

BIOENGINEERING

Spring 2019 Seminar

Date: Thursday, April 25, 2019
Time: 12:00 pm - 1:00pm
Location: Krasnow, Room K229



Samir Mitragotri, Ph.D.

Biography: Dr. Samir Mitragotri is the Hiller Professor of Bioengineering and Hansjorg Wyss Professor of Biologically Inspired Engineering at Harvard University. Prior to this, he was the Mellichamp Chair Professor in the Department of Chemical Engineering at the University of California, Santa Barbara. His research is focused on transdermal, oral, and targeted drug delivery

systems. He is an elected member of the National Academy of Engineering, National Academy of Medicine and National Academy of Inventors. He is also an elected fellow of AAAS, CRS, BMES, AIMBE, and AAPS. He is an author of over 250 publications, an inventor on over 170 patent/patent applications, and a Thomson Reuters Highly Cited Researcher. He received his BS in Chemical Engineering from the Institute of Chemical Technology, India and a PhD in Chemical Engineering from the Massachusetts Institute of Technology. He is the Editor-in-Chief of AIChE's journal Bioengineering & Translational Medicine.

Title: Understanding and Overcoming Biological Barriers for Drug Delivery

Abstract: Effective delivery of drugs is a major problem in today's healthcare. At a fundamental level, the challenge of drug delivery reflects the fact that the drug distribution in the body is limited by body's natural metabolic processes and transport barriers. These biological barriers, while serving an important purpose of regulating body's metabolic functions, limit the drug dose that ultimately reaches the target site. Accordingly, many drugs fail to reach their full therapeutic potential. Our research aims at developing a fundamental understanding of body's key biological barriers such as skin and intestinal epithelium, and utilizing this understanding to develop novel means to negotiate these barriers to deliver drugs. Human skin is one of the most challenging and well-engineered biological barriers in the human body. In principle, it offers an ideal interface to administer drugs into the body through the use of a transdermal patch. However, its' formidable barrier properties limit the drug dose that can enter the body. Our research has led to the understanding of how skin's structure and transport properties can be modulated using external stimuli such as ultrasonic waves, fluid microjets and amphiphiles, and how these stimuli can be controlled to enable transdermal delivery of drugs that were once thought undeliverable. We have also extended the lessons learned from our skin exploration to understand and negotiate other biological barriers in the body. Dr. Mitragotri will present an overview of the lessons learned from our exploration of these biological barriers.