BioSyM Seminar Series 2017

Integrating a Robotic Micropipette with an Optical Trap for T-cell Screening and Manipulation

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Date   : 11th December 2017, Monday

Time   : 12 pm to 1 pm

Venue   : Level 5, Perseverance Room

Abstract

Optical tweezers integrated with a robotic micropipette can be used for single cell/bead manipulation and force measurements. One example, optical tweezers can measure the binding affinity between a T-cell receptor and peptide–major histocompatibility (pMHC)). This interaction defines T-cell specificity and sensitivity and underpins T-cell development, activation, proliferation, and differentiation. With our system, we can then pick up cells with desired binding forces for further analysis (e.g. single cell PCR/mass spectrometry). Conventionally, cell manipulation with a micropipette requires well-trained operators to skilfully operate multiple devices (e.g. microscope stage, micropipette, synchronized pressure and video recording), a time consuming process. Semi automation of single cell aspiration will allow higher throughput measurements to be performed.

This work is in collaboration with ZHU Hai, Research Associate at BioSyM.

Short Biography

Dr. Sharon Ong Lee Ling received her Ph.D. in Field Robotics from The University of Sydney, Australia in 2008. She joined SMART-BioSyM in 2009 as a Postdoctoral Associate and has been a Research Scientist since 2014. Her research interests include medical image analysis, automation, Bayesian statistics and machine learning.