Joint APS/CNM WK#5: Applications of AI/ML to Real-time Multi-modal Analysis at Synchrotron Light Sources and Electron Microscopes

Wednesday, May 5, Morning

8:50 – 9:00   Welcome Day 1

Session 1
9:00 – 9:30   Prasanna Balaprakash (Argonne National Laboratory)
Neuromodulated Neural Architectures with Local Error Signals for Memory-constrained Online Continual Learning

9:30 – 10:00   Maria Chan (Argonne National Laboratory)
Integrating Machine Learning and Theoretical Modeling for X-ray and Electron Data Inversion

10:00 – 10:30 Stephan Hruszkewycz (Materials Science Division, Argonne National Laboratory)
Opportunities for AI/ML to Enable New Materials Science with Coherent X-ray Diffraction

10:30 – 11:00 Break

Session 2
11:00 – 11:30 Wendy Di (Mathematics and Computer Science Division and X-ray Science Division, Argonne National Laboratory)
Multimodal Inverse Problem in Data Science

11:30 – 12:00 Inhui Hwang (Advanced Photon Source, Argonne National Laboratory)
X-ray Emission Data Analysis Software Package Using Unsupervised Machine Learning

12:00 – 12:15 Closeout Discussion for Day 1

Thursday, May 6, Morning

8:50 – 9:00   Welcome Day 2

Session 3
9:00 – 9:30   Bobby Sumpter (Oak Ridge National Laboratory)
Understanding and Controlling the Materials and Chemical World, Atom-by-Atom

9:30 – 10:00   Stephen Whitelam (Molecular Foundry, Lawrence Berkeley National Laboratory)
Learning to Grow: Control of Material Self-assembly Using Evolutionary Reinforcement Learning

10:00 – 10:30 Remi Dingreville (Center for Integrated Nanotechnologies, Sandia National Laboratories)
Decoding Microstructure Statistics from Diffractograms Via Atomistic Simulations and Machine Learning

10:30 – 11:00 Break

Session 4
11:00 – 11:30 Petrus Zwart (Lawrence Berkeley National Laboratory)
Towards High-throughput Autonomous Infrared Spectromicroscopy

11:30 – 12:00 Hemant Sharma (Advanced Photon Source, Argonne National Laboratory)
AI Accelerated Reconstructions for Real-time Analysis of High-energy Diffraction Microscopy Data at APS

12:00 – 12:15 Closeout Discussion for Day 2