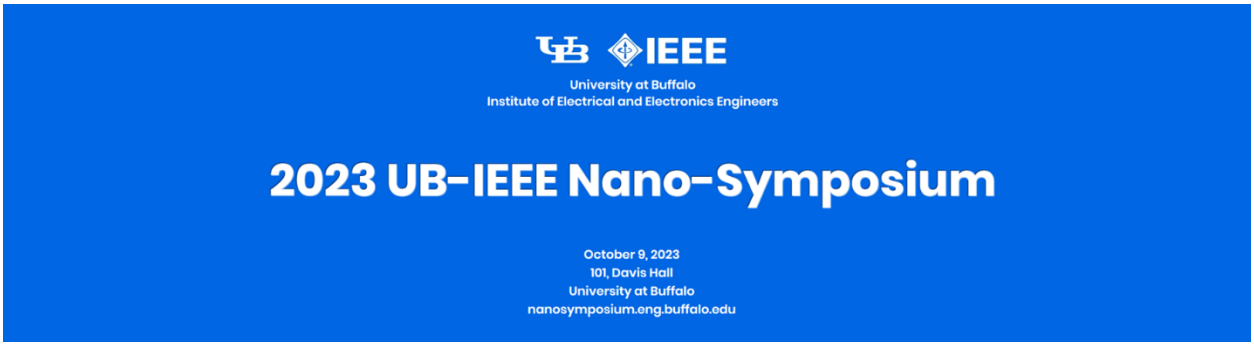

Invited Talk:

Engineered Nanoporous Structures for Energy and Environmental Applications

Abstract: Sustainable energy, environment, water (H_2O), and food, in a large extent, depends on acquiring/capturing/utilizing small molecules, such as H_2O, ammonia (NH_3), carbon dioxide (CO_2), methane (CH_4), ethanol, and liquid hydrocarbons, etc. Precisely designing stable, molecular-scale pores for sieving these molecules, either from the final product or during their production processes, could be an effective way of separating these molecules or promoting their production using compact and well-engineered systems. Considering the very small sizes (0.26-1.0 nm) of these molecules and tiny size difference from their contaminants/by-products, it is a grand challenge to design these molecular-scale pores. My research interest is focused on rationally designing and preparing advanced nanoporous structures for precisely distinguishing molecules by size/shape differences, characterizing and understanding the nanostructures, and applying them for separation and catalysis. In this talk, I will first give an overview of my research work and then present our recent research work on nanoporous membranes for separation and catalysis applications.

Biography: Dr. Miao Yu joined the Department of Chemical and Biological Engineering at the University at Buffalo (UB), the State University of New York, as an Empire Innovation Professor in January 2021. He was an Associate Professor in the Department of Chemical and Biological Engineering at Rensselaer Polytechnic Institute (RPI) from August 2017 to January 2021. Before joining RPI, he was an Assistant Professor in the Department of Chemical Engineering at the University of South Carolina (UofSC) between 2012 and 2017. He was an Assistant Research Professor in the Department of Chemical and Biological Engineering at the University of Colorado, Boulder (CU-Boulder) from 2010 to 2012. He obtained BS (1998) and MS (2002) degrees from Tianjin University, China. He earned his Ph.D. degree from CU-Boulder in 2007, and subsequently worked in the same department as a postdoctoral researcher from 2007 to 2010. Dr. Yu has published 90 peer-reviewed papers; three of them were published in Science, and others in Nature Communications, Advanced Materials, JACS, Nano Letters, Angewandte Chemie International Edition, ACS Catalysis, Chemical Communications, etc. He is the recipient of 2015 NSF Career Award and 2022 AIChE Separations Division FRI/Yeoman Innovation Award.