Microfluidic Engineering for Ultrasensitive Molecular Analysis of Cells

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125 Reber Building

Abstract:
The development of precision medicine requires comprehensive analysis of the molecular drivers of the disease. Microfluidics provides a versatile platform for interrogating tiny amounts of cell samples. Microfluidic analysis obtains molecular information with unprecedented sensitivity, integration and automation. In this talk, I will discuss a variety of microfluidic tools we developed for studying epigenomics, conducting genetic analysis, and examining location proteomics. We demonstrated profiling genome-wide histone modifications using as few as 100 cells; simplifying multi-step PCR analysis based on the physics of diffusion; and rapid screening of the subcellular location of a protein at the single cell level. Finally, I will also briefly describe our work on enhancing gene delivery by taking advantage of hydrodynamic effects in microscale channels. These new technologies will generate insights into disease processes and help create personalized treatment strategy.

Bio:
Dr. Chang Lu is an associate professor of chemical engineering at Virginia Tech. Dr. Lu obtained his B.S. in Chemistry with honors from Peking University, M.S. and PhD in Chemical Engineering from University of Illinois at Urbana-Champaign. He spent 2 years as a postdoc in Applied Physics at Cornell. He is the author of over 60 peer-reviewed journal papers and the inventor of several patents. 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. His group is currently supported by $2.9M NIH grants and has previously received support from NIH, NSF and USDA.