

BIOL4991 Ecology & Biodiversity Project

Titles offered in 2024-25

Dr L Ashton

Research areas:

Insect ecology, plant-insect interactions, climate change.
Thermal preferences of insect herbivores.
Forest restoration, biodiversity and ecosystem processes
Moth traits along a rural-urban gradient

Topic:

Light pollution impacts on insect traits

Dr D M Baker

Research areas: coral reef ecology, marine biodiversity, symbiosis, stable isotopes

Topics:

- Clash of the dinoflagellates! Competition amongst symbionts in marine invertebrates
- Conservation Forensics: genetics and stable isotopes to detect wildlife crime
- MarineGEO-Hong Kong: eDNA to quantify marine biodiversity

Prof T C Bonebrake

Research areas:

Tropical climate change impacts, tropical biodiversity and global change, endangered species conservation, and urban ecology.
Butterflies have served as our focal study taxa, but interests extend across a variety of species and systems. Examples of previous supervised FYPs here:
<https://tropicalconslab.com/undergraduate-research>

Dr J D Gaitan-Espitia

Research areas:

Evolutionary ecology (phenotypic plasticity, local adaptation, eco-evo dynamics)
Stress Ecology

Topic:

- Mechanisms of thermal acclimation, adaptation and evolution in ectotherms
- Seagrass ecology, blue carbon, and climate change
- Hypoxia stress in marine invertebrates
- Sea cucumber physiology and aquaculture

Dr B Guenard

Topics:

- Ecological impacts of invasive ants on arthropods and wildlife
- Diversity of ants in urban environments, is it just low and exotic?
- Ant-Hemipteran mutualism: its importance within Hong Kong habitats
- Ant-plant interactions, which benefits for the plants?
- Chemical warfare in ants: how a single Goliath deal with an army of David?
- Sociometry and morphometry of Asian ants BIOL 4991
- Taxonomic revisions of Asian ants: describing the species.
- Island biogeography in Hong Kong ants
- Foraging Ecology of ants
- How many ants does the world supports?
- Ecophysiology of native and exotic species: is climatic plasticity explaining invasion success?

Dr B C H Hau

Topics:

- Urban biodiversity studies

Dr A. C. Hughes

Research areas: Spatial ecology, Global change ecology, Biodiversity policy and governance, Biogeography, OneHealth, Predictive ecology, Conservation science and practice, Bat ecology, Bioacoustics, Bat biodiversity and systematics

Topics:

- Dimensions of wildlife trade (policies, threat assessments, scoping assessments)
- Developing conservation targets (spatial target setting, complementarities between targets under different UN conventions)
- Translating environmental policy to practice (i.e. ecological redlining, development of red and blue lines)
- Mapping impacts of climate change
- Bat biodiversity/biogeography/systematics/OneHealth
- Southeast Asian biogeographic analyses and threat assessments (various)
- Subterranean biodiversity analysis and development of assessment tools
- Migratory species targets and models in context of infrastructural change

Wide range of topics available under each of these, happy to discuss ideas

Prof J Merilä and Dr K Reid

Topics

- Disease presence in wild bird populations
- Extra-pair paternity and maternity in White-Shouldered Starlings
- Micro-habitat suitability for flat-headed loach *Oreonectes platycephalus* in Hong Kong: implications for species management and conservation
- Phylogenomics of the flat-headed loach *Oreonectes platycephalus* and related species
- I have a broad range of interests, and I would be happy to discuss and entertain projects based on students' own ideas

Dr Paolo Momigliano

Research areas:

Population genetics, ecological genetics, conservation genetics, biogeography, focusing on marine organisms (fish, sharks, corals, marine mammals)

Topics:

- Genetic diversity and divergence between closely related species (*Acropora* spp.)
- Conservation genetics of coral reef associated sharks
- Reconstructing demographic history from genetic data
- Determinants of genetic diversity in complex habitats and their importance in conservation planning
- Evolutionary and conservation genomics of marine mammals
- Happy to discuss further topics in the the are of population and conservation genetics

Dr H Mumby

Topics:

- Human-cattle interactions in Hong Kong
- Use of social norms to mitigate negative human-wildlife interactions
- Mahout-to-elephant directed behaviour and elephant-to-mahout directed behaviour in a learning task
- Risk aversion and perceptions of wildlife in urban space
- Elephant-skin cowboy boots: Analysis of social media for consumption of elephant skin products in the English-speaking world.

Dr Bayden Russell

I approach all of my research from an experimental perspective, manipulating conditions to test the effects on ecosystem processes. I have suggested some projects but am happy to discuss any subtidal, intertidal or laboratory-based experiments.

1. Some like it hot! Are some species better at surviving marine heatwaves?
2. Build it and they will come: biodiversity associated with oyster reef restoration in Hong Kong.
3. Any project linking marine invertebrate or algal physiology to survival under climate change.
4. How can remote sensing (e.g., cameras, drones) most effectively be used to map marine habitats in the face of climate change?

Dr C Schunter (not available for 2024-2025)

Topics:

- Long noncoding RNAs as a mechanism for acclimation to environmental change

Cleaner wrasse behaviour (experiments at SWIMS, lab work on main campus)

- Using environmental DNA for fish biodiversity surveys
- Bioinformatics (e.g. analysis of lncRNA, micro RNA, transcriptome as molecular driver to the response to climate change in fish)
- Parental effects
- Population genetics
- Fish Biology
- Zebrafish behavioural responses to temperature change

Dr Mat Seymour

Research areas:

Environmental DNA

Molecular Ecology

Biodiversity dynamics

Topics:

- Chironomidae biodiversity and links to environmental assessment (malaise trapping, identification, barcoding)
- Freshwater macroinvertebrates eDNA (field sampling of streams, identification and eDNA methods)
- Night fish surveying/eDNA for biodiversity of eastern Hong Kong waters for marine fisheries management (night fishing, identification and molecular methods)
- Hong Kong tick diversity and host associations (eDNA, camera trapping, trapping)
- Various Hong Kong barcode projects (study groups is flexible)

Dr Simon Y W Sin

Research areas:

Animal behaviour

Animal (bird) cognition and intelligence

Animal senses

Animal disease

Aquaculture: use of probiotics in fish feed

Behavioural ecology

Genomics and bioinformatics

Host-parasite/pathogen co-evolution

Molecular ecology

Dr ThiyaqaRAJAN Vengatesen

Topics:

- Seafood safety and climate change
- Climate change impacts on oyster meat quality, taste and odor

- Big data and machine learning for oyster aquaculture

Professor G A Williams

Topics:

- Overall themes: Intertidal ecology; life in extreme environments; ecophysiology and animal behaviour. Students are welcome to propose and discuss their own ideas. Note Projects will be co-supervised with Dr TY Hui.
- Water loss and desiccation resistance of intertidal molluscs: the main cause of zonation patterns?
- Thermal images – how cool are they? (an experimental test of the quality of thermal imaging)
- Thermal stress on Hong Kong shores: are winters limiting?
- How important is the crab, *Grapsus albolineatus*, in intertidal assemblage structure?
- Foot area vs wave exposure in the same species of limpet OR across a tidal gradient in different species of limpet , OR Cirral length vs. wave exposure in the same barnacle species
- Aerial vs aquatic respiration in Pulmonates
- Variation in *Siphonaria japonica* populations at different shore in Hong Kong and the importance of aspect (Must start October – as these limpets die in May)
- Habitat preference of *Patelloida saccharina* on sheltered shores
- Thermal preference of *Monodonta labio*: individual vs group responses
- Thermal biology of coexisting sand-bubbler crabs
- Testing the hypothesis of oxygen- and capacity-limited thermal tolerance in a sand-bubbler crab
- Thermal biology of the soldier crab *Mictyris brevidactylus*: are they cooler than other crabs?
- How well does rock temperature reflect body temperature of intertidal ectotherms?
- How does recent thermal history affect snail behaviour?
- Thermal benefits of aggregations in intertidal gastropods (particularly in winter)
- Usage of shells of various colours by hermit crabs
- Thermal; performances of selected species (e.g. *Siphonaria*; *Littoraria*; *Tetraclita* or *Lottia luchuana*)
- Rock physical characteristics (hardness, colour etc) vs biofilm availability / temperature
- Sequential grazing - is there a trade off between movement speed and radula strength?
- Physical environments on rocky shores during tidal transitions
- Climbing behaviour of Cerithidea on mangroves and grasses - same behaviour but different causes?

Dr Jin Wu

Research area:

Phenology; Global Carbon Cycles; Tropical Ecology; Restoration and Conservation; Nature-based Climate Mitigation; Ecosystem Health and Climate Extremes

Topics:

- Phenology diversity: characterization methods, large-scale patterns, and underlying drivers
- The effectiveness of global protected areas
- Plant thermal acclimation strategy and threshold responses
- Carbon and biodiversity monitoring from the air

Dr M Yaushara

Research area:

Marine ostracod paleobiology

Topics:

- Ostracode paleoecology
- Marine biodiversity research using modern and fossil ostracods
- Paleoenvironmental and paleoclimatic studies