My group (SKB Lab- where science is fun!) is a translational biology group working on fundamental molecular mechanisms that could lead to range of benefits from therapeutic applications to food security. There are two key research programs that are pursued in my group. First, we are interested in understanding mechanisms through which plants sense and respond to changes in ambient temperature (Sureshkumar et al, *Nature Plants*, 2016, Zhu et al *PLoS Genetics*, 2015, Todesco et al, *Nature*, 2010, Balasubramanian et al, *PLoS Genetics*, 2006). Second aspect relates to a discovery in my group in which we revealed the first and only known triplet repeat expansion associated genetic defect outside humans in the model plant *Arabidopsis thaliana* (Essebier et al, *Frontiers in Neuroscience*, 2016, Cao et al, *Nuc. Acids Res*, 2014, Sureshkumar et al, *Science*, 2009). We currently exploit this system in combination with human cell culture to study fundamental mechanisms underlying triplet expansion associated genetic defects. The primary focus at this stage is related to the molecular biology of Friedreich’s ataxia, the most common genetically inherited ataxia for which currently there is no cure. We use a combination of genetic, molecular, biochemical and computational analysis to study the basis of phenotypic variation. The specific project will be negotiated through discussions with the students.
Jeremy Barr

Room: 318, 18 Innovation walk
Email: Jeremy.Barr@monash.edu
Webpage: https://thebarrlab.org/

The Barr research group studies bacteriophage and investigates their role and function in the human body. Projects in his group include the bacteriophage adherence to mucus (BAM) model; utilizing microfluidic devices to create life-like mucosal surfaces; investigating the dynamics of bacteriophage diffusion in complex media and fluids; bioengineering bacteriophages and nanoparticles for prospective biotechnology applications.

John Bowman

Room: 253, 18 Innovation Walk
Email: john.bowman@monash.edu
Webpage: https://sites.google.com/site/johnbowmanresearchgroup/home

We are studying the evolution and development of land plants, one of the several independent evolutions of multicellular organisms, and one that dramatically shaped the terrestrial environment. We utilize two model systems, both amenable to genetic and genomics approaches: Arabidopsis, a diminutive flowering plant that is a model; and Marchantia, a complex thalloid liverwort representing a basal lineage of land plants. We are particularly interested in the genetic control of pattern formation, focusing on the roles of families of transcription factors and hormone mediated signalling pathways that provide insight into how major changes in body plan evolved in the land plants.

Rowan Brookes

Education Honours Project (School of Biological Sciences)

Room: 116, 25 Rainforest walk
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These projects are co-supervised between Dr Rowan Brookes and Dr Susie Ho

Feb. or July 2018 start

Employability is a major issue in higher education. This is because university graduates face a competitive and hanging employment market. Furthermore, the tertiary sector is growing, with more and more students completing degrees and requiring pathways to work.
Our research focuses on the broad question - "How can we best ensure that science graduates possess the skills to successfully transition into the workplace?"

We are offering Honours projects centred on examining the efficacy of approaches to fostering employability in science, with the aim of benchmarking the student perspective to improve curriculum design into the future. The projects are:

'More or less a scientist? How do internships shape the identity of science students?' or 'Towards Gender Equity in STEM. The gendered experience of science students'. Project 1, supervised by Rowan Brookes with Susie Ho).

Do students value undertaking fieldwork as part of undergraduate science units, and why? The project will explore student's experiences and their views on different pedagogical approaches. (Project 2, supervised by Susie Ho with Rowan Brookes).

Rob Bryson-Richardson

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[http://myopathyresearch.org](http://myopathyresearch.org)

We investigate the genetic causes, mechanisms of disease, and potential therapies for a range of muscle diseases (myopathies), using the advantages of the zebrafish model system for in vivo imaging, genetic manipulation, and screening to accomplish these goals. We have previously utilised zebrafish to provide insights into nemaline and myofibrillar myopathies and explore potential therapies for these conditions. Projects in the lab would focus on investigation of novel muscle disease genes and characterisation of disease models.

Martin Burd

Room: 233a, 18 Innovation Walk
Email: martin.burd@monash.edu

Research in our lab is focused on macroevolutionary patterns of plant traits, particularly reproductive traits (floral colour, mate limitation of reproductive success, heterospory). Interested students should contact Martin Burd early to discuss possible projects.
Richard Burke

Room: G32B, 18 Innovation Walk
Email: Richard.Burke@monash.edu
Webpage: https://sites.google.com/site/burkeresearchgroup/home

The Burke Laboratory uses the model organism Drosophila melanogaster to investigate the molecular genetics of ion transport and homeostasis in animals. Metal ions such as copper and zinc and cations such as chloride play critical roles in biology as protein co-factors and signalling molecules and mutation of key ion transport genes are known to cause several diverse human diseases. We use Drosophila to elucidate the function of these genes and screen for drugs able to restore function to mutant transport proteins. Honours projects in the Burke laboratory typically involve a combination of fly genetics, molecular biology and fluorescence confocal microscopy.

David Chapple

Room: G19, 25 Rainforest walk
Email: David.Chapple@monash.edu
Webpage: https://sites.google.com/site/chapplelab/

The Chapple Lab investigates the evolutionary ecology of environmental change. In 2018, I am offering an honours project on the macroecology of Australian lizards. The project will involve collating data from the literature, and visiting several Australian museums to examine preserved specimens. The project will use this data, along with a comparative dataset (life-history, ecology, distribution) for Australian lizards, to examine key ecological and evolutionary questions. The project will be co-supervised by Prof Shai Meiri (Tel Aviv University, http://shaimeirilab.weebly.com/). The project will be a Feb. 2018 start.

Steven Chown

Room:
E-mail: steven.chown@monash.edu
Website: http://chownlab.com/

Our research is focused on two areas. First, we investigate responses to variable environments and how they influence population dynamics both at the local scale and at regional, macroecological levels. Typically we focus on traits such as development rate, metabolic rate, thermal tolerances, water loss and body size. And mitigation of the impacts of environmental change in built, agricultural and conservation landscapes is a key concern of the work. Second we are concerned with biodiversity patterns and conservation across the broader Antarctic region. This includes work in the subAntarctic and on the continent itself. The fields encompass community ecology, invasion biology and phylogeography/phylogenomics. Recent overviews of our work

Applications for Honours projects are welcomed from high-achieving, motivated students who wish to do excellent science with impact. Options are available for work at the computer (e.g. conservation planning, macroecology), in the laboratory (traits and their evolution), and/or in the field (population dynamics, community ecology). Previous Honours students have travelled to the Antarctic and/or worked on projects concerning the region.

**Rohan Clarke**

Room: 223, 18 Innovation Walk
Email: Rohan.Clarke@monash.edu

The Clarke lab is interested in various aspects of avian movement ecology. Current research in our group includes projects on avian malaria dynamics in a diverse bird community, the conservation management of threatened species, and interactions between offshore development, seabirds and other marine vertebrates. Any honours project would be tailored to best meet the student’s interests and our research objectives.

**Tim Connallon**

Room: 107, 12 Innovation Walk
Email: Tim.Connallon@monash.edu
Website: http://timconnallon.com/

Research in the lab uses quantitative genetic and population genetic models to build better bridges between theory and data, and to generate new empirical predictions that may be tested using targeted lab experiments and/or analyses of public datasets. Topics of interest in the lab include: The evolution of sexual dimorphism, the maintenance of genetic variation for fitness and disease, the genetic basis of adaptation, the evolution of genome structure, sex chromosome evolution, and the interaction between dispersal and geographically local adaptation. Potential honours projects may strike a balance between theoretical work, data analysis, and lab experiments using Drosophila.
Carly Cook

Room: G18F, 18 Innovation Walk
Email: Carly.Cook@monash.edu
Webpage: http://carlycookresearch.wordpress.com/

Carly Cook's lab is interested in integrating science into conservation management decisions. Research in Carly's lab ranges from understanding the effectiveness, and cost-effectiveness of common management actions to understanding the use of evidence in conservation decisions. Possible projects include exploring the use of evolutionary theory in threatened species management (with Carla Sgro). Projects can also be negotiated with students based on their interests. For more information about Carly's lab and research interests visit: www.carlycookresearch.wordpress.com

Damian Dowling

Room: 439, 18 Innovation Walk
Email: Damian.Dowling@monash.edu
Webpage: www.damiandowlinglab.com

Damian Dowling’s research group studies evolutionary conflict – both between the sexes, and between genomes. Research in the group is diverse, but generally follows three themes. Honours projects can be developed within any of these themes.

1) In many species, females mate many times within the one reproductive bout. Why do they do this? Traditional sexual selection theory suggests they will acquire genetic benefits for their offspring via multiple mating, but new data suggests that the costs of promiscuity will often outweigh the benefits.

2) Why do females typically live longer than males? Our research suggests the answer might light in the maternally-inherited mitochondrial genome. Maternal inheritance means that the mitochondria are selected for performance in females only. This enables male-harming mutations to inadvertently accumulate within the genome, depressing male longevity.

3) We are studying whether maternal inheritance of mitochondria will facilitate the evolution of genes within the mitochondrial DNA that are sexually antagonistic – benefiting female function, but harming males.
Alistair Evans

Room: 225, 19 Rainforest walk
Email: Alistair.Evans@monash.edu
Webpage: http://evomorph.org

The EvoMorph Lab explores the many aspects of biology that influence the shape or morphology of animals - evolution, development and function. We incorporate functional morphology, evo-devo and palaeontology using 3D scanning, 3D printing, biomechanics and developmental biology to answer fundamental questions about the evolution of animal morphology. Previous students in our lab have worked on whales, marsupials, carnivores, seals and insects, both extant and extinct. Future projects may include diprotodont marsupials, invertebrate body plans or whale evolution.

Ros Gleadow

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http://tinyurl.com/hp3suws

BIO Project 1: Impact of climate change on tropical root crops: effect of temperature on taro (S1 or S2 start)

Taro is a staple food for about 2 million people living in the Pacific. It is a good source of carbohydrate but contains sharp crystals of calcium oxalate that irritate the throat and can cause serious illnesses. Taro is considered a ‘neglected crop’ because there is not a lot known about its basic physiology. This will look specifically at the effect of temperature on the growth and nutritional value of taro.

BIO Project 2: Impact of climate change on tropical root crops: effect of temperature on cassava (S1 or S2 start)

Cassava is eaten by 1 billion people everyday. It is a hardy crop but it contains high concentrations of hydrogen cyanide and can cause neurological disorders and death if it is not properly processed before it is eaten. It is known that plants become more toxic with drought but little is known about the effect of temperature. This project will look at the effect of heat waves on the growth and nutritional value of cassava. The information will be used in a larger project with CSIRO assessing the impact of climate change on food security in Pacific Island nations.
GEN or BIO Project 3 Wild crop relatives as a source of genomic diversity and stress tolerance (S1 or S2 start)

Wild crop relatives are an important source of genetic diversity to improve cultivated crops. Sorghum is the 5th most important grain crop. Most of its wild relatives are native to northern Australia. Some of these species contain hydrogen cyanide, and are therefore toxic. Others do not. This project will examine the diversity of these wild relatives of sorghum and compare it with their ability to tolerate abiotic stress, e.g. drought. The project can be developed either as a GEN project or a BIO project, depending on the interests and skill of the student.

Co-supervised by Dr Cecilia Blomstedt

Chris Greening

Room: 120, 25 Rainforest walk
Email: Chris.Greening@monash.edu
Website: http://www.greeninglab.com/

The Greening research group is called the Integrative Microbiology Lab. The group explores how bacteria persist under adverse environmental conditions. Bacteria are able to dominate practically all ecosystems due to their unprecedented ability to enter dormant states that resist environmental change. The group is interested in understanding the metabolic processes that aerobic bacteria use to remain energised and survive stress in these dormant states. Towards this goal, the group has identified multiple novel mechanisms through which aerobic bacteria survive starvation, hypoxia, and oxidative stress. The group employs a wide range of techniques to explore biological processes from enzymes to ecosystems, including bacterial culturing, genetic dissection, protein biochemistry, and environmental surveys.

Matt Hall

Room: 233A, 18 Innovation Walk
Email: matthew.hall@monash.edu
Website: www.mattdhall.com

The Hall research group explores how evolution has shaped the different strategies that animals use to cope with sex, disease, and death. Using small aquatic invertebrates, known as the water flea, we study how external experiences (such as diet or environment), or innate factors (such as genes and family history), combine to make individuals more or less attractive, healthy, or long-lived. Our group offers projects that explore the interplay between evolution of infectious disease, the conflict between males and females and trait investment, and the genetic and environmental basis of ageing.
Project offering for 2018 (co-supervised by Craig White and Dustin Marshall):

Does metabolic rate affect resistance to infection and disease dynamics? We want an honours student to explore whether individuals with higher or lower metabolic rates are more susceptible to disease and how diseases proliferate in organisms with different metabolic rates. We use the small crustacean Daphnia as a model organism for studying these questions.

Kathryn Hodgins

Room: G30A, 18 Innovation Walk
Email: Kathryn.Hodgins@monash.edu
Website: http://monash.edu/science/about/schools/biological-sciences/staff/kayhodgins.html

The Hodgins’ laboratory studies the genetic basis for adaptation in plants. We are particularly interested in using introduced species as a model for studying rapid adaptation. We also study adaptation to climate change in forest trees and other foundation species. To address evolutionary questions relating to these topics, we use a combination of genomics, ecological fieldwork and experimental approaches. Several projects are available. However, we have a specific project that we would like an honours student to work on. The goal of this project is to harness ecological and genomic approaches to help restore Australian grasslands in the face of global change. This project could involve fieldwork and greenhouse experiments, or lab work and bioinformatics, and can be tailored to the interests and background of the student.

Michael McDonald

Room: 118, 25 Rainforest walk
Email: Mike.McDonald@monash.edu
Webpage: http://www.mcdonald-lab.com/

The McDonald lab is interested in the genetics of adaptation. To study this question, his lab propagates populations of yeast (and other microbes) for 1000’s of generations in a variety of laboratory environments. Microbes grow and divide very quickly, providing a means for directly observing evolution as it happens. The goal is to understand how organisms adapt to better fit their environment, asking what genes do adaptive mutations occur in, how do the mutations change the genetic program of the cell and ultimately, whether we can predict how organisms will respond to environmental change. Mike’s lab employs methods such as high throughput robotic liquid handling, whole genome sequencing and molecular genetic techniques.
Melodie McGeoch

Room: 121, 18 Innovation Walk
Email: Melodie.McGeoch@monash.edu
Webpage: http://melodiemcgeoch.com/

Research in the McGeoch Group focuses on the ecology and conservation of populations, communities and landscapes. We use plant and animal populations and communities to examine the response of biodiversity to changing environments, including the dynamics of biological invasions. Our work ranges from quantifying and modelling the abundance and distribution of species, to examining the consequences of global change for protected areas. This research frequently feeds into environmental policy and management. The golden thread that weaves its way through everything we do is the relationship and dynamics between individuals, species and objects in space, and how best to use this information in biodiversity conservation. Projects on offer in 2018 include the quantification of biodiversity turnover and invasion risk analysis. In both cases a love of statistics and playing with numbers, as well as having some GIS skill/experience would be a good start.

Dustin Marshall

Room: 114, 18 Innovation Walk
Email: dustin.marshall@monash.edu
Webpage: http://meeg.org/

We work on questions ranging from community ecology through to quantitative genetics. Most of our work focuses on sessile marine invertebrates living in coastal systems — these organisms are extremely amenable to manipulation and can be tracked in the field for extended periods of time.

Some of us are interested in traditional marine ecology whereas others are evolutionary biologists who happen to work on marine invertebrates.

Project offering for 2018 (co-supervised by Craig White and Matt Hall):

Does metabolic rate affect resistance to infection and disease dynamics? We want an honours student to explore whether individuals with higher or lower metabolic rates are more susceptible to disease and how diseases proliferate in organisms with different metabolic rates. We use the small crustacean Daphnia as a model organism for studying these questions.
We study the regulation and evolution of environmentally-dependent traits in species from the genus Drosophila. Recently, our efforts have focused on understanding:

1) Developmental Plasticity and Evolution of Body Size and Shape;

2) The Relationship between Foraging Behaviour and Life History Traits.

We use the genetic tools available in *Drosophila melanogaster* to dissect how environmental signals, like nutrition and temperature, regulate growth and foraging choices. By analysing the changes in these mechanisms with genetic variation both within and across species, we hope to identify how these environmentally-dependent traits evolve to create species-specific differences.

My research group explores microevolutionary processes such as selection and adaptation, and the evolutionary ecology of benthic marine organisms.

I develop projects in consultation with the student. My research group focuses on using experiments, ecological models and decision analysis to better understand and manage plant communities and populations. My group works predominantly on grassland restoration on the western edge of Melbourne and on peatland management and invasive plant species in the Victorian Alps. Check out my group’s website for more information. A mid-year start enables projects that include fieldwork in the Victorian Alps.
Moira O’Bryan

Room: 101, 25 Rainforest walk
Email: moira.obryan@monash.edu

We study sperm development and function and the causes of human male infertility.

Male fertility research provides data of three-fold value. Firstly male infertility is a major medical problem affecting 1 in 20 Australian men of reproductive age. For the majority of these men the underlying aetiology is unknown and thus, targeted therapies cannot be applied. Secondly, an enhanced understanding of the mechanisms of spermatogenesis (the process of sperm production) may provide opportunities for contraceptive intervention; and thirdly, spermatogenesis has proven to be an extremely productive system within which to discover molecules and processes of fundamental importance to cell biology and human health. Each of the fields of stem cells, cilia biology, epigenetics and DNA repair had their origins in the testis. In order to produce 1,000 sperm per heart beat, as humans do, stem cells must divide continuously, the DNA breaks inherent in cell division and in meiosis in particular must be faithfully and rapidly repaired, and the thousands of genes involved in forming the highly condensed, and motile sperm must be tightly regulated at each of a transcriptional, translational and post-translational level. Unlike the majority of tissues wherein these processes occur only in discrete developmental processes or in response to challenge, within the testis they occur continuously and on a large scale, thus making spermatogenesis an outstanding system within which to discover novel pathways and to define their in vivo function.

Focus of the Male Infertility and Germ Cell Biology Laboratory include: cilia/flagellar development and function, genetic causes of human infertility, the importance of epigenetic regulation in male fertility, sperm head shaping and the transcriptional and translational control of germ cell expressed genes.

Anne Peters

Room: 108, 19 Rainforest walk
Phone: 99056287
Email: anne.peters@monash.edu
Website: https://sites.google.com/site/petersresearchgroup/

The Behavioural and Evolutionary Ecology of Birds (BEEB) group seeks to answer questions such as: how do animals balance investment in sex and health; what are the costs and benefits of cooperative breeding; why is there such a diversity of bird colours; how is climate change affecting birds. We do a lot of fieldwork, locally on a population of superb fairy-wrens at Lysterfield Park, and at our long-term study site in the Kimberley. Additionally, we use the long-term data record present in museum collections of preserved specimens for comparative analyses.
Updates and further details on Honours projects offered are posted here: petersresearchgroup/opportunities

**Metabolic adaptation of superb fairy-wren nestlings (start mid-year).**

This project will investigate how altricial nestlings respond to variation in temperature before and after they become thermoregulatory competent, and whether this changes throughout the season, as environmental temperatures change. The study species will be superb fairy-wren, *Malurus cyaneus*, and the field site will be Lysterfield Park. The project will involve finding nests and testing metabolic performance of young (downy) nestling and older (feathered) nestlings. Students must be physically fit, enjoy the outdoors, be patient and persistent, have affinity for handling small nestlings and have a drivers licence; if you enjoy fiddling with equipment and gear, that's a bonus. This project will be co-supervised with [Prof. Craig White](#).

**Colour diversity in birds (start first semester or mid-year)**

Differences in coloration between newly diverged taxa are common and may act as prezygotic mating barriers. How do these differences in coloration arise? Are differences in colour between subspecies caused by patterns of colour elaboration or by evolutionary innovations? In order to understand these issues the student will measure colour variability of selected species of Australian birds using museum specimens, process these measurements using psychophysical models of avian colour vision and analyse the data employing modern comparative analyses. Strong quantitative interests are required, existing quantitative skills as well as a familiarity with the R environment are desirable. This project will be closely co-supervised by [Dr Kaspar Delhey](#).

**Predation risk in relation to conspicuousness: a 3D model experiment (start first semester)**

It is widely assumed that increased predation risk is an important cost of conspicuous ornaments. However, conspicuous animals may change their behaviour to mitigate this risk, as we have recently shown in superb fairy-wrens. Males of this species birds will change colour every year, alternating between conspicuous bright blue, and dull female-like brown plumage. In this experiment, we will place 3D models of male superb fairy-wrens into the environment. These models will be painted in realistic colours mimicking male fairy-wrens. We will observe how predation rates for these 3D model vary spatially and temporally in relation to densities of predators, other blue wrens and habitat characteristics. Enthusiasm for the outdoors and a valid drivers licence are a must, a strong work ethic, interest in behavioural ecology, and data analysis highly desirable.
Matthew Piper

Room: G18, 18 Innovation walk
Email: Matthew.Piper@monash.edu
Webpage: www.piperlab.org

**Diet as medicine: investigating how nutrition can enhance health, suppress appetite and extend lifespan in *Drosophila***

My lab uses the fruitfly *Drosophila melanogaster* to investigate the mechanisms by which nutrition affects long-term health and behaviour. In particular, the proportion of amino acids in the diet have recently been implicated as potent modulators of growth, fecundity, ageing and satiety. Using new innovations in fly diets and methods for their design, projects are available to investigate each of these interactive effects. Ultimately, we seek to pin down the molecular mechanisms underlying these interactions, meaning the work is easily expandable into longer-term projects.

Richard Reina

Room: 111, 19 Rainforest walk
Email: Richard.Reina@monash.edu
Webpage: http://richardreina.com/

My research revolves around studying animal responses to challenges from their environments and from human activity to understand how they deal with different these stressors. Most of the work is on marine animals including sharks, rays, penguins and turtles, but I have also studied frogs, crocodiles, lizards and small marsupials. The purpose of this research is to apply our improved knowledge to the conservation and management of affected species and ecosystems.

Projects in 2018/19:

**Reproduction and foraging of penguins** - July 2018 start

Little penguins, *Eudyptula minor*, live and breed in a large colony at Phillip Island southeast of Melbourne. As part of an ongoing program of the Phillip Island Nature Park (PINP) studying the population dynamics and biology of these penguins, a project opportunity exists to study the reproductive biology, behaviour and/or foraging of the penguins in the colony. Studies of parenting and foraging success are possible to understand the relationships between allocation of time and resources to food acquisition and reproduction. Other topics may be negotiated depending on student interests. The project is available for a mid-year start only and will probably require several days per week to be spent at Phillip Island between September and February. This project is co-supervised by Dr André Chiaradia of PINP.
**Project by negotiation** - July 2018 start

I will consider projects suggested by students in the areas of ecological physiology of vertebrate animals in any environment. Let me know if you have your own project ideas.

**Carla Sgrò**

Room: 439a, 18 Innovation Walk  
Email: Carla.Sgro@monash.edu  
Webpage: [http://carlasgrolab.org](http://carlasgrolab.org)

- The focus of our research is to better understand how organisms adapt to environmental change.
- We also explore how evolution can be explicitly incorporated into biodiversity conservation and management.

CS-1: Does nutrition mediate adaptation to environmental change?  
Feb 2018 or July 2018 start

The project will be developed in consultation with the student, but will broadly focus on investigating how pre-adult and adult nutrition interact with climatic stressors (thermal stress, desiccation stress) to influence population persistence. Please see my webpage for a summary of my group’s research interests.

CS-2 Co-supervised with Carly Cook: Putting evolution into conservation management  
Feb 2018 or July 2018 start

The project will be developed in consultation with the student. Please see our respective webpages for a summary of our research interests.

**Paul Sunnucks**

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[https://sites.google.com/site/sunnucksresearchgroup/home](https://sites.google.com/site/sunnucksresearchgroup/home)

Paul Sunnucks heads the Persistence and Adaptation Research Team (PART). Researchers in this team apply combinations of wildlife biology, ecological genomics/genetics and spatial environmental analysis to Australian native species under natural and human-impacted conditions.
Current major project areas include:

(1) Evolutionary adaptation of birds to their local environments. We have recently discovered that a common bird, the Eastern Yellow Robin, seems to be splitting into an inland form and a coastal form. We are running a major field and genomics program to understand this phenomenon better and test how much it applies to other species of bird.

(2) Evolutionary rescue of Australian wildlife. We are working with management agencies to experimentally supplement the genetic diversity of threatened species including Leadbeater’s Possum, Helmeted honeyeater, Macquarie Perch, and a grassland daisy, and to monitor their fitness and genomic responses to this management intervention.

Marina Telonis-Scott

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Webpage: [https://carlasgrolab.org/](https://carlasgrolab.org/)
http://www.monash.edu/science/schools/biological-sciences/staff2/marinatelonis-scott

My research program is geared towards adaptation genomics to better understand how organisms counter climatic extremes in a rapidly changing environment. I utilise a range of quantitative genetic, real time PCR, and Illumina Next generation sequencing technologies to explore a range of *Drosophila* phenotypes in populations from different climatic origins. I’m most excited about understanding how genes are utilised to generate phenotypic variation by probing the transcriptome, ‘the doing molecules’ of genes and how transcripts are processed to generate diversity.

Potential project opportunities:

- **Bioinformatic projects:** DNA sequence variant calling and analysis in wild climatically diverged *Drosophila melanogaster*
- **Laboratory projects:** Candidate climatic gene exploration using CRISPR (genome editing) or RNAi (gene knockdown) in *Drosophila*

Coral Warr

Room: G34D, 18 Innovation walk
Email: Coral.Warr@monash.edu  Webpage: [http://coralwarr.com/](http://coralwarr.com/)

**Drosophila Cellular and Developmental Genetics**

In the Warr lab we are interested in how cells receive and respond to signals from the environment or from each other both during development and in the adult organism.
Understanding this is critical because dysregulation of cell signalling underlies many of the major diseases that afflict society, including cancer and obesity. We use *Drosophila melanogaster* as a model organism because most cell signalling pathways are shared with humans, and in flies we have many sophisticated genetic and molecular approaches available to study gene function. Honours projects are available to study cell signalling during embryo development and during growth.

**Craig White**

Room: 119, 18 Innovation walk  
Email: Craig.White@monash.edu  
Webpage: [https://evolutionaryphysiology.com/](https://evolutionaryphysiology.com/)

Members of the Evolutionary Physiology group are interested in describing and understanding the causes and consequences of broad-scale variation in the physiology of animals. We study a range of traits, with an emphasis on metabolic rate, water loss, and breathing patterns, and employ a range of approaches including manipulative experiments, comparative studies, experimental evolution, and quantitative genetic analyses.

**Potential project opportunities**

- The relationship between metabolic rate and body mass is strong, but the shape of the relationship has been strongly debated for years. This project will examine the statistical approaches used to analyse the relationship between metabolic rate and body mass, to determine the adequacy of existing analyses.

- Although much of the research examining water loss in insects has focussed on respiratory water loss, particularly in the context of discontinuous gas exchange, most insects actually lose more water through their cuticle than their respiratory system. This project will use our cockroach model to test for phenotypic and genetic correlations between respiratory and cuticular water loss, to determine if selection on water loss will alter these traits together.

- The Oxygen and Capacity Limited Thermal Tolerance (OCLTT) hypothesis proposes that cardiorespiratory system failure is the principal determinant of the upper thermal limit of animals, and therefore a primary determinant of their realised thermal niche. The hypothesis has been tested and supported in many species, but it remains controversial. This project would synthesise the results of these tests using a phylogenetically informed meta-analysis framework, to test the generality of the OCLTT hypothesis in diverse groups of animals.

- Recent work has shown that animals allocate significant energy to growth even when fasted; the ongoing costs of growth may therefore influence the
relationship between metabolic rate and body mass during ontogeny. Using our cockroach model, we have previously shown that ambient hypoxia slows growth; this project will exploit this effect of ambient oxygen to examine the interaction between growth rate, body mass, and metabolic rate during ontogenetic growth.

Project offering for 2018 (co-supervised by Matt Hall and Dustin Marshall):

Does metabolic rate affect resistance to infection and disease dynamics? We want an honours student to explore whether individuals with higher or lower metabolic rates are more susceptible to disease and how diseases proliferate in organisms with different metabolic rates. We use the small crustacean Daphnia as a model organism for studying these questions.

**Bob Wong**

Room: 100, 19 Rainforest walk  
Email: Bob.Wong@monash.edu  

Research in our group focuses on animal behaviour, with a particular emphasis on how animals go about finding mates and looking after their young. We are also interested on getting students involved in projects investigating the impacts of environmental change on animal behaviour and the evolutionary process. To this end, we are particularly keen on uncovering the behavioural impacts of pharmaceutical pollutants (i.e. human and veterinary drugs) that enter the environment and have the potential to affect sexual (and other) behaviours in exposed wildlife.

For more details of our research, please check out: bobwonglab.org