Australian National University

Research School of Biology Newsletter

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ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

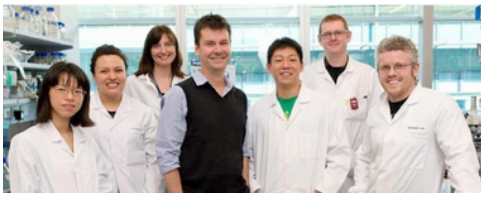
NEWS

Eureka prize finalist

Denisse Leyton (BSB) and colleagues from Monash University have been selected as one of two finalists for the 'Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research'.

The team's research represents a significant leap forward in understanding the fundamental mechanisms by which key disease-causing molecules (autotransporters) are assembled in bacterial 'superbugs'.

Prize winners will be announced on 26 August.
Below: Denise Leyton (second from the left) with the Monash team.



Biology Olympiad success

Juliey Beckman (BTLC) guided a delegation of four of Australia's brightest senior high school students, with the Australian Biology Olympiad's Director, Julie Cook (UC), to the International Biology Olympiad held at Aarhus University, Denmark.

The students competed with Biology students from around the world (60 other teams representing their country) by completing rigorous practical and theoretical examinations (a total of 6 exams sat by every student). The Australian students won two silvers, a bronze and a merit award.

Undergraduate Conference Prizes

Caela Welsh (Honours Student, Bromham Group, EEG), and **Laura Wey** (Atkin Group, PS), were award winners of a number of conference prizes at the ANU Student Research Conference held on July 16-17. Caela and Laura comprise two of the four students nominated to represent ANU at the Australasian Conference of Undergraduate Research, to be held on 29-30 September in Perth at UWA.

Grants

Michael Djordjevic (PS) secured an ARC Linkage Grant as a lead CI with the ANU as the lead organisation. The project aims to reduce reliance on nitrogen fertilisers without reducing crop yield (2 years, $240,870).

The Australian Biology Olympiad delegation, guided by Juliey Beckman (far left). See under 'NEWS'.

Kiaran Kirk (BSB) is the ANU lead on a Linkage Grant to the University of Sydney. The project aims to synthesise new compounds that bind the protein ATP4, an essential ion pump in the malaria parasite (3 years, $410,000).

National Science Week 'Women in Science' events

An exhibition, organised by Anne-Sophie Dielen and Britta Forster and entitled 'The League of Remarkable Women in Australian Science' will be held at the CSIRO Discovery Gallery Room from 5-31 August. On Wednesday 19 August from 6-8pm a public discussion forum will be chaired by Professor Brian Schmidt and the Hon. Karen Andrews MP will discuss the topic 'Women in Science - challenges and solutions'. Both events are registered as National Science Week events and free of charge. The contact is Anne-Sophie Dielen.
(Photo: Charles Tambiah.)

IN THE MEDIA

Benjamin Schwessinger (Rathjen Group, PS) and colleagues have been featured in the media following their study on how the rice plant's immune system is triggered by disease, a discovery that could boost crop yields and lead to more disease-resistant types of rice. The paper was published in *Science Advances* and marks a new chapter for Dr Schwessinger, who along with other new members of the research team, identified errors in the team's previous study and retracted a 2009 paper on the subject, after being unable to replicate the earlier work. The team discovered that the error had arisen from mislabelled bacterial strains and an unreliable test of immune activation, and were able to correctly identify the protein that triggers the immune response using rigorous methods to prevent repeating the error. (Photo: Stuart Hay.)

A paper by **Magrath**, **Haff, McLachlan** and **Igic** (EEG) entitled 'Wild birds learn to eavesdrop on heterospecific alarm calls' and published in *Current Biology* has been featured in the media.

The study found that superb fairy-wrens can learn to recognize previously unfamiliar alarm calls. (Photo: Jessica McLachlan.)

Justin Brorevitz and **John Rivers** (PS) have published an article on the APPS Policy Forum entitled 'Going Genomic - Using science to improve Food security', in which they discuss the implications of using genomic sequencing and genomic breeding to improve crop varieties.

A paper by **Iliana Medina** and **Naomi Langmore** (EEG), entitled 'The costs of parasitism explain variation in egg rejection behaviour in brood parasite hosts' and published in *Biology Letters,* has been featured in online media, including the ABC and in Science news.

PHDs SUBMITTED

Hamish Webb (Foley Group, EEG) 'The genetics of essential oil yield in *Melaleuca alternifolia* and *Eucalyptus loxophleba*'.

Helen Bellchambers (Arkell Group, EEG), 'SUMOylation of the ZIC proteins'.

Yi-Leen Lim (Whitney Group, PS), 'Overcoming limitations in bioengineering Rubisco in higher plant chloroplasts'.

Group Leader profile: Maja Adamska (BSB)

Group research focus

Our interests are related to a set of fundamental and interconnected biological questions: How does a complex animal arise from a single cell during embryonic development? How did the first multicellular animals arise from their single-cell ancestors? What is the molecular basis of morphological diversity in the animal kingdom? Using sponges (which are the best living approximation to the first animals) as research models, we combine cutting-edge sequencing technologies with classic evolutionary thinking to gain insight into molecular basis of evolution of animal complexity.

Teaching and research achievements

My most significant research achievement is demonstration that sponges are not as different from other animals as widely assumed by contemporary biologists. Notion of homology of sponge and coral body plans has been originally developed by Ernst Haeckel over 150 years ago, but direct comparisons between adult sponges and 'true animals' became almost a taboo subject in subsequent years. It took us years of team effort, many heated discussions and several sequenced genomes, but the evidence from developmental gene expression brings the classical hypothesis back to life – and opens avenues for many future studies.

What do you enjoy about teaching?

Sharing my enthusiasm for the beauty and complexity of animal life forms (and their development)!

What do you enjoy about research?

I feel extremely lucky to be able to follow my childhood dreams of getting to understand where animals come from. It is also particularly fruitful time in my research field (evo-devo or evolutionary developmental biology), as new technologies – both in terms of sequencing and manipulation of genomes – become more and more accessible. It is a wonderful life to be a biologist, here and now!

This newsletter is archived at biology.anu.edu.au/news-events/newsletter.
Layout: Sharyn Wragg
Editing: Stefan Bröer & Sharyn Wragg.

Katherine Meacham (von Caemmerer Group, PS), 'Diurinal light and fluorescene profiles in rice canopies: building a dynamic model of photosynthesis for *Oryza sativa*'.

PHDs AWARDED

Wei (Wil) Yih Hee (Hardham Group, PS) 'Characterisation of flagellar mastigoneme components of *Phytophthora nicotianae* zoospores'.

NEW APPOINTMENTS

Marcin Adamski has taken up the role of

Bioinformatician, and is located in Bldg 46 Rm 1104. Marcin has a background in computer science, with over 15 years of bioinformatics experience. His recent research interests can be best described as computational marine biology, with emphasis on de novo genome assembly, detection of differentially expressed genes and phylogeny. Marcin is looking forward to participating in a wide range of projects at RSB – please let him know if you need bioinformatics support!

Mel (Melodie) Norris will take up the role of Outreach and Communications Officer on 3 August. She will report to Stefan and be located in IT.

Sharyn Wragg (IT) has taken up the role of IT Manager. She will continue her duties as Web and Multimedia Specialist, and will work with, and handover, some media duties (including the newsletter) to Mel Norris.

PAPERS ACCEPTED

Bertucci, A, Forêt, S, Ball, EE & Miller, DJ, Transcriptomic differences between day and night in *Acropora millepora* provide new insights into metabolite exchange and light-enhanced calcification in corals, *Molecular Ecology*

Booksmythe, I, Mautz, B, Davis, J, Jennions, MD, *et al.,* Facultative adjustment of the offspring sex ratio and male attractiveness: a systematic review and meta-analysis, *Biological Reviews*

Bragg, JG, Supple, MA, Andrew, RL, & Borevitz, JO, Genomic variation across landscapes: insights and applications, *New Phytologist*

Carroll, CS, Altin, JG, Neeman, T, & Fahrer, AM, Repeated fine-needle aspiration of solid tumours in mice allows the identification of multiple infiltrating immune cell types, *Journal of Immunological Methods*

Cain, K, & Langmore, NE, Female and male song rates across breeding stage: testing for sexual and non-sexual functions of female song, *Animal Behaviour*

Duchene, D, & Cardillo, M, Phylogenetic patterns in bird geographic distributions support the tropical conservatism hypothesis, *Global Ecology and Bioeography*

Duchêne, DA, Duchêne, S, Holmes, EC, *et al.*, Evaluating the adequacy of molecular clock models using posterior predictive simulations, *Molecular biology and evolution*

Dupont, P-Y, Eaton, C, Wargent, Solomon PS, *et al.*, Fungal endophyte infection of ryegrass reprograms host metabolism and alters development, *New Phytologist*

He, J, Yang, W, Qin, L, Fan, D-Y, & Chow, WS, Photoinactivation of Photosystem II in wild type and chlorophyll b-less barley leaves: which mechanism dominates depends on experimental circumstances, *Photosynthesis Research*

Kruuk, L, Livingston, J, Kahn, AT, & Jennions MD, Sex-specific maternal effects in a viviparous fish, *Biology Letters*

Pavitt, A, Walling, CA, Mostl, E, Kruuk, LEB, *et al.*, Cortisol but not testosterone is repeatable and varies with reproductive effort in wild red deer stags, *General & Comparative Endocrinology*

Ng, JLP, Hassan, S, Truong, TT, Hocart, CH, Mathesius, U, *et al.*, Flavonoids and auxin transport inhibitors rescue symbiotic nodulation in the *Medicago truncatula* cytokinin perception mutant *cre1, Plant Cell*

Murray, TG, & Magrath, RD, Does signal deterioration compromise eavesdropping upon other species' alarm calls? *Animal Behaviour*

Ort, DR, Merchant, SS, Alric, J, von Caemmerer, S, *et al*., Redesigning photosynthesis to sustainably meet global food and bioenergy demand, *PNAS*

Quraishi, BM, Zhang, H, Everson, TM, Lockett, GA, *et al.*, Identifying CpG sites associated with eczema via random forest screening of epigenome-scale DNA methylation, *Clinical Epigenetics*

Simbiken, NA, Cooper, PD, & Powell, KS, Development and feeding effect of frosted scale *Parthenolecanium pruinosum* Cocquillet (Hemiptera: Coccidae) on selected *Vitis vinifera L.* cultivars, *Australian Journal of Grape and Wine Research*

Thynne E, McDonald MC, Evans M, Solomon, PS, *et al.*, Re-classification of the causal agent of white grain disorder on wheat as three separate species of *Eutiarosporella, Australasian Plant Pathology*

Wilson, PB, Rebetzke, GJ, & Condon, AG, Pyramiding greater early vigour and integrated transpiration efficiency in bread wheat; trade-offs and benefits, *Field Crop Research.*