

# THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

**PRESENTS**

## Applications of Microfluidics for Single Cell Analysis and Spatial Biology



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Monday, 4/26, 9:55 am

Join Zoom Meeting

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Meeting ID: 989 0302 0154

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### **LECTURE ABSTRACT**

Microfluidics has been considered as an enabling technology for biomedicine, with the advantages of compactness, low cost, high scalability, parallel process, small reagent and sample volumes, and reduced amounts of wastes. After over two decades of active efforts, a vast amount of work in microfluidics has been published in literatures and many microfluidic devices have been commercialized. It is no longer possible to cover the field of microfluidics in a compressive review. In this presentation, we would like to discuss how microfluidics finds its commercial applications in cell-based assay, especially in single cell analysis.

We will start the presentation by discussing droplet-based microfluidics that can be integrated with the existing and new single cell sequencing platforms, including formation of FACS-compatible double emulsion droplets. The bulk of the talk will be on integration of microfluidics into a disposable cartridge (i.e. integration of microfluidics and meso-fluidics) that can be manufactured in high volume at low cost for applications sensitive to cross contaminations.

We demonstrate this microfluidic disposable cartridge as a cell sorter for the world's most compact tabletop FACS system. Then the system is advanced into an image-guided cell sorter which combines the high information content cell images with the high throughput single cell sorting capability. Finally, we discuss the on-going work of 3D imaging FACS system and its challenge for microfluidics to meet the stringent requirements for high-end imaging applications.

### **SPEAKER BIOSKETCH**

Yuhwa Lo received his PhD in electrical and computer engineering from UC Berkeley. He started his career at Bellcore in the areas of semiconductor materials and optoelectronic devices for optical communications. He was an associate professor at Cornell university till 1999. In 2000, he joined the ECE Department of UCSD San Diego as a professor. His research at UCSD includes biomedical devices and systems, Lab-on-Chip, POC, protein-ligand interactions, and single-cell technologies, as well as bio- and nano-photonic devices for LiDAR, sensing, imaging, and quantum communications. He is currently the William SC Chang Professor of the UCSD Jacobs School of Engineering. He has co-founded several companies in semiconductors and biotechnologies, including the company NanoCollect that commercializes tabletop microfluidics FACS systems. He has published around 500 papers and been awarded 42 patents.

Contact Dr. Wei-Chuan Shih ([wshih@uh.edu](mailto:wshih@uh.edu)) for additional information