THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY
Division of Life Science

Seminar Notice

"Whole-brain imaging of sensory processing in larval zebrafish"

by

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QBI

Abstract

Traditionally, neural activity has been monitored in great detail for one or a few cells (as in electrophysiology) or brain-wide by methods that do not provide single-cell resolution (such as functional MRI). The gap between these techniques has made it difficult to observe activity across large populations of neurons while regarding them as individual units. Because the nervous system is, ultimately, a highly interconnected network of neurons, this represents a major blind spot in our ability to describe the functioning brain.

Our group is interested in the neural mechanisms by which sensory stimuli are encoded and interpreted, and in how inputs from different sensory modalities are integrated in the brain. To address the problem described above, we have adopted optogenetic and microscopic techniques that allow us to perform calcium imaging across the entire zebrafish larval brain at single-cell resolution. In the work presented here, we have applied sensory stimuli to intact, alert larvae while observing the genetically-encoded calcium indicator GCaMP6. With house-built selective plane illumination microscopes (SPIM), we have observed large populations of neurons (~75,000 per animal), representing nearly the entire brain.

In this presentation, I will provide an overview of this approach, including its strengths and limitations. As examples, I will present our new descriptions of the neural processing underlying vision, audition, vestibular perception, and water-flow detection, as well as our early work in studying integration across these modalities. Finally, I will describe a novel retino-thalamo-collicular visual circuit that we have identified as having a specific role in visually-mediated escape behaviour.

Date : 20 April 2018 (Friday)
Time : 4:00 p.m.
Venue : Lecture Theatre C (near Lift no. 26)
The Hong Kong University of Science & Technology
Clear Water Bay, Kowloon

(Host faculty: Prof. Julie Semmelhack)

All are Welcome!!