AUSTRALIAN MUSEUM

AUSTRALIAN MUSEUM RESEARCH INSTITUTE STUDENT FORUM 2025

Wednesday 12 November 2025

AUSTRALIAN MUSEUM
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AUSTRALIAN MUSEUM

PROGRAM

12:00pm	Opens forum/housekeeping	Meagan Warwick
12:05pm	Welcome and introduction	Prof Shane Ahyong
Seminars		
12.15pm	• Eli Bieri, University of NSW: *Frogs, fires, floods & fungi*	Chairs: Dr Elena Kupriyanova Dr Jacqueline Nguyen
12.30pm	• Bailey Brooker, James Cook University: *What shells remember: Marine invertebrate responses to environmental change*	
12.45pm	• Matilda Rosas, University of Sydney: *Investigating dung preferences and host specialisation in dung beetles: Laboratory and field surveys*	
1.00pm	• Samantha Ordonez-Flores, University of NSW: *War drums: Drivers of advertisement call variation in an invasive species*	
1.15pm	**BREAK 1 [15 mins]**	
1.30pm	• Nina Knowles, University of Sydney: *Untangling Australian* Ficopomatus, *a genus of biofouling and invasive brackish water calcareous tubeworms*	
1.45pm	• Ethan Seow, University of Sydney: *Molecular phylogeographic study of the longicorn genus* Xylotoles *Newman, 1840 reveals widespread non-monophyly and multiple dispersals to remote oceanic islands*	
2.00pm	• Indiana Riley, University of Sydney: *Measuring the sustainability of coral reef fisheries*	
2.15pm	• James Joseph Roberts, Western Sydney University: *Introduced predator impacts on Norfolk Island's land snails* [**Recording**]	
2.30pm	**BREAK 2 [15 mins]**	
2.45pm	• Genevieve Law, University of Sydney: *Brood mites (*Proctotydaeus furnarius*) and their relationship to Australian stingless bees*	
3.00pm	• Ana Pantoja, University of Sydney: *Associations of the stingless bee* Teragonula carbonaria *with a native brood mite* Proctotydeaus furnarius *(Tydeidae: Ilionidae) and the acarine community in nests*	
3.15pm	• Niamh Ryan, University of Sydney: *The phylogenetics and population structure of a species complex of deep-sea scale worms*	
3.30pm	• Jenny Wang, University of Sydney: *Wrangling the wrasses: combining morphology and genomics to understand the taxonomy and evolutionary history of labrid fishes*	
3.45pm	Vote of Thanks	Prof Shane Ahyong
3.55pm	Close of AMRI Student Forum 2025	

ABSTRACTS

Eli Bieri

PhD Candidate
University of New South Wales
Supervisor: Dr Jodi Rowley (AM, UNSW)

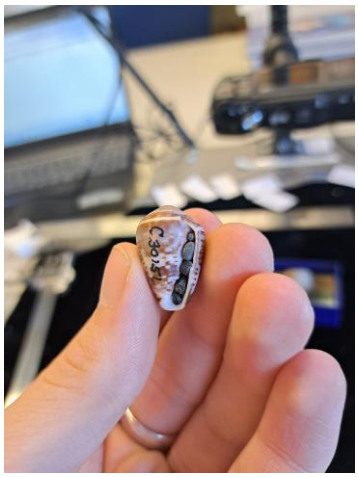
Frogs, fires, floods & fungi

Extreme weather events, including droughts, fires, storms, and floods, are intensifying and impacting ecosystems with unknown effects. The main drivers of population decline in Australian frogs have been identified as climate change and disease. The broad impacts of these extreme events on disease-affected frog species remain unclear, however. Using a Before-After-Control-Impact (BACI) design and citizen science data from the FrogID platform, we assessed the effects of severe wildfires and floods in New South Wales on species richness and distribution changes. We found a significant decline in species richness in flood-affected areas but not in fire-affected areas. Additionally, to evaluate wildfire effects on amphibian chytrid fungus prevalence and infection intensity, we conducted capture-mark-recapture and disease surveys of Northern Stuttering Frogs (*Mixophyes balbus*) at burnt and unburnt sites. Our results support a thermal refuge hypothesis, suggesting that warmer microhabitats created by fire may provide disease refugia for frogs impacted by a fungal pathogen.

Bailey Brooker

Honours Student
James Cook University
Supervisors: A/Prof Sue-Ann Watson (JCU), Dr Michela Mitchell (JCU)

What shells remember: Marine Invertebrate responses to environmental change



Intensifying simultaneous stressors on coral reefs demand long-term, multi-factor data, yet such data sets are scarce. Natural history museum collections are a valuable resource for global climate change biology, providing centuries of evidence for pre- and post-industrial impacts. Biological specimens are a snapshot of the combined lifetime effects of all environmental variables, expressing adaptation over time and space. We analysed morphometric changes in calcified functional structures like shells, apertures, carapaces, and chelae in 16 gastropod and crustacean species (1900+ specimens) held at the Australian Museum collected over the past 150 years. Data to date shows trend changes in morphologic traits such as body size and calcification correlating with increasing temperature, ocean acidification, decreasing carbonate saturation state, and other ocean dynamics. Assessing and predicting changes in predatory, defensive, and environmentally reactive traits explores reef-wide resilience and informs the health, and management needs, of future coral reef communities under accelerating climate change.

Nina Knowles

Honours Student
University of Sydney
Supervisors: Prof Simon Ho (USyd), Dr Elena Kupriyanova (AM)

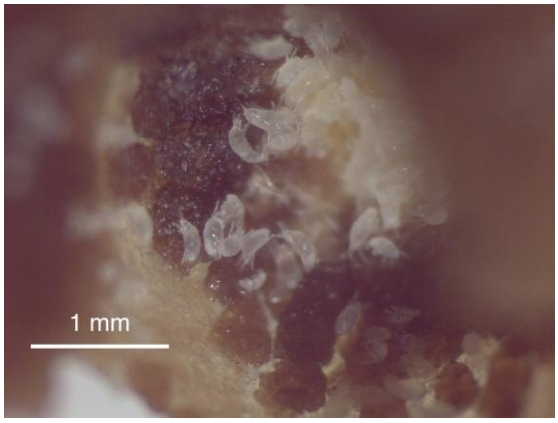
Untangling Australian *Ficopomatus,* a genus of biofouling and invasive brackish water calcareous tubeworms

Ficopomatus Southern, 1921 is a genus of brackish-water tubeworms of the annelid family Serpulidae. Of the six described species in this genus, *F. enigmaticus* from France and *F. uschakovi* from Sri Lanka have been reported in Australia. Both are invasive, but their native ranges and invasion pathways are poorly understood. A previous study has identified three clades within *F. enigmaticus* in Southern Australia. One of these clades, comprising individuals from the Pambula region of southern NSW, morphologically resembles *F. uschakovi*. Nina investigated the phylogenetic relationships within *Ficopomatus* world-wide, including Australian specimens morphologically similar to *F. uschakovi*, using mitochondrial CYTB and nuclear 18S genes. Nina's results confirm that *F. uschakovi* is a monophyletic group comprising closely related putative species. These are *F. uschakovi sensu strico* from Sri Lanka and from invaded localities as well as a clade from Vellar Estuary, India and two Australian clades from Port Darwin and Pambula. This was further supported by species delimitation analyses of the CYTB data. Morphological examination using light and scanning electron microscopy was used to describe the clade from Pambula as a new Australian species. Further research is required to understand the invasive status of the remaining undescribed clades within the complex.

Genevieve Law

PhD Candidate
University of Sydney
Supervisors: Dr Rosalyn Gloag (USyd) with Owen Seeman (QM) and Dr Matt Shaw (AM)

Brood mites (*Proctotydaeus furnarius*) and their relationship to Australian stingless bees



Stingless bees (Apidae: Meliponini) are eusocial bees found in tropical and subtropical areas around the world and play important roles in ecological and agricultural pollination. The species *Tetragonula carbonaria* and *Tetragonula hockingsi* have wide distributions along the eastern coast of Australia, making them popular pollinators and 'pets'. While mites with close relationships to Neoptropical, stingless bees (and other bee taxa) have been described and shown to have important fitness effects on their hosts, symbiotic mites with relationships to Australian stingless bees have not yet been characterised. Here we present the newly described species *Proctotydaeus furnarius*, which is only found within the brood cells of the Australian stingless bees *T. carbonaria* and *T. hockingsi*. In this talk, Genevieve will speak about how they discovered and described this unusual species of mite (in collaboration with Owen Seeman from the Queensland Museum and Dr Matt Shaw from the Australian Museum), including characterisation of its life cycle within the brood cells of the bees and genetic barcoding to compare divergence between sampled mites. *P. furnarius* is a fascinating species of mite, and they are only beginning to uncover its interesting roles within the colonies of stingless bees.

Samantha Ordonez-Flores

PhD Candidate
University of NSW
Supervisors: Dr Jodi Rowley (AM, UNSW)

War drums: Drivers of advertisement call variation in an invasive species

Invasive species offer exceptional opportunities to study rapid evolution. They encounter novel environments and selective pressures as they expand their range. The cane toad (*Rhinella marina*), which was introduced to Australia in 1935 and expanded its range ever since, has undergone significant morphological, behavioural, and ecological changes. Vocal communication, particularly advertisement calls, can evolve quickly under natural and sexual selection, especially in response to environmental and morphological changes. Although cane toad calls have been used to lure individuals for control efforts, little is known about geographic variation in their advertisement calls across Australia. Given their extensive spread and documented physiological and morphological changes, variation in call structure may reflect rapid evolution.
To explore this, we analysed cane toad calls sourced from FrogID, a citizen science database, and measured spectral and temporal features using Raven Pro. We examined how environmental variables (e.g., temperature, vegetation and rainfall) and time since colonisation influence call variation across Australia. Although analyses are still underway, we predict that we will find geographic differences mainly in peak frequency and call duration, shaped by environmental gradients and invasion history. This could offer insight into how communication traits can rapidly evolve in novel environments.

Ana Pantoja

Honours Student
University of Sydney
Supervisors: Dr Rosalyn Gloag (USyd, Dr Kenya Fernandes (USyd), Dr Matt Shaw (AM)

Associations of the stingless bee *Teragonula carbonaria* with a native brood mite *Proctotydeaus furnarius* (Tydeidae: Ilionidae) and the acarine community in nests

The nests of stingless bees (Meliponini) represent valuable resources for many invertebrates, with mites (Acari) being one of the most prevalent associates in these habitats and having varied health effects (positive and negative) on their bee hosts. *Tetragonula carbonaria* is a species of Australian stingless bee with cultural and economic significance, whose association with mites, including the recently described brood mite *Proctotydeaus furnarius*, are largely understudied. In this project, Ana investigated the relationship between *T. carbonaria* and *P. furnarius* morphological and developmental analyses. Ana also quantified the impact of mite abundance on bee morphology in 12 colonies, finding varied responses of colonies to mite load and a positive, but weak, association between individual cell mite-load and odds of deformity. Ana measured the effects of experimentally added mites on brood development in-vitro for five colonies, finding no effect of bees in brood development. Finally, Ana surveyed the acarine and invertebrate communities of declining/dead nests and found 32 morpho groups, out of which 25 represented mites including families like Cheyletidae and Acaridae. In conclusion, Ana found that *P. furnarius* has a potentially complex relationship with *T. carbonaria* and found no beneficial impacts of its presence for bee health and development. Ana also found that *T. carbonaria* nests harbour diverse acarine communities which may be implicated in nest decline and/or decomposition.

Indiana Riley

PhD Candidate
The University of Sydney
Supervisors: Prof Josh Cinner (USyd), Prof Will Figueria (USyd), Dr Hayden Schilling (NSW DPI Fisheries)

Measuring the sustainability of coral reef fisheries

Sustainable harvest is an increasingly urgent goal for global fisheries as oceans and the communities that depend on them face mounting climatic, political, and population pressures. However, conventional fisheries sustainability benchmarks primarily focus on conserving individual species stocks, often overlooking the broader goals of "sustaining" livelihoods, cultures, and the ecosystems that fisheries rely on. The limitations of traditional sustainable benchmarks are particularly evident in coral reef fisheries, where diverse fishing methods yield multispecies catches, the needs and priorities of local communities differ vastly across the globe, and limited resources prevent the collection of long-term, detailed catch data. Traditional single-species stock assessments and reference points are insufficient for guiding sustainable management in these complex systems. Recent advancements in data-poor, multispecies and ecosystem-based reference points offer promising alternatives, but their application to coral reef fisheries remains limited and have rarely been evaluated alongside other indicators of environmental, economic, and social well-being on a global scale. Indy's talk will explore some of the emerging best practices in measuring sustainability on coral reefs, how she intends to apply these methods to measure the sustainability of reefs on global and local scales, and some of the potential trade-offs associated with these measurements.

James Joseph Roberts

PhD Candidate
Western Sydney University
Supervisors: Dr Isabel Hyman (AM), A/Prof Kate D. L. Umbers (WSU), Dr Eleanor Drinkwater (WSU)

Introduced predator impacts on Norfolk Island's land snails

Island land snails are among the most extinction-prone taxa globally, and Norfolk Island supports some of Australia's most diverse and threatened snail species. This project integrates ecological, social, and molecular approaches to clarify key threats and guide conservation. This PhD comprises four chapters. Chapters 1–2 use qualitative data to identify threats and management priorities, incorporating insights from experts and the community. This presentation will focus on Chapters 3–4. Chapter 3 estimates densities of rats and feral chickens across snail habitats using the Random Encounter Model with camera-trap data, identifying when and where management effort would be most effective. Chapter 4 compares the relative predation impact of rats and feral chickens via dietary DNA metabarcoding of faecal samples, enabling detection of soft-bodied prey and helping distinguish predation from scavenging. Together, these chapters provide an evidence base to prioritise predator management and inform practical strategies to prevent further declines of Norfolk Island's endemic land snails.

Matilda Rosas

Honours Student
University of Sydney
Supervisors: A/Prof Tanya Latty (USyd) and Dr Chris Reid (AM)

Investigating dung preferences and host specialisation in dung beetles: Laboratory and field surveys

Please contact Matilda Rosas for further information - the excerpt has been redacted in this instance.

Niamh Ryan

Honours Student
University of Sydney
Supervisors: Prof Simon Ho (USyd) and Dr Elena Kupriyanova (AM)

The phylogenetics and population structure of a species complex of deep-sea scale worms

The distribution of marine annelids in the deep sea remains poorly understood, with taxa's broad ranges potentially reflecting the presence of species complexes. DNA barcoding can efficiently identify genetically distinct lineages, however, mitonuclear discordance may limit the accuracy of these inferences. The addition of genome-wide SNP data for species delimitation provides a high resolution of information and can account for this discordance. This project focuses on annelids of the genus *Laetmonice*, family Aphroditidae. Recent study of the genus in Australia described four new species with bathymetrically isolated distributions. Niamh analysed specimens collected from Australian territorial waters (190 - 5,000 m) alongside previously described specimens. Using both mitochondrial barcoding (COI and 16S) and genomic data (SNPs) Niamh identified putative species and assessed current species hypotheses. Despite limitations in the results produced by both datasets, inference drawn from their comparison allowed for a robust exploration of species boundaries, suggesting seven distinct genetic lineages withing the genus, five of which agree with currently valid species, and two which may represent undescribed species. These results demonstrate the value of utilising multiple methods in proposing species hypotheses and forms the basis of morphological examination of two putative undescribed species in the genus *Laetmonice*.

Ethan Seow

Honours Student
The University of Sydney
Supervisors: Prof Nathan Lo (USyd), Prof Simon Ho (USyd), Dr Chris Reid (AM)

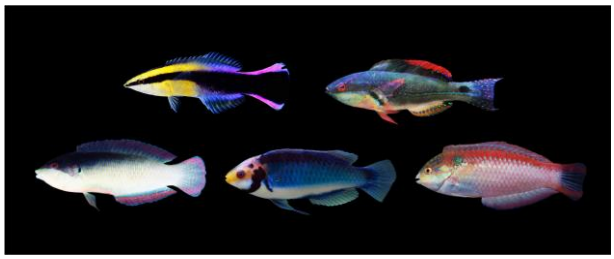
Molecular Phylogeographic Study of the longicorn genus *Xylotoles* Newman, 1840 reveals widespread non-monophyly and multiple dispersals to remote oceanic islands

The Lord Howe Island Group (LHIG) is an insular archipelago formed by volcanic activity between 6.9 to 6.2 million years ago. Located 600km east of mainland Australia, the biota of the LHIG displays biogeographic affinities with Australia, New Zealand and New Caledonia. *Xylotoles* is a genus of longicorn beetle (Cerambycidae) primarily distributed in New Zealand but also described from the LHIG and Norfolk Island. It belongs to a taxonomic complex with similar longicorns from the Southwestern Pacific, such as *Stenellipsis, Mesolita* and *Enicodes*. Ethan conducted time-calibrated phylogenetic analysis on the *Xylotoles* based on mitochondrial and nuclear ribosomal data and demonstrate that the genus as a whole is not monophyletic, with LHIG and Norfolk Island *Xylotoles* forming a clade closer to Australian *Stenellipsis* than congeners from New Zealand. This clade began radiating between approximately 55-32 million years ago, greatly predating the emergence of the LHIG. Ethan's findings suggest multiple colorizations of the LHIG, either from mainland Australia or from older, now submerged islands in the Lord Howe or Tasmantid volcanic groups. Finally, Ethan describes novel species of *Xylotoles* and *Stenellipsis* from the LHIG and show that at least one c.f. *Xylotoles* from the LHIG belongs to the unrelated genus *Sybra*.

Jenny Wang

PhD Candidate
University of Sydney
Supervisors: Prof Simon Ho (USyd), Dr Yi-Kai Tea (AM)

Wrangling the wrasses: Combining morphology and genomics to understand the taxonomy and evolutionary history of Labrid fishes



The family *Labridae* (wrasses) is one of the most speciose and evolutionarily complex groups of marine fishes. With over 600 species spanning wide morphological and ecological ranges, labrids provide an excellent opportunity to explore diverse biological, ecological, and evolutionary processes. However, progress is hindered by taxonomic ambiguities, incomplete phylogenetic reconstruction, and uncertain species boundaries. Further questions remain regarding interspecific boundaries, in particular, the evolutionary mechanisms driving colour pattern diversification among syntopic species with poor phylogenetic signal but are otherwise reproductively isolated. Jenny aims to investigate how different evolutionary drivers can produce the remarkable diversity observed across Labridae. By integrating morphological assessments with genomic analyses, Jenny will revise taxonomically problematic labrid genera and examine the drivers underlying *Cirrhilabrus* (fairy wrasse) colour pattern diversity in syntopic species complexes. Together, this work will contribute to the accurate classification of species in a major coral reef fish family and clarify the processes shaping marine biodiversity.