UCLA Engineering
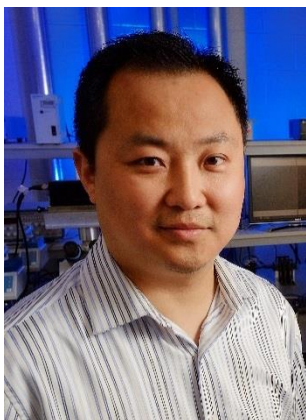### HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

BIOENGINEERING

PRESENTS

Microfluidics for Low-input Epigenomic Profiling in the World of Precision Medicine

THURSDAY, FEBRUARY 25, 2016
12:00 PM – 1:00 PM
2101 ENGINEERING V

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ABSTRACT:

Precision medicine requires comprehensive analysis of the molecular drivers of a disease for individual patients and use of the information to devise therapeutic procedures. In the post-genome era, such analysis benefits tremendously from decreasing cost of next-generation sequencing and improvement in big data processing. However, critical technical barrier still exists for establishing genome-wide profiles using tiny amounts of samples extracted from patients and lab animals. In this seminar, I will discuss our efforts on using microfluidics as a versatile platform for profiling epigenomes based on a low number of cells in the context of precision medicine. The epigenome turns on and off genes in a highly dynamic fashion and forms another layer of regulation on top of gene sequence. We developed MOWChIP-seq to profile histone modifications using as few as 100 cells (2015 *Nature Methods*). We also explored incorporating sonication-based shearing and immunoprecipation for improved integration of these assays. These new technologies will generate insights into disease processes and help create personalized treatment strategy.

BIOGRAPHY:

Dr. Chang Lu is a professor of chemical engineering at Virginia Tech. Dr. Lu obtained his B.S. in Chemistry with honors from Peking University in 1998 and PhD in Chemical Engineering from University of Illinois at Urbana-Champaign in 2002. His PhD work was with Dr. Richard Masel and focused on surface chemistry and fuel cell catalysis. He then spent 2 years as a postdoctoral associate in Applied Physics of Cornell University with Dr. Harold Craighead, working on microfluidic separation and biophysics. His research has been in the general area of developing microfluidic tools and technologies for molecular/cellular manipulation and analysis, with recent focus on profiling epigenomes using tiny amounts of samples to understand disorders and processes such as cancer, inflammation, stem cell differentiation, and brain development. Dr. Lu received Wallace Coulter Foundation Early Career Award, NSF CAREER Award, and VT Dean's award for research excellence among a number of honors. He was named a faculty fellow at Virginia Tech in 2012.