Australian National University

Research School of Biology Newsletter

Issue 40 | 6 February 2013

ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

NEWS

Graham Farquhar awarded an Einstein Professorship

Graham Farquhar (PS) has been awarded an Einstein Professorship by the Chinese Academy of Science (CAS). The Einstein Professorships are awarded each year to 20 distinguished international scientists actively working at the frontiers of science and technology.

Graham was recognised for leading research across a broad range of fields and scales, from integration of photosynthesis with nitrogen and water use of plants, stomatal physiology, isotopic composition of plants, and global change.

The program aims to strengthen the links between CAS scientists and Einstein Professors, and to enhance the training of future generations of scientists in China. It provides funding for recipients to conduct lecture tours in China, as well as for young CAS researchers to visit the recipients in their home laboratories.

Fenner medal to Uli Mathesius

Ulrike Mathesius (PS) has been awarded the prestigious Fenner Medal. The Fenner Medal is awarded by the Australian Academy of Science to recognise distinguished research in biology (excluding the biomedical sciences) by scientists of no more than 40 years.

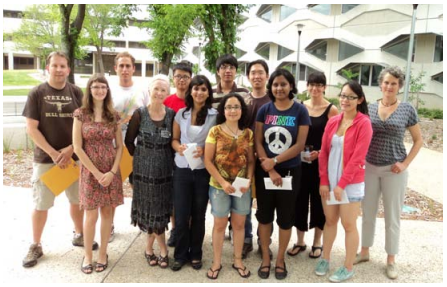
Ulrike's research focuses on how soil microbes shape the plant. She developed and applied techniques at a molecular, cellular and whole plant level to define mechanisms that symbiotic and pathogenic organisms use to manipulate plant development. A central idea of her work is that microbes have 'hijacked' plant signalling pathways for their own purposes. This has implications for utilising microbes to alter crop plant performance and for trying to develop nitrogen-fixing symbioses in non-legumes.

The efficient locomotion of this wrasse may serve as a model for underwater vehicles (see item under 'MEDIA'). (Image: Sally Pollack.)

RSB Student Conference

Congratulations to all 103 students that presented at the 2012 RSB student conference. The one day short-format talks were again a highly engaging showcase of the diverse and high calibre research being undertaken within the school. Thanks go to Karen, Madeleine and Panit from BTLC, the session chairs, the adjudicators and the academic network convenors (Spencer Whitney, Adrienne Nicotra and Helen O'Neil) for their help in ensuring that the event was a success. Thanks also go to Divya George, Isabel Saur, Emily Hanna, Michael Wong, Jason Ng, Camile Moray and Ying Ying Hey for organizing the scientific program and the 'After-Party'.

The high quality of the presentations made it difficult to identify the award winners in each PhD program. The recipients of the Hiroto Naora Awards, each valued at $900, were **Michael Wong** (BSB), **Andrew Kahn** (EEG) and **Kai Chan** (PS). In addition, $250 prizes were awarded to **Divya George** (BSB), **Veronica Briceno** (EEG) and **Samirra Hassan** (PS). The sizeable audience numbers helped ensure the conference (and After-Party) were a great success.



2012 RSB student conference organisers and award recipients.

CBA website and conference

The Centre for Biodiversity Analysis (CBA), a collaboration between the ANU and CSIRO, has launched its website. The centre offers a range of grant and scholarship opportunities.

In April the centre will host the CBA Biodiversity Genomics Conference, and a series of associated of workshops. See the conference website for details.

CONGRATULATIONS

The following staff were promoted in the 2012 round:

To level E
Rob Magrath (EEG)
Mike Roderick (PS & RSES, via CPMS)

To level D
Marcel Cardillo (EEG)
Celeste Linde (EEG)

To level C
Isabelle Ferru (T&L)

To level B
Jason Bragg (EEG).

Tamsyn Hilder (Research Fellow, Chung lab, BSB) has been awarded the 'Young Biophysicist of the Year' by the Australian Society of Biophysics.

Amanda Edworthy (PhD student, Langmore lab, EEG) was awarded a Margaret Middleton Award for research into endangered Australian native vertebrate animals.

Lab Leader Profile
Paul Cooper (EEG)

Lab researching: The mechanisms involved in feeding and activity in insects.

Greatest achievement: Explaining how the environment influences honeybee activity and the role parasites may play in regulation of caterpillar feeding.

Next big thing: Determining the role that amines have in influencing arousal in insects, and how that stimulates feeding responses.

Science hero: V. B. Wigglesworth who wrote his first published paper in 1926 and his last published paper in 1997. His work was always ahead of its time, and he was remarkable for his endurance.

Michael Braby (Visiting Fellow, EEG), won the 2012 Mackerras Medal. This is awarded by the Australian Entomological Society every two years, and is the society's highest award. Michael also won the Hayeshi Award from the Butterfly Society of Japan last year.

Kristen Barratt (PhD student, Arkell lab, EEG) has been awarded an IUBMB Wood-Whelan Fellowship to help fund her visit to the NHGRI (NIH, Bethesda, USA), this year.

Ajay Narendra and **Jochen Zeil** (EEG) have won a $20K, two year grant from the Group of Eight Australia – Germany Joint Research Co-operation Scheme to work with Prof Wolfgang Roessler, University of Wuerzburg on *Navigation and experience-dependent brain organization in ants.*

WELCOME

Staff

BSB

Adelaide Dennis has joined the Kirk lab as a research assistant and will commence a PhD in March.

This monthly newsletter is archived at biology.anu.edu.au/newsletter.

Content & layout: Sharyn Wragg
Editing: Kiaran Kirk & Sharyn Wragg

Email RSB.newsletter@anu.edu.au to submit content or to be added to the distribution list.

EEG

Haris Saslis-Lagoudakis has joined the Bromham lab. Haris has previously worked at the Royal Botanic Gardens Kew and Imperial College, developing phylogenetic approaches to ethnobotany. He will be investigating the application of phyloinformatic tools to understanding the evolution of salt-tolerance in plants.

Peter Cowman joined the Bromham lab last November. Peter recently finished a PhD in diversification of tropical reef fish at JCU in Townsville. He is working on patterns and rates of molecular evolution (see macroevoeco.com).

PS

Keith Bloomfield has joined the Atkin lab, and **Michael Cheah** has joined the Hillier lab.

PhD students

EEG

David Duchene joins the Bromham lab, and **Sarah Hsieh** joins the Foley lab.

Ajay Narendra and **Jochen Zeil** welcome three new PhD students - **Zoltán Kócsi, Chloe Raderschall,** and **Fiorella Ramirez Esquivel**.

PS

Jaime Simbaqueba joins the Jones lab.

Honours students

BSB

Vanessa Howieson and **Eleanor Kerdo** join the Saliba lab; **Andy Leu** joins the Allison lab; **Zhiyang Lin, Becker Lo** and **Mark Paul** join the Behm lab; **Joshua Miazek** joins the Fahrer lab; **Thanh Nhat Nguyen** joins the Bröer lab; **Kathryn Parker** joins the van Dooren lab; **Jana Pickering** joins the Tscharke lab; and **Mrinalini Pratap** joins the Callaghan lab.

EEG

Amelia Coman joins the Moritz lab; **Koula Diamand** joins the Arkell lab; **Louise Hatton** joins the Pryke lab; **Nithiya Lakshmi** joins the Gordon lab; **Vanessa Lam** and **Hannah Wigley** join the Foley lab; **Daniel Power** joins the Jennions lab; **Jack Simpson** joins the Cooper lab; and **Rachel Stenhouse** joins the Deakin lab.

PS

Phoebe Benson joins the Price lab; **Laura McGuffog, Lauren Venugoban,** and **Mengbai Zhang** join the Mathesius lab; **Sophie Holland** and **Estee Tee** join the Pogson lab; **Jennifer Lai** joins the Jones lab; **Kevin Murray** joins the Borevitz lab; **Huw Ogilive** and **John Rivers** join the Djordjevic lab; **Hannah Robinson** joins the Whitney lab; and **Patricia Stewart** joins the Borevitz & Atkins labs.

Visitors

BSB

Margaret Mackinnon, from the KEMRI-Wellcome Trust Research Programme, based in Kilif in Kenya, is spending six months as a Visiting Fellow with the parasitology groups in the School's Division of Biomedical Science and Biochemistry. Margaret studies the evolutionary pressures, and the biology underlying them, that make pathogens virulent, with a particular focus on human malaria parasites.

EEG

Rosa Agudo and **Arthur Georges** are visiting the Moritz lab, **Renee Catullo** is visiting the Keogh lab, **Marjo Saastamoinen** is visiting the Kokko lab and **Jodie Schaefer** is visiting the Fulton lab. **Ajay Narendra** and **Jochen Zeil are** hosting three international visitors, **Willi Ribi**, **Ali Alkaladi,** and **HuiXia Zhao.**

PS

Sandhya Mehrotra is visiting the Price lab, and **Rémi Branco** from the University of Bordeaux has joined the Hardham lab for six months.

Professional staff

Vaughn Dumas has joined IT as a programmer.

Farid Rahimi will be acting STO for BSB for the next two months, until the position is filled permanently.

FAREWELL

Andrew Denny has left Purchasing and Stores.

Markus Koeck (Hardham lab, PS) was awarded his PhD at the end of last year, and will take up a position in the OGTR.

Hector Rodriguez (Senior Technical Officer, BSB). Hector worked at the ANU for 20 years in the School of Psychology, School of Chemistry, BaMBi and RSB. In 2007 Hector won a Vice-Chancellor's Award for Innovation & Excellence in Service and in 2012 was awarded the School's Barney John award for outstanding service by a professional staff member.

MEDIA

Research by **Chris Fulton** (EEG) and colleagues was featured in Australian and international press. The group showed that the Bluelined wrasse *Stethojulis bandanensis* maintains optimum cruising speeds while using 40% less energy than expected for their body size. Efficiency is acheived through a streamlined rigid-body posture and wing-like pectoral fins that generate thrust using a 'figure-8' pattern. The finding could yield dramatic reductions in the power needed to propel underwater vehicles at high speed. The paper has been published in *PLoS ONE.*

Chris and colleagues have also developed a new method of estimating the population of the rare Murray River crayfish, using video surveying (view the ANU Media release, and a video of a crayfish interacting with a baited camera). The paper has been published in *Endangered Species Research,* and has been widely covered in the media.

A new paper from **Ryszard Maleszka's** lab (EEG) in collaboration with scientists from Queen Mary Collage in London has received world-wide media coverage. The paper describes new components of epigenetic 'code' in honey bees that are part of the interplay between environment, nutrition and how the honey bee develops.

Sylvain Foret (EEG) was interviewed by ABC 666 local radio in a session on gene memory.

PAPERS ACCEPTED

Bennett TH, Flowers TJ & Bromham L. Repeated evolution of salt-tolerance in grasses. *Biology Letters.*

Booksmythe I, Backwell PRY & Jennions, MD. Competitor size, male mating success and mate choice in eastern mosquitofish (*Gambusia holbrooki*). *Animal Behaviour.*

Callander S, Hayes C, Jennions MD & Backwell PRY. Experimental evidence that courting neighbours affect male attractiveness. *Behavioural Ecology.*

Caruana G, Farlie PG, Hart AH, Bagheri-Fam S, Wallace MJ, Dobbie MS, Gordon CT, Miller KA, Whittle B, Abud HE, Arkell RM, Cole TJ, Harley VR, Smyth IA & Bertram, JF. Genome-wide ENU mutagenesis in combination with high density SNP analysis and exome sequencing provides a rapid route to the identification of novel mouse models of developmental disease. *PLoS One*.

Cheung A, Hiby L & Narendra A. Ant navigation: fractional use of the home vector. *PLoS One.*

Corry B. Na^+ / Ca^{2+} selectivity in the bacterial voltage-gated sodium channel NavAb. *PeerJ.*

Corry B, Cranfield C & Martinac B. Structure and physiological role of ion channels studied by fluorescence spectroscopy. *Encyclopedia of Analytical Chemistry.*

Croft NP, Smith SA, Wong YC, Tan CT, Dudek NL, Flesch IEA, Lin LCW, Tscharke, DC* & Purcell AW.* (*Joint senior authors.) Kinetics of antigen expression and epitope presentation during virus infection. *PLoS Pathogens*.

Donaldson JA, Ebner, BC & Fulton CJ. Flow velocity underpins microhabitat selection by gobies of the Australian Wet Tropics. *Freshwater Biology*.

Duan G, Saint RB, Helliwell CA, Behm CA, Wang M-B, Waterhouse PM & Gordon KHJ. *C. elegans* RNA-dependent RNA polymerases *rrf-1* and *ego-1* silence *Drosophila* transgenes by differing mechanisms. *Cellular and Molecular Life Sciences.*

Fallow PM, Pitcher BJ & Magrath RD. Alarming features: birds use specific acoustic properties to identify heterospecific alarm calls. *Proceedings of the Royal Society, B.*

Fulton CJ, Johansen JL & Steffensen JF. Energetic extremes in aquatic locomotion by coral reef fishes. *PLoS ONE* (featured under 'MEDIA').

Glanville-Jones HC, Woo N & Arkell RM. Culture of whole post-implantation stage mouse embryos can be accomplished with commercially available reagents. *International Journal of Developmental Biology*.

Gordon D & Chung S-H. Extension of Brownian dynamics for studying blockers of ion channels. *Journal of Physical Chemistry B*.

Gordon D, Chen R & Chung S-H. Computational methods of studying the binding of toxins from venomous animals to biological ion channels: theory and application. *Physiological Reviews*.

Haff TM & Magrath RD. Eavesdropping on the neighbours: fledglings learn to respond to heterospecific alarm calls. *Animal Behaviour.*

Haff TM & Magrath RD. Learning to listen? Nestling response to heterospecific alarm calls. *Animal Behaviour.*

Heatwole SJ & Fulton CJ. Behavioural flexibility in coral reef fishes responding to a rapidly changing environment. *Marine Biology*.

Hilder TA & Chung S-H. Conduction and block of inward rectifier K^+ channels: Predicted structure of a potent blocker of Kir2.1. *Biochemistry*.

Holman L, Linksvayer TA & d'Ettorre P. Genetic constraints on dishonesty and caste dimorphism in an ant. *The American Naturalist*.

Hoyle GL, Venn SE, Steadman KJ, Good, RB, McAuliffe EJ, Williams ER & Nicotra AB. Soil warming increases plant species richness but decreases germination from the alpine soil seed bank. *Global Change Biology.*

Hüner NPA, Bode R, Dahal K, Busch FA, Possmayer M, Szyszka B, Rosso D, Ensminger I, Krol M, Ivanov A & Maxwell DP. Shedding some light on cold acclimation, cold adaptation and phenotypic plasticity. *Botany.*

Huntingford C, Zelazowski P, Mercado LM, Sitch, S, Galbraith, D, Fisher R, Lomas M, Walker A, Jones CD, Booth BBB, Malhi Y, Cox PM, Hemming D, Kay G, Good P, Lewis S, Atkin OK, Lloyd J, Gloor M, Zaragoza-Castells J, Meir P & Betts R. Simulated resilience of tropical rainforest to CO_2–induced climate change. *Nature Geoscience.*

Igic B & Magrath RD. Fidelity of vocal mimicry: identification and accuracy of mimicry of heterospecific alarm calls by the brown thornbill. *Animal Behaviour.*

Kahn AT, Kokko H & Jennions MD. Adaptive sex allocation in anticipation of changes in offspring mating opportunities. *Nature Communications.*

Lehtonen J, Schmidt DJ, Heubel K & Kokko H. Evolutionary and ecological implications of sexual parasitism. *Trends in Ecology & Evolution*.

Mautz B, Møller AP & Jennions MD. Do male secondary sexual characters signal ejaculate quality? A meta-analysis. *Biological Reviews of the Cambridge Philosophical Society.*

Nisar N, Verma S, Pogson BJ & Cazzonelli CI. Inflorescence meristem

grafting made easy in *Arabidopsis*. *Plant Methods*.

Noble MM, van Laake G, Berumen M & Fulton CJ. Community change within a Caribbean coral reef marine protected area following two decades of local management. *PLoS ONE*.

O'Sullivan OS, Weerasinghe KWLK, Evans JR, Egerton JG, Tjoelker MG & Atkin OK. High-resolution temperature responses of leaf respiration in snow gum (*Eucalyptus pauciflora*) reveal high-temperature limits to respiratory function. *Plant Cell and Environment*.

Periasamy P & O'Neill HC. Stroma-dependent development of two dendritic-like cells types with distinct antigen presenting capability. *Experimental Hematology*.

Pratchett MS, Berumen ML, Lawton, R, Feary D, Cvitanovic C & Fulton CJ. 'Biology of butterflyfishes: emerging topics and future research', in MS Pratchett, ML Berumen and BG Kapoor (eds.), *Biology of butterflyfishes.* CRC Press, Boca Raton.

Richards L, Richards B, Corry B & Schaefer A. Experimental energy barriers to anions transporting through nanofiltration membranes. *Environmental Science & Technology.*

Roche DG, Strong LE & Binning SA. Prevalence of the parasitic cymothoid isopod *Anilocra nemipteri* on its fish host at Lizard Island, Great Barrier Reef. *Australian Journal of Zoology.*

Ruzehaji N, Mills SJ, Melville E, Arkell RM, Fitridge R & Cowin AJ. The action of flightless I and toll-like receptors during wound healing in diabetic wounds. *BioMed Research International*.

Smolka J, Raderschall CA & Hemmi JM. Flicker is part of a multi-cue response criterion in fiddler crab predator avoidance. *The Journal of Experimental Biology.*

Spillman NJ, Allen RJW, McNamara CW, Yeung BKS, Winzeler EA, Diagana TT & Kirk K. Na^+ regulation in the malaria parasite *Plasmodium falciparum* involves the cation ATPase PfATP4 and is a target of the spiroindolone antimalarials. *Cell Host & Microbe.*

Spry C, Macuamule C, Lin Z, Virga KG, Lee RE, Strauss E & Saliba KJ. Pantothenamides are potent, on-target inhibitors of *Plasmodium falciparum* growth when serum pantetheinase is inactivated. *PLoS One.*

Sutherland TD, Weisman S, Walker AA & Mudie ST. The coiled coil silk of bees, ants, and hornets. *Biopolymers*.

Thomas M, Jayatilaka D & Corry B. How does overcoordination create ion selectivity? *Biophysical Chemistry.*

Thomas M, Jayatilaka D & Corry B. An entropic mechanism of generating selective ion binding in macromolecules. *PLOS Computational Biology.*

Nemkevich A, Spackman M & Corry B. Simulations of guest transport in clathrates of Dianin's compound and hydroquinone. *Chemistry - A European Journal.*

Umbers KDL, Jennions MD, Gardner MG & Keogh JS. Twenty-five new polymorphic microsatellites for the eastern mosquitofish, *Gambusia holbrooki* (Actinopterygii : Poeciliidae), an invasive species in Australia. *Australian Journal of Zoology.*

van de Pol M, Brouwer L, Brooker LC, Brooker MG, Colombelli-Negrel D, Hall ML, Langmore NE, Peters A, Pruett-Jones S, Russell EM, Webster MS & Cockburn A. Problems with using large-scale oceanic climate indices to compare climatic sensitivities across populations and species. *Ecography*.

Viollet S & Zeil J. Feed-forward and visual feed-back control of head roll orientation in wasps (*Polistes humilis*, Vespidae, Hymenoptera). *Journal of Experimental Biology.*

Walker AA, Weisman S, Church JS, Merritt DJ, Mudie ST & Sutherland TD. Silk from crickets: a new twist on spinning. *PLoS ONE*.

Wijesundara DK, Tscharke DC, Jackson RJ & Ranasinghe C. Reduced interleukin-4 receptor a expression on CD8+ T cells correlates with higher quality anti-viral immunity. *PLoS One*.

Zeil J & Hemmi JM. 'Path integration, vision and decision-making in fiddler crabs', in C Derby & M Thiel (eds.), *Crustacean nervous systems and their control of behavior.* Oxford University Press.