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Research School of Biology Newsletter

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ANU COLLEGE OF MEDICINE, BIOLOGY AND ENVIRONMENT

NEWS

Susanne von Caemerer (PS) has been elected as a Corresponding member of the American Society of Plant Biologists. Corresponding member status is conferred by election on the annual ballot. This honor provides life time membership and Society publications (*Plant Physiology* and *Plant Cell*) to distinguished plant biologists from outside the US.

Amrit Kaur Nanda (Masle lab, PS) won first prize at the Young Scientist Award Session at the annual meeting of the Society of Experimental Biology (SEB) this year.

Iliana Medina (Langmore Lab, EEG) won the poster prize at the Australasian Society for the Study of Animal Behaviour (ASSAB) conference.

David Kainer (Foley lab, EEG) won the RSB Three Minute Thesis (3MT) competition with his talk *Improving Eucalyptus oil production by looking 'under the hood'*. **Kathy Schneebeli** was the Runner-up. Thanks to **Duncan Fitzpatrick, Gabrielle Openshaw** and **Renate Zelger** who also presented. David and Kathy will be competing in the College 3MT final on 22 August.

Grants

Stefan Bröer (BSB) has signed a contract with Sanofi-Aventis to evaluate epithelial amino acid transporter SLC6A19 as a drug target to treat type 2 diabetes and to design a high-throughput assay to identify high-affinity inhibitors for the transporter. **Yang Jiang**, a PhD student in the Bröer lab, was selected to give an oral presentation of this research at the recent Cold Spring Harbor Asia Conference 'Metabolism, Obesity & Obesity-associated Diseases' in Suzhou, China.

Simon Greenhill & **Lindell Bromham** (EEG) have been awarded a grant from the Research School of Asia and the Pacific Research and Development Incentive Program for the project 'Discovering the patterns and drivers of rate variation in language and culture in Polynesia' $4.8K.

Acanthochromis polyacanthus have pectoral fin shapes that match the wave energy conditions on their home reefs (see item under 'MEDIA'). (Photo: Wikimedia commons.)

Nerea Ubierna-Lopez (Farquhar lab, PS) has been awarded a travel grant of $2.1K from the Chancelry.

PhD graduations

The following students were awarded their PhDs at the mid-year graduation ceremony.

Sarojini Balkrishna (Bröer lab, BSB), Molecular insights into the regulation of glutamine transport across cellular membranes.

Owen Carr (Marotte lab, BSB), The distribution and role of ten-m3 in the developing retinogeniculate and retinocollicular projections in the wallaby *Macropus eugenii*.

Angeliza Querubin (Provis lab, BSB), euronal circuitry of the pigeon retina (*Columba livia*) - the morphological classification and organisation of various neuronal types.

Swee Seong Tang (Verma lab, BSB), Molecular characterization of novel serotype 1c of *Shigella flexneri*.

Sophia Callander (Backwell lab, EEG), Social and environmental Influences on mate attraction, mate choice and territorial defence.

Renee Catullo (Keogh lab, EEG), Biogeography, phylogenetics, and cryptic species in the myobatrachid frog genus *Uperoleia*.

Alexandra Livernois (Waters lab, EEG), Evolution of transcriptional inactivation on sex chromosomes in birds and mammals.

Shaun New (Zeil lab, EEG), Eye of the dragon: visual specializations of the Jacky dragon, *Amphibolurus muricatus.*

Natalie Schmitt (Peakall lab, EEG), Patterns of population genetic structure among Australian and the South Pacific Humpback whales (*Megaptera novaeangliae*).

Melissa Snape (Foley lab, EEG), Reproductive and behavioural effects of a GnRH-targeted immunocontraceptive vaccine in macropodids.

Lisa Vlahos (Zeil lab, EEG), Possum magic: Exploring colour vision in the Common brushtail possum (*Trichosurus vulpecula*).

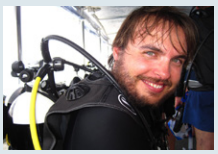
Wee Ho Lim (Farquhar and Roderick labs, PS), The physics of pan evaporation.

Douglas Orr (Whitney lab, PS), Plant RuBisCo biogenesis: A study of the requirements and processing steps during co- and post-translational modification of the large subunit.

MEDIA

A paper published in *Nature communications* by **Audrey Chan**, **Kevin Saliba** (Saliba lab, BSB), **Markus Winterberg** (Kirk lab, BSB) and colleagues has been featured in the media. The paper describes the discovery that the malaria parasite's requirement for thiamine (vitamin B1) can be targeted for the development of novel antimalarials.

Lab Leader profile: Chris Fulton (EEG)



Lab researching:
We explore patterns of aquatic biodiversity in relation to environmental variability across space and time. Our recent work has examined how and why patterns of taxonomic, morphological and physiological diversity in fishes, crayfishes and seaweeds vary across gradients of water flow and temperature.

Greatest achievement:
Demonstrating that the distribution patterns of reef fishes across gradients of wave energy could largely be explained by differences in their swimming ability: fast-swimming fishes typically occupy wave-swept habitats, while slower swimmers are restricted to calmer waters. This spatial assembly rule has since been tested multiple times and found to be valid for reef fishes occupying coral and rocky reefs across the Indo-Pacific and Caribbean, regardless of any differences in the species pool present at each location.

Next big thing:
Species that can persist in habitats subject to extreme environmental conditions (both in terms of variability and magnitude): such extremophiles could really push the limits of our understanding on how organisms can vary their phenotype to deal with abiotic stress.

What do you see as future challenges for your field of research?
One of the main challenges we face is ensuring observer safety when working at the extreme ends of our environmental gradients. To push the boundaries of our field, we are going to need innovative approaches and technologies to be able to safely record the aquatic organisms doing their stuff under the harshest of field conditions.

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Chris Fulton (EEG), **Sandra Binning** (Keogh and Backwell labs, EEG) and colleagues have published a paper in *Coral Reefs*. The findings, featured in the media, suggest that species on the Great Barrier Reef that are highly adapted to local conditions may not be able to re-adapt fast enough to meet the challenges of rapid climate change.

A paper by **Ajay Narendra**, Sarah Gourmaud and **Jochen Zeil** (Zeil lab, EEG), published in the *Proceedings of the Royal Society B*, and featured in the media, show that Jack Jumper ants, *Myrmecia croslandi* rely heavily on visual landmark information at least 10 m distance from the nest.

WELCOME

Tamara Kayali (BTLC), has joined the Biology Teaching and Learning Centre on a three year position to take over convening and teaching BIOL3191 Biology, Society and Ethics and play a role in the postgraduate coursework programs, following Barbara van Leeuwen's appointment to the position of Director of Science Education for the ANU Colleges of Science.

Tamara's PhD was on issues of control, responsibility and the self in depression, which she completed at Cambridge University. She joins the School from Novel Tech Ethics at Dalhousie University, Canada, where she worked on projects in neuroethics and ethics of reproductive technology.

Natalie Smith joins the Corry lab (BSB) after recently completing her PhD at the University of Western Australia. Natalie will research how lipids influence the function of mechanically gated ion channels in bacteria.

Jon Tan rejoins the O'Neill lab (BSB) after spending four years working on spleen organogenesis in Kyoto University. He returns to complete his CJ Martin Fellowship.

Lingling Zhu joins the Atkin lab (PS) as a CSC/ANU Scholarship student from Beijing.

Josie Ginty and **Kevin Le**, PhB students, join the Dewar lab (PS) to work on applications of Maximum Entropy to, respectively, Rubisco optimization and savanna ecology.

FAREWELL

Rémi Branco leaves the Hardham lab (PS) where he has worked on a collaborative project with Dr Jodie Bradby in Physics. The project, the final component of Rémi's Masters degree at the University of Bordeaux, investigated the magnitude of the forces required to induced a localised reorganisation of actin microfilaments in plant cells.

Andrew Chew leaves his position as RSB IT Client Services Manager to take up a 6-month position as Manager of IT at the ANU Mathematical Sciences Institute.

Michael Thomas, a postdoc with both the Corry lab and Chung/Hilder labs (BSB), has left the School to take up a new joint position with La Trobe University and the Victorian Life Science Computation Initiative.

PAPERS ACCEPTED

Bröer S. Diseases associated with general amino acid transporters of the solute carrier 6 family (SLC6). *Current Molecular Pharmacology.*

Bröer S. Epithelial neutral amino acid transporters: lessons from mouse models. *Current Opinion in Nephrology and Hypertension.*

Bromham L, Saslis-Lagoudakis CH, Bennett TH, et al. Soil alkalinity and salt tolerance: adapting to multiple stresses. *Biology Letters*.

Buer CS, Kordbacheh F, Truong TT, Hocart CH & Djordjevic MA. Alteration of flavonoid accumulation patterns in transparent testa mutants disturbs auxin transport, gravity responses, and imparts long-term effects on root and shoot architecture. *Planta.*

Cardillo M & Pratt RC. Evolution of a hotspot genus: geographic variation in speciation and extinction rates in *Banksia* (Proteaceae). *BMC Evolutionary Biology*.

Chen R & Chung SH. Complex structures between the N-type calcium channel (CaV2.2) and ω-conotoxin GVIA predicted via molecular dynamics. *Biochemistry.*

Evans RJ. Topical Review: Improving photosynthesis. *Plant Physiology.*

Goh C-H, Veliz-Vallejo DF, Nicotra AB & Mathesius U. The impact of beneficial plant-associated microbes on plant

phenotypic plasticity. *Journal of Chemical Ecology.*

Hanna E & Cardillo M. Island mammal extinctions are determined by interactive effects of life history, island biogeography and mesopredator suppression. *Global Ecology & Biogeography.*

He Z, Zhou J, Lu X & Corry B. Ice-like water structure in carbon nanotube (8,8) induces cationic hydration enhancement. *Journal of Physical Chemistry C.*

Hilder TA & Chung SH. Designing a C84 fullerene as a specific voltage-gated sodium channel blocker. *Nanoscale Research Letters*.

Keogh JS, Umbers KDL, Wilson EE et al. Influence of alternate reproductdive tactics and pre- and postcopulatory sexual selection on paternity and offspring performance in a lizard. *Behavioural Ecology and Sociobiology*.

Krokowski D, Han J, Saikia M, Bröer S, et al. A self-defeating anabolic program leads to ß-cell apoptosis in endoplasmic reticulum stress-induced diabetes via regulation of amino acid flux. *Journal of Biological Chemistry*.

Palacin M & Bröer S. 'Amino acid transporter defects' Chapter 6, N Blau et al. (Eds), *Physician's guide to the diagnosis, treatment, and follow-up of metabolic diseases*. Springer Publishing.

Pavlova A, Amos N, Sunnucks P, Keogh JS et al. Perched at the mito-nuclear crossroads: divergent mitochondrial lineages correlate with environment in the face of ongoing nuclear gene flow in an Australian bird. *Evolution*.

Pepper M, Doughty P & Keogh JS. Geodiversity and endemism in the iconic Australian Pilbara region: A review of landscape evolution and biotic response in an ancient refugium. *Journal of Biogeography.*

Powell TL, Galbraith DR, Christoffersen BO, Meir P, et al. Confronting model predictions of carbon fluxes with measurements of Amazon forests subjected to experimental drought. *New Phytologist*.

Mitchard ETA, Meir P, Ryan CM, et al. A novel application of satellite radar data: measuring carbon sequestration and detecting degradation in a community forestry project in Mozambique. *Plant Ecology & Diversity.*

Morrison SF, Harlow PS & Keogh JS. Spatial ecology of the critically endangered Fijian Crested Iguana, *Brachylophus vitiensis*, in an extremely dense population: Implications for conservation. *Plos One.*

Noble DWA, Keogh JS & Whiting MJ. Multiple mating in a lizard increases fecundity but provides no evidence for genetic benefits. *Behavioral Ecology.*

Noble DWA, Wechmann K, Keogh JS & Whiting MJ. Behavioral and morphological traits interact to promote the evolution of alternative reproductive tactices in a lizard. *The American Naturalist.*

Rosauer D, Ferrier S, Williams KJ, Keogh JS, et al. Phylogenetic generalised dissimilarity modelling: A new approach to analysing and predicting spatial turnover in the phylogenetic composition of communities. *Ecography*.

Shaw AK & Kelly KA. Linking El Niño, local rainfall, and migration timing in a tropical migratory species. *Global Change Biology.*

Smith NE, Tie WJ, Flematti GR, Corry B et al. Mechanism of the dehydrogenase reaction of DmpFG and analysis of inter-subunit channeling efficiency and thermodynamic parameters in the overall reaction. *The International Journal of Biochemistry & Cell Biology.*

Taylor RW. The Orientalist Hans Friedrich Overbeck 1882 -1942: his entomological work, prisoner-of-war experiences and known photographic images: a biographical memoir. *Journal of the Malaysian Branch Royal Asiatic Society.*

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