



ESE Seminar Announcement

Zhenyu Li

**Department of Biomedical Engineering,
George Washington University**



Tuesday, May 26, 2015

Green Hall, Room 0120

10:10AM

WEARABLE BIOSENSORS AND HANDHELD MICROFLUIDICS: TOOLS FOR BIOLOGY AND MEDICINE

Abstract: Stretchable electronics has attracted considerable attention recently by enabling the placements of electronics and sensors on nonflat surfaces such as human bodies, which are not achievable with conventional rigid solid-state electronics technology. However, relatively little attention has been paid to stretchable microfluidic and photonic devices which are important for many biofluid and biochemical sensing applications. In the first part of this talk, I will present a technique to co-fabricate liquid-core photonic, fluidic and electrical micro/nano structures on a stretchable PDMS substrate. This technique can enable the integration of electronics, sensors, fluidics and photonics all in a single soft material in order to achieve self-contained stretchable biosensing and drug delivery micro-systems. In the second part, I will describe a handheld microfluidic liquid handling system for point-of-care medical diagnostics. Microfluidics and lab-on-a-chip technologies have enabled impressive liquid manipulation capabilities such as pL sample resolution, single cell analysis and droplet PCRs. However, most microfluidic platforms still rely on off-chip infrastructures such as compressed pressure sources, computers and high voltage generators to achieve their functions. Recently, we have developed a smartphone-controlled handheld microfluidic system which can automatically perform all the sample manipulation steps of a bead-based fluorescent immunoassay without any human intervention. This technology is generally applicable to many IVD methods requiring complex liquid handling steps such as PCR, FISH, flow cytometry and sequencing

Bio: Dr. Zhenyu Li is an assistant professor in the Biomedical Engineering department at The George Washington University where he leads the Nanophotonics and Microfluidics Laboratory. Dr. Li received his Ph.D. degree in Electrical Engineering from the California Institute of Technology (Caltech) in 2008. From 2008-2009, he was a postdoctoral scholar in the Nanofabrication group at Caltech. His research interests include nanophotonics, microfluidics, wearable sensors and their applications in biology and medicine.

Host: Dr. Arye Nehorai