

Department of Electrical and Computer Engineering

Materials Engineering Program

Center for Integrated Bio and Nano Systems

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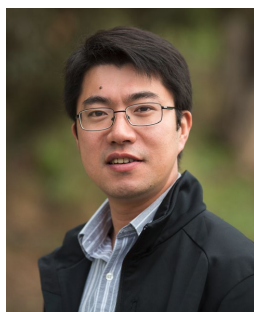
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An integrated Multi-modal X-ray Microscopy for Energy Material Science



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SLAC National Accelerator Laboratory**

Abstract: The in-depth understanding of the relationship between the macroscopic properties/phenomena and the microscopic structure/morphology constitutes a frontier challenge in energy material science. Energy materials and devices are often designed to be structurally hierarchical and chemically heterogeneous. It is of fundamental interest and practical importance to probe the system with high spatial resolution, sufficient chemical sensitivity, and covering a statistically representative volume. Synchrotron based x-ray tools are playing an important role in this research field.

In this presentation, I will review my group's research activities over the past few years including a number of case studies in the fields of industrial catalysis and battery science. I will emphasize on the multi-modal imaging approach that was developed over time by my group in collaboration with our colleagues at SSRL and beyond. Statistical analysis, numerical modeling, and machine learning approaches (in supervised, unsupervised, and hybrid manners) are also key components integrated in my group's research effort and will be touched upon in this talk. I hope this presentation will ignite more enthusiasm in this research field and will spark ideas for future collaborations.

Short Bio: Yijin Liu received his Ph.D. degree in Optics in 2009 through a joint education program between the University of Science & Technology of China (USTC) and the Institute of High Energy Physics (IHEP). He joined Stanford University (Palo Alto, CA) as a postdoctoral scholar in 2009 and became an Associate Staff Scientist at the SLAC National Accelerator Laboratory in 2012, a Staff Scientist in 2015, and a Lead Scientist in 2020. He is currently leading the Transmission X-ray Microscopy program at SSRL. Liu has over 10 years of experience in X-ray microscopy at multiple length scales using both synchrotrons and compact laboratory X-ray sources. In addition to his expertise in X-ray based techniques, his scientific research interest focuses on the fields of functional material science and the associated big data mining.

Please contact Dr. Shuo Chen <schen39@Central.UH.EDU> or Jiming Bao (jbao@uh.edu) if you want to meet with the speaker.