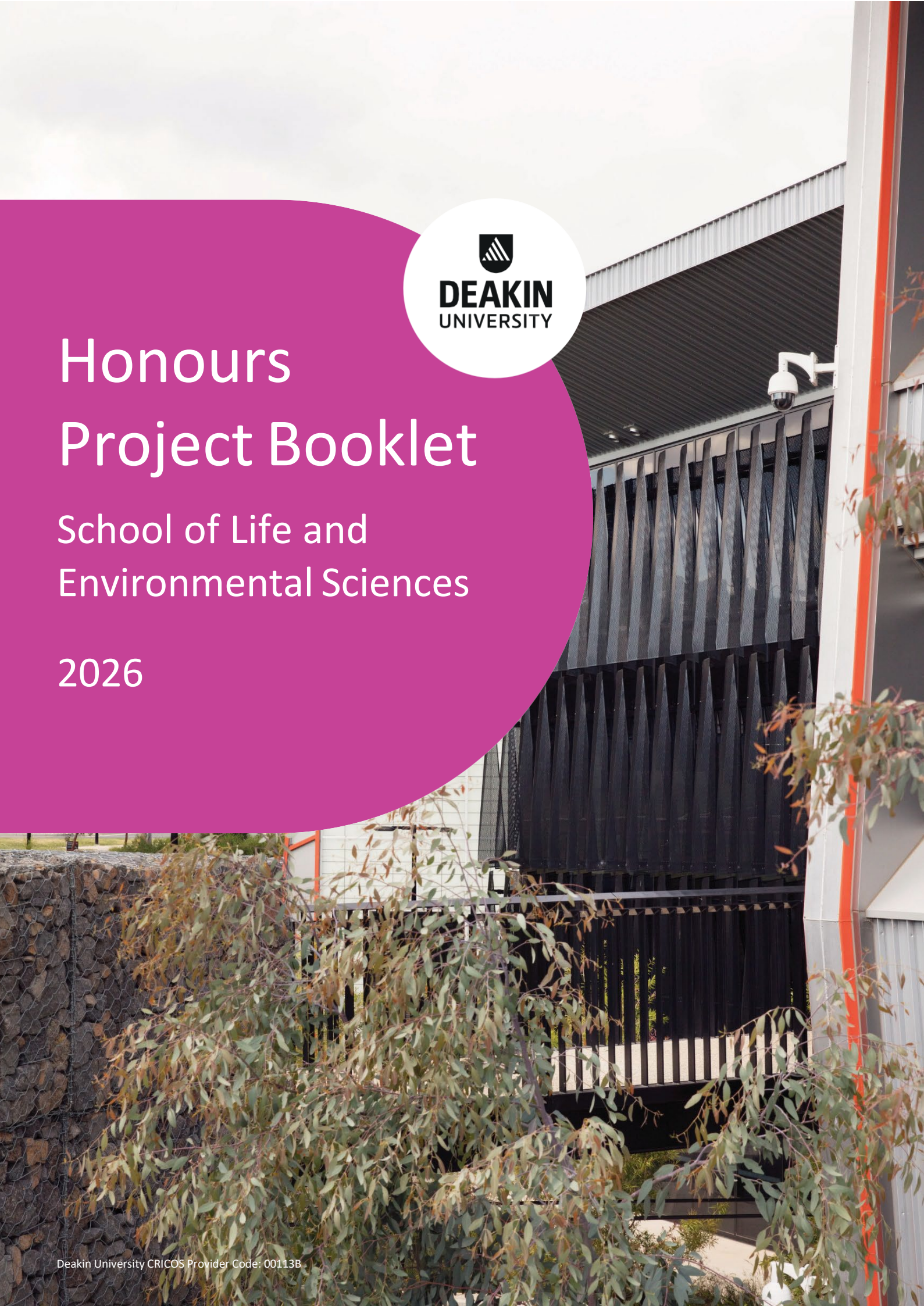


Honours Project Booklet

School of Life and Environmental Sciences

2026

Deakin University CRICOS Provider Code: 00113B

What is Honours?

During Honours, students undertake independent research, under supervision, that forms the majority (75%) of their activity for the year. The research may involve field work, laboratory work and data analysis, depending on the nature of the project. The major assessment component is the written thesis produced at the end of the year. Honours students must present their research via oral presentations. There are also two coursework units (comprising the remaining 25% of activity) which vary according to the Honours program you are enrolled in.

Why do Honours?

An Honours degree provides an important year for further acquisition of scientific skills. In addition to the specialised research training, you obtain during your research project, all Honours students gain further competence in critical thinking and data analysis, information technology, computer software, and scientific communication via oral and written presentations. These skills are recognised by external employers as essential in the workplace. Thus, completion of an Honours year will make you more employable. An Honours degree also exposes you to research of national and international significance, and is the springboard to further study as a postgraduate student undertaking Masters or PhD level research.

How do I get into Honours?

Admission to the Honours program normally requires students to have a Bachelor's degree with an average of at least 65% or greater in their level-3 units. There is an alternative entry pathway with consideration of relevant work experience through an interview process. Furthermore, admission to the Honours program is dependent on a suitable research project and the availability of a supervisor.

Honours structure

There are three Honours courses:

- S400 Bachelor of Science (Honours)
- S401 Bachelor of Forensic Science (Honours)
- S494 Bachelor of Environmental Science (Honours)

All three Honours courses run on a semester structure, with Honours requiring 2 semesters of study. In each semester you will do 4 credit points. Two of these credit points in semester 1 or semester 2 will be for the two stand-alone coursework units. The remaining 6 credit points will be for your research project running across both semesters.

Activities for Semester 1 Honours will commence on **Monday, 2 February 2026,** with thesis submission in early November. Semester 2 Honours commence on **Monday, 6 July 2026,** with thesis submission the following April 2027. You must be available to commence Honours on the specified start dates.

Applications

The first step in securing a place in the program for 2026 is to contact supervisors and discuss projects. Once you have met with a supervisor and agreed on a project, please complete the application form on the website. Application forms must be completed and signed by the nominated Supervisor and attached to your online application via the Deakin applicant portal.

Applications close on **Monday, 12 January 2026** for the Semester 1, 2026 intake and **Monday, 15 June 2026** for the Semester 2, 2026 intake. **Please note that late applications will not be considered.**

Further information can be obtained from your local Honours coordinator (Burwood: Dr Tricia Wevill; Waurn Ponds: Dr Andrew Oxley; Warrnambool: Dr Mary Young) and via the

School Honours website.

Burwood Projects

Dr Carla Archibald

Campus: Burwood
Contact details: c.archibald@deakin.edu.au

Research area description:
Harmonising the ways in which people and societies engage with biodiversity and the natural environment is one of life's great balancing acts. My current research at Deakin University focuses on understanding this balance by calculating "biodiversity footprints" of agricultural products and researching the impacts and dependencies of businesses on nature (known as "nature-related risk"). Some of my previous research projects have focused on private land conservation, wildlife management in urban areas, avian ecology, invasive species management, international conservation policy, conservation finance, and climate change.
Applicants should possess enthusiasm for writing and communicating, familiarity with data analysis and/or statistics (e.g., using Excel, R, Python, or GIS), and the ability to work independently and collaboratively within research and potential industry collaborations. For both projects listed below, applicants should expect to learn desirable skills for future employment in the sustainability field. Please note that I am always happy to discuss other project ideas that students may have, and there will be opportunities to bring on co-supervisors for additional expertise.

Specific project themes:

1. Assessing the biodiversity footprint of a large organisation: Conducting desk-based analysis to assess the biodiversity footprint of a large organisation and explore what it would take for them to become "nature positive."
2. Assessing the risk of nature loss on a large organisation: Conducting desk-based analysis to assess the “nature-related risk” for a large organisation and providing recommendations for actions they should implement to adequately mitigate the risk of nature loss to their business.

Dr Belinda Christie

Campus: Burwood and Online

Contact details: b.christie@deakin.edu.au

Research area description:
I research human–nature relationships, sustainability, urban planning, composting and recyling, mindfulness and spiritual ecology, often in the context of environmental education, using quantitative and qualitative social research methods.

Specific projects on offer:
As each of the below projects involve researching applied mindfulness practices, an interest in, or willingness to experience, some of these practices firsthand will be beneficial. This list is not exhaustive, and I’m happy to adapt these projects, or discuss others of your own design, which align with your interests, cultural background, and the skills you wish to develop as a researcher.

Mindfulness for Sustainability projects:

1. Mindfulness programs for sustainability professionals: Improving sustainability professional wellness and resilience through applied nature-based applied mindfulness practices

2. Mindfulness in university classrooms: The use of applied mindfulness practice and trauma-informed wellbeing as pedagogy (the practice of teaching) within university classrooms and their capacity to assist Graduate Learning Outcomes.

3. Mindfulness in community environment programs: Using trauma-informed applied mindfulness practice and communication in community-based environmental, sustainability, and climate action projects to promote inclusivity for marginalised communities and achieve improved social and environmental outcomes.

4. Mindfulness and sustainable behaviour in consumers: The role of applied mindfulness practices in sustainable lifestyle choices and consumption habits (dietary choice, products, clothing, travel, social and mainstream media, investment decisions, etc)

5. Mindfulness in food waste and composting: The effectiveness of applied mindfulness practices in food waste and composting education and waste diversion.

Prof Raylene Cooke

Campus: Burwood

Contact details: raylene.cooke@deakin.edu.au;

Research area description:

Our research team has a focus on raptors and how they utilize different land-use types including urban, agricultural and forested landscapes. Much of the fieldwork is undertaken at night investigating the movement and behaviour of nocturnal birds (owls and frogmouths) and their prey (possums and gliders) so a willingness to work at night is a must.

We are also interested in investigating the impact rodenticides are having on native wildlife.

Specific projects on offer:

1. Assessing the extent of rodenticides in wildlife. Co-supervisors John White and Kaori Yokochi
2. Determining the presence of nocturnal birds across Phillip Island. Co-supervisor John White
3. Investigating the abundance of possums and gliders in different land-use types. Co-supervisors John White and Kaori Yokochi

Dr Bernhard Dichtl

Campus: Burwood

Contact details: bernhard@deakin.edu.au Ph: 03 9251 7060

Research area description:

In our lab, we are broadly interested in the regulation of gene expression, with a focus on how cells integrate signals from stress, DNA damage, and viral infection to control transcriptional output. Our work examines how transcriptional repression, RNA processing, and post-translational modifications are coordinated to shape gene expression programs under changing cellular conditions. We are particularly interested in how nuclear factors interact to fine-tune the transcriptional machinery in response to physiological and environmental stress, and how these mechanisms contribute to genome stability and cellular homeostasis.

Our research focuses on understanding the molecular pathways that silence gene activity once a response has been initiated. We are exploring how specific nuclear proteins coordinate to suppress transcription at multiple levels, including promoter-proximal pausing, chromatin modification, and the post-translational control of transcription factors and co-regulators. This work aims to define how these layers of regulation ensure that stimulus-responsive genes are inactive under resting conditions and are efficiently downregulated once the cellular response has been resolved. By investigating these pathways, we hope to uncover general principles of gene regulation that apply not only to immune defense, but also to broader contexts such as stress adaptation, DNA repair, and developmental control.

Specific projects on offer:

1. Promoter proximal regulation of gene transcription by termination factors.
2. Biochemical characterisation of factors involved in HIV latency.
3. Regulating the RNA kinase Clp1 in health and disease.

Prof Don Driscoll

Campus: Burwood

Contact details: d.driscoll@deakin.edu.au

Research area description:

The Biodiversity Research and Conservation Ecology lab (https://dondriscoll.com/) has a focus on how species use whole landscapes, including animal movement and disturbances like land-clearing and fire. We test ecological theory using applied conservation problems, and work with a range of government and environmental organisations to ensure our research has real-world impact. The BRACE lab draws on cross-disciplinary expertise to help us answer complex ecological questions, including collaboration with social-sciences, engineering and experts in artificial intelligence.

To complete field projects, you will need to gather volunteers, and you will need a current driver's license. Frog projects involve night work.

Specific projects on offer:

1. **CRACK!** (suits February start) Where do small animals hide when it dries out, and what happens when farming practices threaten those hiding places? In this novel project we will collaborate with the Beyond Bolac catchment action group to map threats to cracks and to assess crack use by frogs and other small animals.
2. **Threatened frog declines** (suits February start) *Pseudophryne semimarmorata* is listed as vulnerable in Victoria due to reported declines. In collaboration with Melbourne Water, this project aims to discover how land management influences this autumn-breeding frog and the extent of decline across its range.
3. **Frogs, drought and chytrid**. *Pseudophryne bibroni* is an autumn-breeding frog with concerns that it may be at risk of decline. This project will build on previous data to understand how drought, chytrid and a novel intervention interact to influence frog survival.
4. **Threatened species distributions and monitoring with the Threatened Species Conservancy including:**
   - *4.1* ***Aprasia parapulchella*** **(pink-tailed worm-lizard) monitoring protocols using eDNA** (Feb, or mid year start)
   - *4.2* ***Breeding requirements of the endangered small ant blue butterfly (Acrodipsas myrmecophila).*** This project will investigate the habitat requirements for the butterfly's host species, the coconut ant and the conditions under which butterflies colonise ant colonies.
   - *4.3* ***Impact of bushfires and climate change on the endangered Otway Black Snail (Victophanta compacta)*** Survey historical and community collected records to determine changes in distributions and potential drivers of change including potential impacts of the 2014 & 2015 bushfires near Wye River post 2 years of El Nino.
5. **Christmas Island Reptiles.** A new management plan has just been developed that highlights some priority projects to help save extinct-in-the-wild reptiles. You would need to self-fund some of the travel, but if you are up for that, this is a very exciting project with potential to help save a species from extinction. The current project includes applications of new AI-assisted cameras to detect invasive species and monitor extinct-in-the-wild reptiles.
6. **Other ideas that you are prepared to organize and lead and which fit into the scope of the BRACE lab and which you can self-fund or cost very little.**

Dr Christie Lam

Campus: Burwood

Contact details: c.lam@deakin.edu.au

Research area description:
I am an environmental and development anthropologist. My research is multidisciplinary in nature, drawing on Anthropology, Environmental Sciences, and Development Studies perspectives. My particular research interests are the social dimension of natural resources conflicts (protected areas management), climate change adaptation, sustainable farming and food security, and pro-environmental behaviour. I love working with communities closely by listening to their voices and empowering them in the decision-making process through participatory research methods such as ethnography and participatory action research to develop co-designed sustainability policies. I welcome inquiries from students who are interested in understanding environmental sustainability from the social science perspective.

Methodology: Qualitative methods, cross-cultural engagement, systems thinking

Specific project on offer:

1. **Regenerative Agriculture Project** Transforming agriculture is crucial to achieving future sustainability, and regenerative farming practices are increasingly popular as a nature-based solution to mitigate climate change, biodiversity loss, and soil degradation; however, the lack of studies on their impacts on the environment and society could pose a barrier to upscale adoption of regenerative practices among farmer communities. In this project, we will work together with industries and farmers to evaluate the impacts of regenerative practices on soil health, water health, animal health, food nutrition, biodiversity, and community wellbeing. If you have relevant knowledge and would like to work together, please contact me. The project aims to use rigorous evidence to inform future sustainable farming practices and policies.
2. **Cellular Agriculture Project** Cellular agriculture attempts to create animal products, such as meat and dairy, through technological innovation and without animals. Such technologies promise significant environmental, health, allergy, and animal well-being benefits. Despite the rapidly advancing technology of cellular agriculture, especially the soon-to-be available animal-free dairy products in the Australian market, the potential impacts of the agriculture industry are unknown. The project aims to investigate farmers' attitudes toward animal-free dairy products and their concerns about the fast-growing cellular agriculture. The study's results will help us design future research on sustainable food systems.

Prof Rebecca Lester, Dr Galen Holt, Dr George Cunningham, Dr Emily Armstrong and David Dodemaide

Contact details: rebecca.lester@deakin.edu.au, g.holt@deakin.edu.au, george.cunningham@deakin.edu.au, emily.armstrong@deakin.edu.au, d.dodemaide@deakin.edu.au

Ph: +61 3 522 78254

Research area description: The Quantitative Aquatic Ecosystem Laboratory (QAEL), undertakes theoretical and applied research in freshwater, estuarine and marine systems. Our current research covers a broad range of ecological and population dynamics questions, focusing on freshwater and brackish systems and the effects of drought, climatic change and other human impacts. Our projects require an enthusiastic student who is open to learning a range of skills from a variety of disciplines. Other research projects related to aquatic ecology are also feasible. Feel free to contact us to discuss potential projects that might be possible in addition to those below.

Specific projects on offer:

- A field-based assessment of the efficacy of fencing and vegetating farm dams in improving biodiversity and environmental condition on farms
- A small-scale study investigating the ability of native species to replace exotic pasture species to improve farmers ability to feed livestock during drought
- A field-based investigation of when and where caddisflies are habitat limited when selecting sites for egg laying
- Identify the crop types used by colonial nesting water birds for foraging using tracking data and satellite imagery
- A field-based investigation into the impact of an emerging disease (*Saprolegnia* infection) on caddisflies and their ability to reproduce
- Can a fungal-like disease actively seek out their hosts (caddisfly eggs)? A laboratory-based experiment investigating chemotaxis and the effect of temperature and nutrients on S*aprolegnia spp*.
- Other field, laboratory or modelling projects investigating aspects of caddisfly species coexistence, stream restoration on farms and responses to drought and climate change.

Dr Roan Plotz

Campus: Burwood and Waurn Ponds

Contact details: r.plotz@deakin.edu.au **Ph: 03 9244 5165**

Research area description:

My research is multidisciplinary and spans the fields of wildlife behavioural ecology (particularly escape and communication behaviour in mammals), Indigenous Knowledge (particularly climate warming driving changes in animal and plant phenology), and human dimensions of wildlife interactions to improve species conservation and management. Most of my projects involve fieldwork, sometimes at night.

Specific projects on offer:

Currently, I am looking for several honours students to work on projects looking at:

- Escape behaviour in mammals (possibly reptiles). Several projects are available looking at using Flight-Initiation Distance to index a variety of mammal responses to human activities (e.g., animal responses to human – presence, use of technologies e.g., urbanization, spotlights, vehicles across contexts etc. Any reptile work would require student experience in reptile identification.
- Eavesdropping behaviour in animals. Investigating how and why animals (birds, reptiles or mammals) eavesdrop on their own or other animals' communication signals (e.g., alarm calls, macropod foot thumping) provides insights into the evolution of sociality, anti-predator behaviour and species competition.
- Indigenous Knowledge and community engagement to enhance climate resilience: opportunities to incorporate Indigenous Knowledge with contemporary science to enhance environmental outcomes.

Around my research themes above a variety of options for honours project ideas are possible. Any students interested in my research areas or projects areas are welcome to contact me. I am very happy to discuss students' area of interest and ideas and see if we can align with my research expertise.

Dr Nicholas Porch

Campus: Burwood

Contact details: nporch@deakin.edu.au Ph: (03) 92517620

Research area description:

Deakin Bug Lab has several ongoing research projects focussing on the poorly known terrestrial invertebrate fauna of SE. Australia (1).

We are discovering hundred of previously unknown and undescribed species every year in wet forests and rainforests (an Australian Research Council Linkage Project with Zoos Victoria, DEECA, Australian Museum and South Australian Museum) and in montane environments (a Hermon Slade Foundation project).
We seek honours students to work on aspects of these projects and don't expect any previous inverbrate experience – just an open mind to what most of biodiversity looks like. Projects may be supervised/co-supervised by Prof. Heloise Gibb and/or Dr. Nathan Butterworth.
Further, Nick is always looking for students interested in the palaeoecology of past environments and using fossils to reconsrtuct the history of human impact on insect biodiversity (2).

Specific projects on offer:

1. **Discovering Australian Terrestrial Invertebrates**: A wide range of potential projects are available that directly or indirectly relate to the projects described above. This includes projects focussing of **patterns of endemism in SE Australia** in selected invertebrate taxa using molecular or morphological approaches, the **association between alpine plant species and obligate plant-feeding insects** and developing **understanding of highly endemic regional faunas**. Some projects would be laboratory based whereas other may involve significant periods of fieldwork.
   We are especially interested in finding students to work on the SE. Australian montane archipelago project which is exploring invertebrate diversity and endemism in the Australian Alps.
2. **Palaeoecology of Human Impact on Island Biodiversity**: Are you interested in islands, extinction, biological invasions, biogeography, palaeoecology or fossils? Projects in this area are laboratory-based investigations into the nature of the recent fossil record of plants and insects on Indo-Pacific oceanic islands. Projects could, for example, explore this **history of human impact on biodiversity** using samples from the Cook Islands or contribute to the growing recognition of catastrophic insect extinction by **describing extinct beetles from Rodrigues in the Indian Ocean**.
   If this area or similar types of questions in an Australian context interest you, please send Nick an email.

Dr Anthony Rendall

Campus: Burwood and Waurn Ponds

Contact details: a.rendall@deakin.edu.au

Research area description: My research spans the fields of invasive species ecology, island ecosystems, trophic dynamics, threatened species conservation and landscape ecology. I am always happy to speak with students about research that interests them or can discuss projects within my fields of research.

Prof Euan Ritchie

Campus: Burwood

Contact details: e.ritchie@deakin.edu.au Ph: (03) 9251 7606

Research area description:
Predator-prey interactions, ecosystem management, fire ecology, invasive species management, mammal ecology, wildlife management and conservation.

Specific projects on offer:
I have a range of potential projects available, working with industry partners, including:

1. Use of artificial and chainsaw hollows by arboreal mammals and birds.
2. The population ecology of eastern barred bandicoots.
3. The distribution and abundance of arboreal mammals in roadsides of the Strathbogie ranges.
4. Predator-prey interactions and population ecology of mammals at the Briars.

I also encourage students to discuss ideas for projects that they may have.

Prof Matthew Symonds

Campus: Burwood

Contact details: matthew.symonds@deakin.edu.au Ph: (03) 92517437

Research area description:
In our group we work on the evolution of behaviour, morphology and physiology between closely related species of animals. Much of our research involves combing ecological and evolutionary information to answer questions about how and why traits have evolved, identifying the factors that shape evolution of the trait – with particularly interest in effects of climate and other environmental variation. I offer a mixture of field-. museum-, lab- and desk-based Honours projects – predominantly on birds, and insects. In additional to the projects below I'm open to suggestions! Feel free to contact me to ask me more about these. If you want to get the best idea of the breadth of my research interests and projects, look no further than the publications page on my website (www.symondslab.wordpress.com/publications/).

Specific projects on offer:

1. The interaction between morphological, behavioural and physiological adaptations across populations in different climates
2. The link between escape responses and bird and mammal distribution and extinction risk
3. Predictors of anti-predator responses in threatened bird species
4. Variation in the control of heat loss in birds, and its consequences for bird body shape
5. The evolution of sexual differences in body shape
6. Drivers of diversity in ant cuticular hydrocarbons
7. Gender differences in publication output in the ecological sciences (this project is suited for a more science-policy, data-based student).

Dr Marcelo Tavares

Campus: Burwood

Contact details: **marcelo.tavares@deakin.edu.au** Ph: 0401 065 144

Research area description:
Our research focuses on computational chemistry, which applies computer-based methods to model and simulate chemical reactions and intermolecular interactions, as well as to predict physicochemical

properties. Projects vary from self-contained theory-oriented studies to applied investigations carried out in collaboration with experimentalists. Some projects may benefit from basic Linux/scripting knowledge, while others use more intuitive software.

Specific projects on offer:

1. Benchmarking DFT methods for metal-containing systems.
2. Elucidating reaction mechanisms in organic and organometallic chemistry relevant to catalysis and surface chemistry.
3. Applying state-of-the-art computational tools, including AI-based methods (e.g., AlphaFold) to solve problems in chemical biology and medicinal chemistry.

During the course, the student will develop skills in computational chemistry software, molecular modelling, data analysis, and visualization, gaining hands-on experience with techniques used in modern chemical research. They will also build skills in scientific writing, with their work potentially contributing to publications in peer-reviewed journals.

Dr Angel A.J. Torriero

Campus: Burwood

Contact details: angel.torriero@deakin.edu.au Ph: (03) 9244 6897

Research area description:

My research group operates at the dynamic intersection of electrochemistry and molecular biology. Our diverse and pioneering projects involve electrosynthesis, electrochemical biosensors and immunosensors, and the interaction of pharmacologically active molecules with cell membranes. Our work aims to develop innovative solutions to current scientific challenges, making a tangible impact on health and technology.

Specific projects on offer:

1. **Development of Electrochemical Calibration-Free Biosensors for Early Disease Detection:** This project focuses on designing and fabricating novel biosensors capable of detecting biomarkers for various diseases at early stages. Students will learn electrochemistry, bioconjugation, and data analysis techniques, providing a comprehensive skill set for careers in medical diagnostics and research.
2. **Electrosynthesis of Pharmacologically Active Molecules:** This project aims to develop new methods for synthesising pharmacologically active compounds using electrochemical techniques. The work involves collaboration with leading pharmaceutical researchers and offers hands-on experience in synthesising, purifying, and characterising new molecules.
3. **Interaction of Drugs with Cell Membranes:** Understanding how drugs interact with cell membranes is crucial for developing more effective therapies. This project combines electrochemical techniques with molecular biology to study these interactions at a detailed level, offering insights into drug design and delivery.
4. **Immunosensors for Point-of-Care Testing:** This project involves developing immunosensors for rapid and accurate point-of-care testing. Students will engage in multidisciplinary research, integrating immunology with advanced sensor technology to create devices that could revolutionise patient care.

Why Join Our Team? Our lab offers a unique opportunity to work at the forefront of scientific research with state-of-the-art facilities and a collaborative environment. Students will gain valuable experience and mentorship, preparing them for successful careers in academia, industry, or further

research. We seek passionate, dedicated students eager to learn and contribute to cutting-edge research.

Assoc Prof Susanna Venn

Campus: Burwood

Contact details: susanna.venn@deakin.edu.au

Research area description:
Alpine plant ecology projects: I'm interested in testing ecological theory in the mountains and looking at ways in which alpine plant communities are coping with environmental change. This could involve focusing on community (re) assembly patterns, how snow drives community composition, ecological function or ecological processes in the mountains, treeline dynamics, vegetation responses to heat and frost, regeneration strategies of alpine plants, and experimental manipulations in the field / lab. Have a look through my webpage for some of the topics that I'm interested in, I'm happy to discuss ideas for honours projects that overlap with any of these topics – or possibly other plant ecology projects in extreme environments. I also co-supervise honours projects with other ecologists in the School.

https://susannavenn.wordpress.com
https://www.extremeplantecology.com/

Specific projects on offer:

1. Phenology and the timing of life history events in alpine plants (Labwork and some fieldwork)
2. Interactions between high light and freezing resistance (Labwork and some fieldwork)
3. Opportunities for growth and development of alpine plants under snow (fieldwork and labwork)
4. Alpine seed germination (Labwork)
5. Evaluating the success of Alpine Resort revegetation projects (Fieldwork)
6. Understanding the effects of drought on alpine plants (Labwork and fieldwork)
7. Using plant functional traits to understand changes in plant community composition and interactions with snow melt timing (Desktop study)

Dr Mark Warne

Campus: Burwood

Contact details: **mark.warne@deakin.edu.au** Ph: (03) 9251 7622

Research area description:
My research focuses on fossil and living Ostracoda. These microscopic shrimp-like aquatic animals live in a minute bi-valved shell (carapace), which is usually composed of the mineral calcite ($CaCO_3$). These crustaceans have a long fossil record, with ostracod-like forms extending back to the Cambrian Period. At the present day, ostracods live in a huge diversity of aquatic environments, ranging from moist forest floors, creeks and rivers, lakes and lagoons, swamps and bogs, caves and aquifers, to coastal rock pools, shallow shelf seas, and deep ocean realms. They reach their highest species diversities in shallow marine environments. The main application of fossil ostracods is the interpretation of past environments back in geological time. The main use of living ostracods is for monitoring environmental changes in aquatic ecosystems.

Specific projects on offer:

1. **Sea level fluctuations in southern Victoria during the Miocene: Microfossil evidence from the Mornington Peninsula coastline.**

This project will involve the use of marine microfossils to interpret past marine environments and to reconstruct the history of sea level fluctuations in southern Victoria during Miocene times.

2. Marine Ostracoda from the shores of Hobson's Bay, Victoria

The distribution of present-day marine ostracod faunas (microscopic crustaceans) along the shores of Hobson's Bay (north end of Port Phillip Bay) will be used to identify sites of maximum biodiversity within this industrial maritime precinct.

Dr Liz Weldon

Campus: Burwood

Contact details: l.weldon@deakin.edu.au Ph: +61 3 92517191

Research area description:

Research supervision capabilities in palaeontology, earth science, palaeobiogeography, palaeoecology, palaeoenvironmental analysis, and geoconservation.

Major themes:

1. **Geoconservation:**
   - Develop regionally and culturally appropriate quantitative methodology to assess geosites and geoheritage for geoconservation.
   - This research is suitable for both Honours and Master of Sustainability students.

2. **Marine invertebrate response to climate change and mass extinction events:**
   - Taxonomic studies and quantitative analysis of marine macro-invertebrate fossils used as bridging taxa for Gondwana-Euroamerican correlation in the Permian.
   - Understand the drivers of diversity, origination, extinction and distribution in response to palaeoenvironmental change.

3. **Terrestrial megafauna:**
   - Quantitative morphological studies of extinct and extant macropods and emus.
   - Plot the spatial and temporal distribution patterns of the Vombatidae from the Miocene (~16-19Ma) to the present.
   - Determine the impacts (e.g. disease/extinction/migration) of varying climate, changes in vegetation, and anthropogenic factors.

4. **Vertebrate and invertebrate palaeontology:**
   - Various projects available in conjunction with the Melbourne Museum.

Assoc Prof Desley Whisson

Campus: Burwood

Contact details: dwhisson@deakin.edu.au Ph: (03) 9251 7302

Research area description:

My research aims to understand the spatial ecology (home range, movements, distribution) of terrestrial wildlife and impacts of climate and landscape change and stochastic processes on species' distributions. I am particularly interested in forest ecosystems and arboreal species (koalas and gliders) but also have a strong interest in rodents including the threatened Broad-toothed Rat.

I am open to developing a mutually-interesting project with you. Some potential projects are listed below.

Specific projects available:

1. **Life after logging: Koalas in the Strathbogies** – Acoustic and transect surveys will assess how past logging affects current koala distribution in the Strathbogies, with possible tracking of some koalas to study their spatial ecology. Suitable for beginning in January or July.
2. **Keeping their cool: Climate change and Victoria's koalas** – Under climate change, refugia where koalas can escape the heat will become more important. This project will map the spatial distribution of koalas with respect to microclimate. Suitable for a July start only.
3. **Broad-toothed Rats: Surviving fire –** This project will assess recovery of Broad-toothed Rat populations at burnt sites in the Victoria Alps, by determining presence (scats and runways) in burnt and unburnt sites. Suitable for a July start only.

Assoc Prof John White

Campus: Burwood

Contact details: john.white@deakin.edu.au

Research area description:

John leads a long-term research project in the Grampians National Park (Gariwerd) investigating the impact of fire and climate on small mammal communities. This research offers a great opportunity to do lots of fieldwork, get valuable project management skills and build your resume skills enormously. A driver's license (all projects) and a commitment to being in the Grampians for up to 8 weeks is essential (projects 1 and 2). The Grampians was hit by a set of massive wildfires over the 24/25 summer, and this is an opportunity to now track the recovery of species.

John also has research focusing on wildlife management and increasingly also the impact of rodenticides on wildlife.

Specific projects on offer:

1. Small mammal trapping in the Grampians (Gariwerd) landscape to determine the influence of fire and climate on long-term trends in small numbers (Long-term ecological research with sites established in 2008). (Co-supervisors Raylene Cooke and Anthony Rendall). See Hindcasting long-term data unveils the influence of a changing climate on small mammal communities - Lupone - 2024 - Diversity and Distributions - Wiley Online Library for context about this amazing project.
2. Testing the effectiveness of species distribution models for small mammals across the Grampians (Gariwerd) landscape using camera trapping. Experience with GIS would be useful. (Co-supervisor: Raylene Cooke)
3. Assessing the extent of rodenticides in wildlife. (Co-supervisors Raylene Cooke and Kaori Yokochi)
4. Determining the presence of nocturnal birds across Phillip Island. (Co-supervisor: Raylene Cooke)
5. Investigating the abundance of possums and gliders in different land-use types. (Co-supervisors Raylene Cooke and Kaori Yokochi)

Assoc Prof Mike Weston

Campus: Burwood

Contact details: mweston@deakin.edu.au Ph: (03) 92517433

Research area description:

Conservation, human-wildlife interactions, solutions.

Specific projects on offer:

1. Flight Initiation Distance of world's mammals – investigating mammals' behavioural responses to disturbance/ environmental change/ urbanisation/ other threats. This is an exciting, new, large-scale research, and there is scope for multiple projects. We have some research topic ideas

already, but bringing your own ideas is encouraged. Co-supervised by Dr Kaori Yokochi, Dr Anthony Rendall, and Dr Roan Plotz and Dr Matt Symonds. Specific projects include:

a. Spotlight colour and escape in Australian mammals. This project will index escape behaviour when different Australian mammals (with different light sensitivities) are observed/approached using different spotlight colours and intensities.
b. Daytime versus nighttime escape in mammals, inside and outside conservation reserves/across predator regimes.
c. The relationship between cover, activity, Giving Up Densities and Flight-initiation Distance.
d. The possibility of major expeditions to locations where Flight-initiation Distances have not yet been recorded. This includes arid and semi-arid Australia, and also overseas, depending on financial and permits.

2. Flight Initiation Distances of world's reptiles. Students with experience in reptile identification are required to conduct some of the first ever studies of escape behaviour in Australia's reptiles using Flight-Initiation Distance. Co-supervised by Dr Kaori Yokochi, Dr Anthony Rendall, Dr Roan Plotz and Dr Matt Symonds.

3. Flight Initiation Distances of world's birds. Antipredator behaviour is a key life history trait and underpins the key threatening process known as "disturbance". A range of projects are available, including exploring discrimination between different types of "stimuli", factors which mediate risk taking (e.g., prevailing predator environment), and the nature and form of escape. Specific projects include:

a. Avian escape behaviour by day and night, especially shorebirds including when nesting and when protected by nest cages.
b. Penguin behaviour and escape under different spotlight colours.
c. Escape and defence in Masked Lapwing across a rural-urban gradient in southern Australia.

4. Shorebird conservation, especially supporting the conservation management of resident shorebirds under pressure from human use of habitats and other stressors e.g. invasive predators. Projects include Red-capped and Hooded Plover conservation and management, but other species are also possible. Project themes include:

a. A desktop project wrangling and analysing a large dataset on Hooded Plover monitoring (**). This project will involve some data entry, much cleaning and consolidation, and involves decades of critical data on birds and their management. Co-supervisors include Dr Grainne Maguire (BirdLife Australia).
b. Building upon a 2007 study at Cheetham Wetlands about unauthorised entries into the off-limits site. Substantial housing development has occurred in the area, so comparison with previous data will infer changes associated with urbanisation. This may extend to multiple shorebird sites off limits to the public.
c. A climate change modelling project where we access the layers available on sea level rise and overlay against Hooded Plover distribution, determining scale of losses and exploring where infrastructure prohibits retreat plus potential interviews with coastal managers about willingness to protect or carry out various actions for climate change preparedness for Beach-nesting Birds.
d. Whether nest protection cages inhibit escape behaviour of incubating plovers and whether cage design considerations can prevent this. Co-supervisors include Dr Grainne Maguire (BirdLife Australia).
e. Whether scent or other deterrents cause predators to avoid plover nests. Co-supervisors include Dr Grainne Maguire (BirdLife Australia).
f. Contaminants/pollutants in shorebird faeces and carcasses. This project will require laboratory analysis and fieldwork.
g. Reintroduction of a locally extinct shorebird (Bush Stone Curlew) to Victoria. A range of projects exist to support critical information gaps in the reintroduction of this species, including elucidating breeding habitat, success, threats and solutions.

5. The function of head-bobbing in shorebirds. Head-bobbing is a distinct behaviour recorded from many (possibly all) shorebirds, and is variously interpreted as alarm, signalling to predators, etc.

This project will combine field observations with a systematic literature review/expert elicitation to understand the occurrence and context of head-bobbing.

Almost all projects involve co-supervisors. For all but one (**) of these projects a current driver's licence and capacity to conduct field work is required. Some projects require field work at night. Please email your CV to start a discussion regarding any of these projects.

Dr Tricia Wevill

Campus: Burwood

Contact details: tricia.wevill@deakin.edu.au

Research area description:

My research focuses on the impact of altered disturbance regimes on vegetation, specifically determining how structure, function and composition may change under altered burning regimes.

Interested students should contact Tricia Wevill to discuss potential projects. If you have an interest in bryophytes, please see the bryophyte projects listed below, supervised by Matt Dell and myself. Matt's research interests include bryophyte ecology, biogeography and threatened plant conservation.

Specific projects available:

1. **Impacts of Phytophthora dieback on a threatened grasstree community**
   This project will investigate the impact of the pathogen in a Box-Ironbark vegetation community to assess the age, distribution and decline of the dominant Critically Endangered (FFG) grasstree *Xanthhorrhoea glauca.* The research team also includes Associate Professor Barbara Wilson, Dr Mark Garkaklis and Dr Kaori Yokochi.
2. **Bryophyte phylogenetic diversity and evolutionary distinctiveness of Australian bioregions using herbarium records**
   Matt Dell, Tricia Wevill
   Herbarium records provide verified information about the distribution of plant species. This project will use database information on bryophyte distribution to analyse and compare phylogenetic diversity and evolutionary distinctiveness at bioregional level (Interim Biogeographic Regionalisation for Australia). The analysis will adapt a joint phylogeny for mosses and liverworts and aims to identify the evolutionary relationship between regions. The outputs will provide tools to assist national-level conservation planning and give greater context to the biogeography of mosses and liverworts within Australia.
   A student with an interest in plant ecology, systematics, data analysis and GIS will be suited to this project. The project will require high standards in data curation and analysis, and will build on an unpublished pilot study undertaken for northern Australia.
3. **The origin of *Climacium dendroides* Marsh Tree-moss in Australasia**
   Matt Dell, Tricia Wevill (includes external co-supervision)
   Marsh Tree-moss is a predominantly northern hemisphere species with disjunct populations in Australia and New Zealand. There is anecdotal evidence that southern hemisphere populations may have been introduced within the last 200 years. Populations are treated as native in Australia and introduced in New Zealand. It is also listed in Victoria as Critically Endangered under the *Flora and Fauna Guarantee Act 1988*. This project will use genomic methods at suitable resolution to estimate divergence times for Australian and New Zealand populations compared with northern populations. Results will be evaluated with herbarium data and ecological information with the aim to identify the origin of this species in the southern hemisphere.
   The project will be suited to a student with an interest in botany and at least a fundamental understanding of plant phylogenetics and associated procedures. The project will include a combination of fieldwork and lab work, including visits to the alpine region of Victoria.

Dr Kaori Yokochi

Campus: Burwood

Contact details: k.yokochi@deakin.edu.au

Research area description: Urban Ecology of wildlife (including Road Ecology), mainly focusing on native mammals but open to any taxa. I'm interested in how urbanisation and infrastructure impacts wildlife and exploring potential solutions. My current and past research includes impacts of light pollution on insectivorous bat communities, use of existing drainage culverts by wildlife to cross roads, wildlife education on teachers using microbats as an ambassador, impacts of rodenticides on wildlife, and impacts of anthropogenic factors on birds and mammals' escape behaviours.

Specific projects available:

1. **Microbats**
    - Impacts of artificial lighting on microbats, and any other microbat research you can think of! I'm especially interested in impacts of urbanisation/ anthropogenic changes on the microbat communities.
    - Microbats as ambassadors – investigating how we can use inconspicuous, not-so-charismatic (not my personal view!) microbats to increase awareness of local biodiversity in the public.
2. **Flight Initiation Distance of world's mammals** – investigating mammals' behavioural response to disturbance/ environmental change/ urbanisation/ other threats. Bringing your own ideas is also encouraged. Nocturnal fieldwork is required. Co-supervised by A/Prof Mike Weston, Dr Anthony Rendall, Dr Roan Plotz and/or Prof. Matt Symonds.
    - Spotlight colour and escape in Australian mammals - indexing escape behaviour when mammals with different light sensitivities are exposed to different spotlight colours and intensities.
    - Daytime versus nighttime escape in mammals, inside and outside conservation reserves/across predator regimes.
    - The relationship between cover, activity, Giving Up Densities and Flight-initiation Distance.
    - FID in reptiles. Students with experience in reptile identification are required to conduct some of the first ever studies of escape behaviour in Australia's reptiles using Flight-Initiation Distance.
3. **Road x coastal squeeze: Use of existing infrastructure as crossing structure by wildlife in Otways** – ability to conduct fieldwork in Otways for a few days at a time is required. Experience in camera trapping is highly desirable. Co-supervised by Dr Marissa Parrott (Zoos Vic), Dr Jemma Cripps (ARI) and Dr Barbara Wilson.
4. **Impacts of Phytophthora dieback on a threatened grasstree and mammal community** - investigating the impact from the perspective of small mammal community. Ability to conduct fieldwork near Seymour for a few days at a time is required. Co-supervised by Dr Tricia Wevill, Dr Barbara Wilson and Dr Mark Garkaklis.
5. **Investigating the abundance of possums and gliders in different land-use types** – then potentially linking the information to powerful owl habitat and defoliation rate of vegetation. Willingness to conduct nocturnal fieldwork is essential. Co-supervised by A/Prof John White and Prof Raylene Cooke.
6. **Grey-headed Flying Fox** – there are some scopes for a project on GHFF camps around Melbourne and Geelong.

A current driver's licence, high level of organisational skills and ability to work independently are required for all projects. Please get in touch with me via email with your CV attached.

Waurn Ponds Projects

Dr Jacqui Adcock

Campus: Waurn Ponds

Contact details: jadcock@deakin.edu.au Ph: (03) 52272096

Research area description:

My research focusses on lipid chemistry and lipid analysis – developing new chromatographic methods for the analysis of various oils and fats and applying them to investigate the chemistry of lipids relevant to health and the food industry. Lipids (oils and fats) are a diverse group of molecules, with a range of important roles including cell membrane structure, energy storage, intracellular signalling, and antioxidant activity. They are present in many foods and are a vital part of a healthy diet. Analysis of lipids can be challenging, in part because of the difficulty in studying such amphiphilic molecules that can vary markedly in polarity and often lack chromophores or other chemical features amenable to current detection methods. In my work, I aim to increase our understanding of lipids and lipid oxidation through the development of improved analytical methods relevant to industry.

Projects will employ a range of analytical methods including: HPLC, GC-FID, GC-MS, UV-vis spectrometry, EPR spectroscopy, titrations and colorimetric reactions.

Specific projects on offer:

1. Degradation of pet foods and pet food ingredients (industry collaboration)
2. Investigation and analysis of lipid oxidation processes in food systems (industry collaboration)
3. Effectiveness of antioxidants in preventing lipid oxidation (industry collaboration)
4. Enzymatic synthesis and analysis of lipid mediators – important anti-inflammatory biomolecules

Assoc Prof Philip Barton

Campus: Waurn Ponds

Contact details: p.barton@deakin.edu.au Ph: (03) 52278191

Research area description:

I lead the Insect Lab at Deakin University Waurn Ponds campus and conduct multidisciplinary research on insect biodiversity and its role in ecosystems. A number of field, lab, or desk-based projects are available for Honours students.

Specific projects on offer:

1. **Enhancing insect biodiversity and function in farming landscapes (field based).** Insects perform a number of important roles in ecosystems, but we don't know how these roles might be managed to benefit farms. This project would suit someone interested in conducting field work to survey insect communities and their ecosystem services on farms.
2. **Understanding the roles of insect decomposers in Australia's alpine region (lab based)**. A large number of surveys of insect biodiversity have been conducted in Kosciuszko National Park, NSW. This project would suit someone interested in lab work and asking questions about the amazing variety of insect species found in Australia's alpine landscapes.
3. **Identifying insect bio-indicators of ecosystem change (desk based).** Insect biodiversity is overwhelming, complex, and critically important to the world around us. A key challenge is finding simple, user-friendly ways to measure and monitor insect biodiversity. This project would suit someone interested in desktop and statistical work aimed at developing tools for land managers.

Dr Victoria (Tori) Berezowski

Campus: Waurn Ponds

Contact details: tori.b@deakin.edu.au Ph: (03) 52273561

Research area description:

Tori's research area combines aspects of forensic anthropology, geophysical sciences, and criminology. Her research mainly focuses on a multidisciplinary approach to search for and detect clandestine graves (such as those associated with homicide cases). More specifically, Tori works with geophysical techniques and remote sensing methods, as well as a focus on criminological theory and human behaviour to increase our chances of locating clandestine graves. Other research interests include: the application of 3D techniques to crime scene documentation, and human identification (in a forensic anthropological capacity). Students interested in forensic science and/or criminology are encouraged to contact Tori for potential honours projects. Some areas of interest include grave detection, body deposition sites, and biological fluid persistence. Projects may be in collaboration with other Deakin staff members.

For more information or to discuss potential project ideas, please feel free to reach out via email.

Assoc Prof Peter Biro

Campus: Waurn Ponds

Contact details: pete.biro@deakin.edu.au

Project or research area description:

My research team focuses on understanding animal personality, and more generally individual variation in physiology, behaviour, and life history – this variation is critical for animal adaptation to changing environments. We are interested in the genetics and flexible programming of these traits, and their plasticity (i.e., 'nature vs nurture'). We also study bird ecology, including bird behaviour during nesting and communication strategies. Projects on individual variation in behaviour are mostly lab based, using fish or crustaceans as model animals. Bird projects are either field-based or lab-based (i.e. using video observations of behaviour or recordings of calls and songs), and some are desk-based using existing data.

Specific projects on offer:

1. Growing up athletic: how does early life 'exercise' program metabolism, personality, and activity rates in adult zebrafish?
2. Artificial selection on boldness in pillbugs: what physiological and life history traits co-evolve with boldness?
3. Does early life exposure to high temperatures program reduced metabolism, behavioural activity, and boldness in pillbugs?
4. Are Spotted Pardalotes Ecosystem Engineers? An **ecosystem engineer** is any species that creates or modifies habitat, benefitting other animals. This project will test whether the Spotted Pardalote, a small songbird that digs deep nesting burrows, is such a species. After nesting is complete, other animals such as frogs move into these burrows; you will extract data from ca. 150 burrows over 2 breeding seasons on what animals use these burrows, and thus document the importance of nesting burrows as habitat for other animals and the role of the pardalote as an ecosystem engineer.
5. Evolution of song in female birds. Historically, bird song has been considered a male-only trait. This study will examine song in female birds.
6. Why do birds sing at the nest? Assessing the costs and benefits of vocalizations during nesting.

7. Avian nest construction. Nest structures are essential for successful reproduction in most bird species. Using an experimental approach, this study will examine the effects of nest characteristics (i.e., camouflage) on nest predation rates.
8. Noisy Neighbors: Do native birds sing less when invasive birds are singing? This project will examine the effects of invasive songbirds on the vocal activity of native Australian birds.

Dr Tim Connell

Campus: Waurn Ponds

Contact details: t.connell@deakin.edu.au

Research area description:

My research investigates the design, synthesis and application of inorganic materials that interact with light in unique ways. Luminescent transition metal complexes exhibit improved photophysics compared to organic dyes, including large Stokes shifts (thereby minimizing inner-filter effects), long emission lifetimes and enhanced photostability. Along with emission energy, these favorable properties may be controlled by manipulating the ligands bound to the central metal atom. The rational design of tailored metal luminophores is attractive across varied applications, including: light-emitting diodes, chemical sensing, generating solar fuels and bioimaging.

The central focus of my program is photoredox catalysis, the artificial equivalent of photosynthesis in plants. Molecular photocatalysts convert visible light (~400-700 nm) into chemical energy; the catalyst absorbs a photon to populate an energetically excited state that then serves as either a potent single-electron oxidant or reductant. This photoinitiated electron transfer to a chemical substrate is followed by an additional 'dark' electron transfer, returning the catalyst to its ground state. The last 15 years have witnessed the rapid growth of this approach, fuelled by the promise of sustainable high-value chemical synthesis. While this recent renaissance generally aims to increase reaction scope, I instead seek to understand the how and why of light-driven reactions.

Specific projects on offer:

1. **Improving atom economy in photoredox catalysis.** Nature builds molecules *via* photosynthesis, exploiting the energy of sunlight under mild reaction conditions. Synthetic photoredox chemistry (a combination of light and reduction/oxidation chemistry) seeks to mimic natural systems but suffers from poor efficiency (i.e. atoms 'spent' per product). This project aims to develop new molecular additives that fuel recyclable chemical syntheses with minimal waste.
2. **Massively bipolar electrocatalysis for sustainable chemical synthesis.** Electrocatalysis offers a 'clean' source of electrons for redox chemistry but suffers from poor mass transport at the electrode surface, limiting reaction efficiency. Bipolar electrochemistry can convert any conducting object into a functional electrode without a physical connection. This project aims to marry bipolar electrochemistry and electrocatalysis for sustainable chemical synthesis.
3. **Photolabile protecting groups for unmasking catalytic metal sites.** Fast, selective catalysis requires precise control of the reaction active site. Metal atoms with one or more vacant coordination sites offer this control but unsaturated metals are difficult to synthetically engineer. This project aims to protect metal active sites with masking ligands during synthesis, which may then be removed by irradiating with visible light.
4. **Amphiphilic luminophores for chemical sensing in water.** Chemical sensors are attractive instruments for water quality analysis. Cyclometalated iridium(III) complexes boast great photophysical properties for increased sensitivity but poor water solubility. This project will design new metal complexes that contain a hydrophobic luminescent 'head' and hydrophilic 'tails,' similar to natural phospholipids, and evaluate their sensing properties in water.

Dr Antoine Dujon

Campus: Waurn Ponds

Contact details: a.dujon@deakin.edu.au Ph: (03) 92445711

Research area description:

This research examines how human induced environmental changes cause cancer in wildlife and the resulting impacts on animal biology, ecological interactions, and overall ecosystem function.

Specific projects available:

1. **Investigate how pollution exposure affects tumour development and progression in freshwater Australian hydras and the resulting consequences for life history traits.**
   This project investigates how exposure to human-produced chemicals affects tumour formation in Hydra, a freshwater cnidarian (similar to jellyfish). By maintaining and monitoring a population of tumour prone freshwater Hydra in the laboratory, it will examine the resulting impacts on their asexual reproduction and survival rates.
2. **Investigate the effect of DNA damage on the predatory behaviour and reproduction of invasive freshwater planaria**
   This project aims to understand how pollution-induced DNA damage affects the predatory behaviour of invasive freshwater planaria (flatworms) and the resulting consequences for Australian freshwater biodiversity. The research will involve conducting behavioural trials using freshwater species to determine prey selectivity and investigating how DNA damage impacts asexual reproduction rates in these organisms.
3. **Model the effects of cancer on predator-prey interactions and ecosystem functioning.**
   Using established modelling tools, this fully computer-based project (using the R statistical software) will investigate how individuals with tumours affect ecosystem functioning and species coexistence. The study aims to quantify the cancer prevalence threshold in wild populations that causes significant ecosystem damage.

Prof Paul Francis

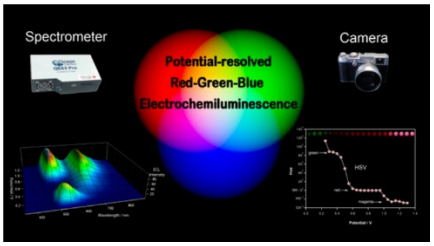
Campus: Waurn Ponds

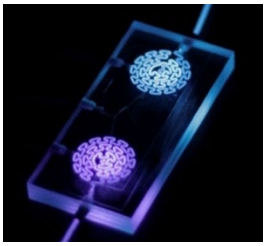
Contact details: paul.francis@deakin.edu.au Ph: (03) 52271294

Research area description:

The capacity to effectively diagnose disease in the human body and identify dangerous pollutants in our environment is fundamentally limited by the speed, selectivity, accuracy and sensitivity that we can measure molecules. We create new analytical approaches based on chemical reactions that produce light, for clinical diagnostic, environmental and forensic science applications.

Our projects involve spectroscopy, analytical chemistry, electrochemistry, inorganic chemistry and/or synthetic chemistry, and are generally of interest to students that enjoyed aspects of **SLE316 Analytical Chemistry and the Environment** and/or **SLE361 Inorganic Chemistry** in their undergraduate course.





Specific projects on offer:

1. **Exploiting 'Redox-Mediators' to Reach New Limits of Detection**. Electrochemiluminescence (ECL) is a widely use detection platform for clinical diagnostics, with over 2 billion assays performed each year. If you have had a blood test, it is likely that some of the analytes were measured using ECL detection systems. Our research group has created a new approach to enhance this mode of detection by orders of magnitude. This project aims to provide unprecedented sensitivity in ECL detection.

2. **Earth-Abundant Metal Complexes for More Sustainable Chemistry**. Complexes of precious metals such as ruthenium, iridium and platinum are widely used in technologies such as solar cells, light-emitting devices, photocatalysis, bioimaging, and chemical detection systems. This project explores luminescent complexes of widely available first-row transition metals such as iron, manganese and chromium, as cost-effective and sustainable alternatives for these important technologies.

3. **Multi-Colour Electrochemiluminescence for Rapid Detection in Portable Devices**. Molecules that emit different coloured light can be selectively switched-on or switched-off by applying different electrochemical potentials. This provides opportunities to simultaneously measure multiple different analytes for time-critical analytical applications, such as point-of-case and at-scene detection with portable analytical devices.

Prof Michelle Harvey

Campus: Waurn Ponds

Contact details: michelle.harvey@deakin.edu.au

Project or research area description:
Research in the areas of entomology and forensic biology. This includes: general insect taxonomy projects, blowfly biology, attraction of insects, growth studies, maggot therapy in chronic human wounds, flystrike by maggots on sheep, bacterial relationships with insects. Forensic projects concern factors affecting field-based decomposition of remains, scavenging of remains, insect succession, effect of substances in/on remains on the development of insects and rate of decay, burial studies, vegetation and aquatic studies.

Specific projects on offer:
Projects are designed in consultation with me to best suit your interests, desired skill set for your future plans, and my own expertise. Ideas include the following, but I encourage you to approach me directly with any suggestions.
Entomotoxicology: how does the presence of a specific substance on or in remains affect fly attraction, oviposition, successional order, and development/survival of offspring? Can be laboratory based or combine an additional field element.
Blowfly competitive effects: How does the presence of one species affect another? Primary blowflies may be affected by the arrival of secondary species such as the hairy maggot blowfly. How do predatory secondary species affect developmental rates, fitness and survival of our early colonisers? Implications for PMI estimation, as well as agriculture.

Dr Brendan Holland

Campus: Waurn Ponds

Contact details: b.holland@deakin.edu.au

Research area description:

Dr Holland is a researcher in the Deakin BioFactory, working with industry partners to develop solutions for handling food waste, agricultural waste, and marine by-products. Our work focusses on building the circular economy by reducing waste going to landfill, developing new approaches to transform and process organic waste and transforming under-utilised marine biomass into bioproducts.

Current project opportunities include converting food waste to aquafeed, fibres and fertilizers; developing low-cost alternative biofuels; and converting marine waste into nutritional supplements. Our research will provide opportunities to gain hands-on experience in analytical chemistry, green chemistry and/or bioprocessing.

Specific projects on offer:

Current project opportunities include converting food waste to aquafeed, fibres and fertilizers; developing low-cost alternative biofuels; and converting marine waste into nutritional supplements. Our research will provide opportunities to gain hands-on experience in analytical chemistry, green chemistry and/or bioprocessing.

Dr Ghazanfar Khan

Campus: Waurn Ponds

Contact details: g.khan@deakin.edu.au Ph: (03) 52278474

Research area description:

My research focuses on plant functional genetics and genomics, particularly on how plants adapt to different nutrient regimes and withstand environmental stresses amidst climate fluctuations. Because plants are rooted in place and unable to flee from unfavourable conditions, they exhibit a fascinating ability to adjust to changing environments through complex molecular pathways. Our lab aims to understand the molecular mechanisms underpinning plant responses to nutrient deficiencies and various abiotic stresses. Understanding and harnessing these adaptive strategies not only deepens our knowledge of plant biology but also promises to enhance crop resilience and productivity in a rapidly changing environment. The projects will provide learning opportunities in genetic engineering, bioinformatics and advanced molecular biology methods.

Specific projects on offer:

1. Characterizing a genetic mutant impaired in nitrogen uptake to understand the molecular mechanisms of nitrogen transport.
2. Genetically engineer herbicide tolerance in canola to explore novel weed management strategies.
3. Developing a bioluminescent sentinel plant for diagnosing disease and stress.

Dr Samuel King

Campus: Waurn Ponds

Contact details: samuel.king@deakin.edu.au

Research area description:

My research interest lies in using bioanalytical chemistry as a tool for interdisciplinary research across human health, textile science, and novel bioactive compound discovery. I work with a broad range of

researchers in assessing cellular inflammation, antimicrobial discovery, textile chemistry, and natural fibre materials science to improve circular economy in Australia.

Specific projects on offer:

1. **Identify processes in commercial cotton dyeing affecting biodegradation:** The commercial dyeing process for cotton involves processes that delay biodegradation of the final fabric. This project will investigate which steps in the dyeing process are responsible for slowing biodegradability by dyeing virgin cotton and measuring its breakdown through CO_2 titration.
2. **Novel bioactives from Australian *Humulus lupulus*:** Hop flowers are a common bittering agent in the beer brewing process and have displayed anti-microbial properties against food-borne pathogens. This project will identify novel bioactive compounds in Australian grown hops using *in vitro* cellular assays. Extracts from leaves and flowers will be assessed for anti-inflammatory, -oxidative and -microbial activity, and their bioactive profile characterised using LC-MS.

Prof Marcel Klaassen

Campus: Waurn Ponds

Contact details: marcel.klaassen@deakin.edu.au

Research area description:

I have a broad research interest including theoretical, experimental, and observational ecological and eco- physiological studies on numerous animal, plant, and microbe taxa. Currently, my focus is primarily on the population dynamics, migration, and disease ecology of birds, notably ducks and long-distance migratory shorebirds. To get a good impression of my (latest) research and what type of research you could do with me during your Honours, please have a look at my publication record at https://scholar.google.com.au/citations?user=OrKqLoAAAAAJ&hl=en. When you are working with me you are guaranteed of (1) regular field work catching, banding, sampling shorebirds and ducks, (2) the possibility to acquire some great analytical skills, and (3) good data sets providing the potential to write a stellar honours' thesis and possibly even a publication. We will jointly decide on your Honours project based on your interests and ambitions, my expertise, and the possibilities that my study systems offer.

Dr Matthew McKenzie

Campus: Waurn Ponds

Contact details: m.mckenzie@deakin.edu.au Ph: (03) 52273015

Research area description:

Defects in mitochondrial function can cause human mitochondrial disease, affecting approximately 1 in every 4,500 people. My research is investigating how defects in mitochondrial sugar and fat metabolism cause mitochondrial disease, as well as new ways to treat affected patients. In my lab we use CRISPR/Cas9 gene editing techniques to create 'knockout' human cell lines, which we then use to investigate how inherited genetic defects disrupt mitochondrial metabolism to cause disease. We do this using a wide range of cutting-edge techniques, including molecular cloning and native gel electrophoresis. My team is also testing new compounds that can increase mitochondrial mass by activating mitochondrial biogenesis, with the potential to develop these compounds into novel therapies for treating mitochondrial disease.

Alterations of mitochondrial metabolism are also associated with cancer, and we are investigating how to modulate mitochondrial function to specifically kill cancer cells. Using different cancer cell lines that we have in the lab, we are examining how we can increase oxidative stress to trigger cell death and inhibit cancer proliferation.

Dr Mikayla Milanovic

Campus: Waurn Ponds

Contact details: mikayla.milanovic@deakin.edu.au Ph: (03) 5227 3774

Research area description:

My research interests lie in forensic chemistry and the manufacture and trafficking of illicit drugs. Under my supervision, honours students will develop synthetic, organic chemistry skills, and become proficient in analytical techniques—with a particular focus on forensically relevant methods—for the characterisation of new chemical species. Through my projects, students will have the opportunity to liaise with Victoria Police Forensic Services Department. My projects will be of interest to students that enjoyed **SLE313 Forensic Analysis and Interpretation** and/or **SLE318 Synthetic and Medicinal Chemistry** in their undergraduate course.

Co-supervisor: Assoc Prof Fred Pfeffer fred.pfeffer@deakin.edu.au

Assoc Prof Fred Pfeffer

Campus: Waurn Ponds

Contact details: fred.pfeffer@deakin.edu.au Ph: (03) 52271439

Research area description:

My research interests range from supramolecular and forensic chemistry to organic and medicinal chemistry with a key focus on understanding molecular level interactions and interconversions. This fundamental knowledge is relevant to a number of fields including (i) the development of new materials—including porous materials and catalysts (ii) recognition and sensing (iii) imaging of biomolecular systems and (iv) medicinal chemistry. I am happy to discuss a modified project if you have an idea you would like to explore.

One theme in my research is the use of large conformationally **preorganised molecular frameworks** to assemble larger architectures (including covalent frameworks, covalent cages, coordination polymers and metal organic frameworks) that can selectively interact with other species. [eg. *Chem. Eur J*., **2016**, p 10791].

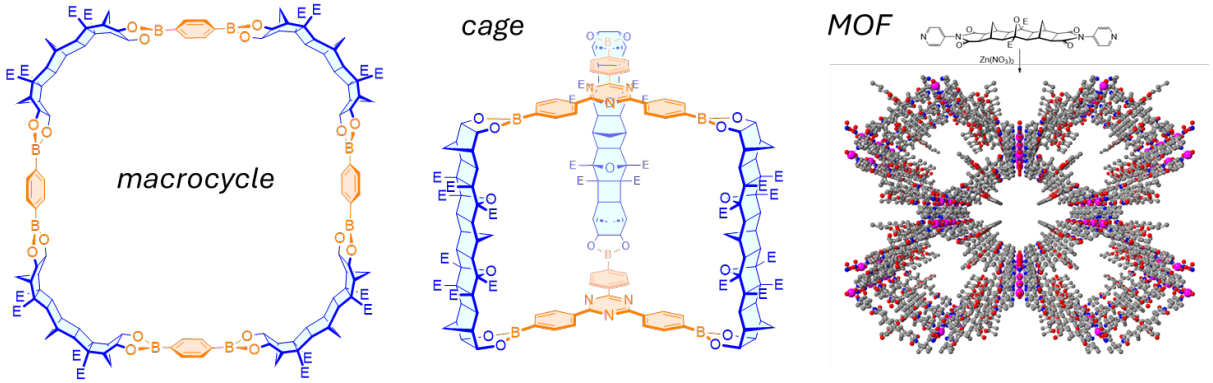
A second theme is the development of high yielding methodology to access a broad range of **naphthalimide based fluorophores** [eg. *Chem. Commun.* **2017**, p 12298, *Chem. Commun*., **2020**, p 6866]. These fluorescent molecules have been customised for cellular imaging and this project has current ARC funding.

Students gain valuable "hands on" organic chemistry skills, and also become proficient in the characterisation of new chemical entities (in particular the use of NMR spectroscopy and mass spectrometry). For naphthalimides the photophysical properties also evaluated. All projects involve collaboration with a number of research groups in Australia and/or overseas.

Specific projects on offer:

1. **Constructing large molecular architectures (with UoM and UNSW)**

   My group has now established an efficient route for the synthesis of large macrocycles and cages based on boronic esters formed from norbornane bis-diols. These structures are unique to our research group and are remarkably stable. Projects are available to investigate applications of such materials as catalysts, gas storage materials and hosts for other species (including forensically relevant materials).



Similarly, a range of coordination polymers and metal organic frameworks (MOFs) have been developed based on carefully functionalised norbornane frameworks. These extended porous structures also have applications as gas storage materials as well as catalysis. Projects are available to construct new ligands to construct novel architectures and investigate their properties.

For both projects use of the Australian Synchrotron may be required for crystallographic characterisation.

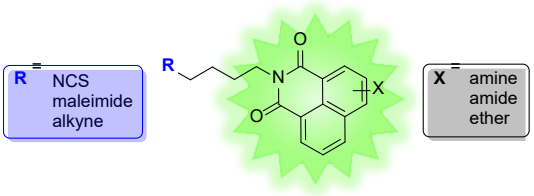
2. **Forensic Organic Chemistry (with Victoria Police Forensic Services Department)**

   A project involving either the masking of (i) amphetamines or (ii) nitazines/fentanyl synthetic opiods.

   A recent trend in the illicit trafficking of controlled substances involves chemical masking. These masked compounds are not currently detected by common detection protocols.

3. **Functionalised naphthalimides for fluorescent imaging. (With Adelaide University)**

   In this project custom functionalisation of naphthalimide fluorophores will be pursued. A number of groups, commonly used in the literature for (i) 'tagging' of biomolecules and (ii) ensuring subcellular localisation, will be incorporated and the of the resultant probe evaluated in cells by collaborators..



Dr Aaron Schultz

Campus: Waurn Ponds

Contact details: aaron.schultz@deakin.edu.au

Research area description:

The Environmental and Human Toxicology lab uses a 'One Health' approach to understand the toxicity risks of pollutants (microplastics, nanomaterials, agrichemicals, etc) to environmental and human health. This includes research that: (1) assesses pollutant levels in freshwater and marine environments, (2) studies toxicity risks and mechanisms of toxicity using zebrafish embryos, planaria, and other aquatic species as models and (3) assesses

toxicity risks and mechanisms of toxicity using human cell lines as models.

Specific projects on offer:
Project 1 – Environmental toxicology: Investigating the presence and toxicity risk of contaminants of emerging concern (micro/nano-plastics, nanomaterials and/or agrichemicals) to freshwater and marine ecosystems. Please see two articles published by our group in this area: https://doi.org/10.1016/j.impact.2022.100387 or https://doi.org/10.1039/D1EN00659B

Associate Supervisors: Prof Beata Ujvari (beata.ujvari@deakin.edu.au), A/Prof Damien Callahan (damien.callahan@deakin.edu.au), and/or Dr Antoine Dujon (a.dujon@deakin.edu.au).

Project 2: The role of the plastisphere in microplastic modification and toxicity.

Associate Supervisors: Dr Andrew Oxley (andrew.oxley@deakin.edu.au), A/Prof. Luis Afonso (luis.afonso@deakin.edu.au) and A/Prof Alessandra Sutti (alessandra.sutti@deakin.edu.au).

Project 3: Use of BioNanoGels as carriers for antimicrobial therapeutics. This project will investigate optimal drug loading and release from the BioNanoGels under various simulated peri-wound chronic infection conditions.

Associate Supervisors: **A/Prof Richard Williams (richard.williams@deakin.edu.au), and Dr Ayushi Priyam (a.priyam@deakin.edu.au).**

Dr Bianca Szkuta

Campus: Waurn Ponds

Contact details: **b.szkuta@deakin.edu.au** Ph: 03 52273132

Research area description:
DNA analysis is recognised in law courts as being underpinned by robust science. This means that rather than asking "whose DNA is it?" the judiciary in criminal cases now focus on "how did the DNA get there?". To answer this, the variables that affect the rate of human DNA transfer, how long DNA remains in the environment, how much DNA exists in the environment at any given time, and how biological material relevant to a crime is best recovered, analysed, interpreted and reported, need to be explored. To that end, our group performs research that will equip forensic science practitioners with the data they require to provide the courts and investigators with the most accurate interpretation of evidence particular to a given case. This research spans multiple fields including human genetics, biochemistry, biomedicine, surface chemistry and statistics. To understand the reseach that we do, further reading has been provided below. Please reach out to discuss ideas for projects if this interests you.

R.A.H. van Oorschot, et al. (2019), DNA transfer in forensic science: A review, Forensic Science International: Genetics 38, 140-166.

R.A.H. van Oorschot, et al. (2021), DNA transfer in forensic science: recent progress towards meeting challenges, Genes 12(11), 1766.

Prof Beata Ujvari

Campus: Waurn Ponds

Contact details: beata.ujvari@deakin.edu.au Ph: via Teams

Research area description:
Our research focuses on evolutionary ecology, host–microbe interactions, and eco-immunology, with the aim to understand how the interaction between organisms and their environment effect on organismal fitness.

Specific projects on offer

1. **Characterization of the Oncogenic Potential of Two Transmissible Cancers in the Tasmanian Devil (DFT1 and DFT2)**

   Supervisors: Prof Beata Ujvari and PhD student Florence Pirard

   The project aims to investigate and compare the oncogenic properties of two independently emerged transmissible cancers, DFT1 and DFT2, in the Tasmanian devil (*Sarcophilus harrisii*). While both cancers are clonally transmissible, they display distinct patterns of dissemination, suggesting potential differences in their tumorigenic behaviours and biological mechanisms.

   The aims of this project are:

   - To characterize cancer hallmarks such as cell proliferation, migration, and possibly invasion, through in vitro assays;
   - To analyse gene expression profiles related to key oncogenic signalling pathways using qPCR;
   - To perform histological and immunohistochemical analyses on tumour samples to assess tissue architecture and protein expression relevant to tumour progression.

   Through these approaches, the project aims to shed light on the biological basis underlying the different dissemination patterns of DFT1 and DFT2, potentially improving our understanding of cancer evolution and transmissibility in a natural host.

2. **Father's Curse or Gift? The Effect of Mitochondrial Recombination on Mussel Fitness**

   Supervisors: Prof Beata Ujvari and Dr Georgina Bramwell

   In most species, including humans, mitochondrial DNA (mtDNA) is inherited maternally. However, in >100 bivalve species (including mussels), an alternative mode of mtDNA transmission occurs, called doubly uniparental inheritance (DUI). Under DUI, two distinct sex-associated mitochondrial lineages (F-type in eggs and M-type in sperm) are transmitted during reproduction. While the F-type is retained in all offspring, the M-type is (1) selectively eliminated in female descendants and (2) dominant in male gonad tissue and spermatozoa. When both F and M mtDNAs are present in sperm, they can recombine to form a new 'masculinized' sequence, which contains an M-type control region (that regulates mtDNA replication) and F-type protein coding sequences. Consequently, male mussels produce sperm that either contain the evolutionarily older "pure" male mtDNA (M-type) or a recombined mtDNA (M^f-type), which exhibit different physiological and biochemical properties and possibly divergent energy balances and demands. The aims of this project are to determine:

   Q1: Is mitochondrial DNA (mtDNA) recombination present in all members of the Australian *Mytilus* spp. complex?

   Q2: What are the characteristics and impacts of mitotypes on mitochondrial function and sperm behaviour under different environmental conditions?

   Q3: How do mitotypes affect sperm competition, gamete-level mate choice and fitness?

3. **>Do bivalve transmissible cancers exist in Australia?**

Supervisors: Prof Beata Ujvari and Dr Georgina Bramwell

Bivalve Transmissible Neoplasia (BTN) is an emerging infectious disease that can decimate wild and farmed bivalve populations. Although it has so far only been reported in species on the Northern hemisphere and the Americas, due to extensive shipping activities across oceans and the mussels' propensity for hull fouling, it is highly likely that BTN have already arrived or will arrive to Oceania in the coming years. We are in the process to generate evidence for the presence of BTN in Australian bivalve populations. By using haemocytology, histology and molecular analyses, we recently provided supporting evidence of BTN's presence in Victorian waters. While our previous study strongly suggests the presence of BTN in Australian waters, further investigations that use additional diagnostics techniques and markers are needed to confirm whether the new cancer lineages are a threat to Australian blue mussels. We aim to generate supportive molecular evidence for the presence of BTN in Australian waters and investigate how BTN spreads between mussels and its impact on mussel' fitness.

Dr Lawrence Webb

Campus: Waurn Ponds

Contact details: Lawrence.webb@deakin.edu.au Ph: 0433 240 654

Research area description:
I focus on developing robust analytical techniques such as gas chromatography, high performance liquid chromatography and mass spectrometry and applying them in a range of biological, chemical and forensic fields. Current areas of work are listed below, offering hands-on experience with advanced analytical instrumentation and industry collaboration.

Specific projects on offer

1. **Understanding the molecular drivers behind flystrike**
   Flystrike is a major issue for the Australian sheep industry and has a significant impact on sheep welfare. A range of multidisciplinary research projects are available in areas of analytical chemistry and molecular biology.
2. **Investigation of local marine species for novel bioproducts**
   Marine organisms represent an excellent source of novel bioproducts that have huge potential in chemical and medical research. This project will work alongside the Deakin marine centre in Queenscliff to identify and characterise novel biomolecules from local marine species.
3. **Characterisation of the lipopolysaccharide of C. burnetii and associated glycoconjugate vaccine**
   We have recently developed a new vaccine for Q-fever using a membrane-based lipopolysaccharide. There is scope in this work to further characterise the antigenic component using liquid chromatography and mass spectrometry and work alongside the project team as the vaccine advances towards clinical trials.

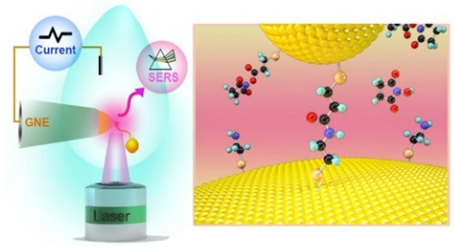
Assoc Prof Wenrong Yang

Campus: Waurn Ponds

Contact details: wenrong.yang@deakin.edu.au Ph: (03) 522729232

Research area description:
Our research team specialises in the use of self-assembled monolayers, biomolecules and nanomaterials to functionalize the surface at the molecular level for the development of new biosensing technologies. The research group is typically about 10 people in size with post-docs, Ph.D.

students, M.Sc. students, honours students and visitors. We create a supportive research environment where all researchers work in the group on related projects with junior researchers being assisted by post-docs and senior Ph.D. students as well as Dr. Wenrong Yang. Since our research involves a range of techniques, all researchers acquire a broad range of skills but typically focus on one or two techniques.



Selected Recent Publications

1) Liu J. *et.al. Acc. Chem. Res*. 2021, 53 (3), 644-653
2) Zhang Y. *et. al. ACS Nano*., 2016, 10, 5096–5103.
3) Mathesh M. *et. al. ACS Catal*. 2016, 6, 7, 4760–4768
4) Liu Z. *et. al. ACS Nano* 2019, 13, 2, 1394–1402
5) Kong N. *et. al . J. Am. Chem. Soc.* 2021, 143, 26, 9781–9790
6) Ramakrishna, TRB *et. al. Langmuir* 2020, 36 (45), 13575-13582
7) Wang J. *et.al. J. Electroanal Chem.*, 2021, 895, 115419
8) Thakkar S. *et.al.*, *Water Research,* 2021, 188, 116538

Specific projects on offer:

1. Electrochemical detection of small molecules.
2. Nanoparticle based biosensors for ultrasensitive detection.
3. The immobilisation of biocatalyst on surfaces (with Dr. Motilal Mathesh and Professor Colin Barrow, Deakin University)
4. Nanostructured surfaces for understanding fundamental catalytic processes (with Professor Ian Chen, Deakin University).
5. Electrochemical engineering of interfacial chemical reactions at the single-molecule level (with Dr. Fred Pfeffer, Deakin University and Dr Jin He, Florida International University, USA).

Warrnambool Projects

Dr Patricia Corbett

Campus: Warrnambool

Contact details: p.corbett@deakin.edu.au

Research area description: Contamination of the marine environment including metals, persistent organic pollutants and microplastics are a global issue. The Deakin Marine Ecotoxicology Research group explores key ecosystem components response to anthropogenic environmental stressors. Research includes investigating evidence of bioaccumulation, impacts and mechanisms of effect as well as the development of animal health indices.

Prof Graeme Hays and Dr Jared Tromp

Campus: Warrnambool

Contact details: g.hays@deakin.edu.au

Research area description: Satellite tracking of sea turtles. These projects are computer-based using data relayed from satellite tags around the world and across species. Excellent computational and numerical skills are needed.

Prof Daniel Ierodiaconou

Campus: Warrnambool
Contact details: Dr Daniel Ierodiaconou daniel.ierodiaconou@deakin.edu.au

Specific projects available

1. **Seabed geomorphology classification of the Bass Strait coast**

   Supervisors: Professor Dr Daniel Ierodiaconou (Deakin University), Dr Rachel Nanson (Geoscience Australia), Dr Marta Ribó (Auckland University of Technology), Prof. David Kennedy (University of Melbourne)

   Maps of seabed geomorphology provide fundamental information to support the sustainable management and planning of marine and coastal areas, and the use of standardised geomorphic terminology ensures the consistency between mapping regions and practitioners. The International Seabed Geomorphology Mapping Working Group (ISGM-WG) recently released a seabed geomorphology classification system designed for application to bathymetry and subsurface seabed datasets. We have a potential project to apply this classification system to characterise and classify the variety of fine-scale features that are observed in several high-resolution bathymetry datasets collected by the Deakin Marine Mapping group from the Bass Strait coast.

   This project will apply a suite of semi-automated geographic information system (GIS) tools to map and characterise the geometric attributes of the seabed, using the different multibeam datasets and the ISGM-WG approach. The aim of this research is to characterize the geomorphology of the seabed and to better understand the distribution and diversity of key seabed habitats in the Bass Strait coast.

   We invite students with a keen interest in GIS mapping, seabed geomorphology and habitats, to get in touch with our team to discuss this research opportunity.

2. **Quantifying the anchoring footprint on the Victorian coast**

   Supervisors: Professor Dr Daniel Ierodiaconou (Deakin University), Marta Ribó (Auckland University of Technology), Dr Sally Watson (NIWA)

   Anchor use in port regions has significantly changed the structure of the seafloor, with downstream impacts on benthic habitats and ecosystem functions. Sediment mixing and overturn by anchoring is comparable to benthic trawling, a well-known driver of seafloor habitat destruction. Recent research has shown that high-tonnage ship anchors excavate the seabed by up to 80 cm and the associated impacts are preserved for at least 4 years. This research suggests anchoring could be more detrimental than trawling, occurring more frequently, with deeper seabed penetration and concentrated in shallow seas and coastal embayments.

   This project will use high-resolution bathymetry data to identify the morphological signatures and

characterise the anchoring footprint within the anchorage regions throughout the Victorian coast. Determining the physical footprint will be coupled with the ship tracking data (i.e., AIS Automatic Identification System data) where possible, to quantify the area and volume of sediment disturbance by anchoring practices, and link physical footprints on the seafloor to anchoring by specific vessels. This project will help to determine the extent of the physical impact of anchoring on the seafloor throughout the Victorian coast.

3. **A comparison of eDNA and BRUV derived measures of spatial fish diversity**
   This project aims to compare environmental DNA (eDNA) and Baited Remote Underwater Video (BRUV) methods for assessing spatial patterns of fish diversity in Bass Strait, with the goal of informing offshore decommissioning decisions. Co-located eDNA sampling and BRUV deployments across natural and infrastructure-associated habitats to evaluate species detection capabilities and community composition. eDNA samples will be analysed using metabarcoding, while BRUV footage will be annotated for visually identifiable taxa. Species distribution models will be developed using random forest algorithms to compare the spatial resolution and predictive performance of each method. By integrating these approaches, the project will generate a comprehensive assessment of fish assemblages across the region and provide an evidence-based framework for evaluating the ecological value of offshore structures, supporting more informed and ecologically responsible decommissioning in temperate Australian waters. **Professor Dr Daniel Ierodiaconou (Deakin University), Dr Ronen Galaiduk (AIMS), Dr Sasha Whitmarsh (Deakin University), Dr Ali Jalali (Deakin University), Dr Dianne Maclean (AIMS)**

4. **A comparison of fish communities surveyed by ROV, BRUVs and eDNA in south-east Australia**

   This project will compare fish communities surveyed using Remotely Operated Vehicles (ROVs), Baited Remote Underwater Video (BRUVs), and environmental DNA (eDNA) to evaluate the strengths and complementarity of each method for biodiversity assessment in south-east Australia. Surveys will be conducted across a variety of temperate reef and soft sediment habitats, including sites associated with offshore infrastructure, to assess differences in species detection, community composition, and habitat associations. ROVs will provide detailed visual data on species presence and behaviour across transects, BRUVs will capture mobile and bait-attracted taxa, and eDNA will detect a broad range of species through metabarcoding of water samples. The project will analyse how each method reflects fish community structure relative to habitat features such as depth, substrate type, and structural complexity. Findings will inform best-practice monitoring strategies for marine biodiversity and support evidence-based decision-making for the management and decommissioning of offshore assets in temperate Australian waters. **Professor Dr Daniel Ierodiaconou (Deakin University), Dr Sasha Whitmarsh (Deakin University), Dr Dianne Maclean (AIMS)**

Dr Mary Young

Campus: Warrnambool

Contact details: mary.young@deakin.edu.au Ph: +61 3 556 33097

Research area description:
My research focuses on applied seascape ecology, using spatial modelling and seabed mapping to understand and manage marine ecosystems under environmental change, supporting sustainable ocean planning and conservation.

Specific project on offer:

1. Mapping urchin barrens using multi-frequency sonar and underwater imagery
2. Climate change impacts on marine species and communities
3. Marine protected area performance in a changing climate focusing on the Victorian MPA network
4. Impact of sponge morphology as habitat for fish communities
5. Open to discussions of other projects related to understanding broad-scale patterns in marine species, communities, or ecosystems.

Queenscliff Projects

Prof Timothy Clark

Campus: Queenscliff

Contact details: t.clark@deakin.edu.au Ph: (03) 92446035

Research area description:

Timothy Clark's lab uses eco-physiological approaches to understand the impacts of climate change on aquatic animals. Current projects use experimental manipulations of temperature and oxygen to understand how future environments may impact the growth and metabolism of fish. Specific areas of interest are:

1. What roles do oxygen uptake (at the gills) and oxygen use (at the body's tissues) play in regulating the observed "shrinking" of fishes with climate warming?
2. How do inter-individual differences in behaviour and metabolism determine which fish grow faster than other individuals of the same species?

Dr Ty Matthews

Campus: Queenscliff

Contact details: ty.matthews@deakin.edu.au Ph:(03) 55633516

Research area description:

I am an aquatic ecologist based at the Queenscliff Marine Centre who works in marine, estuarine and freshwater ecosystems. I am particularly interested in how varying flow regimes influence aquatic plants and animals and in assessing ecological restoration efforts. I am willing to discuss a range of project ideas with students that are of particular interest to them. Other broad project areas of interest include the ecology of estuarine fish and invertebrates and also sandy beach ecology.

I often collaborate with researchers from the Centre of Rural and Regional Futures (CeRRF - Professor Rebecca Lester and her team) and environmental consultants (Austral Research and Consulting & Australian Private Fisheries Resources) on a range of joint freshwater and estuarine projects. This provides additional opportunities and networking for Honours students that are interested in working with me.

Students working with me who have chosen a marine project will be predominantly based at the Deakin University Queenscliff Marine Science Centre (DUQMSC). Those working on freshwater projects are likely to be based on the Waurn Ponds campus working with the CeRRF team.

Assoc Prof Craig Sherman

Campus: Queenscliff

Contact details: craig.sherman@deakin.edu.au

Specific projects on offer:

1. **Developing the tools for seagrass restoration.**
   Start date: February or July
   Project description
   As key ecosystem engineers, seagrasses provide a range of important ecosystem services including nutrient cycling, carbon sequestration, coastal protection, and providing a structurally complex habitat to a variety of vertebrate and invertebrate species. Given these important roles, there has been increasing concern about the rapid decline seagrass populations are now experiencing globally. Several potential projects are available that offers students the opportunity to develop skills and training in undertaking ecological restoration research. Depending on specific project aims, students may undertake field-based trials, mesocosm experiments, habitat mapping, GIS analysis and genetics.
2. **Assessing the genetic structure and mating system of an invasive marine pest.**
   Start date*:* February or July
   Project description:
   Marine pest species are being introduced around the globe at unprecedented rates and represent a significant threat to biodiversity and the environment. The recent detection of several populations of the globally invasive ascidian *Didemnum vexillum* in Australia is of significant concern as it has the potential to rapidly spread and impact native marine communities. Effective management of introduced populations and preventing further introduction requires an understanding of where this species was introduced from, levels of genetic diversity and patterns of spread. Introduced populations are often founded by a small number of individuals, causing the population to go through a genetic bottleneck. This means introduced populations may contain low levels of genetic diversity, which may initially constrain the spread of the populations and limit the geographic range they can occupy. This has implication not only on levels of genetic diversity of introduced populations, but also influences the mating systems (importance of sexual and asexual reproduction) of these populations and therefore their mechanisms of spread. This project will explore the genetic structure of invasive populations to better understand the origin of introductions, levels of genetic diversity within the invasive range and how this species is spreading in Australian waters.

3. **Determining the chemical basis of detection of an invasive predator by scallops.**
   Associate or External Supervisors and their contact details: Xavier Conlan (Deakin University)
   Start date: February or July
   Project description:
   The introduction of non-native species provides an excellent opportunity to study rapid evolutionary change. This is because invasive species have to adapt to a range of novel conditions, while native species often have to evolve novel responses to invasive predators. The Northern Pacific sea star is ranked as one of the top ten most potentially damaging invasive species. It is a ferocious marine predator of marine bivalves and other invertebrates and can have a devastating effect on the biodiversity of native marine communities. Recent work has demonstrated that native scallops in populations exposed to the Northern Pacific sea star show predator avoidance behaviours, while populations with no exposure to this invasive predator show no anti-predator behaviours. This project will explore the chemical basis of this anti-predator behavior and identify the key chemical species involved in predator detection. Students will undertake fieldwork to collect samples and laboratory analysis including a multidimensional approach to detection chemistry with the aid of Mass spectrometry, 2D-HPLC and chemiluminescence detection.

CSIRO Australian Centre for Disease Preparedness Project

Dr Matthew McKenzie

Location: CSIRO Australian Centre for Disease Preparedness, Geelong, Victoria 3220

Contact details: m.mckenzie@deakin.edu.au Ph: +61 3 5227 3015

Supervisors: Dr Sarah Edwards and Prof Glenn Marsh, CSIRO Australian Centre for Disease Preparedness, Geelong

Specific projects on offer:

Serological landscape of Australian flying foxes to Pararubulaviruses

This research project will characterise the serological landscape of Australian flying foxes (Pteropus spp) with respect to pararubulaviruses using Phage Immuno-Precipitation Sequencing (PhIPseq). Flying foxes are known reservoirs for a variety of paramyxoviruses, including henipaviruses and pararubulaviruses, some of which pose zoonotic risks. The study will utilise a pararubulavirus-focused PhIPseq library to screen sera collected from flying fox populations across diverse geographic regions and time points in Australia. This high-throughput serological platform will detect antibodies to a comprehensive panel of viral peptides, offering insights into historical exposure and immune recognition patterns.

Results from this PhIPseq analysis can then be validated using complementary traditional serological assays such as ELISA, Luminex microsphere-based tests and live-virus neutralisation assays. This will allow the student to learn traditional virological and serological skills, such as culturing of viruses in mammalian cell culture, titration of viruses, micro-neutralisation assays, ELISA and Luminex.