



NEWS

Celebrating professional staff for National Science week

Gavin Pritchard and Christine Larsen

(Plant Services) were featured as part of 'Behind the Scenes of Science', a story about the 'unsung heroes of science' run by the College of Science during Science Week (see main photo).

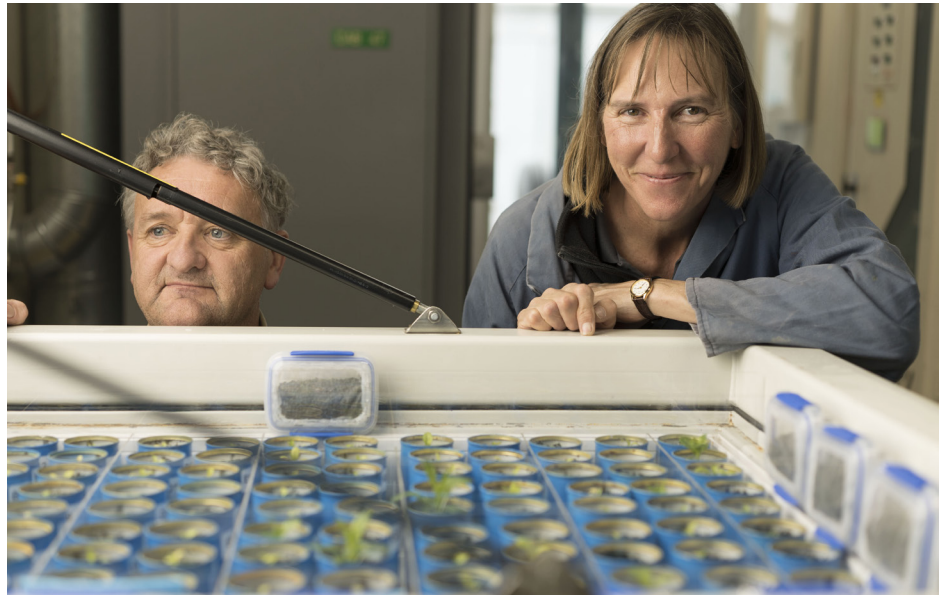
Barry Pogson wins Eureka Prize



Barry Pogson (PS) has been awarded the 2019 Eureka Prize for Outstanding Mentor of Young Researchers. Eureka prizes is awarded annually by the Australian Museum. From the website: 'Professor Barry Pogson's vision is to create a nexus of researchers, industry leaders and policy makers that collectively shape agriculture for the benefit of global food security. Using a dynamic and sustainable multi-tiered mentoring approach, he has a profound impact on the personal development, career prospects and learning experiences of students at all tertiary levels.' You can find out more about Barry's vision in this short video.

Welton appointed PARSA Queer Officer

Weliton Menário Costa (Kruuk group, E&E) has been appointed Queer Officer for PARSA. Welton has been acting Queer Officer but will officially take up the position in late September. He will chair the PARSA Queer Advocacy Committee, where key activities and general issues regarding queer* postgrad or research students at ANU are discussed. He will also participate in the Equity Committee and contribute with advisory for events and campaigns. He will continue focusing on the development of a strong and confident queer community on campus as well as advocating for this community to ensure that the members always feel free and safe across the university social space.



Christine: "Gavin likes to sing to his plants. He's in a choir." Gavin: "Only when there's no-one around." This photo of Gavin Pritchard and Chris Larsen (Plant Services) appeared in an article by the College of Science for National Science week. (See: News Item)



InterACTIVE Science

RSB Parasitologists were keen participants at InterACTIVE Science, a new event held at the Shine Dome during National Science Week. **Erick Tjhin** (van Dooren group, BSB), **Cibelly Goulart** (van Dooren group, BSB), **Vanessa Howieson** (Saliba group, BSB), **Alex Maier** (BSB), **Merryn Fraser** (Maier group, BSB), **Theresa Storiko** (Maier group, BSB), **Stephanie Henkel** (Saliba group, BSB), **Jonathan King** (Saliba group), **Sarah Shafik** (Martin group,

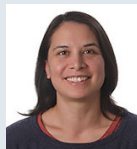
BSB), **Sashika Richards** (Martin group, BSB), along with **Melanie Rug** (Centre for Advanced Microscopy), shared their time and enthusiasm for parasites at an ANU Parasitology stall led by **Christina Spry** (Saliba group, BSB). During the day, parasites big and small (some alive!) were on display along with games and quizzes guaranteed to teach you something you didn't know about parasites.

Visitors to the event even had the opportunity to witness **Alex Maier's** "Hidden Circus – The Unbelievable Abilities of Parasites" performance. Alex, adorned in a top hat, filled the theatre and dazzled the audience with the wonders of parasites. The fun continued into the evening with an "After Dark" session, where the addition of glow in the dark quinine-containing gin and tonics to the stall was a hit. - **Christina Spry** (Saliba group, BSB).



Christina Spry (Saliba group, BSB), Sashika Richards (Martin group, BSB), Sarah Shafik (Martin group, BSB) and Theresa Storiko (Maier group, BSB) on the Parasitology stand at InterACTIVE Science. Image Melanie Ridgway.

DECRA profile: Anna Simonsen (Borevitz group, PS)



Research background

My PhD research career began in my home city where I studied the mutualism between legumes and bacterial symbionts

at University of Toronto. I found the biological system utterly captivating, and this ultimately drew me to Australia with its iconic and highly diverse Acacia legumes. In Australia, I took up a postdoc position at CSIRO studying the diversity of Acacia associated bacterial symbionts in South west Australia. This eventually led me to Canberra, where I am now a DECRA fellow in the Borevitz group continuing my expanding research passions in plant host microbiomes and soil microbe ecology.

Current research interests

I study nitrogen-fixing symbionts that associate with legume roots (a.k.a. rhizobia). Although microscopic, rhizobia play a major role in global nitrogen-cycles because both they and their plant hosts are so globally widespread. Rhizobia spend much of their time as free-living colonies in the soil so the goal of my DECRA is to understand how selective pressures from the soil environment impact how these symbiont associates with their hosts. For example, do more stressful soil environments lead to a stronger mutualistic relationship, or can it lead to a mutualism break down? How does the soil environment impact the dynamics of horizontally transferred genes, including genes that control symbiosis? I will be exploring these and other questions, moving towards the broader goal of understanding how we can leverage these mutualistic relationships for various applications, such as regenerative agriculture and habitat restoration in a changing climate.

Challenges in my field

Rhizobia, like all soil bacteria lead elusive lives in their natural and microscopic habitat. Because we cannot directly observe them, we have to use various indirect approaches, such as next generation sequencing, to gain a basic understanding of their ecology in the soil. The consequence of this approach is that, for each soil sample, we must shred the DNA of all organism into a fragmented, disorganized mess. Since a small soil sample can contain thousands to millions of species, a large part of my research will be implementing new bioinformatic approaches that enable us to infer the ecological and evolutionary dynamics of specific taxa, such as rhizobia. Overcoming these challenges will enable insight into how we can manipulate the soil microbe community and plant-microbe associations in complex soil environments.

Youth leading in STEM



Benjamin Schwessinger (left) works with high school students to work out 'what the tick had for breakfast' at the outreach workshop (Image Sharyn Wragg).

Schwessinger group (PS) members

Benjamin Schwessinger, Ash Jones and **Salome Wilson** ran a workshop as part of a STEM holiday camp for high-school students organised by outreach group, Youth Leading in STEM. The students, from the ACT and regional NSW, were asked the question 'what did this tick have for breakfast?' and guided through the process of DNA extraction, using 'ticks' made from strawberries, live Nanopore sequencing and alignment to a reference genome, to find out which Australian animal their sequence matched to. - **Salome Wilson**, Schwessinger group (PS).

The Case of the Disappearing Research Grants



Tory Clark (right) with other performers in 'Rumpelstiltskin and the case of the disappearing research grants'. (Image Natalia Bateman).

Tory Clarke (von Caemmerer group, PS) performed in the pantomime 'Rumpelstiltskin and the case of the disappearing research grants' at Smiths Alternative, this month. The one-night only satire was produced as part of National Science Week, and featured working scientists, plus characters including 'King Scom', 'Gina the Lionheart PHD' and Clive Palmier.

Canberra Girls Grammar School X2STEM

RSB plant scientists ran two science workshops at the Canberra Girls Grammar X2STEM symposium this month. The classes, for year 5 and year 8 students, included demonstrations of various aspects of plant biology using a

combination of tech gadgets such as VR and thermal imaging and some hands-on experiments including extracting DNA from strawberries or looking at leaf stomata under the microscope.

Thanks to **Richard Poire-Lassus** (Borevitz group, PS), **Ruaraidh Mills** (Borevitz group, PS), **Melanie Carmody** (Pogson group, PS), **Ming-Dao Chia** (Borevitz group, PS), **Kevin Murray** (Borevitz group, PS), **Marten Moore** (Pogson group, PS), **Xin Hou** (Pogson group, PS) and **Reshmi Gaju** (Atkin group, PS). - **Derek Collinge** (Pogson group, PS)



Marten Moore and Xin Hou (both Pogson group, PS) ready to teach science at Canberra Girls Grammar School.

Mother Teresa School



Tory Clarke (von Caemmerer group, PS) spent a day this month at Mother Teresa School in Harrison, doing hands-on plant science activities with around 200 Year 2 and 3 students, for National Science Week (see image above). The students made their own rainbows from sunlight and found out which colours of light leaves use for photosynthesis. They tested different foods to find out which foods store the energy they get from photosynthesis as starch, and they also set up a terrarium to investigate how much water a bean seed needs to grow.

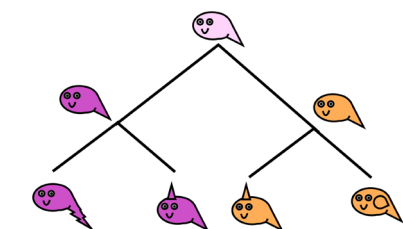
Congratulations

RSB PhD students did well in the College of Science/College of Health and Medicine 3 Minute Thesis competition this month.

Merryn Fraser (Maier group, BSB) won the event, with her talk 'Cooking up cholesterol: the parasite's kitchen', and **Alyssa Weinstein** (Peakall group, E&E) came third, with 'Sex, scent and speciation'.

Merryn was awarded \$1000, and the opportunity to represent the College at the ANU 3MT final on September 4 at Llewellyn Hall.

Caitlin Cherryh (Lanfear group, E&E) was Runner-Up in the ANU Visualise Your Thesis competition, which challenges graduate researchers to create short eye-catching entries that succinctly describe their research and its potential benefits to a non-specialist audience. The prize was awarded for her video 'Quantifying treelikeness in empirical sequence alignments'.



A screenshot from Caitlin Cherryh's Visualise Your Thesis competition..

Awards, Grants

Stefan Bröer (BSB) has been awarded \$88,500 from Merck, for a project entitled 'Exploiting synergy with the integrated stress response to reduce cancer cell growth'.

Jade Venitti (Bröer group) has received a fellowship of \$10,000 from the Replacing Animals in Medical Research Fund (RAMR) to improve a computational model of amino acid homeostasis in cancer cells. Jade developed the first version of the model during her honours year. The model attempts to simulate amino acid transport in cancer cells to replace animal experiments and define new targets for cancer therapy.

IN THE MEDIA

Maja Adamska (BSB) was interviewed for an article in *Quanta magazine* entitled 'Scientists debate the origin of cell types in the first animals'.

Research led by **Maria Ermakova** (von Caemmerer group, PS), published recently in *Communications Biology*, was reported in *Cosmos magazine*, *phys.org*, the *Weekly Times* and other media all over the world.

The research showed that a bottleneck in the photosynthesis process could be relieved by the increased production of a protein that controls electron flow rate, resulting in an increased rate of photosynthesis in *Setaria viridis*.

Ben Long (Badger, Price groups, PS) was interviewed by Robyn Williams on ABC's *The Science Show* to talk about the phase separation of Rubisco leading to carboxysome formation in cyanobacteria. This underlying biochemical interaction forms the focal point of the **RIPE team's work** to improve photosynthetic efficiency in crop plants.

Saul Newman's (Furbank group, PS) preprint 'Supercentenarians and the oldest-old are concentrated into regions with no birth certificates and short lifespans' went viral this month. It was downloaded more than 110,000 times, and more than 2400 tweets linked to it. It was picked up by 11 news outlets, including *The Times (UK)* and the *Sydney Morning Herald*, and is #10 of all time on *bioRxiv*.

WELCOME

The Lehane group (BSB) is happy to welcome a new postdoctoral fellow, **Jinxin (Victor) Pei**. Victor completed his PhD at the University of Adelaide on the function, structure and inhibition of aquaporins. He will be working on an NHMRC project on the mechanism of high-level resistance to antimalarial PfATP4 inhibitors.



Essie Rodgers has joined the Noble group (E&E) – coming from postdocs at the University of Antwerp and the University of California at Davis. Essie is an Ecophysicologist



who will be exploring, with meta-analysis and experiments with lizards, the role of temperature and maternal investment on metabolism and life-history (among many other things).

Veronica Briceño has joined the Nicotra group (E&E) and will be working as a post-doc on the newly funded linkage project "Living on the edge: how do Australian plants cope with extreme temperature?" Vero returns to ANU where she completed her PhD in 2014 after holding a CONICYT PAI postdoctoral fellowship on seed germination and cold tolerance of alpine species in Southern Chile.



Zachary Brown has joined the Nicotra group (E&E) as a Senior Technical Officer to work on the establishment of the LIEF-funded Australian Mountain Research Facility. Zach has just completed his PhD at the University of Tasmania with Mark Hovenden, studying the effects of elevated CO₂ on terrestrial carbon and nitrogen cycling.



Imam (Toni) Fathoni has started his PhD in the Saliba group (BSB), studying thiamine metabolism and utilisation as an antimalarial drug target.



William Hirst is enrolled in the Humboldt University-ANU PhD student program, and has just joined the Saliba group (BSB) for his one year stay in Australia. He will continue his work on microtubule polymerisation in the malaria parasite.



Xizhe Sun is a visiting PhD student from Hebei Agricultural University in China who will be working in the Jones Lab (PS) for one or two years as part of his PhD. He will be working with DECRA Fellow **Lisong Ma** (Jones group, PS) on the molecular basis of the interaction between tomato and the fusarium wilt fungus, *Fusarium oxysporum* f. sp. *lycopersici*.



Welcome to **Paul Tapueluelu**, who has joined RSB IT. Paul has wide IT experience and a passion for Linux and will be with us until the end of the year, assisting us to upgrade our computers and servers.



FAREWELL

Sonya Geange's (Nicotra group, E&E) PhD was conferred last month and she has moved to University of Bergen, Norway, where she has joined the lab of Vigdis Vanvick as a postdoctoral research fellow in ecosystems ecology. Sonya will be working on the **EMERALD project** where her focus is on high latitudes with



boreal, alpine and Arctic vegetation, including Svalbard in a larger pan- Arctic context. If you find yourself in Bergen in the next three years, look her up! - **Adrienne Nicotra** (E&E).

PHDS SUBMITTED

Ross Deans (Farquhar group, PS) 'The role of primary carbohydrate metabolism in wheat grain dormancy and germination.'

Jacinta Watkins (Pogson group, PS) 'Understanding carotenoid esterification in cereals'.

PHDS AWARDED

Oliver Mead (Solomon group, PS) 'Dissecting molecular mechanisms of disease in the wheat pathogen, *Parastagonospora nodorum*.'

PAPERS ACCEPTED

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Crotty SM, Minh BQ, Bean NG, Holland BR, Tuke J, Jermini LS, von Haeseler A, GHOST: Recovering historical signal from heterotachously evolved sequence alignments, *Systematic Biology*.

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Hayward JA, van Dooren GG, Same same, but different: uncovering unique features of the mitochondrial respiratory chain of apicomplexans, *Molecular & Biochemical Parasitology*.

Horsefield S, Burdett H, Zhang X, Manik MK, Shi Y, Chen J, Qi T, Gilley J, Lai J-S, Rank MX, Casey LW, Gu W, Ericsson DJ, Foley G, Hughes RO, Bosanac T, von Itzstein M, Rathjen JP, Nanson JD, Boden M, Dry IB, Williams SJ, Staskawicz BJ, Coleman MP, Dodds PN, Kobe B, NAD⁺-cleavage activity by animal and plant TIR domains in cell-death pathways, *Science*.

Huang Z, Chiba H, Guo D, Yago M, Braby M, Wang M, Fan X, Molecular phylogeny and historical biogeography of Parnara butterflies (Lepidoptera: Hesperiidae), *Molecular Phylogenetics and Evolution*.

Lv L, Liu Y, Osmond H, Cockburn A, Kruuk L, When to start and when to stop: effects of climate on breeding in a multi-brooded songbird, *Global Change Biology*.

McDonald MC, Taranto A, Hill E, Schwessinger B, Liu Z, Simpfendorfer S, Milgate A & Solomon PS, Transposon mediated horizontal transfer of the host-specific virulence protein ToxA between three fungal wheat pathogens, *mBio*.

Meakins F, Hua X, Algy C, Bromham L, Birth of a new contact language does not favour simplification, *Language*.

de Mendoza A, Hatleberg W, Pang K, Leininger S, Bogdanovic O, Pflueger J, Buckberry S, Technau U, Hejnol A, Adamska M, Degnan BM, Degnan SM, Lister R, Convergent evolution of a vertebrate-like methylome in a marine sponge, *Nature Ecology and Evolution*.

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