ANALYTICS SEMINAR

Developing Mass Spectrometry-based Omics Strategies to Capture Organelle Dynamics in Human Neurons.

Professor Ling Hao

Department of Chemistry & Biochemistry
University of Maryland

Organelles such as lysosomes and mitochondria frequently engage in dynamic and transient interactions with other cellular components. However, capturing these interactions remains challenging due to technological limitations. Understanding the interactions and dynamics of lysosomes and mitochondria are crucial for uncovering the molecular mechanisms underlying brain diseases – most of which currently have no cure. Here, I will present our recent advances in developing mass spectrometry (MS)-based analytical chemistry methods, including proximity labeling, organelle isolation, and dynamic SILAC proteomics, to investigate the sub-organelle microenvironment and protein dynamics in human stem cell-derived neurons. Integrating MS-based multi-omics (proteomics, lipidomics, and metabolomics) with advanced human neuron models, we aim to elucidate the molecular causes of neurodegeneration. Lastly, I will introduce our newly established contaminant libraries and contaminant-check assays for MS workflows, providing practical tools for the broader analytical chemistry community.

📅 Tuesday, September 2nd, 2025 🕐 3:30 pm 📍 WTHR 172

PURDUE UNIVERSITY | James Tarpo Jr. and Margaret Tarpo Department of Chemistry