



Rensselaer

The HOWARD P. ISERMANN
DEPARTMENT OF CHEMICAL AND
BIOLOGICAL ENGINEERING

CBE Seminar Series – Spring 2023

Dr. Mahdi Malmali

Assistant Professor of Chemical Engineering
Texas Tech University

Seminar: Wednesday, April 26, 2023

9:30 a.m. (Ricketts 203)

“Decarbonizing Energy and Water via Separations”

Abstract:

To decarbonize energy and water and meet net-zero emissions by 205, the industry should undergo a paradigm shift. To meet net-zero emissions by 2050, four pillars of industrial decarbonization are identified as improving energy efficiency, electrification, utilizing carbon-neutral/negative liquid fuels (CNLFs), and carbon capture and sequestration. One of the many major challenges with decarbonization is the infusion of \$200 billion in capital investment due to recent advances in natural gas processing and technology. Most of these investments rely on the most energy-efficient technologies that can operate for the next 30-50 years. This suggests that not only do we have to make energy and desalination processes more energy efficient, but also the capital cost should become cheaper to pursue considering the replacement of sunk capital, which makes industrial decarbonization even more challenging. In this talk, two examples of the efforts to make separations more sustainable will be presented. In the first part, producing green ammonia at milder conditions by deploying advanced reactions and separations will be discussed. In the second part, the efforts in designing advanced functional membranes to desalinate hypersaline brine will be presented.

Biography:



Mahdi Malmali is an assistant professor of Chemical Engineering at Texas Tech University. He received his M.S. in Chemical Engineering from the Sharif University of Technology (2010) and his Ph.D. in Chemical Engineering from the University of Arkansas (2014). After graduation, Dr. Malmali joined the Chemical Engineering and Materials Science department at the University of Minnesota as a postdoctoral research associate, where he pioneered the design and demonstration of low-pressure green ammonia manufacturing via reaction-absorption process (2015-2017). He then joined Texas Tech University in 2018 as an assistant professor. His research is focused on designing better separation processes to deal with the challenges and opportunities of the water-energy-food nexus. In particular, he is interested in advanced separations for sustainability, membranes and membrane-based separation processes, and energy storage.

Refreshments will be available at 9:00 a.m. in the Ricketts Coonley Lounge (RI 120).

For more information, please contact Lisa Martin (swishl@rpi.edu)