Australian National University

Research School of Biology Newsletter

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ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

NEWS

Three new ARC Centres of Excellence
Members of the Research School of Biology will participate in three new ARC Centres of Excellence. **Murray Badger** (Director), **John Evans, Graham Farquhar, Dean Price, Susanne von Caemmerer,** and **Spencer Whitney** (PS) are all Chief Investigators in the ($22m) **ARC Centre of Excellence for Translational Photosynthesis,** administered by ANU.

Barry Pogson (Deputy Director), **Owen Atkin, Justin Borevitz** (PS) are all Chief Investigators in the ($26m) **ARC Centre of Excellence in Plant Energy Biology**, administered by the University of Western Australia.

Sylvain Foret (EEG) is a Chief Investigator in the ($28m) **ARC Centre of Excellence for Integrated Coral Reef Studies** administered by James Cook University.

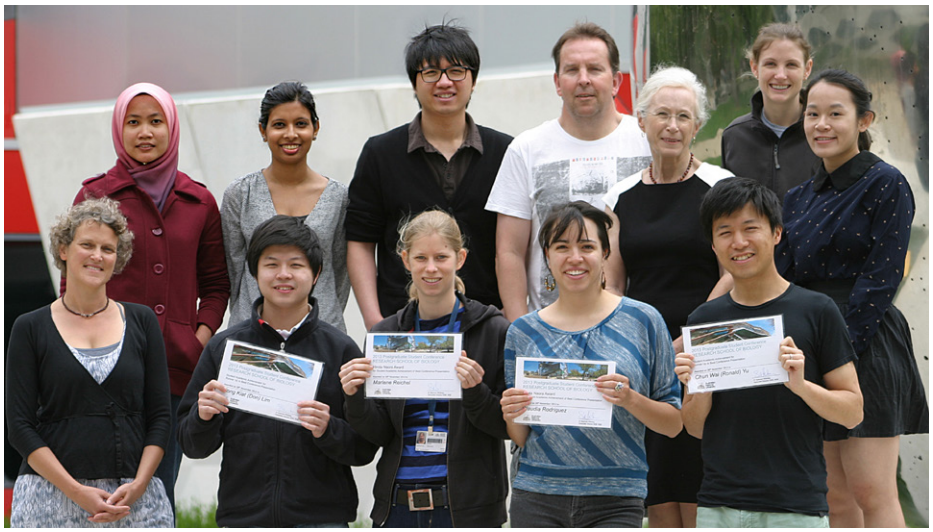
University Medals awarded
Congratulations to the following PhB students who were awarded University Medals in Biology.

Kathryn Parker (Van Dooren & Kirk Labs, BSB) whose thesis was entitled 'The novel putative transporter family in *Toxoplasma gondii*'.

John Rivers (Djordjevic Lab, PS), whose thesis was entitled 'Roots to development: Root Architecture Regulator peptide RAR1 and its effects upon phytohormones and physiology in *Medicago truncatula*'.

John Evans to take over from Murray Badger as Head of Division of Plant Sciences

Murray Badger is to step down as Head of the RSB Division of Plant Sciences at the end of the year, having been in the role since the formation of the School in 2009. The very high profile of the RSB Division of Plant Sciences, both nationally and internationally, owes a great deal to Murray's leadership. In 2014 Murray will take up the role of Director of the ARC Centre of Excellence for Translational Photosynthesis. **John Evans** will take up the role as Head of Division in 2014.



2013 RSB student conference organisers and award recipients (see item under 'NEWS').

RSB Student Conference
Congratulations to all 102 students who presented at the 2013 RSB student conference. The short-format talks once again provided a highly engaging showcase of the diverse and high calibre research being undertaken within the School. Thanks go to **Erin Pugh**, **Karen Scholte** and **Panit Thamsongsana** from the Biology Teaching and Learning Centre, the session chairs, the adjudicators and the academic network convenors (**Adrienne Nicotra, Helen O'Neill,** and **Spencer Whitney**) for their role in ensuring that the event was a success. Thanks also to **Ying Hey**, **Jason Ng**, **Nur Abdul Bahar**, **Catherine Young**, **Piyankarie Jayatilaka** and **David Duchene** for organising the scientific program and the 'After Party'. The high quality of the presentations made it challenging to identify the award winners in each PhD program. The winners of Hirota Naora award (each totalling $900) were **Esther Rajendran** (BSB), **Claudia Rodriguez** (EEG) and **Marlene Reichel** (PS). Runner-up prizes of $250 were awarded to **Don Lim** (BSB), **Iliana Medina** (EEG) and **Chun Wai** (**Ronald**) **Yu** (PS). The record number of attendees helped ensure that the conference, and the After Party, were a great success.

Grant
Gonzalo Estavillo, Adrienne Nicotra, Susane von Caemmerer & **Michael Djordjevic** (PS). eText grant for publication of BIOL2121 'Plant Detective's Manual' ($10K).

Student prize
Tiffany Russell (Tscharke Lab, BSB) was awarded a $500 student presentation prize and a year's membership of the Australian Society of Microbiology for her talk at the recent Australasian Society for Virology meeting in Queenstown, New Zealand.

Paper recognised
A paper by **Yit Heng Chooi** (Solomon Lab, PS) and colleagues was selected for the *Journal of the American Chemical Society* Spotlights.

MEDIA

A paper published in *Science* by **Will Feeney, Iliana Medina, Naomi Langmore** (Langmore Lab, EEG) and colleagues has been featured in the media. The study found that chickless birds of cooperatively-breeding species, such as superb fairy wrens, ensure that their genes are passed on by protecting the eggs and chicks of their relatives against predators and cuckoos.

A paper published in *PLoS ONE* by **Ajay Narendra, Chloé A Raderschall, Willi Ribi** (Zeil Lab, EEG) and colleagues has been featured in ANU media. The paper shows that adaptions of the compound eye of an intertidal ant facilitate vision under both nocturnal and high light conditions.

A study by **Brian Mautz** and colleagues (Jennions Lab, EEG) made *The Age's* Top 10 weird science stories of 2013.

PHDs SUBMITTED

Lucy Aplin (Cockburn Lab, EEG) 'Using social network analysis to map the spread of innovation and information through a wild population of birds'.

Lab Leader profile: Murray Badger (PS)

Lab research: My lab is focussed on understanding the ways different photosynthetic organisms have adapted their photosynthetic biochemistry and physiology to efficiently fix CO_2 in environments where CO_2 is a limiting substrate. This includes interests in the biochemical deficiencies of Rubisco (where I started in my PhD), how organisms have developed CO_2 concentrating mechanisms (my first postdoc) to overcome these limitations, and how the biochemical pathway of photorespiration deals with the waste products of the Rubisco interaction with O_2. We use organisms ranging from cyanobacteria and algae up the plant model systems such as *Arabidopsis*, spanning different evolutionary scales of photosynthetic development.

Greatest achievement: Perhaps my greatest achievement has been to clearly describe that the evolution of efficient photosynthetic CO_2 fixation is driven by a co-evolution of both Rubisco and its kinetic properties and the development of different photosynthetic CO_2 concentrating mechanisms in cyanobacteria, algae, and plants. This evolutionary process is dependent on the nature of the environment which the organism evolves in, including the CO_2 supply, the O_2 levels and the temperature.

Next big thing: This is hard to say. The challenge of using the ever expanding genomics revolution to understand more about the evolution of photosynthesis and its various components will be a focal point. However, the bridge between genomic evolution and how it has been used to specify functional variation will be a challenging hurdle that will be underpinned by detail and not just genomic correlation.

What do you see as future challenges for your field of research? Photosynthesis is the basis of all food production and for me, the challenge facing many researchers in the various areas of photosynthesis is how what we have already discovered about aspects of photosynthesis can be used to improve crop yields and contribute to future world food security. The award of our new ARC CoE for Translational Photosynthesis directly addresses this challenge from an ANU and Australian perspective and reaching tangible improved photosynthesis outcomes over the next seven years will be the greatest challenge of my research career.

Sandra Binning (Backwell & Keogh Labs, EEG) 'Phenotypic plasticity in coral reef fishes'.

Emily Hanna (Cardillo Lab, EEG) 'Drivers of extinction risk in Australian mammals'.

Kathy Schneebeli (Mathesius Lab, PS) 'Studying root diseases of wheat and other cereals, using the model plant *Brachypodium*'.

Laurence Wilson (Fahrer Lab, BSB) 'Investigating the prevalence of an unusual form of alternative splicing'.

Dominique Roche (Jennions Lab, EEG) 'Effects of biotic and physical stressors on fish swimming performance and behaviour'.

PHDs AWARDED

Melanie Edwards (Deakin Lab, EEG) 'Protection of marsupial young: immune mechanisms which protect the developing Tammar wallaby (*Macropus eugenii)*'.

Amardeep Kaur Wander (Gordon Lab, EEG) 'In-vessel composting systems: microbial and compost dynamics'.

Farzaneh Kordbacheh (Djordjevic Lab, PS) 'Promotion of mammalian angiogenesis by plant-derived secondary metabolites'.

Lasantha Weerasinghe (Atkin Lab, PS) 'Assessing the impact of abiotic stress (drought, temperature and nutrient gradients) on leaf respiration of tropical and temperate rainforest species'.

WELCOME

Giulia Russo, a PhD student from the University of Torino in Italy, is visiting the Mathesius Lab (PS) for 6 months to study the role of plant hormones in plant-mycorrhizal interactions.

FAREWELL

Sandra Binning (Backwell & Keogh Labs, EEG) and **Dominique Roche** (Jennions Lab, EEG) have returned to Canada.

Lauren Marotte who was a Lab Leader in BSB and then a Visiting Fellow, retired on 20 December. Lauren worked on the development of the mammalian nervous system, using the wallaby as a model.

Jasper Pengelly (von Caemmerer Lab, PS) is leaving after having worked on the regulation of C_3 and C_4 photosynthesis, and the introduction of cyanobacterial carbon concentrating mechanisms into crop plants.

Lasantha Weerasinghe (Atkin Lab, PS) has returned to Sri Lanka to take up a faculty position at the University of Peradeniya.

This monthly newsletter is archived at biology.anu.edu.au/newsletter
Content & layout: Sharyn Wragg
Editing: Kiaran Kirk & Sharyn Wragg.

PAPERS ACCEPTED

Bromham, L & Bennett, TH, Salt tolerance evolves more frequently in C_4 grass lineages. *Journal of Evolutionary Biology.*

Fromhage, L & Kokko, H, Sexually selected traits evolve positive allometry when some matings occur irrespective of the trait, *Evolution*.

Hilder, TA, Corry, B & Chung, SH, Multi- versus single-ion conduction mechanisms can yield current rectification in biological ion channels, *Journal of Biological Physics.*

Hueber, DS, Rauch, J, Djordjevic, MA, Gunter H, Weiller, GF & Frickey T, Analysis of central Hox protein types across bilaterian clades: on the diversification of central Hox proteins from an Antennapedia/Hox7-like protein, *Developmental Biology*.

Mortier, V, Wasson, A, Jaworek, P, Mathesius, U, et al, Role of LONELY GUY genes in indeterminate nodulation on *Medicago truncatula, New Phytologist*.

Odom, KJ, Hall, ML, Riebel, K, Omland, KE & Langmore, NE. Female song is widespread and ancestral in songbirds. *Nature Communications.*

Petvises, S & O'Neill, HC, Distinct progenitor origin distinguishes a lineage of dendritic-like cells in spleen, *Frontiers in Immunology*.

Pok, S, Wen, V, Shackel, N, Alsop, A, Fahrer, A, et al, Cyclin E facilitates dysplastic hepatocytes to bypass G1/S checkpoint in hepatocarcinogenesis, *Journal of Gastroenterology and Hepatology.*

Spry, C, Saliba, KJ & Strauss, E, 'A miniaturized assay for measuring small molecule phosphorylation in the presence of complex matrices', *Analytical Biochemistry.*

Starrs, D, Davis, JT, Schlaefer, J, Fulton, CJ, et al, Maternally-transmitted isotopes and their effects on larval fish: a validation of dual isotopic marks within a meta-analysis context, *Canadian Journal of Fisheries and Aquatic Sciences.*

Thomas, M, Corry, B & Hilder, TA, What we have learnt about the mechanisms of rapid water transport, ion rejection and selectivity in nanopores from molecular simulation? *Small*.

Wilson, LO, Spriggs, A, Taylor, JM & Fahrer AM, A novel splicing outcome reveals more than 2000 new mammalian protein isoforms, *Bioinformatics*.

Zhang, W, Blackman, LM & Hardham, AR, Transient fusion and selective secretion of vesicle proteins in *Phytophthora nicotianae* zoospores, *PeerJ.*