School of Engineering

UCMERCED

Mechanical Engineering

How porous media enables performance of many engineered systems

Porous materials are ubiquitous in natural and engineered systems. Their action in these systems often seems quite simple, like water flowing through gravel or soaking into a sponge. However, multiple phenomena frequently interact in these systems, exhibiting complex behavior and creating a rich space for design. In this talk, I will look at the transport of mass and energy in porous materials, starting from a very general perspective, then identify some particularly interesting and important applications in engineered systems. Multiphase heat transfer in porous media will be considered in detail. The nature of competition in transport of fluid phases and heat will be explored. Design approaches to manage this competition will be considered along with challenges and opportunities to apply these approaches in real world systems. We will also look at the interaction of electromigration, diffusion, and advection in electrochemical systems utilizing porous electrodes and insulating porous materials.

Dr. James Palko

Associate Professor UC Merced

Biography

James Palko is an Associate Professor in Mechanical Engineering at the University of California, Merced. His group focuses on energy and mass transport in porous media with a variety of applications emphasizing energy and sustainability. He received his Ph.D. and M.S. in Materials Science and Engineering from the University of Illinois, Urbana-Champaign, where he was a Hertz Fellow. He also holds a B.S. in Mechanical Engineering from Arkansas Tech University. Following his Ph.D., he worked for several years in the aerospace and renewable energy fields with an emphasis on photovoltaics. He returned to academia as a research scientist at Stanford University focusing on thermofluid sciences, prior to joining UC Merced in 2017.

Friday, October 6, 2023 – 10:30 am – COB 110

Fall 2023 Seminar Series