ASSAB 2026

Conference Booklet

23-25 June 2026

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WELCOME

Welcome to ASSAB 2026 at Flinders University!

Perched above the coastline in southern Adelaide, Flinders University has been a hub of innovative research and teaching since its establishment in 1966. Named after the explorer Matthew Flinders, the university was founded with a strong commitment to interdisciplinary collaboration and progressive education. Flinders was the first university in Australia to offer a dedicated degree in Animal Behaviour, an enduring reflection of its leadership in this field and its commitment to understanding the complexity of animal lives.

Flinders is located on the traditional lands of the Kaurna people, whose deep connection to Country continues to shape the cultural and ecological heritage of the region. The surrounding landscape offers a remarkable natural laboratory for the study of behaviour, with a mosaic of coastal, woodland, and urban habitats. From the nearby shores of the Gulf St Vincent to the native vegetation on and around campus, attendees may encounter a rich diversity of wildlife, from seabirds along the coast to reptiles basking in native bushland and mammals active across the landscape.

We are delighted to welcome you to ASSAB 2026 at Flinders University and look forward to an engaging and inspiring conference.

Sincerely,

The 2026 ASSAB Organising Committee

ACKNOWLEDGEMENTS

Organising committee: Diane Colombelli-Négrel, Ondi Crino, Bruno Buzatto, Ben Ashton, Yuri Ogawa, Karin Nordström

Volunteers: Aika Young, Alicia Wollaston, Patricia Slattery, Sebastian Hayden, Ryan Michie, Bronte Fairclough, Penny Dong, Panduka Amarasekara, Arisha Silverlake, Yazmin Rizk, Kai Ting Ng, Emma Vanderzon, Incheol Shin, Josh Martin

ASSAB Board: Chrissie Painting, Ajay Narendra, Juliane Gaviraghi Mussoi, Lucy Alpin, Athena Brown, Bruno Buzatto, Geoffrey Hughes, Avichal Tatu, Annabell Klinke, Mick Wakefield, Shefali Dorepalli, Amy Martin, Damien Farine, Oakleigh Wilson, Dominique Potvin, Kamya Patel, Michelle Roper, Samuele Ramellini, Nina Cosgriff, Fran Hacker.

Sponsors and partners: Birds SA, The Journal of Experimental Biology, Macquarie University Pollinator Futures Centre, Flinders University, Flinders Health and Medical Research Institute, New Zealand Journal of Zoology

Journal of Experimental Biology

Birds SA

Flinders University | FHMRI Flinders Health and Medical Research Institute

MACQUARIE University

Flinders University

CODE OF CONDUCT

We wish to foster a society that recognises the inherent worth of every person – we value inclusion, dignity, understanding, and mutual respect.

At ASSAB 2026, we are dedicated to providing a positive, safe and supportive experience for everyone, regardless of gender, sexual orientation, disability, appearance, age, race, ethnicity, political affiliation, socioeconomic status, language, or religion – and not limited to these aspects.

We do not tolerate harassment or hostile behaviour in any form. Discriminatory language, images or jokes are not welcome at this conference, including at all talks, online, and social events. We reject intimidation or interference with a person's participation or opportunity for participation in our society or conference, whether in speech or behaviour, in person, in presentations or online.

Harassment includes but is not limited to: comments that exclude, discriminate or offend based on gender, religion etc.; sexual images in presentations, public spaces, twitter etc.; intimidation, stalking, or following; harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact; unwelcome sexual attention; and advocating for or encouraging any of the above behaviour.

Participants that are asked to stop any harassing behaviour are expected to comply immediately. Participants violating these rules may be sanctioned or expelled at the discretion of the conference organisers, without a refund.

Protocol for reporting and conflict resolution

It is the responsibility of the ASSAB community as a whole to promote an inclusive and positive environment.

Report If you are being harassed or notice that someone else is being harassed (active bystander principle), or have any other concerns, please immediately contact ASSAB president chrissie.painting@waikato.ac.nz; or vice president ajay.narendra@mq.edu.au. We will accept and respond to anonymous reports. If you have been harassed via email or social media, you may send emails or screenshots to the above emails.

Escalate Our primary response will be to ensure the safety of the person experiencing unwanted behaviour and may include providing escorts, contacting campus or accommodation security or local law enforcement, or otherwise assisting those experiencing harassment and will help them to feel safe for the duration of the event.

Resolve The ASSAB conference organisers will require anyone engaging in harassing behaviour to cease immediately or face sanctions. Those sanctions can include reporting to the individual's organisation, expulsion from the conference or the society, reporting to campus security and local law-enforcement. If an incident results in corrective action, then the conference organisers will support those harmed by the incident, both publicly (where appropriate) and privately. If any individual encounters problems or issues attempting to help a victim of harassment while following our anti-harassment policy and protocol, we encourage you to contact ASSAB president chrissie.painting@waikato.ac.nz; or vice president ajay.narendra@mq.edu.au.

GENERAL INFORMATION

Getting to the conference: The conference venue is **STH1**, in the **South Lecture Theatres building** in South Ridge, Flinders University, Bedford Park. Entry is via the sliding doors in anchor court; the venue is up the stairs. See map on the next page. You can also see an interactive map on this link: https://www.flinders.edu.au/campus/bedford-park/location

Train: Flinders Railway Station, arriving at Flinders Medical Centre. From there, take the free Campus Connector and Tonsley Link bus services to Flinders University. These services operate Monday to Friday, 7am–6pm. The FLNDRS (Flinders to City) train journey from the city takes approximately 22 minutes.

Bus: There are a number of buses that come to Flinders University and Flinders Medical Centre. Services from the southern suburbs, railway stations and Marion Shopping Centre connect with the University's Campus Bus service.

Parking: You must pay for parking when parked on Bedford Park campus from Monday to Friday, 9am to 5pm. Please park in a general marked parking bay (white) at all times. Reserved, access (disability), loading zones, business blue bays and signed 'at all times' parking areas are monitored 24/7 and are not for general use.

Registration and information: Registration will open on the 23rd of June 7am-9am in anchor court.

Wifi: Free access through 'eduroam' or 'Flinders Conference' using the code provided on the first day.

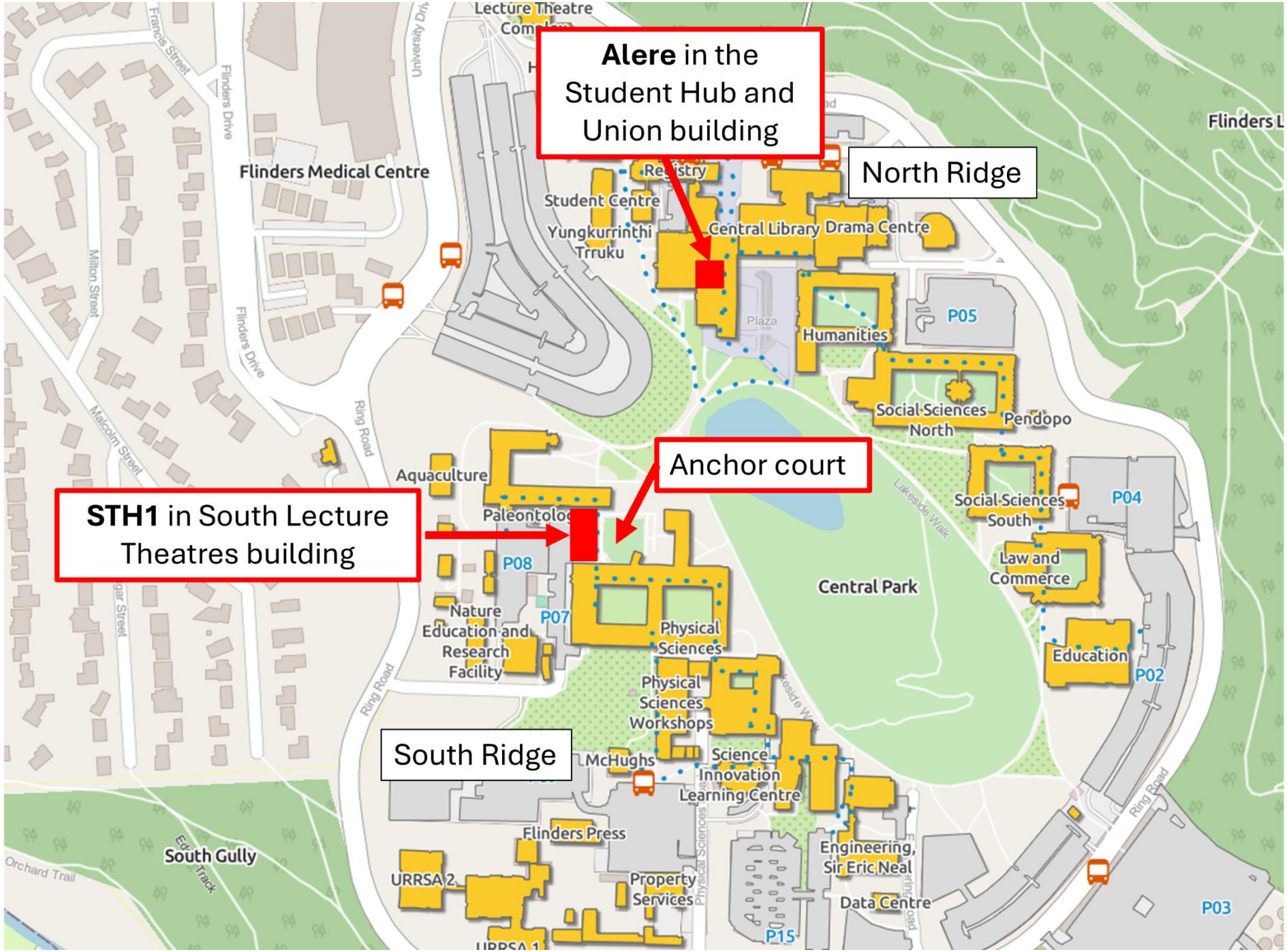
Tea breaks and lunches: Tea breaks and lunches will be served at Alere, Level 2 in the Student Hub and Union building, in North Ridge, Flinders University, Bedford Park. This is a 5 min walk from STH1. Lunch will be supplied for the duration of the conference (Tuesday, Wednesday, Thursday).

Poster session (day 1): Alere, Level 2 in the Student Hub and Union building, in North Ridge, Flinders University, Bedford Park. This is a 5 min walk from STH1.

Social Events (days 1 and 3)*:* Flinders Tavern, in the Student Hub and Union building, in North Ridge, Flinders University, Bedford Park. This is a 5 min walk from STH1.

Dinner (day 2): The conference dinner will be hosted at the Strathmore Hotel, 129 North Terrace, Adelaide. Website: www.strath.com.au

Program Booklet: We are aiming to minimise waste, so please bring the program booklet in any format you prefer. The full program will be available on the information board at the venue.


Alere in the Student Hub and Union building
North Ridge
STH1 in South Lecture Theatres building
Anchor court
South Ridge
Flinders Medical Centre
Lecture Theatre Complex
Registry
Student Centre
Yungkurrinthi Trruku
Central Library
Drama Centre
Plaza
Humanities
P05
Social Sciences North
Pendopo
Social Sciences South
P04
Law and Commerce
Education
P02
Aquaculture
Paleontology
P08
P07
Nature Education and Research Facility
Physical Sciences
Physical Sciences Workshops
Central Park
Lakeside Walk
McHughs
Science Innovation Learning Centre
Flinders Press
URRSA 2
Property Services
Engineering, Sir Eric Neal
Data Centre
P15
P03
South Gully
Orchard Trail
Francis Street
Flinders Drive
University Drive
Milton Street
Malcolm Street
Ring Road

INVITED SPEAKERS

Dr Upama Aich – University of Western Australia

Sex and stress in a changing world

Dr Aich is a Forrest Fellow whose research examines the evolution of behavioural, reproductive, and life-history traits in light of sexual selection and environmental changes. Her current projects investigate the long-term, intergenerational effects of environmental pollutants, particularly endocrine disruptors and pharmaceuticals, on animal behaviour and physiology in fish and invertebrates.

Dr Kawsar Khan – Macquarie University

Behaviour ecology in the Anthropocene

Dr Khan's research focuses on understanding how insects respond to environmental change, particularly climate change. His work examines thermal tolerance, parasitism, and immunity in damselflies and other insects across temporal and spatial scales. His recent research explores how seasonal plasticity and latitudinal gradients affect species resilience to future climate conditions.

A/Prof. Kristal Cain – University of Auckland

Chasing birds and shiny squirrels - an alternative path in academia

A/Prof. Cain is a Senior Lecturer in the School of Biological Sciences and an integrative organismal biologist. Her research investigates the eco-evolutionary pressures and physiological mechanisms mediating traits and behaviours important in social interactions. She focuses on testing long-standing assumptions in evolutionary biology and animal behaviour, with particular interest in sex differences, learning, competition, communication and parental care, primarily in wild birds.

Prof. Andrew Barron – Macquarie University

Why the honeybee is smarter than ChatGPT

Prof. Barron is Director of the Macquarie Minds and Intelligences Initiative and a neuroethologist studying the neural mechanisms of natural animal behaviour. His research focuses on insect cognition, particularly honeybees, using advanced techniques to understand fundamental behavioural systems such as navigation, social behaviour, learning and memory. He also researches bee health and welfare, investigating how bees and colonies are impacted by pesticide and disease stressors.

PROGRAM

Day 1: Tuesday 23 June		
8:00-8:15	Welcome to Country	
8:15-8:30	Conference Opening & House Keeping - Chair: Diane Colombelli-Négrel	
8:30-9:00	Upama Aich	Plenary 1: Sex and stress in a changing world – Chair: Bruno Buzatto
9:00-9:30	Kawsar Khan	Plenary 2: Behaviour ecology in the Anthropocene – Chair: Bruno Buzatto
Session 1: Cognition & Neuroethology - Chair: Chris Reid		
9:30-9:43	Anuja Joseph*	To See or Not to See: Do Decorations Influence Web Detection in Australian Stingless Bees?
9:43-9:56	Daniel M. Allman*	*Camponotus consobrinus* ants perform flexible self-protective behaviours consistent with "pain-like experience"
9:56-10:09	Vanessa Penna Goncalves	Unveiling Sexual Dimorphism in Spider Brains for the First Time
10:09-10:22	Wanzheng (Penny) Dong*	Hoverflies display locomotor activity changes and adaptation after dim light exposure at night
10:22-11:10	**MORNING TEA BREAK**	
Session 2: Global Change - Chair: Sarah Nicholas		
11:10-11:23	Sophia M. Love*	Trouble in Paradise? Platypus of the WET Tropics
11:23-11:36	Jing-Chia Guo*	Too hot to handle? The impact of high temperatures on nestling dehydration risk
11:36-11:49	Ashley Murray*	Post-fire grazing impact on an endangered habitat specialist: Is management required?
11:49-12:02	Karen Burke da Silva	Temperature thresholds for heat loss and avoidance behaviours in a specialist folivore
12:02-13:15	**LUNCH BREAK**	
13:15-14:15	**POSTER SESSION**	

Session 3: Behavioral Ecology and Conservation - Chair: Ajay Narendra

14:15-14:28	Arisha Silverlake*	Exploring the ontogeny of personality in little penguin chicks
14:28-14:41	Chenyue Yang*	Flexibility of nest-building behaviour in Superb Fairy-wren
14:41-14:54	Michelle Newman*	From Maps to Management: Species Distribution Models to Inform Dolphin Conservation in South Australia
14:54-15:07	Emma Vanderzon*	Investigating the influence of urbanisation and landscape characteristics on the presence and behaviour of oystercatchers
15:07-15:20	Oakleigh Wilson*	Surely There's An Easier Way: Reinvestigating Unsupervised Clustering For Behavioural Classification In Animal-Borne Accelerometry
15:20-15:33	Esha Shekar*	Intensity of Nest Defense of White-Winged Choughs (*Corcorax melanoramphos*) in Urban Versus Natural Habitats
15:33-16:30	**AFTERNOON TEA BREAK**	

Session 4: Foraging & Navigation - Chair: Yuri Ogawa

16:30-16:43	Pranav Joshi*	Form Meets Jump: Morphology-Kinematics Relationship in Australian Jumping Spiders
16:43-16:56	Martha M.M. Daniel*	Navigation in a three-dimensional marine landscape by wild mantis shrimp
16:56-17:09	Ajay Narendra	Touchdown Denied: How to deter flies from landing
17:09-17:22	Anna Seibel*	Home Among the Gum Trees: Visual Navigation in an Arboreal Jumping Spider
17:22-17:26	Noah Tan*	A novel approach to examining animal habitat selection in urban landscapes using Bluetooth low-energy beacons (LT)
17:26-19:15	*Social Event at the Tavern (Flinders University, Bedford Park)*	

LT indicates Lightning talk
** indicates student presenter*

Day 2: Wednesday 24 June		
8:30-9:30	Kristal Cain	Plenary 3: Chasing birds and shiny squirrels - an alternative path in academia – Chair: Chrissie Painting
Session 5: Communication & Sensory Ecology - Chair: Ondi Crino		
9:30-9:43	Edward Lawrence*	Evidence of learned recognition of heterospecific calls among mixed-species flock participants
9:43-9:56	Rahman Rasyidi*	Song-Sharing Networks Reveal Cultural Neighbourhoods in North Island Saddleback (*Philesturnus rufusater*)
9:56-10:09	Brendah Nyaguthii Nyagah*	Testing the dear enemy effect on a non-territorial group-living bird
10:09-10:22	Kamya Patel*	Sleepy singers: How does chronic sleep disturbance during a critical juvenile learning period affect bird song?
10:22-10:35	Maddison C. Randall*	How echolocation and navigation behaviour influence the morphology of the inner ears of bats
10:35-11:20	**MORNING TEA BREAK**	
Session 6: Communication & Sensory Ecology 2 - Chair: Ines Braga Goncalves		
11:20-11:33	Bronte Fairclough*	The Sound of Danger: an acoustic and behavioural analysis of alarm calling in koalas
11:33-11:46	Sebastian Hayden*	Can bulb mites use chemical cues to detect conspecifics and discriminate their kin?
11:46-11:59	Asser Loutfi*	Investigating the Mechanisms of Conflict Resolution during Collective Decision Making in Weaver Ants
11:59-12:12	Theresa Jones	Population variation in behavioural responses to artificial light at night
12:12-12:25	Sarah Nicholas	Target sensitivity in two classes of hoverfly descending neurons
12:25-13:30	**LUNCH BREAK**	

Session 7: Cognition & Neuroethology 2 - Chair: Ben Ashton

13:30-13:43	Aubrey R. Keirnan*	Evolutionary drivers of parrot neuroanatomy: Assessing the influence of phylogeny, behaviour, and ecological traits
13:43-13:56	Lee DeSouza*	Variation in associative and reversal learning across an urban gradient in sulphur-crested cockatoos (*Cacatua galerita*)
13:56-14:09	Lisa Fontana*	How cities shape behaviour: experimental evidence for innovation and social learning in wild cockatoos
14:09-14:22	Yazmin Rizk*	Investigating the repeatability of problem-solving performance in superb fairy-wrens, within and across contexts

14:22-14:35	Rob Boddington*	How Information Influences the Emergence and Persistence of Leadership in Animal Groups
14:35-14:48	Andrew Blunsden*	Social system predicts observational spatial memory performance in Australian magpies (**Gymnorhina tibicen**)
14:48-15:01	Tasmin Rymer	Do fawn-footed mosaic-tailed rats experience age-related cognitive decline in novel object recognition?
15:01-15:05	Rui Shi*	Factors influencing prey choice in spiders: the potential role of colour cues (LT)
15:05-15:09	Yuri Ogawa	Head orientation aligns before landing commitment in hoverflies (LT)
15:09-15:13	Karin Nordström	Sensorimotor transformation of optic flow (LT)
15:13-16:00	**AFTERNOON TEA BREAK**	
16:00-17:00	**WORKSHOPS**	
19:00	*Conference Dinner (Strathmore Hotel, Adelaide)*	

LT indicates Lightning talk
** indicates student presenter*

Day 3: Thursday 25 June		
8:30-9:30	Andy Barron	Plenary 4: Why the honey bee is smarter than ChatGPT – Chair: Karin Nordström
Session 8: Social Behaviours - Chair: Stephan Leu		
9:30-9:43	Julia Kovacs*	Fragmented melodies: The effects of habitat fragmentation on vocal culture and dispersal of the Korimako (*Anthornis melanura*)
9:43-9:56	Caitlin Nicholls*	Inter- and intraspecific variation in social structure among coastal dolphins in Australian waters
9:56-10:09	Xingyi Jiang*	Collective movement decisions in the multi-level society of superb fairy-wrens (*Malurus cyaneus*)
10:09-10:22	Samuele Ramellini*	Non-breeding sociality reduces territorial conflicts in the superb fairywren (*Malurus cyaneus*)
10:22-10:35	Kahurangi Cronin	Recognising Taonga with AI: Facial Recognition for Kākā Conservation Management
10:35-11:20	**MORNING TEA BREAK**	
Session 9: Social Behaviours 2 - Chair: Anastasia Shavrova		
11:20-11:33	Patricia Slattery*	Fancy facades and pigment preferences: are the colourful faces of male bees sexy?
11:33-11:46	Russell D. C. Bicknell	Exploring the complexity of crab claw behaviour and ecology
11:46-11:59	Chris R. Reid	Exploring mechanisms of cooperative prey transport and nest construction from weaver ants to robots and back again
11:59-12:12	Stephan Leu	Heat stress conditions alter disease transmission networks and drive population health outcomes
12:12-13:45	**LUNCH BREAK**	
12:45-13:45	**ASSAB AGM meeting**	
Session 10: Reproduction & Parental Care - Chair: Bruno Buzatto		
13:45-13:58	Michael G.C. Wakefield*	Nest camera insights on factors impacting the nesting success of Square-tailed Kites and Little Eagles
13:58-14:11	Anastasia Shavrova	Sexual conflict is mediated and potentially resolved by polyphenisms in bulb mites
14:11-14:24	Sneha Kumar*	High risk, high reward?: Male mate choice in polyphenic bulb mites
14:24-14:37	Incheol Shin*	Sperm precedence patterns and potential post-copulatory mate guarding in bulb mites

14:37-14:41	Emily Lynch*	The ideal female for picky mites! (LT)
14:41-14:45	Brendan C. Ebner	Does the eastern freshwater cod select for small or large cavities in which to spawn? (LT)
14:45-14:55	10min break	
Session 11: Physiology & Biomechanics - Chair: Matt Schwarz		
14:55-15:08	Noelia Calderon*	Scaling the jump: Sexual Dimorphism in Jump Kinematics in Peacock spider
15:08-15:21	Caitlin Dwyer*	Hot Summers, Cold Deaths: Moult Conditions and Winter Mortality in Superb Fairywrens
15:21-15:34	Jade Fountain*	Heart rate variability and behaviour in dogs during and after scent work
15:34-15:47	Pablo Recio	Hormonal mechanisms of pair bonding in a long-term monogamous reptile
15:47-16:00	Fiorella Ramirez-Esquivel	How does a bull ant sting?
16:00-16:45	**AFTERNOON TEA BREAK**	
16:45-17:15	**Prizes & Closing** - Chair: Diane Colombelli-Négrel	
17:15-19:15	*Social Event at the Tavern (Flinders University, Bedford Park)*	

LT indicates Lightning talk
** indicates student presenter*

POSTERS

Poster No.	Presenter	Title
1	Kai Ting Ng	Behavioural difference does not explain visual adaptation in nymphalid butterflies
2	Panduka D. Amarasekara*	Webbed woes and fearsome foes: a review of the natural enemies of mygalomorph and mesothelean spiders
3	Janet Klein*	How gut microbiome influences the foraging strategy & habitat use of a marsupial folivore, *Phascolarctos cynereus*
4	Alisha Lowe*	Dispersal of the Adelaide trapdoor spiderlings (*Blakistonia aurea*) to aid in conservation
5	Liying Nikki Chin*	BeeWare of the Wasp: Predator-Prey Interactions Between Two Native Hymenopterans
6	Charlotte Sutton*	The cognitive effects of early-life sleep disturbance in zebra finches (*Taeniopygia guttata*)
7	Hansani S. Daluwatta Galappaththige*	Putative intra-genus mimicry of Delias butterflies in Australia
8	Alicia Wollaston*	Temporal variation in Little Penguins' diet
9	Hannah McKennall*	Rakali in focus – Using baited camera traps to capture the presence and distribution of an under-researched Australian mammal
10	Joshua S. Martin*	Housing in a pinch: a range extension and use of galls in the pseudoscorpion genus, Aldabrinus
11	Lucy Southwell-Hambly*	Decoding the chemical variation in New Zealand's endemic giraffe weevil
12	Matthew Schwarz	Hoverfly looming neurons show stimulus-specific adaptation independent of response strength
13	Lucinda Hatswell*	Using animal-borne video to investigate foraging behaviour and habitat use of the Australian Sea Lion
14	Jerom Stocks	A multi-scale biotelemetry approach to inferring nesting behaviour from aquatic animal movement data
15	Rhiana Woods*	The role of constraints on the nest architecture of white-winged choughs (*Corcorax melanorhamphos*)
16	Kai Feng	Hierarchical Transformation of Navigational Variables into Coordinated Turning Behaviour
17	Braeden M. Thomson*	Examining links between early-life conditions, oxidative stress, and telomere length in the purple-crowned fairy-wren, *Malurus coronatus*

* *indicates student presenter*

GUIDELINES FOR PRESENTERS

FOR PRESENTERS - TALKS

Full Length talks: 12 minutes (10 mins + 2 min of Q & A)

Lightning talks: 3 mins (including Q & A)

Please bring your PowerPoint presentation with you to the conference on a USB device for uploading with the AV Team.

Speakers scheduled in Session 1, please upload your talks before the first Plenary session. Speakers scheduled in other sessions: please upload your talks during the break prior to your scheduled presentation time.

Please ensure that your presentation format is in 16:9. For Mac users, the presentation will be displayed on a Windows computer.

FOR PRESENTERS - POSTERS

The poster session is scheduled on Day 1 (13:30-14:30). Posters will be displayed in Alere (where we have lunches and tea breaks) for the entire duration of the conference.

Please place your poster on the assigned poster board labelled with your poster number. Posters can be removed during/after the last tea break on Day 3.

Posters should be in A0 size and portrait orientation.

WORKSHOPS

We are delighted to offer two workshops at the conference. Both workshops will run simultaneously.

WORKSHOP 1

Title: "So you want to study marine wildlife behaviour: building the research and the researcher"

Marine wildlife research is as much about the researcher as it is the research. This workshop will take participants behind the scenes of modern marine wildlife behavioural science, from traditional survey methods to drones, acoustics, and other emerging monitoring technologies. We will then turn to the practical side of building an early career in this space and hear from early-career researchers with experience across NGO, government, and academic settings.

Location: STH1

Note: while this workshop is focused on marine biology and wildlife, it is open to anyone who may be interested in understanding the practical side of building an early career

WORKSHOP 2

Title: ***"****From Field to Dashboard: Rapid Ecological Data Collection and Visualisation with Survey123"*

This one-hour workshop introduces ecologists and behavioural researchers to rapid field-data collection and visualisation workflows using ArcGIS Survey123 and ArcGIS Dashboards. Participants will learn how to design a mobile survey application for ecological field data collection, including species observations, behavioural records, habitat assessments, and spatially referenced field measurements for around the Flinders University campus. The workshop then demonstrates how submitted records can be viewed in real time through interactive dashboards and automatically summarised into formatted reports for monitoring, management, and research applications. Emphasis is placed on building efficient workflows that link field observations directly to spatial visualisation and automated reporting, reducing manual data handling while improving accessibility and communication of ecological data. The session is designed as a practical introduction suitable for researchers with limited prior GIS experience.

Location: STH2

Note: Please bring your own laptop. ArcGIS access will be provided to those attending the workshop for the duration of the conference.

ART DISPLAY

All conference participants are warmly invited to take part in this year's Art Display Competition.

Artwork may include photographs, illustrations, sketches, or other creative works inspired by animals, plants, ecology, and behaviour. Display tables and poster boards will be provided, and artworks will be exhibited for the full duration of the conference alongside the scientific posters.

Entries are limited to one artwork.

Expression of interest

To participate, please email diane.colombelli-negrel@flinders.edu.au by **12th of June** with:

- confirmation that you would like to participate, and
- the type of artwork you will be displaying (e.g. photograph, illustration).

Artwork requirements

- Please bring your artwork printed and ready for display.
- For photographic entries, the print size should be **A4.**
- Please clearly write your name on the back of your artwork.

All artwork entries must be delivered to the registration desk and displayed before lunch on Day 1 of the conference.

Conference attendees will have the opportunity to vote for their favourite artwork in each category throughout the event.

ABSTRACTS

Camponotus consobrinus ants perform flexible self-protective behaviours consistent with "pain-like experience"

Daniel M. Allman; Kate E. Lynch; Thomas E. White
The University of Sydney

A key line of evidence for invertebrate sentience—first-person, valenced sensations—is the ability to identify and protect bodily sites of injury; behaviours called flexible self-protection. Although well documented in cephalopods and decapods, quantitative accounts of self-protective behaviours in insects exist for three species: bumblebees, house crickets, and American cockroaches. Our study adds to this understanding by investigating intraspecific differences in the self-protective behaviours of the polymorphic ant, *Camponotus consobrinus*. We applied a 55°C heated probe to the antenna of forager and soldier caste ants (n = 32 per caste) and explored how antennal grooming frequency and duration changed compared to procedural control and a control conditions. Treatment ants allocated a greater proportion of grooming effort towards sites of stimulation, while procedural and control ants divided their attention equally between antennae. Furthermore, soldiers displayed a greater amount of effort in terms of grooming than foragers, signalling intraspecific differences. We compare these results to quantitative and qualitative reports of similar behaviours in other insects and invertebrates more broadly. Understanding such behaviours within insects remains a priority as we continue to investigate invertebrate sentience, especially as we continue to rely on these animals as a solution to global challenges like sustainable agriculture.

Webbed woes and fearsome foes: a review of the natural enemies of mygalomorph and mesothelean spiders

Panduka D. Amarasekara; Joshua S.T. Lenton; Bruno A. Buzatto
Flinders University

Antagonistic interactions between organisms and their natural enemies form vital ecological links, which can inform on the conservation of both organisms. The Mygalomorphae and Mesothelae represent lineages of spiders with shared traits, including fossoriality, sessility, and poor dispersal abilities. Mygalomorphs include tarantulas, funnel webs, and trapdoor spiders, while Mesothelae are remarkable for retaining abdominal segmentation, and are ecologically similar to trapdoor spiders. Knowledge of spider natural history is focused on the highly diverse Araneomorphae, with far less research on mygalomorphs and the Mesothelae. To address this, we systematically review the literature and report new data on interactions between mygalomorph and mesothelean spiders and their animal natural enemies. We recovered more than 550 interactions, of which more than 200 taxa were identified to species level and directly observed in the field. Natural enemies were categorised into predators (65), parasites (107), and parasitoids (385), which were represented overwhelmingly by pompilids. Network analyses between parasitoids and spiders highlighted considerable taxonomic variability of host specialisation across parasitoids of spiders. We provide the most comprehensive summary to

date of natural predators for two lineages of comparatively understudied spiders, generating ecological data that can be applied to a myriad of contexts.

Exploring the complexity of crab claw behaviour and ecology

Russell Bicknell; Joanna Wolfe; John Flynn; Melanie Hopkins
Flinders University; American Museum of Natural History

Brachyuran crustaceans are arguably the most iconic marine arthropods, representing important examples of carcinization and convergent evolution. A striking feature of brachyurans are their anterior clawed appendages—chelipeds. These structures showcase a large diversity of morphologies that reflect shifts in ecology, biology, and overall multifunctionality. Despite the well-documented nature of these claws, a comprehensive assessment of appendage functional morphology within phylogenetic and ecological trait contexts is wanting. By combining 3D geometric morphometrics, finite element analyses, multilocus molecular phylogeny and ecological factors for 80 crab species, including three fossil forms, we reveal a complex evolutionary history for crab chelipeds. In doing so, we explore how certain forms are optimised for shell crushing and that deviations from this morphofunctional space highlight shifts into derived appendages morphologies influenced by sexual selection and the diversification of ecological life modes. Trade-offs in functionality and marked shifts in crab ecology are uncovered and novel insights into the complex multifunctionality of these highly modifiable appendages is revealed.

Social system predicts observational spatial memory performance in Australian magpies (*_Gymnorhina tibicen_*)

Andrew Blunsden; Benjamin Ashton; Simon Griffith; Inês Braga Gonçalves; Grace Blackburn; Ken Cheng
Macquarie University

The origin of differences in cognitive abilities between animals remains a contentious topic in current biology. The social intelligence hypothesis (SIH) postulates that the informational challenges of social life select for greater cognitive abilities, yet conflicting evidence suggests that ecological challenges may instead shape advanced cognitive abilities. However, previous comparative studies often relied on indirect proxies of cognitive abilities, and/or were confounded by phylogenetic, ecological or captive effects. Thus, a study was conducted to directly compare the performance of two Australian magpie (*Gymnorhina tibicen*) subspecies in a socio-cognitive task: the cooperatively-breeding G. t. dorsalis, which lives in large social groups, and *G. t. tibicen*, where breeding groups consist of only a bonded pair. Here, the more socially-complex subspecies G. t. dorsalis performed significantly better on the task than *G. t. tibicen*—a relationship that remained when controlling for group size. Although systematic differences in training and the effect of natal group size could not be ruled out as contributing factors, these results provide tentative evidence in favour of the SIH and that cooperative breeding—not just group size—may select for greater cognitive ability. This relationship holds implications for the evolution of greater intelligence in animals, including our own.

How Information Influences the Emergence and Persistence of Leadership in Animal Groups

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Over time, leadership in animal groups is expected to become established. This can by driven by information, with successful leaders gaining greater access to foraging opportunities through learning environmental information which can increase their propensity to lead again. However, social information from leaders can be learnt by followers, which, in turn, could increase the likelihood of followers occupying leadership positions. To explore the role of learnt information in leadership dynamics, we trained 20 groups of naïve ten three-spined sticklebacks (*Gasterosteus aculeatus*) to associate one of two stimuli with a food reward over ten presentations. The rewarding stimulus was then reversed, and groups were exposed to an additional ten presentations. Fish learnt which stimuli were rewarded, albeit with a colour and side bias. Leaders during the collective decision were more likely to be faster, reach the stimulus first and consume food rewards. The identity of leaders and those that reached the rewarded stimulus, and consumed the food reward, showed low repeatability across trials with competition for spatial positions within groups increasing with trial number. These findings suggest that learnt information can disrupt the establishment of consistent leader-follower roles, promoting egalitarian decision-making over time, possible driven by social learning.

Temperature thresholds for heat loss and avoidance behaviours in a specialist folivore

Natasha Wilczek; Julian Beaman; Kieren Beaumont; Claire Moore,
Carmen da Silva, **Karen Burke da Silva**
Flinders University; Macquarie university

Understanding how endotherms thermoregulate under changing environmental conditions is crucial for predicting species resilience to climate warming. This study investigates the thermoregulatory behaviour of koalas, Phascolarctos cinereus, across a gradient of ambient temperatures, focusing on postural adjustments and microhabitat selection. Our findings reveal an ordered deployment of behavioural strategies, including postural changes that favour increased convective heat dissipation, tree-hugging, and shade-seeking in non-feed trees, that closely align with physiological thresholds derived from laboratory and biophysical models. Notably, koalas appear to rely on low-cost behavioural mechanisms (e.g. postural adjustments) within the thermoneutral zone before adopting more energetically and water-expensive behaviours at higher temperatures. The deployment of these strategies reflects both evolved trade-offs and individual adaptive capacity, balancing hydration, energy expenditure, and predation risk, and highlights the importance of microclimatic variation, habitat structure, and behavioural flexibility. Our work underscores the need to incorporate mechanistic thermoregulatory traits, plasticity, and population-specific variation into predictive models and conservation planning to better mitigate climate-related risks to koala populations under warming scenarios.

Scaling the jump: Sexual Dimorphism in Jump Kinematics in Peacock spider

Noelia Calderon; Pranav Joshi; Dinesh Rao; Ajay Narendra
Macquarie University

Animals use a wide range of locomotory modes - walking, flying, gliding, crawling, swimming and jumping - to reach places of significance. Jumping is considered an extreme form of locomotion because it requires rapid, high-power bursts of forces that push an animal's sensory systems and biomechanical systems to their limits. While most jumping animals rely on muscles or spring-loaded mechanisms, jumping spiders (Salticidae) rely on a semi-hydraulic system because they lack muscles to powerfully extend their legs. Peacock spiders, both males and females, are known for executing precise locomotory jumps to cross small gaps. In this study we aimed to identify the jump kinematics required to cross gaps of varied distances between 4-12cm in *Maratus griseus*. Using high speed videography, we captured take-off and landing sequences and analysed the footage frame-by-frame to quantify the power and kinematic modifications required to jump different distances. We will present how male and female spiders modulate their jump mechanics to cross gaps that are 8-24 times their own body length.

BeeWare of the Wasp: Predator-Prey Interactions Between Two Native Hymenopterans

Liying Nikki Chin; Dinesh Rao; Ajay Narendra
Macquarie University

Predation is one of the most widespread behavioural strategies animals use to obtain food, encompassing a diverse range of tactics such as ambush, stalking, luring, and cooperative hunting. Among these, active pursuit predation is characterised by continuous, real-time interactions between predator and prey, involving tracking, planning, anticipating, trajectory adjustment, rapid chase manoeuvres, and final capture. Identifying the rules underlying active pursuit in natural environments thus remains challenging. Native Australian sand wasps (*Bembix musca*) provide a unique opportunity to study predator-prey interactions since they are known to capture stingless bees (*Tetragonula carbonaria*) at hive entrances. However, the choreography of wasp attacks or bee escapes have never been studied. In this study, we aim to characterise the hunting choreography of wasps under natural conditions. We will achieve this by filming successful wasp attacks using two synchronised high-speed cameras in the field, and carrying out a frame-by-frame analyses to reconstruct 3D trajectories of both wasp and bee. This will enable us to quantify the predator-prey interactions between these two hymenopterans in 3D-environments, and contribute to the understanding of active, and possibly selective, pursuit predation in natural environments.

Recognising Taonga with AI: Facial Recognition for Kākā Conservation Management

Kahurangi Cronin
Victoria University of Wellington Te Herenga Waka

The conservation of taonga species in Aotearoa requires approaches that honour both ecological complexity and cultural responsibility. This project explores the use of AI-based facial recognition technology to support long-term monitoring of kākā (Nestor meridionalis), while ensuring that

Māori knowledge systems (mātauranga Māori) and The Treaty of Waitangi (New Zealand's 1840 founding agreement between Māori leaders and the British Crown that guides shared governance and protects Māori interests) principles remain central to its design and implementation. A formal meeting was held at Te Tumu Herenga Waka Marae (Victoria University of Wellington, New Zealand) brought together indigenous representatives, conservation practitioners, researchers, and council partners to shape the project from its earliest stages. Key themes included the need to clearly articulate why AI is being used, the importance of ongoing partnership with Māori, the evolving role of mātauranga Māori in modern conservation practice, and critical questions of data sovereignty, ownership, and access. Participants emphasised that technology must serve relationships between people, place, and species rather than override them. The meeting established a foundation for co-design, culturally informed decision making, and started a conversation around the transparency of how the governance of data and AI models should be used during the project and afterward the project is over. This presentation shares these insights and aims to highlight ways for emerging technologies to incorporate Indigenous knowledge systems in ways that improve environmental stewardship and strengthen future conservation practices.

Putative intra-genus mimicry of Delias butterflies in Australia

Hansani Dalwautta; Mariella Herberstein
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Australia has ten Delias species, and several of these species co-occur in their geographic range. Delias species are phenotypically similar, requiring a detailed examination of small wing features to determine the exact species. The geographic overlap and phenotypic similarity make Delias an excellent case study in butterfly mimicry, which has not been tested to date. To determine possible mimicry patterns of Delias species in Australia, a qualitative and quantitative assessment of morphological features on the Delias wings was conducted. For this, the ventral sides of the male and female Delias museum specimens were photographed (with scale). Then, a qualitative assessment of some morphological features on the wings, such as the presence or absence of apical spots and the apical band, and their colour, was scored. For the quantitative approach, the area of important morphological elements on the wings was measured. Then, a similarity score composite was calculated to identify potential mimicry pairs, which were then confirmed by overlapping ranges. A phylogenetic analysis was conducted using COI DNA sequences to assess relatedness among species. The results suggest at least two species pairs that are likely to be intra-genus mimics. We also propose that some pairs were likely mimics based on common ancestry, while others may have undergone signal convergence. Future questions include how predators (birds) might perceive these putative mimics.

Navigation in a three-dimensional marine landscape by wild mantis shrimp

Martha M. M. Daniel; Matteo Santon; Martin J. How; Ajay Narendra
Macquarie University; University of Bristol

Central place foragers, such as smasher-type mantis shrimp (Stomatopoda), must return to their home burrows after a foraging journey. However, most stomatopod behaviors have been studied under laboratory conditions, in simplistic arenas with limited natural context. Here, we studied

peacock mantis shrimp (*Odontodactylus scyllarus*) in the wild, off Kuredu Island, Maldives, to describe their foraging and navigation behaviors. For this purpose, we developed a new methodology in which two SCUBA divers each followed individual mantis shrimp with a GoPro camera, maintaining low profiles to minimize disturbances to the animals. We also collected swim-over footage of the reef with a bespoke photogrammetry rig, to reconstruct the 100m2 habitat in three-dimensions. The routes taken by stomatopods were manually tracked into the 3D model. In total, we collected 20 hours of footage, encompassing 121 excursions, of four individuals navigating their shared reef habitat. The trajectories of these individuals provide a first glimpse into spatial use by stomatopods in a 3D marinescape, including overlap in trip ranges of individuals. Our footage also captures the intricate behavioral repertoires of these mantis shrimp, including competitive interactions and courtship. The results of this study establish a foundational dataset describing both the behaviors and spatial knowledge of peacock mantis shrimp in their wild habitat.

Variation in associative and reversal learning across an urban gradient in sulphur-crested cockatoos (*Cacatua galerita*)

Lee DeSouza; Lucy Aplin; Lara Blumenstiel; Sofia Bolcato
Australian National University

Urbanisation poses a major ecological threat worldwide, yet some species thrive in cities. Understanding the mechanisms behind urban adaptation is pivotal to improving biodiversity in cities and managing human-wildlife conflict. Complex cognition is found in many urban adaptors and facilitates behavioural innovations, allowing animals to exploit novel opportunities. However, to date little work has been done on the underlying cognitive processes which facilitate these innovations. Here, we measure two fundamental cognitive processes, associative and reversal learning, in sulphur-crested cockatoos across an urban gradient using a three-stage reversal learning task on a touchscreen puzzle-box. Building on previous research, we examine performance at the individual and population level across four sites and compare performance to habitat use, quantified by movement tracking with Bluetooth Low Energy tags. We focus on two environmental metrics known to affect innovation rates: urbanisation and environmental heterogeneity, quantifying these at high resolution using a composite metric of environmental features. This research will improve understanding of how environment and cognition interact to facilitate urban adaptation in birds.

Hoverflies display locomotor activity changes and adaptation after dim light exposure at night

Wanzheng (Penny) Dong; Sarah Nicholas; Yuri Ogawa; Hannah Scott; Karin Nordström
Flinders University

Eristalis tenax are diurnal hoverflies, found across the globe, including in urban areas, which are often exposed to artificial light at night (ALAN). To investigate the effect ALAN may have on hoverflies, we compared flies that were kept in darkness at night (control) to flies that were exposed to dim light conditions (exposed), corresponding to the light intensities of suburban streets. During the 12 h day the two groups were subjected to the same light conditions. We found the female hoverflies that were exposed to dim light from third instar had a significantly reduced

life span, but male survival was not affected. We next measured the acute effects of ALAN using a Locomotor Activity Monitoring System (LAMS), where their movements were quantified over approx. 48 hours. We found that flies from the control group were significantly more active in the first night and less active in the first day, compared to the control flies. Conversely in the second night and day, the flies no longer displayed significant activity differences between conditions. We suggest that hoverfly sleep is disrupted by light pollution at night, however, while they adapt their locomotor activity remarkably quickly, survival is affected adversely. This is important as hoverflies are valuable alternative pollinators.

Hot Summers, Cold Deaths: Moult Conditions and Winter Mortality in Superb Fairywrens

Caitlin Dwyer; Franziska Hacker; Samuele Ramellini; Damien Farine
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Moult is an energetically costly process timed to avoid overlap with resource-limited life stages such as breeding, migration, and winter. Because body feathers are not replaced outside of moult, insulation declines between moults as feather density and length decrease. For most species, primary moult ends in autumn, meaning warm conditions during moult may create a trade-off between current overheating and future hypothermia. We investigate this trade-off as a possible mechanism for increasing winter mortality in a superb fairywren (*Malurus cyaneus*) population at the Australian National Botanic Gardens (Canberra). Winter mortality in this population is associated with hotter preceding summers and warm periods prior to cold snaps, which suggests a maladaptive long- to mid-term acclimation pathway. We will quantify feather density and morphology from museum specimens, and pair results with climatic reconstructions using NicheMapR Microclimate Hindcaster. This data will be compared to modelled optimal plumage under varying climates using the NicheMapR endotherm model. We expect that warm autumns will reduce the maximum feather density produced in moult while warm winter periods will exacerbate feather loss and wear. If true, the results may inform the current understanding of moult dynamics and bird population responses to climate change.

Does the eastern freshwater cod select for small or large cavities in which to spawn?

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Parental caring fishes that spawn on hard substrata commonly select interstices or cavities in which to nest. To examine nesting microhabitat preferences of adult eastern freshwater cod Maccullochella ikei (3 males and 3 females per pond), we deployed six nest boxes [alternating between low (27.5 cm) and high (55 cm) cavity dimensions] within each of six earthen ponds. Each nest box had a single opening facing away from the bank. In total, twelve fertilised spawns were detected across four of the ponds. Spawning occurred five times more often in low than high cavities. However, these results should be interpreted with caution for reasons that will be discussed. We encourage the ongoing refinement of nest box design for eastern freshwater cod and other Australian freshwater cod species based on experimentation in captivity associated with fingerling production. However, real world recovery of these cavity-spawning species also requires appreciating societal and ecological nuances in the catchments where these fishes once flourished.

The Sound of Danger: an acoustic and behavioural analysis of alarm calling in koalas

Bronte Fairclough; Karen Burke da Silva; Diane Colombelli-Négrel; Julian Beaman
Flinders University

The traditional dichotomy of social species and solitary species is outdated. Solitary species exhibit a diverse array of social structures which are partially defined by their communication systems. As a solitary marsupial, the koala's (*Phascolarctos cinereus*) social interactions have long been studied purely through the lens of breeding or agonistic encounters. However, anecdotal reports and field observations consistently note a distinct "bleat" vocalisation during human-induced interactions, primarily upon sighting of humans or during capture. The presence of a potential alarm call in their vocal repertoire hints at a hidden social complexity. To confirm this and determine its potential to encode individual information (and thus convey messages towards conspecifics), our study characterises the acoustic properties of the koala bleat, with a focus on temporal and frequency features. Defining the acoustic profile and functional context of the bleat enhances our understanding of koala communication and contributes to the broader field of marsupial vocal ecology. A clearer understanding of how koalas vocalise under stress can inform best-practice protocols for behavioural observations and capture, ensuring that scientific and conservation activities minimise distress and prioritise the wellbeing of this iconic species.

Hierarchical Transformation of Navigational Variables into Coordinated Turning Behaviour

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University of Queensland; Champalimaud Foundation; Julius-Maximilians-University of Würzburg; NYU Grossman School of Medicine

The transformation of navigational variables into coordinated motor actions is a fundamental requirement for autonomous agency. The circuit and control mechanisms that underline this transformation are not well understood. Here, we combine connectomics, neuronal activity perturbations, functional imaging and electrophysiology to identify a central steering circuit in Drosophila. This steering circuit operates in both goal-directed navigation and exploratory search and controls both walking and flying turns. We show that this circuit implements a hierarchical, stepwise transformation from navigation-related signals to motor output. One key input arises from the central complex neuron ExR7, whose activity is modulated by the reliability of the fly's internal heading estimate and promotes exploratory turning when this estimate deteriorates, providing a mechanism for uncertainty-driven behavioural adaptation. At the top of the hierarchy, reciprocally connected DNa03 and LAL013 neurons play complementary roles: DNa03 integrates lateralized sensory and internal information to generate an effector-agnostic steering signal during goal-directed navigation, whereas LAL013 is modulated by ExR7 and other bilateral inputs, promoting exploratory turning. Both pathways provide input to an overlapping set of descending neurons innervating leg or wing motor circuits. Among those, DNa11 targets leg motor circuits directly as well as indirectly through subordinate descending neurons. DNa11 activation

coordinately changes the stepping directions of all six legs to generate rapid saccadic turns. Together, our results reveal a hierarchical circuit architecture that transforms navigational variables into abstract steering representations and ultimately into motor commands, providing a general framework for flexible control of behaviour across contexts and motor systems.

How cities shape behaviour: experimental evidence for innovation and social learning in wild cockatoos

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The detrimental effects of urbanisation on wildlife are well documented. Yet, not all species respond negatively, some appear to benefit from it. As a response to urbanisation, some species have developed innovative solutions to better cope with daily challenges, which can spread through social learning and potentially persist across generations as cultural traits. The emergence and spread of these behaviours depend on social dynamics, ecological conditions, the structure of social networks, and are generally associated with advanced cognition. However, experimental evidence for these processes in natural populations remains scarce. Here, we address this gap through a series of field experiments using puzzle-boxes in wild sulphur-crested cockatoos (*Cacatua galerita*), a successful urban dweller. First, we investigate the social and ecological drivers of innovation across the urban matrix. We then examine the mechanisms underlying social learning within groups using a two-action-control task. Finally, we test how innovations spread across the broader landscape and explore the socio-ecological factors shaping this diffusion. Together, these experiments provide some of the first experimental evidence for how innovations rise and spread in wild populations navigating an urbanising world.

Heart rate variability and behaviour in dogs during and after scent work

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Scent work is a scent-based activity for companion dogs which is increasingly popular as a cognitively stimulating and engaging activity. Many dog trainers believe scent work tasks are good for dogs, however studies into the effects of scent work on canine arousal and emotional valence remain limited. We conducted a within-subjects study ($N = 21$), assessing heart rate variability and behaviour during scent work compared with a control condition. Heart rate increased during both the search and control conditions compared to baseline ($p < .001$), with significantly higher values during the search task compared to the control ($p < .001$). There were no differences in heart rate variability measures between conditions. Tail carriage was high for significantly longer during search than control ($p = 0.013$), with no observation of stress-related behaviour during the search. Scent work in dogs is likely to be associated with increased arousal and activation of the sympathetic nervous system. Heart rate did not decrease during scent activities as has been proposed anecdotally. Further research is necessary to determine if scent work is also associated with positive valence.

Unveiling Sexual Dimorphism in Spider Brains for the First Time

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Brain size and organisation can shift in response to ecological pressures such as foraging strategy, exposure to novelty, social structure, and sex. Spiders show strong sexual dimorphism in morphology, behaviour, and life history. Males are typically smaller than females and often differ in colouration and body shape. At the final moult, males develop copulatory organs on the pedipalps for sperm transfer. Behaviour also changes after maturation: males reduce or cease feeding and reallocate effort to locating mates. We used microCT to compare relative brain volume in wild-caught male (n = 10) and female (n = 15) social huntsman spiders, Delena cancerides. To our knowledge, this is the first study to examine sexual dimorphism in spider brains. Females were 1.6 times heavier than males. Brain organisation (major neuropils) was broadly similar between sexes, but males had a smaller relative brain volume. Preliminary analyses suggest male-biased positive allometry for visual neuropils, implying greater proportional investment in visual processing than females. This may reflect the importance of visual cues for mate searching, courtship, or male–male competition. In females, comparatively larger higher-order centres (arcuate body and mushroom bodies) may indicate greater cognitive and sensory demands linked to maternal or social behaviour.

Too hot to handle? The impact of high temperatures on nestling dehydration risk

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Global warming exacerbates thermoregulatory challenges in endotherms, especially in nestling birds because of their confinement to the nest and high energy demands for growth. Heat dissipation increases water loss, which can lead to dehydration, thereby impairing physiological functions. Understanding nestling responses to heat exposure is essential for predicting species' capacity to adapt to climate warming. However, the effect of high temperatures on hydration level remains largely unknown, especially in hot and humid conditions where evaporative heat loss is compromised. We address this in purple-crowned fairy-wrens (*Malurus coronatus coronatus*), a small songbird inhabiting riparian vegetation lining waterways of the monsoonal tropical savannah of northwest Australia. Nestlings in this species are sensitive to hot conditions, as these are known to affect their body condition and DNA integrity, thereby reducing survival to recruitment and their breeding lifespan. However, the mechanisms underlying this heat sensitivity are unknown. Here, we use hematocrit as an indicator of hydration status, in 946 nestlings to assess the impact of high temperatures in conditions of low and high water availability, controlling for confounding effects such as parental provisioning. We discuss our results in the context of how hot and humid environments might impact endotherm behaviour, growth and survival.

Using animal-borne video to investigate foraging behaviour and habitat use of the Australian Sea Lion

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Flinders University; South Australian Research and Development Institute (SARDI); Australian Sea Lion Recovery Foundation; Deakin University

The Australian sea lion (*Neophoca cinerea*) is a unique, benthic, marine predator, found on the coast of Southern and Western Australia. The species has declined by over 60% in the last 40 years, resulting in Australia's only endemic pinniped now being listed as endangered. Due to the nature of their foraging style, the species has traditionally been challenging to study, with many knowledge gaps still present when it comes to their habitat, behaviour and diet. This study will employ the novel technique of animal-borne video to expand upon what is known of the underwater lives of sea lions, exploring key habitats and foraging behaviours of the species. Focussing on the South Australian population, high-definition colour video, time-depth recorders, satellite-linked GPS loggers and triaxial accelerometer/magnetometers will be deployed to expand upon the limited data already available. This will allow detailed information on habitat use, predation tactics, foraging behaviours, and intra- and inter- species interactions (including fished species) to be recorded. This data will provide critical knowledge to guide improved management actions and future conservation initiatives for Australian sea lions.

Can bulb mites use chemical cues to detect conspecifics and discriminate their kin?

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Group-living can provide benefits such as foraging efficiency, increased mating opportunities, and reduced predation risk. However, these benefits may be offset by increased mate competition, and aggregation decisions may depend on context and individual strategy, with some individuals gaining additional benefits by aggregating with kin and increasing inclusive fitness. We tested whether the bulb mite *Rhizoglyphus echinopus* can use chemical cues to detect and move towards conspecifics, and distinguish between kin and non-kin cues. We also investigated sex-specific differences in the propensity of these aggregation behaviours. Experimental arenas contained zones conditioned with chemical cues from (a) full-siblings of the focal mite, (b) unrelated individuals, and (c) distilled water (control). Focal mites (n = 50; 26 females, 24 males) were observed for eight hours during the experiment. We predicted females would interact more with cues from relatives (gaining benefits via the selfish herd and unselfish swarm), while males would interact more with cues from non-relatives (gaining benefits through reduced kin competition and inbreeding avoidance). We found mites were able to use chemical cues to detect conspecifics. Contrary to our expectations, both sexes spent more time on zones containing unrelated chemical cues, but males showed stronger discrimination for those cues.

Collective movement decisions in the multi-level society of superb fairy-wrens (*Malurus cyaneus*)

Xingyi Jiang; Samuele Ramellini; Damien Farine
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Reaping the benefits of group living depends on group members remaining cohesive, which requires making collective decisions about when and where to move. It is now well established that shared decision-making is widespread across group-living species, and individuals can vary substantially in their influence on group decisions. However, groups may also coordinate their actions with other groups, particularly in multilevel societies (MLSs). Yet the relative contribution of different group members to movement decisions when in the presence of other groups remains unknown. Here, we quantify how superb fairywrens (*Malurus cyaneus*) make collective decisions during cohesive movements. Based on 1,218 movement initiations from 112 individuals, we found that female initiators were generally more likely to recruit at least one follower. During multi-unit movements, individuals preferentially followed initiators from their own unit, with individuals from different units joined later than same-unit members. We also found that distance to each unit's core breeding area also impacted leadership, with individuals being more likely to initiate when the group was closer to this area. Our results reveal that collective decision-making in MLSs is structured hierarchically according to unit membership, and influenced by spatial familiarity, providing novel insights into decision-making patterns in complex animal societies.

Population variation in behavioural responses to artificial light at night

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The University of Melbourne

Artificial light at night (ALAN) is a chronic anthropogenic stressor, with a range of behavioural and physiological consequences on animals. However, little is known about the specific role of historic or current lighting environment on behavioural responses to ALAN. Here, we explored the behavioural responses of five populations of black field crickets, *Teleogryllus commodus*, with varying degrees of ALAN exposure. F0 crickets were collected across Victoria, Australia and reared under common garden conditions for two generations. After eclosion to adulthood, to test the impacts of historic ALAN exposure, all individuals were tested for their responses to advertisement calls in the presence or absence of an artificial light source, after which, individuals were placed back under dark-at-night or exposed to ALAN. Ten days after the first round of testing, to test the impacts of current ALAN exposure, all individuals underwent a second round of testing. Following this, all crickets were videoed under ALAN for 24 hours. Movement towards advertisement calls was influenced by an interaction between sex, historic and current lighting exposure. However, typically crickets from historic ALAN populations were slower to initiate movement, potentially indicating less attraction or adaptation to ALAN. There were also considerable population differences in life-history traits.

To See or Not to See: Do Decorations Influence Web Detection in Australian Stingless Bees?

Anuja Joseph; Dinesh Rao; Ajay Narendra
Macquarie University

Animals frequently encounter various obstacles while navigating to a food source or returning home and must constantly make decisions to detect, detour or avoid obstacles that may otherwise be fatal. Spider webs are among the most common, yet often inconspicuous obstacles for flying insects. Interestingly, the St Andrew's Cross Spider, *Argiope keyserlingi* often adds prominent, dense UV reflecting silk decorations in the hub of its orb web. The functional significance of these decorations remains debated with hypotheses supporting prey attraction, anti-predation, web stabilization, thermoregulation or stress responses, although several studies suggest that they act as deceptive signals to attract insect prey. Here we investigated how the Australian native stingless bee *Tetragonula carbonaria*, responds to decorated vs undecorated web regions enroute to a food source. We trained the bees to navigate a 1.5 m- long flight tunnel to reach a feeder at the end. We then placed decorated or undecorated webs at 80 cm from the tunnel entrance. We filmed their flights from above with a high-speed camera at 250 fps, tracked individual bee positions and analysed flight dynamics. Here, we show how bees interact with these webs en route to a goal and discuss our findings based on the bee's visual system.

Form Meets Jump: Morphology-Kinematics Relationship in Australian Jumping Spiders

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Jumping spiders (Family: Salticidae) exhibit remarkable morphological variation and also occupy diverse microhabitats. These animals rely on a semi-hydraulic system to produce fast and controlled jumps used in predation, escape, courtship, and navigation. How variation in morphology and habitat occupancy influences jump performance remains poorly understood. In this study, we will examine how variation in morphology and the habitats animals use affect jump dynamics across multiple Australian salticid genera. Morphological variation and centre of mass were determined by scanning specimens with micro-computed tomography (µCT) and performing 3D reconstructions. Using a high-speed video camera, we recorded locomotory jumps at 3000-5000 frames per second and carried out frame-by-frame analyses to measure key kinematic variables such as take-off velocity and acceleration. Here, we will show how morphology and microhabitat influence jump performance in Australian jumping spiders.

Evolutionary drivers of parrot neuroanatomy: Assessing the influence of phylogeny, behaviour, and ecological traits

Aubrey Keirnan; Sara Citron; Andrew Iwaniuk; Vera Weisbecker
Flinders University

Parrots (Order: Psittaciformes) are known for their sophisticated behavioural repertoires, including advanced problem-solving, social learning, and complex vocal communication,

supported by relative brain sizes that rival those of primates. While studies have broadly linked various cognitive, behavioural, and ecological traits to differences in avian neuroanatomy, few studies have focussed on how these behavioural demands have shaped the proportions of individual brain regions across the parrot order. Here, we use a sample of 97 species, ranging from large macaws and kea to the tiny pygmy parrots, representing roughly a quarter of all psittaciform diversity. We use µCT-based endocast reconstructions to quantify whole-brain and region-specific scaling patterns through phylogenetically informed residuals. We then compare relative region sizes with qualitative and quantitative behavioural and ecological traits. Our preliminary findings show that shared ancestry explains much of the common brain morphology observed across clades but also indicate instances of morphological and behavioural convergence between distantly related species. Multivariate models further reveal that variation in several brain regions is associated with diet-linked foraging strategies, habitat use, and degrees of behavioural and ecological specialisation.

How gut microbiome influences the foraging strategy & habitat use of a marsupial folivore, *Phascolarctos cynereus*

Janet Klein; Elizabeth Dinsdale; Karen Burke da Silva
Flinders University

Koalas are specialised folivores that rely almost exclusively on a narrow suite of eucalypt species, making their movement patterns and habitat use tightly linked to the distribution, nutritional quality and accessibility of these trees. Koalas have been observed having both strong intra and inter specific tree preferences, with this dietary separation responding to variable leaf chemistry. Yet the koala exists in habitat where eucalypt leaf chemistry itself varies across the landscape and within species. Utilising microbial fermentation of leaf cells by symbiotic micro-organisms in a structurally adapted hindgut, this relationship is likely critical for the koala's ability to metabolise a challenging diet. The characteristics of the koala gut microbiome, how it varies within and between populations, how it determines its dietary preferences and therefore determines a koala's foraging strategy are scantly known and are not available for populations of koala in South Australia. By integrating optimal foraging theory with high-resolution spatial data and leaf chemical analysis in the contrasting habitats of two populations of koala in the remnant forest of Belair National Park and eucalyptus plantations on Kangaroo Island, this study provides a comprehensive explanation of koala movement and diet selectivity, generating a fine scale palatability map.

Fragmented melodies: The effects of habitat fragmentation on vocal culture and dispersal of the Korimako (*Anthornis melanura*)

Julia Kovacs; Dianne Brunton; Michelle Roper; Kristal Cain
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Animal culture is increasingly recognized for its role in population resilience and adaptability. In passerines, vocal culture facilitates information flow and reproduction. Globally, habitat fragmentation affects bird populations, yet its cultural impacts remain underexplored. Fragmentation can drive cultural drift, reduce song diversity, and alter transmission pathways. Our study examines movement and vocal culture of the Korimako (*Anthornis melanura*) in

Tawharanui Regional Park, a mosaic of forest patches ideal for studying small-scale fragmentation effects. We: (1) track movements of banded individuals within and between patches; (2) record male and female songs to assess spatial variation; (3) measure morphological traits to detect habitat-linked clustering; and (4) conduct a cultural transmission experiment to test the uptake of a new song variant. Preliminary results suggest both sexes move between patches, with higher dispersal probability in females. Distinct male and female song variants occur in marginal habitats with high edge proportion. Morphological clustering indicates heavier birds with shorter wings and tails remain in central habitats with abundant resources, while slimmer, longer-winged individuals dominate isolated patches, suggesting adaptation to commuting. By integrating movement, morphology, and song, we aim to map cultural diffusion across fragmented landscapes and uncover links between vocal culture, dispersal, and adaptation.

High risk, high reward?: Male mate choice in polyphenic bulb mites

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In the late 1800s, Darwin convinced scientists that males and females were different in their ability to choose a mate. He proposed that females in the mating pool were limited as they produced few and costly eggs. Whereas males possessed 'unlimited sperm' and were instead restricted by the number of females. This dynamic created an imbalance in the mating pool, leading to males evolving weapons or embellishments to ensnare females, and females choosing between them. Thus began a century of studies on female mate choice and responsive male adaptation. However, these sexual traits can be extremely expensive, causing males to consider which female is worth the trouble. I tested whether males with weapons became picky with their mates by comparing the mate choices of weaponised and non-weaponised bulb mites. I found that weaponised mites were indeed pickier, but made none of the choices I expected.

Evidence of learned recognition of heterospecific calls among mixed-species flock participants

Edward Lawrence; Chun-Chieh Liao; Robert Magrath; Damien Farine
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Mixed-species flocking is a well-documented phenomena allowing birds to adapt to harsh environmental conditions. Previous studies show that preferential attraction to heterospecific vocalisations is one mechanism involved in flocks forming. However, how this mechanism is first established remains unanswered. The composition of mixed-species flocks is often caused by species spatiotemporal co-occurrences which, in turn, determines how often one species is exposed to the vocalisations of another species. Hence, flocking participants may learn to recognise heterospecific social calls to identify mixed-species flocks. To investigate this, we used a playback experiment to test whether a flocking participant, superb fairywrens (*Malurus cyaneus*), differed in approach rates after hearing buff-rumped thornbill (*Acanthiza reguloides*) calls in overlapping and non-overlapping sites, while simultaneously accounting for habitat differences by also testing responses to yellow-rumped thornbill (*Acanthiza chrysorrhoa*) calls – a species spatially co-occuring with superb fairywrens across our study sites. We found

fairywrens were significantly more likely to approach buff-rumped thornbill calls in overlapping sites than in spaces where buff-rumped thornbills were absent, while there was no significant difference in approach rates to yellow-rumped thornbill across sites. This study provides greater insight into the mechanisms driving mixed-species flocking formations and, more fundamentally, how heterospecific associations can be learned.

Heat stress conditions alter disease transmission networks and drive population health outcomes

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The thermal environment is a major driver impacting animal behaviour. Climate change is leading to more frequent and severe heat stress events. Yet, how climate change induced behavioural changes impact disease transmission dynamics within populations and drive health outcomes is poorly understood. Here, we investigated this in sheep in two different climate zones. During heat events sheep shift their space use to more shaded areas. This affects the social network structure and an individual's connectivity in it. Focussing on host behavioural changes, we tracked two flocks during the hot summer using GPS collars and constructed relevant transmission networks. As our case study, we used the disease pneumonia, which is associated with the directly transmitted bacterium *Mycoplasma ovipneumoniae*. We then used a network-based disease modelling approach to simulate how disease transmission through the sheep flock would be impacted by a +1°C and +3°C temperature increase and compared them with current conditions. We provide mechanistic insights on how individual behavioural adjustments to climate change conditions alter disease transmission processes and ultimately affect population health.

Investigating the Mechanisms of Conflict Resolution during Collective Decision Making in Weaver Ants

Asser Loutfi
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Cooperative transport in weaver ants (*Oecophylla smaragdina*) requires groups to navigate collectively in order to carrying loads much larger than themselves. When participating individuals have conflicting navigational information, the group must resolve these conflicts to achieve any efficient or coordinated movements. My research investigates the mechanisms underlying this conflict resolution during cooperative transport in *O. smaragdina*. My previous work examined how transport groups utilize different information sources during navigation. Y-maze experiments revealed that visual cues created by the presence of freely moving foragers is prioritized pheromone trail information, suggesting that transport groups rely on real-time social cues when making directional decisions. Building on these findings, my current experiments directly test conflict resolution mechanisms by creating scenarios where two sub-colonies from the same source colony possess opposing navigational preferences. Nest boxes are positioned on opposite sides of an arena with prey at the center, forcing transport groups to integrate conflicting directional information when they meet. By tracking individual behaviors during these

conflicts, I aim to identify the mechanisms that allow groups to transition from deadlock states to a shared consensus. This research provides insights into how decentralized systems resolve informational conflicts and achieve coordinated decisions without centralized control.

Trouble in Paradise? Platypus of the WET Tropics

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Isolated populations face increased extinction risk due to inbreeding, genetic drift, and environmental change, but isolation can also promote local adaptation and divergent evolution, potentially leading to speciation. The platypus (*Ornithorhynchus anatinus*) is an enigmatic Australian mammal distributed along much of the eastern coast, with several genetically isolated populations. The Far North Queensland population, which resides in a uniquely tropical environment, is genetically isolated, with low genetic diversity. Consequently, it is identified as a unique management unit. Using environmental DNA (eDNA), camera trapping, and live capture surveys, I am investigating the ecology and behaviour of this population to assess its conservation status and inform management. From citizen science and existing records, I have collected over 1,770 platypus reports and sampled 50 sites for eDNA. Recent reports are concentrated in highly trafficked areas, with fewer inland reports in recent years. Positive eDNA detections just south of Cooktown represent the first records in this area since 2019. Although eDNA results indicate the population still occupies much of its historic range, connectivity may be reduced in the southern parts.

Dispersal of the Adelaide trapdoor spiderlings (*Blakistonia aurea*) to aid in conservation

Alisha Lowe; Panduka Amarsekara; Dr Bruno Alves Buzatto
Flinders University

Spiders are often overlooked in conservation science, which usually focuses on vertebrates. However, trapdoor spiders have long been recognised as a group of conservation significance in Australia. These spiders belong to the infraorder Mygalomorphae, a group characterised for slow maturation times, long lifespans, and poor dispersal abilities, resulting in ‘short-range endemism’, defined as species ranges of less than 10,000 km2, making them vulnerable to habitat disturbance. This study aimed to assess the dispersal ability of spiderlings of the Adelaide trapdoor spider *Blakistonia aurea* (family Idiopidae). This was achieved by observing the behaviour of spiderlings recently emerged from maternal burrows in captivity to better understand how far they disperse before establishing new burrows. The findings suggest that spiderlings begin burrowing very soon, within approximately 9.5 minutes after leaving the maternal burrows, and usually after dispersing on average only 74.2 cm. The findings of this study can shed light on the natural dispersal abilities of these spiders in the wild and also have implications for the conservation of the endangered pygmy-bluetongue lizard (*Tiliqua adelaidensis*), which lives in the abandoned burrows of these spiders.

The ideal female for picky mites!

Emily Lynch; Anastasia Shavrova
UNSW

When we think about mate choice in the animal kingdom, we usually picture females as the picky ones, carefully selecting partners based on flashy colours, elaborate dances, or impressive horns. But producing these exaggerated traits is costly for males, which raises an interesting question: can males be just as choosy? In this study, we explored whether male bulb mites (*Rhyzoglyphus echinopus*) adjust their mating preferences based on a female's mating history. In this species, males can develop into one of two morphs. Males can be fighters, developing weaponry to monopolise females and ward off rivals or alternatively, they become scramblers, taking a more passive approach by mating with an available female. But these two strategies come with trade-offs. Fighter males, despite their impressive weaponry, may pay a cost. They have less competitive sperm, reduced manoeuvrability, and a smaller body size. Scramblers, on the other hand, may excel in sperm competition, meaning that mating with an already-mated female could be far less of a disadvantage for them. This raises the possibility that the two male morphs may differ in how much they care about a female's mating history. Using behavioural choice trials, we gave males the opportunity to choose between virgin and already-mated females to see whether they could tell the difference, if they use pheromones to do so, and overall whether these influence their mate choice.

Housing in a pinch: a range extension and use of galls in the pseudoscorpion genus, Aldabrinus

Mark S Harvey; **Joshua S Martin**; Jameson C Ellis-Steinborner; Bruno A Buzatto
Flinders University

Galls are structures formed on plants by a variety of arthropods that facilitate the development of their offspring. While galls are intended for a species' own offspring, usage of galls by other species has been readily recorded in the literature. In this study, we report on a new instance of a pseudoscorpion of the genus Aldabrinus using another species' gall, Apiomorpha sp., for an as of yet unconfirmed reason. Suspected causes of this novel behaviour (e.g. shelter, breeding, phoresy, etc.) and implications on conservation are discussed in the broader context of both similar rare records from other continents and records from other arachnid taxa. Additionally, we provide a considerable range extension for the genus, which was formally only previously recorded from mainland Western Australia, but is now known from an opportunistic find from Kangaroo Island. Our study describes a novel behaviour in a rare and cryptic arachnid genus, that furthers our knowledge of its ecology, and provides a better understanding of its distribution, and thus allowing us to improve conservation management for it in the future.

Rakali in focus – Using baited camera traps to capture the presence and distribution of an under-researched Australian mammal

Hannah Mckennall; Ryan Baring; Gilad Bino; Tahneal Hawke
Flinders University

Freshwater resources are becoming increasingly compromised and over-allocated in the Anthropocene era, due to urbanisation and human consumption. Freshwater animals, including semi-aquatic taxa, are disproportionately threatened due to such disturbances a, yet population assessments for many semi-aquatic species are significantly lacking. The mammal order Rodentia has some of the highest proportions of population data deficiencies, particularly for native semi-aquatic species that are often ecologically unique and culturally important. Our research aimed to investigate the presence of an under researched semi-aquatic freshwater mammal; the Rakali (*Hydromys chrysogaster*) across an urban to reserve gradient, to ascertain potential foraging/scavenging responses to urbanisation. Through baited camera trap surveys conducted in 2025, results found that Rakali presence was not significantly impacted by location, site, or weather conditions, with the exception of a positive correlation between detection rate and decreasing minimum daily temperatures. Detection rates also differed between baiting periods, with indications of different behavioural responses to bait across urban locations. This study provides the first population assessment of Rakali in the Goolwa region, South Australia, and findings will assist in understanding the dynamics of Rakali response to increasing urbanisation and human disturbance in freshwater habitats nationally.

Post-fire grazing impact on an endangered habitat specialist: Is management required?

Ashley Murray
Flinders University

The pygmy bluetongue is an endangered habitat specialist, endemic to the Mid North of South Australia. Pygmy bluetongues live in fragmented agricultural grasslands and have a low dispersal capacity. Due to being a low-dispersing habitat specialist occupying fragmented habitat pygmy bluetongues are potentially vulnerable to disturbance events, as they are unable to escape threats. My research investigates the impact of post-fire grazing on pygmy bluetongues by measuring activity and body condition across a post-fire and post-fire grazing site one year after fire has occurred against comparative sites that have not had a fire occur. It is expected that the pygmy bluetongue is at risk of reduced activity and body condition post-fire and after post-fire grazing disturbance namely due to increased or perceived predation risks, loss of shelter, and decreased food availability. By investigating the impact of post-fire and post-fire grazing disturbance on pygmy bluetongues, management insights can be provided to private stakeholders regarding the recovery of affected pygmy bluetongue populations habitats post-fire.

Touchdown Denied: How to deter flies from landing

Diana Perez-Staples; Dinesh Rao; Richard Peters; Luis- Robeldo-Ospina; **Ajay Narendra**
Macquarie University

Insects are attracted to fruits both as a food source and as sites for reproduction, often guided by strong cues such as sugar and fermentation. The fruit fly *Bactrocera tryoni* is particularly notorious for such behaviour: females insert their eggs into ripening fruit so that emerging larvae have immediate access to soft, nutrient rich tissue. Here, we took advantage of the visual system of the fly to modify the visual appearance of the fruit to prevent landing. We modified one half of a pear fruit by adding high contrast black and white vertical stripes, leaving the other half unaltered. The pear was placed in a flight cage, and female flies were released. Using synchronised high speed cameras (500 frames per second), we recorded their behaviour and reconstructed their flight trajectories in three dimensions. Our results show that flies approaching the striped half of the fruit were significantly less likely to land compared to those approaching the unmodified surface of the fruit. We will present when and how flies respond to the striped pattern and discuss these findings in the broader context of their visual ecology.

From Maps to Management: Species Distribution Models to Inform Dolphin Conservation in South Australia

Michelle Newman; Luciana Möller; Tessa Lane; Ryan Baring; Guido J Parra
Flinders University

Coastal dolphins are increasingly exposed to cumulative anthropogenic pressures. In South Australian gulfs and adjacent coastal waters, the key threats to Indo-Pacific bottlenose (*Tursiops aduncus*) and common dolphins (*Delphinus delphis*) include fisheries interactions, vessel traffic, habitat degradation, and climate change. However, due to ecological differences between these species, they are likely exposed to different combinations and intensities of human stressors across the region. To support spatial risk assessments of cumulative impacts to dolphins in South Australian waters, we developed species-specific habitat suitability models using MaxEnt species distribution modelling. Results indicated that bottlenose dolphins preferentially occur in shallow coastal waters, with high habitat suitability in upper Spencer Gulf and northern Gulf St Vincent. In contrast, common dolphin distribution was primarily driven by water depth, with high habitat suitability predicted in southern Spencer Gulf and along the northern coastline of Kangaroo Island. Integrating these species-specific habitat suitability models with spatial data on anthropogenic pressures will identify areas where high-quality dolphin habitat overlaps with human activities. This approach can inform targeted management actions and mitigation strategies to better protect bottlenose and common dolphins in South Australian waters.

Behavioural difference does not explain visual adaptation in nymphalid butterflies

Kai Ting Ng; Darrell Kemp; Yuri Ogawa
Flinders University

Self-motion generates substantial background noise in luminance and motion channels, potentially masking behaviourally relevant signals used for navigation, communication, and

hazard avoidance. How animals extract meaningful visual features while moving remains poorly understood. Male nymphalid butterflies are an empirical model because they exhibit two mate-locating strategies: perching and patrolling. Perchers detect females while stationary, whereas patrollers search while flying, exposing them to different levels of self-motion. To test whether these strategies are associated with differences in visual processing, we measured spectral and temporal properties of the eye. Optical eyeshine imaging was used to quantify the proportion of red ommatidia, an indicator of tetrachromatic colour vision. The proportion of red ommatidia did not differ between behavioural groups. Critical flicker fusion frequency was ~173Hz in perching species and ~154Hz in patrolling species, showing no significant difference between behavioural groups. Eyeshine fading speed differed significantly between the percher *Hypolimnas bolina* and the patroller *Danaus plexippus* ($p < 0.01$), but was not correlated with flicker fusion frequency. Overall, no consistent differences in visual traits were detected between perching and patrolling butterflies, although limited sample sizes may have reduced statistical power.

Target sensitivity in two classes of hoverfly descending neurons

Sarah Nicholas; Karin Nordström
Flinders University

Recognising small, fast-moving objects is vital for many animals, supporting behaviours such as pursuit, territorial defence and predator avoidance. In the hoverfly *Eristalis tenax*, looming objects may evoke escape responses while small targets can trigger male territorial pursuits. Descending neurons (DNs), which relay visual information to motor centres, are essential for transforming target-related sensory cues into behavioural actions. In E. tenax, both target selective descending neurons (TSDNs) and looming sensitive DNs respond to small moving targets, and both are likely to receive presynaptic input from small target motion detectors (STMDs). While TSDNs are often linked to pursuit behaviour, the functional role of target sensitivity in looming sensitive DNs is less clear. Using electrophysiological recordings, we compare target detection in looming sensitive DNs and TSDNs by analysing receptive fields and tuning for direction and size. We find clear population-level differences, although some looming sensitive DNs show substantial overlap with TSDNs. This suggests that while looming sensitive DNs may support distinct behavioural roles, a subset could contribute to pursuit behaviours typically attributed to TSDNs. Overall, our findings reveal substantial diversity among neurons tuned to small moving targets in the descending visual pathway, consistent with the functional specialization expected of these circuits.

Inter- and intraspecific variation in social structure among coastal dolphins in Australian waters

Caitlin Nicholls; Guido Parra, Mauricio Cantor; Luciana Moller
Flinders University

Understanding how social systems vary within and between species is central to behavioural ecology. Coastal dolphins exhibit fluid and diverse association patterns, yet the extent of inter- and intraspecific variation in their social structure remains poorly quantified across ecological contexts. Using long-term photo-identification data, we compare social structure and network properties across eight populations of three Australian coastal dolphin species: Indo-Pacific

bottlenose dolphins (*Tursiops aduncus*, n=4), Australian humpback dolphins (*Sousa sahulensis*, n=2), and Australian snubfin dolphins (*Orcaella heinsohni*, n=2). We found substantial inter- and intraspecific variation in key structural network properties, including normalised modularity, global efficiency, eigenvector centralisation and network density. Some species and populations exhibited highly modular, centralised networks characterised by clustered subgroups and socially influential individuals, whereas others displayed more diffuse and evenly connected structures. This variation suggests that dolphin social structures are likely shaped by local ecological and demographic conditions. Such differences shape how information and disease flow through local populations, with potential implications for their resilience to environmental change. By comparing multiple species and populations with a unified analytical framework, this study advances our understanding of the diversity and plasticity of social systems in marine mammals.

Sexual dimorphism in sensorimotor transformation of optic flow

Sarah Nicholas; Katja Sporar Klinge; Yuri Ogawa; **Karin Nordström**
Flinders University

Motion vision underpins a wide range of adaptive behaviours essential for individual and species survival. In hoverflies, some visual behaviours are sexually dimorphic, including for example male high-speed pursuit of conspecifics, matched by improved optics, and faster photoreceptors. However, there is no sexual dimorphism in flight speed during e.g. foraging between flowers. To investigate this discrepancy, we compared the electrophysiological response characteristics and morphology of optic flow sensitive descending neurons in male and female hoverflies and linked these findings to the behaviour of tethered hoverflies viewing similar stimuli. We used the wing beat amplitude (WBA) as a measure of the optomotor response and found no sexual dimorphism, while the extension of the fore- and hind legs exhibited sexual dimorphism. Furthermore, while neural morphology, receptive fields and direction sensitivity of the descending neurons showed minimal sex differences, the velocity response functions differed significantly between males and females. Critically, neural responses were poorly correlated with behavioural output to the same stimuli. Together, our findings uncover a nuanced, sex- and stimulus- dependant sensorimotor transformation, shaped by both neural architecture and behavioural demands.

Testing the dear enemy effect on a non-territorial group-living bird

Brendah Nyaguthii; Chun-Chieh Liao; Kushini Kalupahana; Damien Farine
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Familiarity arising from repeated interactions among neighbours can reduce the aggression by individuals responding to territorial intrusions, a phenomenon known as the dear enemy effect. However, little is known about this behaviour in non-territorial species. Further, it has been suggested that familiarity during the winter that precedes a breeding season, when many animals are more social, could also underpin dear enemy responses. We investigated the dear enemy effect in white-winged choughs, a cooperative breeder that form multilevel societies during winter. While they are non-territorial during the breeding season, intergroup nest usurpation and nest ovicide are common. We tested responses to playbacks of foraging calls from familiar groups with high association rates, unfamiliar groups with low association rates, and stranger

groups from outside our population, recording the behavioural responses of focal individuals. We predict that groups will show reduced aggressive behaviour towards familiar groups, strong responses towards strangers, and intermediate responses towards unfamiliar groups. By testing the dear enemy effect in a non-territorial species, this study broadens our understanding of how social structure during winter season shapes intergroup interactions in subsequent seasons, even in species that are not otherwise territorial.

Head orientation aligns before landing commitment in hoverflies

Yuri Ogawa; Andrew Barron; Karin Nordström
Flinders University

Insect decision making is often studied in a forced choice paradigm, such as choosing between two options in a y-maze. However, in natural settings, decision making is a continuous process, where incoming sensory information is used to update behavioural output. To investigate such active decision making we used our recently developed closed-loop virtual reality arena where the visual scenery is controlled by a tethered hoverfly's wing beat amplitude (Ogawa et al., 2025). We created a virtual world with several virtual flowers and quantified female hoverfly (Eristalis tenax) approaches. The hoverflies reliably approached the virtual flowers and when close, extended both fore- and hind legs, which we defined as a landing response. We found that landing responses occurred predominantly near a flower, with response duration increasing with proximity. Flight speed at landing initiation was higher when near the flower, whereas lower speeds were observed further from the flowers. This indicates that flower-elicited landing reflects a coordinated approach behaviour rather than a simple motor reflex. We next looked at the head orientation during flower approaches and found that the hoverflies aligned the head towards the flower more than 300 ms before landing initiation. This suggests that the hoverflies were actively using visual input to update their decision to land, and that ongoing visuomotor adjustments are used to determine landing commitment.

Sleepy singers: How does chronic sleep disturbance during a critical juvenile learning period affect bird song?

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Sleep is essential for many animal behaviours such as learning, memory retention, and communication. However, birds living among humans are constantly faced with sleep disturbances such as urban light, noise, and traffic. Studies have shown that a lack of sleep can decrease the song performance of adult birds. Juvenile songbirds rely on learning and memory to produce high-quality songs as adults. Yet, no study to date has tested whether sleep disturbances in juveniles affect song learning and crystallisation. Our study used a model bird species, the zebra finch (*Taeniopygia guttata*), to investigate whether experiencing chronic sleep disturbances during the critical song learning window affects how birds learn their songs. We experimentally disturbed 14 male zebra finch chicks for up to 20% of every night during the sensory and sensory motor phases (ages 35 to 75) and compared them to 16 undisturbed birds. Both control and experimental birds received an unrelated tutor playback until song crystallisation (Day 100). We recorded individuals' vocalisations during their sensory motor

phase until song crystallisation. We then compared song characteristics such as peak frequency, average entropy and song similarity to the tutor song during the song learning period and post-song crystallisation. Preliminary results suggest clear differences in the songs of experimental and control males, suggesting that sleep disturbances during the juvenile period can alter adult song. These results inform how songbird species may be affected when sleeping under chronic disturbances, such as those experienced by urban birds.

Non-breeding sociality reduces territorial conflicts in the superb fairywren (*Malurus cyaneus*)

Samuele Ramellini; Damien R. Farine
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In seasonal breeders, individuals often switch from being strongly territorial to being social in the non-breeding season. The immediate benefit of non-breeding sociality is likely an evolutionary strategy to increase survival by forming larger groups. Individuals can also gain benefits by being strategic in terms of who they are social with. A recent hypothesis proposed that the benefits of non-breeding sociality can extend to the following breeding season. By associating with future neighbours, individuals can reduce the costs of re-establishing territories through a dear-enemy-like effect. We test this hypothesis by conducting a playback territorial intrusion experiment in a wild population of superb fairywren (*Malurus cyaneus*) at the onset of the breeding season. Individuals that were social during the previous winter showed substantially reduced territorial responses. By contrast, being neighbours in the previous breeding season did not affect territorial responses. We confirm that preferential social associations during the non-breeding season can have carry-over benefits in territorial disputes. As more social birds are also more likely to survive the winter, winter sociality can increase the chances of their social associates also surviving. Thus, both immediate and longer-term benefits of non-breeding sociality can explain the emergence of preferential associations, such as those expressed in multilevel societies.

How does a bull ant sting?

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Macquarie University

Bull ants of the genus Myrmecia are an iconic Australian insect infamous for their painful stings. Their large size, heavy reliance on vision, and huge mandibles make them a striking feature of the Australian bush. Many of us will have been stung while bushwalking or camping and can attest to the ferociousness of a bull ant, actively chasing an organism many times larger than themselves. The potency of their sting is also not something easily forgotten. Although much is known about the chemistry of their venom, the venom delivery system is less well described. In this study, we set out to describe the anatomy of the bull ant stinging apparatus and record their sting in action. We use light microscopy and SEM to describe the overall anatomy and sensory sensilla. We then build on that information by reconstructing the 3D anatomy using micro-CT imaging. We present our preliminary findings and compare them to previously described hymenopteran stingers.

How echolocation and navigation behaviour influence the morphology of the inner ears of bats

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An animal's navigational behaviour plays an integral role in the evolution of specialised sensory organs. In echolocating bats, the inner ears are optimised to detect high-frequency sounds, enabling precise navigation in total darkness. Because echolocation is tightly linked to habitat complexity and foraging requirements, we hypothesise that morphological structure of the inner ears should reflect these ecological niches. Furthermore, bats that occupy similar ecological niches may exhibit convergent morphological traits, regardless of phylogenetic relatedness. We used 3D geometric morphometrics to quantify inner ear shape across 147 species of bats representing 20 extant bat families. We assessed the influence of echolocation call type (e.g., Constant Frequency vs. Frequency Modulated), foraging strategy (e.g., gleaning vs. aerial hawking), and phylogeny on shape variation. This study aims to determine the extent by which the functional demands of specialised navigation drive sensory diversification in bats. Preliminary results indicate that two CF echolocating families – Rhinolophidae and Hipposideridae, differ in overall cochlear dimensions. Conversely, the FM echolocating family Megadermatidae occupies a distinct morphospace, that may reflect their use of prey-generated cues while foraging. By comparing morphological variation across extant families, we aim to clarify the balance between phylogenetic constraint and adaptive convergence in the Chiropteran auditory system.

Song-Sharing Networks Reveal Cultural Neighbourhoods in North Island Saddleback (*Philesturnus rufusater*)

Rahman Rasyidi; Konrad Muller; Kristal E. Cain; Dianne H. Brunton
University of Auckland

Animal culture, such as birdsong, arises from social learning. A population's cultural landscape reflects the interactions among learning biases and demographic processes that shape social networks. Disturbances such as invasive predators can disrupt social processes and cultural transmission. We investigated how song culture forms in North Island Saddleback (tīeke; *Philesturnus rufusater*) and how predator-driven demographic change influences learning pathways by examining sociality and song-sharing patterns. Tīeke is known for its distinct song dialects and provides an ideal system for examining how ecological disturbance affects cultural structure. We recorded male rhythmic songs (MRSs) from banded tīeke at Tawharanui Regional Park (Auckland, New Zealand), a population that has undergone bottlenecks and recovery following invasive predator disturbance since its translocation. Here, we constructed individual repertoire databases across 2024 and 2025. Territories were mapped using a spot-mapping method, supplemented with observations of social interactions. In both years, males located farther apart tended to have more dissimilar songs, indicating spatial structuring of cultural similarity. We also found a modular structure, with individuals forming distinct song neighbourhoods even when population size was small in 2024. Additionally, some neighbourhood members were geographically distant from the rest of their cluster, suggesting that conformity or tutor choice may maintain cultural similarity after juvenile dispersal. This work provides insights into how spatial structure, social learning, and demographic processes interact to shape song culture in tīeke.

Hormonal mechanisms of pair bonding in a long-term monogamous reptile

Pablo Recio; Ondi Crino; Gerrut Norval; Mike Gardner
Flinders University

Although many vertebrate species form socially monogamous pair bonds, the endocrinological mechanisms underlying these associations remain poorly explored outside a few mammalian and avian systems. Expanding studies to other vertebrate groups is essential to determine whether similar mechanisms regulate pair bonding when monogamy evolves independently. Here, we investigate the relationship between circulating hormones and pair bonding in a long-term monogamous reptile, the sleepy lizard. We collected plasma samples from wild-caught individuals and used LC–MS to quantify circulating concentrations of "pair-bonding" hormones (dopamine, mesotocin, and arginine-vasotocin) as well as hormones associated with stress and social competition (corticosterone and testosterone). We then modelled the likelihood of individuals being paired or solitary as a function of hormone concentrations. We predict that paired individuals will show higher levels of bonding hormones and lower levels of stress- and competition-related hormones compared with solitary individuals. This study provides the first endocrine investigations of pair bonding in reptiles and will contribute to a broader comparative understanding of the physiological mechanisms underlying social monogamy across vertebrates.

Exploring mechanisms of cooperative prey transport and nest construction from weaver ants to robots and back again

Chris Reid; Daniele Carlesso; Varna Sree Kumar; Madelyne Stewardson; Donald James McLean; Geoffrey PF Mazue; Simon Garnier; Ofer Feinerman; Meer Shadman Saeed; Subhas Mukhopadhyay; Laurel George
Macquarie University

Weaver ants (*Oecophylla smaragdina*) are masters of collective behaviour, working together to move large prey items in teams, and constructing elaborate nests from leaves and silk. This teamwork is coordinated in a self-organised manner, based only on local communication without centralised decision making. This method requires no overseers, blueprints or prior environmental knowledge, and may be crucial for future swarm robotics platforms in exploration, search-and-rescue or space habitat construction. I will present recent work from my lab on weaver ant collective prey transport and silk nest construction, and will showcase our new swarm robotics platform, 'Myrm-X', designed to directly test ant-inspired algorithms for swarm behaviour. We used a tethered-object protocol to show that weaver ants pool together the opinions of all group members to increase their navigational accuracy – the first report of a 'wisdom of the crowd' strategy in ant collective transport. We have also quantified the 3D structure of the ants' silk nests, using photogrammetry and CT-scanning, to understand how the ants essentially 3D-print functional structures as a decentralised swarm. I will describe our efforts to translate these empirical findings into control algorithms for the Myrm-X robots, to both interrogate the ant system, and provide inspiration for future swarm engineering approaches.

Investigating the repeatability of problem-solving performance in superb fairy-wrens, within and across contexts

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In fluctuating environments, increased problem-solving abilities can help animals overcome and adapt to novel challenges to ensure their survival. To understand how natural selection influences problem-solving behaviour, we must first establish the stability and repeatability of this trait and assess its consistency across contexts to account for motivation-related biases. We investigated the repeatability of problem-solving in wild superb fairy-wrens, *Malurus cyaneus*, across four problem-solving tasks: (1) a lid-pushing extractive foraging task, (2) a lid-piercing extractive foraging task, (3) an obstacle removal task at the nest using a familiar object, and (4) an obstacle removal task at the nest using a novel object. Over two field seasons, we tested 15 birds across all tasks. We found that latency to solve the task was moderately repeatable within each task, but not across tasks. At the nest, birds were significantly slower at solving the task with the novel obstacle compared to the familiar obstacle. Together, these findings provide evidence that problem-solving is a context-dependent repeatable trait that may be subject to natural selection and shaped by neophobia and situational factors.

Do fawn-footed mosaic-tailed rats experience age-related cognitive decline in novel object recognition?

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Ageing is associated with reduced cognitive function, with numerous studies focusing on age-related cognitive decline in laboratory rodent models to provide insight into human ageing and neurogenerative disease. However, fewer studies have focused on age-related cognitive decline in captive wild animals, which typically live longer than their free-roaming wild counterparts. We investigated whether recognition memory, measured using a novel object recognition task, declines with age in a captive population of fawn-footed mosaic-tailed rats (*Melomys cervinipes*). Adult mosaic-tailed rats were tested for NOR twice, 4.6 years apart. Both younger and older mosaic-tailed rats took longer to approach the novel object, while intermediate aged rats responded the fastest. In addition, intermediated aged rats were less discriminatory than both younger and older rats. Interestingly, sex affected the number of interactions with the novel object, with female mosaic-tailed rats interacting more with unfamiliar objects than males. This is the first study to study age-related cognitive decline in NOR in a native Australian rodent and these findings suggest that recognition abilities of mosaic-tailed rats do not diminish over time. Instead, some intrinsic biological factors affect NOR, and there may be a trade-off in energetic investment associated with neophobia and other factors during the prime-of-life.

Hoverfly looming neurons show stimulus-specific adaptation independent of response strength

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Insects use looming cues to detect approaching objects and avoid collision. Looming-sensitive descending neurons (here referred to as looming neurons) link visual processing in the brain to motor centres in the thoracic ganglia. In hoverflies (*Eristalis tenax*), some looming neurons have dual receptive fields: a dorsal region tuned to small-target motion and a ventral region tuned to wide-field motion. Looming neurons adapt strongly to the presentation of repeated looming stimuli, but it is unclear whether this is driven specifically by looming motion, or whether it can also be generated by small-target and wide-field motion. Here we recorded extracellularly from hoverfly looming neurons and presented a low-contrast loom before and after an adaptor, which was either a high-contrast loom, wide-field motion, or small-target motion, in different directions. We show that the strongest adaptation occurred after a high-contrast looming stimulus. Wide-field motion in the direction generating the strongest response also adapted the neurons, but less strongly. However, other adaptor stimuli did not produce significant adaptation, even when they generated strong responses. This indicates that looming neuron adaptation is not simply a consequence of response strength, but is highly stimulus specific. This may help maintain responsiveness to ecologically relevant stimuli in natural settings.

Home Among the Gum Trees: Visual Navigation in an Arboreal Jumping Spider

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Navigation is essential for all mobile animals to locate food, mates and return home. Our understanding of arthropod navigation is mostly based on social insects that forage from a centrally located home. Since jumping spiders typically do not have a permanent home, their navigation abilities in the wild have remained largely unexplored. Here, we studied an arboreal jumping spider, *Arasia mullion*, that builds an inconspicuous silken retreat on tree bark to which it returns after every foraging trip, making it a unique system to investigate fine scale navigation strategies in salticids. We used a laser pointer to lead spiders from their retreats to specific locations, and found that spiders return home from almost 40 cm. We provide the first experimental evidence that arboreal jumping spiders use both celestial and terrestrial visual compass cues to steer towards home. Spiders could find the location of the retreat even when it was occluded, suggesting they use local visual cues to pinpoint home. In completely unfamiliar locations, spiders relied on path integration but only travelled a fraction of their home vector. We report these navigation strategies and discuss how they may interact to enable successful homing.

Sexual conflict is mediated and potentially resolved by polyphenisms in bulb mites

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Males and females engage in an evolutionary arms-race to maximize reproductive fitness, often at a cost to the opposite sex. Males may adopt manipulative strategies to secure matings, while females exercise choice before or after copulation. However, it remains unclear how male polyphenisms influence the intensity of sexual conflict. We investigated sexual conflict in the polyphenic mite *Rhizoglyphus echinopus*, where males develop into either an aggressive fighter morph or a passive scrambler morph. We examined whether female fecundity and survival differed when mated to each morph under monandrous or polyandrous conditions, and whether females showed any morph preference. Female fecundity and survival were unaffected by male morph in both mating scenarios, and females showed no preference for either morph. However, reproductive rate did differ between monandrous and polyandrous matings. We argue that low sexual conflict in R. echinopus reflects the species life history in variable environments. At fluctuating population densities, each morph may be favoured at different times, with fighters advantaged when competition is high and scramblers when it is low, reducing the net cost imposed on females.

Intensity of Nest Defense of White-Winged Choughs (*Corcorax melanoramphos*) in Urban Versus Natural Habitats

Esha Shekar, Brendah Nyaguthii, Damien Farine
Australian National University

Nesting birds face risks of predation, prompting parents to invest in nest defense. However, parental investment may vary across environments. Urbanization often leads to an increase in generalist nest predators, potentially driving higher risks of reproductive failure. This may require urban-breeders to invest more time and energy in defense, while balancing activities, like incubation, foraging, and feeding their young. We assessed the impact of urbanization on nest defense by white-winged choughs (*Corcorax melanorhamphos*). We predicted that urban habitats have a greater abundance of nest predators compared to natural habitats, and nest defense would correspondingly be higher in urban-breeding birds. We also predicted that nest defense would increase with age of the brood, according to the nest defense theory, irrespective of habitat. Our results confirm a significantly greater abundance of avian nest predators in urban areas, and that nest defense is significantly higher in urban groups compared to groups in natural habitats. However, we found no significant increase in nest defense with age of the brood. Our study confirms that the increase in nest predator abundance causes urban birds to face different trade-offs, and invest more in nest defense. This reflects one effect of urbanization on the behavior of urban wildlife.

Factors influencing prey choice in spiders: the potential role of colour cues

Rui Shi
USYD

Spiders (Araneae) are one of the most diverse and ecologically important groups of arthropods, inhabiting a wide range of habitats worldwide. As predators with varied prey ranges and complex foraging behaviours, they play a vital role in regulating invertebrate populations, making their foraging behaviour a key focus in behavioural ecology. Previous studies have examined how both internal and external factors influence spiders' foraging behaviours. Different species respond differently to these factors, navigating associated trade-offs in context-dependent and species-specific ways. Evidence suggests that prey choice in spiders involves flexible, adaptive decision-making rather than fixed, innate preferences. Learning and experience also substantially shape foraging behaviour, highlighting cognitive contributions that enhance spiders' ability to adjust to changing conditions. In addition, visual cues play an important role in shaping predatory decisions. Colour signals can provide ecological information about prey profitability or potential toxicity. However, whether spiders can recognise particular colours as aposematic signals remains poorly understood. To address this gap, Ongoing behavioural experiments investigate whether spiders exhibit biases towards or avoidance of particular prey colours, including colours commonly associated with aposematic signalling. Understanding how spiders interpret colour cues in prey may provide new insights into predator decision-making and strategies.

Sperm precedence patterns and potential post-copulatory mate guarding in bulb mites

Incheol Shin; Bruno Alves Buzatto
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Sexual selection in polygamous systems often extends beyond pre-copulatory mate competition and mate choice to post-copulatory processes, such as sperm competition. Sperm competition is mediated by patterns of sperm precedence (e.g., first- vs. last-male advantage), which are shaped by female reproductive morphology (how the female reproductive tract positions incoming sperm) and ejaculate dynamics. However, these mechanisms are often overlooked in studies of fitness and the evolution of reproductive behaviour. Consequently, individual fitness, commonly inferred from mating success alone, may be substantially over- or underestimated without direct assessment of fertilisation success. I will discuss current knowledge gaps in sperm precedence patterns in the bulb mite *Rhizoglyphus echinopus*, a highly promiscuous species exhibiting male dimorphism. Fighter males engage in lethal contests to monopolise females, whereas scramblers avoid fights and seek unguarded females. A recent study revealed a mismatch between pre-copulatory aggression behaviours that suggest first-male sperm precedence and female reproductive anatomy from related species that suggest last-male precedence. This mismatch raises important questions about the selective pressures shaping reproductive strategies in these animals. I suggest that mate guarding behaviour may reconcile this discrepancy and emphasise the importance of incorporating post-copulatory processes for understanding the evolution of reproductive behaviours.

Exploring the ontogeny of personality in little penguin chicks

Arisha Silverlake; Andrew Katsis; Ondi Crino; Diane Colombelli-Négrel
Flinders University

Personality in adult animals is often consistent across time and contexts and linked to behaviours effecting survival. However, less is known regarding the ontogeny of personality; particularly the age at which it first emerges. The development of personality traits may influence which individuals survive to maturity as certain behavioural characteristics may be favoured. In particular, those relating to predator responses and affinity towards novelty may be highly influential. Therefore, we measured personality across the chick life stage in a threatened population of Australian little penguins (*Eudyptula novaehollandiae*) that are highly impacted by post-fledging mortality and experience no known parental investment after leaving the nest. We assessed (1) boldness towards a simulated human nest intrusion and (2) neophilia towards a novel object every week from three weeks of age until fledging (at 8 weeks of age). Personality traits were moderately consistent within this life stage and chicks showed an increased response to personality assays as they aged. Our results suggest that the development of personality may be linked to developmental stages (i.e. rapid periods of growth) associated with increasing independence. Additionally, we found a positive correlation between boldness and neophilia, indicating the presence of a behavioural syndrome and a potential trade-off between correlated behaviours.

Fancy facades and pigment preferences: are the colourful faces of male bees sexy?

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Sexual dimorphism in Hymenoptera often involves variation in colouration and facial pigmentation, and males of bees that display this dimorphism have more extensive facial markings than females. Sexual selection might underly these patterns, but we know little about the courtship and mating habits of native bees. Assuming they mate in the typical manner for bees, males approach and mount females from behind. This suggests little opportunity for either sex to observe the facial markings of another, making intersexual selection seem unlikely. Intrasexual selection might fit better, but the gap in research makes it difficult to draw conclusions. To address this, we aim to first test and provide evidence for the rule of males presenting with more extensive facial markings. From there, a comparative phylogenetic approach can measure the rates of evolution in both sexes and infer if this trait is under sexual selection. If colourful faces are being selected for, we should see an increased rate across male bees, compared to the more conserved faces of females. By using an endemic, but understudied group (Colletidae: *Euryglossinae*), we can maximise our efforts in developing our understanding of the Australian bee fauna, while still addressing our overarching question.

Decoding the chemical variation in New Zealand's endemic giraffe weevil

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Cuticular hydrocarbons are compounds that cover an insect's cuticle, and are crucial mediators of behavioural interactions between individuals, including mate-competition and mate-choice. In this study, we observed the cuticular hydrocarbon (CHCs) profiles of the New Zealand giraffe weevil – an endemic beetle species in Aotearoa. This species demonstrates unique features, such as high body size variation and extreme sexual dimorphism, as well as alternative reproductive tactics amongst males, with small males evading competition by 'sneaking' up to females. Here we describe sex and size variation in the abundance and composition of CHCs in giraffe weevils. Similarly, we describe the possible use of chemical evasion by small sneaker males to avoid detection by larger males. Studying this species will develop insight into how extreme size variation within a species translates to variation in CHC profiles and provides a baseline for our research on the plasticity of chemical profiles in response to simulated increased temperature due to climate change in Aotearoa New Zealand.

A multi-scale biotelemetry approach to inferring nesting behaviour from aquatic animal movement data

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Identifying reproductive behaviour in wild fishes is particularly challenging in turbid environments yet is important to inform management interventions that support conservation outcomes. We developed a systematic, multi-scale framework to infer nesting behaviour of a large bodied riverine specialist, Murray cod (Maccullochella peelii), in its natural environment. First, pond-based mesocosm experiments using direct observations and accelerometer data were used to characterise nesting and not nesting behaviours and to train a Random Forest model. Adult Murray cod were then tracked over 16 months using a broad-scale acoustic telemetry array spanning 58 km of a lowland river in south-eastern Australia to quantify breeding-season residency and to guide the deployment of an intensive fine-scale tracking array (<1 m positioning accuracy), where site attachment was sufficient to warrant fine-scale monitoring. The trained model was then applied to accelerometry records from the acoustically tagged wild fish to classify daily nesting and not nesting behaviour. Behavioural assignments in wild fish were integrated with fine-scale space-use metrics and high-resolution habitat mapping to examine nest site habitat associations. The Random Forest model identified nesting behaviour in 14 of the 20 accelerometry-tagged fish, with nesting activity strongly seasonal and concentrated during spring, particularly October (38.4% of nesting records) and November (30.4%). Fish showing predicted nesting behaviour had significantly smaller 50% and 95% kernel utilisation distributions and significantly higher acceleration values compared to not nesting fish. Fine-scale positioning identified discrete nesting locations associated with complex structural habitat, with nesting fish occupying depths ranging from 1-3 m in areas of low water velocity. Repeated nest-site fidelity was also observed across breeding seasons for some individuals. By linking telemetry across spatial scales with experimentally validated behavioural models, this study enabled robust inference of nesting behaviour in free-ranging

wild fishes. The integrative workflow provides a transferable approach for studying reproductive behaviour in other aquatic species that are cryptic or inhabit turbid environments where direct observation is limited

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The cognitive effects of early-life sleep disturbance in zebra finches (*Taeniopygia guttata*)

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Cognition, learning, and memory consolidation are partly controlled by a balanced circadian rhythm and sufficient sleep. Global increases in light and noise pollution are disrupting normal sleep cycles in birds. Despite birds being commonly used in cognition research, the link between chronic sleep disturbance and cognitive deficits in birds remains unknown. While some studies have shown impaired cognitive performance when birds are acutely deprived of sleep the night before the experiment, this has limited applications in a real-world context. To date, no study has explored the potential effects of chronic sleep disturbance on avian cognition. In our study, one group of 13 juvenile male zebra finches (*Taeniopygia guttata*) will have their sleep disturbed from age 25–65 days post hatch, with a control group of 15 males remaining undisturbed. Once matured (>100 days post hatch), the birds will go through associative learning tasks. First, they will be trained to associate either green or yellow stimuli with a food reward. The rewarded and unrewarded colour will then be switched, in order to measure reversal learning and cognitive flexibility. The speed of learning both the cognitive associations and the motor skills required for the task will be measured alongside neophobia. It is expected that the sleep-disturbed group will learn at a significantly slower rate and have more variation in learning speed than the control group. Examining differences in learning speed for birds that go through chronic sleep disturbances will expand our understanding of the importance of sleep for learning and cognitive flexibility.

A novel approach to examining animal habitat selection in urban landscapes using Bluetooth low-energy beacons

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Tracking animal movement is pivotal in understanding how animals respond to urbanisation and environmental heterogeneity through patterns of space use. However, despite evidence of anthropogenic disturbance significantly limiting animal movement, urban environments remain underrepresented in biotelemetry movement studies. Recently, Bluetooth low-energy (BLE) beacons have emerged as an accessible and scalable tracking method suited to high human-density landscapes – albeit with limitations in studying habitat selection. Here, we examine habitat selection in white-winged choughs (*Corcorax melanorhamphos*) and evaluate the use of BLE beacons to infer habitat selection across urban landscapes. Using a population of BLE-tagged choughs in Canberra, we develop a detection-rate-based BLE approach by modelling detection rates of fixed BLE beacons along an urbanisation gradient, thereby evaluating whether it captures 'ground-truth' habitat selection patterns. By assessing the efficacy of BLE approaches for quantifying habitat selection patterns and connectivity across fragmented urban habitats, we

provide an urban tracking methodology suited to habitat selection that overcomes key limitations of traditional tracking methods.

Examining links between early-life conditions, oxidative stress, and telomere length in the purple-crowned fairy-wren, *Malurus coronatus*

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Telomere length is known to affect longevity and survival in wild songbirds, especially when individuals are exposed to high temperatures during early-life stages. Understanding the physiological mechanisms linking early-life conditions to telomere shortening in songbirds is critical to predict how environmental change will drive population trends. Oxidative stress is a candidate physiological mechanism that may mediate the relationship between early-life conditions and telomere shortening, yet few studies have focused on relationships between oxidative stress and telomere length. Here, we will examine associations between oxidative stress, early-life conditions, and telomere length in an endangered songbird of Australia's monsoonal tropics, the purple-crowned fairywren Malurus coronatus, using data collected at the Australian Wildlife Conservancy's Mornington Wildlife Sanctuary (Kimberley, WA). In this species, nestlings with shorter telomeres have lower lifetime fitness, and those that grow up in hotter and drier conditions have shorter telomeres. We therefore hypothesize that nestlings will incur greater oxidative stress during hotter conditions, and that increased oxidative stress will be associated with shorter telomeres. We also predict that better habitat and greater water availability will attenuate the effects of high temperature on oxidative stress. Our work will provide insight into the oxidative processes linking early-life heat exposure and telomere shortening.

Investigating the influence of urbanisation and landscape characteristics on the presence and behaviour of oystercatchers

Emma Vanderzon; Ryan Baring; Diane Colombelli-Négrel
Flinders University

As human populations increase and move towards the coast, coastal environments are becoming increasingly more urbanised. This has important implications for shorebirds as coastal ecosystems provide them with important habitat and feeding opportunities. Here, we investigated habitat selection and usage of two Australian Oystercatchers (Pied and Sooty Oystercatchers) along four major coastal regions in South Australia that varied in levels of urbanisation and human disturbance. We surveyed 150 coastal beaches and recorded oystercatchers' presence and, behaviours to determine site usage (foraging and roosting vs breeding). We also recorded habitat characteristics (i.e., landscape features and urban development), food availability (from sediment samples), and human activities. We found that only 10% of the sites were used for breeding while 26% were used for nesting/roosting. The remaining 64% were unused by the birds despite previous historical records mentioning their presence Oystercatcher presence and usage of the sites were strongly influenced by both food availability and the degree of urbanisation. These results demonstrate that even species considered highly urbanised, such as Oystercatchers, remain responsive to urbanisation levels.

This understanding strengthens our ability to identify the factors shaping shorebird presence and behaviours and to guide more effective management and conservation strategies.

Nest camera insights on factors impacting the nesting success of Square-tailed Kites and Little Eagles

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Birds of prey often occupy apex predatory niches in ecosystems, yet are undergoing widespread global decline. Our research investigates Little Eagles (*Hieraaetus morphnoides*) and Square-tailed Kites (*Lophoictinia isura*) on the New England Tablelands of NSW using a combination of field observations and nest camera data. We aimed to identify breeding behaviour and potential threats to nest success in these species, so that mitigation strategies for preventing ongoing population declines can be developed. In the 2025-26 breeding season we observed poor fledging success rates of 33% (LE) and 0% (STK). Further, some individuals occupying breeding territories were unable to secure a mate. We also identified previously unrecorded nest predators and cases of severe interspecific competition that further highlight the threats that these species face. We have also monitored nests using bioacoustics and developed automated recognisers to help map and monitor species presence over a wider area. Our project continues with further nest observations, GIS-mapping of habitat use and planned tagging of individuals to generate movement ecology data in the upcoming season, aiming to improve the survival prospects for these declining raptors in our region.

Surely There's An Easier Way: Reinvestigating Unsupervised Clustering For Behavioural Classification In Animal-Borne Accelerometry

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High-frequency animal-borne biologgers provide increasingly detailed insights into the lives of free-ranging animals. Among these, accelerometers continuously record animal body movement and can be used to infer posture, energy expenditure, and even fine-scale behaviours. Despite increasing interest in these methods, however, behavioural classification from accelerometry remains underutilised outside of agricultural systems, largely due to the complexity and practical constraints of the required supervised machine learning workflows. Unsupervised clustering provides a potential, simpler, and more generalisable alternative. By identifying inherent underlying similarities in the acceleration data, unsupervised approaches remove reliance on labelled training sets and enable classification on unknown data. Here, we reconceptualise behavioural classification as a clustering problem and assess whether unsupervised approaches can extract biologically meaningful structure from acceleration data of 20 species' datasets. By embedding multiple species in the same cluster space, we provide not only a generalisable pathway for species classification where supervised learning is inaccessible, but also enable a direct comparison of the variations in behaviour across a range of species.

Temporal variation in Little Penguins' diet

Alicia Wollaston; Ryan Baring; Arisha Silverlake; Diane Colombelli-Négrel
Flinders University

Marine top predators, such as seabirds, play a critical role in structuring marine food webs by regulating prey populations and dispersing nutrients. As such, understanding their adaptability to adjust their behaviour and foraging strategies to changing environments can provide valuable insights into ecosystem resilience. In this study, we used stable isotopes and fatty acids to assess temporal variation in little penguins' (*Eudyptula minor novaehollandiae*) diet across six years spanning several environmental pulse events, including La Nina floods, El Nino upwelling, a marine heatwave, and a recent algal bloom. To do so, we collected feathers from moulting little penguins on Granite Island (South Australia) between 2016 and 2026. To date, Little Penguin diet has been mostly inferred from New Zealand and South-Eastern/ Western Australian populations using blood and muscle tissues, with little data from South Australian populations. This study will, therefore, fill an important knowledge gap for little penguins as well as improve our understanding of top predators' capacity for behavioural flexibility under changing conditions.

The role of constraints on the nest architecture of white-winged choughs (*Corcorax melanorhamphos*)

Rhiana Woods; Damien Farine; Brendah Nyaguthii Nyagah
Australian National University

Variation in nest architecture is often interpreted as being adaptive, whereby birds shape their nest in response to environmental pressures such as predation, concealment or sexual selection. While many studies have examined nest architecture in this context, fewer have considered the role of constraints in shaping the structures that birds are able, rather than optimised, to build. Here, I apply a constraints-based perspective to the mud nests of the white-winged choughs (*Corcorax melanorhamphos*). I predicted that (1) higher mud availability after rain will facilitate larger nests, but that (2) larger groups will build larger nests as they are less constrained. I also predicted that (3) smaller groups will have a higher probability of immature group members participating in nest building. My results confirm that white-winged choughs build significantly larger nests when mud availability was higher, and that larger groups build significantly larger nests than smaller groups. Smaller groups had a significantly higher probability of immatures participating in nest building than larger groups, which suggests that they are more constrained by the number of available adult nest builders. This research proposes that at least part of the variation in nest architecture is a reflection of environmental and social constraints.

Flexibility of nest-building behaviour in Superb Fairy-wren

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Bird nests are sophisticated structures that buffer offspring from harsh environmental conditions, a function that is becoming increasingly critical as climate change intensifies.

Seasonal variations in nest morphology have been observed in Superb Fairy-wrens (*Malurus cyaneus*), with nests becoming smaller, lighter, and less insulated in summer. This research investigates whether this variation in nest morphology has functional consequences for nest microclimate using a novel translocation experiment. Previously collected Superb Fairy-wren nests of varying morphologies were redeployed under standardized field conditions and instrumented with temperature and humidity loggers. Complementary wind tunnel experiments under controlled laboratory conditions will also be performed to test how nest morphology influences thermal buffering across different temperatures and wind speeds. Ultimately, this study will provide rare experimental evidence of how construction flexibility may enable birds to mitigate the impacts of anthropogenic climate change.
