



**DEPARTMENT OF MECHANICAL ENGINEERING
AND
MEDICAL ENGINEERING PROGRAMME**

SEMINAR

Title: Mechanobiology of single cells and membrane

**Speaker: Professor Allen Liu
Assistant Professor of Mechanical Engineering
Adjunct: Biomedical Engineering, Cellular and Molecular
Biology, Biophysics
University of Michigan
USA**

Date: 9 June, 2017 (Friday)

Time: 11:00 a.m.

Venue: Room 7-37, Haking Wong Building, HKU

Abstract:

Biological membranes are involved in a large number of cellular processes including cell migration, membrane trafficking, and cell signaling. The proper responses of cells to mechanical stimuli are important in numerous physiological processes. With the development of microsystem engineering tools, controlled and repeatable application of active mechanical input to single cells is becoming more available. In the first part of the talk, I will describe a multilayer microfluidic device using soft lithography with the goal of applying controlled aspiration and compression to single cells. The device, called microfluidic pipette array and compression (μ FPAnC), consists of a flow channel with trapping cups that have narrow microchannels to the side to serve as aspiration micropipettes. Two independent pneumatically controlled valves above the flow channel serve to facilitate single cell loading and compression when they are actuated. The design enabled us to perform mechanical measurements of single cells at a higher throughput compared to manual micropipette aspiration. In the

second part of my talk, I will describe how cell tension influence cellular activities in clathrin-mediated endocytosis and mechanosensitive channels (Msc). Using biophysical/bioengineering tools, we have uncovered mechanisms of tension-mediated changes to clathrin-coated pit dynamics and Msc activation. Together, our work provides basic understanding of cellular mechanotransduction.

Biography:

Allen Liu received a B.Sc. degree in Biochemistry (Honours) from the University of British Columbia, Vancouver, Canada, in 2001. He obtained his Ph.D. in Biophysics in 2007 from the University of California-Berkeley. Since January 2012, he has been an Assistant Professor in the Department of Mechanical Engineering and Biomedical Engineering at the University of Michigan. His current research interests lie in cellular mechanotransduction and uses tools from systems biology, synthetic biology, biophysics, and microfluidics. He is a recipient of the NIH Director's New Innovator Award, a Young Innovator by Cellular and Molecular Bioengineering (CMBE), a Rising Star from CMBE-BMES, and Future of Biophysics Burroughs Wellcome Fund Symposium speaker.

ALL INTERESTED ARE WELCOME.

For further information, please contact Dr. Y. Lin at 3917 7955.

Research areas: Biomedical Engineering and Thermofluids