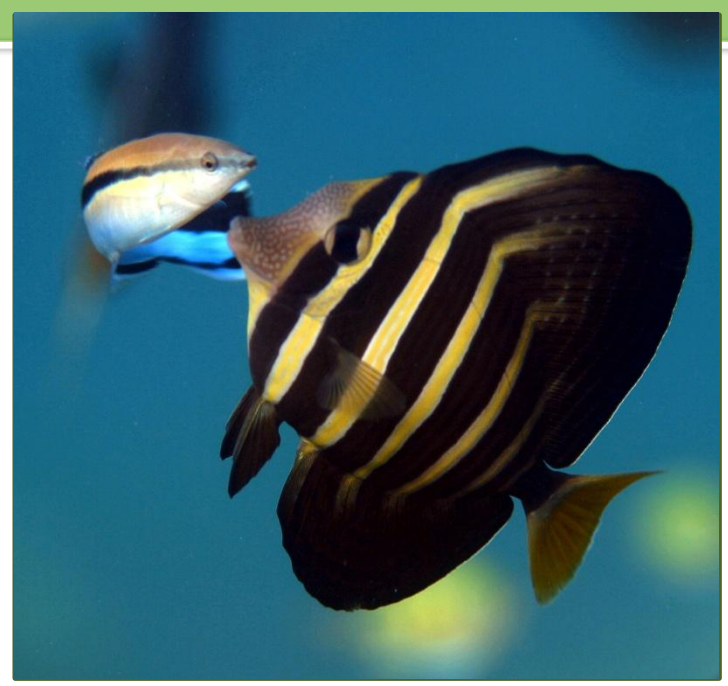
The University of Hong Kong
School of Biological Sciences

Public Seminar

Brains that bargain: neurogenomic foundations of cleaning, cheating, and recognition in coral reef cleaning mutualisms

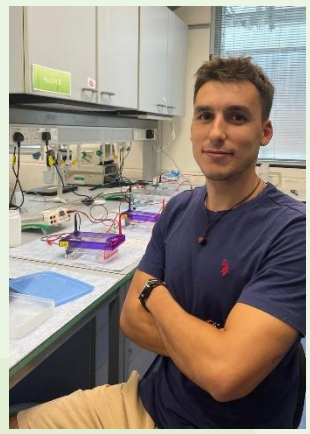


Date: 29 April 2026

Time: 09:00 a.m.

Venue: 6N-11

About the speaker:



Daniele is a PhD candidate supervised by Prof. Celia Schunter. The focus of his research is to define the molecular mechanisms behind cleaning behaviour in coral reef ecosystem.

Abstract:

From perception to action, animal behaviour underpins interspecific interactions, including the coral-reef cleaning mutualism, in which cleaners feed by removing ectoparasites from “client” fishes, improving fish health and reef stability. Cleaner fish exploit complex social environments with refined behavioural tactics, and understanding the molecular bases of these behaviours is key to explaining how animals process, value, and act on social cues to produce appropriate responses. Using field and laboratory experiments, we examined the molecular mechanisms of cleaning behaviour, the interspecific and evolutionary variation in cheating (feeding on client mucus rather than ectoparasites), and the transcriptomic and epigenetic basis of familiarity-based recognition in cleaner fish. Client interaction in the wild triggered rapid brain transcriptional changes linked to learning, memory, neurotransmission, and feeding motivation. Furthermore, under standardised conditions, cleaner species differed markedly in interaction time and cheating frequency, revealing interspecific variation in behavioural strategies. At the evolutionary level, this variation suggests that cheating did not arise from a single molecular innovation, but through a layered process in which shared functional systems were repeatedly recruited across lineages. Finally, familiarity-based social recognition involved temporally structured transcriptomic responses, while epigenetic differences appeared to play only a supportive role. These results advance our understanding of the mechanisms and evolution of complex social behaviour, showing how molecular processes sustain interspecific phenotypic variation in complex social environments such as coral reefs.