

BIOENGINEERING

PRESENTS

BioMEMS and Biomedical Nanotechnology: From Lab on Chip to Printing Cellular Machines



THURSDAY, May 30th 2019

12:00 – 1:00 PM

2101 ENGINEERING V

Rashid Bashir, Ph.D.

UIUC

Dean,

Department of Bioengineering

ABSTRACT:

Integration of biology, medicine, and fabrication methods at the micro and nano scale offers tremendous opportunities for solving important problems in biology and medicine and to enable a wide range of applications in diagnostics, therapeutics, and tissue engineering. Microfluidics and Lab-on-Chip can be very beneficial to realize practical applications in detection of disease markers, counting of specific cells from whole blood, and for identification of pathogens, at point-of-care. In this talk, we will present data driven approaches for stratification of sepsis, detection of cells and proteins from a drop of blood, rapid detection of pathogens from body fluids, and spatial mapping of nucleic acids from cancer tumors. We will also present our work on bio-printing with stereolithography to produce bio-hybrid devices made of polymers and cells for the development of biological machines, soft robotics, and hyper organs. Such complex cellular systems will be a major challenge for the next decade and beyond, requiring knowledge from tissue engineering, synthetic biology, micro-fabrication and nanotechnology, systems biology, and developmental biology. These devices could have potential applications in drug delivery, power generation, and other biomimetic systems.

BIOGRAPHY:

Rashid Bashir is Dean of Engineering, the Grainger Distinguished Chair in Engineering and Professor of Bioengineering at the University of Illinois at Urbana-Champaign. Previously, he was the Executive Associate Dean at the Carle-Illinois College of Medicine (2017 – present), the Abel Bliss Professor of Engineering, Head of Department of Bioengineering (2013 – 2017), and Director of the Micro and Nanotechnology Laboratory (a campus-wide clean room research facility) (2007 – 2013). Prior to joining UIUC, he was at Purdue University (1998 – 2007) with faculty appointments in Electrical and Computer Engineering, and Bioengineering. From 1992 to 1998 he worked at National Semiconductor Corporation in Santa Clara, CA as Sr. Engineering Manager.

He graduated with a PhD in Electrical Engineering from Purdue University in 1992. He has authored or co-authored over 240 journal papers, over 200 conference papers and conference abstracts, and over 120 invited talks, and has been granted 46 patents. He received the NSF Faculty Early Career Award, the 2012 IEEE EMBS Technical Achievement Award, and the 2018 Pritzker Distinguished Lecture Award. He is a fellow of IEEE, AIMBE, AAAS, BMES, IAMBE, RSC, APS, and NAI. He has been involved in 3 startups that have licensed his technologies. He was part of the founding team and co-chair of the curriculum committee for the Carle Illinois College of Medicine, the world's first engineering based College of Medicine at the University of Illinois at

Urbana-Champaign.

His research group is interested in developing new technologies for precision and personalized medicine, and 3D bio-fabrication of cellular systems. Using bionanotechnology, BioMEMS, and lab on chip, he is working at the interface of biology and engineering from the molecular to the tissue scale, and aiming to make an impact on grand challenges in health and medicine including cancer, sepsis, and others.

In addition to leading his own research group, he was the PI on an NSF IGERT on Cellular and Molecular Mechanics and Bionanotechnology and PI on an NIH Training Grant on Cancer Nanotechnology. He is also co-PI on a recently funded National Research Traineeship (NRT) from NSF. He is also Associate Director and UIUC site lead on an NSF Science and Technology Center on Emergent Behavior of Integrated Cellular Systems (with MIT, Georgia Tech, and other partners).