STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

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Electrowetting-on-dielectric (EWOD) Based Digital Microfluidics and Applications

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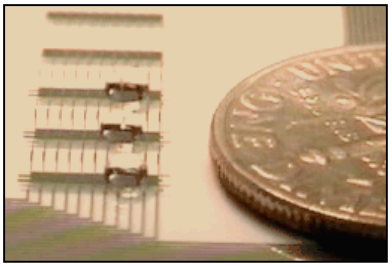

EWOD driving of 3 discrete droplets on electrode array

The Lab-on-a-chip (LOC) concept promises reduced sample/reagent consumption, analysis time, and a greater capacity to integrate or hybridize multiple functional units (e.g. sensors, reaction chambers, and sample preparation processes). For LOC platforms, microfluidics plays a critical role in sample delivery and is typically achieved through two methods: continuous and digital microfluidics. *Continuous microfluidics* represents the conventional approach of driving and parsing a continuous flow of liquid through a network of microchannels and valves coupled with pressurized sources, often resulting in bulky and complicated systems. *Digital microfluidics* based upon Electrowetting-on-Dielectric (EWOD) effects, have emerged as an alternative method that can drive small discrete droplets about a programmable electrode array by modulating surface tension at the solid-liquid interfaces via applied voltages and can perform sample deliveries in simple compact cartridges. The use of surface tension in microscale is particularly powerful due to its dominance through the scaling effect over body forces, such as weight or inertia. In this seminar, the speaker will introduce EWOD microfluidics as well as recently demonstrated hybrid microfluidics which can interface both continuous and digital driving methods and patent pending, web-driven EWOD applications.

Dr. Uichong B. Yi received his Ph.D. (2004) and M.S. (2000) in Mech. Engineering at UCLA and his B.S in Mech. Engineering at UC San Diego in 1996. After post doctoral research at UCLA, he joined Core Microsolutions--a UCLA biochip spinoff and has been working as the Chief Scientist since 2004. His research interests include Lab-on-a-chip/micro total analysis systems (μTAS), bioMEMS/NEMS, and nanotechnology. Currently, he is leading key research programs in the company and is serving as the principle investigator for several government research projects, including developments of hybrid sample preparation chips and Web-Enabled Biochip Labs (WEBLab) for college and K-12 science education.

For more information, please contact Prof. Frank Fisher at Frank.Fisher@stevens.edu or 201-216-8913