



NEWS

Alex Maier elected Fellow of ASP



Alex Maier (BSB) has been elected as a Fellow of the Australian Society for Parasitology (ASP). This is the highest honour the Society can award, and was presented to Alex during the ASP conference this month (see image above). The award recognises Alex's leadership in both research and teaching, including the establishment of the [International Research Training Group](#) program with Humboldt University, the [Concepts in Parasitology](#) course, and his pioneering work on the molecular mechanisms of malaria pathogenesis that has led to multiple patents and the first genetically attenuated malaria live vaccine to enter clinical trials.

RSB and E&E shine at the largest evolution meeting ever.



2018 Ernst Mayr Award winner Ian Brennan, with Society of Systematic Biologists (SSB) President Susana Magallón. Image SSB.

From the 18th to the 22nd of August this year, there was a rare event: a joint meeting of the European (European Society for Evolutionary Biology) and USA Evolution and Systematics Societies (Society for the Study of Evolution, Society of Systematic



DECRA of the month Sam Periyannan (Rathjen group, PS) poses with a statue of his science hero, Norman Borlaug, at the International Maize and Wheat Improvement Center (CIMMYT) in Obregon, Mexico. (See: DECRA profile on page 2).

Biologists, American Society of Naturalists). It also happened to be in Montpellier, France which is a global powerhouse of evolutionary biology and a rather wonderful venue all round. About 2,500 scientists (of a much larger number of applicants) attended this very well run meeting.

Anyway, the point here is that RSB science was exceptionally well represented. Having received the ESEB President's award, **Loeske Kruuk** (E&E) gave the opening plenary to a HUGE and enthusiastic audience. Somehow **Andrew Cockburn** (E&E) and fairy wrens were prominent therein! And there was more. Each of the US societies have hotly contested student talk competitions. In each case, participants in these symposia are selected from a large number of applications. For the SSB Ernst Mayr award, RSB fielded no fewer than 3 of the 14 selected talks and for the SSE Hamilton awards we had 2 of 14 talks. **Huw Ogilvie**, (Moritz group, E&E), **Ian Brennan** (Keogh group, E&E) and **Moos Blom** (Moritz group, E&E) gave excellent talks in the Mayr Award symposium, as did **Damien Esquerre** (Keogh group, E&E) and **Josh Penalba** (Moritz group, E&E) in the Hamilton Award symposium. Beyond this, RSB students also gave other presentations at the conference. And the outcome? **Ian Brennan** received the Ernst Mayr award! I think we are doing something right in RSB.- **Craig Moritz**, E&E.

Promotions



Congratulations to **Angela McGaughan** (Moritz group, E&E), **Christina Spry** (Saliba group, BSB) and **Louis Ranjard** (Rodrigo group, CBBU) (above, left to right), who have all been promoted from Academic Level A to Academic Level B.

Animal research ethics talks



Amanda Buyan and Stephen Fairweather talk to Mary Bate, from the NHMRC, at the ANZCCART conference

On 25th July RSB post-doctoral scientists **Amanda Buyan** (Corry group, BSB) and **Stephen Fairweather** (Bröer group, BSB) spoke at the 2018 Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART) Annual Conference at the Hyatt, Canberra.

DECRA profile: Sam

Periyannan (Rathjen group, PS)

Research background

Born and brought up on a small sugar cane farm in Southern India, I never dreamed I'd become a crop researcher rather than a cane farmer. In 2008 I moved from Sydney University to CSIRO in Canberra initially as a visiting PhD student for 3 months, but stayed for more than 10 years, as PhD student, Postdoc and Research Scientist. In 2017 I crossed the road to ANU on secondment to take up the DECRA project in the Rathjen lab. I'm now working on the wheat rust pathogen, after spending many years cloning rust resistance genes in the host plant.

Current research interests

My current research in the Rathjen lab is to characterise wheat stripe rust pathogen strains to identify virulence molecules. These molecules are the prime target for the host plant resistance genes to detect the pathogen's presence and trigger the immune response. But in the battle the rust pathogen tries harder, modifying these molecules to escape recognition. My interest is also to understand the various mechanisms employed by the pathogen to prevent interaction with the host resistance genes. With this fundamental knowledge and using advancements in genetic engineering, my long-term vision is to create synthetic resistance genes with the ability to quickly defeat any new forms of the rust pathogens.

Who is your science hero?

Dr Norman Borlaug, father of the Green Revolution and Nobel Peace Prize winner. He became world famous by tripling food production through the introduction of semi-dwarf, high yielding and disease resistant wheat varieties during the 1960s when there was a massive crisis for food grains. He used a new breeding strategy called Shuttle breeding to accelerate the generation of his high-yielding wheat varieties. Instead of growing one generation of the crop in a fixed location, he used two geographically distinct locations within Mexico to produce two crops in a given year thereby halving the breeding time. Being Borlaug's true fan, in March I was fortunate to visit his research hub, the International Maize and Wheat Improvement Centre's (CIMMYT) regional station at Ciudad Obregon, Mexico where I had a mind-blowing experience.

Both of them relished the opportunity to communicate their research to a more general audience that was made up predominately of stakeholders and academics from other disciplines involved in animal research ethics. The interest generated was substantial and both gained some valuable insights into the approaches and points of view of various professional fields including from tertiary animal ethics committees, fundraising and funding bodies, government agencies and other academics from disciplines as diverse as philosophy and law. A special thanks to Sharyn Watson from [Medical Advances Without Animals \(MAWA\)](#), which funds both Amanda and Stephen with current Research Fellowships and who arranged for the two to talk at the conference. Amanda and Stephen also enjoyed the conference dinner that evening, Amanda being especially pleased to meet potential future collaborators. -

Stephen Fairweather (Bröer group, BSB).

First CEAT workshop

On 4 September the new Centre for Entrepreneurial Agri-Technology (CEAT), hosed its first workshop. This agri-tech Innovation Ecosystem event was well attended, exceeding its initial target of 20 participants with diverse participation from across ANU, government and industry. An [overview of the workshop](#) is provided on the CEAT website. Speakers, **Rob Elshire**, president of Genomics for Aotearoa New Zealand, and our own **Justin Borevitz** (PS) took a broad look at the changing landscape of agri-tech, offering insights into how innovation can be fostered, and provided an example of how an agri-tech ecosystem can add enormous value to the small business community.

In coming weeks, the CEAT website will have a copy of the talks given and key recommendations, so watch this space. - **Emma Burns** (Atkin group, PS).

Outreach News



Teachers and students from Tuggeranong schools in the large Gould teaching lab. Image Mel Norris.

Fifty-two students and six teachers from Tuggeranong primary and high schools came to RSB this month for their

annual ANU extension day. The day is organised by specialist science teacher Sarah Fletcher, and the students spend time in the lab doing experiments and collecting and identifying invertebrates from Sullivan's Creek. Thanks to **Melanie Trinick**, **Fiona Roxburgh**, **Tammy Gomersall** and **Yiming Li** (all BTLC), and **Allen Rodrigo** (CBBU). The event was covered by two news stations - WIN News Canberra and Nine News - you can watch the [WIN story here](#) and the [Nine News story here](#).

Alex Maier (BSB) and **Melanie Rug** (CAM) contributed to the STEAM festival at Turner primary school, with a workshop called 'Eat and be eaten - survival in the animal kingdom'. Alex also conducted an outreach activity at the [Gene Technology Access Centre](#) in Melbourne during the Australian Society for Parasitology conference.

IN THE MEDIA

Recent research published in Nature Communications by **Ben Long** (Price, Badger groups, PS) and colleagues in the [RIPE](#) (Realising Increased Photosynthetic Efficiency) lab and [CoETP](#) (Centre of Excellence for Translational Photosynthesis) has had broad coverage by both local and international media. The paper describes the first-ever construction of a Rubisco-containing cyanobacterial carboxysome in plant chloroplasts, forming the basis of a CO₂-concentrating mechanism to enhance photosynthesis in crops. It was covered by Phys.org, the AAAS's EurekaAlert!, the This Week In Science Podcast and several other news outlets. Ben was also interviewed by IFLScience, 2GB Rural News and the ABC Canberra Afternoons program.

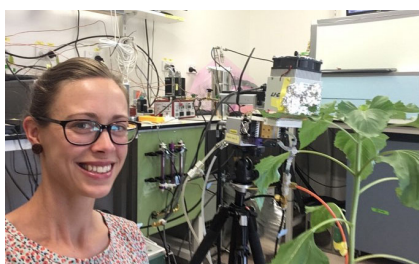
Research published by **Eve Cooper** (Kruuk group, E&E) and **Loeske Kruuk** (E&E) about the influence of the developmental environment on senescence in wild animals was covered by several outlets including [breitbart.com](#) and [UPI](#). Evolution Letters published a [blog post](#) written by Eve about the study, and she was interviewed on ABC Radio Canberra's Saturday morning show about the study and about her PhD research more generally.

FAREWELL

After six years at RSB, **Meisha Holloway-Phillips** (Farquhar group, PS) has moved to a new job in the Physiological plant ecology group at the University of Basel. She has written some reflections on her

time at RSB - an edited version is below, and you can read the full version [here](#).

I honestly didn't know what stable isotopes were when I sat eating my first pie with the infamous **Graham Farquhar** (it would be months before I realised the relevance of pie-eating, and is a treasured memory I will be taking with me). Fast forward six years and now that I know what swagelock fittings are, have forgone the conceptual diagram for a mathematical definition and I am the owner an 'I love isotopes' mug, I've packed my bags and moved to Switzerland to get a taste of holey cheese and mountains that make Ainslie look like pebbles; adding hydrogen isotopes to my tool bag; and going back in time to understand how plants are responding to climate change with the development of an isotopic marker for plant carbon balance. And I have many people to thank for making this a possibility, not least Graham. Graham is one exceptional human being. His intellect goes without saying; but it's everything else that comes with being a part of his lab family that has made being at ANU an incredible experience that has exceeded all expectation. So, I leave ANU with optimism and fire in my belly, and humbled to even have the choice. - **Meisha Holloway-Phillips.**



Meisha Holloway-Phillips in the stable isotope laser spectroscopy lab she built at RSB with Hillary Stuart-Williams.

PHDS SUBMITTED

Nadya Farah (Jones group, PS) 'Functional characterisation of the flax rust AvrP/AvrP123 avirulence proteins'.

Jessie Au (Foley group, E&E) 'Studying the relationship between forage quality with the distribution of koalas.'

Robyn Shaw (Peakall group, E&E) 'The genetic consequences of demography and disturbance in small mammal populations.'

Erick Tjhin (Saliba group, BSB) 'The pantothenate kinase of the human malaria parasite *Plasmodium falciparum*.'

PAPERS ACCEPTED

Asbjornsen H, incl Meir P, *et al.*, Guidelines and considerations for designing field experiments simulating precipitation

extremes in forest ecosystems, *Methods in Ecology and Evolution*.

Bloomfield KJ, Cernusak LA, Eamus D, ... Egerton JGG, ... Zhu L, Atkin OK, Testing leaf trait-environment relationships based on optimality principles, *New Phytologist*.

Bröer S, Fairweather S, Amino acid transport across the mammalian intestine, *Comprehensive Physiology*.

Dinnage R, Simonsen AK, Barrett LG, Cardillo M, Raisbeck-Brown N, Thrall PH, Prober SM, Larger plants promote a greater diversity of symbiotic nitrogen-fixing soil bacteria associated with an Australian endemic legume, *Journal of Ecology*.

Do TTH, Catanzariti A-M, Lim GTT, Jones DA, Evidence against the existence of genes for resistance to *Fusarium oxysporum* f. sp. *lycopersici* races 1 and 2 on *Solanum pennellii* chromosome 7 additional to I-3, *Acta Horticulturae*.

Earles JM, Buckley TN, Brodersen CR, Busch FA, ... Evans JR, Farquhar GD, *et al.*, Embracing 3D complexity in leaf carbon-water exchange, *Trends in Plant Science*.

Eller C incl Meir P *et al.*, Modelling tropical forest responses to drought and El Niño with a stomatal optimisation model based on xylem hydraulics, *Philosophical Transactions of the Royal Society of London, B*.

Gould N, Minchin PEH, Thorpe MR, 'Using aphids to measure turgor pressure inside sieve elements', in J. Liesche (ed), *Methods in Molecular Biology: Phloem*, Springer.

Gullan PJ, Kondo T, Fiala B, Quek S-P, Taxonomy of coccids (Hemiptera: Coccidae: *Coccus* L.) associated with *Crematogaster* ants (Hymenoptera: Formicidae) in the stems of *Macaranga* plants (Euphorbiaceae) in Southeast Asia, *Zootaxa*.

Hsiao Y, Ślipiński A, Yu Y, Deng C, Pang H, *Allostrophus cretaceus* gen. et sp. nov.: A new polypore fungus beetle (Coleoptera, Tetratomidae) from the Cretaceous Myanmar amber, *Cretaceous Research*.

Hsiao Y, Huang CL, Taxonomic revision on the genus *Ornatomalthinus* Poinar and Fanti (Coleoptera: Cantharidae) with description of a new species from the Cretaceous Burmese amber, *Cretaceous Research*.

Hsiao Y, Okushima Y, Takahashi N, Hu F-S, A taxonomic review of the *Micropodabrus* Pic, 1920 of Taiwan, with a checklist of the world fauna (Coleoptera, Cantharidae), *Entomologische Blätter und Coleoptera*.

Huet D, Rajendran E, van Dooren GG, Lourido S, Identification of cryptic subunits from an apicomplexan ATP synthase, *eLife*.

Konvička O, Hsiao Y, A description of *Synchroa ruzzieri* sp. nov. from China (Coleoptera: Tenebrionoidea: Synchroidae) with a key to the world fauna of Synchroidae, *Studies and Reports, Taxonomical Series*.

Rifai S incl Meir P *et al.*, ENSO drives interannual variation of forest woody growth across the tropics, *Philosophical Transactions of the Royal Society of London, B*.

Salesse C, Sharwood RE, Busch FA, Kromdijk J, Bardal V, Stern D, Overexpression of Rubisco subunits with RAF1 increases Rubisco content in maize, *Nature Plants*.

Seidi A, Muellner-Wong LS, Rajendran E, Tjhin ET ... Aw YTV ... van Dooren GG, Elucidating the mitochondrial proteome of *Toxoplasma gondii* reveals the presence of a divergent cytochrome c oxidase, *eLife*.

Skeels A, Cardillo M, Reconstructing the geography of speciation from contemporary biodiversity data, *The American Naturalist*.

Wan L, Koeck M, Williams SJ, ... Hardham AR, Jones DA, *et al.*, Structural and functional insights into modulation of the activity of a flax cytokinin oxidase by flax rust effector AvrL567-A, *Molecular Plant Pathology*.

Warren DL, Beaumont L, Dinnage R, Baumgartner J, New methods for measuring ENM breadth and overlap in environmental space, *Ecography*.

Yang N, McDonald MC, Solomon PS, Milgate A, Genetic mapping of *Stb19*, a novel resistance gene to *Zymoseptoria tritici* in wheat, *Theoretical and Applied Genetics*.

Ying H, Cooke I, Sprungala S, Wang W, Hayward DC, Tang Y, Huttley G, Ball EE, Miller DJ, Comparative genomics reveals the distinct evolutionary trajectories of the robust and complex coral lineages, *Genome Biology*.