



NEWS

Kevin Saliba elected Fellow of ASP



Kevin Saliba and President of the ASP, Una Ryan.

Congratulations to Kevin Saliba (BSB), who has been elected a Fellow of the Australian Society for Parasitology (ASP). This is the highest honour the Society can award, and was presented to Kevin during the ASP conference this month.

RSB congratulates our newest PhDs



New PhD graduate Dr Flor Danila (centre) with her supervisor Susanne von Caemmerer (PS) and Bob Furbank, Director of the ARC Centre of Excellence for Translational Photosynthesis, on graduation day this month.

RSB congratulates our latest PhD graduates, who were awarded their degrees in the graduation ceremony on Thursday 18 July. The new Doctors are: Jessie Au (Foley group, E&E), Sabrina Chin (Mathesius group, PS), Qi Cheng (Bröer group, BSB), Florence Danila (von Caemmerer group, PS), Nadya Farah (Jones group, PS), Alex Hulyer (Callaghan group, BSB), Stefanie Oberprieler (Moritz group, E&E), Angelin Samuel (Gordon group, E&E), Amit Singh (Nicotra group, E&E), Eleanor Stalenberg (Foley group, E&E) and Erick Tjhin (van Dooren group, BSB).

ARC Linkage grant success

RSB researchers were successful in two ARC linkage grants announced this month. 'Living on the edge: how do Australian plants cope with extreme temperature', led by Adrienne Nicotra (E&E) was awarded



Staff and students from RSB and NTU at the Nature Education and Research Centre at Endau Rompin, Malaysia. (Image: Wes Keys) (See: News Item)

\$729,500. The project includes collaborators from the The Australian Botanic Garden, the Australian National Botanic Gardens, the NSW Office of Environment and Heritage, and Universidad de la Frontera in Chile, and aims to ascertain the thermal breadth of Australian species.

Justin Borevitz (PS) is a partner on 'Optimising plant populations for ecological restoration and resilience', led by Richard Edwards (UNSW). This project aims to develop methods to quantify the trade-off between maximising genetic diversity and selection for desirable properties, focusing on Australian rainforest trees affected by myrtle rust.

University medal awarded to RSB student

Angela Stoddard, honours student in the Mathesius group (PS) (co-supervised by Viv Rolland at CSIRO) was awarded the University Medal for her excellent academic record at graduation this month. In addition to her Honours research on root-microbe systems, Angela was able



to contribute to other research in the School, resulting in co-authorship on two publications.

RSB 3MT competition

Nine HDR students competed in the 2019 RSB Three Minute Thesis competition this month. They were Chun-Chia Chou (Backwell group, E&E), Yuzhen Fan (Atkin

group, PS), Merryn Fraser (Maier group, BSB), Tomás Fuenzalida (Meir group, PS), Jenni Hayward (van Dooren group, BSB), Ayman Hemasa (Saliba group, BSB), Theresa Störiko (Maier group, BSB), Oliver Stuart (Mikheyev group, E&E) and Alyssa Weinstein (Peakall group, E&E). The quality of the talks was outstanding, and the judges had a difficult task identifying the winners. The results were Alyssa Weinstein (Winner), Oliver Stuart (Runner-up) and Merryn Fraser (People's Choice).

Thanks to judges Jay Prentice (BTLC), Naresh Verma (BSB), Tom Davis (RSBIT) and Xia Hua (MSI), and to Jay Prentice and Sam Jahromi (BTLC) for organising the event.



Participants and judges at the RSB 3MT competition held this month. Front, from left: Jay Prentice, Chun-Chia Chou, Yuzhen Fan, Tomas Fuenzalida, Merryn Fraser. Back row: Xia Hua, Naresh Verma, Tom Davis, Jenni Hayward, Ayman Hemasa, Theresa Störiko, Alyssa Weinstein, Oliver Stuart. Image Sharyn Wragg.

Singapore and Malaysia field trip

Biol2203/3303 (Advanced) Field Studies in Functional Ecology was held in Singapore and Malaysia in July this year (see main photo). Sixteen ANU students and four



## DECRA profile: Helen Bothwell (Borevitz group, PS)

### Research background



I fell in love with macrosystems ecology as an undergrad at the University of Wisconsin – Madison, where I worked in the Lindroth Chemical Ecology & Entomology Lab investigating how continental-scale patterns of fire history

and herbivorous browsing interact to influence the biogeography of chemical defense in forest trees across Canada. As a PhD student and later post doc at Northern Arizona University, my fascination with understanding the links between micro- and macroscale ecological processes continued. My research utilized a genes to ecosystems approach to investigate how past and present landscape and climatic factors have shaped spatial genetic structure and gene flow in foundation tree species across western North America. I also developed landscape genetic prediction models to assist land managers in preparing for future climate change impacts within National Parks. In 2017, I took a fun detour to the animal world and joined an international team of scientists from Arizona, Oxford, Borneo, Sumatra, and Southeast Asia as a statistical consultant, working to develop habitat suitability models for conservation of threatened clouded leopards. In the spring of 2018, I made the big leap across the Pacific to join the Borevitz Lab. While here, I'm working on a DECRA project investigating landscape genomics of drought adaptation in eucalyptus.

### Current research interests

Above all, my research is motivated by a drive to contribute concrete, practical solutions for conservation genetic management of our world's forests. Over the course of my research career, we have rapidly accelerated from studies using a handful of markers to whole genome sequences. At the same time, spatial statistical modeling has seen its own revolution in high performance computing power, high-resolution geospatial datasets, and a wealth of creative and exciting modeling tools. I work at the intersection of these fields, using GIS and spatial modeling to understand what ecological and evolutionary processes have contributed to the spatial distribution of species and adaptive genomic variation across the landscape. A perpetual challenge is building better models that reduce sources of uncertainty, thereby reducing risks associated with management decisions. My current work is digging under the surface to investigate variation in root growth and drought adaptation strategies in southeast Australian eucalyptus species. In collaboration with local land managers, I look forward to translating this basic research into identification of optimal restoration stock for rebuilding climate-resilient forests.

### What I enjoy most about research

I feel fortunate to spend my days tackling new challenges that fascinate and inspire me – as researchers we never stop learning. As a forest ecologist, I've also had the pleasure of doing fieldwork and camping in some of the most beautiful and remote corners of the American West. I'm grateful for the time spent gaining an intimate knowledge of that vast and beautiful landscape, for exploring quiet places where few others have ever set foot, and for being able to contribute to its conservation. As much as conservation work is place-based, being a spatial modeler has afforded global opportunities to work with scientists all over the world. It's exciting living in a digital age where we can work collaboratively on coding with partners in Poland, write manuscripts with co-authors in Bhutan, and develop grants with Aussie collaborators, all in the same day from a laptop anywhere in the world. Now more than any other time in history, we have the capacity to bring together great minds to solve big challenges.

students from our partner uni Nanyang Technological University (NTU) in Singapore took the course. The ANU staff contributing were **Adrienne Nicotra** (E&E) and **Megan Head** (E&E), **Wes Keys** (Divisional Technical Officer, E&E), with **Brad Posch** (Atkin group, PS) and **Sally Buck** (Whitney group, PS - currently working with **Oliver Mueller-Cajar** at NTU on a Jan Anderson Scholarship) as demonstrators. We had active engagement from colleagues in the School of Biological Sciences and the Asian School of the Environment at NTU: **Oliver Mueller-Cajar** (photosynthetic thermal tolerance), **Shawn Lum** (tropical forest ecology), **Serafino Teseo** (ant biology), **Yanson Miao** (microscopy). We spent the first portion of the course exploring the secondary forests of Pulau Ubin off the north coast of Singapore, and the core of the course consisted of projects in the primary forest of Bukit Timah and surrounds. At the end of the course we spent four nights in Endau Rompin National Park, Malaysia, where we were joined by **Nur Bahar** (formerly Atkin group, PS, now a forest conservation ecologist in Malaysia) and colleagues from the NGO Wildlife Conservation Society Malaysia to learn about forest connectivity and wildlife monitoring. The collaboration between the schools is developing well and we're hoping that in the not too distant future we'll have the opportunity to return the hosting favour and have the NTU students join in on the field course when it runs at Kosciuszko. - **Adrienne Nicotra** (E&E).



Biol 3303 students encounter one of the many wild pigs that inhabit the island of Pulau Ubin, a small island just off the NE coast of Singapore, near Changi. Image Wes Keys.

## Innovations in Agriculture for Food Security Conference

The Translational Photosynthesis Conference: Innovations for Food Security was held at the Brisbane Convention and Exhibition Centre from the 30th June to the 3 July. 112 participants attended, including a huge participation of members from the Research School of Biology, as well as other ANU colleges and people from the UK, Germany, Canada, USA, China, the Philippines, Czech Republic

and NZ.

The Conference featured a diverse range of speakers, posters and trade presentations. Rather than focussing on reporting the excellent science in our Centre, the aim of this outward conference was to raise awareness of the broader context within which we work. Establishing contacts and a network of people can be of great benefit to science and careers, so the meeting began on the Sunday evening with a forum for the next generation.

Plenty of time was allocated for networking with members of the agricultural industry and researchers from a range of disciplines including experts in gene technology regulation, plant science, climate change, phenomics, robotics, and synthetic biology. Poster presenters introduced themselves in flash talks to encourage people to come and discuss their work. It was clear from the animated groups, that these opportunities were well used.

Three PhD students from RSB were awarded the Conference poster prizes: **Lily Chen** (First place), **Tim Rhodes** (Second place) and **Rowarne Leith** (People's choice).



InnovAg conference poster prize winners Rowarne Leith (People's Choice), Tim Rhodes (Second Prize) and Lily Chen (First Prize) with conference organising committee Chair John Evans. Image Natalia Bateman-Vargas.

The Conference was generously sponsored by the GRDC, LI-COR, the International Society of Photosynthesis Research, Western Sydney University, CEAT, CoE in Plant Energy Biology, FLIR, PSI, BASF, the Journal of Experimental Botany, John Morris and the Australian Society of Plant Scientists.

**Graham Farquhar** (PS) regaled us over the conference dinner with how many times during his career his next step was only made possible by personal recommendations rather than from an excellent academic record. From the many direct comments I have received, participants enjoyed the meeting and I want to acknowledge the tremendous work from many, but particularly from **Sarah Fraser-Chitticks**, **Natalia Bateman** and **Victoria Allen**.

As the conference drew to a close, a clear message emerged. We have to work together – across researchers, growers, decision makers, regulators, research

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Layout: Mel Norris  
Editing: Scott Keogh & Mel Norris

fundes and the public – if we are to feed the world and give Australia a resilient and profitable agriculture sector over the next two decades. - **John Evans**, PS, Chair of the organising committee.

### Faculty Flash

Genome Biology was the theme of the fourth annual RSB Faculty Flash, held this month in the RN Robertson Lecture Theatre. Nine scientists from the school spoke for 8 minutes each about their research - **Justin Borevitz** (PS), **David Gordon** (E&E), **Gavin Huttley** (E&E, CBBU), **Maja Adamska** (BSB), **Sasha Mikheyev** (E&E), **John Rathjen** (PS), **Allen Rodrigo** (CBBU), **Aude Fahrre** (BSB), **Benjamin Schwessinger** (PS), and **Craig Moritz** (E&E). **Rob DeSalle** from the American Museum of Natural History gave the keynote address.

### RN Robertson building wins award

The RN Robertson project won the award for 'Commercial and Retail Fitout, Refurbishment or Alteration more than \$5million' at the Master Builders Association Award night this month.

### CEAT Update



The Centre for Entrepreneurial Agri-Technology (CEAT) invites you to explore our [new website](#) and view the updated information about CEAT. Driven by the desire to continue building an innovation ecosystem where research and technology is targeted to agricultural challenges independent of traditional discipline boundaries, we invite you to join the conversation if you haven't already. Please visit [www.ceat.org.au](http://www.ceat.org.au) and download our [flyer](#) to explore if there are opportunities for you within the Research Translation Initiative and/or the Innovation Training Initiative. - **Mary Kelly**, CEAT Director.

### Awards and Grants

**David Duchêne** (Moritz group, E&E) was awarded the Alan Wilton Award by the Genetics Society of Australasia this month. The award recognises outstanding contributions to the field of genetics research by Australasian scientists early in their career.

A Major Equipment Grant application led by **Joe Brock** (BSB) for a **WAVE**

**Bioreactor** has been funded. This system will allow large scale (5-20L) insect and mammalian cell culture, and will be installed in **Giel van Dooren's** (BSB) tissue culture lab next month.

**Aude Fahrre** (BSB) and collaborator **Desmond Yip** (ANU medical school) have been awarded \$45,000 from Perpetual's 2019 IMPACT Funding Program for their project entitled 'Cancer Immunotherapy - a paradigm shift in checkpoint inhibitors.'

**Rosie Harris** (Fulton group, E&E) has won a University Grant from the Australian Wildlife Society for her Masters research on the community ecology of tropical macroalgal forests.

**David Ellis** (Fulton group, E&E) has won the 2019 Michael Hall Student Innovation Award from the Australian Society for Fish Biology for his PhD research on the seasonal habitat ecology of a tropical fishery species.

**Octavio Jimenez Robles** (Moritz group, E&E) has a one-year extension of his postdoctoral scholarship from Fundación Ramón Areces, until September 2020.

## IN THE MEDIA

**Xuankun Li** (Rowell group, E&E) named a bee fly after the Night King from Game of Thrones, and the media loved it. The newly named species, *Paramonovius nightking*, was reported widely, including by the BBC, SBS, the ABC, CNN, Fox News, The Age, The Canberra Times and many other outlets.

Inclusive fitness is hot topic in evolutionary theory. A new paper by **Michael Jennions** (E&E) and **Lutz Fromhage** (University of Jyväskylä, Finland) tackled the problems and proposed a [controversial solution](#) on the biological purpose of life. It received a [very positive commentary](#) by respected scientist David Queller, in the Proceedings of the Royal Society B.

## WELCOME

The Macroevolution and Macroecology group (E&E) welcomes **Andrew Ritchie**



who is starting an ARC funded postdoc on molecular evolution. Andrew completed a PhD in molecular phylogenetics with Simon Ho in Sydney, and a postdoc on protein evolution with David Liberles at Temple University, and will investigate why species vary in their rates of DNA sequence evolution, and

how this rate variation might impact on molecular dating from phylogenetics. - **Lindell Bromham** (E&E).

**Putter Tiatragul** has just started his PhD in the Keogh Lab (E&E).



Putter is from Thailand and recently completed his MS at Auburn University in the USA. He is interested in ecology and conservation and good food.

**Qingqing Han** is a PhD student from Lanzhou University in China, who will be visiting the Mathesius group (PS) for the next two years as part of her PhD, funded by the Chinese Scholarship Council. She will be working on the interactions of a plant growth promoting soil bacterium with nitrogen fixation in legumes.

The Price lab is very glad to be welcoming **Angela Stoddard** – she has joined for



the next 9-10 months as a casual research officer. She recently completed mid-year Honours with **Uli Mathesius** (PS) and **Viv Rolland** (CSIRO) for

which she received a University medal. She will be working on an Agility grant project from the Centre of Excellence in Translational Photosynthesis and partly on RIPE projects. Her work will revolve around transient expression of transgenes in tobacco combined with high resolution confocal imaging for chloroplast and carboxysome localisation.

## NEW APPOINTMENTS

We congratulate **Xia Hua** (Bromham group, E&E) on beginning her DECRA and a tenure track lectureship in Mathematics. In Xia's seven years as a postdoc in RSB, she has been a never-ending source of enthusiasm and creativity in her approach to a wide range of topics in evolution and ecology, including molecular evolution, new methods in macroevolutionary phylogenetics, models of niche evolution and innovative approaches to studying language change, and she has formed connections between the bioinformatics, conservation biology, and macroevolution and macroecology groups within the school. During her time with us she has published research in Nature, Nature Communications, PNAS, American Naturalist and other top journals. Although we are very sad to see Xia

leave the school, the upside is that the Macrevolution and Macroecology group has gained a principal investigator in maths, so we look forward to ongoing cross-departmental collaboration. -

**Lindell Bromham** (E&E),

**Stephen Fairweather** (Bröer group, BSB) has taken a part-time position with **Megan O'Mara** at the Research School of Chemistry, working on bacterial manganese transporters. He will remain a Visiting Fellow in the Bröer group.

## PHDS SUBMITTED

**Weidong Jing** (Bröer group, BSB) 'Functional and physiological characterisation of the putative aminophospholipid flippase ATP11C'.

## PHDS AWARDED

**Sonya Geange** (Nicotra group, E&E). 'Does the individual matter? Quantifying the role of intraspecific variation and phenotypic plasticity in plant responses to climate change'

**Divya Muthiah** (Callaghan group, BSB) 'Strategies to overcome ABCB1 and ABCG2 mediated drug resistance in cancer'.

## PAPERS ACCEPTED

Bohman B, Weinstein AM, Phillips RD, Peakall R, Flematti GR, 2-(Tetrahydrofuran-2-yl) acetic acid and ester derivatives as long-range pollinator attractants in the sexually deceptive orchid *Cryptostylis ovata*, *Journal of Natural Products*.

Clermont O, Dixit OVA, Vangchhia B, Condamine B, Bridier-Nahmias A, Denamur E, Gordon D, Characterisation and rapid identification of phylogroup G in *Escherichia coli*, a lineage with high virulence and antibiotic resistance potential, *Environmental Microbiology*.

Cresswell A, Langlois TJ, Wilson SK, Fulton CJ *et al.* Disentangling the response of fishes to recreational fishing over 30 years within a fringing coral reef reserve network, *Biological Conservation*.

Deans RM, Farquhar GD, Busch FA, Estimating stomatal and biochemical limitations during photosynthetic induction, *Plant, Cell & Environment*.

Esquerre D, Ramírez-Álvarez D, Pavón-Vázquez C, ... Keogh J, *et al.*, Speciation across mountains: phylogenomics, species delimitation and taxonomy of the

*Liolaemus leopardinus* clade (Squamata, Liolaemidae), *Molecular Phylogenetics and Evolution*.

Flores-Moreno H, Fazayeli F, Banerjee A, ... Atkin OK, *et al.*, Robustness of trait connections between multiple plant organs across environmental gradients and growth forms, *Global Ecology and Biogeography*.

Fromhage L, Jennions MD, The strategic reference gene: an organismal theory of inclusive fitness, *Proceedings of the Royal Society B*.

Hsiao Y, A checklist of Cephalomalthinus Pic, 1921 of Taiwan (Coleoptera: Cantharidae), *Taiwanese Journal of Entomological Studies*.

Hsiao Y, Taxonomic notes on Eustrophinae from the mid-Cretaceous Burmese amber, with description of a new species (Coleoptera, Tetratomidae), *Paläontologische Zeitschrift*.

Jiménez-Robles O, De la Riva I, Lizards in the mist: Thermal niches constrained by habitat and microclimates in the Andes of southern Bolivia, *Journal of Biogeography*.

Linde C, Smith L, Host specialisation and disparate evolution of *Pyrenophora teres* f. *teres* on barley and barley grass, *BMC Evolutionary Biology*.

Macdonald DW, Bothwell HM, Kaszta Ž, *et al.*, Multi-scale habitat modeling identifies spatial conservation priorities for mainland clouded leopards (*Neofelis nebulosa*), *Diversity and Distributions*.

Martinez-Escobar DF, Mallela J, Assessing the impacts of phosphate mining on coral reef communities and reef development, *Science of the Total Environment*.

Mathesius U, 'Hormonal interactions in the regulation of the nitrogen-fixing legume-Rhizobium symbiosis', in P Frendo, C Masson & F Frugier (eds), *The nitrogen-fixing legume rhizobium symbiosis*, Academic Press.

Mathesius U, 'The role of the flavonoid pathway in *Medicago truncatula* in root nodule formation. A review', in: FJ de Bruijn (ed), *The Model Legume Medicago truncatula*, John Wiley & Sons.

Mathesius U, 'Phytohormone regulation of Medicago-Rhizobia interactions. A review', in FJ de Bruijn (ed), *The Model Legume Medicago truncatula*, John Wiley & Sons.

Mathesius U, van Noorden GE, 'The autoregulation gene SUNN mediates changes in nodule and lateral root formation in response to nitrogen through changes of shoot-to-root auxin transport', in FJ de Bruijn (ed) *The Model Legume Medicago truncatula*, John Wiley & Sons.

Robbin S, Singleton C, Chan CX, Messer L, Geers A, Ying H, Baker A, Bell S, Morrow K, Ragan M, Miller D, Foret S, ReFuGe2020 Consortium, Voolstra C, Tyson G, Bourne D, A genomic view of the reef-building coral *Porites lutea* and its microbial symbionts, *Nature Microbiology*.

Schulte P, Zeil J, Stürzl W, An insect-inspired model for acquiring views for homing, *Biological Cybernetics*.

Tilley A, Hunnam KJ, Mills DJ, Steenbergen DJ, Govan H, *et al.*, Evaluating the fit of co-management for small-scale fisheries governance in Timor-Leste, *Frontiers in Marine Science*.

Skells A, Lineages through space and time plots: Visualising spatial and temporal changes in diversity, *Frontiers of Biogeography*.

## NOTICES

An RSB innovative proposal funded in late 2018 was: Future Proofing Scientific Rigour at RSB. We encourage best practice for tasks like registering studies, recording protocols, formulating hypotheses, analysing data, and making it publicly available. To benchmark current practices we encourage all academics, PhD, MSc & Hons students at RSB to complete a short survey. It is here. Any queries, contact **Michael Jennions** (E&E) or **Megan Head** (E&E).

**Today's tip:** If you are interested in registering a study, check out this FREE, user-friendly site [osf.io](https://osf.io). What does it mean to register a study? Here is an example from an RSB student. Why register a study? For starters, it protects you against the temptation of using post-hoc hypotheses to explain away strange results, or of adding more data to make a marginally NS result significant, and then neglecting to mention that you did these things. If you don't think either of these behaviours are inappropriate then keep an eye out for our upcoming workshops to find out why they are bad for science. - **Michael Jennions** (E&E).