

Special Program in Applied Mathematics and Applied Mechanics

Control Gaseous and Mechanical Microenvironments in vitro: Microfluidic Cell Culture

2015 - 03 - 04 (Wed.)

15:50 - 17:20

308, Mathematics Research Center Building (ori. New Math. Bldg.)

Cells are the basic functional units of most living organisms. They sense and respond to changes in their environment and communicate with neighboring cells by releasing chemicals or generating electrical signals. Basic in vitro cell culture techniques have changed little for almost a century. The dominant format for cell culture is the petri dish or similar platforms. However, this approach becomes increasingly expensive, complicated to scale up, and has difficulties to recreate the dynamic cellular microenvironments as in vivo.

Microfluidic technology offers the attractive ability to precisely control or mimic the rich biochemical and biophysical complexity of the cellular microenvironments; moreover, the analysis system can also be integrated into the same device. In this talk, I will discuss two types of microfluidic devices for cell culture, including: 1) Control of micro-scale cellular gaseous microenvironments, and 2) Pressure sensor embedded microfluidic device for cellular mechanical microenvironment monitoring.

