Australian National University

Research School of Biology Newsletter

Issue 43 | 30 May 2013

ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

NEWS

Susan Howitt appointed as a Tuckwell Fellow

Susan Howitt (BSB) has been appointed as an inaugural ANU Tuckwell Fellow, having been selected from a large number of applicants from around the ANU. As a Tuckwell Fellow, Susan will play a lead role in the new Tuckwell Scholarship Program scheme, providing mentoring, advice and support to the Scholarship holders. The first twenty five Tuckwell Scholars will start at the ANU at the beginning of next year.

CONGRATULATIONS

Rob Lanfear (Kokko lab, EEG) has been awarded a grant in collaboration with **Bill Foley** and **Carsten Kulheim** entitled 'Mosaicism, somatic mutation, and environmental change in long-lived plants'. The three-year grant is for $49K and was awarded by the Hermon-Slade foundation.

The Australian Academy of Science has awarded Visiting Fellow **Claire O'Brien** (Allison lab, BSB) a France-Australia Science Innovation Collaboration (FASIC) Program Early Career Fellowship 2013. This will allow Claire to visit Prof. Darfeuille-Michaud's laboratory in France for 6 weeks, to learn an assay for identifying adherent-invasive *E. coli* that have been implicated in Crohn's disease.

Amanda Edworthy (Langmore lab, EEG) has been awarded the 2013 Emu - Austral Ornithology Research Award of $4K.

Gabriel James (PS) and **Chris Munday** (BSB) have submitted their PhD theses.

Dominique Roche (Jennions lab, EEG) and **Sandra Binning** (Keogh & Backwell labs, EEG) each received funding of 450 GBP from the Company of Biologists to attend the Society for Experimental Biology annual meeting in Valencia, Spain.

MEDIA

A paper published in *Nature Communications* by **Rob Lanfear** (Kokko lab, EEG) and colleagues has been featured online in *Science*Shot 'Short plants are evolutionary sprinters' (see under 'PUBLICATIONS').

Superb Fairy Wrens mobbing a stuffed Shining Bronze Cuckoo (see Feeney & Langmore paper under 'PUBLICATIONS'). (Photo: Will Feeney.)

Nature World News features the work of **Sarah Pryke** (EEG) 'Frill color linked with fighting abilities for Australia's iconic lizard' and **Ajay Narendra** and **Chloe Raderschall** (Zeil lab, EEG) 'Ants move slower at night, get lost more often: study finds'.

WELCOME

Elena Martina Avila, post-doctoral fellow, joins the Whitney lab (PS) after completing her PhD on chloroplast bioengineering at the University of Manchester. Elena takes up an ARC funded position to explore ways to enhance the catalytic efficiency of the CO_2-fixing enzyme, Rubisco.

Laura Wedd, APA awardee, joins the Maleszka lab (EEG) to work on honey bee epigenetics.

Kristin Kallapur (nee Griffiths) joins the O'Neill lab (BSB) in June. Kristin has just completed a very successful PhD at Oxford University on tuberculosis vaccines and immunity. Kristin was a former member of the lab, completing an undergraduate research project, an Honours project, and a period as a Research Assistant, before winning a Wellcome Fund scholarship to do a PhD at the Jenner Institute at Oxford University.

Michael Thorpe, Visiting Fellow, joins the Dewar lab (PS) to work on phloem transport.

FAREWELL

Pravin Periasamy (O'Neill lab, BSB) will leave the School at the end of May to take up a position at the Therapeutic Goods Authority. Pravin did his Honours and PhD degrees in the O'Neill lab, contributing to studies on extramedullary hematopoiesis in spleen and the definition of niche cellular elements which support tissue-specific hematopoiesis.

PAPERS ACCEPTED

Bertram J & Dewar RC. Statistical patterns in tropical tree cover explained by the different water demand of individual trees and grasses. *Ecology.*

Brazil-Boast J & Pryke SR. Morph-dependent resource acquisition and fitness in a polymorphic bird. *Evolutionary Ecology*.

Bromham L, 'Molecular evolution: patterns and rates', (4.0) in John Wiley & Sons Ltd, (eds.). *eLS*. Chichester.

Caliandro R, Nagel KA, Kastenholz B, Bassi R, Li Z, Niyogi KK, Pogson BJ, Schurr U & Matsubura S. Effects of altered α- and β-branch carotenoid biosynthesis on photoprotection and whole-plant acclimation of *Arabidopsis* to photo-oxidative stress. *Plant, Cell & Environment*.

Carmody M & Pogson BJ, 'Systemic photo-oxidative stress signaling', in F Baluska, (ed.). *Long-distance systemic signaling and communication in plants*. Springer, Dordrecht.

Chan, KX, Wirtz, M, Phua, SY, Estavillo, GM & Pogson BJ. Balancing metabolites in drought: the sulfur assimilation conundrum. *Trends in Plant Science*.

Da Costa ACL, Metcalfe DB, Doughty CE, de Oliveira AAR, Neto GFC, da Costa MC,

Lab Leader profile: Ulrike Mathesius (BSB)

Lab researching:
The symbiosis between legumes and nitrogen-fixing rhizobia.

Greatest achievement:
When rhizobia infect the plant they cause the formation of a complete new organ, the nodule. My group has pieced together a model for how rhizobia manipulate hormone pathways in the plant to control the formation of nodules. We have shown that this nodule development program shares similarities with other developmental programs, for example lateral root and root gall formation, and this could indicate that making nodules could be achievable in non-legumes.

Next big thing:
Trying to find out the essential signals required for nodule development so that we could try to initiate nodules in non-legumes. Another exciting question is what other signals are required for proper nodule functioning and we are investigating how plants perceive bacterial quorum sensing signals and interfere with bacterial communication. This could be important for bacterial colonization of roots, for example to establish nitrogen-fixing symbioses without nodules, just by improving the attachment and nitrogen-fixation ability of free living bacteria around plant roots.

What do you see as future challenges for your field of research?
Most of the molecular research in the Rhizobium-legume symbiosis has been carried out in a few model species. Yet there are hundreds of legumes and many types of nodules and possible infection mechanisms. Exploiting this diversity could bring important insights into the evolution of nodulation and for future attempts to create nitrogen-fixing non-legumes.

Athayades, J, Aragao LEOC, Almeida SS, Galbraith DR, Rowland LM, Meir P & Malhi Y. Ecosystem respiration and net primary productivity after 8 - 10 years of experimental through-fall reduction in an eastern Amazon forest. *Plant Ecology and Diversity.*

Dalziell AH, Peters RA, Cockburn A, Dorland AD, Maisey AC & Magrath RD. Dance choreography is coordinated with song repertoire in a complex avian display *Current Biology.*

Deveson I, Li J & Millar AA. Expression of human *ARGONAUTE 2* inhibits endogenous microRNA activity in *Arabidopsis. Frontiers in Plant Science.*

Du Fall LA & Solomon PS. The necrotrophic effector SnToxA induces the synthesis of a novel phytoalexin in wheat. *New Phytologist.*

Estavillo GM, Verhertbruggen Y, Pogson BJ Heazlewood J, Scheller HV & Ito J. Isolation of the plant cytosolic fraction for proteomic analysis. *Methods in Molecular Biology.*

Feeney WE & Langmore NE. Social learning of a brood parasite by its host. *Biology Letters.*

Fisher JB, Malhi Y, Torres IC, Metcalfe DB, van de Weg M, Meir P, Espejo JES & Huaraca W. Nutrient limitation in rainforests and cloud forests along a 3000m elevation gradient in the Peruvian Andes. *Oecologia*.

Harts A & Kokko H. Understanding promiscuity: when is seeking additional mates better than guarding an already found one? *Evolution*.

Husen J, Förster B, Chow WS, Pogson BJ & Osmond CB. Decreased photochemical efficiency of Photosystem II following sunlight exposure of shade-grown leaves of avocado (*Persea americana* Mill.): because of, or in spite of, two kinetically distinct xanthophyll cycles? *Plant Physiology.*

James GO, Hocart CH, Hillier W, Price GD & Djordjevic MA. Temperature modulation of fatty acid profiles for biofuel production in nitrogen deprived *Chlamydomonas reinhardtii. Bioresource technology.*

Kokko H, 'How wise is Mother Nature? Maximization, optimization and short-sighted resource use in biological evolution', in H Brockmann & J Delhey, (eds.). *Human happiness and the pursuit of maximization: is more always better?* Springer.

Kou J, Takahashi S, Oguchi R, Fan D-Y, Badger MR & Chow WS. Estimation of the steady-state cyclic electron flux around Photosystem I in spinach leaf discs in white light, CO_2-enriched air and other varied conditions. *Functional Plant Biology*.

Lanfear R, Ho SYW, Davies JT, Moles AT, Aarssen L, Swenson NG, Warman L, Zanne AE, & Allen AP, Taller plants have lower rates of molecular evolution. *Nature Communications* (see under 'MEDIA').

Langmore NE. Fairy-wrens as a model system for studying cuckoo - host coevolution. *Emu*.

Li J & Millar AA. Expression of a microRNA-resistant target transgene misrepresents the functional significance of the endogenous microRNA:target gene relationship. *Molecular Plant.*

Mautz BS, Wong BMB, Peters R & Jennions MD. Penis size interacts with body shape and height to influence male attractiveness. *Proceedings of the National Academy of Sciences, U.S.A.*

McMurtrie RE & Dewar. RC New insights into carbon allocation by trees from the hypothesis that annual wood production is maximised. *New Phytologist.*

Narendra A, Reid SF & Raderschall CA. Navigational efficiency of nocturnal *Myrmecia* ants suffers at low light levels. *PLoS ONE* (see under 'MEDIA').

Nisar N, Verma S, Pogson BJ & Cazzonelli, CI. Inflorescence stem grafting made easy in *Arabidopsis. Plant Methods.*

Pogson BJ & Albrecht V, 'An overview of chloroplast biogenesis and development', in SM Theg & F-A Wollman (eds.). Plastid Biology, *Advances in Plant Biology*, Springer.

Roche DG, Binning SA, Strong LE, Davies J & Jennions MD. Increased behavioural lateralization in parasitized coral reef fish. *Behavioural Ecology and Sociobiology.*

Rowland L, Stahl C, Bonal D, Williams M, Siebicke L & Meir P. The response of tropical rainforest dead wood respiration to seasonal drought. *Ecosystems.*

Weiss Y, Forêt S, Hayward DC, Ainsworth T, King R, Ball EE & Miller DJ. The acute transcriptional response of the coral *Acropora millepora* to immune challenge: expression of GiMAP/IAN genes links the innate immune responses of corals with those of mammals and plants. *BMC Genomics.*

Wilson LOW & Fahrer AM, 'Condensins, chromatin remodeling and gene transcription, chromatin remodelling', in D Radzioch (ed.). *InTech*.

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