICAL SCIENCES CO-CHAIR: Abayomi Adegboyega, Purdue University

PHYSICAL SCIENCES CO-CHAIR: Huiming Guo, University of California, Irvine

SOCIAL CHAIR: Daniel Zangeneh, University of Illinois - Chicago

POST-DOC SUBCOMMITTEE CHAIR: Jake Garcia, Ph.D., National Institute of Standards and Technology

X61 Synergy of Hardware Innovations and Computational Breakthroughs in TEM

****Organized by the MSA Abberation-Corrected Electron Microscopy & Electron Microscopy Data Analysis and Management Focused Interest Groups****

Sunday, July 28, 2024 ▪ 8:30 AM - 5:00 PM

Separate registration is required

ORGANIZERS:

Debangshu Mukherjee, Oak Ridge National Laboratory

Wyeth Gibson, University of Illinois Chicago

Alexander Rakowski, Lawrence Berkeley National Laboratory

Andrew Lupini, Oak Ridge National Laboratory

David C. Bell, Harvard John A. Paulson School of Engineering and Applied Sciences

Shize Yang, Yale

X62 Obtaining Reliable and Relevant Insights in Our In Situ Microscopy and Spectroscopy Studies of Reactions in Liquids and Gases: A Discussion on Re-producibility, Robustness and Rigor

****Organized by the MSA Electron Microscopy in Liquids and Gases Focused Interest Groups****

Sunday, July 28, 2024 ▪ 8:30 AM - 5:00 PM

Separate registration is required

ORGANIZERS:

Grace Burke, Oak Ridge National Laboratory

See Wee Chee, Fritz Haber Institute of the Max Planck Society

Patricia Kooyman, University of Cape Town

Piyush Haluai, Arizona State University

Kinga Unocic, Oak Ridge National Laboratory

Yuanyuan Zhu, University of Connecticut

Stephen House, Sandia National Laboratory

David Yang, National Institute of Standards and Technology

X10 Guidelines for Performing 4D-STEM Characterization from the Atomic to Micrometer Scales: Experimental Considerations, Data Analysis

LEAD INSTRUCTORS:

Colin Ophus, Lawrence Berkeley National Laboratory

David Muller, Cornell University

X11 Cryo-EM for Materials Sciences: Hardware, Applications and Data Acquisition

LEAD INSTRUCTORS:

Ismail El Baggari, Harvard University

Myung-Geun Han, Brookhaven National Laboratory

Michael Zachman, Oak Ridge National Laboratory

X12 Transmission Electron Microscopy and Spectroscopy from First Principles

LEAD INSTRUCTORS

Toma Susi, University of Vienna, Austria

Paul Zeiger, Uppsala University, Sweden

Thomas Ginnis, University of Oxford, United Kingdom

X13 Automated Experiments in Electron Microscopy

LEAD INSTRUCTORS

Sergei Kalinin, University of Tennessee, Knoxville

Maxim Ziatdinov, Oak Ridge National Lab

Kevin Roccapriore, Oak Ridge National Lab

X14 From Obscure to Clear: A Dive into Tissue Clearing and Expansion Microscopy

LEAD INSTRUCTORS

Yongxin (Leon) Zhao, Carnegie Mellon

Alan Watson, University of Pittsburgh

X15 Focused Ion Beam Theory & Methods

LEAD INSTRUCTORS:

Lucille Gianuzzi, EXpressLO, LLC

Joseph Michael, Sandia National Laboratory (ret.)

Monday, July 29

Scientific Program

SESSION CHAIRS:

Jay Potts, President, Microscopy Society of America

Pat Camus, President, Microanalysis Society

James LeBeau, M&M 2024 Program Chair

MONDAY 8:30 AM – 12:00 PM

Huntington-Cleveland Convention Center – Grand Ballroom AB

OPENING WELCOME:

Jay Potts, President, Microscopy Society of America

Pat Camus, President, Microanalysis Society

Program Chair Welcome Remarks

8:45 AM **1** *Tools for Analyzing and Controlling Biological Systems;* (Invited) **Ed Boyden**

9:45 AM MAS Awards Presentation

10:00 AM Coffee Break

10:30 AM MSA Awards Presentation

10:45 AM M&M Meeting Awards Presentation

11:00 AM **2** *How Microscopy Enabled Laboratory Fusion;* (Invited) **Christopher (Wren) Carr**

11:55 AM **Program Chair Closing Remarks**

12:00 PM Lunch

A Analytical/Instrumentation Sciences Symposia – Monday Afternoon

A02.1 Data Science and Atom Probe Tomography *(IFES-Organized)*

PLATFORM SESSION
Monday 1:30 PM

1:30 PM **3** *On Violations to the Time-of-Flight Assumptions in Atom Probe Tomography;* (Invited) **Benjamin Caplins,** Ann Chiaramonti, Jacob Garcia, Luis Miaja-Avila Rman Sanford

2:00 PM **4** *AdAPTS: An Adaptive Atom Probe Tomography Simulation Library;* **Julian Lüken**, Claudia Fleischmann, Jan Sijbers, Jan De Beenhouwer

2:15 PM **5** *Considerations for using Calibration Curves to Infer Oxide Stoichiometry from Atom Probe Tomography Data;* **Daniel Schreiber**, Karen Kruska, Kayla Yano, Ann Chiaramonti

2:30 PM **6** *Newton vs. Gibbs: Do We Need Full Dynamics to Simulate Field Evaporation in Atom Probe Tomography?;* (Invited) **Jiayuwen Qi**, Emmanuelle Marquis, Wolfgang Windl

A08.1 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

PLATFORM SESSION
Monday 1:30 PM

1:30 PM **7** *Navigating the X-ray Computed Tomography Landscape: Tools and Techniques for 3D and 4D Imaging;* (Invited) **Nikolaus Cordes**

2:00 PM **8** *Multi-scale, Correlative Investigation of Thermo-Mechanical Fatigue in SAC Solder Balls;* **Charlotte Cui**, Wolfgang Flachberger, Michael Tkadletz, Bernhard Sartory, Rahulkumar Si jiya, Fereshteh Falah Chamasemani, Priya Paulachan, Michael Reisinger, Daniel Scheiber, Roland Brunner

2:15 PM **9** *A 3D Investigation on Powder Metallurgy Based Turbine Repair: Revealing New Insights Through X-Ray Microscopy;* **Coleton Parks**, André Phillion

2:30 PM **10** *X-Ray Computed Tomography at Idaho National Laboratory's Irradiated Materials and Characterization Laboratory;* **William Chuirazzi**, Swapnil Morankar, Rahul Kancharla, Brian Newell

2:45 PM **11** *Characterization of Hierarchical Microstructures in TiC Reinforced Nickel Matrix Composites: Fine Feature Detection in 3D using X-ray Microscopy;* **Kaushik Yanamandra**, Hrishikesh Bale, Rajarshi Banerjee

A09.1 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Monday 1:30 PM

1:30 PM **12** *Multimodal Co-orchestration for Exploring Structure-Property Relationships in Combinatorial Libraries via Multi-Task Bayesian Optimization;* (Invited) **Boris Slautin,** Utkarsh Pratiush, Ilia Ivanov, Yongtao Liu, Rohit Pant, Xiaohang Zhang, Ichiro Takeuchi, Maxim Ziatdinov

2:00 PM **13** *Human-in-the-loop Automated Experiment Simulated with Scanning Tunneling Microscopy;* **Yu Liu**, Harris Pirie, Christian Matt, Pengcheng Chen, Jennifer Hoffman, Sergei Kalinin

2:15 PM **14** *Autonomous Multi-Modal Chemical Tomography using Bayesian Optimization;* **William Millsaps**, Jonathan Schwartz, Jason Manassa, Zichao Wendy Di, Yi Jiang, Robert Hovden

2:30 PM **15** *Advancing Microscopy through the Synergy of Human Expertise, LLM Efficiency, and API Enabled Automation;* **Yongtao Liu**, Marti Checa, Rama Vasudevan

2:45 PM **16** *Innovative TEM Auto Metrology by Integrating Statistical Analysis with Improved Accuracy;* **Yong Liu**, Christopher Carlton, Qi Taylor

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Monday Afternoon cont.

A10.1 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Monday 1:30 PM

1:30 PM **17** *Using 3D X-ray Microscopy to Understand the Driving Force for Grain Boundary Migration in Polycrystals;* (Invited) **Gregory Rohrer**

2:00 PM **18** *Deep Learning Based X-ray Microscopy Reconstruction for Large Volume Correlative Characterization;* **Nathan Johnson**, Yulia Trenikhina, Stephen Kelly, Hrishikesh Bale

2:15 PM **19** *3D Large Volume Non-Destructive Grain Structure Characterization In Metallic Alloys Using Lab-Based Diffraction Contrast Tomography (LabDCT);* **Hrishikesh Bale**, Kaushik Yanamandra, Nathan Johnson, Jette Oddershede, Jun Sun

2:30 PM **20** *Automated Bandgap Measurements in Optoelectronic Devices by Monochromated Electron Energy-Loss Spectroscopy;* **Christopher Addiego**, Mike Salmon, Jiangtao Zhu

2:45 PM **21** *Visualization of Inhomogeneous Strain and Particle Distribution in a Shape Memory Alloy via Composite Reconstruction of 3DXRD Data;* **Marcel Chlupsa**, Ashwin Shahani

B Biological Sciences Symposia – Monday Afternoon

B02.1 Biological Applications of Quantitative Label-Free Imaging

Monday 1:30 PM

1:30 PM **22** *Computationally Enhanced Quantitative Phase Imaging for Label-Free Transparent Structures and Three-Dimensional Spheroids;* (Invited) **Xi Chen**

2:00 PM **23** *Label-free Imaging of Cancer Cell Structure and Dynamics;* (Invited) **Rohit Bhargava**, Sun Woong Hur, Minsung Kwon, Melika Hajimohammadi, Ashok Samuel

2:30 PM **24** *Single Beam Digital Holography Reconstruction: A Support-Enhanced Complex-wavefront Filtering;* **Charlotte Kyeremah**, Chandra Yelleswarapu

2:45 PM **25** *Determination of Intracellular Protein Concentration Using a Bright-Field Microscope;* **Michael Model**

B03.1 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy

Monday 1:30 PM

1:30 PM **26** *Sex and the EM Facility: Electron Microscopy of Mating Mosquitoes, Drosophila Sperm and More;* (Invited) **Hilda Pasolli**, Anurag Sharma

2:00 PM **27** *High-quality Scanning Electron Microscopy Incorporated with a Freeze-Drying and Gaseous Nitrogen-Based Approach for Cell-Extracellular Vesicle Interactions;* **Kunihiro Uryu**, Nadine Soplop, Nancy Boudreau, Candia Kenific, Irina Matei, Ayako Hashimoto, Ayuko Hoshino, David Lyden

2:15 PM **28** *Morphology of Candida Albicans Exposed to Electric Current Treatments and UV Radiation in Sabouraud Broth Analyzed with Scanning Electron Microscopy;* **Carlos Arzate-Quintana**, Venecia Jazmín Ruelas-Casas, Claudia A. Ramírez-Valdespino, Celia María Quiñonez-Flores, Alva Rocío Castillo-González, Iván René Ramos-Moctezuma, Susana Aideé González-Chávez, Diana Elia Caballero-Hernández

2:30 PM **29** *See through the Foregut – Dissecting the Drosophila Foregut Using Optical and Electron Microscopy;* (Invited) **Haolong Zhu**, Allan Spradling, William Ludington

B09.1 Volume Electron Microscopy

Monday 1:30 PM

1:30 PM **30** *Glial Connectomics: Inner Retinal Müller Cell Connectivity in the Healthy and Degenerate Retina;* (Invited) **Rebecca Pfeiffer**, James Anderson, Jia-Hui Yang, Bryan Jones

2:00 PM **31** *Revealing the Ultrastructure and Intracellular Distributions of Secretory Granules in Malignant Human Mast Cells by Volume Electron Microscopy;* **Hui Qian**, Narcy Arizmendi Puga, Marianna Kulka

2:15 PM **32** *Three-dimensional Imaging of the Symbiotic Interface Using Volume Electron Microscopy;* (Invited) **Zerrin Uzum**

2:30 PM **33** *High-Resolution Focused-Ion Beam Scanning Electron Microscopy Reveals Differentially Organized F-actin Compartments in Cochlear Hair Cell Stereocilia;* **Abigail Dragich**, Mark McClendon, Shadan Hadi, A. Catalina Velez-Ortega, Gregory Frolenkov

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Monday Afternoon

C01.1 Emerging 4D STEM Techniques in Materials and Biological Sciences

Monday 1:30 PM

1:30 PM **34** *Strategies to Find Where's Waldo (Wally) in Biology using 4D STEM;* (Invited) **Judy Kim**, Chen Huang, Emanuela Liberti, Marcus Gallagher-Jones, Brian Caffrey, Adrián Pedrazo-Tardajos, Mark Boyce, Peng Wang, Professor Kirkland

2:00 PM **35** *Combining Scanning Nanobeam Electron Diffraction with 3D Electron Diffraction to Investigate Crystal Defects;* **Helen Leung**, Royston Copley, Joonatan Laulainen, Duncan Johnstone, Paul Midgley

2:15 PM **36** *Mapping Electron Beam-Induced Radiolytic Damage in Molecular Crystals;* **Ambarneil Saha**, Matthew Mecklenburg, Alexander Pattison, Aaron Brewster, Jose Rodriguez, Peter Ercius

2:30 PM **37** *Towards More Efficient Use of Electrons: Demonstrating Cryo-4D-STEM Phase Imaging Techniques on Thick and Thin Biological Specimens, from Organelles to Proteins;* (Invited) **Yue Yu**, Stephanie Ribet, Georgios Varnavides, Colin Ophus, David Muller

C02.1 Facilities Management: Crucial Skills and Strategies

Monday 1:30 PM

1:30 PM **38** *Integration of Transformational Capabilities in Research Service Center Facilities;* (Invited) **Luisa Amelia Dempere**, Gary Scheiffele

2:00 PM **39** *Advanced Automated Environment Management at a Large Multi-User shared Facility;* **David Bell**

2:15 PM **40** *A Successful Story about Management and Operation of the Facilities at Irvine Materials Research Institute;* **Jian-Guo Zheng**, Toshihiro Aoki, Li Xing, Qiyin Lin, Ich Tran, Xiaofeng Liu, Mingjie Xu, Celia Goulding, Matt Law, Xiaoqing Pan

2:30 PM **41** *Towards Improved Inter-Institution Microscopy Collaboration in the Utah/Idaho/Nevada Region–Progress in the Formation of the Great-Basin Microscopy Society;* **Brian Van Devener**, Felipe Rivera

C06.1 Memorial Symposium: Lena Fitting Kourkoutis

Monday 1:30 PM

1:30 PM **42** *In Memory of Lena Kourkoutis and Her Unfinished Work;* (Invited) **David Muller**

2:00 PM **43** *Progress of Instrumental Developments for Analytical Electron Microscopy;* (Invited) **Max Haider**, Giulio Guzzinati, Martin Linck, Felix Börrnert

2:30 PM **44** *Lena Fitting Kourkoutis–in Memoriam;* (Invited) **Ondrej Krivanek**

P Physical Sciences Symposia – Monday Afternoon

P02.1 Memorial Symposium: Terence E. Mitchell

Monday 1:30 PM

1:30 PM **45** *Solute Hardening and Softening of BCC Metals: Excerpts from an Early Life with Terry Mitchell;* (Invited) **Ronald Gibala**

2:00 PM **46** *Microscopy and Machine Learning Segmentation Methods for Fatigue Fracture Surface Defect Analyses of LPBF Ti-6Al-4V;* (Invited) **John Lewandowski,** Austin Ngo

2:30 PM **47** *TEM: Investigating What Lies Within;* (Invited) **Stuart Maloy**

P03.1 Electron Microscopy of Advanced Functional Materials

Monday 1:30 PM

1:30 PM **48** *In Situ TEM Investigation of Conductive Bridge RAM Devices;* **Robert Winkler**, Oscar Recalde, Tianshu Jiang, Déspina Nasiou, Alexander Zintler, Lambert Alff, Leopoldo Molina-Luna

1:45 PM **49** *Atomic Scale Defect Formation and Evolution at LiGa5O8/β-Ga2O3 and Ga2O3/Ni/Au Interfaces;* **Christopher Chae**, Kaitian Zhang, Daram Ramdin, Vijay Gopal Thirupakuzi Vangipuram, Leonard Brillson, Hongping Zhao, Jinwoo Hwang

2:00 PM **50** *Unraveling Metal to Metal Hydride Phase Transformation Using In-situ S/TEM Techniques;* **Gopi Krishnan**, Herman Schreuders, Lars Bannenberg, Joerg Jinschek

2:15 PM **51** *Interfacial Origins of Electrical Breakdown Strength Enhancement in AlScN through Multilayer Structure;* **Paria Gharavi**, Roy H. Olsson III, Eric Stach

2:30 PM **52** *Structural Manipulation of Functional Metal Oxides by In-Situ TEM;* (Invited) **Xuedong Bai**

P05.1 Advanced Imaging and Spectroscopy Beyond Room Temperature

Monday 1:30 PM

1:30 PM **53** *Cryogenic Electron Microscopy of Quantum Matter;* (Invited) **Ismail El Baggari**, Suk Hyun Sung, Yang Zhang, Robert Hovden, Maya Gates, Emily Rennich, Nishkarsh Agarwal

2:00 PM **54** *Revealing the Decoherence and Dephasing of Intra- and Inter-layer Excitons in MoS2 via Temperature Dependent Spectroscopy;* **Essance Ray,** Carlos Weckmann, Xiaodong Xu, Juan Idrobo

2:15 PM **55** *In situ Cryogenic Cooling, Electric Biasing, and 4D-STEM of the 1T-TaS2 Charge Density Wave Transition;* **James Hart**, Saif Siddique, Noah Schnitzer, Stephen Funni, Lena Kourkoutis, Judy Cha

2:30 PM **56** *Probing Atomic Structure and Excitons in 2D Heterostructures Through Cryogenic STEM-EELS;* **Elizaveta Tiukalova**, Olugbenga Olunloyo, Kai Xiao, Andrew Lupini, Miaofang Chi

2:45 PM **57** *Atomic-Scale analysis of Dislocation-Controlled Domain Nucleation and Domain-Wall Pinning in Single-Crystal BaTiO3 by Cryo/Heating MEMS-Based In Situ TEM;* **Tianshu Jiang**, Fangping Zhuo, Oscar Recalde, Yevheniy Pivak, Leopoldo Molina-Lun

P06.1 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From In-situ to Ultrafast

Monday 1:30 PM

1:30 PM **58** *Dynamic Insights of Developing Functional Nanomaterials for Clean Energy and Microelectronics;* (Invited) **Judith Yang**, Sooyeon Hwang, Fernando Cami

2:00 PM **59** *Streak Imaging in a Dynamic Transmission Electron Microscope;* **Kenneth Beyerlein**, Samik Roy Moulik, Yingming Lai, Aida Amini, Patrick Soucy, Jinyang Liang

2:15 PM **60** *TEM Imaging of Bias-Induced Electronic Changes in a GaN HEMT;* **William Hubbard**, B. C. Regan

2:30 PM **61** *Ultrafast Diffraction Studies within an Operating Electrochemical Device;* (Invited) **Aaron Lindenberg**

Scientific Program

A Analytical Sciences Poster Sessions – Monday

3:00 PM – 5:00 PM **EXHIBIT HALL**

A02.P1 Data Science and Atom Probe Tomography *(IFES-Organized)*

POSTER # 1

62 *A Machine Learning based Workflow to Quantify Atom Probe Tomography Data;* **Alaukik Saxena**, Nikita Polin, Shyam Katnagallu, Baptiste Gault, Christoph Freysoldt

POSTER # 2

63 *A Model to Optimize the Voltage Plus Laser Pulsing Mode in Atom Probe Tomography;* **François Vurpillot**, Sylvain Nulli, Raphaele Danoix, Ty Prosa, David Reinhard, Isabelle Martin, Robert Ulfig, David Larson

POSTER # 3

64 *Experimental Tip Shape Imaging Routes to Assist Data Reconstruction in Atom Probe Tomography;* **Claudia Fleischmann**, Vitaly Krasnov, Igor Makhotkin, Jeroen Scheerder, Yuan Tu, Paul van der Heide

POSTER # 4

65 *Geochemical Quantification of Olivine Minerals by Atom Probe Tomography;* **David Saxey**, Denis Fougerouse, Dimitris Dimitriou, Jessica Barnes, William Rickard, Nicholas Timms, Fred Jourdan, Steven Reddy, Phillip Bland, Trevor Ireland

POSTER # 5

66 *Towards Improved Measurement of Chemical Composition and Isotope Ratios of Rare-Earth Phosphates in Atom Probe Tomography;* **Tom Veret**

A08.P1 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

POSTER # 6

67 *4D STEM and EELS Acquired Simultaneously with a Fast Pixelated Direct Detector with Center Hole;* **Martin Huth**, Valentin Kroner, Yassine El Imari, Stefan Aschauer, Ryusuke Sagawa, Hiroki Hashiguchi, Akiho Nakamura, Lothar Strüder, Heike Soltau

POSTER # 7

68 *Additive Manufacturing of Highly Detailed Copper Shells by AMSME Process;* **Carlos Sanchez-Morales**, Julia Mirza-Rosca, Juan Carlos Lozano-Medina, Mariana Hernandez-Perez

POSTER # 8

69 *Analysis of Crystal Defects by Electron Channeling Contrast Imaging (ECCI) for the Advancement of Structural Materials;* **Hrishikesh Bale**, Lamya Abdellaoui, Benjamin Tordoff, Stefan Zaefferer

POSTER # 9

70 *Application of Polarized Light Microscopy for 3D Materials Science;* **Paul Chao**, Rhianna Oakley, Andrew Polonsky

POSTER # 10

71 *Atomically Resolved Secondary Electron Imaging for Bulk Materials;* **Sooyeon Hwang**, Lijun Wu, Kim Kisslinger, Judith Yang, Ray Egerton, Yimei Zhu

POSTER #11

72 *Fabrication of a 6061 Aluminum Matrix Composite Material Reinforced with Residual Ceramic for Structural Purposes.;* **Orlando Soriano-Vargas**, Tomas De la Mora Ramírez, Jorge Mastache Mastache é López Perrusquia, Ohtokani Cabrera Rodriguez, Christopher René Torres San Miguel, Nicolas Cayeta Castro

POSTER # 12

73 *Investigation of Stress Corrosion Cracking in CMSX-4 Turbine Blade Alloys using Deep Learning Assisted X-Ray Microscopy and Correlative Imaging Workflow;* **Hrishikesh Bale**, Concetta Pelligra, Mehdi Mosayebi, Travis Casagrande, Michael Phaneuf, Nabil Bassim, Simon Gray

POSTER # 13

74 *Machine-Learning Assisted Analysis of Battery Electrode by PFIB-SEM Tomography;* **Ying Huang**, Xiuhong Han, Sarah Wang, Jiangtao Zhu

POSTER # 14

75 *Quantitative High Resolution Phase Contrast Imaging of Au-Cu Bimetallic Nano Structures;* **Manish Singh**, Joysurya Basu, Bratindranath Mukherjee, Rajiv Mandal

POSTER # 15

76 *Recovery of Subsampled EBSD Datasets Using a 3-D Data Volume for Inpainting;* **Zoë Broad**, Jack Wells, Alex Robinson, Daniel Nicholls, Amirafshar Moshtaghpour, Robert Masters, Louise Hughes, Professor Kirkland, Nigel Browning

POSTER # 16

77 *Solid Oxide Cells: from 3D Microstructure to Comprehensive Quantification;* **Bartlomiej Winiarski**, Patrick Barthelemy, Chengge Jiao, Dirk Laeveren, Dalton Cox, Scott Barnett

POSTER # 17

78 *Spectral Micro-CT Imaging of Minerals: Retrieving Atomic Information And Density Maps;* **Jan Dewanckele**, *Wesley De Boever, Denis Van Loo, Bert Masschaele, Marijn Boone*

POSTER # 18

96 *X-ray Computed Tomography of Tristructural Isotropic (TRISO) Fuel from the AGR-5/6/7 Irradiation Tests;* **Swapnil Morankar**, William Chuirazzi, Rahul Kancharla, Brian Gross, John Stempien

A Analytical Sciences Poster Sessions – Monday cont.

A10.P1 Correlative Analysis and Multimodal Microscopy and Spectroscopy

POSTER # 19

80 *Correlative Characterization of Dielectric Breakdown in Functional Space Polymers;* **Raphael Rose**, Bryson Clifford, Karen Wiratan, Noah Hoppis, Kathryn Sturge, Holly Wilson, John Cumings, Timothy Koeth

POSTER # 20

81 *Correlative XPSAnalysis of a Novel Material System Generated Using a Combinatorial Approach;* **David Surman**, Jonathan Counsell, Nalia Al Hasan, Chris Moffitt, Tieren Gao, Huilong Hou, Ichiro Takeuchi

POSTER # 21

82 *Crystalline Materials Analysis Using Compact and Powerful SEM-EBSD System;* **Mayu Ishino**, Yohei Kojima, Yuta Matsumoto, Daniel Goran, John Gilbert, Naoki Kikuchi

POSTER # 22

83 *Crystallographic Orientations of Cracks Formed in SiGe/Ge/Si(111);* **Junji Yamanaka**, Kota Tajima, Keisuke Arimoto, Kosuke Hara, Youya Wagatsuma, Kentarou Sawa

POSTER # 23

84 *Defect Imaging of Nickel-based Superalloy in the SEM Utilizing Tilt-free EBSD*; **Daniel Veghte**, Ashton Egan, Michael Mills

POSTER # 24

85 *Direct-On-Filter Analysis of Airborne Engineered Nanomaterials using Correlative Microscopy and Spectroscopy;* **Jianqi Wang**, Chen Wang, Kabir Rishi, Vasileia Vogiazi

POSTER # 25

86 *Improvement of Reflectivity in Silicon Wafers through the generation of Porous Silicon and its Chemical Attack with Potassium hydroxide;* **Salomón Borjas**, X. León, K. Chávez, César Márquez-Beltrán, E. Quiroga-González

POSTER # 26

87 *Liquid-Phase Scanning Electron Microscopy for Imaging Hydrated Particle Structures;* **Mia San Gabriel**, Dian Yu, Mikaella Brillantes, Stas Dogel, Jason Giallonardo, Uwe Erb, Jane Howe

POSTER # 27

88 *Microscopy Analysis and Mechanical Properties of PETG-CF;* **Gerardo Pérez Mendoza**, Humiko Hernándes Acosta, Alejandro Miranda Cid é López Perrusquia, Marco Antonio Doñu Ruiz

POSTER # 28

89 *Microwave-Assisted Morphological Evolution and Thermal Behavior of Expanded Graphite Interlayered Compounds;* **J.M. Mendoza-Duarte**, P. Pizá-Ruíz, A. Santos-Beltrán, Erique Rocha-Rangel, C.D. Gómez-Esparza, C.G. Garay-Reyes, I. Estrada-Guel, R. Martínez-Sánchez

POSTER # 29

90 *Morphological and Mineralogical Characterization of a Mexican Natural Clay Under Thermal Treatment;* **Jose Luis Mendez Montes de Oca**, Hipolito Mendez Montes de Oca, Nikte Maricela Gomez Ortiz, Salomón Borjas, Pablo Martínez Torres

POSTER # 30

91 *On the Thermal Stability of a New Metastable D022 Cr3Ni Intermetallic within High-Temperature Cr-based Alloys;* **Bryan Lim**, Jonathan Poplawsky, Jenny Forrester, Marissa Brennan, Steve Buresh, Michael Spencer, Brian Gordon, Peeyush Nandwana

POSTER # 31

92 *Quantification of Super Duplex Steel Phases by Processing of Backscattered Electron Images;* **Geronimo Perez**, Maria Vittoria Moraschini Reis, Marcelo Sampaio, Juan Pardal, Leandro Reis Lidizio, Pedro Garcia, André Pimenta, Arthur Gonzaga, Sergio Maior Tavares, Guillermo Solórza

POSTER # 32

93 *Simultaneous Raman and SEM imaging of Mineral Sections*; **Tim Prusnick**, Darren Nutting, Pete Johnson, Tim Batten

POSTER # 32.1

184 *Investigation of Ordinary Portland Cement Hydration Mechanisms Utilising X-ray Mapping, In-situ X-ray Diffraction and In-situ Micro-CT;* **Richard Wuhrer**, Daniel Fanna, Laurel George, Ken Moran

Scientific Program

B Biological Sciences Poster Sessions – Monday

B02.P1 Biological Applications of Quantitative Label-Free Imaging

POSTER # 33

94 *3D Imaging and Spectroscopy of Complex Biological Systems at the Sub-Cellular, Cellular and Multicellular Levels;* **Alexander Khmaladze**

B03.P1 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy

POSTER # 34

95 *An Efficient Clinical TEM Workflow Using Automated Specimen Processing;* **Steven Goodman ah Flint**, Gina Anderson, Lisa Johnson, Chloe Young, Brian MacArthur

POSTER # 35

96 *Analysis of Waxy Plant Surface on Rudbeckia fulgida Leaf;* **Tae Kyong John Kim**

POSTER # 36

97 *CMK-3 Carbon Nanopipes Arrangement Synthesized with Pectin Extracted from Golden Delicious Apple;* **Karla Quiroz-Estrada**, Liliana Edith Rojas-Candelas, Felipe Cervantes Sodi, Hector Calderon, Diana Guerrero-Araque, Carlos Felipe

POSTER # 37

98 *Copepod Swimming Biomechanics: Pleopod Articulations in Labidocera aestiva;* **Cas Cummins**, Stan Kunigelis

POSTER # 38

99 *Cytotoxicity of CS-LZ Nanoparticles for Future Biomedical Applications;* **Cynthia Nazareth Hernández-Téllez**, Ana Guadalupe Luque-Alcaraz, Pedro Amado Hernández-Abril, Jorge L. Iriqui-Razcón, Joel Said Garcia-Romo

POSTER # 39

100 *Determining Collagen Composition in Obese Gerbil Brown Adipose Tissue Using the Picrosirius- Polarization Method;* **Zineb Bellahreche**, Ouahiba Sihali-Beloui, Sabrina Souttou, Nesrine Semiane, Aicha Mallek, Yasmina Dahmani

POSTER # 40

101 *Dimethyl itaconate Restores Mitochondrial Integrity in LPS-treated C2C12 Myoblasts;* **Anastasia Arkhipova**, Sofya Makarova, Maxim Senko

POSTER # 41

102 *Eucommia ulmoides Aqueous Extracts Attenuate Individual Markers of Glucose Induced Aging in NIH/3T3 Fibroblasts;* **Anastasia Arkhipova**, Qixin Zheng, Xinyu Zhang, Sofya Makarova, Tolbert Ozire, Zhuoyan Han

POSTER # 42

103 *Fibroblast Mediated Vasculogenesis and Blood-Thymic Barrier System of Fish;* **Subrata De**, Sk Samim Hossin

POSTER # 43

104 *Fibroin-Based Porous Scaffolds for Bone Tissue Regeneration;* **Anastasia Arkhipova**, Le Kang, Tolbert Ozire, Liubov Gorbacheva

POSTER # 44

105 *Inducing Vascular Endothelial Growth Factor to Investigate Tissue Regeneration and Stimulation of Early Angiogenesis in Axolotl Salamanders;* **Carl Brashears**, Renee Dickie

POSTER # 45

106 *Localization and Quantification of UV-Absorbing Compounds in an Invasive Deciduous Tree Species, Chinese Tallow (Triadica sebifera);* **Yadong Qi**, Vanessa Ferchaud, Kit Chin

POSTER # 46

107 *Optimization of Conventionally Processed Biological Samples for STEM-EDS Elemental Quantification;* **Jennifer Gray**, Yuan Tian, Gang Ning, Tatum Cutler, Yunzhen Zheng, Andrew Patterson

POSTER # 48

109 *Scanning Electron Microscopic Examination and Technical Training for Specialty Animal Fiber Identification in Textile Materials;* **Tumen Wuliji**

POSTER # 49

110 *Stereolithographic (SLA) 3D Printing of Microfluidic Flow Cells to Encapsulate EM Grids Used to Culture Cells for Correlative Imaging Studies;* **Nicholas Rienstra**, Juan Sanchez, Steve Garvis, Heather Fischer, Elizabeth Wright

POSTER # 50

111 *Subcellular mapping of thallium (Tl) delivered by Prussian blue nanoparticles in lung cancer cells.;* **Pedro Machado**, Katarzyna Wulfmeier, Juan Pellico, Alejandra Carbajal, Saskia Bakker, Philip Blower, Vincenzo Abbate, Samantha Terry

C Cross-Cut/Interdisciplinary Sciences Poster Sessions – Monday

C01.P1 Emerging 4D STEM Techniques in Materials and Biological Sciences

POSTER # 51

112 *A Cluster-Based Filtering Technique for Denoising 4D-STEM Datasets;* **Adan Mireles**, Yimo Han

POSTER # 52

113 *A New Fully Integrated Retractable 4D STEM Detector for Scanning Electron Microscopes Using Timepix3 Based Pixelated Detector;* **Jaroslav Jiruše**, Rastislav Motúz, Pavel Stejskal, Michal Horák, Tomáš Šikola

POSTER # 53

114 *Comparing Ptychographic Methods for Maximum Low Dose Performance;* **Tamazouzt Chennit**, Christoph Hofer, Biao Yuan, Songge Li, Andrew Maiden, Timothy Pennycook

POSTER # 54

115 *Correcting Projector Lens Aberrations for High-Resolution Electron Ptychography;* **Qian He**, Mengyao Su, Shoucong Ning, Yinhang Ma, Shengdong Tan, Wu Zhou

POSTER # 55

116 *Lattice Constant Statistical Analysis with 4D-STEM: A Case Study of Point Defects in Cr Under Varied Temperature and Irradiation;* **Dongye Liu**, Sean Mills, Benjamin Derby, Matthew Chancey, Kayla Yano, Yongqiang Wang, Andrew M. Minor

POSTER # 56

0 *Optimizing Electron Ptychography for Advanced Characterization of Soft/Hard Interfaces;* **Roberto dos Reis**, Xiaobing Hu, Daniel Stroppa, Vinayak Dravid

POSTER # 57

118 *Probing Local Strain and Orientation in Layered Materials using 4D-STEM Moiré Analysis;* **Peter Schweizer,** Lilian Vogl, Dana Byrne, Frances Allen, Colin Ophus, Andrew Minor

POSTER # 58

119 *Real-time Experimental 4-D STEM using Compressive Sensing;* **Alex Robinson**, Jack Wells, Daniel Nicholls, Amirafshar Moshtaghpour, Professor Kirkland, Nigel Browning

POSTER # 59

120 *Soft Electrostatic RAFA Lens's Electron Beam Imaging and Diagnosis Of Individual Atoms In 3D Specimen–A Proposal;* **Rodney Herring**

POSTER # 60

121 *Spatially Resolved Components in Battery Corrosion Films by 4D STEM;* **Xintong Yuan**, Matthew Mecklenburg, Yuzhang Li

POSTER # 61

122 *Sub-Angstrom Structure Determination of Organic Molecules at Room Temperature Using 100 KeV Serial Electron Diffraction;* **Yasuchika Suzuki**, Ehsan Nikbin, Sreelaja Pulleri Vadhyar, Man Sze Cheng, Robert McLeod, Jane Howe, R. J. Dwayne Miller

POSTER # 62

123 *The "Platform 9¾ Problem" in Fluctuation Electron Microscopy;* **Armin Zjajo**, Hongchu Du, Rafal Dunin-Borkowski, Aram Rezikyan, Murray Gibson, Michael Treacy

POSTER # 63

124 *Towards Quantitative Imaging of Atomic Vibrations with Multi-dimensional STEM Detectors;* **Koudai Tabata**, Takehito Seki, Yuichi Ikuhara, Naoya Shibata

C07.P1 Lens on Diversity in the Microscopy and Microanalysis Community

POSTER # 64

125 *CCEM's Strategic Initiatives and Collaborative Approach to Advancing Equity, Diversity, and Inclusion in STEAM Fields;* **Samantha Stambula**, Nabil Bassim

POSTER # 65

126 *Diversity in Microscopy: A User Facility Perspective;* **Karren More**

POSTER # 66

127 *Enabling Microscopy for the Visually Impaired: Tactile 3D Printed Representations of Electron Micrographs;* **Kendall Trellue**, Alex Lascheid, Eric Lang

POSTER # 67

128 *Facilitating Diversity and Accessibility in Microscopy through Educational Initiatives and Streamlined Training Approaches;* **Akanksha Parmar**, Rosa Diaz

POSTER # 68

129 *Physical Investigations of Microbiologically Influenced Corrosion on Naval Materials and Assets using Scanning Probe Microscopy;* **Treva Brown**, Jason Lee

POSTER # 69

130 *Strategic Initiatives in Electron Microscopy Education – Bridging Gaps for a Diverse Community;* **Rosa Diaz**

POSTER # 70

131 *The Development of a Microscopy Outreach Program and How to Raise the Next Generation of Material Scientists for Semiconductor Technology;* **Sebastian Thomas Arthur**, Rosa Diaz

Scientific Program

B Physical Sciences Poster Sessions – Monday

P03.P1 Theory and Applications of Advanced Electron Tomography

POSTER # 71

132 *4D-STEM Study on Ferroelectric Domain Structure within Biaxially-Strained BiFeO3 Film;* **In-Tae Bae**, Brendan Foran, Hanjong Paik

POSTER # 72

133 *Defect Propagation in Heterostructures of 2D Materials;* **Naveen Goyal**, N Ravishankar

POSTER # 73

134 *Differentiating the Bonding States in Calcium Carbonate Polymorphs by Low-loss Electron-energy-loss Spectroscopy;* **Guangming Cheng**, Nan Yao

POSTER # 74

135 *Direct Imaging of Lithiation-induced Phase Transition in Epitaxial T-Nb2O5 Thin Flims A de under Electric Fields by In-situ STEM;* **Soli Sung**

POSTER # 75

136 *EELS and 4D-STEM Investigation of Strain Induced Ferromagnetic Transition and Domain Formation at LaFeO3/SrTiO3 Interface;* **Jinwoo Hwang**, Menglin Zhu, Joseph Lanier, Sevim Polat Genlik, Jose Flores, Victor Barbosa, Mohit Randeria, Patrick Woodward, Maryam Ghazisaeidi, Fengyuan Yang

POSTER # 76

137 *Electron Microscopy Investigations of Phase Transformations in Mixed Metal Oxides;* **Naveen Goyal**, Rajeev Kumar Rai, N Ravishankar

POSTER # 78

139 *Ferroelastic Charged Domains in Ferroelectric BiFeO3 Nanoneedles;* **Francisco Guzman**, Christopher Addiego, Moaz Waqar, Aiden Ross, Long-Qing Chen, Xiaoqing Pan

POSTER # 79

140 *Identifying Spectral Descriptors for Protonation in BaZr0.8Y0.2O3-x with Electron Energy Loss Spectroscopy;* **Elizabeth Griffin**, Yea-Shine Lee, Roberto dos Reis, Linding Yuan, Zhi Li, Christopher Wolverton, James Rondinelli, Vinayak Dravid

POSTER # 80

141 *Investigation of Anisotropic Electronic Structure in Graphite by Momentum-Resolved Electron Energy Loss Spectroscopy (ω-q Mapping) and Electron Spectroscopic Diffraction Patterns;* **Sz-Chian Liou**, Hwanhui Yun, Vladimir Oleshko, GUO-JIAN SHU

POSTER # 81

142 *Mapping Density in Tribological Coatings After Wear Testing Using Low-Loss EELS;* **Joshua Sugar**, Tomas Babuska, Steven Larson, John Curry, Suzy Vitale, Michael Dugger

POSTER # 82

143 *Microscopy and Microanalysis Advancing the Next Generation of Qubit Technologies;* **Rosa Diaz**, Michael J. Manfra

POSTER # 83

144 *Modeling Electron Energy Loss and Momentum Transfer in a Swift Electron Interaction with Small Polyhedral Nanoparticles;* **Jorge Briseño-Gómez**, Alejandro Reyes-Coronado

POSTER # 84

145 *Novel Electron Gun Design Using a Virtual Source Mode of Thermionic LaB6;* **In-Yong Park**, Ha Rim Lee, Junhyeok Hawang, Takashi Ogawa, Jisoo Kim, Jeong-Woong Lee, Haewon Jung, Daljae Yun, Sangsun Lee

POSTER # 85

146 *Probing Charge Transfer across Various Metal Support Interactions in Heterogeneous Catalysts via 4D-STEM Techniques;* **Levi Brown**, Wenjie Zang, Zejie Chen, Shane Ardo, Xiaoqing Pan

POSTER # 86

147 *Quantitative Determination of 2D Layer Thickness of Atomically Thin Fe3GeTe2 in STEM;* **Cheng Li**, Hongkui Zheng, Kai He

POSTER # 87

148 *STEM Energy-Dispersive X-ray Spectroscopy for Quantitative Compositional Metrology in ULSI Technology;* **Amit Kohn**, Daniel Fishman, Adham Basha, Amram Azulay

POSTER # 88

149 *STEM Investigation of Structural and Chemical Degradation Mechanisms in Nano-Based Batteries;* **Sadikul Alam**, Gabriel Calderon Ortiz, Jehee Park, Junbin Choi, Xinwei Jiao, Jung Hyun Kim, Eungje Lee, Jinwoo Hwang

POSTER # 89

150 *Using STEM Techniques to Investigate TeO2 as a Back-Contact Material in CdTe Solar Cells;* **Ah Kamm**, Arashdeep Thind, Robert Klie, Walajabad Sampath

P06.P1 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From In-situ to Ultrafast

POSTER # 90

151 *Advancements in Laser-Free Ultra Fast Electron Microscopy;* **Darrin Leonhardt**, Eric Montgomery, Chunguang Jing, Bart Wyderski, Yubin Zhao, Sean Miller

POSTER # 91

152 *Electron Beam-Initiated Semi-Templated Synthesis of Unavailable Fullerenes;* **Sol Lee**, Kihyun Lee, Jinwoo Cheon, Kwanpyo Kim, Dominik Lungerich

POSTER # 92

153 *Harnessing Nanosecond STEM Electron Pulses with an Electrostatic Beam Blanker for Angstrom Spatial Resolution in Time-Resolved Studies of Electrically Excited Dynamics;* **Thomas Gage**, Jianguo Wen, Hanyu Hou

POSTER # 93

154 *Progress toward Mapping Nanoscale Carrier and Structural Dynamics in Silicon using Ultrafast TEM-Electron Energy-Loss Spectroscopy;* **Wonseok Lee**, Levi Palmer, Thomas Gage, Scott Cushing

POSTER # 94

155 *Studying Nanomaterial Transformations in the Movie-mode Dynamic Transmission Electron Microscope at INRS;* **Patrick Soucy**, Aida Amini, Israt Ali, Kenneth Beyerlein

P10.P1 In Situ and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials

POSTER # 95

156 *Cryo-STEM and Multiscale Microscopy of Earth-Abundant Cathode Particles;* **Madison King**, Katherine Jungjohann, Nikita Dutta, John Mangum, Patrick Walker, Bingning Wang, Renae Gannon, Chen Liao

POSTER # 96

157 *Cryo-TEM Imaging of Biomimetic Boron Nitride Single-Digit Nanotubes in Liposome Membranes;* **Alex Hall**, Zhongwu Li, John Cumings, Aleksandr Noy, Yuhao Li, Yaqing Wang

POSTER # 97

158 *Damage Free 3D Characterization and TEM Sample Preparation of Beam Sensitive Materials Using Advanced Multiple Ion Source PFIB Under Cryogenic Conditions;* **Min Wu**, Brandon Leer, Haifeng Gao

POSTER # 98

159 *Direct STEM Probing of Short-Range Order in Cation-Disordered Oxide Cathode;* **Chongmin Wang**, Linze Li

POSTER # 99

160 *Effect of Solvent Exchange on the Microstructure of Cement;* **Arpita Bathija**, Shan n Eichmann, Roland Martinez, Mohamed Hamed, Qiushi Sun

POSTER # 100

161 *Lithium Growth on Surface of Oxide Solid-State Electrolyte by Charging Effect;* **Jong hoon Kim**, Woo Tae Jang, Yoon Jae Jeong, Young Heon Kim, Hyuckjun Park, Yonghee Lee, Moon Seop Hyun, Kyung Jin Park, Yoon Kyung Seo

POSTER # 101

162 *Noble Dome: A Novel Air-Free Transfer System for Scanning Electron Microscopy and Focused Ion Beam;* **Valerie Brogden**, Jeff Garman, Kurt Langworthy, Steve Wiemholt

POSTER # 102

163 *Paths to Attenuate Radiolysis-Induced Secondary Damage in Biological cryoEM*; **Matthew Mecklenburg**, Shervin Nia, Ambarneil Saha, Z. Hong Zhou

POSTER # 103

164 *The Crystal Orientation of Li Metal A Des: A Better Understanding of Lithium-Ion Solid-State Batteries;* **Pawel Wakowski**, Cecile Bonifacio, Mary Ray, Paul Fischione

POSTER # 104

165 *Tiny Bubbles: Measuring Strain Fields and Missing Atoms in Nanoscale He Bubbles via High-Resolution STEM Techniques;* **Sean Mills**, Christoph Gammer, Peter Ercius, Peter Hosemann, Andrew M Minor

POSTER # 105

166 *Toward Single Particle Phases Mapping in Degraded Layered Oxide Cathodes via 4D-STEM;* **Zhen Wang**, Yaqi Jing, Huolin Xin

POSTER # 106

167 *Understanding the Effect of Local Grain Boundary Engineering on Solid-State Electrolytes;* **Tofunmi Ogunfunmi**, Xinxing Peng, Hyunwon Chu, John Watt, Jennifer Rupp, Mary Scott

Tuesday, July 30

A Analytical/Instrumentation Sciences Symposia – Tuesday Morning

A02.2 Data Science and Atom Probe Tomography *(IFES-Organized)*

Tuesday 8:30 AM

8:30 AM **168** *Machine Learning Enhanced Tomographic Imaging of Chemical Short-range Order in Fe-based Solid Solutions;* (Invited) **Yue Li**, Baptiste Gault

9:00 AM **169** *How Can 4D-STEM Inform Atom Probe Experiments? Relating Structure and Composition of Multiferroic Oxides at the Atomic Scale;* **Geri Topore**, James Douglas, Lynette Keeney, Baptiste Gault, Shelly Michele Conroy

9:15 AM **170** *Analyzing Linear Features in Atom Probe Tomography Datasets using Skeletonization;* **Alaukik Saxena**, Markus Kühbach, Shyam Katnagallu, Paraskevas Kontis, Baptiste Gault, Christoph Freysoldt

9:30 AM **171** *Spatial Ranging and Volume Segmentation of Atom Probe Tomography Data;* **Robert Ulfig**, Frederick Meisenkothen, David Reinhard, Ed Oltman, David Larson

9:45 AM **172** *Atom Probe Tomography Investigation of the Impact of Stacking Faults on InGaN/GaN Quantum Well LED Systems;* **Ruiying Shu**, Rachel Oliver, Martin Frentrup, Men Kappers, Helen Xiu, Gunnar Kusch, David Wallis, Christina Hofer, Paul Bagot, Michael Moody

A08.2 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

Tuesday 8:30 AM

8:30 AM **173** *Multi-dimensional Characterization of Nanostructures in Titanium Alloys using 2D Aberration-corrected STEM and 3D Atom Probe Tomography;* **Deepak Pillai**, Yufeng Zheng

8:45 AM **174** *Multi-Scale Correlative Characterization of Battery Aging Effects via XRM and SEM and In Operando Cell Experiments;* (Invited) **Adrian Mikitisin**

9:15 AM **175** *Analyzing Lithium Diffusion Processes in Battery Materials at Atomic Resolution with Correlated Electron Microscopy;* **Nikola Šimić**, Anna Jodlbauer, Evelin Fisslthaler, Ilie Hanzu, Daniel Knez

9:30 AM **176** *Multi-dimensional Characterization of Additively Manufactured Titanium Alloys using 3D FIB-SEM Tomography*; **Sydney Fields**, Dian Li, Yufeng Zheng

9:45 AM **177** *Improving Chemical Composition Measurements from Microscale to Atomic Scale with Fused Multi-Modal Microscopy;* **Zhaslan Baraissov**, Zeming Sun, Matthias Liepe, David Muller

A09.2 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Tuesday 8:30 AM

8:30 AM **178** *Integrating High-Performance Computing with Electron Microscopy for Scientific Insights;* (Invited) **Ayana Ghosh**, Kevin Roccapriore, Matthew Boebinger, Debangshu Mukherjee, Anees Al-Najjar, Marshall Mcdonnell, Sergei Kalinin, Maxim Ziatdinov

9:00 AM **179** *Precision Defect Engineering in 2D Materials via Automated STEM Atomic Fabrication;* **Matthew Boebinger**, Kevin Roccapriore, Ayana Ghosh, Kai Xiao, Andrew Lupini, Maxim Ziatdinov, Sergei Kalinin, Raymond Unocic

9:15 AM **180** *Realizing Smart STEM via Machine Learning on Remote High Performance Computer;* **Utkarsh Pratiush**, Kevin Roccapriore, Yongtao Liu, Sergei Kalinin, Gerd Duscher

9:30 AM **181** *Synergizing Theoretical Model Development and Experimentation through the Bayesian Co-Navigation Workflow;* **Sergei Kalinin**, Boris Slautin, Yongtao Liu, Hiroshi Funakubo, Rama Vasudevan, Maxim Ziatdinov

9:45 AM **182** *Extracting and Utilizing Multimodal Microscopy Datasets of Images and Text with Foundation Models;* **Aikaterini Vriza**, Eric Schwenker, Carter Ekberg, Coltin Kunz, Harris Heit, Maria KY Chan

A10.2 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Tuesday 8:30 AM

8:30 AM **183** *Bio-Interface Design with Multi-Scale Characterization for Microbial Modulation;* (Invited) **Yiliang Lin**

9:00 AM **185** *CLEM and Super-resolution Microscopy Pipeline Demonstrate Single Co-releasing GABA-Glutamate Axon Terminals Establishing Convergent Synapses for Glutamate or GABA Release in Mouse Brain;* **Alexey Shevelkin**, Shiliang Zhang, Kevin Yu, Rong Ye, Hui-Ling Wang, Marisela Morales

9:15 AM **186** *Multimodal and Operando Synchrotron X-ray Characterization for Advanced Energy Materials;* (Invited) **Yu-chen Karen Chen-Wiegart**

Scientific Program

B Biological Sciences Symposia – Tuesday Morning

B02.2 Biological Applications of Quantitative Label-Free Imaging

Tuesday 8:30 AM

8:30 AM **187** *Polarization Second Harmonic Generation Microscopy for Individual Muscle and Collagen Fibril Ultrastructure Determination;* (Invited) **Danielle Tokarz**, Richard Cisek, MacAulay Harvey, Caylee MacDonald

9:00 AM **188** *Two Complementary Label-Free Techniques: Orientation-Independent Differential Contrast and Polychromatic Polarization Microscopy;* (Invited) **Michael Shribak**, Elena Iourieva

9:30 AM **189** *CARS Imaging to Evaluate Neurodegenerative and Demyelinating Activity;* (Invited) **Robert Clements**

B03.2 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy

Tuesday 8:30 AM

8:30 AM **190** *Immuno-Electron Microscopy in the Evaluation of Connective Tissue Disorders;* (Invited) **Douglas Keene**, Sara Tufa

9:00 AM **191** *EM Optimized Cryostat Sections (EMOCS) for Wide Scale Ultrastructural Imaging of Tissue Morphology Combined with Antigen Detection by Immunohistochemistry;* **Mike Reichelt**, Miriam Baca, Cecile Chalouni, Meredith Sagolla, Hartmut Koeppen

9:15 AM **192** *Evaluation of the Damage and Neuroprotective Effects in the CNS Using a Model of Perinatal Asphyxia;* (Invited) **Francisco Capani**, Nicolas Toro-Urrego, Sofia Bordet, Tamara Kobiec, Paula Abbas, Yanine Rojas, Carlos Kusnier, Rodolfo Kolliker-Frers, Marcos Dambrosio Andrade, Juan Pablo Luaces

B09.2 Volume Electron Microscopy

Tuesday 8:30 AM

8:30 AM **194** *In-Resin CLEM of Epon-Embedded Cells and Tissues: An Approach for Volume CLEM;* (Invited) **Isei Tanida**, Junji Yamaguchi, Shun Mitsui, Takahito Sanada, Chigure Suzuki, Soichiro Kakuta, Yasuo Uchiyama

9:00 AM **195** *3D Reconstruction of Neurons with Selective Synaptic Connectivity in the Ventral Tegmental Area by Corelative Light and Electron Microscopy;* **Shiliang Zhang**, Alexey Shevelkin, Kevin Yu, Rong Ye, Huiling Wang, Marisela Morales

9:15 AM **196** *Insights Into vEM and Correlative Nanoscopy at UIUC;* (Invited) **Kingsley Boateng**, Moon-Sub Lee, Mahmoud Mahrous, Glenn Fried, Reza Rajabi-Toustani

9:45 AM **197** *High-Resolution Volume Electron Microscopy of an Entire Epidermal Plant Cell Using Plasma-Focused Ion Beam Scanning Electron Microscopy;* **Lolita Rotkina**, Andrea Zanini, Tessa Burch-Smith, Janithri Wickramanayake, Kirk Czymmek

C Cross-Cut/Interdisciplinary Sciences Symposia – Tuesday Morning

C01.2 Emerging 4D STEM Techniques in Materials and Biological Sciences

Tuesday 8:30 AM

8:30 AM **198** *Data-Defined Masks in 4D-STEM–Not all Pixels are Equal;* (Invited) Richard Beanland, Yining Xie, Eoin Moynihan, Ana Sanchez

9:00 AM **199** *Exploring Inelastic Differential Phase Contrast Imaging for Inner-shell Ionization;* **Michael Deimetry**, Timothy Petersen, Hamish Brown, Matthew Weyland, Scott Findlay

9:15 AM **200** *Pushing the Limits of Electron Ptychography with Physics-informed Bayesian Optimization;* **Yi Jiang**, Xiangyu Yin, Zhi Yang, Yimo Han

9:30 AM **201** *Emerging Machine Learning-Based Data Analysis Techniques and Algorithms for Exploiting 4D-STEM Dataset;* (Invited) ***Hsu-Chih Ni***, Renliang Yuan, Jiong Zhang, Jian-Min Zuo

C02.2 Facilities Management: Crucial Skills and Strategies

Tuesday 8:30 AM

8:30 AM **202** *Core Facility Management: Crucial Skills & Strategies;* (Invited) **Julia Aebersold**, Curt McKenna, Jasmin Beharic, Michael Martin, James Morris, Mary Watson, Margaret Lucas, Sung Jin Kim

9:00 AM **203** *Defining a Professional Career Path for Research Core Technical Staff;* **Benjamin Myers**, Amy Blanchard, Jane Merkel

9:15 AM **204** *Enhancing Efficiency and Collaboration in Research-Driven Microscopy Laboratory;* **Feng-Xia Liang**

9:30 AM **205** *Tracking Facility Publications with NEMO-CE;* **Jamie Ford**, Hossam Tamri, Mathieu Rampant

C06.2 Memorial Symposium: Lena Fitting Kourkoutis

Tuesday 8:30 AM

8:30 AM **206** *In tribute to Lena Fitting-Kourkoutis—The path to Cryo-Lift-Out for Sensitive Biological or "Other" Soft and Fragile Matter;* (Invited) **Jürgen Plitzko**, Wolfgang Baumeister

9:00 AM **207** *Analysis of Sensitive Materials by Monochromated STEM-EELS in Cryo-Conditions;* (Invited) **Marta de Frutos**

9:30 AM **208** *Opening Windows into the Cell: Bringing Structure to Cell Biology using Cryo-Electron Tomography;* (Invited) **Elizabeth Villa**

Scientific Program

P Physical Sciences Symposia – Tuesday Morning

P02.2 Memorial Symposium: Terence E. Mitchell

Tuesday 8:30 AM

8:30 AM **209** *From Electron Microscopy to Sustainable Energy – A Fitting Tribute to Dr. Terrence E. Mitchell;* (Invited) **Harriet Kung**

9:00 AM **210** *Dynamic Observations of Dislocations and Grain Boundaries in Oxides;* (Invited) **Yuichi Ikuhara**

9:30 AM **211** *Characterization of Dislocation Structures in Uranium Dioxide After High Temperature Creep via Diffraction and Electron Channeling Contrast;* (Invited) **Pedro Peralta**, *Benjamin Shaffer*

P03.2 Electron Microscopy of Advanced Functional Materials

Tuesday 8:30 AM

8:30 AM **212** *Observation of Atomic Structure in Crocidolite Asbestos Using Low-dose STEM Imaging Techniques;* **Ichiro Ohnishi**

8:45 AM **213** *Stability of Carbon-Supported Nanoparticles in Hydrogen Fuel Cells Resolved by Automated Electron Tomography;* **Lynda Amichi**, Haoran Yu, Amir Ziabari, Obaidullah Rahman, Jose D Arregui-Mena, Laure Guetaz, David Cullen

9:00 AM **214** *Electron Microscopy of Au Islands on the ZnO-TiO2 Heterojunction to Enhance the Photocatalitic Hydrogen Production;* **Hector Calderon**, Diana Guerrero-Araque

9:15 AM **215** *Oxidation States of Stoichiometric Ni Doped CeO2 Aerogel;* **Kyle Sendgikoski**, James Hart, Andrew Lang, Travis Vak, Debra Rolison, Michelle Johannes, Todd Brintlinger

9:30 AM **216** *Towards High-Throughput Catalyst Innovation via Electron Microscopy;* (Invited) **Qian He**

P05.2 Advanced Imaging and Spectroscopy Beyond Room Temperature

Tuesday 8:30 AM

8:30 AM **217** *Field and Structure Imaging by Magnetic-field-free Atomic Resolution Scanning Transmission Electron Microscopy;* (Invited) **Naoya Shibata**

9:00 AM **218** *Ultra-High Energy Resolution EELS Beyond Room Temperature;* **Tracy Lovejoy**, Cameron Johnson, Michael Hotz, Ondrej Krivanek, Niklas Dellby, George Corbin, Joel Martis, Andreas Mittelberger, Benjamin Plotkin-Swing, Steven Quillin

9:15 AM **219** *New Approach to Phonon and Magnon Angle-Resolved EELS and EEGS Simulations Including the Effect of Multiple Scattering;* **José Ángel Castellas-Reyes**, Paul Zeiger, Jan Rusz

9:30 AM **220** *Understanding Ferroelectric Polarization in Hafnium Zirconium Oxide;* (Invited) **B.C. Regan**, Yueyun Chen, Tristan O'Neill, Shelby Fields, Megan Lenox, Jon Ihlefeld, William Hubbard, Ho Leung Chan

P06.2 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From In-situ to Ultrafast

Tuesday 8:30 AM

8:30 AM **222** *Applications and Directions for Electrically Driven Ultrafast Electron Microscopy;* (Invited) **Spencer Reisbick**, Alexandre Pofelski, Chuhang Liu, Myung-Geun Han, Yimei Zhu

9:00 AM **224** *Nanosecond Electron Microscopy of Electrical Switching of Charge Density Waves;* **Daniel Durham**, Thomas Gage, Con r Horn, Ilke Arslan, Haihua Liu, Xuedan Ma, Supratik Guha, Charudatta Phatak

9:15 AM **225** *Capturing Spin Waves with Microwave-Mediated Stroboscopic Electron Microscopy;* **Chuhang Liu**, Spencer Reisbick, Yimei Zhu

9:30 AM **223** *Reaching sub-picosecond time resolution in Ultrafast TEM without Photoemission;* **Erik Kieft**, Ondřej Sháněl, Gabriele Bongiovanni, Eric Van Cappellen

9:45 AM **221** *In Situ Ultra-fast TEM Observation of Acoustic Excitation of 128° Y-X LiNbO3;* **Kayla Callaway**, Spencer Reisbick, Shashi Poddar, Eric Montgomery, Chunguang Jing, Yimei Zhu, June Lau, John Cumings

P07.1 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Tuesday 8:30 AM

8:30 AM **226** *Coupling Between Charge Density Waves and Stacking Order in Layered Quantum Materials Probed by In-Situ Cryo STEM;* (Invited) **Judy Cha**, James Hart, Saif Siddique, Ratnadwip Singha, Noah Schnitzer, Myung-Geun Han, Yimei Zhu, Lena Kourkoutis, Leslie Schoop

9:00 AM **227** *Unveiling a Large Supermodulation Underlying Electronic Anisotropy in Uranium Chalcogenide;* **Suk Hyun Sung**, Mengke Liu, Thao Dinh, Christopher Broyles, Jules Gardener, Austin Akey, Sheng Ran, Philip Kim, Jennifer Hoffman, Ismail El Baggari

9:15 AM **228** *Interaction of Charge Density Waves with Defects in Rare-Earth Tritellurides;* **Saif Siddique**, James Hart, Drake Niedzielski, Myung-Geun Han, Michael Colletta, Lena Kourkoutis, Yimei Zhu, Leslie Schoop, Tomas Arias, Judy Cha

9:30 AM **229** *Quantum Device Transmission Electron Microscopy;* **Joachim Dahl Thomsen**, Myung-Geun Han, Prineha Narang, Yimei Zhu, Frances Ross

9:45 AM **230** *Correlative Cryogenic Transmission Electron Microscopy of Structural Phase Transition in Multiferroic GaV4S8;* **Myung-Geun Han**, Fernando Camino, Junsik Mun, Lunyong Zhang, Sang-Wook Cheong, Yimei Zhu

P09.1 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Tuesday 8:30 AM

8:30 AM **231** *Understanding Phase Transitions in 2D Van der Waals Materials via Atomic-Scale Cryogenic STEM;* (Invited) **Miaofang Chi**, Haoyang Ni, Joy Chao, Elizaveta Tiukalova

9:00 AM **232** *In Situ Dewetting and Reactions of Gold-Titanium Bilayers on 2D Materials;* **Pip Knight**, Kate Reidy, Alexandre Foucher, Frances Ross

9:15 AM **233** *Formation of Metal Atom Chains at the Edges of Graphene Nanoribbons Supported by Graphene;* **Kenan Elibol**, Toma Susi, Clemens Mangler, Dominik Eder, Jannik Meyer, Jani Kotakoski, Richard G. Hobbs, Peter A. van Aken, Bernhard C. Bayer

9:30 AM **234** *In-situ Time-Resolved Atomic-Scale Response of 2D TMD WSe2 under High-Frequency AC Electric Fields;* **Christopher Nelson**, Ondrej Dyck, Mina Yoon, Andrew Lupini, Jawaher Almutlaq, Dirk Englund, Stephen Jesse

9:45 AM **235** *Ultralow-dose TEM Study: Modulating the Grain Size-Dependent Sub-Grain Planar Defects via A-site Compositional Tuning in Metal Halide Perovskites;* **Byeongjun Gil**, So Jeong Park, Jin Young Kim, Miyoung Kim

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Tuesday Late Morning

A02.3 Data Science and Atom Probe Tomography *(IFES-Organized)*

Tuesday 10:30 AM

10:30 AM **236** *Practical Considerations for FAIR Data for the APT and FIM Communities: Lessons Learned from the NIST Electron Microscopy Facility;* (Invited) **June Lau**

11:00 AM **237** *Automated Burnup Analysis from Metallic, Ceramic, and Amorphous Fuels using Atom Probe Tomography;* **Mukesh Bachhav**, Anshul Kamboj, Sohail Shah, Jian Gan, William Hanson, Jeffrey Giglio, Fei Teng

11:15 AM **238** *Ranging Atom Probe Spectra to Reduce Measurement Bias;* **Frederick Meisenkothen**, David Newton, Karen DeRocher, Mark McLean

11:30 AM **239** *Evaluation of Stoichiometric Accuracy with Deep-Ultraviolet Laser-Assisted Atom Probe Tomography of Hydroxyapatite;* **Jack Grimm**, Sandra Taylor, Arun Devaraj

A08.3 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

Tuesday 10:30 AM

10:30 AM **240** *Synchrotron X-Ray Nano-Analysis for Material Science: from 2D to 4D;* (Invited) **Julie Villa Va**, Pauline Gravier, Anthony Harrup, Aline Léon, Pierre Lhuissier, Gustavo Pinzon, Luc Salvo, Olga Stamati, Victor Vanpeene, Aatreya Venkatesh

11:00 AM **241** *Multimethod Approach to Uncover the Capacity Loss in Silicon-Based Lithium-Ion Batteries;* **Michael Häusler**, Olga Stamati, Julie Villa va, Bernhard Sartory, Christoph Gammer, Bernd Fuchsbichler, Christoph Stangl, Roland Brunner

11:15 AM **242** *Enabling 3D imaging of operating batteries;* (Invited) **Johanna Weker**

11:45 AM **243** *Battery Electrolyte Behavior During Formation and Heating: New Insights Using High-Resolution and Dynamic Micro-CT;* **Jan Dewanckele**, Wesley De Boever, Frederik Coppens, Marijn Boone

A09.3 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Tuesday 10:30 AM

10:30 AM **244** *Automated SEM Image Acquisition and Image Analysis for Rigid Foams;* (Invited) **Daniel Abebe**, David Reuschle, Trang Le, KD Derr

11:00 AM **245** *Automated High Content Imaging and Analysis of Spheroids Using Clearing and Deep Learning for Volumetric Quantification;* **Jonathan Boyd**, Nancy Lee, Jason Zoeller

11:15 AM **246** *Characterizing the Interdiffusion Layer and Plating Layers in a Press Hardened 22MnB5 Steel Grade Using an Image Analysis Software;* **Koushik Karthikeyan Balasubramanian**, Eliseo Hernandez, Patrick Cleaver

11:30 AM **247** *Framework for Generative Artificial Intelligence-Assisted Microscopy Image Analysis Automation of Metallic Materials: A Case Study;* **Siyu Tu**, Ayoub Dergaoui, Phuong Vo

11:45 AM **248** *A Framework for Overcoming Resolution and Sensitivity Limits in 7nm Node Technology Inspection via Automated Imaging and Analysis;* **Nitin Varshney**, Shajib Ghosh, Md Mahfuz Al Hasan, Reza Forghani, Navid Asadizanjani

A10.3 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Tuesday 10:30 AM

10:30 AM **249** *Phase Retrieval in Electron and X-ray Microscopy using Automatic Differentiation;* (Invited) **Tao Zhou**, Mathew Cherukara, Saugat Kandel, Stephan Hruszkewycz, Charudatta Phatak, Martin Holt

11:00 AM **250** *Tracking Morphology and Chemical State of Electrocatalysts during Reaction through Correlated Electron Microscopy, X-ray Microscopy and X-ray Absorption Spectroscopy Experiments;* **See Wee Chee**, Aram Yoon, Shih-Yu Fu, Beatriz Roldan Cuenya

11:15 AM **251** *Unveiling Eutectic Solidification: Integrating Radiography and Tomography Data from X-ray Imaging with Crystallographic Analysis for Comprehensive Analysis;* **Shanmukha Kiran Aramanda**, Paul Chao, Xianghui Xiao, Ashwin Shahani

11:30 AM **252** *The Combined Use of Hard X-ray Scanning Nanoprobe and Confocal Microscopy in Single Pancreatic Cells Revealed Novel Physiologically Relevant Iron-regulating Structures;* (Invited) **Kira Slepchenko**, Si Chen, Robert Colvin, Craig Nunemaker

B Biological Sciences Symposia – Tuesday Late Morning

B01.1 3D Structures: from Macromolecular Assemblies to Whole Cells *(3DEM FIG)*

Tuesday 10:30 AM

10:30 AM **253** *Bacterial Adhesion Pili; Inhibition of Disease by Interaction with Salivary Peptides;* (Invited) **Esther Bullitt**

11:00 AM **254** *Understanding the structural Ballet of Cellulose Formation – Using Cryoem to Reveal the Role of Protein Flexibility on Higher-Order Oligomer Formation, Glucan Catalysis, and Cellulose Microfibril Extrusion;* **Alexis Williams**, Lynnicia Massenburg, Hugh Oneill, Tracy Nixon

11:15 AM **255** *Baited Classification with 2D Template Matching;* **Sarah Loerch**, Edward Petrossian

11:30 AM **256** *Training Robust Deep Learning Models with Synthetic Cryo-ET Data;* (Invited) **Matthew Swulius**

B03.3 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy

Tuesday 10:30 AM

10:30 AM **257** *Hyperspectral Confocal Fluorescence & Raman Microscopy for Characterizing Plant Response at the Cellular and Subcellular Level: Current Progress and Future Opportunities;* (Invited) **Jerilyn Timlin**

11:00 AM **258** *Electron Microscopy Characterization of Mangifera Indica L Residues for Application in Solid Biofuels in Agro-Industrial Regions of Mexico;* **Ricardo Gonzalez**, Mario Morales-Máximo, Luis Bernardo López-Sosa

11:15 AM **259** *Correlative FLIM/Raman using the Renishaw inVia Raman microscope;* **Tim Prusnick**, Dale Boorman

B09.3 Volume Electron Microscopy

Tuesday 10:30 AM

10:30 AM **261** *Mitochondrial Ultrastructure and Its Regulation Revealed by Deep Learning-based Analysis;* (Invited) **Shogo Suga**, Koki Nakamura, Bruno Humbel, Nobuhiko Ohno, Hiroki Kawai, Yusuke Hirabayashi

11:00 AM **262** *Vision Systems for Volume Electron Microscopy;* **Tuan Phamdo**, Jeff King, Narasimha Kumar

11:15 AM **263** *Extractions of Diverse Structural Information from vEM Data with CLEM and Deep Learning Workflows to Understand Brain Function;* (Invited) **Naomi Kamasawa**, Connan Thomas

Scientific Program

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

C01.3 Emerging 4D STEM Techniques in Materials and Biological Sciences

Tuesday 10:30 AM

10:30 AM **265** *Signal to Noise in Low-Dose Ptychography: The Effect of Imaging Parameters and Partial Coherence;* (Invited) **Peter Nellist**, Zhiyuan Ding, Felix Bennemann, Angus Kirkland

11:00 AM **266** *Visualizing Defects and Amorphous Materials in 3D with Mixed-State Multislice Electron Ptychography;* **Shake Karapetyan**, Steven Zeltmann, Ta-Kun Chen, Vincent D.-H. Hou, David Muller

11:15 AM **267** *Information Limit and Dose Efficiency of Electron Ptychography;* **Desheng Ma**, David Muller

11:30 AM **268** *Electron Ptychography for Deep Sub-angstrom Resolution Without an Aberration Corrector;* (Invited) **Pinshane Huang**, Chia-Hao Lee, Yi Jiang, Kayla Nguyen, Yue Zhang, Priti Kharel, Arend van der Zande

C02.3 Facilities Management: Crucial Skills and Strategies

Tuesday 10:30 AM

10:30 AM **269** *Designing, Operating and Managing a Multi-purpose-Multi-user Advanced Materials Characterisation Facility;* (Invited) **Richard Wuhrer**

11:00 AM **270** *The Environmental Impact of Large Scientific Infrastructure;* **Patrick McBean**, Jonathan Peters, Stephen Dooley, Lewys Jones

11:15 AM **271** *Design Process for Beautiful, High-Performance Microscopy Facilities at Johns Hopkins University;* **Kenneth Livi**, Matthew Fickett

11:30 AM **272** *Facility Design for, Installation, and Management of a 300kV Cryo-Transmission Electron Microscope;* **Bernd Zechmann**

C06.3 Memorial Symposium: Lena Fitting Kourkoutis

Tuesday 10:30 AM

10:30 AM **273** *Mapping Lattice Distortions Across Phase Transitions With Atomic-Resolution STEM;* (Invited) **Michelle Smeaton**, Hong Zheng, Elliot Fuller, Suhas Kumar, John Mitchell, Katherine Jungjohann, Lena Kourkoutis

11:00 AM **274** *Surface Polarity Dynamics in Oxygen-Deintercalated Nickelate Thin Films;* **Peter A. van Aken**, Chao Yang, Rebecca Pons, Wilfried Sigle, Hongguang Wang, Eva Benckiser, Gennady Logvenov, Bernhard Keimer

11:30 AM **275** *Atomic Scale Imaging of Complex Oxide Interfaces;* (Invited) **Julia Mundy**

P Physical Sciences Symposia – Tuesday Late Morning

P02.3 Memorial Symposium: Terence E. Mitchell

Tuesday 10:30 AM

10:30 AM **276** *Using Atomic Scale Computer Simulation to Interpret Defect Processes;* (Invited) **Robin Grimes**

11:00 AM **277** *Exsolution and Coarsening in Metal-Oxide Systems;* (Invited) **Ivar Reimanis**, Dylan Jennings, Sandrine Ricote, Jose Santiso

11:30 AM **278** *Structure and Properties of Functionally Graded Mullite Environmental Barrier Coatings;* (Invited) **Soumendra Basu**

P05.3 Advanced Imaging and Spectroscopy Beyond Room Temperature

Tuesday 10:30 AM

10:30 AM **279** *Unraveling the Electronic Structure of Nanoplasmonics at the Atomic Scale;* **Arashdeep Thind**, Woonhyuk Baek, Paul Alivisatos, Robert Klie

10:45 AM **280** *Nanoscale Decomposition Pathways of Low-Dimensional Quantum Materials;* **Casey Rowe**, Eric Formo, Jordan Hachtel, Bradley Norvell, Tina Salguero

11:00 AM **281** *Mapping Nanoscale Anisotropic Thermal Expansion and Strain through Correlative Diffraction, Imaging, and Spectroscopy in the TEM;* **Levi Palmer**, Wonseok Lee, Thomas Gage, Scott Cushing

11:15 AM **282** *Investigating Thickness Dependence of Vibrational EELS through Simulation;* **Paul Zeiger**, Jan Rusz

11:30 AM **283** *EELS Quantification of Ca and Y Segregation Behaviors in Magnesium Aluminate Spinel;* **Alexander Campos Quiros**, Animesh Kundu, Masashi Watanabe

11:45 AM **284** *Instrument Optimization of a High-Energy Electron Energy-loss Spectrometry System in an Aberration-Corrected Scanning Transmission Electron Microscope;* **Masashi Watanabe**, Alexander Campos Quiros, Giulio Guzzinati, Pirmin Kükelhan, Volker Gerheim, Martin Linck, Heiko Müller, Max Haider, Thomas Hoffman, Kotaro Sakaguchi

P06.3 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From In-situ to Ultrafast

Tuesday 10:30 AM

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 **286** *Acoustic Oscillations on Piezoelectric Materials Excited by a GHz Pulsed Electron Beam;* **Yohei Sato**, Kenji Tsuda, Spencer Reisbick, Daisuke Morikawa, Masami Terauchi, Yimei Zhu

11:15 AM **287** *Visualizing the Amorphous to Crystalline Transition of Bismuth Selenide in the TEM;* **Debangshu Mukherjee**, Jane Chen, Ayana Ghosh, Soumendu Bagchi, Panchapakesan Ganesh, Matthew Brahlek, Kevin Roccapriore

11:30 AM **288** *Approaching Single Atom Resolution for Electron Beam Driven Transformations in Multilayer Crystals;* (Invited) **Frances Ross**, Julian Klein

P07.2 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Tuesday 10:30 AM

10:30 AM **289** *Atomic Resolution Secondary Electron Imaging of Top and Bottom Surfaces;* **Benjamin Plotkin-Swing**, Joel Martis, Cong Su, Michael Hotz, Niklas Dellby, Tomas Radlicka, Ondrej Krivanek, Tracy Lovejoy

10:45 AM **290** *Excitonic States Beyond the Optical Spectrum in Epitaxially Grown Mono - And Multilayer WS2: A Spatially-Resolved EELS and DFT Study;* **Max Bergmann**, Jürgen Belz, Oliver Massmeyer, Samane Ojaghi, Robin Günkel, Johannes Glowatzki, Andreas Beyer, Stefan Wippermann, Kerstin Volz

11:00 AM **291** *Direct Imaging of Atom-by-atom Structures and Transformations in 2D Moirés;* (Invited) **Yichao Zhang**, Pinshane Huang

11:30 AM **292** *Manipulating Transition Metal Dichalcogenide Exciton Linewidths and Lineshapes with Dielectric Engineering as Uncovered by Electron Spectroscopies;* (Invited) **Steffi Woo**, Fuhui Shao, Ashish Arora, Steffen Michaelis, Odile Stéphan, Mathieu Kociak, Javier García de Abajo, Rudolf Bratschitsch, Andrea Konečná, Luiz Tizei

Scientific Program

P Physical Sciences Symposia – Tuesday Late Morning cont.

P09.2 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Tuesday 10:30 AM

10:30 AM **293** *Towards Atomic-Scale Investigation of Resistive Switching in Memristive Systems via MEMS-based In Situ Electron Microscopy;* (Invited) **Leopoldo Molina-Luna**

11:00 AM **294** *In-situ Switching of van der Waals Ferroelectrics with in-plane Electric Biasing;* **Xinyan Li**, Chuqiao Shi, Nannan Mao, Jing Kong, Ramamoorthy Ramesh, Yimo Han

11:15 AM **295** *Impact of Oxidation Layer in the Resistive Switching Behavior of Nitride-based Memristor Devices;* **Di Zhang**, Rohan Dhall, Chengyu Song, Matthew Schneider, Stephen House, Sundar Kunwar, Hongyi Dou, Jim Ciston, Haiyan Wang, Aiping Chen

11:30 AM **296** *Advancing In-Situ Sample Preparation for MEMS-Based Electrical and Electro-Thermal (S)TEM Characterization;* **V. Srot**, Rainer Straubinger, Felicitas Predel, Peter A. van Aken

11:45 AM **297** *PFIB and STEM EBIC: A Potent Combination for Operando TEM of Electronic Devices;* **William Hubbard**, B. C. Regan

A Analytical/Instrumentation Sciences Symposia – Tuesday Afternoon

A03.1 Data Science and Atom Probe Tomography *(IFES-Organized)*

Tuesday 1:30 PM

1:30 PM **298** *Revealing Mass Transport Mechanisms and Pathways Across Materials Using Isotopic Tracers and Atom Probe Tomography;* (Invited) **Sandra Taylor**

2:00 PM **299** *Resolving Hydrogen Trapping Sites in Steels at Ultra-High Resolution Using Cryogenic Atom Probe Tomography;* **Yi-Sheng (Eason) Chen**, Pang-Yu Liu, Ranming Niu, Shao-Lun Lu, Chao Huang, Hung-Wei Yen, Hao Chen, Julie Cairney

2:15 PM **300** *Improvement of Boron Dopant Quantification Accuracy in Atom Probe Tomography via High Electric Field Analysis;* **Bavley Guerguis**, Ramya Cuduvally, Richard J. H. Morris, Gabriel Arcuri, Brian Langelier, Nabil Bassim

2:30 PM **301** *In-situ Hydrogen Implantation in Atom Probe Tomography and Investigation of Hydrogen Embrittlement;* **Jean-Baptiste Maillet**, Gérald Da Costa, Christian Bacchi, François Vurpillot

2:45 PM **302** *Modelling of UV Picosecond Laser Interaction With Nanotips for Application in Atom Probe Tomography;* **Anup Sharma**, Ravi Raj, Deepak Marla, Jing Fu

A07.1 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods

Tuesday 1:30 PM

1:30 PM **579** *Probing the Solid-Electrolyte Interface in Lithium Ion Batteries with Time-of-Flight Secondary Ion Mass Spectrometry;* (Invited) **Luke Hanley**, Teodora Zagorac, Michael Counihan, Reyhane Shavandi, Jungkuk Lee, Yuepeng Zhang, Sanja Tepavcevic

2:00 PM **580** *Application of ζ-factor Microanalysis to Quantify Grain Boundary Enrichment in Eu-doped B6O;* (Invited) **Christopher Marvel**, Kristopher Behler, Jerry LaSalvia, Richard Haber, Masashi WATANABE, Martin Harmer

2:15 PM **581** *Cryo-Microanalysis of Hydrated and Vacuum Sensitive Minerals;* **Colin MacRae**, Ian Grey, Nicholas Wilson, Cameron Davidson

2:30 PM **582** *Identification of Hydrogen and Helium in Lunar Materials;* **Katherine Burgess**, Brittany Cymes, Rhonda Stroud

A08.4 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

Tuesday 1:30 PM

1:30 PM **308** *Unsupervised Machine Learning Analysis for 4D-STEM Datasets;* (Invited) **Mary Scott**

2:00 PM **309** *Contrast Optimization Aided by Machine Learning Applied to Virtual 4D-STEM Images;* **Daniel Stroppa**, Roberto dos Reis

2:15 PM **310** *Improving Robustness of Electron Ptychography by Bayesian Optimization of Tilt and Thickness;* **Dasol Yoon**, *David Muller*

2:30 PM **311** *Understanding Formation of Irradiation-Induced Defects through 4D-STEM, Electron Tomography, and WBDF-STEM;* **Yan-Ru Lin**, Yajie Zhao, Michael Zachman, Jose D Arregui-Mena, Grace Burke, Steven Zinkle

2:45 PM **312** *Spatial Mapping of Bulk Elastic Strain in De-alloyed Nanoporous Gold using Four-Dimensional Scanning Transmission Electron Microscopy;* **Daniel Zeitler**, Doug Perovic, Roger Newman

A09.4 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Tuesday 1:30 PM

1:30 PM **313** *Quantitative Imaging that Makes Magnetic Rotational Spectroscopy with Nanorods a Tool for Characterization of Nanoliter Droplets and Thin Films;* (Invited) **Konstantin Kornev**

2:00 PM **314** *Image Processing and Analysis Methods for Assessing Aerosol Jet Printed Traces;* **Daniel Rakowsky**, Janet Gbur

2:15 PM **315** *High Throughput Imaging and Analysis of Intracellular Dynamics with Correlative Label-Free and Fluorescence Microscopy;* **Ivan Ivanov**, Eduardo Hirata Miyasaki, Talon Chandler, Rasmi Cheloor Kovilakam, Li-Hao Yeh, Janie Byrum, Juan Perez-Bermejo, Manuel Leonetti, Bo Huang, Shalin Mehta

2:30 PM **316** *Non-Parametric Voronoi Tessellation-Based Clustering Enables Rapid Point Pattern Analysis of Single Molecule Localizations in 3-D;* **Andrew Soltisz**, Rengasayee Veeraraghavan, Peter Craigmile

2:45 PM **317** *Machine-Learning-Assisted Statistical Analysis of Electron Microscopy Data for Nanoparticle Synthesis;* **Min Gee Cho**, Myounghwan Oh, Katherine Sytwu, Luis Rangel DaCosta, Kate Groschner, Mary Scott

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Tuesday Afternoon cont.

A10.4 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Tuesday 1:30 PM

1:30 PM **318** *Quantifying Protein Dynamics at Solid-Liquid Interfaces with Atomic Force Microscopy and Machine Learning;* (Invited) **Shuai Zhang**, James De Yoreo

2:00 PM **319** *Innovative In-Situ AFM-in-SEM Characterization Workflow of Cathode Components;* **Veronika Hegrova**, Radek Dao, Vojtech Schanilec, Jan Neuman

2:15 PM **320** *Nanoparticle Characterization with in-situ AFM-SEM-EDS;* **Kerim Arat**, Fan Dong, Lukas Stühn, William Neils, Stefano Spagna

2:30 PM **321** *In-situ AFM-SEM-EDS, a Correlative Microscopy Platform for Surface Characterization and Elemental Analysis;* **Kerim Arat**, Jost Diederichs, Brent Colvin, Andreas Amann, Sid Kusu ki, Hajo Frerichs, Chistian Schwalb, Sebastian Siebert, William Neils, Stefano Spagna

2:45 PM **322** *Correlation Nanoscopy Using Nano-Optical Imaging and Spectroscopy;* **Artem Danilov**, Tobias Gokus, Claas Reckmeier, Andreas Hube

B Biological Sciences Symposia – Tuesday Afternoon

B01.2 3D Structures: from Macromolecular Assemblies to Whole Cells *(3DEM FIG)*

Tuesday 1:30 PM

1:30 PM **323** *Using 3D Large Scale Electron Tomography to Study Force Generation in the Mitotic Spindle;* (Invited) **Stefanie Redemann**, Vitaly Zimyanin, Magdalena Magaj, Theresa Gibney, Xavier Horton, Che-Hang Yu, Mustafa Basaran, Jacques Pecreaux, Helene Bouvrais, Daniel Needleman

2:00 PM **324** *3D Digital Reconstruction of Bacterial Enzymatic Megacomplexes for Antibiotic Biosynthesis;* **Paul Straight**, Anindito Sen, Kalyani Josyula, Alma Fernandez, Aart Verhoef, Anton Classen

2:15 PM **325** *Automating Workflows for Cryo-Electron Tomography with an Open-Source and Comprehensive Data-Pipeline;* **Jonathan Schwartz**, Reza Paraan, Shawn Zheng, Utz Ermel, Ariana Peck, Dari Kimanius, Anchi Cheng, Clinton Potter, Bridget Carragher

2:30 PM **326** *Beyond Ribosomes: In Situ Structural Biology of Diverse Targets in C. reinhardtii;* **Jessica Heebner**, Ron Kelley, Martin Obr, Sagar Khavnekar, Xianjun Zhang, Saikat Chakraborty, Ricardo Righetto, Florent Waltz, Alicia Michael, Wojciech Wietrzynski

2:45 PM **327** *In-Situ Cryo-EM Structural Studies of Eosi phil Granules;* **Jae Yang**, Joshua Mitchell, Deane Mosher, Elizabeth Wright

B03.4 Biomedical Research on Diseases in Humans, Plants and Animals using Electron and Light Microscopy

Tuesday 1:30 PM

1:30 PM **328** *Multiscalar Imaging: a Workflow for Combining Large Scale Context and High Resolution Imaging in Fixed Biological Samples*; (Invited) **Jose Smokowski**, Sarah Mikula

2:00 PM **329** *The Impact of SARS-CoV-2 Omicron Mutations on the Conformational Landscape of the Spike Protein;* **Ruth Parsons**, Alexandria Calloway, Ellie Zhang, Katarzyna Janowska, Bhishem Thakur, Priyamvada Acharya

2:15 PM **330** *How do Bacteria Respond to Nanostructured Features of the Brass Substrate?;* **Agnieszka Krawczynska**, Karolina Budniak, Anna Michalicha, Marta Ciemiorek-Bartkowska, Przemyslaw Suchecki, Michael Kerber, Daria Setman, Malgorzata Lewandowska, Anna Belcarz

2:30 PM **331** *Preparation of cells & tissue for TEM delivering consistent results, time savings, & cost-effectiveness using the Prepmaster 5100 EM Specimen & Grid Processor;* **Thomas Strader**, Robert Goodwin, Clive Wells

2:45 PM **332** *Evaluation of the Antimicrobial Effect of Eucalyptus (Eucalyptus camaldulensis Dehnh.) and Jalapeño Pepper (Capsicum annuum cv.) Extracts by CLSM and AFM;* **Benjamín Arredondo-Tamayo**, Gabriela Villagómez-Zaldivar, Lizbeth Gonzalez Victoriano, Susana Dianey Gallegos-Cerda, Josué Hernández-Varela, Candelaria Galvan Colorado, Abigail Pérez-Valdespino, José Jorge Chanona-Pérez

B09.4 Volume Electron Microscopy

Tuesday 1:30 PM

1:30 PM **333** *Challenges and Opportunities of Volume Electron Microscopy: In Search of Planarian Neoblasts;* (Invited) **Melainia L McClain**, Stephanie H Nowotarski

2:00 PM **334** *Laboratory Based Soft X-Ray Microscopy at a Core Facility;* **Kenneth Fahy**, Paul Sheridan, Sergey Kapishnikov, William Fyans, Fergal O'Reilly, Tony McEnroe

2:15 PM **335** *Spectral Unmixing of Ultrastructure in Large-Scale Electron Microscopy;* (Invited) **Ahmad Alsahaf**, Peter Duinkerken, Jacob Hoogenboom, Ben Giepmans

2:45 PM **336** *Limits of Axial Resolution in Volume Electron Microscopy of Cells and Tissues;* **Richard Leapman**, Jed Yang, Joshua Kim, Guofeng Zhang, Maria Aronova

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Tuesday Afternoon

C01.4 Emerging 4D STEM Techniques in Materials and Biological Sciences

Tuesday 1:30 PM

1:30 PM **337** *More than a Phase: Uncovering the Structure of Materials with Electron Phase Retrieval Techniques;* (Invited) **Stephanie Ribet**, Georgios Varnavides, Yue Yu, Colin Ophus

2:00 PM **338** *Newcomer's Guide into Optimal Data Acquisition for Electron Ptychography;* **Radim Skoupy**, Daniel Stroppa, Manuel Guizar-Sicairos, Elisabeth Müller, Emiliana Fabbri, Emiliya Pogosyan

2:15 PM **339** *Unraveling Atomic-Scale Reconstruction at the Interface: A Novel Insight into Epitaxial Growth Mechanism of Metallic Delafossite Thin Films;* **Anna Scheid**, Qi Song, Hari Pokhrel, Tobias Heil, Stephanie Ribet, Colin Ophus, Y. Eren Suyolcu, Philipp Hansmann, Darrell Schlom, Peter A. van Aken

2:30 PM **340** *Imaging of Hydrogen Atoms and Their Inhomogeneity in Multi-Principal-Element Alloys via Multislice Electron Ptychography;* **Pengcheng Li**, Chenglin Pua, Zehao Dong, Zhengxiong Su, Lin Gu, Zhen Chen

2:45 PM **341** *Direct Quantification of Grain Boundary Space Charge Layers using Multislice Electron Ptychography;* **Colin Gilgenbach**, Thomas Defferriere, Harry Tuller, James LeBeau

C06.4 Memorial Symposium: Lena Fitting Kourkoutis

Tuesday 1:30 PM

1:30 PM **342** *Bridging biological and materials research through cryo-EM;* (Invited) **Yuzhang Li**

2:00 PM **343** *In Memoriam of Lena Kourkoutis: The Development of Cryo EXLO;* **Lucille Giannuzzi,** Michael Colletta, Thomas Dougherty, Brandon Heck, Lena Kourkoutis, Alice Dohnalkova, David Muller

2:30 PM **344** *Cryogenic TEM for Soft-Hard and Liquid-Hard Interfaces in Nanotechnology and Energy Sciences;* (Invited) **Huolin Xin**, Chunyang Wang

P Physical Sciences Symposia – Tuesday Afternoon

P02.4 Memorial Symposium: Terence E. Mitchell

Tuesday 1:30 PM

1:30 PM **345** *Dislocations in Metals and Ceramic Materials studied by TEM;* (Invited) **C Barry Carter**

2:00 PM **346** *Intercalations in Ba2Sr2Ca2Cu3Oy and Sr2Ca2Cu3Oy and their Critical Current Density Improvement;* (Invited) **Hisayuki Suematsu**

2:30 PM **347** *The Fruits of an Enduring Research Program Benefiting from the Coupling of Advanced Characterization and Testing with Material Deformation Modeling;* (Invited) **Rodney McCabe**, *Hi Vo, Matthew Schneider, Greeley Duncan, Darshan Bamney, Tomé Carlos, Capolungo Laurent*

P03.3 Electron Microscopy of Advanced Functional Materials

Tuesday 1:30 PM

1:30 PM **348** *Artificially controlled Nanoscale Chemical Reduction via Electron Beam Illumination;* **Yang Zhang**, Fan Zhang, Linglong Li, Pu Yu

1:45 PM **349** *The Oxidation Sequence of Ultrathin Hafnium Metal on Graphene;* **Zhenjing Liu**, Rafael Jaramillo, Frances Ross

2:00 PM **350** *In-situ Atomic-Scale Visualization of Oxygen Vacancy Assisted Reaction Dynamics on TiO2 Surfaces;* **Xiaobo Chen**, Meng Li, Sooyeon Hwang, Dmitri Zakharov, Judith Yang, Guangwen Zhou

2:15 PM **351** *Locating UO22+ in Metal Sulfide Ion Exchange Materials Utilizing Multimodal STEM Techniques;* **Patricia Meza**, Roberto dos Reis, Yukun Liu, Anastasia Pournara, Mercouri Kanatzidis, Vinayak Dravid

2:30 PM **352** *In Situ Gas Phase Environmental Transmission Electron Microscopy;* (Invited) **Dan Zhou**

P04.1 Science and Applications of High-Entropy Materials

Tuesday 1:30 PM

1:30 PM **353** *High-throughput Screening and Design Guidelines for Single-Phase Refractory High Entropy Alloys from the Nb-Ti-Zr System;* **Sebastian Lech**, Elaf Anber, Emily Holcombe, Jason Hattrick-Simpers, Howie Joress, Mitra Taheri

1:45 PM **354** *Exploring High Entropy Two-Dimensional MXene by Aberration Corrected STEM;* (Invited) **Per Persson**

2:15 PM **355** *Effect of Directional Partial Ordering in L12 CSRO Domains on Dislocations Behavior in FCC Multicomponent Alloys via 4D-STEM Diffuse-Scattering Fluctuation and Correlation Analysis;* **Po-Cheng Kung**, Jian-Min Zuo, Jessica Anne Krogstad

2:30 PM **356** *Local Lattice Distortion and Chemical Short-Range Order in High-Entropy Alloys;* (Invited) **Takeshi Egami**

P05.4 Advanced Imaging and Spectroscopy Beyond Room Temperature

Tuesday 1:30 PM

1:30 PM **357** *High Spatiotemporal Resolution STEM Imaging at High Temperature;* (Invited) **Ryo Ishikawa**, Toshihiro Futazuka, Yu Jimbo, Kazuaki Kawahara, Naoya Shibata, Yuichi Ikuhara

2:00 PM **358** *Atomically Stable Cryogenic In Situ Biasing (S) TEM holder with Precise Temperature Control Over a Wide Range of Temperatures;* **Mia Andersen**, Yevheniy Pivak, Vasilis Papadimitriou, Tianshu Jiang, Vladimir Roddatis, Leopoldo Molina-Luna, Shelly Michele Conroy

2:15 PM **359** *Ultra-Cold Cryogenic TEM Sample Holder with Liquid Helium and High Stability (Conference Abstract);* **Maya Gates**, Emily Rennich, Suk Hyun Sung, Nishkarsh Agarwal, Robert Kerns, Robert Hovden, Ismail El Baggari

2:30 PM **360** *Probing the Emergent Phases in Materials for Quantum Technology via Cryogenic In-situ Biasing 4D-STEM & EELS;* (Invited) **Shelly Michele Conroy**

P06.4 Visualizing Electronically Driven Dynamics Across Spatiotemporal Scales: From In-situ to Ultrafast

Tuesday 1:30 PM

1:30 PM **364** *Universal Carrier Dynamics in InAs and GaAs Revealed by Ultrafast Electron Microscopy;* (Invited) **Suhas Kumar**, Francis Alcorn

2:00 PM **362** *Probing Photocarrier Dynamics in Wide Bandgap Semiconductors with UV-Pumped Scanning Ultrafast Electron Microscopy;* **Yujie Quan**, Zeyu Xiang, Usama Choudhry, Basamat Shaheen, Ryan Gnabasik, Bolin Liao

2:15 PM **363** *Recent developments in time-resolved cathodoluminescence: measuring dynamics at the Nanoscale;* **Ben Lich**, Sangeetha Hari emie Bonnet, Toon Coenen, Herman Duim

2:30 PM **361** *Emerging Modalities for Condensed Matter Explorations Using Ultrafast Electron Microscopy;* (Invited) **Michael Yannai**, Ido Kaminer

Scientific Program

P Physical Sciences Symposia – Tuesday Afternoon cont.

P07.3 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Tuesday 1:30 PM

1:30 PM **365** *Role of Localized Interfacial Phonon at FeSe/SrTiO3 Interface;* **Ruochen Shi**, Xuetao Zhu, Peng Gao

1:45 PM **366** *Electron-PhononCoupling at the FeSe/SrTiO3 Interface: Insight from Atomically Resolved Vibrational Spectroscopy;* **Hongbin Yang**, Yinong Zhou, Guangyao Miao, Jiandong Guo, Ruqian Wu, Xiaoqing Pan

2:00 PM **367** *Systematic Absences of Optical PhononSignals in Momentum-Resolved Vibrational Spectroscopy;* **Aowen Li**, Paul Zeiger, Zuxian He, Mingquan Xu, Stephen J. Pennycook, Jan Rusz, Wu Zhou

2:15 PM **368** *Beyond Vibrational Spectroscopy: Hunting the Signature of Elusive Quasiparticles with Monochromated STEM-EELS;* (Invited) **Quentin Ramasse**, Demie Kepaptsoglou, **José Ángel Castellano-Reyes** (Invited), Paul Zeiger, Khalil El Hajraoui, Julio Alves do Nascimento, Vlado Lazarov, Anders Bergman, Jan Rusz

2:45 PM **369** *STEM-EELS: A Proper Tool for Observation of Strong Coupling Effects between Surface Excitations with High Spatial and Energy Resolution;* **Tomáš Šikola**, Pavel Gallina, Michal Kvapil, Andrea Konečná, Michal Horák, Ora Bitton, Lothar Houben, Vlastimil Křápek, Gilad Haran, Juan Idrobo

P09.3 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Tuesday 1:30 PM

1:30 PM **370** *The Scanning Transmission Electron Microscope as a Platform for Atomic Scale Synthesis;* **Stephen Jesse**, Ondrej Dyck, Andrew Lupini, Christopher Nelson, Mina Yoon

1:45 PM **371** *Exploring Structural Dynamics of Small Pt Nanoparticles on Ceria;* **Henrik Eliasson**, Yubiao Niu, Ivan Surin, Xiansheng Li, Sharon Mitchell, Javier Pérez-Ramirez, Richard Palmer, Henrik Grönbeck, Rolf Erni

2:00 PM **372** *Unveiling Metal Single Atom Migration Dynamics: Insights into Support-Induced Stability;* **Wenjie Zang**, Jaeha Lee, Phillip Christopher, Xiaoqing Pan

2:15 PM **373** *Investigation of Electron-Beam-Induced Structural Changes in MgCrM 4;* **Danial Zangeneh**, Robert Klie

2:30 PM **374** *Two-Dimensional Fe Oxide on Metallic Fe Nanoparticles Visualized by Atom-resolved Secondary Electron Imaging;* **Xi Liu**, Tian Qian

2:45 PM **375** *In-situ 4D-STEM Study of Chemo-Mechanical Interactions during Metal Oxidation;* **Yongwen Sun**, Ying Han, Dan Zhou, Hector Hugo Perez Garza, Alejandro Gomez-Perez, Athanassios Galanis, Stavros Nicolopoulos, Yang Yang

A Analytical Sciences Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **Exhibit Hall**

A08.P2 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

POSTER # 107

376 *Analyzing Surface Relaxation in TEM-Lamella: A Method for Revealing Alloy Concentrations at Strained Semiconductor Interfaces;* **Frederik Otto**, Laura Niermann, Tore Niermann, Michael Lehmann

POSTER # 108

377 *Detecting Chemical Shift with Energy Dispersive Spectroscopy;* **Yueyun Chen**, Rebekah Jin, Yarin Heffes, Brian Zutter, Tristan O'Neill, Jared Lodico, B. C. Regan, Matthew Mecklenburg

POSTER # 109

378 *Enhancing Microscopy Data Simulation and Analysis Using Quantum Algorithms;* **Roberto dos Reis**

POSTER # 110

379 *Evaluation of Lattice Spacing of Precipitates and Matrix in a Ni-Al-Ti alloy by NBD and Image Analysis using Two Condenser-Lens TEM;* J**unji Yamanaka**, Joji Furuya, Keisuke Arimoto, Kosuke Hara, Mi ru Doi

POSTER # 111

380 *Four-Dimensional Scanning Transmission Electron Microscopy (4D-STEM) for Advance Characterization of Grain Boundaries at the Nanoscale in Copper Bicrystals;* **Theresa Kucinski**, Dongyue Xie, Nan Li, Benjamin Savitzky, Colin Ophus, Michael Pettes

POSTER # 112

381 *High-resolution STEM Image Acquisition Method for Tilted Specimen Using a New Type of Aberration Corrector;* **Wataru Koibuchi**, Ryusuke Sagawa

POSTER # 113

382 *Imaging by Diffraction in Transmission Electron Microscopy;* **Jung Cho**, Ambarneil Saha, Matthew Mecklenburg

POSTER # 114

383 *Information Transfer Improvement by Parallax Correction and Ptychography Reconstruction Applied to Fast Large-Area 4D STEM Experiments;* **Daniel Stroppa**, Stephanie Ribet, Georgios Varnavides, Colin Ophus, Philipp Pelz

POSTER # 115

384 *Investigating the Partition of Metalloid Pollutants in Gold Mine Tailings by STEM-EELS Spectrum Image;* **Erico Freitas**, Virginia Ciminelli

POSTER # 116

385 *L-edge Soft X-ray Self-Absorption Structure (SX-SAS) Observation of the First Transition Elements;* **Takaomi Yokoyama**, Shogo Koshiya, Takanori Murano, Hideyuki Takahashi

POSTER # 117

386 *Nanoscale Insights into the Thermal Phase Behavior of All-I rganic Halide Perovskites by in-situ 4D STEM;* **Fernando Castro**, Anahita Pakzad, Paul Smeets, Roberto dos Reis

POSTER # 118

387 *Optical Microscopy as an Evaluation Tool for Aerosol Jet Printing Optimization;* **Lexi Miskey**, Daniel Rakowsky, Sylvie Crowell, Janet Gbur

POSTER # 120

389 *Precise Measurements of Spatial Coherence and Brightness for Thermionic and Field-Emission Guns;* **Jun Yamasaki**, Shuhei Hatanaka

POSTER # 121

390 *Probing the Stacking Order of Covalent Organic Frameworks using Electron Ptychography;* **Patrick Carmichael**, Priti Kharel, Anusree Natraj, Chloe Pelkowski, Pinshane Huang, William Dichtel

A09.P1 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

POSTER # 122

391 *Aberration Measurement from Crystalline Ronchigrams with an Attention Neural Network;* **Jingrui Wei**, Paul Voyles

POSTER # 123

392 *Advancing Microplastic Detection Technology through Digital Image Processing, Fractal Analysis, and Polynomial Approximation Methods;* **Maximiliano Campos López**, Ricardo Aguilar-Garay, Ivonne B. Bonilla-Martínez, Jorge Gomez-Castrejon, Jorge A. Mendoza-Pérez, Marco A. Reyes-Guzmán, Vicente Garibay Febles

POSTER # 124

393 *AI-Enhanced Nanoparticle Analysis:Integrating Single-Shot Object Detection and Vision Transformer for Rapid and Accurate Characterization;* **Arda Genc**, Justin Marlowe, Jordan Finzel, Phillip Christopher

POSTER # 125

394 *An Advanced Smart Counting Mode for Pixelated Direct Electron Detectors Based on Semiconductors;* **Björn Eckert**, Stefan Aschauer, Martin Huth, Petra Majewski, Lothar Strueder, Heike Soltau

POSTER # 126

395 *Complex-Color Darkfield TEM Interfaces for Crystal, Defect, & Strain Analysis;* **Phil Fraundorf**, Kevin Linden

POSTER # 127

396 *Estimating Specimen Height Using SEM Working Distance;* **Jiwon Yoon**

POSTER # 128

397 *Generating and Sampling Complex Nanostructures with Construction Zone;* **Luis Rangel DaCosta**, Mary Scott

Scientific Program

A Analytical Sciences Poster Sessions – Tuesday Afternoon cont.

POSTER # 129

398 *Image Analysis Using Imaris 10.1 Machine Learning to Quantitate γH2AX Foci in U87 Cells;* **Linda Yasui**, Emma Planck, Dominic Teoli

POSTER # 130

399 *Integrated Workflow for Particle Analysis in Nanoscale Materials: From Automatic Acquiring to Analysis Using (S) TEM/EDS;* **Masahide Shima**, Philipp Wachsmuth, Takeshi Kaneko, Kevin McIlwrath, Ichiro Ohnishi

POSTER # 131

400 *Rapid Characterization of Microstructure of Open Cell Foams;* **Daria Monaenkova**, Thomas Fitzgibbons, Manoj Thota

POSTER # 133

402 *Real-Time Blind Inpainting via Multi-Instance Beta-Process Factor Analysis;* **Jack Wells**, Alex Robinson, Daniel Nicholls, Amirafshar Moshtaghpour, Professor Kirkland, Yalin Zheng, Jony Castagna, Nigel Browning

A10.P2 Correlative Analysis and Multimodal Microscopy and Spectroscopys

POSTER # 134N

403 *Accelerated Microstructure-Mechanical Property Mapping of Multi-Component Structural Materials;* **Kevin Schmalbach**, Justin Cheng, Eric Hintsala, Nathan Mara, Douglas Stauffer, Sanjit Bhowmick

POSTER # 135

404 *Automated Chemical Tilt Series in STEM;* **Kevin Fiedler**, Derek Hopkins, James Haag, Steven Spurgeon, Matthew Olszta

POSTER # 136

405 *Correlative Characterisation of Rangifer tarandus (Reindeer) Antler, Evaluating Differences Between Male, Female, and Calving Females;* **Richard Johnston**, Rachel Board, Elizabeth Sackett, Ude Hangen, Jebin Jestine, Michelle Oyen

POSTER # 137

406 *Effect of Current on the Morphology and Microstructure of 312 Stainless Steel cords using High Precision Tig Welding;* **C.I. González-Villalobos**, Raúl Pérez-Bustamante, John Edison-Garcia, J.A. Betancourt-Cantera, C. Félix-Martínez, Juan Manuel González Carmona, Luis-Alberto Cáceres-Díaz

POSTER # 138

407 *Exploring the Impact of Silane Surface Modification on Z Nanoparticles in the Wettability of PLA/Natural Wax Composites.;* **M.E. Mendoza-Duarte**, Diana Abigail López, Ivan Alziri Estrada Moreno , Jacqueline Bocarando Chacón, Imelda Olivas Armendáriz, Karla Campos Venegas, A. Vega Rios, J.M. Mendoza-Duarte

POSTER # 139

408 *High-Resolution Mechanical Property Mapping Using Advanced Nanoindentation Techniques;* **Eric Hintsala**, Douglas Stauffer, Kevin Schmalbach

POSTER # 140

409 *In-Situ Electron Microscopy of Abnormal Grain Growth in Nanocrystalline Nickel;* **Richard Johnston**, Kamil Ulatowski, Mark Coleman, Andy Holwell, Ria Mitchell, Benjamin Tordoff, Kenneth P'ng

POSTER # 141

410 *Investigating Recrystallization Kinetics of 316L stainless steel in Hybrid Manufacturing for Microstructure Control;* **Andres Marquez**, Rangasayee Kannan, Peeyush Nandwana, Thomas Feldhausen

POSTER # 142

411 *Low-temperature coating of Si oxide by Aerosol Assisted CVD;* **P. Pizá-Ruíz,** L. Salazar-García, C.G. Garay-Re, (Invited) I. Estrada-Guel, R. Martínez-Sánchez

POSTER # 143

412 *Microscopy Study and Mechanical Behavior on PETG with 40% and 100% Infill;* **Gerardo Pérez Mendoza**, Humiko Hernándes Acosta, Alejandro Miranda Cid é López Perrusquia, Marco Antonio Doñu Ruiz

POSTER # 144

413 *Microstructural and optical effects of Zn-Doped Magnesium Oxide Nanoparticles obtained by the Precipitation Method;* **Benjamín Hernández- Figueroa**, Joan S. Salas-Leiva, Jesus Uribe-Chavira, M.A. Ruiz-Esparza-Rodriguez, Antonia Luna-Velasco, Claudia A. Ramírez-Valdespino, Guillermo Herrera-Perez

POSTER # 145

414 *Microstructural Evolution and Mechanical Behavior of an Additively Manufactured Pseudoelastic Shape Memory Alloy;* **Sarah Graham**, Patxi Fernandez-Zelaia, Christopher Ledford, Fred List, Jason Mayeur, Chins Chinnasamy, Michael Kirka

POSTER # 146

415 *Multimodal and Correlated STEM Analysis to Generate Stress Maps of Additive Manufactured AlSi10Mg Alloy;* **Mohamed Daoud**, Inas Taha, Mohamed Helal, James Weston, Dalaver Anjum

POSTER # 147

416 *Preparation Of Large Wide Cross Sections Of Electronic Devices With A Femtosecond Laser for SEM Imaging;* **Martina Heller**, Olena Vertsanova, Sebastian Krauss, Benjamin Tordoff

B Biological Sciences Poster Sessions – Tuesday Afternoon

3:00 PM – 5:00 PM **Exhibit Hall**

B01.P1 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

POSTER # 148

417 *Adapting Entry-Level TEMs for single particle cryoEM data collection;* **David Strugatsky**, Jonathan Jih, Mark Arbing, Michael Spilman, Matthew Mecklenburg

POSTER # 149

418 *Advancing Cryo-EM Sample Preparation Through High-Precision Robotics;* **Wyatt Peele**, Venkata Dandey, Kaichun Yang, Tony Huang, Mario Borgnia

POSTER # 151

420 *Conformational Transitions and Allosteric Modulation in a Heteromeric Glycine Receptor;* **Eric Gibbs**, Emily Klemm, David Seiferth, Arvind Kumar, Serban Ilca, Philip Biggin, Sudha Chakrapani

POSTER # 152

421 *Cryo-EM Analysis of Molecular Interactions in the Drosophila Flight Muscle Thick Filament;* **Jiawei Li,** Fatemeh Abbasi Yeganeh, Hosna Rastegarpouyani, Kenneth Taylor

POSTER # 153

422 *Cryogenium – An Automated Blot-Free Cryo-Plunger with Optical Realtime Feedback for Single-Particle and Cell-Based Workflows*; **Michael Schwertner**, Roman I. Koning, Bram Koster, Martijn van Nugteren, Hildo Vader, Ar Id J. Kamp, Tiemen Smit, Peter A. Grocutt, Andrew Davies, Clara Ko

POSTER # 154

423 *Cryo-EM Structure of Immune Complex Between a Monoclonal Antibody (IgG) and Human C-reactive Protein;* **Olga Sokolova**, Alexander Kalikin, Andrey Moiseenko, Nadezhda A. Byzova, Anatoly V. Zherdev, Boris B. Dzantiev

POSTER # 155

424 *Delivering Consistent and Efficient Imaging for SPA with HexAuFoil Sample Supports;* **Claire Naylor**, Herve Vandekerckhove

POSTER # 156

425 *Easy and Efficient Cryo-FIB Workflow for Cryo-TEM Sample Preparation;* **Wataru Shigeyama**, Noriaki Mizuno, Hideki Matsushima, Naoki Hosogi

POSTER # 157

426 *High-resolution reconstruction of entire Siphovirus;* **Olga Sokolova**, Rafael Ayala, Andrey Moiseenko, Eugene Kulikov, Andrey Letarov, Matthias Wolf

POSTER # 158

427 *Structural Analysis of KCNQ1 Channel Distal C-terminus based on Cryogenic Electron Microscopy and Molecular Modeling Data;* **Olga Sokolova**, Ekaterina V. Kravchuk, Lisha Mai, Andrey Moiseenko, Valery Voseletsky

POSTER # 159

428 *Structural and Biochemical Characterization of MERS-CoV Polymerase;* **Ziyang Xiao**, Robert Kirchdoerfer

POSTER # 160

429 *Structural Studies of Helicobacter Pylori's Cag Type IV Secretion System*; **Wilhelm Salmen**, Arwen Frick-Cheng, Jacquelyn Roberts, Timothy Cover, Melanie Ohi

POSTER # 161

430 *TEM Grid Surface Micropatterning Using Modified Graphene for In Situ Cell Imaging;* **Md Rejaul Hoq**, Min Su

POSTER # 162

431 *Two Different Forms of Thick Filament in the Flight Muscle of Drosophila melanoglaster;* **Hosna Rastegarpouyani**, Alimohammad Hojjatian, Jiawei Li, Fatemeh Abbasi Yeganeh, Kenneth Taylor

B09.P1 Volume Electron Microscopy

POSTER # 163

432 *Automated Specimen Preparation for Electron Microscopy;* **Steven Goodman**, Jeffrey Percival

POSTER # 164

433 *Optimising a Modern High Performance FE-SEM for Multimodal vEM;* **Donna Gosselin**, Eudri Venter

POSTER # 165

434 *Practical Protocol and Parameter Optimizations For SBF-SEM Imaging–Tips & Tricks for Technically-Demanding Tasks;* **Joseph Sall**, Chris Petzold, Feng-Xia Liang

POSTER # 166

435 *To Stain or Not To Stain: Micro-CT Analysis of Eucalyptus Leaves;* **Richard Wuhrer**, Laurel George, Daniel Fanna, Sue Lindsay, Hyunsung Min, Trevor Hinwood

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Poster Sessions – Tuesday

3:00 PM – 5:00 PM **EXHIBIT HALL**

C01.P2 Emerging 4D STEM Techniques in Materials and Biological Sciences

POSTER # 167

436 *4D-STEM Characterization of Stainless Steel 316L after Corrosion in Lead-bismuth Eutectic;* **Zhiyu Zhang**, Sarah Wang, Peter Hosemann, Yang Yang, Andrew M. Minor

POSTER # 168

437 *Accelerating Ptychographic Phase Reconstructions with ML-Enabled Phase Unwrapping;* **Arthur McCray**, Stephanie Ribet, Georgios Varnavides, Colin Ophus

POSTER # 169

438 *Achieving High-Resolution Ptychographic Phase for Radiation-Sensitive Materials Using Multi-Frame/Multi-Pass Approach;* **Ali Mostaed**, Emanuela Liberti, Chen Huang, Amirafshar Moshtaghpour, Angus Kirkland

POSTER # 170

439 *Enhancing Depth Resolution of Multislice Ptychography with Data-Driven Prior and Regularization;* **Chia-Hao Lee**, David Muller

POSTER # 171

440 *Large Angle Rocking Beam Electron Diffraction Utilizing Electron Direct Detector;* **Robert Busch**, Hsu-Chih Ni, Yu-Tsun Shao, Jian-Min Zuo

POSTER # 172

441 *Multidimensional Ptychography and 4D STEM;* **Yu Lei**, Biying Song, Zhiyuan Ding, Xiaoqing Pan, Angus Kirkland, Peng Wang

POSTER # 173

442 *Optimized Parameters for Electron Ptychographic Imaging of 1D nanowires;* **Hannah DeVyldere**, Stephanie Ribet, Mary Scott

POSTER # 175

444 *Random Forest Prediction of Crystal Structure from Electron Diffraction Patterns;* **Samuel Gleason**, Alexander M Rakowski, Jim Ciston, Colin Ophus

POSTER # 176

445 *Simultaneous Acquisition of 4D and EELS Data by Newly Developed Pixelated STEM Detector;* **Ryusuke Sagawa**, Hiroki Hashiguchi, Akiho Nakamura, Shoko Shibagaki, Yutaka Kazama, Martin Huth, Yassine Imari, Valentin Kroner, Stefan Aschauer

POSTER # 177

446 *Towards Atomic Resolution of Cryogenic Ptychography Single-Particle Analysis (Cryo-EPty SPA);* **Peng Wang**, Yu Lei, Chen Huang, Judy kim, Julie Staunton, Angus Kirkland

POSTER # 178

447 *Unsupervised Deep Denoising of Four-Dimensional Scanning Transmission Electron Microscopy;* **Alireza Sadri**, Timothy Petersen, Emmanuel Terzoudis-Lumsden, Bryan Esser, Joanne Etheridge, Scott Findlay

POSTER # 179

448 *Unveiling the Formation Mechanism of Medium Range Ordering in Zr-based Bulk Metallic Glasses Using Angular Correlation Analysis of 4D-STEM;* **Minhazul Islam**, Gabriel Calderon Ortiz, Yuchi Wang, Yuchu Wang, Geun-Hee Yoo, Ji Young Kim, Eun Soo Park, Yue Fan, Yunzhi Wang, Jinwoo Hwang

C02.P1 Facilities Management: Crucial Skills and Strategies

POSTER # 180

449 *A Review of ClusterMarket(TM) as an Instrument Scheduling and Project Management Tool for Brigham Young University's Electron Microscopy Facility;* **Felipe Rivera**

POSTER # 181

450 *Advances in Interdisciplinary Research--Electron Microscopy Core in Research Resources Center in University of Illinois Chicago;* **Fengyuan Shi**

POSTER # 182

451 *Microscopy and Characterization Suite – a Facility Designed for Post-Irradiation-Examination;* **Yaqiao Wu**, David Estrada, Brenden Heidrich

POSTER # 183

452 *Microscopy Core Facility at Appalachian State University;* **Guichuan Hou**

POSTER # 184

453 *Supporting Correlative Light and Electron Microscopy (CLEM) Services in a Core Facility Setting;* **Farida Korobova**, Lennell Reynolds, Constadina Arvanitis

P Physical Sciences Poster Sessions – Tuesday

3:00 PM – 5:00 PM **EXHIBIT HALL**

P01.P1 Innovative Magnetic Imaging

POSTER # 185

454 *Combining Lorentz TEM and SEM with Polarization Analysis to Uncover Fractional Topological Spin Textures in Fe/Gd Multilayer Thin Films;* **William Parker**, Sergio Montoya, Eric Fullerton, Benjamin McMorran

POSTER # 186

455 *Disentangling the Ferrimagnetic Moment Arrangement in the Ti-doped Barium Hexaferrite using EMCD;* **Hitoshi Makino**, Bernd Rellinghaus, Pohl Darius

POSTER # 187

456 *Evaluation and Design for Magnetic Lens Thermal Management Systems Driven by a Layer of Graphite/ Paraffin-Based Composite Phase Change Material;* **Chenyu Guo**, Xuefeng Song, Zhensheng Zhang, Dapeng Yu

POSTER # 188

457 *Lorentz Scanning Transmission Electron Microscopy Holography (LSTEMH) Measurement of Domain Walls in Fe/Gd Multilayers;* **Andrew Ducharme**, William Parker, Fehmi Yasin, Xiuzhen Yu, Benjamin McMorran

POSTER # 189

458 *Observation of Thermal Current-Driven Spin Texture Dynamics in (Fe0.63Ni0.3Pd0.07)3P via Lorentz Transmission Electron Microscopy;* **Fehmi Yasin**, Jan Masell, Kosuke Karube, Daisuke Shindo, Yasujiro Taguchi, Yoshi ri Tokura, Xiuzhen Yu

POSTER # 190

459 *Pulsed Electron Illumination and Beam Deflection Transfer Function Measurement using Multi-Trigger < 1 µs Exposures on the Merlin – Medipix Detector;* **Zekun Fang**, Arthur Blackburn

P03.P2 Electron Microscopy of Advanced Functional Materials

POSTER # 191

460 *Analysis of Microstructural Evolution during the Sintering Process of Aluminum Matrix Nanocomposites Reinforced with Al4C3, using X-ray and HRTEM.;* **A. Santos-Beltrán**, V. Gallegos-Orozco, Miriam Santos-Beltran, I. Estrada-Guel, Hansel Medrano, Iza Ronquillo-Ornelas, R. Martínez-Sánchez

POSTER # 192

461 *Characterization of Mg-Alloyed Zinc Oxide Thin Films in Memory Devices via Transmission Electron Microscopy Analyses;* **Ece Günay**, Sebastian Calderon, R. Jackson Spurling, Jon-Paul Maria, Elizabeth Dickey

POSTER # 193

462 *Corrosion Behavior of a Titanium Nanostructured Surface Fabricated by Glancing Angle Sputter Deposition;* **Matteo Bertapelle**, Joel Borges, Julia Mirza-Rosca, Filipe Vaz

POSTER # 194

463 *Determine the Grain Structure of Poly-Silicon Using Differential Phase Contrast Imaging;* **Xiangyu Zhu**, Guoda Lian

POSTER # 195

464 *Doping Effect on Ge(001)/Mn5Ge3Cx Co-sputtered Thin Films by Solid Phase Epitaxy Method.;* **Adriana Alvídrez-Lechuga**, José Holguín-Momaca, Ricardo López Antón, Sion olive-Méndez

POSTER # 196

465 *Effect of Acid Etching Time in Ti3C2 MXene's Interlayer Spacing and Conductivity;* **Bishnu Bastakoti**, Shanna Alonzo, Rabin Dahal, Moses Ashie

POSTER # 197

466 *Effect of Mn substitution on Parasitic Reactions at the interface of MgCr2-xMnxO4 Cathodes for Rechargeable Magnesium-Ion Battery;* **Maksim Sultanov**, ZhenZhen Yang, Evelyna Wang, Jiyu Cai, Chen Liao, Brian Ingram, Yasuo Ito, Jianguo Wen

POSTER # 198

467 *Electron Microscopy of a gC3N4(p)/AgCl Heterojunction;* **Hector Calderon**, Enrique Samaniego

POSTER # 199

468 *Exploring Phase Control in ScxAlx-1N Heterostructures Grown by Molecular Beam Epitaxy;* **Andrew Lang**, James Hart, Matthew Hardy, Eric Jin, Neeraj Nepal, Vikrant Gokhale, Brian Downey, D. Scott Katzer, Virginia Wheeler

POSTER # 200

469 *High Resolution Surface Modification of WS2 via Plasma Oxidation and Electron Beam Reduction;* **Nicholas Hagopian**, Yangchen He, Daniel Rhodes, Paul Voyles

POSTER # 201

470 *In situ TEM Pyrolysis of Conductive 2D Coordination Polymers for Improved Application as Solid Acid Fuel Cell Electrode Materials;* **Bethany Hudak**, J. August Ridenour, William Maza, Brian Chaloux, Olga Baturina, Albert Epshteyn, Hannah Ashberry

POSTER # 202

471 *Operando Liquid-cell Transmission Electron Microscope Sample Holder with Bulk Reference and Counter Electrodes for Electrocatalysis Applications;* **Calvin Parkin**, See Wee Chee, Daan Hein Alsem

POSTER # 203

472 *Structural and Morphological Characteristics of Rare Earth Element based MAX Phase and MXene;* **Bhoj Gautam**, Joshua Abbott, Vanessa Morris, Menuka Adhikari, Sangeetha Balabhadra, Alex Bretana, Binod Rai, Daniel Autrey

POSTER # 204

473 *Synthesis and Microscopic Characterization of Nanoparticles NiCo by Reactive Mechanical Grinding;* **Berenice Castañeda**, Marco Ortega, Hector Calderon

POSTER # 205

474 *TEM Preparation and Characterization of a GeTe-based Phase Change Memory Device at Partial SET Mode;* **Cecile Bonifacio**, Yiqi Yu, Mary Ray, Marek Skowronski, Paul Fischione

POSTER # 206

475 *Temporal Evolution of 2D NiCo Structures Under Electron Beam Irradiation in a Transmission Electron Microscope;* **Yazmin Hernandez**, Oscar Cigarroa-Mayorga

Scientific Program

P Physical Sciences Poster Sessions – Tuesday cont.

POSTER # 207

476 *Transmission Electron Microscopy Exploration of Solution-Grown Lead Oxide Nanosheets: Unveiling Crystallinity and Defects;* **Udupa Manjunatha**, N Ravishankar

POSTER # 208

477 *Transmission Electron Microscopy of Crystalline Nanorods of Molecules in Ammonium Urates;* **Hector Calderon**, WeiWei Tang

P04.P1 Science and Applications of High-Entropy Materials

POSTER # 209

478 *Corrosion Behavior of New B4C Ceramic Doped with High-Entropy Alloy in an Aggressive Environment;* **Alberto Daniel Rico-Cano**, Julia Mirza-Rosca, Burak Cagri Ocak, Gultekin Goller

POSTER # 210

479 *Electrochemical Comparison Between HEA Films in Different Deposition Conditions;* **Julia Mirza-Rosca**, Ionelia Voiculescu, Doina Craciun, Valentin Craciun

POSTER # 211

480 *In-depth Analysis of Structural Heterogeneity in High Entropy Bulk Metallic Glasses Using 4D-STEM;* **Minhazul Islam**, Ji Young Kim, Geun-Hee Yoo, Soohyun Im, Gabriel Calderon Ortiz, Eun Soo Park, Jinwoo Hwang

POSTER # 212

481 *Synthesis of CrMnFeCoNiAlx Alloy by Mechanical Alloying and Sintering by High-Frequency Induction;* **Leonardo Baylón García**, C.G. Garay-Reyes, X. Atanacio-Sánchez, P. A. Guerrero-Seañez, I. Estrada-Guel, A. Martínez-García, J.M. Mendoza-Duarte, M.A. Ruiz-Esparza-Rodriguez, R. Martínez-Sánchez

POSTER # 213

482 *The Influence of the Re-Melting on the Microstructure and Corrosion Resistance of New Welding Material;* **George Simion**, Matteo Bertapelle, Julia Mirza-Rosca, Ionelia Voiculescu, Elena Scutelnic*u*

P09.P1 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

POSTER # 214

483 *Analyzing Structural Dynamics in Nanocrystalline Thin Films using In-Situ 4D-STEM: A Statistical Approach;* **Yuan Tian**, Yutong Bi, Mingjie Xu, Evgeniy Boltynjuk, Horst Hahn, Jian Han, David Srolovitz, Xiaoqing Pan

POSTER # 215

484 *Atomic Force Microscopy Imaging of Individual CO Molecules Adsorbed on a Cu(111) Surface;* **Dingxin Fan**, Pengcheng Chen, Nan Yao

POSTER # 216

485 *Deep learning Driven Analysis of a Structural Phase Transformation in CrSBr;* **Dawn Ford**, Mads Weile, Thang Pham, Aubrey Penn, Frances Ross, Julian Klein

POSTER # 217

486 *Electrochemical Transmission Electron Microscopy (EC-TEM) of Capacitance-Induced Electrodeposition and Coarsening on Graphene;* **Serin Lee**, Shu Fen Tan, Frances Ross

POSTER # 218

487 *Flexible Framework for Customized Autonomous Acquisition of In-Situ Spectrum Image Series Using DigitalMicrograph;* **Liam Spillane**, Shelly Michele Conroy

POSTER # 219

488 *He Bubble Evolution in LiAlO2: A Comparison of Human and Artificial Intelligence Based Analysis;* **Kip Wheeler**, Eric Lang, Christopher Field, Nathan Madden, Ryan Schoell, Ryan Pena, David Senor, Andrew Casella, Khalid Hattar

POSTER # 220

489 *In situ Electron Energy Loss Spectroscopy (EELS) Studies of Laser-induced Graphene Oxide Reduction in a Dynamic Transmission Electron Microscope (DTEM);* **Israt Ali**, Kenneth Beyerlein

POSTER # 221

490 *In Situ light Injection Study on Stacked WS2/WSe2 /hBN Hetero-Bilayers;* **Sriram Sankar**, Medha Dandu, Piyush Haluai, Takashi Taniguchi, Kenji Watanabe, Archana Raja, Sandhya Susarla

POSTER # 222

491 *In situ TEM Investigation of Graphitization Mechanism on Nickel Catalyst;* **Jaemin Kim**, Seungwoo Son, Myeonggi Choe, Zonghoon Lee

POSTER # 223

492 *In Situ TEM Study on Temperature-dependent Growth of Carbon Nanofiber and Nanotube from Ethanol Vapor;* **Handolsam Chung**, Myeonggi Choe, Wonjun Kim, Younggeun Jang, Zhaoying Wang, Zonghoon Lee

POSTER # 224

493 *In-situ Heating Technique with the FIB-TEM Compatible MEMS Specimen Holder;* **Toshie Yaguchi**, Akiko Wakui, Katsuji Ito, Hiroyuki Asakura, Yasuhira Nagakubo, Meng Li, Zhiwei Shan

POSTER # 225

494 *In-situ Observation of the Effect of Grain Boundary Defects on Dynamics of Incoherent Twin Boundaries in FCC Crystals;* **Yutong Bi**, Yuan Tian, Xiaoguo Gong, Eugen Rabkin, Jian Han, David Srolovitz, Xiaoqing Pan, Jonathan Zimmerman

POSTER # 226

495 *Solid State Phase Transformations in Materials for Carbon Capture and Conversion Revealed Using Electrothermal S/TEM Holders;* **William Bowman**, Jenna Wardini, Jenny Martinez

POSTER # 227

496 *Standard Calibrations and Prediction for Thermal Gradients during In Situ Transmission Electron Microscopy Heating Experiments;* **Yi-Chieh Yang**, Sriram Vijayan, Murat Yesibolati, Joerg Jinschek

POSTER # 228

497 *Understanding Redox Behavior in STCH Water Splitters Using In-Situ Monochromated EELS and Atomic Resolution EDS;* **Arielle Clauser**, Keith King, Dan Lowry, Sean Bishop, Anthony McDaniel, Joshua Sugar

Wednesday, July 31

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Wednesday Morning

A03.2 Data Science and Atom Probe Tomography *(IFES-Organized)*

Wednesday 8:30 AM

8:30 AM **498** *Insights into Grain Boundary Junctions and Advances in the TOMO Project;* (Invited) **Ashok Vayyala**, Joachim Mayer, Juri Barthel, Rafal Dunin-Borkowski, Joe Bunton, Dan Lenz, Thomas F Kelly, Maarten Bischoff, Hugo van Leeuwen, Stephan Kujawa

9:00 AM **499** *Correlative Characterisation of Neutron-Irradiation Damage Induced in Zr Alloys;* **Wenyu Zhang**, Rajat Nama, Paul Bagot, Chris Grovenor, Michael Moody

9:15 AM **500** *A High Kinetic Energy Atom Probe Design to Improve Instrument Performances in Voltage Pulse Mode;* **François Vurpillot**, Antoine Normand, Martin Brault, Sylvain Nulli, Gérald Da Costa, Christian Bacchi, Raphaele Danoix

9:30 AM **501** *Simulation and Registration Assisted Planar Structure Reconstruction with Adaptive Apex Shapes;* (Invited) **Brian Geiser**, David Reinhard, Isabelle Martin, David Larson

A07.2 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods

Wednesday 8:30 AM

8:30 AM **502** *EPMA of Low-Z Elements: A Closer Look at Mass Attenuation Coefficient Accuracy of Soft X-rays;* (Invited) **Aurélien Moy**, Xavier Llovet, Philipp Pöml, John Fournelle

9:00 AM **503** *Software Methods and Tools for WDS Light Element Analysis;* **John Donovan**, Aurélien Moy, Anette von der Handt

9:15 AM **504** *Enhanced Electron Backscatter Correction for Electron Probe Microanalysis;* **Andrew Ducharme**, Aurélien Moy, John Donovan

9:30 AM **505** *Utilising the WDS-SD for Obtaining Better Estimations of Backgrounds and Mass Attenuation Coefficients;* **Richard Wuhrer**, Ken Moran, Michael Matthews

9:45 AM **506** *Shortcomings in Low-Energy X-ray Quantification using Proportional Counters in WDS;* **Patrick Camus**, Ken Moran, Michael Matthews, Richard Wuhrer

A08.5 New Opportunities in Material Science—Multi-dimensional Imaging and Advanced Data Processing

Wednesday 8:30 AM

8:30 AM **507** *3D-Micro XRF and XRD Analysis with Capillary Optics;* (Invited) **Kouichi Tsuji**

9:00 AM **508** *Multi-Scale Characterization of 3D Printable Oxide-Dispersion-Strengthened MPEAs by Methods of Advanced Stereo-STEM Diffraction Contrast Imaging Cross-Correlated with Energy-Dispersive X-ray Spectroscopy;* **Milan Heczko**, Timothy Smith, Christopher Kantzos, Antonín Dlouhý, Michael Mills

9:15 AM **509** *Recovering Stoichiometry via Multi-Modal Fused Electron Tomography;* **Jason Manassa**, Jonathan Schwartz, Jaewhan Oh, Zichao Wendy Di, Yi Jiang, Huihuo Zheng, Jeffrey A. Fessler, Yongsoo Yang, Robert Hovden

9:30 AM **510** *Enhancing Resolution in STEM EELS Hyperspectral Data through Rigid Image Registration;* **Yifeng Huang**, Xingxu Yan, Toshihiro Aoki, Chaitanya Gadre, Xiaoqing Pan

9:45 AM **511** *Application of Micro X-ray Fluorescence and X-ray Tomographic Analysis of Metal And Actinide Materials;* **Brian Patterson**, Nikolaus Cordes, Arjen Van Veelen, Joshua White, Bryan Hunter

A09.5 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Wednesday 8:30 AM

8:30 AM **512** *Performance of Machine Learning Models for Detecting Grain Boundaries in Transmission Electron Microscopy Images;* (Invited) **Xing Wang**, *Aiden Ochoa, Xinyuan Xu*

9:00 AM **513** *Neural Network Models Towards Space Group Determination Using Dynamically Simulated EBSD and TKD Patterns;* **Alfred Yan**, Muhammed Nur Talha Kilic, Ankit Agrawal, Roberto dos Reis, Vinayak Dravid

9:15 AM **514** *Quantitative Electron Microscopy of Zeolites Using Aberration Corrected (S)TEM and Machine Learning;* **Tahmid Choudhury**, Huang Huang, Aakash Varambhia, Alessandro Turrina, Mervyn Shannon, Dogan Ozkaya, Angus Kirkland

9:30 AM **515** *Automated Defect Detection in Atomic Resolution STEM Images: A Machine Learning Approach with Variational Convolutional Autoencoders;* **Raja Abdul Wahab Ayyubi**, James Buban, Robert Klie

9:45 AM **516** *Segmenting Atomic Layers in Images of Atomically Resolved van der Waals Bilayers;* **Austin Houston**, Sumner Harris, Jordan Hachtel, Yiling Yu, David Geohegan, Kai Xiao, Gerd Duscher

A10.5 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Wednesday 8:30 AM

8:30 AM **517** *Magnetic Sector SIMS Systems for FIB Platforms: New Developments, Applications, and Prospects;* (Invited) **Tom Wirtz**, Olivier De Castro, Hung Quang Hoang, Antje Biesemeier, Santhana Eswara, Jean-Nicolas Audinot

9:00 AM **518** *The IONMASTER magSIMS: An Innovative Multi-Ion Species FIB Platform For Correlative High-Resolution Ion Microscopy and SIMS Analyses;* **Alexander Ost**, Torsten Richter, Olivier De Castro, Peter Gnauck, Jean-Nicolas Audinot, Tom Wirtz

9:15 AM **519** *The Value of Light Element Imaging Using FIB-SIMS for Material Characterization at Nanometer Scales;* **Lex Pillatsch**, Valentine Riedo-Grimaudo, James Whitby, Renato Pero, Nicholas Randall, Masoud Baghernejad

9:30 AM **520** *Multimodal Imaging of the Microbial Effect on the Oil-in-Water Bilgewater Emulsion;* **Xiao-Ying Yu**, Jiyoung Son

9:45 AM **521** *Correlative APT-STEM for Understanding Evolution of Heterostructure Degradation in High Intensity Environments;* **Bethany Matthews**, Kayla Yano , Khalid Hattar, Steven Spurgeon

Scientific Program

B Biological Sciences Symposia – Wednesday Morning

B01.3 3D Structures: from Macromolecular Assemblies to Whole Cells *(3DEM FIG)*

Wednesday 8:30 AM

8:30 AM **522** *Cryo-EM of an Anti-Enterovirus Cross Species Neutralizing Antibody;* (Invited) **Michael Wozny**

9:00 AM **523** *Cryo-Electron Tomography and Sub-Tomogram Averaging of Respiratory Syncytial Virus Structural Proteins from Native Virions;* **Bryan Sibert**, Jae Yang, Elizabeth Wright, Brenna Rae

9:15 AM **524** *Empowering the Visualization of Native Soil Viruses;* **Amar Parvate**, Trinidad Alfaro, Regan McDearin, Amy Zimmerman, Kirsen Hofmockel, William Nelson, James Evans

9:30 AM **525** *SPOT-RASTR—a Cryo-EM Specimen Preparation Technique that Overcomes Problems with Preferred Orientation and the Air/Water Interface;* **Behrouz Ghazi Esfahani**, Peter Randolph, Ruizhi Peng, Tim Grant, Elizabeth Stroupe, Scott Stagg

9:45 AM **526** *Exploring the Use of Lipid-Monolayers Affinity Grids for CryoEM Structural Determination of Protein Complexes at a Multi-User Core Facility;* **Joshua Strauss**, Aleksandra Skrajna, Rick Baker

B06.1 Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization

Wednesday 8:30 AM

8:30 AM **527** *Democratization of Multimodal Microscopy Imaging: Convergence Across Scales of Imaging Modalities from Single Instrument to Research Technology Centers. Advantages and Challenges;* (Invited) **Anastas Popratiloff**, Cheryl Clarkson-Paredes, Sofia Garcia-Hernandez, Shashwitha Puttaswamy

9:00 AM **528** *The Installation and Operation of SEM-EDS Analysis in a Regulated Environment;* **Anthony Hyde**, Simon Burgess, Haithem Mansour, Edward Jackson, Michael Hjelmstad

9:15 AM **529** *3D Automated Characterization of Vitamin B2 (Riboflavin) Supplements using X-ray Microscopy, Deep Learning and AI;* **Ria Mitchell**, Darragh Murnane, Andy Holwell

9:30 AM **530** *In Situ Microneedle Insertion Mechanics into an SEM-Compatible Artificial Mechanical Skin Model;* **Mason Rhue**, Robert Wheeler, Kayla Presley, Lawrence Drummy

C Cross-Cut/Interdisciplinary Sciences Symposia – Wednesday Morning

C01.5 Emerging 4D STEM Techniques in Materials and Biological Sciences

Wednesday 8:30 AM

8:30 AM **531** *Stability Requirements for Ultra-Cold Atomic Imaging: Opportunities in 4D-STEM;* (Invited) **Benjamin Savitzky**, Robert Hovden, Ismail El Baggari

9:00 AM **532** *Electron Correlation Microscopy: In Situ 4D STEM for Fluctuating Systems;* **Paul Voyles**, Shuoyuan Huang, Carter Francis

9:15 AM **533** *Three-Dimensional Imaging of 2D Materials with Tilted Multislice Electron Ptychography;* **Jeffrey Huang**, Yichao Zhang, Sang Hyun Bae, Pinshane Huang

9:30 AM **534** *Open-Source Phase Reconstructions of Focused-Probe 4D-STEM Data with Near-Ideal Direct-Electron Detection;* **Toma Susi**, Niklas Dellby, Russ Hayner, Christoph Hofer, Jani Kotakoski, Tracy Lovejoy, Clemens Mangler, Andreas Mittelberger, Timothy Pennycook, Benjamin Plotkin-Swing

9:45 AM **535** *Imaging Point Defect and Planar Defect in Metals with 4D-STEM;* **Yang Yang**, Sheng Yin, Andrew Minor

C06.5 Memorial Symposium: Lena Fitting Kourkoutis

Wednesday 8:30 AM

8:30 AM **536** *Exploring Spatiotemporal Limits for Atomic Resolution In Situ Electron Microscopy;* (Invited) **Peter Crozier**

9:00 AM **537** *Difficult Measurements of Materials Systems at Cryogenic Temperatures: Cryo-EELS and Cryo-4D-STEM;* (Invited) **Peter Ercius**, Sandhya Susarla, Mit Naik, Yujun Xie, Jingyang Wang, Archana Raja, Colin Ophus, Haimei Zheng

9:30 AM **538** *Before Cool was Cool: Cryogenic Electron Microscopy Techniques for Materials Science;* (Invited) **Andrew Minor**

C08.1 Vendor Symposium

Wednesday 8:30 AM

8:30 AM **539** *STEM Developments: A Versatile Light Injector/Collector, fast 4D-STEM, and High Energy Resolution EELS without Compromising Beam Current;* **Tracy Lovejoy**, Joel Martis, Benjamin Plotkin-Swing, Benedikt Haas, Toma Susi, Michael Hotz, Ondrej Krivanek, Niklas Dellby, Andreas Mittelberger, Steven Quillin

8:45 AM **540** *The Importance of an Open Camera System Demonstrated with Wide-Ranging Applications of MerlinEM, Hybrid Pixel Direct Electron Detector for Scanning Transmission Electron Microscopy;* **Matus Krajnak**, Gearóid Mangan

9:00 AM **541** *Results Before Lunch: Capturing and Processing in-situ 5D STEM;* **Benjamin Miller**, Bernhard Schaffer, Anahita Pakzad

9:15 AM **542** *PNDetector–Global Supplier of Modern Radiation Detectors for High-Resolution Spectroscopy and High-Speed Imaging in Electron Microscopy;* **Adrian Niculae**, Stefan Aschauer, Maximilian Schmid, Martin Huth, Kathrin Hermenau, Klaus Heinzinger, Heike Soltau, Lothar Strueder

9:30 AM **543** *Development of Chopped Scan Control for Beam Blanking;* **Grigore Moldovan**, Wolfgang Joachimi

9:45 AM **544** *Physics-Based Scan Distortion Correction in Hardware;* **Benjamin Bammes**, Kalani Moore, Barnaby Levin

Scientific Program

P Physical Sciences Symposia – Wednesday Morning

P02.5 Memorial Symposium: Terence E. Mitchell

Wednesday 8:30 AM

8:30 AM **545** *The δ → γ Phase Transformation in Plutonium;* **Jeremy Mitchell**, Sven Rudin, Daniel Schwartz, Terence Mitchell

9:00 AM **546** *Dislocations in Spinel: Structure and Properties of Extended Defects in MgO•nAl2O3;* (Invited) **Kurt Sickafus**

9:30 AM **547** *Atomic Scale Structure of Ferroelectric Domain Walls;* (Invited) **Venkatraman Gopalan**, *Greg Stone, Debangshu Mukherjee, Nasim Alem*

P03.4 Electron Microscopy of Advanced Functional Materials

Wednesday 8:30 AM

8:30 AM **548** *Atomic Resolution Imaging of Highly Air-sensitive Twisted-Bilayer 2D Structures:* **Guangming Cheng**, Nan Yao

8:45 AM **549** *Unconventional Lattice Reconstruction in Twisted Multilayer CrI3 (Conference Abstract);* **Nishkarsh Agarwal**, Liuyan Zhao, Zeliang Sun, Suk Hyun Sung, Robert Hovden

9:00 AM **550** *Lattice-scale Insights for Synthesis and Fabrication of Bespoke Functional Devices;* **Berit Goodge**, Samra Husremovic, Isaac Craig, D. Kwabena Bediako

9:15 AM **551** *Investigation of the Interface Between Pulse Laser Deposition Grown Cubic Boron Nitride and Nitrogen Functionalized Diamond;* **Tymofii Pieshkov**, Abhijit Biswas, Jordan Hachtel, Robert Vajtai, Pulickel Ajayan

9:30 AM **552** *Scanning Transmission Electron Microscopy as a Part of an Integrated Vacuum Setup for Growth and Manipulation of 2D Materials;* (Invited) **Jani Kotakoski**, Umair Javed, Carsten Speckmann, Wael Joudi, Manuel Längle, Alberto Trentino, Harriet Ahlgren, Clemens Mangler, Kimmo Mustonen, Toma Susi

P04.2 Science and Applications of High-Entropy Materials

Wednesday 8:30 AM

8:30 AM **553** *Low-Temperature Nucleation Behavior of L12 Al3Zr Precipitates in a Dilute Al-Zr-Sn Alloy;* **Janet Meier**, Jonathan Poplawsky, Ichiro Ohnishi, Huikai Cheng, Dongwon Shin, Lawrence Allard, Amit Shyam

8:45 AM **554** *Coupled Transmission Electron Microscopy and Atom Probe Tomography Reveals an Interesting Pathway to Nanolamellar Microstructures in High Entropy Alloys;* (Invited) **Rajarshi Banerjee**, Sriswaroop Dasari, Abhishek Sharma, Bharat Gwalani, Stephåne Gorsse

9:15 AM **555** *Electrochemical Performances of MgAlTiCoNi Hydrogen Storage Alloy used as Electrode.;* **Alfredo Martinez-Garcia**, C.G. Garay-Reyes, X. Atanacio-Sánchez, Leonardo Baylón García, P. A. Guerrero-Seañez, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

9:30 AM **556** *Electron Microscopy of Transformation Induces Lattice Distortions in TiHfZrNb0.3 Refractory High Entropy Alloys;* **Kaijun Yin**, Xuesong Fan

9:45 AM **557** *Analysis of Low Signal-to-Noise Atomic Resolution Spectroscopy of Radiation-Induced Sublattice Disorder in Fe/Ni/Al/Ti Superalloys;* **Thomas Pfeifer**, Kan Ma, Nianhua Peng, Alexander Knowles, Jordan Hachtel, Eric Hoglund, Patrick Hopkins

P05.5 Advanced Imaging and Spectroscopy Beyond Room Temperature

Wednesday 8:30 AM

8:30 AM **558** *In situ Gas and Liquid Cell Imaging and Spectroscopy of Nanocatalysts;* (Invited) **Sarah Haigh**, Nick Clark, Sam Sullivan Allsop, Matthew Lindley, Rui Zhang, Rongsheng Cai, Roman Gorbachev, Thomas Slater

9:00 AM **559** *Electron Ptychography of Twisted Bilayer MoS2 at Elevated Temperatures with < 0.5 Å Resolution;* **Sang Hyun Bae**, Yichao Zhang, Pinshane Huang

9:15 AM **560** *Endotaxial Stabilization of 2D Charge Density Waves with Long-range Order;* **Suk Hyun Sung**, Nishkarsh Agarwal, Ismail El Baggari, Noah Schnitzer, Pat Kezer, Jeremy Shen, Lena Kourkoutis, John Heron, Kai Sun, Robert Hovden

9:30 AM **561** *Direct Observation of Strain-Induced Ferrochiral Transition in Quasi-1D BaTiS3;* (Invited) **Rohan Mishra**, Guodong Ren, Gwan-Yeong Jung, Huandong Chen, Boyang Zhao, Rama Vasudevan, Andrew Lupini, Miaofang Chi, Jordan Hachtel, Jayakanth Ravichandran

P07.4 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Wednesday 8:30 AM

8:30 AM **562** *Atomic-Resolution Analysis of 2-D and Thin Film Quantum Materials;* (Invited) **Robert Klie**

9:00 AM **563** *Plasmon Dispersions of Superconducting BiPt;* **Babafemi Agboola**, Maureen Joel Lagos

9:15 AM **564** *Imaging Point Defects in Quantum Materials Using Multislice Electron Ptychography;* (Invited) **Zhen Chen**, Zehao Dong, Pengcheng Li, Yayu Wang

9:45 AM **565** *Resolving Chemically Driven Charge Ordering in Infinite Layer Nickelates with Multislice Electron Ptychography and 4D-STEM;* **Lopa Bhatt**, Christopher Parzyck, Noah Schnitzer, Darrell Schlom, Kyle Shen, Berit Goodge, David Muller, Lena Kourkoutis

P09.4 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Wednesday 8:30 AM

8:30 AM **566** *In-situ Insight into MXene Oxidation Process via Closed-Cell Transmission Electron Microscopy under Near-Atmospheric Pressure;* **Yongfa Cheng**, Kunmo Koo, Xiaobing Hu, Vinayak Dravid

8:45 AM **567** *The Behavior of Co0.52Mn0.48O/SiO2 Under H2 Using In Situ Closed-Cell Gas-Reaction STEM;* **Kinga Unocic**, Anh T To, Nicole LiBretto, Jeremy Kropf, Daniel Ruddy, Theodore Krause, Lawrence Allard, Susan Habas

9:00 AM **568** *Understanding Phase Stabilization and Transformations in Ga2O3 Wide-Bandgap Semiconductors Through In Situ Transmission Electron Microscopy;* (Invited) **Stephen House**, Kunyao Jiang, Jingyu Tang, Robert Davis, Lisa Porter, Debabrata Das, Ramana Chintalapalle V

9:30 AM **569** *Revealing Atomic Scale Competitive Oxidation Dynamics in Cu-Ni using In Situ ETEM with Advanced Data Analysis;* **Meng Li**, Jimmie McEver, Dmitri Zakharov, Wissam Saidi, Judith Yang

9:45 AM **570** *Unravelling the Reaction Mechanism of Pd-catalyzed Hydrogen Oxidation Through In Situ Gas-cell Transmission Electron Microscopy;* **Yukun Liu**, Kunmo Koo, Xiaobing Hu, Vinayak Dravid

P11.1 Frontiers in Electron Tomography

Wednesday 8:30 AM

8:30 AM **571** *Making Every Electron Count: Strategies for Electron Ptychography at Low Fluence;* (Invited) **Angus Kirkland**, Amirafshar Moshtaghpour, Chen Huang, Ivan Lobato, Abner Velazco-Torrejon, Jingjing Zhao, Peng Wang, Judy Kim

9:00 AM **572** *Using Phase Contrast 4D-STEM to Solve 3D Inorganic and Biological Nanostructures;* (Invited) **Colin Ophus**, Stephanie Ribet, Georgios Varnavides, Philipp Pelz

9:30 AM **573** *Three-Dimensional Imaging of Buried Interfaces in Twisted Hexagonal Boron Nitride;* **Colum M. O'Leary**, Haozhi Sha, Jianhua Zhang, Cong Su, Salman Kahn, Alex Zettl, Jim Ciston, Jianwei Miao

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Wednesday Late Morning

A03.3 Expanding Capabilities of Atom Probe Tomography *(IFES-Organized)*

Wednesday 10:30 AM

10:30 AM **574** *Correlative In-Situ Liquid Cell Electrochemistry TEM and Cryogenic APT of Liquid-Solid Interfaces;* (Invited) **Michele Shelly Conroy**, Neil Mulcahy, Lukas Worch, Ramin Jannat, Hongyu Sun, Mary Ryan, Baptiste Gault, James Douglas

11:00 AM **575** *Advancements in Cryogenic-Atom Probe Tomography to Directly Resolve Electrochemical Interfaces at the Atomic Scale;* **Oliver Waszkiewicz**, Ayman A. El-Zoka, Mary Ryan

11:15 AM **576** *State-of-the-Art and Future Directions of fs-Laser Assisted Specimen Preparation Techniques for Atom Probe Tomography Measurements;* **Michael Tkadletz**, Maximilian Schiester, Oliver Renk, Nina Schalk

11:30 AM **577** *Rapid preparation of Nanoscaleres in Embedded Samples Using Site-Specific Laser Ablation and Focused Ion Beam Milling;* **Anup Sharma**, Levi Tegg, Aristide Djoulde, Deepak Marla, Jing Fu

11:45 AM **578** *High-Pressure Resin Embedment of Mesoporous Silica Supported Nanoparticles for High-Quality Atom Probe Tomography Analysis;* **Jonathan Poplawsky**, Florian Zand, Matteo Monai, Matthew Boebinger, Bert Weckhuysen

A07.3 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Method

Wednesday 10:30 AM

10:30 AM **303** *Chemical State Analysis of Low-Z Elements by X-ray Photoelectron Spectroscopy (XPS);* (Invited) **Mark Biesinger**

11:00 AM **304** *A Simple and Accurate Approach for Thickness Measurement of Particles and Thin Films Using SEM-EDS;* **Mouad Essani**, Juliette Pastore, Fabien Stalport, Hervé Cottin

11:15 AM **305** *Optimal Energy Dispersive X-ray Microanalysis of Low-Z Elements;* **Nicholas Ritchie**, Dale Newbury

11:30 AM **306** *Detecting Trace Boron Doped in Tungsten Plates Using ToF-SIMS, Raman, and SEM;* **Xiao-Ying Yu**, Tim Graening, Guang Yang, Tanguy Terlier, Gabriel Parker, Yutai Katoh

11:45 AM **307** *Assessing the Accuracy of Lithium Contents Determined by Combined Quantitative Backscattered Electron and X-Ray Energy Dispersive Spectroscopy Analysis;* **David Stowe**, Jonathan Lee, Rene de Kloe, Julia Mausz, Shangshang Mu

A09.6 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Wednesday 10:30 AM

10:30 AM **583** *Frozen in Motion: FAIR and Sustainable Data Management in Cryo-EM at the Worldwide Protein Data Bank;* (Invited) **Justin Flatt**, Brian Hudson, Irina Persikova, Yuhe Liang, Zukang Feng, Chenghua Shao, Ezra Peisach, Jasmine Young, Stephen Burley

10:45 AM **584** *Bias in Image-Based Classification by the Autoscale Pre-processing Operation;* **Carol Heckman**

11:00 AM **585** *PEAR: A Knowledge-guided Autonomous Pipeline for Ptychography Enabled by Large Language Models;* **Xiangyu Yin**, Chuqiao Shi, Junjing Deng, Yimo Han, Yi Jiang

11:15 AM **586** *Characterizing Data-dependent Generalization Phenomena for Machine Learning in High-Resolution Transmission Electron Microscopy;* **Luis Rangel DaCosta**, Katherine Sytwu, Mary Scott

11:30 AM **587** *Reward Driven Image Analysis Workflow in Static and Active Learning;* (Invited) **Kamyar Barakati**, Hui Yuan, Amit Goyal, Sergei Kalinin

11:45 AM **588** *Classification of Crystal Systems on HAADF STEM Images using Fractal-Based Neural Network;* **Shinjan Dutta**, Yulong Dai, Alexander M Rakowski, Colin Ophus, Aggelos K Katsaggelo, Maria KY Chan

A10.6 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Wednesday 10:30 AM

10:30 AM **589** *Multimodal STEM and XAS Characterization of Bimetallic Nanocatalysts;* (Invited) **Alexandre Foucher**, Nicholas Marcella, Jennifer Lee, Daniel Rosen, Ryan Tappero, Christopher Murray, Anatoly Frenkel, Eric Stach

11:00 AM **590** *Understanding Ion Implantation Defect Distributions in Silicon Induced by FIB and Other Ion Sources Using Advanced STEM;* **Luis Jauregui**, Ping Lu, Michael Titze, Deanna Campbell, David Scrymgeour

11:15 AM **591** *Mapping the Mechanical Properties of Aluminum Alloys at Macro-to-Micro Scales;* **Dalaver Anjum**, Mohamed Daoud, Inas Taha, Mohamed Helal, James Weston

11:30 AM **592** *Unraveling the Phase Transition in MOFs: Effects of Particle Size and Synthesis Parameters on Material Properties;* **Sara Talebi Deylamani**, Pritam Banerjee, Giuseppe Di Palma, Kasper Pedersen, Joerg Jinschek

11:45 AM **593** *Optical Properties of Aluminum Oxide Compared with Asymptotic Giant Branch Environments from Amorphous to Crystalline Structures;* **Arturo Ponce**, Rakibul Shohan, Francisco Espinosa-Magaña, Cody Cly, Raul Borja-Urby, Angela Speck, Alan Whittington, Beth Sargent, Joseph Nuth

A Analytical/Instrumentation Sciences Symposia – Weds. Late Morning cont.

A11.1 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-Throughput Multi-beam Imaging

Wednesday 10:30 AM

10:30 AM **594** *STEM in SEM and Multiple Beam SEM: Past Achievements and Future Prospects;* (Invited) **Joseph Michael**

11:00 AM **595** *STEM-in-SEM versus SE-InLens-type-SEM as a Reliable Analytical Pair-Tool for Measurement of Nanoparticle Size and Shape Distribution;* **Vasile-Dan Hodoroaba**, Christoph Salzmann, Francesco Pellegri

11:15 AM **596** *Scanning Low Energy Electron Microscopy and Time-of-Flight Spectroscopy Capabilities for Study of Advanced 2D Materials and Thin Foils;* (Invited) **Ilona Müllerová**, Ivo Konvalina, Aleš Paták, Lukáš Průcha, Martin Zouhar, Jakub Piňos, Eliška Materna Mikmeková

11:45 AM **597** *Towards Atomic-Resolution Electron Energy Loss Spectroscopy in an Uncorrected 30kV Scanning Electron Microscope;* **Quentin Ramasse**, Demie Kepaptsoglou, Takeshi Sunaoshi, Kazutoshi Kaji, Satoshi Okada, Yu Yamazawa, Tsutomu Saito, Michael Dixon, Feridoon Azough, Robert Freer

Scientific Program

B Biological Sciences Symposia – Wednesday Late Morning

B01.4 3D Structures: from Macromolecular Assemblies to Whole Cells *(3DEM FIG)*

Wednesday 10:30 AM

10:30 AM **598** *Structural Genetics to Understand Holoenzyme Assembly and Substrate Selection of Diverse Multimeric Serine-Threonine Phosphatases;* (Invited) **Derek Taylor,** Wei Huang, Jiri Veis, Alexander Day, Shouqing Cui, Daniel Leonard, Goutham Narla, Egon Ogris

11:00 AM **599** *Unraveling Structural Characteristics of Honeycomb Amyloid Self-Assembling Peptide: HONEY ASAP!;* **Ingo Lieberwirth**, Francesca Mazzotta, Jasmina Gacanin

11:15 AM **600** *Time- Resolved Cryo-EM using Acoustofluidics;* **Venkata Dandey**, Wyatt Peele, Kaichun Yang, Tony Huang, Mario Borgnia

11:30 AM **601** *Structural Dynamics of Heteromeric Glycine Receptor Complex;* (Invited) **Sudha Chakrapani**, Eric Gibbs, Emily Klemm, David Seiferth, Arvind Kumar, Serban Ilca, Philip Biggin

B06.2 Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization

Wednesday 10:30 AM

10:30 AM **602** *Iodine-Loaded Albumin Nanoparticles for X-ray Computed Tomography (CT) and Iodine-Enhanced Radiation Therapy (I-ERT);* **Vishwas Joshi**, Anuja Ria Joshi

10:45 AM **603** *Microscopic and Elemental Characterization of PLLA functionalized with electrosinthetized AgNPs;* **Carlos Arzate-Quintana**, Iván René Ramos-Moctezuma, César Leyva-Porras, Edmundo Berumen-Nafarrate, Venecia Jazmín Ruelas-Casas, Susana Aideé González-Chávez, María Alejandra Favila-Pérez, Irene Leal-Berumen

11:00 AM **604** *From Powder to Structure: Multi-Dimensional Electron Diffraction to Enhance Small Molecule Pharmaceutical Formulation Characterization and Development;* **Helen Leung**, Royston Copley, Duncan Johnstone, Paul Midgley

11:15 AM **605** *Fast Event-Based Electron Counting for Small Molecule Structure Determination by microED;* **Niko Vlahakis**, Songrong Qu, Logan Richards, Jose Rodriguez

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

C01.6 Emerging 4D STEM Techniques in Materials and Biological Sciences

Wednesday 10:30 AM

10:30 AM **606** *MicroED-informed 4D-STEM of MOFs for Carbon Capture;* (Invited) **Sarah (Sally) Karstens**, Matthew Dods, Ambarneil Saha, Karen Bustillo, Peter Ercius, Jeffrey Long, Andrew Minor

11:00 AM **607** *Applying Precession Electron Diffraction to Cepstral Analysis to Investigate Polarity in Ferroelastically Tilted Specimens;* **Allison Mis**, Colton Brown, Megan Holtz

11:15 AM **608** *Robust Strain Analysis of Complex Heterostructures by Whole Pattern Fitting;* **Steven Zeltmann**, Hem Prasad Bhusal, Aiming Yan, Colin Ophus

11:30 AM **609** *Towards High-throughput Low Dose Observation by OBF STEM;* **Takehito Seki**, Kousuke Ooe, Mitsuru Nogami, Yuichi Ikuhara, Naoya Shibata

11:45 AM **610** *Elucidating Electrostatics at Grain Boundaries in Perovskite Solid Electrolytes Using 4D-STEM;* **Chaojie Du**, Tom Lee, Yifeng Huang, Toshihiro Aoki, Zhaokun Wang, Xiaoqing Pan

C06.6 Memorial Symposium: Lena Fitting Kourkoutis

Wednesday 10:30 AM

10:30 AM **611** *Probe Correlated Quantum Phenomena at High Spatiotemporal Resolution and Cryogenic Temperatures;* (Invited) **Yimei Zhu**, Lijun Wu, Shiqing Deng, Myung-Geun Han, Chuhang Liu, Spencer Reisbick, Alex Pofelski

11:00 AM **612** *Cryogenic STEM in the World of Relaxor Ferroelectric Materials;* (Invited) **James LeBeau**

11:30 AM **613** *In Situ Cryo 4D STEM of CDW Phase Transitions in Quantum Materials;* (Invited) **Judy Cha**, James Hart, Saif Siddique, Noah Schnitzer, Lopa Bhatt, Lena Kourkoutis

C08.2 Vendor Symposia

Wednesday 10:30 AM

10:30 AM **614** *New Generation Environmental In Situ TEM Holder for Gas Cell Research Across Multiple Platforms;* **Hector Hugo Perez Garza**, Yevheniy Pivak, Dan Zhou, Christian Deen-van Rossum, Merijn Pen, Ronald Spruit, Hongkui Zheng, Hongyu Sun

10:45 AM **615** *Determining the best Ar ion milling sample preparation conditions for SEM applications;* **Pawel Nowakowski**, Mary Ray, Paul Fischione

11:00 AM **616** *Latest Developments in Post-FIB Concentrated Ar Ion Beam Milling of TEM Specimens with Large Electron-transparent Areas;* **Cecile Bonifacio**, Pawel Nowakowski, Mary Ray, Paul Fischione

11:15 AM **617** *Enhancing Backscattered Electron Detection in SEM: Investigating Geometric Collection Efficiency and Diode Layout Optimization;* **Mozhdeh Abbasi**, Maximilian Schmid, Alessia Mafodda, Stefan Aschauer

11:30 AM **618** *Multivariate Volume Data: Achieving Deeper Insight through Multivariate Volume Rendering and Machine-Guided Exploration;* **Patrick Avery**, Sankhesh Jhaveri, Ayush Kumar, Xinyu Zhang, Huolin Xin, Hanfei Yan, Xiaojing Huang, Wei Xu, Klaus Mueller

11:45 AM **619** *Development of a Multimodal Robotic Device for 2D and 3D Inspection and Analysis of Objects;* **Marek Kotrlý**, Josef Uher, Jan Jakubek, Ivana Turková, Marek Kotrlý

Scientific Program

P Physical Sciences Symposia – Wednesday Late Morning

P03.5 Electron Microscopy of Advanced Functional Materials

Wednesday 10:30 AM

10:30 AM **620** *Probing Ferroelastic Strain and Stacking Orders in van der Waals Ferroelectrics via Multi-modal 4D-STEM;* **Chuqiao Shi**, Nannan Mao, Tianyi Zhang, Jing Kong, Yi Jiang, Yimo Han

10:45 AM **621** *Four-Dimensional Scanning Transmission Electron Microscopy (4D-STEM) for Catalytic Nanoparticles;* (Invited) **Yimo Han**, Chuqiao Shi, Zhihua Cheng, Alberto Leonardi, Kaijie Zhao, Yao Yang, Michael Engel, Matthew Jones

11:15 AM **622** *Characterizing the 3D Polar Texture of Ferroelectric Relaxors using Multislice Electron Ptychography;* **Menglin Zhu**, Michael Xu, Colin Gilgenbach, Bridget Denzer, James LeBeau

11:30 AM **623** *Revealing 3D Defect Structure in van der Waals Ferroelectric α-In2Se3 via Multislice Electron Ptychography;* **Gillian Nolan**, Edmund Han, Shahriar Nonahid, Patrick Carmichael, Arend van der Zande, André Schleife, Pinshane Huang

11:45 AM **624** *Elucidating the Polar Structure of Twinned Domains in BiI 3 Using Electron Ptychography;* **Bridget Denzer**, Deokyoung Kang, Menglin Zhu, Michael Xu, Colin Gilgenbach, Lane Martin, James LeBeau

P04.3 Science and Applications of High-Entropy Materials

Wednesday 10:30 AM

10:30 AM **625** *Transmission Electron Microscopy Characterization of Deformation Features in Refractory High Entropy Alloys;* **Madelyn Payne**, David Cook, Punit Kumar, Mingwei Zhang, Robert Ritchie, Mark Asta, Andrew M Minor

10:45 AM **626** *Observation of Structural & Chemical Configuration, Lattice Distortion, Defect Dynamics and Phase Evolution in High-Entropy Transition Metal Carbides;* (Invited) **Xiangyu Zhu**, Zijiao Wu, Qingxiao Wang, Yuan Wu, Xiongjun Liu, Hui Wang, Suihe Jiang, Zhaoping Lv, Moon Kim

11:15 AM **627** *TEM and Mechanical Properties Study of Tungsten Carbide Bonded with Equiatomic Cantor Alloy CoCrFeMnNi;* **M.A. Ruiz-Esparza-Rodriguez**, C.G. Garay-Reyes (Invited), I. Estrada-Guel, X. Atanacio-Sánchez, P. A. Guerrero-Seañez, Leonardo Baylón García, J.M. Mendoza-Duarte, A. Martínez-García, R. Martínez-Sánchez

11:30 AM **628** *TEM Characterization of Radiation-Induced Segregation at Irradiation-Induced Dislocation loops in Al0.3CoCrFeNi and CoCrFeMnNi High Entropy Alloys;* **Nestor J. Zaluzec**, Wei-Ying Chen

11:45 AM **629** *Structural and Chemical Analysis of Entropy-Engineered Vanadium Rich 2D Thiophosphates (MPS3);* **Patricia Meza**, Abishek Iyer, Roberto dos Reis, Yukun Liu, Mercouri Kanatzidis, Vinayak Dravid

P05.6 Advanced Imaging and Spectroscopy Beyond Room Temperature

Wednesday 10:30 AM

10:30 AM **630** *Atomic-Scale Insights into the High-Pressure Superconductor La3Ni2O7 and Topotactically Reduced LaNiO2 Single Crystals;* (Invited) **Y. Eren Suyolcu**, Yu-Mi Wu, Pablo Sosa-Lizama, Pascal Puphal, Masahiko Isobe, Bernhard Keimer, Matthias Hepting, Peter A. van Aken

11:00 AM **631** *Correlating Cryogenic Ptychography and EELS to Disentangle Structural and Electronic Components of a Metal-Insulator Transition in NdNiO3;* **Lopa Bhatta,** Noah Schnitzer, Yonghun Lee, Xin Wei, Yi Jiang, Harold Hwang, Berit Goodge, David Muller, Lena Kourkoutis

11:15 AM **632** *Revealing Laser Interactions with Thin Films Using in situ Methods;* **Kinga Unocic**, John Lasseter, Yousub Lee, Rangasayee Kannan, Kevin Roccapriore, Philip Rack, Spencer Gellerup, Stephen Jesse, Harry Meyer III, Steven Randolph

11:30 AM **633** *Quantitative Study of Grain Boundary Dynamics at High Temperatures Using In Situ Transmission Electron Microscopy;* (Invited) **Xiaoqing Pan**, Yuan Tian, Yutong Bi, Jian Han, David Srolovitz

P07.5 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Wednesday 10:30 AM

10:30 AM **634** *V2O3 Thin Film Insulator-Metal Transition Characterization Using Cryogenic 4D-STEM;* **Alexandre Pofelski**, Yoav Kalcheim, Pavel Salev, Alberto Rivera, Chubin Huang, Ivan Schuller, Javier Del Valle, Yimei Zhu

10:45 AM **635** *Unlocking Orbital-Driven Peierls Dimerization: Atomic-Scale Insights into the Unconventional Metal-to-Metal Phase Transition in NaRu2O4;* **Anna Scheid**, Isha Lallar, Arvind Kumar Yogi, Masahiko Isobe, Birgit Bussmann, Tobias Heil, Peter A. van Aken

11:00 AM **636** *Cryo-STEM Mapping of Phase Transitions in Oxide Quantum Materials with Atomic Resolution;* (Invited) **Noah Schnitzer**, Lopa Bhatt, Ismail El Baggari, Berit Goodge, David Muller, Lena Kourkoutis

11:30 AM **637** *Atomic Scale Observation of Incommensurate Modulation in Ba2TiSi2O8;* **Hwangsun Kim**, Elizaveta Tiukalova, Michael E. Manley, Raphael Hermann, Miaofang Chi, Andrew Lupini

P09.5 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Wednesday 10:30 AM

10:30 AM **638** *Evolution of Incommensurate Charge Density Waves Quantified with In Situ TEM;* **Jeremy Shen**, Suk Hyun Sung, Nishkarsh Agarwal, Alex Stangel, Robert Hovden

10:45 AM **639** *Towards In-situ Electromagnetic Field Imaging by Differential Phase Contrast Scanning Transmission Electron Microscopy;* (Invited) **Naoya Shibata**

11:15 AM **640** *In-situ TEM Study and Control of Octahedral Units' Migration in Rutile TiO2;* **Silu Guo**, Supriya Ghosh, Sreejith Nair, Bharat Jalan, K. Andre Mkhoyan

11:30 AM **641** *In-situ Observation of Formation Mechanism of Infinite-layer Iron Oxide;* **Yaolong Xing**, Inhwan Kim, Kyeong Tae Kang, Woo Seok Choi, Jaekwang Lee, Sang Ho Oh

11:45 AM **642** *Visualizing Crystallization of Porous High Entropy Oxide and 2D High Entropy Oxide Nanosheets from Multielement Gel Precursor;* **Azadeh Amiri**, Reza Shahbazian-Yassar

P07.5 Frontiers in Electron Tomography

Wednesday 10:30 AM

10:30 AM **643** *3D and 4D Structure Analysis of Colloidal Nanoparticles Using Graphene Liquid Cell TEM;* (Invited) **Jungwon Park**, Sungsu Kang, Joodeok Kim

11:00 AM **644** *Three-Dimensional Origin Of Fivefold Misfit in Icosahedralon Multiply Twinned Particles at Atomic Level;* (Invited) **Jihan Zhou**, *Zhen Sun, Yao Zhang, Zezhou Li, Xuanxuan Du, Zhiheng Xie, Yiheng Dai, Colin Ophus*

11:30 AM **645** *Atomic-Scale 3D Structural Analysis of Core-Shell Nanoparticles;* (Invited) **Hung Jo**, Dae Han Wi, Taegu Lee, Alexander Pattison, Wolfgang Theis, Colin Ophus, Peter Ercius, Seunghwa Ryu, Sang Woo Han, Yongsoo Yang

11:45 AM **646** *Atomic Electron Tomography of Thin Films;* **Aviram Bhalla-Levine**, Kunwoo Park, Jungwon Park, Peter Ercius, Jianwei Miao

Scientific Program

T Technologists' Forum – Wednesday Late Morning

X30.1 Exploring New Methods in Volume Electron Microscopy (vEM)

Wednesday 10:30 AM

10:30 AM **647** *Challenges of Sample Preparations for vEM-CLEM;* (Invited) **Naomi Kamasawa**

11:00 AM **648** *Strategies for Optimizing SBF-SEM Imaging of Biological Samples;* (Invited) **Joseph Sall**, Chris Petzold, Feng-Xia Liang

A Analytical/Instrumentation Sciences Symposia – Wednesday Afternoon

A01.1 Advances in Cathodoluminescence Spectroscopy and Analysis

Wednesday 1:30 PM

1:30 PM **649** *Combining Cathodoluminescence Hyperspectral Imaging with Other Electron Microscopy Modes to Study Semiconducting Materials for Ultraviolet Applications;* (Invited) **Paul Edwards**, Douglas Cameron, Daniel Hunter, Naresh Kumar, Robert Martin

2:00 PM **650** *Cathodoluminescence and Friends to Study Defects in UV Emitters;* **Douglas Cameron**, Marcel Schilling, Gunnar Kusch, Paul Edwards, viesturs Spulis, Tim Wernicke, Michael Kneissl, Rachel Oliver, Robert Martin

2:15 PM **651** *High-Resolution STEM Cathodoluminescence of 2D Exfoliated Quantum Emitters;* **Hanyu Hou**, Muchuan Hua, Thomas Gage, Benjamin Diroll, Jian-Min Zuo, Jianguo Wen

2:30 PM **652** *Spatial, Spectral and Time Resolution: Tackling the Challenges of Multidimensional Luminescence Data Analysis with LumiSpy;* (Invited) **Mikel Gómez Ruiz**, Jonas Lähnemann

A06.1 Electronic and Thermal Device Characterization with Electron Microscopy

Wednesday 1:30 PM

1:30 PM **653** *From Imaging Conductivity to Imaging Electron Density;* (Invited) **Ondrej Dyck**, Jawaher Almutlaq, David Lingerfelt, Jacob Swett, Bevin Huang, Andrew Lupini, Dirk Englund, Stephen Jesse

2:00 PM **654** *TEM Specimen Preparation for STEM-EBIC Analysis of Advanced Semiconductor Devices;* **Cecile Bonifacio**, William Hubbard, Richard Li, Mary Ray, Paul Fischione

2:15 PM **655** *Adapting Conventional SEM and STEM Instruments for Acquisition of Electron-Beam Induced Current (EBIC) Images;* **Fernando Camino**, Myung-Geun Han, Alexandre Pofelski, Armando Rua, Kim Kisslinger, Daniel Hayes (Invited), Juan Alban, Rakesh Agrawal

A09.7 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

Wednesday 1:30 PM

1:30 PM **656** *3D Automated Mineralogical Classification, Characterization and Quantification of Blended Portland Cements using X-ray Microscopy, Deep Learning, and AI;* **Ria Mitchell**, Andy Holwell, John Provis, Antonia Yorkshire, Sarah Kearney

1:45 PM **657** *Deleting a Diffraction Dimension–Real-Time in-situ Visualization via Python;* **Benjamin Miller**, Cory Czarnik

2:00 PM **658** *The Position Dependence Of Electron Beam Induced Effects in 2D materials with Deep Neural Networks;* **Kevin Roccapriore**, Max Schwarzer, Jesse Farebrother, Riccardo Torsi, Igor Mordatch, Aaron Courville, Marc Bellemare, Joshua Robinson, Pablo Samuel Castro, Sergei Kalinin

2:15 PM **659** *Event-responsive Beam-modulated STEM with Multi-frame and Sparse Scanning;* **Matthew Mosse**, Jonathan Peters, Bryan Reed, Daniel Masiel, Shelly Michele Conroy, Lewys Jones

2:30 PM **660** *Automated High-Resolution Phase-Contrast Scanning Transmission Electron Microscopy;* (Invited) **Alexander Pattison**, Cassio Pedroso, Bruce Cohen, Justin Ondry, Paul Alivisatos, Wolfgang Theis, Peter Ercius

2:45 PM **661** *Atomic lock-On: In Situ Picometer Precise Beam Placement in the Scanning Transmission Electron Microscope;* **Julian Klein**, Kevin Roccapriore, Frances Ross

A10.7 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Wednesday 1:30 PM

1:30 PM **662** *Integrating Soil Aggregate Chemical Imaging with Soil 3D Physical Structure through Multimodal Data Analysis;* **Odeta Qafoku**, Tamas Varga, Anil Battu, Peter Zwart, Maruti Mudunuru, Charles Resch, David D'Amore, Rebecca Lybrand, Devin Rippner

1:45 PM **663** *Correlative Microscopy Analysis for Battery Materials;* **Yulia Trenikhina**, Nathan Johnson, Stephen Kelly

2:00 PM **664** *A Correlative Look at Battery Cathodes;* **James Sagar**, Daniel Haspel, Joshua Lea, Jonathan Moffat, Pedro Machado

2:15 PM **665** *Advancements in Controlled Environment Workflows for Cryo-APT and Correlative Studies;* **Urs Maier**, Claudio Weiss, Oliver Waszkiewicz, Marc Maier, Tobias Hofmaenner, Ayman A. El-Zoka

2:30 PM **666** *Correlative EDS and Raman spectroscopy;* **Markus Boese**, Stephen Kelly, Thomas Meyer, Ute Schmidt

2:45 PM **667** *Tunnel-Shaped Weathering Features in Soil Grains: Why 3D Imaging must be Performed for Accurate Characterization and Interpretation;* **Ria Mitchell**, Paul Kenrick, Andrew Bodey, James Mansfield, Richard Johnston

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Weds. Afternoon cont.

A11.2 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-Throughput Multi-beam Imaging

Wednesday 1:30 PM

1:30 PM **668** *Large-Scale Connectomics with Multi-Beam Scanning Electron Microscopy;* (Invited) **Meike Sievers**, Alessandro Motta, Martin Schmidt, Moritz Helmstaedter

2:00 PM **669** *High-Throughput Plastic Localization Measurements by Multi-Beam SEM Imaging;* **J.C. Stinville**, R.L. Black, Tomasz Garbowski, C. Bean, Anna Lena Eberle, Stephan Nickel

2:15 PM **670** *Ion Beam Etching And Milling—Multibeam Scanning Electron Microscopy | IBEAM-MSEM;* (Invited) **Thomas Templier**, Kenneth Hayworth, David Peale, Harald Hess

2:45 PM **671** *Rapid Chip Reverse Engineering Using Laser, FIB, and SEM;* **Matthew Maniscalco**, Hongbin Choi, Nicholas May, Adrian Phoulady, Alexander Blagojevic, Toni Moore, Sina Shahbazmohamadi, Pouya Tavousi

B Biological Sciences Symposia – Wednesday Afternoon

B01.4 3D Structures: from Macromolecular Assemblies to Whole Cells *(3DEM FIG)*

Wednesday 1:30 PM

1:30 PM **672** *From Crystals to Cells: Freezing Challenging Biological Targets With The VitroJet;* **Elizabeth Wright**, Jae Yang, Bryan Sibert, Matthew Larson

1:45 PM **673** *Quantum C100, a Wafer Scale CMOS Detector Optimised for 100 keV Cryo Electron Microscopy;* **Herman Larsen**, Mohamed El Sharkawy, Ben Marsh, Tobias Starborg, Matthew Hart, Craig Macwaters, Angus Kirkland, Nicola Guerrini, Iain Sedgwick, Sam W Hutchings

2:00 PM **674** *Miniaturizing and Accelerating Structure Determination by Combining Cell-Free Expression, Picoliter Deposition and Cryo-EM;* **James Evans**, Trevor Moser, Samantha Powell

2:15 PM **675** *Electron Tomography Finds Three-Dimensional Chromatin Packing Domain Structure in Single Cell Different from Topological Associated Domains;* **Wing Shun Li**, Lucas Carter, Luay Almassalha, Emily Pujadas, Marcelo Carignano, Reiner Bleher, Roberto dos Reis, Vadim Backman, Vinayak Dravid

2:30 PM **676** *Optimizing a Pipeline for Eukaryotic Ultrastructure;* **Victoria Pappas**, Paul DeCaen

2:45 PM **677** *Cryo-Electron Tomography of Chlamydomonas Reinhardtii: Leveraging Electron Event Representation (EER) Image Format in Visual Proteomics;* **Martin Obr**, Jeroen Keizer, Ricardo Righetto, Xianjun Zhang, Ron Kelley, Sagar Khavnekar, Erik Franken, Ben Engel, Jürgen Plitzko, Abhay Kotecha

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Wednesday Afternoon

C03.1 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

Wednesday 1:30 PM

1:30 PM **678** *Cryo-FIB Milling for Uni- and Multicellular Samples—The Base For Cryo-Electron Tomography At Molecular Resolution;* (Invited) **Jürgen Plitzko**, Oda Schiøtz, Christoph Kaiser, David Klebl, Florian Beck, Johann Brenner, Sven Klumpe

2:00 PM **679** *Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques for the Analysis of Epoxy-Embedded and Native Bio-Samples;* **Olivier De Castro**, Tatjana Taubitz, Zahraa Berro, Jean-Nicolas Audinot, Tom Wirtz, Antje Biesemeier

2:15 PM **680** *The STEP Initiative—A Materials Genome Approach for Open Resource Sharing;* **Deb Kelly**, William Dearnaley, Jennifer Gray

2:30 PM **681** *Biology in its Element: Using Energy Dispersive X-ray Spectroscopy Scanning Transmission Electron Microscopy (EDX-STEM) to Probe Bacterial Ultrastructure;* **Brian Caffrey**, Adrián Pedrazo-Tardajos, Emanuela Liberti, Ben Gaunt, Judy Kim, Professor Kirkland

2:45 PM **682** *Vibrational Spectroscopy of Structured Fluids Using Cryogenic STEM-EELS;* **David McComb**, Brittany Ford, Alexander Reifsnyder, Andrew Lupini, Jordan Hachtel

C05.1 Correlative Microscopy Using Light, Electron, and X-ray Microscopy

Wednesday 1:30 PM

1:30 PM **683** *Correlative Cryo-Electron Tomography on Isolated Plasma Membranes;* (Invited) **Kem Sochacki**, Willy Sun, Dennis Michalak, Prasanthi Kunamaneni, Jenny Hinshaw, Justin Taraska

2:00 PM **684** *Latest Developments in Precise Correlative Cryo-FIB Milling for Cryo-ET Lamella Production;* **Marit Smeets**, Deniz Daviran, Wessel Teunisse

2:15 PM **685** *Integrating cryo soft x-ray tomography into light and electron microscopy workflows;* **Sergey Kapishnikov**, Paul Sheridan, William Fyans, Fergal O'Reilly, Tony McEnroe, Kenneth Fahy

2:30 PM **686** *CoCID: Compact Cell Imaging Device for Correlative Investigation of Hepatitis E Infection;* **Christopher Evans**, Kenneth Fahy, Sergey Kapishnikov, Tiina O'neill, Dimitri Scholz, Nicola Fletcher

2:45 PM **687** *Design Concept of Cryogenic Plasma Focused Ion Beam (cryo-PFIB) Supported X-ray Microscopy for Multidimensional Biological Systems;* **Tugba Isik**, Benjamin Davis, Evan Maxey, Yuzi Liu, Si Chen

C03.3 Vendor Symposia

Wednesday 1:30 PM

1:30 PM **688** *Investigation of Ultra-Low-Voltage SEM Imaging Method of Battery Materials;* **Yoichiro Hashimoto**, Yutaka Nagaoka, Toru Aiso, Shuhei Yabu, Masahiro Sasajima

1:45 PM **689** *Elimination of Human Error in Critical Point Drying Process in Sample Preparation for Electron Microscopy;* **Anna Walkiewicz**

2:00 PM **690** *Crystal Structure Elucidation with the MerlinEM Hybrid Pixel Direct Electron Detector;* **Gearóid Mangan**, Matus Krajnak, Andrew Stewart

2:15 PM **691** *Two Beam RAFA Lens's Focused Enhancement Of HIFU Medical Treatment;* **Rodney Herring**, M Reade, Mohammed Yahya

2:30 PM **692** *Improved EPMA Analysis of Rare Earth and Trace Elements Using a New Precision Germanium WDS Crystal;* **Stephen Kuehn**, Donald Lesher, Boris Verman, Licai Jiang, Nick Grupido

2:45 PM **693** *trame: an Open Source Framework for Efficiently Building Interactive Visualization and Analysis Applications;* **Patrick Avery**, Sebastien Jourdain, Patrick O'Leary

P Physical Sciences Symposia – Wednesday Afternoon

P01.1 Innovative Magnetic Imaging

Wednesday 1:30 PM

1:30 PM **694** *Electron Ptychography and Aberration-Corrected 4D-STEM for Magnetic Imaging;* (Invited) **David Muller**

2:00 PM **695** *Mapping Magnetic Field by Retrieving and Refining the Center Position of n-uniform Diffraction Disks in Lorentz 4D-STEM;* **Lijun Wu**, Myung-Geun Han, Yimei Zhu

2:15 PM **696** *Probing Magnetic Properties at the Nanoscale: A Novel Setup for In-Situ Hall Measurements in a TEM;* **Pohl Darius**, Yejin Lee, Dominik Krieger, Sebastian Beckert, Sebastian Schneider, Andy Thomas, Bernd Rellinghaus

2:30 PM **697** *Imaging Nanomagnetism with Interference and Spins of Electrons;* (Invited) **Benjamin McMorran**

P03.6 Electron Microscopy of Advanced Functional Materials

Wednesday 1:30 PM

1:30 PM **698** *Crystallographic Analysis of Intertwined Nano-Domain Microstructure Of Gamma-Al2O3;* **Libor Kovarik**, Mark Bowden, Konstantin Khivantsev, Janos Szanyi

1:45 PM **699** *Comparative S/TEM Study of Superconducting Ta Quantum Resonators by Wet and Dry Etching Types;* **Junsik Mun**, Chenyu Zhou, Nana Shumiya, Kim Kisslinger, Rebecca Cummings, Nathalie de Leon, Mingzhao Liu, Yimei Zhu

2:00 PM **700** *Investigating Pulsed Laser Annealing of Hafnia-Zirconia Using a Dynamic Transmission Electron Microscope;* **Aida Amini**, Katharina Kohlmann, Sebastian Obernberger, Andreas Ruediger, Kenneth Beyerlein

2:15 PM **701** *Observation of Ultra-Thin Polar Domains in La-doped HfO2;* **Guodong Ren**, Xin Li, Pravan Omprakash, Jordan Hachtel, Andrew Lupini, Miaofang Chi, Xiaoshan Xu, Rohan Mishra

2:30 PM **702** *Nanoscale Charge Redistribution under Electron and Photon Illumination: Insights from Off-axis Electron Holography;* (Invited) **Piyush Haluai**, Martha McCartney, Blake Dorame, Yifan Wang, Peter Crozier

P04.4 Science and Applications of High-Entropy Materials

Wednesday 1:30 PM

1:30 PM **703** *Extended Cation Solubility in the A6B2O17 (A = Zr, Hf; B = Nb, Ta) Family of Phases;* **R. Jackson Spurling**, Jon-Paul Maria

1:45 PM **704** *Performance of High Entropy Alloys Under Severe Environments via In-situ Transmission Electron Microscopy-Irradiation Experiments;* (Invited) **Osman El Atwani**, Matheus Tunes, Enrique Martinez

2:15 PM **705** *Investigation of the Influence of Growth Conditions on the Local Structure in High Entropy Oxides using S/TEM;* **Sai Venkata Gayathri Ayyagari**, Leixin Miao, Gabriela Niculescu, Matthew Webb, John Barber, John Heron, Christina Rost, Nasim Alem

2:30 PM **706** *Atomic Structure and Chemistry of High-Entropy Oxide Grain Boundaries revealed by STEM Imaging, Strain Mapping, and Spectroscopy;* **Huiming Guo**, Hasti Vahidi, Hyojoo Kang, Soham Shah, Mingjie Xu, Toshihiro Aoki, Timothy Rupert, Jian Luo, Kandis Leslie, Gilliard-AbdulAziz, William Bowman

2:45 PM **707** *Developing High-area Silica Supported High-entropy Oxide Nanoclusters for Heterogeneous Catalysis: Characterization Challenges;* **Jingyue Liu**, Yiwei Yu, Bailey Holmes

P07.6 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Wednesday 1:30 PM

1:30 PM **708** *Separating Surface Relaxations from Bulk Structure with Multislice Ptychography;* (Invited) **Harikrishnan K. P.**, Kevin Crust, Kinnary Patel, Aarushi Khandelwal, Sergey Prosandeev, Ruijuan Xu, Yu-Tsun Shao, Laurent Bellaiche, Harold Hwang, David Muller

2:00 PM **709** *Probing Sub-Unit Cell Polarization Waves in Multiferroic Layered Oxides with EELS;* **Geri Topore**, Lynette Keeney, Quentin Ramasse, Sinead Griffin, Baptiste Gault, Shelly Michele Conroy

2:15 PM **710** *Revealing Picoscale Incommensurate Modulations in a Multiferroic by Electron Ptychography;* **Ting-Ran Liu**, Maya Ramesh, Lucas Caretta, Ramamoorthy Ramesh, Darrell Schlom, Yu-Tsun Shao

2:30 PM **711** *Exploring the Structure of the Chiral, One-Dimensional Semiconductor InSeI via High-Resolution Electron Microscopy;* **Patrick Hays**, Melike Erdi, Brent Nannenga, Dewight Williams, Sefaattin Tongay, Sandhya Susarla

Scientific Program

P Physical Sciences Symposia – Wednesday Afternoon cont.

P09.6 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Wednesday 1:30 PM

1:30 PM **712** *Liquid Cell Electron Microscopy with Self-Supervised Machine-Learning Denoising Framework;* (Invited) **Jungwon Park**, Joodeok Kim, Sungsu Kang

2:00 PM **713** *Determining the Extent of Radical Diffusion and Corresponding Irradiation Damage During Liquid-Phase TEM Experiments via Post-Mortem 4D-STEM;* **Nathan Rosenmann**, Karthik Gnanasekaran, Roberto dos Reis, Nathan Gianneschi

2:15 PM **714** *Characterization of Electron Beam Effects in Liquid Phase TEM Study of Chemical Processes;* **Haimei Zheng**, Daewon Li, Sophia Betzler

2:30 PM **715** *Operando Electrochemical Liquid-Cell STEM (EC-STEM) at Dynamic Catalyst Interfaces;* (Invited) **Yao Yang**, Chuqiao Shi, Yimo Han

P10.1 In Situ and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials

Wednesday 1:30 PM

1:30 PM **716** *Atomic-scale Dynamics of the Initial Stages of Cu and Cu Alloy Oxidation;* (Invited) **Judith Yang**, Meng Li, Dmitri Zakharov, Jack McEver, Linna Qiao, Xiaohui Qu, Samuel Gleason, Jim Ciston, Guangwen Zhou, Deyu Lu

2:00 PM **717** *In situ Studies of Cu Catalyzed CO2 Electro-reduction by soft X-ray Scanning Transmission X-ray Microscopy and soft X-ray Spectro-Ptychography;* **Adam Hitchcock**, Chunyang Zhang, Haytham Eraky, Drew Higgins

2:15 PM **718** *Tracking Metal/Oxide Interface Evolution and Reaction Kinetics of Fusion Energy Nanostructured Tungsten Material Using In-situ ETEM;* **Rajat Sainju**, Marlene Pati , Matthew Baldwin, Osman El Atwani, Yuanyuan Zhu

2:30 PM **719** *Understanding the Durability of Nanocatalysts in Energy Conversion Devices by Advanced Electron Microscopy;* (Invited) **Paulo Ferreira**

P11.3 Frontiers in Electron Tomography

Wednesday 1:30 PM

1:30 PM **720** *Atomic Electron Tomography for Multi-Dimensional Data;* (Invited) **Yongsoo Yang**, Chaehwa Jeong, Juhyeok Lee, H Yesung Jo, Jaewhan Oh, Si-Young Choi, YongKeun Park, Colin Ophus, Sergey Prosandeev, Laurent Bellaiche

2:00 PM **721** *Chemical Electron Tomography at Lower Dose and Higher Resolutions;* (Invited) **Robert Hovden**, Jonathan Schwartz, Suk Hyun Sung, Peter Ercius, Mary Scott, Zichao Wendy Di, Yi Jiang, Steve *Rozeveld*

2:30 PM **722** *Unveiling Complex Topological Polar Structures in Ferroelectric BaTiO3 Nanoparticles via Atomic Electron Tomography;* **Chaehwa Jeong**, Juhyeok Lee, H Yesung Jo, Hionsuck Baik, Kyoung-June Go, Junwoo Son, Si-Young Choi, Sergey Prosandeev, Laurent Bellaiche, Yongsoo Yang

2:45 PM **723** *3D Geometric Phase Analysis for Electron Tomography (Conference Abstract);* **William Millsaps**, Jonathan Schwartz, Mary Scott, Colin Ophus, Robert Hovden

T Technologists' Forum – Wednesday Afternoon

X32.1 Technologists' Forum Roundtable: Tips for Managing an EM Lab

Wednesday 1:30 PM

1:30 PM **724** *Biological Specimen Preparation Workflows in EM Laboratories;* (Invited) **Steven Goodman**

1:30 PM **725** *Tips and Tricks for Managing an EM Lab;* (Invited) **Ru-ching Hsia**, RIchard Martens, Natalia de Val, Lee Cohen-Gould, Debra Page Baluch

A Analytical/Instrumentation Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

A03.P1 Expanding Capabilities of Atom Probe Tomography (IFES-Organized)

POSTER # 229

726 *Advanced characterization of Metallic Fuels by Atom Probe Tomography;* **Sohail Shah**, Charlyne Smith, Daniele Salvato, Anshul Kamboj, Tiankai Yao, Fei Teng, Jeffrey Giglio, Mukesh Bachhav

POSTER # 230

727 *Atom Probe Tomography (APT) Characterization of Annular U-Zr Metallic Fuel cladded with HT-9;* **Arnold Pradhan**, Sohail Shah, Mukesh Bachhav, Tiankai Yao

POSTER # 231

728 *Atom Probe Tomography of Porous Fuel Cell Electrodes;* **David Larson**, Katherine Rice, Isabelle Martin, Maxime Hubert, Ozden Celikbilek, Jerome Laurencin

POSTER # 232

729 *Comprehensive Experimental Study of Insulating Aluminum Oxide (α-Al2O3) Using NUV- and EUV-Pulsed Atom Probe Tomography;* **Jacob Garcia**, Ann Chiaramonti, Benjamin Caplins, Luis Miaja-Avila, Norman Sanford

POSTER # 233

730 *Microstructural Investigation of Porous Plating Copper by Atom Probe Tomography;* **Naochika Kon Nobuyasu**, Jun Uzuhashi, Tadakatsu Ohkubo

POSTER # 234

731 *Using Voltage-plus-Laser Mode to Characterize the Atom-Probe Field-Evaporation Properties of a Standard Silicon Specimen;* **Ty Prosa**, Michael Holman, Yimeng Chen, David Reinhard

A07.P1 Triumphs, Trials, and Trepidations in Quantifying Low-Z Elements with Microanalytical Methods

POSTER # 235

732 *An Improved Sum Peak Removal Method for EDS Analysis;* **Stephen Seddio**

POSTER # 236

733 *Characterization and Customization of Individual EDS Detectors to Improve X-ray Microanalysis of Light Elements;* **Philippe Pinard**, Simon Burgess, John Zhang, Peter Statham

POSTER # 237

734 *Considerations for Determining Duane-Hunt Limits on Electron Beam Instruments;* **John Donovan**, Petras Jokubauskas, Nicholas Ritchie, John Fournelle, Andrew Ducharme

POSTER # 238

735 *Development of Electron-Beam Induced Soft X-ray and Vacuum Ultraviolet Emission Spectrometer;* **Shogo Koshiya**, Takanori Mura, Peter McSwiggen, Vern Robertson

POSTER # 239

736 *Exploring the Use of Electron Rutherford Backscattering for the Detection and Quantification of Light Elements in Scanning Electron Microscope (SEM);* **Philippe Staib**

POSTER # 240

737 *Heat-treatment importance in H13 Tool Steel Microstructure Analysis for Texturing in Injection Molding;* **Juan Terrazas**, Maricruz Hernandez-Hernandez, Victor Hugo Mercado-Lemus

POSTER # 241

738 *Increasing the Hardness of Aluminum Alloys Used in the Aerospace Industry by Recycling Lithium Batteries;* **C. Carreño-Gallardo**, Claudia López, Roberto Luján, Jonathan Domínguez, José Ernesto Ledezma, Kevin Isaac Contreras-Vargas, J.M. Mendoza-Duarte, D. Lardizabal-Gutiérrez, José Herrera-Ramirez

POSTER # 242

739 *Li Band Structure Observation and Characterization with the New Diffraction Grating;* **Takanori Murano**, Shogo Koshiya, Masaru Takakura, Kouichi Tsuji, Kiminori Kondo, Masato Koike, Masami Terauchi

POSTER # 243

740 *Quantitative Analysis with EDS and WDS at High Count Rates;* **Ralf Terborg**, Jan Dellith

POSTER # 244

741 *What does the Proportional Counter Really See: The WDS-SD Shows Us;* **Patrick Camus**, Ken Moran, Richard Wuhrer

A09.P2 Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization, and Management

POSTER # 245

742 *Can Conventional Classifiers Outperform Neural Networks in Identifying Structural Defects from Atomic Resolution Micrographs?;* **Jiadong Dan**, Cheng Zhang, Duane Loh

POSTER # 246

743 *Denoising of Scanning Electron Microscope Images Acquired at Rapid Frame Rates for Metrology Measurement;* **Haewon Jung**, Hoon Kang, Ha Rim Lee, In-Yong Park

POSTER # 247

744 *DigitalMicrograph and stand-alone Python Integration;* **Jacob Wilbrink**, Winnie Lei, Dieter Weber, Alexander Clausen

POSTER # 248

745 *Flaw Detection on Surface-Treated Steels Using Convolutional Neural Networks (CNN);* **Oscar Gonzalez Arias**, Marco Antonio Doñu Ruiz, Jorge Victor Cortes Suarez, Christopher René Torres San Miguel, David Sánchez Huitron, Tomas De la Mora Ramírez é López Perrusquia

POSTER # 249

746 *From Machine Learning to Deep Learning: The Dynamic Role of AI in Microscopy Applications;* **Sreenivas Bhattiprolu**, Marion Lang, Sebastian Rhode

POSTER # 250

747 *Generative AI Enables Label-free Segmentation for Live Analysis of Supported Nanoparticle Catalysts;* **Wenhao Yuan**, Bingqing Yao, Shengdong Tan, Qian He

Scientific Program

A Analytical/Instrumentation Sciences Posters – Wednesday cont.

POSTER # 251

748 *Integration of Machine-Learned Force Fields for Phonon DOS in Nanoscale Heterostructures;* **Harrison Walker**, Eric Hoglund, De-Liang Bao, Md. Kamal Hussain, Haoyang Ni, Asif Khan, Joshua Caldwell, Patrick Hopkins, Jordan Hachtel, Sokrates Pantelides

POSTER # 252

749 *Python Implementation of Various Denoising Filters for HR(S)TEM images;* **Tao Ma**

POSTER # 253

750 *Real-time Denoising Algorithm for STEM Imaging Using Markov Random Field Model;* **Taichi Kusumi**, Shun Katakami, Ryo Ishikawa, Kazuaki Kawahara, Naoya Shibata, Masato Okada

POSTER # 254

751 *Real-time Point of Interest Segmentation for Electron Microscopy Images via Machine Learning;* **Michael Lin Lin**, Yousra Nahas, Prokhorenko Sergei, Sujit Das, Ruijuan Xu, Harold Hwang, Ramamoorthy Ramesh, Laurent Bellaiche, David Muller, Yu-Tsun Shao

POSTER # 255

752 *SmartSPIM Pipeline: A Scalable Cloud-Based Image Processing Pipeline for Light-sheet Microscopy Data;* **Camilo Laiton**, Nicholas Lusk, John Rohde, Mike Taormina, David Feng, Sharmishtaa Seshamani

POSTER # 256

753 *Use of SEM/FIB and machine learning to characterize REBCO conductors;* **Hannah Matos-Pimentel**, Carina Zha, Nicole Bishop, Keyou Mao, Jozef Kvitkovic, Jun Lu, Jeremy Levitan, Dmytro Abraimov

POSTER # 256.1

401 *Rapid Image Segmentation Pipeline to Support Multimodal STEM Acquisition;* **Roberto dos Reis**, Alexandra Day, Carolin Wahl, Wei-keng Liao, Youjia Li, Muhammed Nur Talha Kilic, Chad Mirkin, Vinayak Dravid, Alok Choudhary, Ankit Agrawal

POSTER # 256.2

432 *Automated Specimen Preparation for Electron Microscopy;* **Steven Goodman**, Jeffrey Percival

A10.P3 Correlative Analysis and Multimodal Microscopy and Spectroscopy

POSTER # 257

754 *A Versatile Peak Force IR Variation for Correlative Nanoscale Chemical and Mechanical Study;* **John Thornton**, Martin Wagner, Qichi Hu, Chunzeng Li, Cassandra Phillips, Peter De Wolf

POSTER # 258

755 *Characterization of Ball Mill Applied Graphene Coatings on 316L Steel Spheres;* **Sebastian Lara**, Kaleb Hood, Samuel Olson, Helen Wang, Jun Jiao

POSTER # 259

756 *Characterization of Stainless Steel Percutaneous Leads Exposed to Common Environmental Solutions;* **Janet Gbur**

POSTER # 260

757 *Correlative Microscopy Evaluation of Surface and Sub-Surface Cracking of Additively Manufactured Haynes®-230;* **Laura Wilson**, Drew Davidson, Elizabeth Young-Dohe, Christopher Kantzos

POSTER # 261

758 *Correlative X-ray Microanalysis of a Boron Steel Sample Using Micro-XRF and SEM-EDS;* **Shangshang Mu**, David Stowe

POSTER # 262

759 *Deployment of Magnetic Sector Secondary Ion Mass Spectrometry Technology on Focused Ion Beam Instruments: From the Initial Concept Idea to the Analytical Add-On System;* **Olivier De Castro**, Hung Quang Hoang, Olivier Bouton, Rachid Barrahma, Chérif Coulbary, Tom Wirtz

POSTER # 263

760 *High Quality of Color Etching in a Heat-Treated Copper;* **Victor Hugo Mercado Lemus**, A. F. Navarro-López, M. Vázquez-Pérez, Maricruz Hernandez-Hernandez, Adriana del carmen Gallegos-Melgar, Isaías Garduño-Olvera, Hugo Arcos-Gutierrez, Jan Mayen-Chaires, I. Pereyra, A. E. Salas-Reyes

POSTER # 264

761 *Improved Phase Discrimination in Power Plant Steels using In-Column Secondary Electron Detectors and Spherical Indexing;* **Johan Westraadt**

POSTER # 265

762 *Microscopy of Surface Microstructural Phenomena in 8620 Steel After Annealing;* **Kaleb Hood**, Sebastian Lara, Samuel Olson, Martin Silva, Jun Jiao

POSTER # 266

763 *Microstructural and Electroactivity Evaluation of PANI and PANI/Ag Composite;* **Luis David Arellano Gutierrez**, Ivan Alziri Estrada More , E.Armando Zaragoza Contreras

POSTER # 267

764 *Microstructure Evolution of Dissimilar Graded Joints of Ferritic P91 and Austenitic 347H Stainless Steels Manufactured with Directed Energy Deposition;* **Selda Nayir**, Rangasayee Kannan, Sebastien Dryepondt, Peeyush Nandwana

POSTER # 268

765 *Multi-modal spectroscopic Characterization and Defect Identification in S 2 /Ga2O3 Nanostructures;* **Praveena Manimunda**, João-Lucas Rangel, Francis Ndi, Didier Hocrelle, Jérémy Brites, Emilio Gales, Maria Bianchi Mendez Martin

POSTER # 269

766 *Stainless Steel 316 L Deposited on the AISI 1018 Steel Substrate Using an Additive Manufacturing Technique.;* **John Edison-Garcia**, Raúl Pérez-Bustamante, Luis-Alberto Cáceres-Díaz, J.L. Marin-Martínez, J.A. Betancourt-Cantera

POSTER # 270

767 *Study of the Microstructure And Hardness of an H13 Steel Bead by Plasma Transferred Arc Welding;* J.**L. Marin-Martínez**, Raúl Pérez-Bustamante, John Edison-Garcia, J.A. Betancourt-Cantera, Juan Muñoz Saldaña, Luis-Alberto Cáceres-Díaz

POSTER # 271

768 *Understanding Dislocation-Interface Interactions During Recrystallization of Mg-Ca-Zn Alloys;* **Rogine Gomez**, Aeriel Leonard

B Biological Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

B01.P2 3D Structures: from Macromolecular Assemblies to Whole Cells (3DEM FIG)

POSTER # 272

769 *Cryo-EM Reconstruction of Tail and Capsid of Stx bacteriophage phi24B;* **Olga Sokolova**, Matvey Bubenchikov, Rongrong Zhang, Andrey Moiseenko, Alexander Kuznetsov, Andrey Letarov

POSTER # 273

770 *Cryo-EM Screening of Apoferritin at 100 kV Using Hitachi's HT7800 Thermionic Transmission Electron Microscope;* **Heather Berensmann**, Theo Humphreys

POSTER # 274

771 *Exploring Optimal Imaging Conditions for STEM Tomography on Biological Samples using Integrated Differential Phase Contrast Imaging Method;* **Xiaoqing He**, Xiaoxu Guo, Min Su

POSTER # 275

772 *Preparation of RNAP E.coli for Structural Analysis of +39 Elongation Complex by Cryo-Electron Microscopy;* **Olga Sokolova**, Elizaveta Osina, Andrey Moiseenko, Nadezhda Gerasimova, Anna Korovina, Olesya Volokh, Tatiana Stanishneva-Ko valova, Vasily Studitsky

POSTER # 276

773 *Prepare to Square the Circular Beam;* **Lambertus Alink**, Eugene Chua, Alex de Marco

POSTER # 277

774 *Sample Preparation in Bulk Tissue Samples Using the Arctis Plasma FIB DualBeam to Enable Molecular Imaging;* **Ron Kelley**, Xianjun Zhang, Dimple Karia

POSTER # 278

775 *Smarter Hole Targeting in Leginon;* **William Rice**, Bing Wang, Huihui Kuang

POSTER # 280

777 *Thermo Scientific Smart EPU: Towards the "One-button" Screening Solution;* **Fanis Grollios**, Holger Kohr, Julio Ortiz, Edward Pryor

POSTER # 281

778 *Tracking Intracellular Proteins of Interest with Cryo-Electron Microscopy;* **Giovanna Grandinetti**, Daniel Goetz, Amy Santas, Krishna Chinthalapudi, Amanda Trout

POSTER # 282

779 *Using Cryogenic Electron Tomography (cryoET) to Determine Binding Curves in Bacteria Microcompartments;* **Kristy Rochon**, Ryan Gray, Wenxiang Cao, Luke Oltrogge, David Savage, Enrique De La Cruz, Lauren Ann Metskas

POSTER # 283

780 *Vacuum or Not to Vacuum that is the Question;* **Robert Gheorghita**, Lambertus Alink, Edward Eng

POSTER # 284

781 *Visualizing Heterogeneous Protein Conformations with Multi-Tilt Nanoparticle-Aided Cryo-Electron Microscopy Sampling;* **Yeeun Kim**, Changin Kim, Sang Jin Lee, So Ri Yun, Jungkweon Choi, Seong Ok Kim, Yongsoo Yang, Hyotcherl Ihee

B04.P1 Electron Microscopy in Education

POSTER # 285

782 *Developing a Comprehensive CryoEM Cross-Facility Training Curriculum that Adheres to Best Practices Across Diverse Settings;* **Edward Eng**, Cathleen Castello, Charlie Dubbeldam, Elina Kopylov, Eugene Chua, Christina Zimanyi, Mahira Aragon, Aaron Owji, Jeffrey Kieft, Alex de Marco

POSTER # 286

783 *Inspiring Entomological Exploration Via X-ray Microscopy and Virtual Reality in Outreach, Research, and Teaching;* **Richard Johnston**, Holly Weston, Wendy Harris, Ross Williams

POSTER # 287

784 *Modular Training Methods at the Pacific Northwest Center for Cryo-EM Using Varied Learning Delivery Mechanisms;* **Rose Marie Haynes**

POSTER # 288

785 *Process Your Cryo-EM Data Using Computing Resources at Pacific Northwest Center for Cryo-EM (PNCC);* **Irina El Khoury**, James Evans

POSTER # 289

786 *Training Videos as Guidance for Workshops on cryo-EM Facilities;* **Claudia Lopez**, Sean Mulligan

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

C03.P1 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

POSTER # 290

787 *A Cryo-TEM Study of Phase Transition in Lecithin-Water-Etha l Mixtures;* **Faraz Burni**, Wen-An Chiou, Srinivasa Raghavan

POSTER # 291

788 *Biosynthesized Self-Assembled Silver Spheres and their Electrochemical Characterization;* **Salomón Borjas**, K. Chávez, Gerardo Rosas Trejo

POSTER # 292

789 *Direct Visualization of Polystyrene Sphere Packing in Solution with Cryo-FIB;* **Jamie Ford**, Emily Beeman, Zhimin Jiang, James Pikul

POSTER # 293

790 *Improving Methods for Imaging Viral Pathogens Using Liquid Transmission Electron Microscopy;* **Liza-Anastasia DiCecco**, Liam Kaylor, Samantha Berry, Jennifer Gray, Deb Kelly

POSTER # 294

791 *Microscopy Analysis of the g-C3N4/Co3O4 Heterojunction for Environmental Applications;* **Hector Calderon**, Angeles Mantilla

POSTER # 295

792 *Microstructure and Dose Tolerance of Organic-Inorganic Hybrid Perovskite CsxFA1-xPbI3;* **Yuxi Zhang**, Saiphaneendra Bachu, Sai Venkata Gayathri Ayyagari, Farzaneh Rezaei, Kelly Vences, Ken Kaushal, Mariana Bertoni, David Fenning, Nasim Alem

POSTER # 296

793 *Revealing the Microstructure of Binary Solvent Hydrogels: a novel Cryo-SEM Approach;* **Aria Khalili**, Muhammad Amirul Islam, Xinyu Wang, Darren Makeiff, Mohtada Sadrzadeh, Kenneth Harris, Jae-Young Cho

POSTER # 297

794 *The Effect of Sample Preparation and Sampling Conditions on Observed Morphology of Lubricating Greases;* **Matthew Thorseth**, Joseph Harris, Lauren Huffman, Kevin Capaldo, Cindy Liu, Clare Leahy, Jocelyn Zhao, Edward Worthington

POSTER # 298

795 *X-ray Energy Dispersive Spectroscopy and Electron Energy-Loss Spectroscopy of Mineralized Particles in Soft-Tissue Samples;* **Amanda Trout**, Giovanna Grandinetti, Robert E A Williams

C05.P1 Correlative Microscopy Using Light, Electron, and X-ray Microscopy

POSTER # 299

796 *Herpesvirus-Induced Manipulation of the Nucleolus;* **Kenneth Fahy**, Simon Leclerc, Sergey Kapishnikov, Visa Visa Ruokolainen, Inka Huusko, Salla Mattola, David Rogers, Stephen O'Connor, Vesa Aho, Maija Vihinen-Ranta

POSTER # 300

797 *Insights into Oxide Growth: In-Situ Atomic-Scale Visualization of Mass Transport during Copper Oxidation;* **Linna Qiao**, Jianyu Wang, Shuonan Ye, Xiaobo Chen, Meng Li, Dmitri Zakharov, Kim Kisslinger, Judith Yang, Guangwen Zhou

POSTER # 301

798 *Laboratory Based Soft X-Ray Microscopy at a Core Facility;* **Kenneth Fahy**, Paul Sheridan, Sergey Kapishnikov, William Fyans, Fergal O'Reilly, Tony McEnroe

POSTER # 302

799 *Microstructural Effect of Extrusion-Blended PLA/BaTiO3 Composite: SEM and XRD Analysis;* **Mariana Luján-Aguilar**, Guillermo Herrera-Perez, Ivan Alziri Estrada Moreno, C. Carreño-Gallardo, Jesus Uribe-Chavira, Nestor Uribe-Chavira, M.L. Camacho-Rios, D. Lardizabal-Gutiérrez, Óscar Solís-Canto

POSTER # 303

800 *Microstructural Effects of Cerium Oxide Nanoparticles Obtained by the Hydrothermal Route: HRTEM and XRD Analysis;* **Guillermo Herrera-Perez**, M.L. Camacho-Rios, M.A. Ruiz-Esparza-Rodriguez, D. Lardizabal-Gutiérrez, Enrique Garcia-Mireles, Claudia A. Ramírez-Valdespi

POSTER # 304

801 *Multilateral Evaluation of Lithium-ion Batteries and Materials;* **Christopher Macey**, Takeshi Miyamoto

POSTER # 305

802 *Rapid HCV Replication Machinery Removal after Antiviral Treatment with Direct-Acting Antivirals Monitored by Multimodal Imaging;* **Kenneth Fahy**, Victoria Castro, Gema Calvo, Ana J. Perez, David Rogers, Stephen O'Connor, Sergey Kapishnikov, Paul Sheridan, Eva Pereiro, Pablo Gastaminza

POSTER # 306

803 *The Growth Kinetics of Sucrose Crystals in an Isothermal Continuous-Flow Cell using a Photomicroscopic Method;* **LieDing Shiau**, JiaHao Ye

P Physical Sciences Posters – Wednesday

3:00 PM – 5:00 PM **Exhibit Hall**

P03.P3 Electron Microscopy of Advanced Functional Materials

POSTER # 307

804 *Additively Manufactured Nickel Aluminum Bronze via Laser Powder Bed Fusion Shows Excellent Anticorrosion;* **Wen Qian**, Maxwyll McConnell, Jazmin Ley, Luke Schwaninger, joseph Turner

POSTER # 308

805 *Characterization and Analysis of Additively Manufactured Maraging Steel by Analytical Electron Microscopy with Electron Energy Loss Spectroscopy X-ray Energy Dispersive Spectroscopy, and 4D-STEM;* **Robert E A Williams**

POSTER # 309

806 *Cryo-FIB Solution Comparison for Characterization of Indium Microbond Structures;* **Heiko Stegmann**, Jaber Derakhshandeh

POSTER # 310

807 *EDX Elemental Mapping of Trace Amounts of Ir on the Surface of Pt Cubic Nanoparticles for Ammonia Electro-Oxidation;* **Michael Watson**, Cristina Cordoba, Arthur Blackburn

POSTER # 311

808 *Effect of Mn, Ti and Sc Addition on Hardness in an Artificially Aged 2024 Al Alloy;* **P. A. Guerrero-Seañez**, C.G. Garay-Reyes, A. Martínez-García, X. Atanacio-Sánchez, M.A. Ruiz-Esparza-Rodriguez, Leonardo Baylón García, I. Estrada-Guel, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 312

809 *Electron Microscopic Analysis of Rotating Single Lattice Z Crystals Produced by Photothermal Laser Printing;* **Lukas Grünewald**, Kristian Kraft, Matthias Steurer, Paul Somers, Steven Kraus, Stefanie Dehnen, Claus Feldmann, Christopher Barner-Kowollik, Martin Wegener, Yolita Eggeler

POSTER # 313

810 *Impact of Powder Morphology and Coating Microstructure on Mechanical Properties of Plasma-Sprayed Magnesia (24%)-Stabilized Zirconia on Stainless Steels;* **Mohamed Hafez**, Ali Khalil

POSTER # 314

811 *Investigation on Micro-scale Deformation of Additively Manufactured Inconel 718: Role of Segregation on Melt-pool Boundaries;* **Animesh Basak**

POSTER # 315

812 *Leveraging Methods in Microscopy for Exploring Structure-Property Relations of Ultrahigh Aspect Ratio Multiwalled Carbon Nanotubes Subject to Ball Milling and Compounding with Polymers;* **Mason Rhue**, Brian Grady

POSTER # 316

813 *Microscopy Characterization of Halloysite/Carbon Dots Composite;* **Hector Calderon**, Ana C. S. Alcantara

POSTER # 317

814 *Multi-Point or Mean Atomic Number Backgrounds? Trace Element Quantification of Intentionally Tagged U Fuels using EPMA;* **Joseph Boro**, Naomi Marks, Kara Luitjohan

POSTER # 318

815 *Preparation of Al-Li-Cu-Graphite Composite via High-Energy Ball Milling and Sintering with High-Frequency Induction Heating;* **José Mendoza**, A. Martínez-García, Xochitl Atanacio Sanchez, P. A. Guerrero-Seañez, C.G. Garay-Reyes, I. Estrada-Guel, R. Martínez-Sánchez

POSTER # 319

816 *Probing Enzyme@Metal-Organic Framework Interactions for Enhanced Stability and Catalytic Efficiency Using Cryogenic Electron Energy Loss Spectroscopy(CryoEELS) and Energy-Filtered TEM (EF-TEM);* **Elisa Olivas**, John Watt, Joe Patterson

POSTER # 320

817 *Revealing the Atomic Structure and Ion Exchange Effects of One-Dimensional Lepidocrocite Nanofilament;* **Fatemeh Karimi**, Francisco Lagunas, Robert Klie

POSTER # 321

818 *Segregation to Creep-induced Planar Faults in Ni-base Single Crystal Superalloys;* **Zhongmin Long**, David Bürger, Christian Dolle, Yuting Dai, K. V Vamsi, Yolita Eggeler

POSTER # 322

819 *Structural evolution of Alloyed Aluminum Nitride Heterostructures;* **Sebastian Calderon**, Chloe Skidmore, Jon-Paul Maria, Elizabeth Dickey

POSTER # 323

820 *Study of the Morphological and Surface Properties of Silica Dioxide Nanoparticles for Their Potential Use in Biomedical Applications;* **Jorge L. Iriqui-Razcón**, Ana Guadalupe Luque-Alcaraz, Pedro Amado Hernández-Abril, Cynthia Nazareth Hernández-Téllez, Hiram J. Higuera-Valenzuela

POSTER # 324

821 *Using Rapid Prototyping to Complement the Side-Entry Transmission Electron Microscope;* **Alexander Reifsnyder**, Jordan Hachtel, Andrew Lupini, David McComb

P07.P1 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

POSTER # 325

822 *Development of Hollow-Cone Schlieren Electron Microscopy for Observation of Electromagnetic Fields;* **Ken Harada**, Keiko Shimada, Hiroshi Nakajima, Shigeo Mori, Yoshio Takahashi

POSTER # 326

823 *EELS-Monitored AC-STEM-Fabrication of Sub-Nanometer Pores and Features in Hexagonal Boron Nitride and Correlated Photoluminescence and Ionic Transport Measurements;* **Rachael Keneipp**, Chih-Yuan Lin, Jordan Gusdorff, Pia Bhatia, Trey Shin, Lee Bassett, Marija Drndic

POSTER # 327

824 *Holographic Generation of Mathieu Beams with Electrons;* **James Haverstick**, Benjamin McMorran

POSTER # 328

825 *Rotational Tunning Mechanisms of Crystalline Thermal Conductivity Revealed by Electron Microscopy;* **Xiaowang Wang**, Chaitanya Gadre, Xingxu Yan, Toshihiro Aoki, Runqing Yang, Bolin Liao, Xiaoqing Pan

Scientific Program

POSTER # 329

826 *Transmission Electron Microscopy of Formaldehyde Lead Bromide and Iodide Perovskite Quantum Dots;* **Surya Prakash Reddy Mandalreddy**, Hao Zhang, Aditya Mohite, Piyush Haluai, Sandhya Susarla

POSTER # 330

827 *Unraveling the Connection between Deposition, Microstructure, and Performance of Superconducting Quantum Circuits using Multi-modal Electron Microscopy;* **Jin-Su Oh**, Cameron Kopas, Jayss Marshall, Anna Grasselli, Alexander Romanenko, Jigang Wang, Ruslan Prozorov, Kameshwar Yadavalli, Matt Kramer, Lin Zhou

POSTER # 331

828 *Wavefront Shaping With a 48-Element Programmable Phase Plate for Electrons;* **Armand Béché**, Chu-Ping Yu, Francisco Vega Ibañez, Johan Verbeeck

POSTER # 332

829 *Asymmetric Nanoparticle Oxidation Observed In-Situ by the Evolution of Diffraction Contrast;* **John Watt**, Agus Poerwoprajitno, Nitish Baradwaj, Manish Singh, C. Barry Carter, Dale L. Huber, Rajiv Kalia

P09.P2 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

POSTER # 333

830 *Combined in situ STEM and SEM Investigation of Fe-Ru Nanocatalysts;* **Alexandre Foucher**, Kai Shen, John Vohs, Robert Macfarlane, Frances Ross

POSTER # 334

831 *Compositional Tuning of PtZn Nanoparticles via Heat Treatment for Propane Dehydrogenation;* **Bingqing Yao**, Chaokai Xu, Qian He

POSTER # 335

832 *Convincing Catalytic Chemists: Progress Towards Matching In-Situ Gas Phase Microscopy to the Benchtop;* **Madeline Dukes**, Tim Eldred, Yaofeng Guo, Nynke Krans

POSTER # 336

833 *Direct Evidence of Phosphate Binding on Ferritin Based on Quantitative Elemental Analysis at the Single-Particle Level;* **Xiaoben Zhang**, Wen Zhuang, Nestor Zaluzec, Junhong Chen

POSTER # 337

834 *Discovery of Accelerated Three-way Catalyst Sintering in Mixed Gas Environments;* **Jacob Smith**, Miaofang Chi

POSTER # 338

835 *Electron Beam-Induced Atomic Migration in the Formation of Nd(OH)3 Nanostructures;* **Eric Vazquez-Vazquez**, Yazmin Hernandez, Oscar Cigarroa-Mayorga

POSTER # 339

836 *In Situ Ferroelectric Polarization of BaTiO3 at Low Temperatures Measured by Electron Holography;* **Rakibul Shohan**, Carolina Mendoza-Ramirez, Jesus Cantu-Valle, Mario Moreno, Arturo Ponce

POSTER # 340

837 *In situ gas-heating atomic-scale STEM Analysis of Au-Pd Nanoparticles at 1 bar;* **Alexandre Foucher**, Cameron Owen, Tanya Shirman, Joanna Aizenberg, Boris Kozinsky, Eric Stach

POSTER # 341

838 *In-Situ STEM Study of Recrystallization in Amorphous SrTiO3;* **Supriya Ghosh**, Silu Guo, K. Andre Mkhoyan

POSTER # 342

839 *Phase Transformation Pathways of Titanium Nitride in Oxidation Process: Investigated by Environmental Scanning/Transmission Electron Microscopy;* **Qianqian Li**, Ronghui Hao, Wenkang Miao, Wanyin Xu

POSTER # 343

840 *The Mean Inner Potential of Hematite α-Fe2O3 across the Morin Transition;* **Avi Auslender**, Adham Basha, Daniel A. Grave, Avner Rothschild, Oswaldo Diéguez, Amit Kohn

POSTER # 344

841 *The Study of Crystallization Kinetics and Chemical changes in Ge4Sb4Te5 through Transmission Electron Microscope;* **Manish Singh**, Chanchal Ghosh, John Watt, C. Barry Carter, Helena Silva

POSTER # 345

842 *Toward Probing Molecular Radiolysis Behavior in Gas Cell Electron Microscopy;* **Kunmo Koo**, Xiaobing Hu, Vinayak Dravid

POSTER # 346

843 *Uncovering Effects of Mixing State on Hygroscopic Behavior of Multicomponent Aerosols with In Situ Transmission Electron Microscopy;* **Yuhang Wang**, Dewansh Rastogi, Kotiba Malek, Amy Chen, Martin Ahn, Jiayue Sun, Akua Asa-Awuku, Taylor Woehl

P11.P1 Frontiers in Electron Tomography

POSTER # 347

844 *Combining Interactive and Automatic Volume Registration Techniques in Tomviz;* **Patrick Avery**, Alessandro Genova, Matt McCormick, Yu-chen Karen Chen-Wiegart

POSTER # 348

845 *Electrostatic Dose Modulation Improves Lifespan of Beam-Sensitive Specimens for Advanced Electron Crystallography Techniques;* **Daniel Foley**, Partha Pratim Das, Barnaby Levin, Bryan Reed, Daniel Masiel, Runlai Wang, John Tovar, Alejandro Gomez-Perez, Monika Budayova-Spano, Wai Li Ling

POSTER # 349

846 *Silicon Based Sample Carrier for Cryogenic Electron Microscopy;* **Vasilis Papadimitriou**, Evgeniya Pechnikova, Arjen Jakobi, Merijn Pen, Hector Hugo Perez Garza

POSTER # 350

847 *Three-Dimensional (3D) FIB-SEM Topography of Porous Particles;* **Shiyou Xu**, Kaleigh Scher, Xinye Chen, Laura Fabris, Long Pan, Ke Du

Thursday, August 1

A Analytical/Instrumentation Sciences Symposia – Thursday Morning

A01.2 Advances in Cathodoluminescence Spectroscopy and Analysis

Thursday 8:30 AM

8:30 AM **848** *Unravelling Multi-Stage Formation and Deformation Events of RE-Rich and RE-Poor Anhydrite Via Hyperspectral Cathodoluminescence Mapping and Analysis;* (Invited) **Zsanett Pinter**, Colin MacRae, Aaron Torpy, Antony Burnham, Nicholas Wilson, Alexander Glenn, Sam Hill

9:00 AM **849** *Compositional and Structural Mapping of rthwest Africa 15507 Angrite;* **Heather Lowers**, Paul Carpenter, Jay Thompson, Anthony Irving

9:15 AM **850** *Correlating Quantified Cathodoluminescence Spectra in Jadeite with Micro-scale Color Measurements via Visible-Near Infrared Reflectance Spectrometry;* **Edward Vicenzi**, Thomas Lam, Heather Lowers, Colin MacRae

9:30 AM **851** *Correlative Cathodoluminescence Imaging Techniques for Geology;* (Invited) **Noémie Bonnet**, Sangeetha Hari, Toon Coenen

A06.2 Electronic and Thermal Device Characterization with Electron Microscopy

Thursday 8:30 AM

8:30 AM **852** *Determining Electronic and Thermal Properties of β-Ga2O3 Based Devices Using In situ STEM Combined with Spectroscopic Methods;* (Invited) **Jinwoo Hwang**, Chris Chae, Menglin Zhu, Hsien-lien Huang, Minhazul Islam

9:00 AM **853** *Understanding Dislocation and Deformation Structure in Mo clinic Ultrawide Bandgap Semiconductor β-Ga2O3 Under High-Stress;* **Andrew Balog**, Anuj Bisht, Jani Jesenovec, Benjamin Dutton, John McCloy, Nasim Alem

9:15 AM **854** *Using Thermal Diffuse Scattering in Electron Backscatter Diffraction to Probe Temperature Changes on the Nanoscale;* **Ryan Gnabasik**, Usama Choudry, Basamat Shaheen, Yujie Quan, Zeyu Xiang, Bolin Liao

9:30 AM **855** *Accessing Thermal Phonon States within Nanoscale Cavities;* (Invited) **Maureen Joel Lagos**, Joaquin E. Reyes-Gonzalez, Ka Yin Lee, Nabil Bassim, Peter Rez

A10.8 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Thursday 8:30 AM

8:30 AM **856** *Morphological and Chemical Nanoscale Analysis of Mesoporous Mixed IrOx-TiOy Thin Films as Electrode Materials;* **Vasile-Dan Hodoroaba**, René Sachse, Leyla Kotil, Lidija Matjacic, Greg McMahon, Michael Bernicke, Denis Bernsmeier, Ralph Kraehnert, Andreas Hertwig

8:45 AM **857** *Microscopic and Spectroscopic Understanding of n-metal Dopants in Photocatalytic Properties of Titania;* **Bishnu Bastakoti**, Moses Ashie, Kennedy West, Rabin Dahal

9:00 AM **858** *SEM EDX Analysis of Sub-Micron Thin Oxide Scale on 316L Stainless Steel;* **Alexander Michas**, Felipe Rivera, Brian Jensen, Richard Vanfleet

9:15 AM **859** *Extraction Replication of Inert Particles in Additively Manufactured 800H Builds;* **Qiushi Jin**, Manuel Sanchez-Poncela, Rainer Hebert, Maria florencia Gatti, Mark Aindow

9:30 AM **860** *Analysis of the Crack Generated in Ductile Materials (Al6063), Subjected to Accelerated Aging Conditions in Elements of the Aerospace Industry;* **Israel Baez**, Misael Flores Baez, Guillermo Urriolagoitia Sosa, Guillermo Manuel Urriolagoitia Calderon, Beatriz Romero, Ángeles Romero, Israel Fernando Barajas, Arturo Sanchez Cervantes

9:45 AM **861** *Brazing: Microstructural Characterization of a Motor Armature Join;* **Jose Contreras**, Maricruz Hernandez-Hernandez, Victor Hugo Mercado-Lemus, Carlos Pobla

A11.3 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging

Thursday 8:30 AM

8:30 AM **862** *Exploring 4DSTEM-in-SEM: From Implementation to Material Characterization;* (Invited) **Johannes Müller**, Christoph Koch

9:00 AM **863** *4D STEM in SEM with a Fast Pixelated Direct Detector;* **Martin Huth**, Björn Eckert, Petra Majewski, Stefan Aschauer, Lothar Strüder, Heike Soltau

9:15 AM **864** *An Investigation on 3D Electron Diffraction and 4-Dimensional Scanning Diffraction Tomography Using a Scanning Electron Microscope;* **Saleh Gholam**, Nikita Denisov, Andrey Orekhov, Johan Verbeeck, Joke Hadermann

9:30 AM **865** *Transmission Electron Imaging and Diffraction of Asbestos Fibers in an SEM;* **Jason Holm**, Elisabeth Mansfield

B Biological Sciences Symposia – Thursday Morning

B04.1 Electron Microscopy in Education

Thursday 8:30 AM

8:30 AM **866** *Hands-On Cryo-EM Learning with CryoEDU;* (Invited) **Michael Cianfrocco**, Mark Herzik

9:00 AM **867** *Boundaryless Access: Lowering Barriers of Access to Advanced Microscopy Facilities;* (Invited) **Yoshie Narui**, Giovanna Grandinetti, Binbin Deng, Daniel Veghte, Daniel Huber, Robert E A Williams, David McComb

9:30 AM **868** *Merit Badges for Broadening Cryo-EM Access and Training at NCCAT;* (Invited) **Eugene Chua**, Christina Zimanyi, Mahira Aragon, Aaron Owji, Charlie Dubbeldam, Cathleen Castello, Dianne Carpen, Elina Kopylov, Edward Eng, Alex de Marco

B07.2 Microscopy Uncovering Biological and Technological Details Towards Biomimetics

Thursday 8:30 AM

8:30 AM **869** *Optical Form and Function of Leafhopper-Produced Brochosomes;* (Invited) **Tak-Sing Wong**

9:00 AM **870** *Correlative Imaging as a Prospecting Tool for Biophysics and Bioinspiration;* (Invited) **Richard Johnston**

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Morning

C03.2 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

Thursday 8:30 AM

8:30 AM **871** *SVSEM Tomography of Tubular Network Block Copolymers – Observation of the Core Regions of Crystallographic Defects;* (Invited) **Edwin Thomas**

9:00 AM **872** *Focused Ion Beam Milling of Soft Materials for Improved Sample Preparation;* **Tugba Isik**, Guanyi Wang, Yijin Liu, Yuzi Liu, Si Chen

9:15 AM **873** *Tracking Thermal Metamorphism of Organic Matter and Iron Minerals in the Primitive Meteorite Orgueil with Transmission X-ray and Electron Microscopy;* **Bradley De Gregorio**, Katherine Burgess, Matthew Marcus, Kana Amano, Tomoki Nakamura

9:30 AM **874** *Using advanced Micro-to-Atomic Scale Characterizations to Explore the Role of Ge in CZTSSe Solar Cells;* **Jialin Cong**, Jialiang Huang, Yi-Sheng Chen, Julie Cairney, Xiaojing Hao

9:45 AM **875** *Achieving 0.002° Measurement Precision of Sample Surface Tilt by Utilizing FIB-SEM Coincidence;* **Pengyuan Xiu**, Aidan Lee, Logan Ridings, Bryan Gauntt, Hyun Woo Shim

C04.1 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturings

Thursday 8:30 AM

8:30 AM **876** *High Performance Computing and Artificial Intelligence Enabled Materials Characterization and Experimental Automation;* (Invited) **Mathew Cherukara**

9:00 AM **877** *Dynamic STEM-EELS of Atom and Defect Evolution During Electron Beam Transformations;* **Kevin Roccapriore**, Riccardo Torsi, Joshua Robinson, Sergei Kalinin, Maxim Ziatdinov

9:15 AM **878** *Active Learning based Structure-Property Correlation in STM;* **Ganesh Narasimha**, Dejia Kong, Zheng Gai, Rama Vasudevan, Maxim Ziatdinov

9:30 AM **879** *Development of Automatic Cross-Sectional Scanning-Electron-Microscope-Observation Technique using Image Recognition of Semiconductor-Devices Structure;* **Takashi Dobashi**, Hiroyuki Yamamoto, Takeshi Ohmori

9:45 AM **880** *Automating Experiments with Scanning Probe Microscopy;* **Yu Liu**, Utkarsh Pratiush, Jason Bemis, Roger Proksch, Sergei Kalinin

C05.2 Correlative Microscopy Using Light, Electron, and X-ray Microscopy

Thursday 8:30 AM

8:30 AM **881** *A 3D Correlative Workflow for Studying Materials Formation Processes in Biological Tissues Combining Raman, Light and Cryogenic Electron Microscopy;* (Invited) **Nico Sommerdijk**, Robin Van Der Meijden, Rona Roverts, Luco Rutten, Marit De Beer, Deniz Daviran, Judith Schaart, Ben Joosten, Juriaan Metz, Anat Akiva

9:00 AM **882** *Controlling the Solution Chemistry in Aqueous Phases During In Situ Microscopy;* **Birk Fritsch**, Andreas Körner, Andreas Hutzler

9:15 AM **883** *Correlative Microscopy strategies for the Identification of Intracellular Nanoparticles and their Cellular Processing;* **Ingo Lieberwirth**, Anke Kaltbeitzel, Daksh Daksh

9:30 AM **884** *Discovering Nanoparticle Formation Mechanisms and Molecular Intermediates with Liquid Phase Electron Microscopy and Reaction Networks;* (Invited) **Taylor Woehl**, Jiayue Sun, Birk Fritsch, Andreas Körner, Mehran Taherkhani, Mei Wang, Chiwoo Park, Andreas Hutzler

P Physical Sciences Symposia – Thursday Morning

P01.2 Innovative Magnetic Imaging

Thursday 8:30 AM

8:30 AM **885** *X-ray Microscopy of Magnetic Topological Spin Textures—From van der Waals Magnets to Bulk Chiral Systems;* (Invited) **Max Birch**, Lukas Powalla, Kai Litzius, Fehmi Yasin, Luke Turnbull, Sebastian Wintz, Claire Donnelly, Xiuzhen Yu, Gisela Schütz, Marko Burghard

9:00 AM **886** *Discovery of a Bloch Point Quadrupole Coupling Topological Skyrmions and Antiskyrmions into Hybrid Strings via Holographic Vector Field Electron Tomography;* **Fehmi Yasin**, Jan Masell, Yoshio Takahashi, Tetsuya Akashi, Rio Baba, Kosuke Karube, Daisuke Shindo, Takahisa Arima, Yasujiro Taguchi, Yoshi Nori Tokura

9:15 AM **887** *Temperature dependence of Topological Spin Textures in Ferrimagnetic Mn2-xZnxSb Crystal;* **Yue Li**, Md Rafique Un Nabi, Hyowon Park, Yuzi Liu, Amanda Petford Long, Jin Hu, Suzanne te Velthuis, Charudatta Phatak

9:30 AM **888** *Direct Magnetic Field Imaging by Advanced Differential Phase Contrast Scanning Transmission Electron Microscopy;* (Invited) **Naoya Shibata**

P03.7 Electron Microscopy of Advanced Functional Materials

Thursday 8:30 AM

8:30 AM **889** *Nanoscale Combined Optical Measurements of 2D Chalcogenides in Van der Waals heterostructures using Cathodoluminescence and Electron Energy Loss Spectroscopy in SEM and STEM;* **Noémie Bonnet**, Jassem Baaboura, Florian Castioni, Steffi Woo, Ching-Hwa Ho, Kenji Watanabe, Takashi Taniguchi, Luiz Tizei, Toon Coenen

8:45 AM **890** *Control of Charge Transfer Paths In Integrated Aluminum Nanostructures;* **Kenan Elibol**, Marko Burghard, Peter A. van Aken

9:00 AM **891** *Understanding Interface Transitionsin Polycrystalline Diamond/Dielectric Interlayer/Si Heterostructures using STEM-EELS;* **Ramandeep Mandia,** Mohamadali Malakoutian, Kelly Woo, Manuel Gutierrez, Srabanti Chowdhury, David Smith

9:15 AM **892** *Revealing Frequency-Dependent Atomic Vibrational Anisotropies in a Centrosymmetric Lattice by Monochromated Electron Microscopy;* **Xingxu Yan**, Paul Zeiger, Yifeng Huang, Ruqian Wu, Jan Rusz, Xiaoqing Pan

9:30 AM **893** *Nanoscale Characterization of a Novel Electro-Chemical Memory Device by STEM-EELS;* **Stephen Funni**, Longlong Xu, Bilge Yildiz, Judy Cha

9:45 AM **894** *Unveiling Coupled Dark Modes in CdO Structures;* **Caleb Whittier**, Travis Casagrande, Jon-Paul Maria, Joshua Caldwell, Nabil Bassim, Maureen Joel Lagos

P07.7 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Thursday 8:30 AM

8:30 AM **895** *Probing Structural and Chemical Short-Range Ordering in Fe5-xGeTe2 using 4D-STEM and EELS;* **Haoyang Ni**, Andrew May, Jian-Min Zuo, Miaofang Chi

8:45 AM **896** *Accessing d-d Excitations Around Misfit Dislocations in Strongly Correlated NiO Thin Films Using High Energy-Resolution EELS;* **Matthieu Bugnet**, Khalil El Hajraoui, Adam Kerrigan, Vlado Lazarov, Guillaume Radtke, Quentin Ramasse, Demie Kepaptsoglou

9:00 AM **897** *Inverse Transition of Correlated Disorder Revealed by Atomic-Resolution Cryogenic Electron Microscopy;* **Yang Zhang**, Suk Hyun Sung, Sang-Wook Cheong, Ismail El Baggari

9:15 AM **898** *Correlative Lorentz and Dark Field TEM for Studying Skyrmion-Defect Interactions in Van-der-Waals Ferromagnet Co-doped Fe5GeTe2;* (Invited) **Reed Yalisove**, Peter Meisenheimer, Hongrui Zhang, Xiang Chen, Robert Birgeneau, Ramamoorthy Ramesh, Mary Scott

P09.7 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

Thursday 8:30 AM

8:30 AM **899** *Fresnel Free Imaging Mode (FFIM) for Transmission Electron Microscopy: A Computationally Mediated Solution using Spatio-Temporal Functionalization of the Illumination Optics;* **Nestor Zaluzec**

8:45 AM **900** *Towards Correlative Electron Microscopy Imaging for Proteins and Cells;* (Invited) **Qian Chen**, Jiahui Li, John Smith, Kai-Yu Huang, Hua Wang, Aditi Das, Hyunjoon Kong

9:15 AM **901** *Studying Aqueous Alkaline Batteries at pH 14 Using Electrochemical Transmission Electron Microscopy;* **Hanglong Wu**, Serin Lee, Joseph Manser, Yet-Ming Chiang, Frances Ross

9:30 AM **902** *Identical Location Electron Microscopy study of Cu electrocatalyst;* **Qian He**, Shikai Liu

9:45 AM **903** *Visualizing Plasmon Mediated Metal Deposition and Gold Nanorod Reshaping with Liquid Phase Transmission Electron Microscopy;* **Amy Chen**, Asher Leff, Zhenpu Li, Carlos Ríos Ocampo, Jonathan Boltersdorf, Taylor Woehl

P10.2 In Situ and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials

Thursday 8:30 AM

8:30 AM **904** *Correlative Electron and X-ray Spectroscopy of Processing Battery Materials;* (Invited) **Feng Wang**

9:00 AM **905** *Convolutional Neural Networks for Evaluation of Sequential Beam Damage of Beam-Sensitive Solid Electrolytes;* **Hongkui Zheng**, Xiwen Chen, Abolfazl Razi, Kai He

9:15 AM **906** *Low-Dose Mapping of Ionic Channel Architectures in Fuel-Cell Polymer Membranes with Cryo-STEM-EELS;* **Danielle Markovich**, Jesse Hsu, Brett Fors, David Muller, Lena Kourkoutis

9:30 AM **907** *Quantification of Radiolytic and Electrochemical Processes in Next Generation Batteries by Operando STEM;* (Invited) **B. Layla Mehdi**

P11.4 Frontiers in Electron Tomography

Thursday 8:30 AM

8:30 AM **908** *Electron Tomographic Reconstruction of Soft Nanomaterials for Morphometry Studies;* (Invited) **Qian Chen**, Falon Kalutantirige, Paul Bodgan

9:00 AM **909** *Exploring the Advantage of 4D-STEM in Cryo-ET Applications on Structural Biology;* (Invited) **Yue Yu**, Reza Paraan, Daniel Serwas, Jonathan Schwartz, Ariana Peck, Elizabeth Montabana, Stephanie Ribet, Georgios Varnavides, Colin Ophus, David Muller

9:30 AM **910** *Using Pop-Out 3D Metrology to Image Large Areas and Fast Dynamics to Nanometer Resolutions*; **Deepan Balakrishnan**, Joel Yeo, Zhaogang Dong, Ramon Paniagua-Dominguez, Michel Bosman, Utkur Mirsaidov, Duane Loh

A Analytical/Instrumentation Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

A01.P1 Advances in Cathodoluminescence Spectroscopy and Analysis

POSTER # 351

911 *Cathodoluminescence Analysis of Charge Carrier Recombination in Photovoltaic Absorber Materials;* **Harvey Guthrey**

POSTER # 352

912 *Cathodoluminescence Imaging and Spectrometry of a Jadeite Microbeam Reference Crystal: Detection of Ce3+;* **Thomas Lam**, Heather Lowers, Scott Wight, Edward Vicenzi

POSTER # 353

913 *Cathodoluminescence in Freshwater and Saltwater Pearls;* **Emma Bullock**, Gabriela Farfan

POSTER # 354

914 *Cathodoluminescence of Mn4+-doped Lithium Hafnium Fluorides;* **Zhiping Luo**, Menuka Adhikari, Shantae Mohan, Cheng Li, Hui Wu, Liurukara Sanjeewa, Bhoj Gautam

POSTER # 355

915 *Rare Earth Doped Anhydrite—A Cryo-Cathodoluminescence Study;* **Colin MacRae**, Weihua Liu, Nicholas Wilson, Zsanett Pinter, Alexander Glenn, Aaron Torpy, Cameron Davidson

POSTER # 356

916 *Challenges in Silver Conservation: Characterizing the Composition and Sources of Unusual Tarnish on Seleucid Silver Coins Using SEM-EDS;* **Maria Stanko**, Dian Yu, Laura Lipcsei, Jane Howe, Doug Perovic

POSTER # 357

917 *Improving Elemental Detection In XRF Spectrum Images From Paintings By Applying Image Restoration Methods;* **Richard Mott**

POSTER # 358

918 *Micro-fading Analysis of the Light Stability of Information Recorded on Historical Thermal Imaging Media;* **Henry Duan**

A06.P1 Electronic and Thermal Device Characterization with Electron Microscopy

POSTER # 359

919 *Atomic Scale Investigation Between the Heterointerfaces in BaTiO3 and Ultrawide Band-Gap Semiconductors;* **Christopher Chae**, Hyunsoo Lee, Ashok Dheenan, Fengyuan Yang, Siddharth Rajan, Jinwoo Hwang

POSTER # 360

920 *Coherent Twin Boundary Induced Phonon Softening in Boron Arsenide;* **Han-Hsuan Wu**, Xingxu Yan, Chaitanya Gadre, Hongbin Yang, Toshihiro Aoki, Bolin Liao, Zhifeng Ren, Xiaoqing Pan

POSTER # 361

921 *Exploring Experimental Conditions for Analyzing Heterogeneous PbSn Solder Material By Using Electron Probe Microanalysis (EPMA);* **Christian Harris**, Allyson Blanchard, Christopher Manspeaker, Mark Rodriguez

POSTER # 362

922 *Investigation of Alumina Atomic-Scale Structure and Crystallization Behavior Across a β-Ga2O3/Al2O3 Interface;* **Andrew Balog**, Saurav Roy, Sriram Krishnamoorthy, Nasim Alem

POSTER # 363

923 *Oxidation of Eutectic Gallium-Indium Nanoparticles;* **Shuonan Ye**, Guangwen Zhou, Xiaobo Chen, Pu Zhang, Xianhu Sun, Timothy Singler

POSTER # 364

924 *Precession-Assisted 4D-STEM Strain Characterization of Semiconductor Devices;* **Eduardo Serralta**, Tomáš Morávek, Robert Hooley, Narendraraj Chandran

A11.P1 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging

POSTER # 365

925 *A Decade of Multi-Beam SEM Technology – Celebrating the 10th Anniversary of MultiSEM;* **Stephan Nickell**, Anna Lena Eberle, Tomasz Garbowski, Friedhelm Panteleit

POSTER # 366

926 *BIB-mSTEM Approach for Large Scale Acquisition of Brain Tissue;* **Maria Kormacheva**, Arent Kievits, Joakim Reuteler, Marre Niessen, Sander den Hoedt, Safe Khan, Carles Bosch, Jacob Hoogenboom, Andreas Schaefer, Adrian Wanner

POSTER # 367

927 *Development of Low-voltage Ultra-high-vacuum 4D STEM in FE-SEM System;* **Jisoo Kim**

POSTER # 368

928 *Direct Visualization of Metal Sintering and Powder Bed Fusion of 316 Stainless Steel Powders via In Situ Scanning Electron Microscopy;* **John Lasseter**, Philip Rack, Rangasayee Kannan, Yousub Lee, Steven Randolph, Kinga Unocic

POSTER # 369

929 *Electron Backscatter Diffraction Analysis of Microstructure in Spray Formed AA7050 Aluminium Alloy;* **Maria Vittoria Moraschini Reis**, Leandro Reis Lidizio, Cássio Barbosa, Geronimo Perez

POSTER # 370

930 *High-Resolution Imaging and X-Ray Microanalysis of Oxide at Low Energy using Scanning Electron Microscope and Triple Beam FIB Microscope;* **Ritvij Chandrakar**, Stéphanie Bessette, Nicolas Brodusch, Raynald Gauvin

POSTER # 371

931 *Icosahedral Quasicrystalline Phase on the Surface of Spherical Particles in Al-Cu-Fe Alloy;* **Lincoln Baker**, Chunfei Li, Josiah Dubovi, Tracy Lu, Zebulon Fry

Scientific Program

A Analytical/Instrumentation Sciences Posters – Thursday

POSTER # 372

932 *Improving Transmission Kikuchi Diffraction Workflows;* **Kim Larsen**, Michael Hjelmstad

POSTER # 373

933 *In Situ SEM/STEM Enabling a More Complete Understanding of Thermally Induced Structural Changes in Materials;* **Eric Formo**, Casey Rowe, Jordan Hachtel, Tina Salguero

POSTER # 374

934 *Insights About the Thermal Decomposition of Violet Phosphorus Nanosheets from In Situ STEM;* **Casey Rowe**, Eric Formo, Jordan Hachtel, Bradley Norvell, Tina Salguero

POSTER # 375

935 *Microscopy and Microanalysis on Graphite in Graphite Talc Mixture;* **Chung-Ying Tsai**, Jessica Grealy

POSTER # 376

936 *Non-Destructive Imaging of Polar Domains and Crystallographic Symmetry in The Scanning Electron Microscope;* **Ann Ngo**, Koushik Jagadish, Amir Avishai, Hyun Chae, Maya Ramesh, Harish Kumarasubramanian, Rehan Kapadia, Darrell Schlom, Jayakanth Ravichandran, Yu-Tsun Shao

POSTER # 377

937 *Understanding Correlative Electron Microscopy Imaging with SEM, STEM-in-SEM and TEM for the Accurate Characterization of Size and Shape of Iron Oxide Nanoparticles;* **Vasile-Dan Hodoroaba**, Paul Mrkwitschka, Sarah-Luise Abram, Bastian Rühle

B Biological Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

B06.P1 Imaging, Microscopy, and Micro/Nano-Analysis of Pharmaceutical, Biopharmaceutical, and Medical Health Products—Research, Development, Analysis, Regulation, and Commercialization

POSTER # 378

938 *2D Axisymmetric simulation model of Electrostatic Force Microscopy for Detecting Buried Carbon Nanotubes in Poly(methyl methacrylate) Matrix;* **Carlos Rosero-Zambra**

POSTER # 379

939 *Cellular Characterization of Kernels of Zea mays L. by Confocal, SEM and Hyperspectral Fluorescence Microscopy;* **Maria Cristina Ubach**

POSTER # 380

940 *Characterization Morpho-Structure of Instant Soups Dried by Oven and Freeze-Dried;* **Liliana Edith Rojas-Candelas**, Minerva Renteria-Ortega, Edith González Benigno, Juan Méndez-Méndez, Liliana Edith Rojas Candelas, María de lourdes Colín-Álvarez

POSTER # 381

941 *Electrochemical Amyloid β Immunosensor Based on Ti3C2Tx MXene Nanosheets;* **Angelina Locke**, Antonio Garcia, Bryson Core, Bhoj Gautam, Daniel Autrey, Shubo Han

POSTER # 382

942 *Elemental and Morphological Analysis of Atmospheric Aerosols by SEM-EDS;* **Roberto Ramirez-Leal**, A. Alvarado-Castro, Hammed Estuardo-Moreno, M. Cruz-Campas

POSTER # 383

943 *Evaluation of The Mechanical and Corrosion Properties of New Ti Alloys For Orthopedic Devices;* **Cristina Jimenez-Marcos**, Julia Mirza-Rosca, Madalina Simona Baltatu, Petrica Vizureanu

POSTER # 384

944 *Exploring Grid Diversity: Enhancing Graphene Transfer for Improved Cryo-EM Sample Preparation;* **Sara Abouelniaj**, Yimo Han, Zhao Wang

POSTER # 385

945 *Influence Morphology of Platelet-Shape for the Antibacterial Properties of Z Nanostructures;* **Aurora Araiza-Campos**, Guillermo Herrera-Perez, Joan S. Salas-Leiva, Antonia Luna-Velasco, Dayana Salas-Leiva, Eduardo Campos-Chávez, Dariel Tovar-Ramírez, Alejandro Romo-Chacón, Erasmo Orrantia-Borunda, Francisco Paraguay-Delgado

POSTER # 386

946 *Sintering of Porous Titanium using the Spark Plasma Sintering Technique for Application as a Joint Prosthesis;* **Katia Rivera**, José Herrera-Ramirez, José Ernesto Ledezma, Armando Tejeda-Ochoa, Victor Orozco, C. Carreño-Gallardo

POSTER # 387

947 *Super Resolution Microscopy for the Evaluation of Therapeutic Distribution;* **Emily Condiff**, Kelsey Dickinson, Shabnam Ghiasvand, Robert Cost, Dinesh Bangari, Peter Piepenhagen

POSTER # 388

948 *The Behavior of Ti-15Zr-5Nb in very Aggressive Environments;* **Julia Mirza-Rosca**, Iosif Hulka, Ioan Aron, Jenifer Vaswani-Reboso

POSTER # 389

949 *Transmission Electron Microscopy Study of a Nanosuspension of Verteporfin and Evaluation of Stability in Human Serum;* **John Quinlan**, Wen-An Chiou, Robert Robey, Michael Gottesman, Huang-Chiao Huang

B07.P1 Microscopy Uncovering Biological and Tech logical Details Towards Biomimetics

POSTER # 390

950 *Claws of Terrestrial Crustaceans: Structure, Composition and Mechanics;* **V. Srot**, Miloš Vittori, Birgit Bussmann, Felicitas Predel, Peter A. van Aken, Jasna Štrus

POSTER # 391

951 *How to Improve Soil Anti-Adhesion by Studying the Micro Relief of the Cuticle Surface of Digging Beetles: Exploring The Gromphas Lacordairii (Oken, 1834) Pro Tum;* **Lorena Setten**, Luciana Gomez, María Victoria Sánchez elia Guillen, Eduardo Favret

POSTER # 392

952 *Microstructural Analysis of Popcorn Kernel and Pericarp;* **Liliana Edith Rojas-Candelas**, Minerva Renteria-Ortega, Felipe Cervantes Sodi, Hector Calderon, Luisa Fernanda Duque-Buitargo, Liliana Edith Rojas Candelas

POSTER # 393

953 *Morphology, Crystalline, and Microscopy Study of Non-Alkanal Functionalized Cellulose Nanofibrils;* **Benjamín Arredondo-Tamayo**, Josué Hernández-Varela, Oscar Mendoza-Sánchez, Nahui Morales López, Susana Dianey Gallegos-Cerda, Lizbeth Gonzalez Victoria , Candelaria Galvan Colorado, Felipe Cervantes Sodi, José Jorge Chanona-Pérez

C Cross-Cut/Interdisciplinary Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

C03.P2 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

POSTER # 394

954 *Astonishing Soft Tissue Permanence in Surface Collected Triceratops Horn Shards from Hell Creek, Montana;* **Jonas Cruz**, Mark Armitage

POSTER # 395

955 *Bone Canal Clots in Surface Collected Shards of Triceratops Horn are Disrupted by Exposure to Surface Environment Conditions in MT, USA;* **Mark Armitage**

POSTER # 396

956 *Ferrite Nanoparticles Doped with Magnesium in Synergy with Glycine-Betaine Improve the Germination of Zea Mays and Mitigate the Negative Effects Caused by Water Stress;* **Salomón Borjas**, Nicolás Abraham zamudio Durán, Gladys Juárez Cisneros, Nestor Alejandro Muñoz-Ruiz, Javier Villegas-Moreno, Dhirendra Kumar Tiwari

POSTER # 397

957 *High-Resolution Study of Crystalline Planes for TiO2 Over TEM Images: A Step-By-Step Analysis;* **Nahui Morales López**, Susana Dianey Gallegos-Cerda, Josué Hernández-Varela, Lizbeth Gonzalez Victoria, Benjamín Arredondo-Tamayo, José Jorge Chanona-Pérez

POSTER # 398

958 *Investigation of Thermal Sintering Effects on Aerosol Jet Printed Silver Nanoparticle Ink Flexible Electronics using FIB/SEM;* **Sylvie Crowell**, Janet Gbur

POSTER # 399

959 *Multi-walled Carbon Nanotubes Functionalized with Cyclodipeptides improve Seed Germination and Early Development of Solanum Lycopersicum*; **Salomón Borjas**, Daniela Fernández-Gómez, Jesus Campos García, Gladys Juárez Cisneros, Dhirendra Kumar Tiwari, Javier Villegas-Moreno

POSTER # 400

960 *Oxidizing and Functionalizing Multi-walled Carbon Nanotubes with Fluorescein Isothiocyanate Enhances Germination and Biomass in Avena sativa;* **Salomón Borjas**, Marco Antonio Alemán-Méndez, Dhirendra Kumar Tiwari, Gladys Juárez Cisneros, Javier Villegas-Moreno

POSTER # 401

961 *Study of a CuAg Alloy from Microscale to Atomic Scale;* **Hannah Matos-Pimentel**, Yan Xin, Ken Wu, Jason Cooley, Seth Imhoff, Joel Montalvoand, Ke Han Wu, Chad Mirkin, Vinayak Dravid, Daniel Apley, Wei Chen

C03.P2 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing

POSTER # 402

962 *Automated Sample Drift Correction for Low Intensity Electron Counted TEM Images;* **Dmitri Zakharov**, Polina V Burmistrova, Xiaohui Qu, Dmytro Nykypanchuk, Meng Li, Yolanda Small

POSTER # 403

963 *Constrained DKL to Accelerate Structure-Property Relationship Discovery in Automated Electron and Scanning Probe Microscopy;* **Utkarsh Pratiush**, *Jinyuan Yao, Marti Checa, Ying Liu, Sergei Kalinin, Yongtao Liu*

POSTER # 404

964 *Determining Diffusion Characteristics of Nanoparticles in Liquid Phase TEM Using Deep Learning;* **Zain Shabeeb**, Naisargi Goyal, Vida Jamali

POSTER # 405

965 *Evaluating Deep-Learning Resolution Recovery Algorithm Performance as a Function of Feature Size and Point Spread Function;* **V. V. Rohit Bukka**, Matthew Andrew, Andriy Andreyev

POSTER # 406

966 *Improved STEM Imaging Using Deep Learning Based Compressed Sensing;* **Alex Williams**, Jack Wells, Alex Robinson, Daniel Nicholls, Amirafshar Moshtaghpour, Professor Kirkland, Konstantinos Tsakalidis, Yao-Chun Shen, Nigel Browning

POSTER # 407

967 *Informed Sampling Strategies for Efficient and Low-Dose Scanning (Transmission) Electron Microscopy;* **Richard Jinschek**, Jack Wells, Alex Robinson, Amirafshar Moshtaghpour, Professor Kirkland, Mario Gianni, Yao-Chun Shen, Nigel Browning

POSTER # 408

968 *Machine Learning Diagnosis for Accelerated Development of 2d/3D Perovskite;* **Hamid Latif**, Syed Tayyab, Iftikhar Sheazi

POSTER # 409

969 *Machine Learning-Enhanced TEM Image Analysis Techniques;* **Kamyar Barakati**, Xin Zhang, Xiang Wang, Sergei Kalinin

POSTER # 410

970 *MC X-ray Coupled with Neural Networks for Element Quantification: A Neural Network-Enhanced Approach;* **Dawei Gao**, Yu Yuan, Raynald Gauvin, Nicolas Piché

POSTER # 411

971 *Optical Distortion Correction of Convergent Beam Electron Diffraction Disks Using Deep Learning;* **Matthew Fitzpatrick**, Arthur Blackburn

POSTER # 412

972 *Study of Mechanical Properties and Electrical Conductivity in Al-Mg-Zn Systems Subjected to a T8 Treatment;* **X. Atanacio-Sánchez**, C.G. Garay-Reyes, I. Estrada-Guel, Leonardo Baylón García, P. A. Guerrero-Seañez, M.A. Ruiz-Esparza-Rodriguez, J.M. Mendoza-Duarte, R. Martínez-Sánchez

POSTER # 413

973 *Unsupervised Deep Video Denoiser: A Potential Key to Extracting Information from Monochromated EELS;* **Yifan Wang**, Peter Crozier, Carlos Fernandez-Granda

P Physical Sciences Posters – Thursday

10:00 AM – 12:00 PM **Exhibit Hall**

P03.P4 Electron Microscopy of Advanced Functional Materials

POSTER # 414

974 *Adhesion Characterization on AISI 9254 Steel Boriding;* **Lizbeth Sanchez Fuentes é López Perrusquia**, Milton Elías Espinosa, Dulce Viridiana Melo Máximo, Tomas De la Mora Ramírez, Victor Hugo Olmos Domínguez, Marco Antonio Doñu Ruiz

POSTER # 415

975 *Characterization of Chopped Carbon Fiber Reinforced Composites Produced Using Fused Deposition Modeling;* **Jonathon Tran**, Rachel Shubella, Alexander Hunt

POSTER # 416

976 *Chitosan Nanoparticles with Potential Biomedical Applications: Effect of Concentration in the n-solvent Phase;* **Ana Guadalupe Luque-Alcaraz**, Pedro Amado Hernández-Abril, Cynthia Nazareth Hernández-Téllez, Ana Karenth López-Meneses

POSTER # 417

977 *Exploring In-Situ Synthesis of Composite Nanostructures with Carbon-Based Materials using Open-Atmosphere Set-Up;* **Adeal S. Matuk**, Jafar F. AlSharab

POSTER # 419

979 *Fabrication of a PLA Matrix Composite Reinforced with Exfoliated Graphite Produced by a Green Route;* **Emilio Gómez Sánchez**, I. Estrada-Guel, Dimitrios Papageorgiou, J.M. Mendoza-Duarte, C.G. Garay-Reyes, R. Martínez-Sánchez

POSTER # 420

980 *Formation of SiC by Magnesium-Thermal Synthesis;* **Kevin Isaac Contreras-Vargas**, C. Carreño-Gallardo, Patricia Amézaga-Madrid, Antonio Ramirez-Delacruz, M.A. Ruiz-Esparza-Rodriguez, D. Lardizabal-Gutiérrez

POSTER # 421

981 *From Silver Nanoparticle to Thin Films Produced by Pulsed Laser Deposition: Effects of Ar Gas Pressure and Substrate Surface Free Energy;* **Cauê de Souza Coutinho Nogueira**, Ângela Caroliny Agra Pinto, Dante Ferreira Franceschini Filho, Masashi Watanabe, Yutao Xing

POSTER # 422

982 *Investigation of Carbon Products Produced by Catalytic Pyrolysis of Natural Gas;* **James Poston**, Jarrett Riley, Hayat Adawi, Chris Atallah, Ranjani Siriwardane

POSTER # 423

983 *Physical and Elementary Chemistry Characterization of Particles PM2.5 through Scanning Electron Microscopy Equipped with X-ray Scattering;* **Roberto Ramirez-Leal**, A. Alvarado-Castro, Hammed Estuardo -More , A. L. Ramos-Cordova

POSTER # 424

984 *Self-healing to Perfect Single Crystals via Synergistic Stabilization;* **Soo-Yoon Hwang**, Yeongki Yeo, Chan-Ho Yang, Si-Young Choi

POSTER # 425

985 *SEM Characterization of GG-CaCO3-TiO2 Composite Film for Its Application in Photocatalysis;* **Nahui Morales López**, Susana Dianey Gallegos-Cerda, Benjamín Arredondo-Tamayo, Josué Hernández-Varela, Felipe Cervantes Sodi, José Jorge Chanona-Pérez

POSTER # 426

986 *SEM of Erosive Wear Mechanisms of Kevlar Fiber Reinforced Composites;* **Edgar Vera**, Abel Eslava Hernandez, Julio Alejandro Rodriguez Gonzalez, A. I. Martínez-Pérez, Carlos Rubio Gonzalez

POSTER # 427

987 *Synthesis and Crystal Growth of Mg-Calcite and Dolomite;* **Hannah Matos-Pimentel**, Cecilia Oliveira, Jesiel Carvalho

POSTER # 428

988 *Synthesis of Mesoporous Gadolinium Oxide by Using CTAB as an Organic Template;* **Salomón Borjas**, Pablo Martínez Torres, Ariosto Medina Flores, Gerardo Rosas Trejo, Laura Rubí Delgado-García, Gonzalo Viramontes Gamboa, Jesús Armando Vargas-Correa, Javier Villegas-Moreno

POSTER # 429

989 *Synthesis of Praseodymium Oxide Aggregates with Mesoporosity Using Surfactant CTAB;* **Salomón Borjas**, Pablo Martínez Torres, Gerardo Rosas Trejo, Sheila Vélez Navarrete, Javier Villegas-Moreno

POSTER # 430

990 *Synthesis of Titanium Carbide Nanoparticles by Magnesiotermic Method;* **M.L. Camacho-Rios**, M.A. Ruiz-Esparza-Rodriguez, Guillermo Herrera-Perez, D. Lardizabal-Gutiérrez, C. Carreño-Gallardo, Raúl Pérez-Bustamante, José Antonio Betancourt-Cantera

POSTER # 431

991 *Understanding the Relationship Between Zein Solution Concentration and Nanoparticle Physicochemical Characteristics for Biomedical Use;* **Pedro Amado Hernández-Abril**, Ana Guadalupe Luque-Alcaraz, Jorge L. Iriqui-Razcón, Cynthia Nazareth Hernández-Téllez, Hiram J. Higuera-Valenzuela

P05.P1 Advanced Imaging and Spectroscopy Beyond Room Temperature

POSTER # 432

992 *Cathodoluminescence Thermometry for Accurate Temperature Measurements in In Situ TEM;* **Pavel Olshin**, Won-Woo Park, Ye-Jin Kim, Hak-Won Nho, Daria Mamo va, Ilya Kolesnikov, Vassily Medvedev, Oh-Hoon Kwon

POSTER # 433

993 *Cryogenic Optical Near-field Imaging and Spectroscopy with 20nm Spatial Resolution;* **Tobias Gokus**, Artem Danilov, Richard Hentrich, Andreas Huber

POSTER # 434

994 *Identifying a Critical Nucleus for Ice Nucleation on Hydrophilic and Hydrophobic Surfaces;* **Pengcheng Chen**, Dingxin Fan, Nan Yao

Scientific Program

P Physical Sciences Posters – Thursday

POSTER # 435

995 *Progress in Simulations of Magnon EELS;* **José Ángel Castellanos-Reyes**, Paul Zeiger, Jan Rusz

POSTER # 436

996 *The Magnetic Multislice Method and Applications;* **José Ángel Castellanos-Reyes**, *Jan Rusz*

POSTER # 437

997 *Understanding of Destructive Niobium Hydride Phase Formation Mechanism using Cryogenic Structural Analysis;* **Zuhawn Sung**, Arely Cano, Daniel Bafia, Evguenia Karapetrova, Jae Yel Lee, Anna Misiewicz, Alexander Romanenko, Akshay Murthy

P07.P2 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

POSTER # 438

998 *Berry Phase in Dynamical Electron Diffraction;* **Yueming Guo**, Yu-Tsun Shao

POSTER # 439

999 *Changing the Atomic and Electronic Structures of Oxide Grain Boundaries with n-contacting Electric Fields;* **Klaus van Benthem**, William Hahn, Andrew Lupini

POSTER # 440

1000 *Connecting Medium Range Ordering to Topological Properties of Amorphous Bi2Se3;* **Gabriel Calderon Ortiz**, Kazi Aatish Imroz, Sadikul Alam, Yuan-Ming Lu, Jyoti Katoch, Roland Kawakami, Jinwoo Hwang

POSTER # 441

1001 *Deciphering Phonon Modes in Thin Film Ferroelectrics;* **Mahir Manna**, Surya Prakash Reddy Mandalreddy, Sujit Das, Sandhya Susarla

POSTER # 442

1002 *Detecting Magnon-Phonon Coupling in the Scanning Transmission Electron Microscope;* **Alexander Reifsnyder**, Mohamed Nawwar, Minyue Zhu, Jordan Hachtel, Joseph Heremans, David McComb

POSTER # 443

1003 *Investigating Implantation Damage in Silicon Carbide Using ADF STEM and Multislice Ptychography;* **Aaditya Bhat**, Junghwa Kim, Colin Gilgenbach, James LeBeau

POSTER # 444

1004 *Mapping Moiré Potentials with STEM EBIC Imaging;* **Tristan O'Neill**, Edgar Elias, Yueyun Chen, Ho Leung Chan, Qianhui Shi, B. C. Regan

POSTER # 445

1005 *Towards Atomic Imaging and Spectroscopy of Er defects in Z;* **Orlando Daniel Salguero Pesantez**, Jeong Rae Kim, Adrian Beckert, McCoy Lim, Shimin Zhang, Yuan Ping, Andrei Faraon, Joseph Falson, Juan Idrobo

P09.P3 Advances in In Situ TEM Characterization of Dynamic Processes in Materials

POSTER # 446

1006 *Data Processing for In Situ Electron Tomography toward Unbiased Approach: Application to Metal Nanoparticles Sintering;* **Shiro Ihara**, Mitsuhiro Murayama

POSTER # 447

1007 *Deciphering Acid Etching-Induced Anisotropic Shape Transformation of Z Nanorods via in situ Liquid Cell TEM;* **Fangyuan Liu**, Haiyan Tan, Zichao Bian, Guoan Zheng, Puxian Gao

POSTER # 448

1008 *Deep Learning Object Detection Video Analysis to Determine Grain Boundary Defect Sink Efficacy in Ion Irradiated Specimens;* **Emily Mang**, Annie Barnett, Sebastian Lech, Mitra Taheri

POSTER # 449

1009 *Establishing Mechanisms for Thiolate-Protected Gold Nanoparticle Growth by Variable Temperature Liquid-Phase Transmission Electron Microscopy;* **Jiayue Sun**, Taylor Woehl

POSTER # 450

1010 *High-Temporal Resolution Event Streaming for Electron Counting;* **Benjamin Bammes**, Michael Spilman

POSTER # 451

1011 *Identification of Chemical Segregation and Surface Twinning Structures in Electro-deposited Al Dendrites;* **Xiaodong Liu**, Fatemehsadat Rahide, Tingting Yang, Peng-Han Lu, Sonia Dsokea, Helmut Ehrenberg, Rafal Dunin-Borkowski, B. Layla Mehdi

POSTER # 452

1012 *Improvement in Phase Resolution with Beam Tilting Measurements in Electron Holography Using Environmental Cells;* **Fumiaki Ichihashi**, Tetsuya Akashi, Yoshio Takahashi, Toshiaki Tanigaki

POSTER # 453

1013 *Influence of Mischmetal Rare Earth Elements Additions on the Microstructural Properties of HIP and Conventional Sintering Heat Treated Inconel 718.;* **Hansel Medrano**, A. Santos-Beltrán, Miriam Santos-Beltran, C.g. Garay-Reyes, I. Estrada-Guel, J.s. Castro-Carmona, H. Camacho-Montes, V. Gallegos-Orozco, G. Rodríguez-Cabriales, R. Martínez-Sánchez

POSTER # 454

1014 *Interfacial Phase Evolution during in-Situ TEM Dealloying Approach of Ti30Cr/Ni;* **Elaf Anber**, Sebastian Lech, Jodie Baris, David Beaudry, Ian McCue, Jonah Erlebacher, Mitra Taheri

POSTER # 455

1015 *Learning the Physics of Liquid Phase TEM Nanoparticle Trajectories Using Physics-informed Generative AI;* **Zain Shabeeb**, Naisargi Goyal, Pagnaa Nantogmah, Vida Jamali

POSTER # 456

1016 *Observation of As-Quenched DU-6wt%Nb Microstructure by Transmission Kikuchi Diffraction;* **Christian Walters**, Rodney McCabe, Matthew Schneider, Danel Savage, Donald Brown, Elena Garlea, Sean Agnew

POSTER # 457

1017 *Synthesis of Star-like Z Nanostructures on a Z Lamella under Electron Beam Irradiation;* **Oscar Cigarroa-Mayorga**, Yazmin Hernandez

POSTER # 459

1019 *Visualization of Water Uptake by Human Respiratory Aerosol Components with In Situ Transmission Electron Microscopy;* **Martin Ahn**, Akua Asa-Awuku, Taylor Woehl

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Thursday Afternoon

A05.1 Microscopy and Microanalysis in Cultural Heritage Studies

Thursday 1:30 PM

1:30 PM **1020** *Investigation of Artists Pigments with a Nonlinear Microscopy Technique;* (Invited) **Heidi Kastenholz**, David Grass, Michael Topper, Martin Fischer, Warren Warren

2:00 PM **1021** *A Nondestructive Method for Probing Layer Thicknesses in Early Photographs from Micrometers to Nanometers Using SEM-based µXRF Spectrometry;* **Edward Vicenzi**, Thomas Lam, Rachel Wetzel, Shannon Perich

2:15 PM **1022** *Insights into the Transformation of Au Gilding into Nanoparticles Enabled with Electron Microscopy Analysis Techniques;* **Eric Formo**, Kristie Le, Monika Milkovska, Darrah Dare, Tina Salguero, Mark Abbe

2:30 PM **1023** *Cryogenic FIB lift-out Reveals Atomic-Scale Photoactive Homojunctions in Cadmium Yellow Paint from Matisse's "Flower Piece";* **Michael Colletta**, Barnaby Levin, Jennifer Mass, Adam Finnefrock, David Muller

A06.3 Electronic and Thermal Device Characterization with Electron Microscopy

Thursday 1:30 PM

1:30 PM **1024** *Measurement of Electrostatic Potentials in Semiconductor Devices by Off-Axis Electron Holography;* (Invited) **David Cooper**, Victor Boureau

2:00 PM **1025** *Chasing Down Leads: Imaging Conductivity Networks in a FinFET Processor;* **William Hubbard**, Cecile Bonifacio, Richard Li, Mary Ray, B.C. Regan, Paul Fischione

2:30 PM **1026** *Nano-PUND and STEM EBIC Imaging for Ferroelectric Polarization Mapping;* **Ho Leung Chan**, Yueyun Chen, Tristan O'Neill, Shelby Fields, Megan Lenox, Jon Ihlefeld, William Hubbard, B. C. Regan

A10.9 Correlative Analysis and Multimodal Microscopy and Spectroscopy

Thursday 1:30 PM

1:30 PM **1027** *Characterization of Dislocations in GaN Wafers using Correlative Microscopy: A Raman-SEM-EDS and AFM study;* **Ute Schmidt**, Alfredo Gonzalez, Ted Limpoco, Niklas Biere, Jan Englert, Thomas Meyer

1:45 PM **1028** *Evolution of Electron Channeling Contrast Imaging of Plastic Deformation Induced by Berkovich Nanoindentation in Ferrite Steel;* **Oluwasogo Adegboyega**, Nicolas Brodusch, Lise Guichaoua, Richard R. Chromik, Raynald Gauvin

2:00 PM **1029** *Thermal Evolution of Alumina through Dehydration of Aluminum Hydroxide;* **Cody Cly**, Angela Speck, Arturo Ponce, Alan Whittington, Beth Sargent, Joseph Nuth

2:15 PM **1030** *Correlated Multi-Scale Characterization of Crystals in a Conductive Polymer;* **Alison Trachet**, Kristy Schepker, Gary Scheiffele

2:30 PM **1031** *Analysis of the Behavior of the Maximum Permissible Crack in Mechanical Elements of Internal Combustion Engines;* **Misael Flores Baez**, Israel Baez, Guillermo Urriolagoitia Sosa, Guillermo Manuel Urriolagoitia, Beatriz Romero, Israel Fernando Barajas, Arturo Sanchez Cervantes

2:45 PM **1032** *New Approaches Towards Visualization of Biological Samples by the Means of Liquid Phase TEM;* **Evgeniya Pechnikova**, Hongyu Sun, Alejandro Rozene, Daniel Pfeiffer, Leon Abelmann, Hector Hugo Perez Garza

A11.4 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging

Thursday 1:30 PM

1:30 PM **1033** *Ongoing International Interlaboratory Comparisons on Size, Shape and (Relative) Concentration of Complex Nanoparticles under the Pre-Standardization Platform of VAMAS;* (Invited) **Vasile-Dan Hodoroaba**, Christoph Salzmann, Maria Heilmann, Francesco Pellegrino, Bénédicte Durand, Olivier Taché, Amaia Zurutuza

2:00 PM **1034** *Visualizing the Point-Spread Function of the SEM Optics;* **Surya Kamal**, Richard Hailstone

2:15 PM **1035** *Inelastic and Elastic Scattering Cross-Sections for Carbon at 20-30 keV;* **Cristina Cordoba**, Nicolas Brodusch, Robert McLeod, Raynald Gauvin, Arthur Blackburn

2:30 PM **1036** *Unified Approach to Standards-Based Absolute Quantification of EDX and EEL Spectra of Nanoscale Materials in STEM and STEM-in-SEM;* **Vladimir Oleshko**, Nicholas Ritchie, Andrew Herzing

B Biological Sciences Symposia – Thursday Afternoon

B04.2 Electron Microscopy in Education

Thursday 1:30 PM

1:30 PM **1037** *Lessons Taught and Lessons Learned from Teaching Cryo-EM Courses;* (Invited) **Gabriel Lander**

2:00 PM **1038** *The Atlas of Fourier Transforms: A Guide to Reciprocal Space for Biologists and Materials Scientists (Conference Abstract);* **Miti Shah**, Suk Hyun Sung, Robert Hovden

2:15 PM **1039** *The Challenges of Manual Cryo-Plunger Design and Construction;* **Tristan O'Neill**, Noah Bodzin, Wong Hoi Hui, Matthew Mecklenburg

2:30 PM **1040** *Implementing Cryo-EM Manual Plunger Techniques in University Workshops and Teaching Laboratories;* (Invited) **Cody Brazel**, Dylan Girodat

B07.2 Microscopy Uncovering Biological and Tech logical Details Towards Biomimetics

Thursday 1:30 PM

1:30 PM **1041** *Designing Biomimetic Surfaces as Facilitator for a Cleaner Environment;* (Invited) **Hendrik Hölscher**

2:00 PM **1042** *Freeze Casting Biomimetic Materials: X-Ray Tomoscopy Reveals the Dynamics of Ice Templating and Structure Formation;* (Invited) **Ulrike G. K. Dr. Wegst**, Paul H. Dr. Kamm, Kaiyang Dr. Yin, Tillmann R. Dr. Neu, Christian Schlepütz, Francisco García-More

Scientific Program

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Afternoon

C03.3 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

Thursday 1:30 PM

1:30 PM **1043** *Charge-Induced Structural Rearrangements in Organic Mixed Ionic Electronic Conductors: A Cryogenic 4D-STEM Study;* (Invited) **Yael Tsarfati**, Karen Bustillo, Benjamin Savitzky, Iain McCulloch, Colin Ophus, Andrew Minor, Alberto Salleo

2:00 PM **1044** *Uncovering the Complex Nanoscale Architecture of Human Enamel and Insights in Its Nanoscale Mechanical Properties;* **Paul Smeets**, Stephanie Ribet, Roberto dos Reis, Xiaobing Hu, Colin Ophus

2:15 PM **1045** *The Characterization of Newly Secreted Dental Enamel by Electron Energy Loss Spectroscopy;* **Ya-Hsiang Hsu**, David McComb, Amanda Trout, Asra Hassan, John Bartlett, Charles Smith

2:30 PM **1046** *Exploration of the Defect Landscape of Aragonite CaCO3 at the Atomic Scale;* **Xiaobing Hu**, Paul Smeets, Roberto dos Reis, Vinayak Dravid

2:45 PM **1047** *TEM Sample Preparation and TKD Analysis of Epoxy-Embedded Pd Powder Particles Using a DualBeam FIB/SEM;* **Suzy Vitale**, Joshua Sugar, Meghan Rogers, Carly Hui, David Robinson

C04.2 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing

Thursday 1:30 PM

1:30 PM **1048** *Towards Autonomous Experiments by Connecting High Performance Microscopy with High Performance Computing;* (Invited) **Peter Ercius**, Alexander Pattison, Wolfgang Theis, Chris Harris, Samuel Welborn, Bjorn Enders

2:00 PM **1049** *Describing Atomic Order Through Foundational Microscopy;* **Steven Spurgeon**, Waqwoya Abebe, Jan Strube, Christina Doty, Derek Hopkins, Kevin Fiedler, Matthew Olszta, Nathan Tallent

2:15 PM **1050** *Silicon Nanostructures Through Guided Recrystallization;* **Gerd Duscher**, Austin Houston, Utkarsh Pratiush, Matthew Chisholm, Sergei Kalinin

2:30 PM **1051** *Prediction of the Cu Oxidation State from EELS and XAS Spectra Using Supervised Machine Learning;* **Samuel Gleason**, Matthew Carbone, Deyu Lu, Jim Ciston

2:45 PM **1052** *Quantification of Intermetallic Compounds in Aluminum 6061 Alloy with Electron Microscopy;* **Yinuo Li**, Sabrina Clusiau, Pascal Gauthier, Nicolas Piché, Colin MacRae, Raynald Gauvin

C05.3 Correlative Microscopy Using Light, Electron, and X-ray Microscopy

Thursday 1:30 PM

1:30 PM **1053** *Multi-scale Correlative Workflows, Challenges and Opportunities for Cryo CLEM;* (Invited) **Roland Fleck**, Maryna Kobylynska, Pippa Hawes

2:00 PM **1054** *Do Tissue Microenvironments Affect Antibiotic Efficacy?;* **Antony Fearns**

2:15 PM **1055** *Visualisation of Gene Expression within the Context of Tissues: an X-ray Computed Tomography-Based Multimodal Approach;* **Kristaps Kairišs**, Natalia Sokolova, Lucie Zilova, Christina Schlagheck, Robert Reinhardt, Tilo Baumbach, Tomáš Faragó, Thomas Kamp, Joachim Wittbrodt, Venera Weinhardt

2:30 PM **1056** *Correlative Electron Microscopy and Multi-isotope Mass Spectrometry Reveal Biological Longevity at Macromolecular, Organelle, Cell, and Tissue Scales;* (Invited) **Rafael Arrojo e Drigo**

P Physical Sciences Symposia – Thursday Afternoon

P01.3 Innovative Magnetic Imaging

Thursday 1:30 PM

1:30 PM **1057** *Evaluation of Phase Reconstruction Techniques in Quantitatively Analyzing Nanoscale Magnetic Materials;* (Invited) **Kayna Mendoza Trujillo**, Haoyang Ni, Georgios Varnavides, Miaofang Chi, Colin Ophus, Charudatta Phatak, Amanda Petford Long

2:00 PM **1058** *ML-Enabled Single Image Magnetic Phase Reconstruction for Lorentz Transmission Electron Microscopy;* **Arthur McCray**, Tao Zhou, Yue Li, Saugat Kandel, Amanda Petford Long, Mathew Cherukara, Charudatta Phatak

2:15 PM **1059** *In-situ Correlation of the Anomalous Hall Effect with the Occurrence of Topological Magnetic Phases;* **Sebastian Schneider**, Vijay Bhatia, Daniel A. Mayoh, Geetha Balakrishnan, Taka Nori Sato, Yevheniy Pivak, Pohl Darius, Bernd Rellinghaus, Julie Cairney, Magnus Garbrecht

2:30 PM **1060** *Development of ns × nm Magnetic Imaging Technique for Current-induced Dynamics based on Ultrafast Transmission Electron Microscopy;* (Invited) **Dongxue Han**, Takahiro Shimojima, Asuka Nakamura, Kyoko Ishizaka

P03.8 Electron Microscopy of Advanced Functional Materials

Thursday 1:30 PM

1:30 PM **1061** *Structural and Microstructural Defects in Mechanically Deformed Lead-free Ferroelectrics;* **Katarina Žiberna**, Maja Koblar, Micka Bah, Franck Levassort, Hana Uršič, Goran Dražić, Andreja Benčan

1:45 PM **1062** *Exploring Short-Range Ordering in Semiconducting Materials;* **Lilian Vogl**, Peter Schweizer, Shunda Chen, Xiaochen Jin, Shui-Qing Yu, Dana Byrne, Frances Allen, Jifeng Liu, Tianshu Li, Andrew M Minor

2:00 PM **1063** *Formation of Ruddlesden-Popper Faults in Complex Perovskite Oxides;* **Rishi Raj**, Hwanhui Yun, K. Andre Mkhoyan

2:15 PM **1064** *Control of Threading Dislocation Formation in La-doped BaS 3 Films Grown by Hybrid Molecular Beam Epitaxy;* **Supriya Ghosh**, Fengdeng Liu, Bharat Jalan, K. Andre Mkhoyan

2:30 PM **1065** *Analytical S/TEM to Understand Structure and Chemistry of Dimensionally Resolved 1D and quasi-2D van der Waals Sb2S3 Nanocrystals;* **Toshihiro Aoki**, Dmitri Leo M Gordova, Kenneth Chua, Rebecca Mai Huynh, Maxx Q Arguilla

2:45 PM **978** *Exploring the Impact of Microstructure on the Mechanical Properties of High-Strength Zn Coating For Biomedical Application;* **Maria Watroba**, Killang Pratama, Chunhua Tian, Krzysztof Mackosz, Amit Sharma, Wiktor Bednarczyk, Johann Michler, Jakob Schwiedrzik

P07.8 Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods

Thursday 1:30 PM

1:30 PM **1066** *Imaging and Analysis of Quantum Materials, Developments in Workflow and Infrastructure;* **David Bell**, Avi Auslender, Austin Akey, Shu Yang Frank Zhou, Alan Chen, Joseph Checkelskey

1:45 PM **1067** *Atomic Engineering: Electron Microscope as a Manufacturing Tool;* (Invited) **Cong Su**

2:15 PM **1068** *From Structure to Coherence: Comprehensive Electron Microscopy Analysis of Superconducting Quantum Devices;* **Roberto dos Reis**, Thang Pham, Vinayak Dravid

2:30 PM **1069** *Polarity Switching and Josephson Junction Interfaces Investigated by Multislice Ptychography;* **Naomi Pieczulewski**, John Wright, Debdeep Jena, David Muller

2:45 PM **1070** *On the Hunt for Spin Qubits Using Multislice Electron Ptychography;* **Junghwa Kim**, Aaditya Bhat, Colin Gilgenbach, James LeBeau

P10.3 In Situ and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials

Thursday 1:30 PM

1:30 PM **1071** *In-situ S/TEM Investigations of Domain and Phase Transitions in Polarized Cu2Se; (Invited)* **Jinsong Wu**, Hao Luo, Hui Bai, Dongwang Yang

2:00 PM **1072** *Cryogenic Electron Diffraction Study of Abundant Charge Density Waves in Kagome Metal ScV6Sn6;* **Chuhang Liu**, Lijun Wu, Yimei Zhu

2:15 PM **1073** *Automated Cryo-TEM of Highly Beam-Sensitive Hard-Soft Ionomer Interfaces in Green Hydrogen Devices;* **Michael Zachman**, Bingzhang Zhang, Gang Wu, David Cullen

2:30 PM **1074** *Molecular-Resolution Electron Imaging of Defects and Dynamics at the Ice-Water Interface;* (Invited) **Jingshan Du**, James De Yoreo

Scientific Program

A Analytical/Instrumentation Sciences Symposia – Thursday Late Afternoon

A05.2 Microscopy and Microanalysis in Cultural Heritage Studies

Thursday 3:30 PM

3:30 PM **1075** *From Macro to Micro: Microscopic and Microanalytical Techniques in Museum Conservation Science;* (Invited) **Elena Basso**, Martina Rugiadi

4:00 PM **1076** *State of the Art SEM-based, Electron, X-ray and Raman Imaging and Analysis Reveals Century Old Secrets: Case of a 19th Century wooden inventory;* **Lucia Spasevski**, Domagoj Mudronja, Marin Šoufek, Haithem Mansour, Joshua Lea, Simon Burgess

4:15 PM **1077** *Predicting the Long-Term Light Stability of Color Photographic Prints: Comparing Macro and Micro-fade Testing Results;* **Henry Duan**

4:30 PM **1078** *Decoding Chinese Murals: Material Characterization of 'Ming Dynasty' Paintings in Western Collections;* (Invited) **Marcie Wiggins**, Anne Gunnison, Gabrielle Niu, Aniko Bezur

A11.5 Perspectives from Complementary SEM Techniques: STEM-in-SEM Analytics and High-throughput Multi-beam Imaging

Thursday 3:30 PM

3:30 PM **1079** *Low Voltage Scanning Transmission Electron Microscopy as a Viable Tool for Routine Analysis of Materials Science Specimens;* (Invited) **Nicolas Brodusch**, Raynald Gauvin

4:00 PM **1080** *TSEM-EDS Study of Nanoprecipitates in Oxide-Dispersion-Strengthened (ODS) 14YWT Ferritic Alloys;* **Tugce Uz**, Jeffrey Pigott, Jerard Gordon, Buhari Ibrahim, Jennifer Carter

4:15 PM **1081** *Closing the Gap in Electron Detection Capabilities between SEM and TEM;* **Maximilian Schmid**, Mozhdeh Abbasi, Adam Meisel, Yassine Imari, Alessia Mafodda, Stefan Aschauer

4:30 PM **1082** *Broad Ar Ion Beam Milling Improves EBSD Analysis of Phyllosilicates;* **Kayleigh Harvey**, Noriyuki Inoue, Sarah Penniston-Dorland

B Biological Sciences Symposia – Thursday Late Afternoon

B04.3 Electron Microscopy in Education

Thursday 3:30 PM

3:30 PM **1083** *Optimization of Single-Particle CryoEM: from Sample Preparation to Structure Determination and Everything In-Between;* (Invited) **Christopher Arthur**

4:00 PM **1084** *CryoEM/ET 101: An Engaging Online Self-Paced Course That Teaches Cryo-EM and Cryo-ET Principles;* (Invited) **Julia Brasch**, Peter Shen, Janet Iwasa

4:30 PM **1085** *What does "Training to Independence" Mean for Cryo-EM?;* (Invited) **Craig Yoshioka**, Omar Davulcu, Marcelo de Farias, Rose Marie Haynes, Nancy Meyer, Marzia Miletto, Sean Mulligan, Janette Myers, Vamseedhar Rayaprolu, Claudia Lopez

C Cross-Cut/Interdisciplinary Sciences Symposia – Thursday Late Afternoon

C03.4 Interdisciplinary Analysis of Soft/Hybrid/Bio Materials Using Advanced Focused Ion Beam Methods and Multimodal Microscopy Techniques

Thursday 3:30 PM

3:30 PM **1086** *Enabling New Science with Atom Probe Tomography via Environmentally Protected Specimen Handling;* (Invited) **Daniel Perea**

4:00 PM **1087** *Cryo STEM of Low Melting Point Metals Enabled by Cryo FIB and EXLO;* **Michael Colletta**, Jamie Ford, Joseph Michael, Lucille Giannuzzi, David Muller

4:15 PM **1088** *Effect of Single-Layer Graphene Substrate on Mitigating the Electron Beam Induced Damage in ZIF-8 Metal-Organic-Framework (MOF);* **Sara Talebi Deylamani**, Pritam Banerjee, Kathrin L. Kollmannsberger, Roland A. Fischer, Joerg Jinschek

4:30 PM **1089** *Ion Count-Aided Microscopy for Quantitative, Shot Noise-Mitigated Secondary Electron Imaging;* **Akshay Agarwal**, Leila Kasaei, Xinglin He, Oguz Kagan Hitit, Ruangrawee Kitichotkul, Albert Schultz, Leonard Feldman, Vivek Goyal

4:45 PM **1090** *Damage Diffusion Model in Scanning Transmission Electron Microscopy;* **Amirafshar Moshtaghpour**, Abner Velazco-Torrejon, Alex Robinson, Daniel Nicholls, Nigel Browning, Professor Kirkland

C04.3 Machine Learning-driven Automated Microscopy for Materials Discovery and Semiconductor Manufacturing

Thursday 3:30 PM

3:30 PM **1091** *The use of Artificial Intelligence and Machine learning in soft X-ray Technology for Advanced Semiconductor Process Development and Control;* (Invited) **Adrian Wilson**, Wei Ti Lee, Parker Lund, Mitch Shiver, Parikshit Jain, Torsten Stoll, Dmitry Kislitsyn

4:00 PM **1092** *Automating X-ray Fluorescence Mapping with Differentiable Modeling;* **Xiangyu Yin**, Zichao Wendy Di, Olga Antipova, Si Chen, Yi Jiang, Arthur Glowacki

4:15 PM **1093** *Enhancing 3D SEM Imaging with AI: Generating Training Data through Laser Machining and Confocal Analysis;* **Hongbin Choi**, Alexander Blagojevic, Matthew Maniscalco, Adrian Phoulady, Toni Moore, Nicholas May, Sina Shahbazmohamadi, Pouya Tavousi

4:30 PM **1094** *Towards Autonomous Synchrotron Fourier Transform Infrared Microscopy;* (Invited) **Peter Zwart**, Neslihan Tas, Marcus Noack, HoiYing Holman

C05.4 Correlative Microscopy Using Light, Electron, and X-ray Microscopy

Thursday 3:30 PM

3:30 PM **1095** *Correlation Between Electrical Conductivity of Solid Electrolyte Interphase and Rechargeable Battery Performance Revealed by Cryo and In Situ TEM;* (Invited) **Yaobin Xu**, Diego Galvez-Aranda, Saul Perez Beltran, Xia Cao, Phung Le, Jorge Seminario, Perla Balbuena, Ji-Guang Zhang, Wu Xu, Chongmin Wang

4:00 PM **1096** *Identifying the Active Sites of NiFe Hydroxides by Low-Dose Electron Microscopy and In-Situ X-Ray Absorption Spectroscopy;* **Zixiao Shi**, Qihao Li, Héctor Abruña, David Muller

4:15 PM **1097** *Correlative Microscopy of Nanophotonic Materials;* **Tomáš Šikola**, Michal Horák, Petr Liška, Peter Kepič, Rastislav Motúz, Jaroslav Jiruše, Andrea Konečná, Vlastimil Křápek

4:30 PM **1098** *Correlative Raman, Backscattered Electron and X-ray imaging and Energy Dispersive X-ray Spectrometry Uncovers Unique Chemical Signatures Surrounding Nanoparticles and Wear Debris in Periprosthetic Tissue;* **Pedro Machado**, Joshua Lea, Louise Hughes, Zhidao Xia

4:45 PM **1099** *Phase Transformation Characterization of High-Pressure Olivine Polymorphs in Shocked Meteorites using STEM-EDS and 4D-STEM;* **Tirzah Abbott**, Stephanie Ribet, Hannah Bausch, Laura Gardner, Karen Bustillo, Colin Ophus, Vinayak Dravid, Roberto dos Reis, Steven Jacobsen

P Physical Sciences Symposia – Thursday Late Afternoon

P03.9 Electron Microscopy of Advanced Functional Materials

Thursday 3:30 PM

3:30 PM **1100** *Quantifying Amorphous Structures On The Nm Scale: LiNbO3 Coatings in Solid State Batteries;* **Johannes Haust**, Jürgen Belz, Shamail Ahmed, Franziska Hüppe, Yiran Guo, Linus Erhard, Jochen Rohrer, Anna-Lena Hansen, Valeriu Mereacre, Kerstin Volz

3:45 PM **1101** *Atomic-resolution Imaging of Li Vacancies in a Battery Cathode through Depth Sectioning with Multi-slice Electron Ptychography;* **Dasol Yoon**, Yu-Tsun Shao, Dong Ren, Yao Yang, Héctor Abruña, David Muller

4:00 PM **1102** *Imaging Structural Evolution on Cycling of Li- and Mn-rich Cathode Materials using Combined ADF and Ptychography in STEM;* **Peter Nellist**, Weixin Song, Jun Chen, Zhiyuan Ding, Robert House, Thomas Slater, Peter Bruce

4:15 PM **1103** *Stabilization of Antiferroelectric Nanodomains by Local Chemical Disorder Determined using Multislice Electron Ptychography;* **Michael Xu**, Menglin Zhu, Yu Yun, Liyan Wu, Or Shafir, Colin Gilgenbach, Ilya Grinberg, Jonathan Spanier, James LeBeau

4:30 PM **1104** *Understanding Functionality of Energy Storage Materials via Advanced Electron Microscopy;* **Albina Borisevich**, Bishnu Thapaliya, Craig Bridges, Sheng Dai

P10.4 In Situ and Cryogenic Electron Microscopy and Spectroscopy for Energy Materials

Thursday 1:30 PM

3:30 PM **1105** *In-situ TEM for Uncovering Electro-Chemo-Mechanical Failures of Li Anode and Ceramic Solid-State Electrolytes in Li-metal Batteries;* (Invited) **Huolin Xin**, Chunyang Wang, Yubin He, Yaqi Jing

4:00 PM **1106** *Unveiling Nanostructure Design in Ion-Containing Polymers using Cryo-TEM;* **Xi Jiang**, Yen Jea Lee, Morgan Seidler, Xubo Luo, David Prendergast, Ronald Zuckermann, Nitash Balsara, Brooks Abel

4:15 PM **1107** *Development of a New Environmental In Situ TEM Holder for Liquid Cell Research with Combined Electrochemical and Thermal Stimuli Control;* **Hector Hugo Perez Garza**, Yevheniy Pivak, Hongyu Sun, Vasilis Papadimitriou, Christian Deen-van Rossum, Andres Alvarez, Merijn Pen, Ronald Spruit, Hongkui Zheng, Joe Patterson

4:30 PM **1108** *Investigation of Early Stage Lithium Growth Behaviors Using Cryo-TEM;* (Invited) **Seung-Yong Lee**, Seokho Nahm, Jeongmin Kim, Hyunbin Kim, Mihyun Kim, Haena Yim, Kwanyoung Oh, Minki Kim, Jinseok Hong, Jiwon Choi

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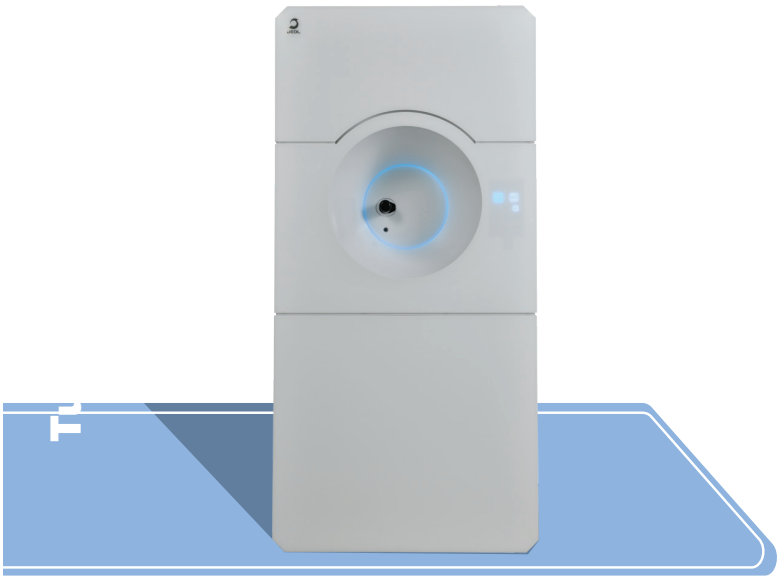

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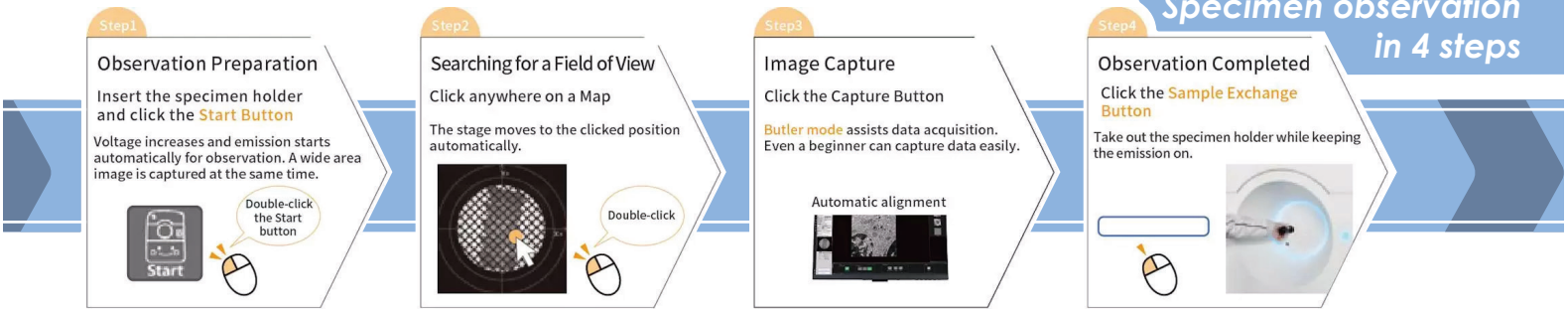

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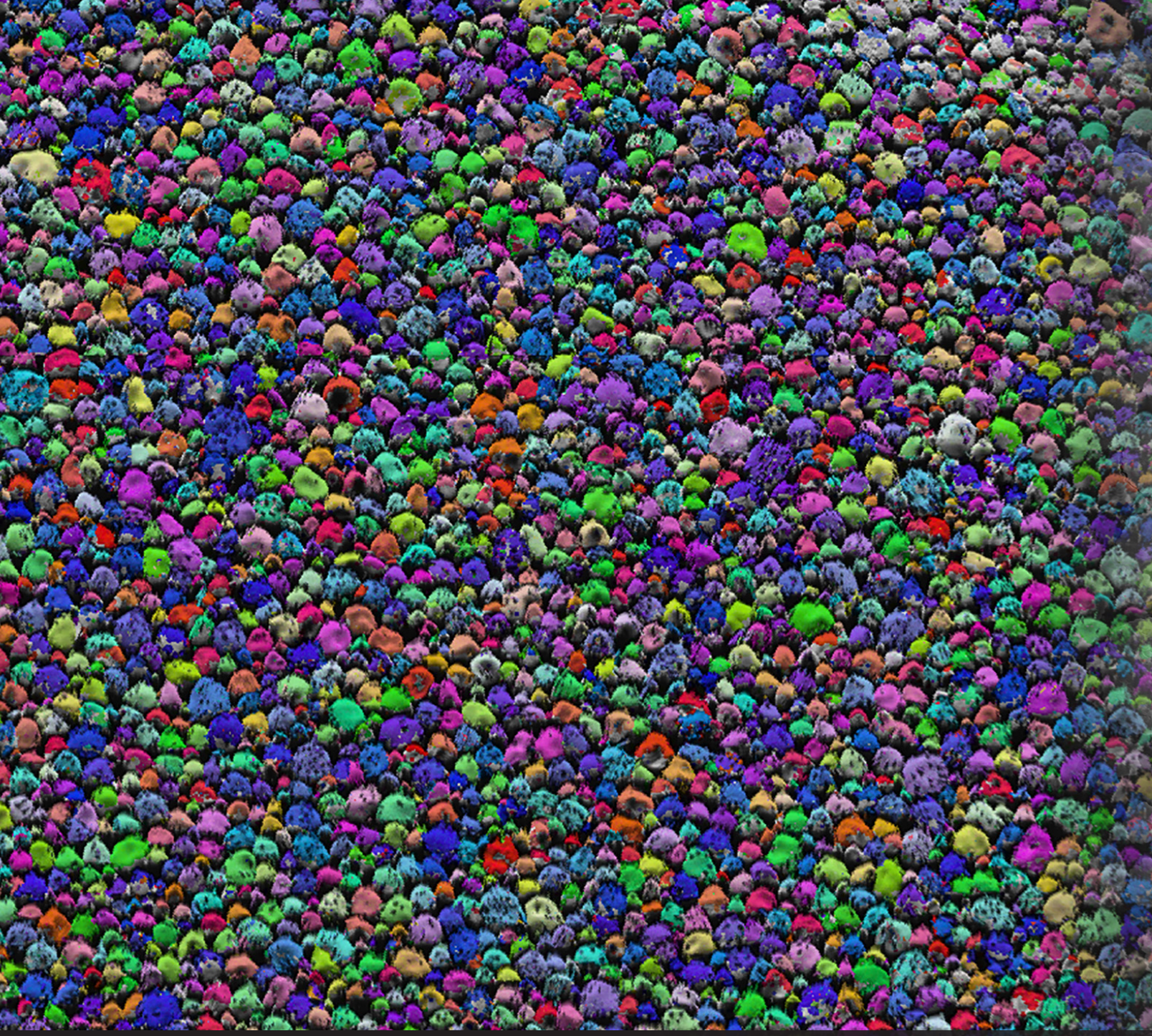

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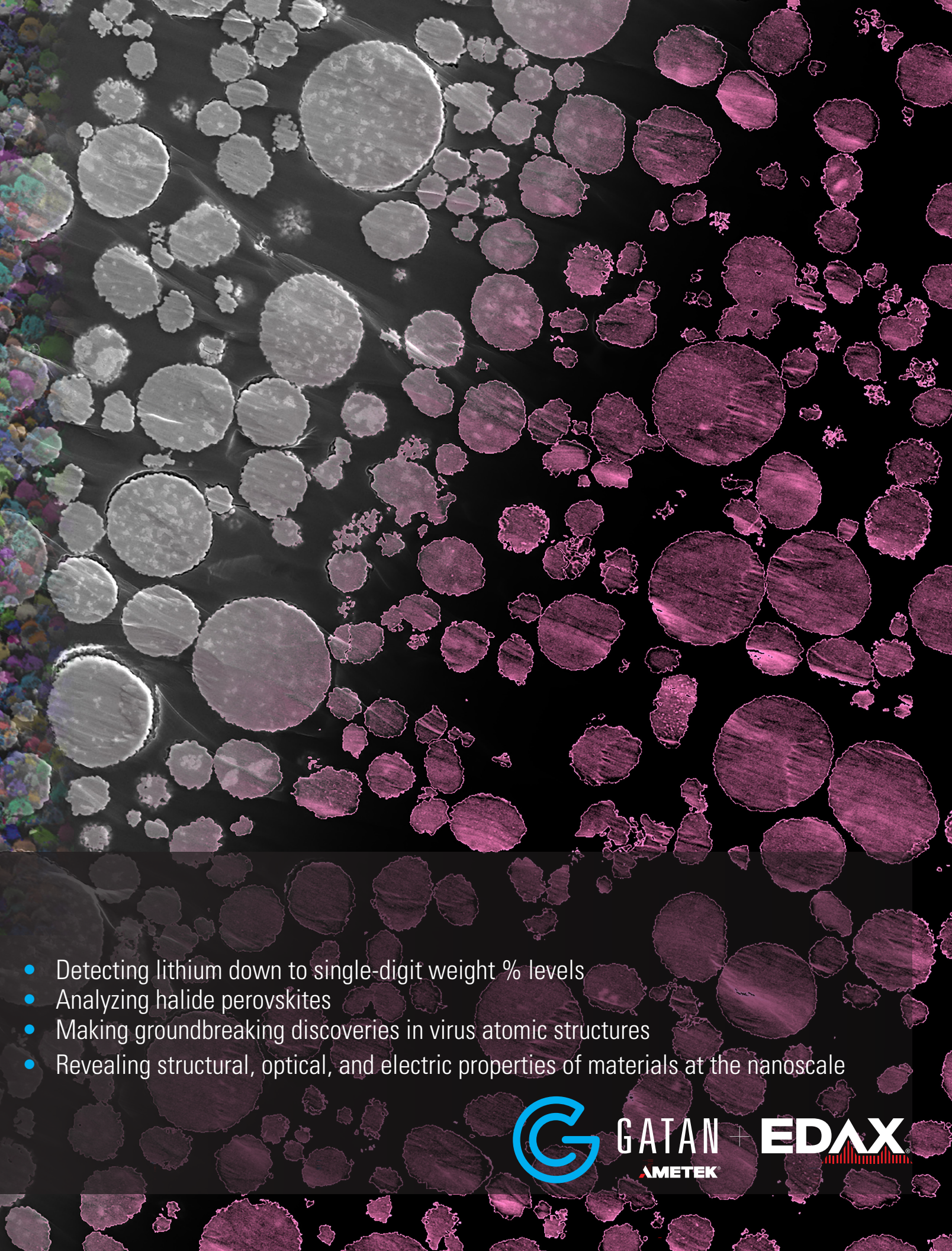

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- Making groundbreaking discoveries in virus atomic structures
- Revealing structural, optical, and electric properties of materials at the nanoscale

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