

## Workshop I: Diffractive Imaging with Phase Retrieval

Monday October 10, 2022

- 8:00–8:55 *Check-In/Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00 *Session Chair (AM): Margaret Murnane (Univ. Colorado Boulder)*
- 9:00–9:40 **Jianwei (John) Miao** (University of California, Los Angeles (UCLA))  
*Computational Microscopy: From Coherent Diffractive Imaging to Atomic Electron Tomography*
- 9:50–10:05 *Break*
- 10:05–10:45 **Hyunjung Kim** (Sogang University)  
*In situ coherent x-ray diffraction imaging study of internal structural deformation during the chemical process*
- 10:55–11:10 *Break*
- 11:10–11:50 **Manuel Guizar-Sicairos** (Paul Scherrer Institute)  
*Virtual Talk: Resonant ptychography, applications to 3D magnetization and chemical characterization*
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Session Chair (PM): Laura Waller (UC Berkeley)*
- 2:00–2:40 **Sebastian Seung** (Princeton University)  
*Virtual Talk: Petascale connectomics and beyond*
- 2:50–3:05 *Break*
- 3:05–3:45 **Changyong Song** (Pohang University of Science and Technology (POSTECH))  
*Single-pulse XFEL diffraction imaging to reveal ultrafast irreversible phenomena at femtosecond and nanometer scale*
- 3:55–4:15 *Lightning Poster Presentations*
- 4:15–4:45 *Break - Go to NRB*
- 5:00–6:00 **Margaret Murnane** (University of Colorado Boulder)  
*Green Family Lecture #1: Building the Microscopes of Tomorrow (at UCLA NRB Auditorium)*
- 6:15–7:45 *Poster Session & Reception (Hosted by IPAM)*



## Tuesday October 11, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair (AM): Stan Osher (UCLA)*
- 9:00–9:40 **Michael Unser** (École Polytechnique Fédérale de Lausanne (EPFL))  
*Virtual Talk: High-Speed Fourier Ptychography with Deep Spatio-Temporal Priors*
- 9:50–10:05 *Break*
- 10:05–10:45 **George Barbastathis** (Massachusetts Institute of Technology)  
*On the use of machine learning for computational imaging*
- 10:55–11:10 *Break*
- 11:10–11:50 **Chris Metzler** (University of Maryland)  
*Adversarial Sensing: A Learning-Based Approach to Imaging and Sensing with Unknown Forward Models*
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Session Chair (PM): Hyungjung Kim (Sogang Univ.)*
- 2:00–2:40 **Tim Salditt** (Georg-August-Universität zu Göttingen)  
*Phase Retrieval and Tomographic Reconstruction in X-ray Near-field Diffractive Imaging: Inverse Problems at Work - An Experimentalist's View*
- 2:50–3:05 *Break*
- 3:05–3:45 **Albert Fannjiang** (University of California, Davis (UC Davis))  
*From Tomographic Phase Retrieval to Projection Tomography*
- 3:55–4:45 *Break - Go to NRB*
- 5:00–6:00 **Margaret Murnane** (University of Colorado Boulder)  
*Green Family Lecture #2: Harnessing Quantum Physics for Tabletop X-Ray Lasers (at UCLA NRB Auditorium)*

## Wednesday October 12, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair (AM): John Miao*
- 9:00–9:40 **Laura Waller** (University of California, Berkeley (UC Berkeley))  
*3D phase imaging with scattering samples*
- 9:50–10:05 *Break*

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- 10:05–10:45 **Katie Bouman** (California Institute of Technology)  
*Capturing the First Portrait of Our Milky Way's Black Hole & Beyond*
- 10:55–11:10 *Break*
- 11:10–11:50 **Chris Jacobsen** (Argonne National Laboratory/Northwestern University)  
*Coherent x-ray imaging: how big can we go small?*
- 12:00–12:10 *Group Photo*
- 12:10–2:00 *Lunch (on your own)*
- 2:00 *Session Chair (PM): Chris Jacobsen (ANL/Northwestern Univ.)*
- 2:00–2:40 **Ross Harder** (Argonne National Laboratory)  
*Bragg Coherent Diffraction Imaging at the Advanced Photon Source 34-ID Beamline*
- 2:50–3:05 *Break*
- 3:05–3:45 **Marie-Ingrid Richard** (Commissariat à l'Énergie Atomique (CEA))  
*Structural evolution of nanoparticles under realistic conditions observed with Bragg coherent x-ray imaging*
- 3:55–4:10 *Break*
- 4:10–4:50 **Yukio Takahashi** (Tohoku University)  
*Virtual Talk: Recent progress in coherent diffraction imaging at SPring-8*

## Thursday October 13, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair (AM): Ross Harder (Argonne National Laboratory)*
- 9:00–9:40 **Ian Robinson** (Brookhaven National Laboratory)  
*Progress towards Machine Learning Phasing for Bragg Coherent Diffractive Imaging*
- 9:50–10:05 *Break*
- 10:05–10:45 **Demetri Psaltis** (École Polytechnique Fédérale de Lausanne (EPFL))  
*Machine Learning for 3D Optical Imaging*
- 10:55–11:10 *Break*

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- 11:10–11:50 **Monika Ritsch-Marte** (Medical University of Innsbruck)  
*Virtual Talk: Phase Retrieval and Optical Trapping'*
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Session Chair (PM): Oleg Shpyrko (UC San Diego)*
- 2:00–2:40 **Margaret Murnane** (University of Colorado Boulder)  
*Attosecond Quantum Technologies for Advanced Materials Metrologies*
- 2:50–3:05 *Break*
- 3:05–3:45 **Stefano Marchesini** (SLAC National Accelerator Laboratory)  
*Framewise discrepancies in Ptychographic phase retrieval*
- 3:55–4:10 *Break*
- 4:10–4:50 **Alberto Bartesaghi** (Duke University)  
*Virtual Talk: Imaging biomolecules using high-resolution single-particle cryo-electron microscopy.*

### Friday October 14, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair (AM): Ian Robinson*
- 9:00–9:40 **Anne Sentenac** (Fresnel Institute)  
*Virtual Talk: A unified description of 3D diffraction microscopy*
- 9:50–10:05 *Break*
- 10:05–10:45 **Oleg Shpyrko** (University of California, San Diego (UCSD))  
*Operando Imaging of energy storage devices using Bragg Coherent Diffractive Imaging.*
- 10:55–11:10 *Break*
- 11:10–11:50 **Ivan Vartaniants** (Deutsches Elektronen-Synchrotron (DESY))  
*Virtual Talk: Exploring nanocosmos with coherent x-rays*
- 12:00–2:00 *Lunch (on your own)*
- 2:00 *Session Chair (PM): Katie Bouman (Caltech)*
- 2:00–2:40 **Aydogan Ozcan** (University of California, Los Angeles (UCLA))  
*Diffractive Optical Networks & Computational Imaging Without a Computer*
- 2:50–3:05 *Break*
- 3:05–3:45 **Mathew Cherukara** (Argonne National Laboratory)  
*Virtual Talk: HPC+AI-Enabled Real-Time Coherent X-ray Diffraction Imaging*
- 3:55–4:10 *Break*

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4:10–4:50     **Ju Sun** (University of Minnesota, Twin Cities)  
*Toward practical phase retrieval with deep learning*

5:00–5:00     *Conclusion*

