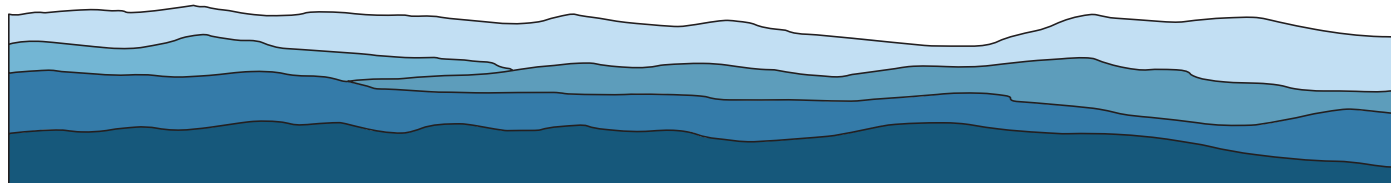


# HIGHLANDS IN CHEMISTRY SEMINAR SERIES



## YIJIN LIU

SLAC

### “A Macro-to-nano zoom through the hierarchy of a lithium-ion battery and beyond”

APRIL 23, 2021

2:30PM ET

ZOOM

FACULTY HOST:  
FENG LIN

Lithium-ion battery (LIB) is featured by structural and chemical complexities across a broad range of length scales. Ultimately, it is the hierarchy of the battery structure that determines its functionality. An in-depth understanding of the battery function, degradation, and failure mechanisms requires a thorough and systematic investigation from the structural, chemical, mechanical, and dynamic perspectives. Here we present a macro-to-nano zoom through the hierarchy of a standard battery cell using a suite of state-of-the-art X-ray microscopy techniques. Damage, deformation, and heterogeneity at different length scales are visualized and are associated to different degradation phenomena and mechanisms. Our results highlight the importance of the cathode material's mechanical properties, which could impact both the immediate and the long-term cell behaviors significantly. While this talk focuses on the battery studies, x-ray techniques are broadly applicable to a wide range of research fields. Toward the end of the presentation, I will briefly showcase a few examples including the study of materials under extreme pressure and the investigation of microstructure in N95 respirator filters.

