

Dr. Anderson Shum

Title: Electro-microfluidics: a platform for fabrication, characterization and printing

Abstract: By incorporating electrical charges, fluid flow can be modified: 1. Liquid jets can be stretched to acquire a smaller diameter; 2. Stagnant emulsion droplets can be actuated to exhibit intricate dynamics; 3. Viscous liquid threads can be induced to coil. When combined with electrodes for charging, electrical forces can be applied to enhance the processibility of liquids and extend the degree of control to a wider range of liquids under different microflow conditions. In this talk, I will share some of our efforts in understanding the electrically induced dynamics of emulsion droplets and in applying our understanding to characterize emulsion stability and surfactant efficacy. If time allows, I will also demonstrate a new approach to enhance the processing and mixing of highly viscous liquids in an electro-microfluidic device. The principles demonstrated are general and should be applicable to the manipulation to nanometer-scaled flows and applications.