The University of Hong Kong
School of Biological Sciences

Public Seminar

DOES THERMAL PHYSIOLOGY SHAPE THE LOCAL AND BIOGEOGRAPHICAL DISTRIBUTION OF INTERTIDAL INVERTEBRATES? A CASE STUDY WITH BRACHYURAN CRABS

For the degree of doctor of Philosophy

Date: 18 June 2021

Time: 9:00 – 9:45am

Venue: KBSB 6N-11/Zoom

About the speaker:

Pedro J. Jimenez is a PhD candidate in the iMEco Lab and is supervised by Stefano Cannicci. His PhD research covered aspects of the thermal biology of intertidal crabs.

Abstract:

Temperature is a major factor regulating biological processes and is an important driver for species distribution. Intertidal crabs live under unique environmental and thermal conditions and provide a great opportunity to study the vulnerability of ectotherms to global warming and the relationship between thermal physiology and local and geographical distribution. Despite their importance for the ecosystem, these organisms are often overlooked in studies on thermal biology and vulnerability to climate change. I assessed multiple aspects of the thermal physiology of intertidal crabs, including their upper thermal limits and its relationship with experienced temperatures, latitudinal distribution, and sex. My findings show that intertidal crabs have high warm tolerance, with upper thermal limits being related to the maximum temperatures experienced by the crabs. The results also show that the upper thermal limit is an evolutionary conservative trait in intertidal crab families. Thus, the relationship between upper thermal limits and latitudinal distribution is weak in these organisms. My study supports that water-breathing crabs have a narrower aerobic scope compared to air-breathing species. Additionally, female intertidal crabs showed higher oxygen consumption and lower thermal limits compared to males, indicating narrower aerobic scope in females, possibly due to higher energetic investment in reproduction. This result suggests that the ontogenetic/reproductive stage could be a bottleneck for species survival in the warming world. My research shows the importance of considering different biological traits and phylogenetic relationships when assessing the vulnerability of ectotherms to climate changes.