



The University of Hong Kong
School of Biological Sciences

Qualifying
Seminar

Modelling the effects of thermal stress on intertidal mussels with computer vision

Date: 9th June 2022

Time: 9:00

Venue: Zoom



About the speaker:

Yi-Fei Gu used to be a software engineer and now is the first joint PhD student between SWIMS, HKU, and Northeastern University, USA. He will be using high-performance computing to address thermal-related ecological questions.



Abstract:

Intertidal ectotherms often experience lethal heat stress during low tide aerial exposure. Whilst mobile species can move to avoid such stress, sessile organisms like mussels lack the option of mobile thermal regulation. As a result, mussels living on temperate rocky shores risk reaching lethal body temperatures under heatwaves, whereas, on tropical shores, summer mortality events already occur. The risk to individual mussels is, however, not uniform as natural mussel beds are not homogeneous single layers. Individuals who experience less thermal stress may, therefore, provide a 'thermal buffer' function for the persistence of mussel populations on rocky shores as temperatures increase. Current assessments of abiotic conditions on rocky shores are often coarse, which hampers a mechanistic understanding of body temperature and corresponding physiological variations at organismally relevant scales.

This interdisciplinary project proposes a quantitative simulation-based approach to integrate the structural and microclimate variations found in mussel beds with a biophysical model to estimate inter-individual mussel body temperatures. These approaches will build a 'bottom-up' approach to study how mussel thermal profiles' change under varying environmental gradients and may contribute to their population persistence in different regions.