

MAE Seminar SERIES

THURSDAY,

APRIL 14

3:30 PM

OBRIAN 112



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DELIVERING AND REMOVING COLLOIDAL PARTICLES FROM POROUS MEDIA WITH A PINCH OF SALT

ABSTRACT

The transport of colloidal suspensions containing various solutes in porous media is involved in many critical applications such as drug delivery, oil extraction, CO₂ sequestration, bioseparation, soil remediation, and water purification. Such systems often exhibit spatiotemporal inhomogeneities in the solute and colloid distributions, which may lead to unique colloidal dynamics via non-equilibrium processes. One of which is diffusiophoresis, which refers to the spontaneous migration of colloidal particles induced by solute gradients. In this talk, I will discuss three examples in which diffusiophoresis can be helpful for systems that require accelerated colloid transport in confined porous media: 1) delivering therapeutic nanoparticles across a compressed extracellular matrix, 2) removing oil emulsion from deep rock pores, and 3) getting cleaner laundry.

BIO SKETCH

Sangwoo Shin received his B.S. and Ph.D. in Mechanical Engineering from Yonsei University in 2005 and 2012. He is currently an Assistant Professor in the Department of Mechanical Engineering at the University at Buffalo. Prior to joining UB, he was a Postdoctoral Research Associate at Princeton University from 2013 to 2016 and an Assistant Professor at the University of Hawaii from 2017 to 2021. His research involves diverse problems in the areas of complex fluids, interfacial processes, and transport phenomena in small-scale systems.



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