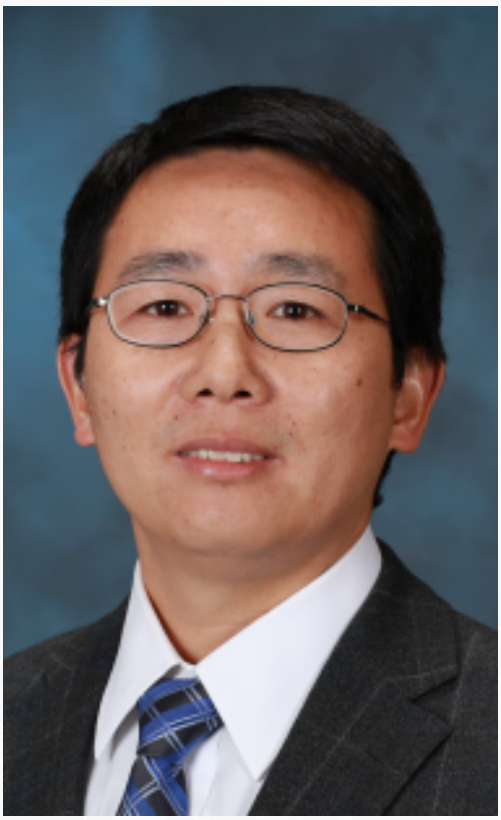
2024 FALL SEMINAR SERIES

SCHOOL OF
CHEMICAL ENGINEERING
College of Engineering, Architecture and Technology

North Classroom Building 203 | September 10, 2024 | 10:30 - 11:45 a.m.



Fundamental Understanding of Catalytic Hydrogen Production and Utilization through New Materials and Characterization Tools

There have been renewed research interests in the hydrogen economy in the light of net zero as hydrogen holds significant promise for the decarbonization of the chemical industry and transportation sectors among many others. Catalysis science is essential for the production of hydrogen via various routes and the efficient utilization of hydrogen. In this talk, I will show how the use of both new materials and characterization tools may help to understand the fundamental mechanisms of catalytic reactions and structures involving hydrogen generation and utilization. Specifically, I will show how to build a structure-catalysis relationship in hydrogen production through water-gas shift, and how to understand the structural dynamics and reaction pathways in the hydrogenation of N2 (ammonia synthesis) and CO2 (methanol synthesis) over hydride-based materials. The use of neutron scattering will be particularly highlighted for its unique insights into catalysis including surface species, catalytic structure and reaction mechanisms.

Zili Wu, Ph.D.

Zili Wu earned his Ph.D. in physical chemistry from the Dalian Institute of Chemical Physics in Dalian, China in 2001. Following this, he completed a post-doctoral fellowship at Northwestern University in Evanston, IL in 2006 before commencing his role at Oak Ridge National Laboratory in Oak Ridge, Tennessee. Dr. Wu currently serves as the group leader of surface chemistry and catalysis at ORNL, leveraging his extensive expertise in heterogeneous catalysis, applied spectroscopy, and nanomaterial synthesis. His research focuses on understanding catalytic active sites in heterogeneous catalysis, photocatalysis, and electrocatalysis, establishing structure-catalysis relationships in catalytic solids, utilizing in situ and operando characterization methods, and creating nanomaterials with precise structures. Dr. Wu actively participates in the ACS and has organized over 15 ACS Symposia centered on fundamental catalysis and energy materials.