APS Scientific Computation Seminar Series

Speaker:
Dr. James Weng
Beamline Scientist
X-Ray Science Division at APS

Title:
Compressed sensing-based data collection strategies

Date:
April 1, 2024

Time:
1:00 p.m. (Central Time)

Location:
Join ZoomGov Meeting
https://argonne.zoomgov.com/j/1601444470?pwd=N1phbHZVdCtmcVR5cGh0c1Zhc0orZz09 Meeting ID: 160 144 4470
Passcode: 937918
One tap mobile
+16692545252,,1601444470# US (San Jose)
+16468287666,,1601444470# US (New York)
Dial by your location
+1 669 254 5252 US (San Jose)
+1 646 828 7666 US (New York)
+1 646 964 1167 US (US Spanish Line)
+1 669 216 1590 US (San Jose)
+1 415 449 4000 US (US Spanish Line)
+1 551 285 1373 US
Meeting ID: 160 144 4470
Find your local number: https://argonne.zoomgov.com/u/af2crdvQy

Hosts:
Mathew Cherukara and Nicholas Schwarz

Abstract:
With the advent of brighter light sources there are new challenges in data collection. Naively increasing exposure time can easily destroy both the sample and detector, resulting in useless measurements and expensive instrument damage. In the case of disordered materials, where material defects are the information of interest, beam damage (which creates new defects) must be avoided during measurement. Here we present compressed sensing-based measurement strategies, which take advantage of the structured nature of data in order to provide measurements with minimal beam exposure. By leveraging modern signal processing and computing resources, these strategies not only reduce necessary collection time, but also provide less noisy measurements than conventional measurement strategies.