

Coherence 2018

From June 25 to 28, 120 scientists from around the world gathered at Danford's Hotel and Marina in Port Jefferson, New York to participate in the Coherence 2018 conference. The conference fosters scientific exchange and discussion about research using x-ray, electron, and optical coherence for phase retrieval and coherent scattering, imaging matter, and probing structure and dynamics.

The conference, which is held every two years, first took place at Lawrence Berkeley National Laboratory (LBNL) in May 2001. Now, it is traditionally held at a waterside location in summertime to encourage a relaxed and interactive experience. This year, the weather did not disappoint, and many of the discussions were held outdoors. Ian Robinson and Yong Chu, from the U.S. Department of Energy's (DOE) Brookhaven National Laboratory, were the conference chairs and hosted the 120 attendees from the U.S., Europe, and Australasian countries.

The invited speakers were experts in four fields of research: coherent diffractive imaging, ptychography, time-correlation spectroscopy, and angular correlation analysis. While most of the presentations highlighted research using x-rays, a number of important results using electron and visible-light coherence were shown, as well as some forward-looking presentations about algorithms and computational data-based methods. The posters and contributed talks matched these four themes and offered additional insight into the newest advancements in these research fields. In total, there were 14 invited talks and 45 contributed talks in a well-packed program. In addition to the oral presentations, 38 posters were judged by a panel, which selected two of these for the conference's poster prizes.

On the first day, John Spence, of Arizona State University (ASU), gave his invited talk about "Molecular Movies, Intensity Interferometry and a Campus XFEL." In the ptychography session, Professor Chris Jacobsen of Northwestern University (NWU) and DOE's Argonne National Laboratory gave a fascinating presentation about "Coherent Imaging of Biological Specimens: Today and Tomorrow." Two additional presentations were included on the first day. Felix Lehmkuehler from Deutsches Elektronen Synchrotron (DESY) spoke about "Two Types of Liquid Water – Diffusive Dynamics during the Transition from High- to Low-density Amorphous Ice," and Bill Pedrini from the Paul Scherrer Institute (PSI) gave a talk, titled "Model-independent Particle Species Disentanglement by X-ray Cross-correlation Scattering."

The second day of the conference had another set of four fascinating sessions, including a talks by Derek Mendez from Arizona State University (ASU) and Stanford University about "Correlated X-ray Solution Scattering in Practice" and Frank Seiboth from DESY on "Sharper X-ray Vision through Aberration-corrected Optics." Additional presentations were given by Tais Gorkhover from SLAC National Accelerator Laboratory (SLAC) on "X-

ray Fourier Holography Takes Off” and Qingteng Zhang from Argonne, who spoke about “Thermal Fluctuations of Ferroelectric Nanodomains Studied with Wide-angle X-ray Photon Correlation Spectroscopy.”

The third day offered interesting talks by Claire Donnelly from the Swiss Federal Institute of Technology in Zurich (ETH Zurich) about “X-ray Magnetic Tomography of Three-dimensional Magnetisation Structures” and by Xiaojing Huang from the National Synchrotron Light Source II—a DOE Office Science User Facility located at Brookhaven Lab—who spoke about “Multi-slice Ptychography with Multilayer Laue Lenses.” Diling Zhu from SLAC gave a talk on “Split-Delay Optics and Two-Pulse Capabilities at LCLS,” while Akihiro Suzuki from Hokkaido University spoke about “Recent Advances in XFEL-Based Coherent Diffractive Imaging at SACLA.”

On the last day, Leonie Flückiger from the Technical University of Berlin talked about “Time-resolved X-ray Imaging of a Laser-induced Nanoplasma and its Neutral Residuals,” while David Shapiro from LBNL spoke about “A Facility for Spectro-Ptychography of Energy Materials at the Advanced Light Source.”

The poster award winners, Sara Fernandez from PSI, for her poster on “Coherent Diffraction Imaging for EUV Mask Inspection,” and Kasra Nowrouzi from LBNL, for “Nanosurveyor 2: The Next Generation Ptychography Microscope at the Advanced Light Source,” summarized their findings in five-minute oral presentations.

Aside from all the in-depth scientific discussions and presentations, the conference also offered many opportunities for the scientists to socialize. On Wednesday afternoon, participants rushed onto buses with a boxed lunch for a tour of Brookhaven Lab’s National Synchrotron Light Source II, where they had the chance to visit various beamlines. After the facility tour, the attendees could enjoy a wine tasting and a banquet held at The Vineyards at Aquebogue on the North Fork of Long Island, where they enjoyed the beautiful display of the fireflies in the back garden of the banquet estate.

This year’s Coherence 2018 conference was well attended and scientists indicated that they enjoyed the intensive exchange and lively discussions during the four days of conference.