☒ **Talk** ☐ **Poster**

Multi-modal geochemical analysis merging synchrotron x-ray imaging with conventional microscopies

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X-ray fluorescence (XRF) imaging from synchrotron sources has become a "go-to" technique across the Earth Sciences for the spatial determination of elemental distributions on scales from the nano-scale to the macro-scale. Synchrotrons provide both high brightness and tunability of the incident x-ray energy to provide unique sensitivities and to perform spectroscopy for chemical species information. With any technique, the ability to expand informational content with other techniques is often highly desired and important for data interpretation. Imaging techniques across different modalities can be difficult to treat in more than a qualitative manner due to the difficulty in the registration of images from different techniques. This is often apparent when the different imaging modalities produce vastly different distributions of data, that provide little in terms of common reference points.

This presentation will show how a multi-modal data collection and analysis approach is being implemented at the Stanford Synchrotron Radiation Lightsource, using imaging data from optical/fluorescence light microscopy, FTIR/Raman microscopy, mass-spectroscopy imaging, and XRF imaging. Data is processed in a data pipeline as a coherent multi-modal set of data, where each pixel of the data image stack contains information from each of the data modalities. Real-life applications of this type of data collection approach to the Earth and environmental sciences will be discussed.