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*

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*

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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*

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*

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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*

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

5:00–5:00 *Conclusion*