DRIVING **DISCOVERY**

2017 APS/CNM USERS MEETING

COMPREHENSIVE PROGRAM

Monday, May 8

8:00–5:00 Exhibits
Bldg. 402, Gallery (lower level), outside E1100/1200 and Bldg. 402, Atrium

7:30–5:00 Registration
Bldg. 402, Atrium

12:00–1:30 Lunch
Tents outside of lower level Gallery

Opening Session—Morning
Bldg. 402, Lecture Hall

Session Chairs: Jason Benedict (State University of New York, Buffalo) and Yasuo Ito (Northwestern Illinois University)

8:30—8:35 Jason Benedict, Chair, APS Users Organization and Yasuo Ito, Chair CNM Users Executive Committee
Welcome and Launch of the 2017 Meeting

8:35—8:45 Paul K. Kearns, Interim Laboratory Director
Welcome from the Laboratory

8:45—9:00 Paul Runci, Pacific Northwest National Laboratory and Chair of the Board of Directors for the Society for Science at User Research Facilities (SSURF)
Introducing the Society for Science at User Research Facilities

9:00—9:05 Yasuo Ito, Chair, CNM Users Executive Committee
Introduction of Keynote Speaker

9:05–9:55 Keynote Speaker: Eli Yablonovitch, University of California, Berkeley
The Scientific Challenge of Replacing the Transistor with a Lower Voltage Device

9:55–10:20 Break

10:20–10:35 Stephen Streiffer, APS Director
APS Update

10:35–10:50 Supratik Guha, CNM Director
CNM Update

10:50–11:05 Jim Kerby, Interim APS Upgrade Project Director
APS Upgrade Update

11:05—11:10 Jason Benedict, Chair, APS Users Organization
Introduction of the Speed Science Slam

11:10–12:00 S^3: Speed Science Slam

Jonghun Lee (Advanced Photon Source, Argonne National Laboratory)
Stress Relaxation of Shear-thickened Colloidal Suspensions

Kiran Sasikumar (Center for Nanoscale Materials, Argonne National Laboratory)
Integrated Imaging and Multiscale Simulation to Investigate Lattice Deformations in Externally Stimulated Nanocrystals

Cunming Liu (Advanced Photon Source, Argonne National Laboratory)
Solvent Effects on the Photoinduced Spin Crossover Process in Fe(II) Complexes

Tomasz Kolodziej (Advanced Photon Source, Argonne National Laboratory)
Diamond Endurance to Irradiation with X-ray Beams of Multi-kW/mm2 Power Densities for XFELO Application

Sanjay Behura (University of Illinois at Chicago)
All CVD Direct Growth of Large-Scale Graphene and Hexagonal Boron Nitride Heterostructures for Complex 2D Circuits

William Rock (Advanced Photon Source, Argonne National Laboratory)
We Study Solvent Extractions! So What Are They?

Qinglong Jiang (Center for Nanoscale Materials, Argonne National Laboratory)
Halide Perovskite and LED

Koffi Yao (Advanced Photon Source, Argonne National Laboratory)
In-operando *EDXRD of Graphite and Silicon-Graphite Electrodes in Lithium-ion Cells*

Curt Preissner (Advanced Photon Source, Argonne National Laboratory)
The Velociprobe: Photons (Measurements) So Phast You'll Phreak...!

Wenli Bi (Advanced Photon Source, Argonne National Laboratory
Studies of Phase Transitions in EuFe2As2 by ^{57}Fe and ^{151}Eu Nuclear Resonant Scattering under Hydrostatic Pressure

Alexander Scheinker (Los Alamos National Laboratory)
Feedback Control for X-ray Diffraction Measurements

12:00 Lunch

Parallel Facility Plenary Sessions—Afternoon

APS Session
Bldg. 402, Lecture Hall

Session Chair: **Amy Clarke (Colorado School of Mines)**
APSUO Steering Committee Vice Chair

1:00–1:35 Peter Voorhees (Northwestern University)
Microstructural Evolution in Materials

1:35–2:10 John Maio (University of California-Los Angeles)
Beyond Crystallography: Coherent X-ray Diffractive Imaging and Atomic Electron Tomography

2:10–2:45 Hongcai Joe Zhou (Texas A&M University)
Synthetic-method Development for the Preparation of Robust and Functionalized MOFs (Metal-Organic Frameworks)

2:45–3:00 Break

3:00–3:25 Student Invited Talk: Michael L. Whittaker (Northwestern University)
Synthesis of High-temperature Materials from Amorphous Precursors at Ambient Conditions

3:25–3:50 Dean Haeffner (Argonne National Laboratory)
APS-U Feature Beamlines and Beamline Enhancements

3:50–4:25 Tom O'Halloran (Northwestern University)
Breakthroughs in Biology Driven by Quantitative Subcellular X-ray Fluorescence Imaging

4:25–5:10 Keynote Speaker: Elizabeth Rampe (NASA Johnson Space Center)
X-ray Diffraction on Mars: Scientific Discoveries Made by the CheMin Instrument

5:30 Buses leave APS and Guest House for the banquet at 5:30 sharp!

6:15 Banquet
Meson Sabika
1025 Aurora Avenue, Naperville, IL 60540

Parallel Facility Plenary Sessions—Afternoon

CNM Session
Bldg. 402, Room A1100

Session Chair: **Steve Smith (South Dakota School of Mines & Technology)**
CNM Users Executive Committee Chair

1:30–2:00 Latha Venkataraman (Columbia University)
Physics and Chemistry of Single-molecule Circuits

2:00–2:30 David Fenning (University of California-San Diego)
A New (X-ray) Window into the Local Chemistry of the Emergent Hybrid Perovskite

2:30–3:00 Anand Bhattacharya (Argonne National Laboratory)
Spin Seebeck Effect in the Absence of Ferromagnetism

3:00–3:20 Break

3:20–3:30 Yasuo Ito (Northern Illinois University; Chair, CNM Users Executive Committee)
Update from the CNM Users Executive Committee

3:30–4:00 Diana Berman (University of North Texas)
2D Materials Superlubricity and How to Find It

4:00–4:30 Yuan Zhang (Argonne National Laboratory)
STM Manipulation of Individual Molecules: From Oligomers to Molecular Machines

4:30–4:45 Student Invited Talk: Lin Chen (Illinois Institute of Technology and Joint Center for Energy Storage Research & Energy Systems Division, Argonne National Laboratory)
Metal Oxide Protected Lithium Anode Enabled by Atomic Layer Deposition towards Practical Applications

4:45 Adjourn

5:30 Buses leave APS and Guest House for the banquet at 5:30 sharp!

6:15 Banquet
Meson Sabika
1025 Aurora Avenue, Naperville, IL 60540

Tuesday, May 9

8:00–5:00 Exhibits
Bldg. 402, Gallery (lower level), outside E1100/1200 and Bldg. 402, Atrium

8:00–5:00 Registration
Bldg. 402, Atrium

12:00–2:00 Poster setup
(shuttle buses and vans provided throughout the lunch hour to provide transportation between APS, the Guest House, and TCS Bldg. 240)

12:00–1:30 Lunch
Tents outside lower level Gallery

12:00–1:30 APSUO Steering Committee/APS Partner User Council Meeting
Bldg. 401, Fifth Floor Gallery

5:30–8:00 Poster Session
TCS Building 240

Parallel Facility-specific Workshops

APS Workshop 1 (full day) – Bldg. 402, Room E1100/1200
High-energy Resolution Inelastic X-ray Scattering Workshop (see page 21)

APS Workshop 2 (full day) – Bldg. 401, Room 5000
Even Small Wavelengths, When Bright Enough, Have Big Data Problems (see page 27)

CNM Workshop 3 (full day) – Bldg. 401, Room A1100
Transient Spectroscopy and Non-equilibrium Dynamics of 2D Materials (see page 31)

CNM Workshop 4 (full day) – APCF Auditorium
Machine Learning and Data Science in Materials Modeling, Imaging and Applications (see page 35)

APS Symposium (full day) – Bldg. 402, APS Lecture Hall
Structure-based Drug Discovery: The Next 25 Years (see page 39)

Wednesday, May 10

8:00–1:30 Exhibits
Bldg. 402 Gallery, outside E1100/1200 and Bldg. 402 Atrium

8:00–1:30 Registration
Bldg. 402, Atrium

12:00–1:30 Lunch
Tents outside lower level Gallery

12:00–1:30 CNM Users Executive Committee Meeting
Bldg. 440, Room A105/106

Parallel Facility-specific Workshops

CNM Workshop 5 (full day) – Bldg. 440, Room A105/106
Materials with Unique Nano-architectures: Fabrication, Theory and Characterization
(see page 43)

APS/CNM Workshop 6 (full day) – Bldg. 401, Room A5000
Nanodiffraction in Materials, Chemistry, and Physics: Scientific Opportunities *(see page 47)*

APS Workshop 7 (morning) – Bldg. 401, Room A1100
High-resolution Fluorescence Detection: Advanced X-ray Emission and Absorption Spectroscopy Studies Towards an Upgraded APS (APS-U) *(see page 52)*

APS Workshop 8 (afternoon) – Bldg. 401, Room A1100
Advances in Chemical Interpretation of Signals in Macromolecular Crystallography *(see page 56)*

APS Workshop 9 (full day) – Bldg. 402, Room E1100/E1200
X-ray Characterization of Materials Evolution: The State-of-the-Art *(see page 59)*

APS/CNM Workshop 10 (full day) – APCF Auditorium
Multimodal, Operando *Imaging Materials, Devices, and Architectures for Neuromorphic Computing*
(see page 64)