

WORKSHOP # 10
October 29, 2025
NSLS-II Bldg 745, Room 156

Multi-scale Fluorescence Imaging of Complex Systems

Organizers: Andrew Kiss

Understanding complex and multiscale systems using imaging techniques is extremely challenging. Typically, if the resolution is high, the time required to sufficiently image a representative area is too long. Conversely, to properly image a representative area, the fine details on where to investigate can be lost. This applies in several scientific fields from imaging energy materials such as lithium-ion batteries to traditional energy sources such as oil and gas production. This challenge is particularly apparent in the Earth sciences - where rock formations can span many miles and contain many fine features where the areas of interest can be much smaller scale and on the order of microns. Due to their source brightness, synchrotron techniques – such as X-ray fluorescence - are particularly sensitive to trace concentrations. This is important for locating critical minerals - considering how they are distributed and how to extract them. For this workshop, the goal is to bring together researchers to discuss the challenges associated with understanding how synchrotron imaging can aid to understand their complex and multiscale systems for helping the country's energy needs and security.

Start Time (ET)	Title	Speaker (Affiliation)
5:30 pm on October 28: Dinner (provided) and networking for Workshop 9 & 10 Participants (Bldg 742)		
8:30	Breakfast (coffee, tea, pastries) and Check-In NSLS-II Bldg 745, Room 156	
9:00	Introduction	Andy Kiss (BNL)
9:30	Understanding REE Mineralization and Complexation using Advanced Fluorescence Imaging Techniques	Xin Zhang (PNNL)
10:00	Extraction and Characterization of Rare Earth Elements Encapsulated in Coal Mine Tailings	Damilola Daramola (Northeastern University)
10:30	Break (coffee, tea, pastries)	
11:00	X-ray fluorescence mapping: Illuminating battery interfaces	Esther Takeuchi (Stony Brook)
11:30	Synchrotron for Nuclear Nonproliferation	Dominic Piedmont (BNL)
12:00	Lunch Break (provided)	

1:00	Characterization and Extraction of Critical Materials from Energy Production Waste Streams	Adam Jew (SLAC)
1:30	Locating Geotech-Induced Reaction Zones in Subsurface Porous Media Using XRF Mapping	Qingyun Li (Stony Brook)
2:00	From Luminescence Dating to Synchrotron X-ray fluorescence Mapping: Unraveling Radiofluorescence Signal Heterogeneity	Marine Frouin (Stony Brook)
2:30	Group Photo Break (coffee, tea, pastries)	
3:00	Brainstorming and Discussion	
4:30	Summarize and Adjourn	