Center of Excellence in Intelligent Engineering Systems

CENTER OF EXCELLENCE IN INTELLIGENT ENGINEERING SYSTEMS

SEMINAR

Speaker: Prof. Ali Khademhosseini

Harvard-MIT's Division of Health Sciences and Technology

HiCi, Distinguished Adjunct Professor,
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Ali Khademhosseini is a Full Professor at Harvard-MIT's Division of Health Sciences and Technology (HST), Brigham and Women's Hospital (BWH) and Harvard Medical School (HMS) as well as an Associate Faculty at the Wyss Institute for Biologically Inspired Engineering. His research is based on developing micro- and nanoscale technologies to control cellular behavior with particular emphasis in developing microscale biomaterials and engineering systems for tissue engineering. His work has been published in leading journals and routinely highlighted in international media. He has been cited ~15500 times and has an H-index of 65. Also, he has given over 250 invited seminars and keynote lectures. Dr. Khademhosseini's interdisciplinary research has been recognized by over 30 major national and international awards. To name a few, for example, the early career awards from three major engineering discipline societies: electrical (IEEE Engineering in Medicine and Biology Society (EMBS) award and IEEE Nanotechnology award), chemical (Colburn award from the American Institute of Chemical Engineers) and mechanical engineering (Y.C. Fung award from the American Society of Mechanical Engineers), the Presidential Early Career Award for Scientists and Engineers (PECASE), the Pioneers of Miniaturization Prize from the Royal Society of Chemistry for his contribution to microscale tissue engineering and microfluidics, the young investigator awards of the Society for Biomaterials (SFB), the Tissue Engineering and Regenerative Medicine International Society-Americas and the American Society for Engineering Education (ASEE).

Date: **Monday, February 23, 2015**

Time: **1:00 PM**

Venue: **Engineering Building, Second floor, Room 24C28 (ECE Seminar Room)**

Title

Engineered hydrogels for regenerative medicine applications

Abstract

Engineered materials that integrate advances in polymer chemistry, nanotechnology, and biological sciences have the potential to create powerful medical therapies. The Biomaterials Innovation Research Center group aims to engineer tissue regenerative therapies using water-containing polymer networks, called hydrogels that can regulate cell behavior. Specifically, they have developed photocrosslinkable hybrid hydrogels that combine natural biomolecules with nanoparticles to regulate the chemical, biological, mechanical and electrical properties of gels. These functional scaffolds induce the differentiation of stem cells to desired cell types and direct the formation of vascularized heart or bone tissues. Since tissue function is highly dependent on architecture, they have also used microfabrication methods, such as microfluidics, photolithography, bioprinting, and molding, to regulate the architecture of these materials. They have employed these strategies to generate miniaturized tissues. To create tissue complexity, they have also developed directed assembly techniques to compile small tissue modules into larger constructs. It is anticipated that such approaches will lead to the development of next-generation regenerative therapeutics and biomedical devices.

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