



## *Integration of biology and engineering at the micro and nanoscale: From integrated biochips to self-assembly of electronics*

The areas of BioMEMS and bionanotechnology can have significant impact on many fields such as electronics, sensing, medicine, and life-sciences. The ability to fabricate micro and nano-structures and electromechanical systems with scales and dimensions similar to biological entities has paved the way to new concepts and systems for a variety of cellular diagnostic and therapeutic applications, such as intelligent biochips and biosensors. In this talk, we will present an overview of our work towards an integrated biochip for detection and characterization of microorganisms and other biological entities such as viruses and DNA. We will present the use of electrical and mechanically based phenomena at the micro and nano-scale to perform characterization and various functions needed for integrated biochips including concentration, sorting, growth and detection of cells, viruses, DNA, etc. We will also present an update on our work towards heterogeneous integration of materials to assemble silicon electronic devices using ac and dc electric fields and biomolecules. These devices and systems can provide the technology needed to further advance systems biology and synthetic biology.



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*B. Rashid Bashir completed his Ph.D. in 1992 and worked at National Semiconductor in the Process Technology Development Group from 1992-1998. He is currently an Associate Professor of Electrical and Computer Engineering and Courtesy Associate Professor of Biomedical Engineering at Purdue University. He has authored or coauthored over 100 journal and conference papers and over 25 patents. His research interests include biomedical microelectromechanical systems, applications of semiconductor fabrication to biomedical engineering, advanced semiconductor fabrication techniques, and nano-biotechnology. In 2000, he received the NSF Career Award for his work in Biosensors and BioMEMS. He also received the Joel and Spira Outstanding Teaching award from School of ECE at Purdue University, and attended the NAE Frontiers of Engineering Meeting in Fall 2003.*

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4:00 p.m.  
ACES Library Monsanto Room  
Reception immediately following  
in the Heritage Room