

APS Scientific Computation Seminar Series

Speaker: Samuel S. Welborn, Ph.D.

Title: TomopyUI: A User-Friendly Tool for Rapid Tomography Alignment and Reconstruction

Date: Monday, June 6, 2022

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

Location: <https://argonne.zoomgov.com/j/1615356746>
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Hosts: Mathew Cherukara and Nicholas Schwarz

Abstract: After collecting a set of projection images at an X-ray microscopy beamline, users are left with gigabytes of raw data to preprocess, align, and reconstruct. This can be a daunting task for the average synchrotron user, who may be unfamiliar with the nuances of the tomography processing pipeline. At SSRL we have developed TomoPyUI, an open-source graphical user interface for TomoPy that operates entirely within the Jupyter ecosystem, to shorten the time between data acquisition and scientific discovery. In this talk, I will present key features of the application, including a scalable data import system, metadata storage during import and along the pipeline, image visualization, data interactivity, and speed enhancements from CUDA and Astra Toolbox. Integrating TomoPyUI into the workflows of the various tomography beamlines requires only minor modifications to existing code, and we hope this talk can provide a jumping-off point for that integration.

Biography: Samuel Welborn graduated from Virginia Tech in 2016 with degrees in Chemical Engineering and Chemistry. He is now a Materials Science and Engineering PhD candidate in Eric Detsi's group at the University of Pennsylvania and will defend his thesis in just a few weeks. During his PhD, Sam has used *in situ* and *operando* X-ray scattering techniques to characterize nanoporous metals during synthesis and processing and built 3D energy storage devices using these nanoporous metal scaffolds. Sam is a recipient of the 2019 Vagelos Institute of Science and Technology Graduate Research Fellowship and a winner of the NNCI's "Plenty of Beauty at the Bottom" scientific art competition. He became a DOE Office of Science Graduate Research fellow (SCGSR program) and is now a visiting student at SLAC. With Lead Scientist Johanna Nelson Weker at SSRL, he is studying charge storage in 3D Li-ion battery materials using transmission X-ray microscopy and has also developed the tomography application that he will talk about today.