

The University at Buffalo Department of
Chemical and Biological Engineering
presents

The **20th** Anniversary
Graduate Student Research Symposium

“Understanding and
Overcoming Biological
Barriers for Drug Delivery”

Samir Mitragotri

*Hiller Professor of Bioengineering and Wyss Professor
School of Engineering and Applied Sciences
Harvard University*

Friday, September 22, 2017

Center for the Arts, UB Amherst Campus
Doors 12:30 p.m., Lectures 1:00 p.m., Screening Room
Poster Contest and Reception 3:30 p.m., Atrium
(RSVP cbe-chair@buffalo.edu)



University at Buffalo

Department of Chemical
and Biological Engineering
School of Engineering and Applied Sciences

About

Graduate Student Research Symposium



Over the years the UB CBE Graduate Student Research Symposium has evolved into an exciting, comprehensive event that showcases the high quality, multidisciplinary research that is conducted in our department, and spans diverse areas such as molecular engineering of novel materials, nanotechnology, bioengineering, and molecular modeling. Every year our faculty and graduate students welcome the opportunity to present their work to their peers from CBE, other UB departments, our alumni, and representatives from local business. The Symposium has grown in ambition and scale, featuring over 60 posters, a graduate student lecture, and a keynote lecture from an accomplished colleague. This year we are particularly pleased to welcome Samir Mitragotri, Hiller Professor of Bioengineering and Wyss Professor School of Engineering and Applied Sciences, Harvard University. Our Symposium will include a wine, beer, and hors d'oeuvres reception to honor our alumni and guests.

“Understanding and Overcoming Biological Barriers for Drug Delivery”

Samir Mitragotri

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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 the body's natural metabolic processes and transport barriers. These biological barriers, while serving an important purpose of regulating the 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 the 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. I will present an overview of the lessons learned from our exploration of these biological barriers.

About

Samir Mitragotri

Samir Mitragotri is the Hiller Professor of Bioengineering and Wyss Professor in the School of Engineering and Applied Sciences 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 210 publications, an inventor on over 150 patent/patent applications, and a 2015, 2016 Thomson Reuters Highly Cited Researcher. He was also the founding director for UCSB's Center for Bioengineering. 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 and SBE's new journal *Bioengineering and Translational Medicine*.



The UB Department of Chemical and Biological Engineering

This Symposium is a collaborative effort supported in part by the CBE Graduate Student Association, the UB CBE Advisory Board, our graduate student speakers, CBE faculty, and various colleagues in and around UB who serve as judges for the all-important student poster competition. Many thanks to all our graduate students who work so hard on their research, and for their excellent poster and oral presentations during the symposium. Ultimately, this Symposium is a showcase for the excellence that we strive for in our scholarship and graduate education. We look forward to many more years of this celebration of our research accomplishments.

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CBE is proud to present our 20th anniversary PhD candidate speakers:

- Parham Rohani: "Boron, Boron Hyper-doped Silicon and Silicon nanoparticles: Synthesis, Properties and Applications"
- Yayu Liu: "Novel roles of cell-cell adhesion in stem cell differentiation, proliferation and extracellular matrix synthesis"

JOIN US

CBE STUDENT/ALUMNI RECEPTION
3:00-5:30pm Center for the Arts Atrium

- Meet Samir Mitragotri • Learn what's new • Connect with your colleagues •
- Wine • beer • soft drinks • hors d'oeuvres •

rsvp cbe-chair@buffalo.edu or call 716-645-1174

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