

APS Scientific Computation Seminar Series

Speaker: Marcus Hanwell
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Title: Tomviz: Data Analysis, Visualization and Reproducibility

Date: Monday, October 19, 2020

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

Location: <https://bluejeans.com/953574441>

Hosts: Nicholas Schwarz and Mathew Cherukara

Abstract:

The Tomviz project is an open source desktop application, licensed under the permission 3-clause BSD license developed primarily in C++ with Qt and using Python-based processing pipelines to offer a cross-platform desktop application that offers hardware accelerated visualization on Windows, macOS, and Linux. It leverages the Visualization Toolkit (VTK) for state-of-the-art visualization, and used the scientific Python stack to offer familiar Python data analysis tools available in a user friendly graphical user interface. The analysis can be extended at runtime with a built in editor where new code can be developed and tested interactively within the interface.

The current capabilities of the project will be discussed, along with the ambitious extension of Tomviz to better serve the beamline community. This includes plans for improved packaging within the Conda ecosystem, which will enable deeper integration with community tools such as TomoPy, Bluesky, and DataBroker. New capabilities are being added to the C++ application and the Python interfaces to facilitate deeper integration of X-ray imaging techniques commonly used at synchrotrons, and ongoing work to offer graphical pipeline builders that can save workflows which then can be run in batch.

The use and extension of a powerful JSON-based state file that can now be embedded within a HDF5 file to offer reproducibility of all data processing, analysis, and visualization settings will be shown, and how it relates to offering a tool that can be used to do better science designed for transparency and reproducibility only possible with open source tooling. Standardization on data representation, standards for sharing and dissemination are essential in order to develop tools like Tomviz, and promote the principles of open science within the user facility communities.