



## From the Director

Dear all

Just short message from me this time as I'm currently travelling (on external funds).

Another semester of high-quality teaching has just wrapped up, with final assessments still to come in many courses. Research-led teaching, and the original research that enables it, is core business for RSB and I want to thank all those involved, especially course conveners and the BTLC team.

I'm sure you are all now aware that we are facing significant new constraints on our budget due to the broader University deficit. The settings to which we must respond have been changing almost weekly and exactly how much we have to cut from our 2024 budget is still to be determined. Our priorities are to pay staff salaries and HDR stipends and to minimise impact on our HDR students and teaching. Otherwise, I have proposed to Faculty some ways to cut non-salary spending and we will have further discussions in the 2<sup>nd</sup> half of June. To the extent possible I will keep all informed as we move along and I hope we can deal with this in a collegial way.

Craig

## Welcome



Welcome to **Chenke Zhang** (Jennions Group, E&E) who has started her PhD in E&E co-supervised by **Michael Jennions** (E&E) and **Megan Head** (E&E). Chenke will begin by working out why males sometimes stick together when they want to find a female to mate, even though this increases the likelihood that they share paternity.

## Grants awarded

**Eric Mirindi Dusenge** (commencing with the Atkin Group in 2024, PS) and **Emily Roycroft** (Moritz Group, E&E) were awarded J.G. Russell Awards from the Australian Academy of Science valued at \$6,970 and \$7,000 respectively.



**Olga M. Azevedo** (Sequeira Group, E&E) was awarded a Lerner-Gray Grant for Marine Research by the American Museum of Natural History valued at \$USD 3000.

**David Collings** (PS) and **Mitzy Pepper** (E&E) were both awarded a 2024 Hermon Slade Foundation Grant from the Hermon Slade Foundation valued at \$41,900 and \$58,325 respectively, see their project summaries below.

**David Collings** (Mathesius Group, PS) - *Bioengineering a better plant root - do phi thickenings make plant roots stronger?*

Investigators: **David Collings** (Mathesius Group, PS), **Ulrike Mathesius** (PS), **Volker Nock** (University of Canterbury, NZ), **Ayelen Tayagui** (University of Canterbury, NZ)

Is it possible that a highly prominent anatomical feature, found in the roots of many plant species, can have no demonstrated functions despite being discovered more than a century ago? In the case of phi thickening networks (PTNs), the surprising answer is yes!

PTNs form from narrow bands of stiff, secondary cell wall that loop around the radial walls of cortical cells in plant roots, a location that textbooks suggest should only have a thin primary wall. While PTNs have been suggested to mechanically strengthen the growing root, this remains untested. We have developed an in vitro system in which Brassica roots induce PTNs when exposed to the hormone jasmonic acid. This system will allow us to directly test the biomechanical properties of PTNs, and to quantify whether PTNs increase the mechanical strength of the growing root allowing better soil penetration. Additionally, we will also use our system to further characterise the biochemical and molecular pathways through which Brassica PTNs develop.

**Mitzy Pepper** (Keogh Group, E&E) - How did the spread of Australia's deserts impact the genomic diversity of arid zone lizards?

Investigators: **Mitzy Pepper** (Keogh Group, E&E)

Australia's vast arid zone has been a focal point for understanding how climatic changes shaped the evolution of its unique biodiversity. During the Last Glacial Maximum (LGM) 18,000 years ago, much of the continent was a harsh, unrecognizable landscape, posing significant challenges for the persistence of desert dwelling organisms. I have just been awarded a research grant from the Hermon Slade Foundation to generate high quality reference genomes of arid zone lizards to better understand their demographic history and evolutionary responses to past climate events. With whole genomes from a range of different arid species, and employing advanced demographic inference techniques, my project seeks to uncover how the dramatic environmental changes of the LGM influenced the incredible lizard biodiversity in Australia's deserts.

## Congratulations

Congratulations to **Emily Roycroft** (Moritz Group, E&E) who was awarded the 2024 Alan Wilton Award from the Genetics Society of AustralAsia. The award recognises outstanding contributions to the field of genetics research by an Australasian scientist early in their career.

Two RSB PhD students have won first prizes (and hearts!) at the Canberra RNA Emerging Leaders Symposium held on 20th May 2024 at JCSMR. Congratulations to **Rebecca Tyrrell** (Pogson Group, PS)

and **Viktor Makota** (van Dooren Group, BSB) for winning the best 6-minute rapid-fire talk and poster presentation, respectively.



Organized by the members of the ACT RNA Club Organizing Committee, a collaborative effort spanning the RNA research community across Canberra, including the RSB and JCSMR at ANU, CSIRO, and the University of Canberra, this event witnessed an outstanding enthusiasm of the next generation of RNA trailblazers!

## PhDs awarded

**Scott Ferguson** (Borevitz Group, PS) *Investigation into the genome evolution of the genus Eucalyptus, and assessing and improving real accuracies of Oxford Nanopore long-read Sequencing.*

**Carl McCombe** (Williams Group, PS) *Functional characterisation of Nudix hydrolase effectors from phytopathogenic fungi.*

**Angus Rae** (Mathesius Group, PS) thesis title confidential.

**Putter Tiatragul** (Keogh Group, E&E) thesis title confidential.

**Vicky Zhang** (Byrt Group, PS) *Characterising the regulatory effects of splice variants of transporters*

## MPhil awarded

**Simone Babij** (Leyton Group, BSB) *Understanding collateral sensitivity in the malaria parasite.*

## News

**Ana Sequeira** (E&E) spoke with ABC Radio Pilbara about the **Gathaagudu Animal Tracking Project** and the dugongs that were satellite tagged in Shark Bay and moved close to Carnarvon.

**Hannah Calich** (Sequeira Group, E&E) had the opportunity to discuss the impact *Jaws* had on sharks and answer questions from the public at the [Science Art.Film](#). The movie *Jaws* is well-known for two things, “man-eating” sharks and a gripping soundtrack (du duh... du duh...), and it was only fitting that Hannah was joined on the panel by Professor Kenneth Lampl from the ANU School of Music.

**Ben Corry's** (BSB) research on 'Force-sensing' proteins has been widely reported on across outlets such as

radio, print and online. Tune in to the April 21st [Healthy Living](#) podcast by 2GB Sydney to hear more.



**Naomi Langmore's** (E&E) new publication features in the article [What's that in my nest? How the evolutionary arms race between cuckoos and hosts creates new species](#) by The Conversation. The publication was a team effort involving current and former RSB members including , **Alex Skeels** (Cardillo Group, E&E), **Iliana Medina** (previously Langmore Group, E&E), **Hee-Jin Noh** (previously Langmore Group, E&E), **Alicia Grealy** (previously Langmore Group, E&E), **Kevin Murray** (previously Pogson Group, PS) and John Grant.

## Obituary

Vale Adrian Horridge, A Man of Many Accomplishments



Adrian Horridge, one of the Foundation Professors of what was then the Research School of Biological Sciences, died on April 30, age 96. He has summarised his career in considerable detail on [Wikipedia](#), so I will spend only a short paragraph on his career and another on some of the many stories about him.

Adrian started at Cambridge as an undergraduate in 1946 and stayed on to do a PhD. He describes the experience as follows, “As a research student in Cambridge in those days, you stood up alone and stood on your own feet, then you walked or preferably ran. You found yourself your own topic, searched the literature, and somebody who would supervise you.” This experience stood him in good stead later in life, as he was never one to shrink from a challenge. From Cambridge he became a highly successful Director of the Gatty Marine lab of the University of St Andrews from 1960–69. In one of his famous experiments from this period he demonstrated that the ventral nerve cord of a headless cockroach could learn a task. In a second he demonstrated, using electric shocks, that the polyps of a coral colony were connected by a nerve net. He also co-authored a two volume work with a famous American neuroscientist, Ted Bullock, entitled *Structure and Function in the Nervous System of Invertebrates*, that helped to cement his reputation. On the basis of his success at the Gatty, in 1969 Adrian was offered one of the foundation chairs in the newly established Research School of Biological Sciences, which he occupied until his retirement in 1993. In Canberra Adrian quickly built a large and international department, which attracted scientists from Australia, England, the US, Germany, and Japan, as shown in the photo below from 1972. Much of his research in Canberra was on the structure and function of the compound eyes of insects. In addition to his own research, during his career he supervised or co-supervised 51 PhD students, 8 of whom went on to become Fellows of the Royal Society.

Adrian is legendary for many things. While at St Andrews he sawed a dual-beam oscilloscope in half to create two oscilloscopes. He was also famous for his imitation of a dancing bee when he lectured on communication in honeybees. One of his secrets for attracting PhD students was to have a workshop where,

in addition to working on equipment for their experiments, they could work on their cars. So, in the early days he had a lathe and a drill press in H block at ANU and he later fought hard to have an experimental workshop for academics in the Robertson building, something that would almost certainly be banned on OHS grounds today.



One characteristic of Adrian throughout his life was that he appeared to wear the same knitted jumper throughout his time in Canberra, as will be apparent if you compare his appearance in the attached photo from 1972 with recent photos on Wikipedia. In fact, the jumper is a very old pattern still knitted by one family in Scotland.

Obituary written by Eldon Ball (E&E).

## Papers

Bandyopadhyay T, Maurya J, Bentley AR et al. Identifying the mechanistic basis to nitrogen responsiveness in two contrasting *Setaria italica* accessions. *Journal of Experimental Botany*. <https://doi.org/10.1093/jxb/erae204>.

Braby MF, Hsu Y-F & Lamas G. How to describe a new species in zoology and avoid mistakes. *Zoological Journal of the Linnean Society*. <https://doi.org/10.1093/zoolinnean/zlae043>.

Carvalho AP, Owens HL, St Laurent RA, Braby, M.F et al. Comprehensive phylogeny of Pieridae butterflies reveals strong correlation between diversification and temperature. *iScience*.

Chan AHY, Ho TCS, Fathoni I, Saliba KJ et al. Evaluation of ketoclozazole and its analogues as inhibitors of 1-deoxy-D-xylulose 5-phosphate synthases and other thiamine diphosphate (ThDP)- dependent enzymes. *RSC Medicinal Chemistry*. <https://doi.org/10.1039/D4MD00083H>

Chen L, Ghannoum O, Furbank RT. Sugar sensing in C4 source leaves: a gap that needs to be filled. *Journal of Experimental*. <https://doi.org/10.1093/jxb/erae166>.

Chung M-H, Fox RJ & Jennions MD. Male allocation to ejaculation and mating effort imposes different life history trade-offs. *PLoS Biology*. <https://doi.org/10.1371/journal.pbio.3002519>.



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Featured as the journal cover art with collaborating artist and PhD Student Kasey Pham.

(University of Florida)

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Pulsford SB, Outram MA, Forster B, Rhodes T, Williams S, Badger MR, Price GD, Jackson CJ et al. Cyanobacterial  $\alpha$ -carboxysome carbonic anhydrase is allosterically regulated by the Rubisco substrate RuBP. *Science Advances*. <https://doi.org/10.1126/sciadv.adk7283>.

Title PO, Singhal S, Grundler MC, Moritz C et al. The macroevolutionary singularity of snakes. *Science*. <https://doi.org/10.1126/science.adh2449>.

Ubierna N, Holloway-Phillips M-M, Wingate L, Farquhar GD et al. Using Carbon Stable Isotopes to Study C3 and C4 Photosynthesis: Models and Calculations. *Photosynthesis: Methods and Protocols*. [https://doi.org/10.1007/978-1-0716-3790-6\\_10](https://doi.org/10.1007/978-1-0716-3790-6_10).

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