



## SEMINARS IN CHEMICAL AND BIOMOLECULAR ENGINEERING



**Friday, April 6th, 2018 | 10:00AM Boelter Hall 3400**

Presented by:

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### **“Recreating Human Physiology on a Chip: A Tale of Microreactors, 3D Printed Tissues and Real-Time Biosensors”**

A major challenge in identifying new drugs is to test the efficacy and safety of the candidate molecules. This is one of the major reasons that it now costs billions of dollars and nearly a decade to get a drug to the market. This is because the current methods of using tissue culture dishes or small animal models do not recreate the complexity of human tissues. Our goal is to overcome these challenges by engineering systems that can recreate the behavior of human physiology. To achieve this we have 3D printed tissues, made of cells and materials, within microreactors that can be connected to each other through microfluidics. The 3D printing process can be used to recreate the human tissue microarchitecture whereas patient-derived cells can be used to engineer structures that are similar to a patient’s normal or diseased tissues. Furthermore, to non-invasively monitor the behavior of these miniaturized tissues we have developed advanced optical and biochemical sensors. In this talk I will discuss our advances in making these organ-on-a-chip systems and their use in enabling personalized medicine.

Ali Khademhosseini received his Ph.D. in bioengineering from MIT in 2005 under the supervision of Professor Robert Langer. He then began his independent career at Harvard University where he rose to Professor at Harvard Medical School (HMS) and faculty at the Harvard-MIT’s Division of Health Sciences and Technology (HST), Brigham and Women’s Hospital (BWH) and as well as associate faculty at the Wyss Institute for Biologically Inspired Engineering. As of November 2017, he is the Levi Knight Professor of Bioengineering, Chemical Engineering and Radiology at the University of California-Los Angeles (UCLA). He is the Founding Director of the Center for Minimally Invasive Therapeutics at UCLA as well as an Associate Director of the California NanoSystems Institute. He is a leader in applying bioengineering solutions to precision medicine. His large and interdisciplinary group is interested in developing ‘personalized’ solutions that utilize micro- and nanoscale technologies to enable a range of therapies for organ failure, cardiovascular disease and cancer. He has edited multiple books / journal special issues and is an author on >500 peer-reviewed journal articles, editorials and review papers, >60 book chapters/edited books and >20 patent/disclosure applications. His work has been published in leading journals and routinely highlighted in international media. Dr. Khademhosseini is an Associate Editor for ACS Nano. He has been cited >38,000 times and has an H-index of 99. [Find out more about Ali Khademhosseini.](#)