Australian National University

Research School of Biology Newsletter

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ANU COLLEGE OF SCIENCE

NEWS

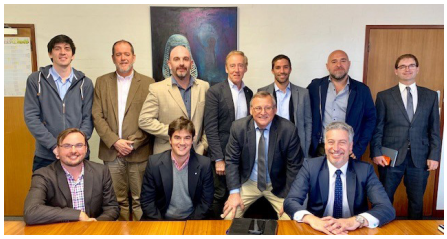
Owen Atkin appointed as 2019 Entrepreneurial Fellow

Head of Plant Science, **Owen Atkin**, has been named the 2019 Vice-Chancellor's Entrepreneurial Fellow for his work around entrepreneurial agri-technology (see main image).

Chris Fulton engaged by Murray-Darling Basin Authority to develop fish plan

The Murray-Darling Basin Authority has engaged **Chris Fulton** (E&E) to guide development of the Murray-Darling Native Fish Management & Recovery Strategy, which was recently announced by the Federal Minister for Agriculture & Water Resources in response to the mass mortality of fishes in the Lower Darling and other at-risk MDB catchments. Chris is working with over 80 stakeholders from all of the Basin states to map out a plan that will address key knowledge gaps and threats to the survival and recovery of iconic native fishes such as the Murray cod, yellowbelly and Macquarie perch.

Science-based approaches to marine protected areas in Argentina



Chris Fulton (E&E) (front left, in photo above) met with delegates from Argentina's fishing industry and key government agencies (eg, Ministry of Agriculture & Fisheries, National Director for Marine Protected Areas), and the Australian Ambassador to Argentina, to discuss how science-based approaches to marine protected area design can deliver ecological and social benefits to our maritime nations.

Imposter Syndrome, a reflection by Jennie Mallela (Rodrigo group, CBBU)

This year I was nominated by Science and Technology Australia as a "Superstar of STEM". What appealed to me about the program was its innovative approach to challenging commonly held assumptions about female scientists. You may ask if this is necessary. So, if I tell you that women only account for 16% of science (STEM) qualified Australians, or that when Australian children draw a scientist the majority draw a man you may begin to see the bigger picture. Clearly, gender inequality is a complex and insidious problem and it's one I wanted to engage with. One of the key themes of the program is to smash imposter syndrome and empower women in STEM to share their stories.

I've been asked a lot of questions about the program so I thought I'd share some of my initial thoughts and 'light bulb' moments with you. Earlier this year I joined a group of female scientists for our first Superstars of STEM workshop in Melbourne. This group of women ranged from early career researchers through to senior level, leading scientists in their fields. I have to admit to feeling rather apprehensive when I read their biographies, a part of me wondered "*How on earth did I end up being part of this amazingly inspiring group of women? Did they make a mistake choosing me?*" Yes, imposter syndrome had snuck in!

For those of you not familiar with the phrase, imposter syndrome occurs when you doubt your own ability or your accomplishments and even think you'll be discovered as a fraud. It can have serious impacts on your career and self-confidence. Over the course of two days I was really surprised to hear that everyone at the workshop had suffered from imposter syndrome at one stage or another, including those really amazing leaders of our time who I thought would be well beyond the stage of doubting themselves. For me this was a real "ah ha" moment and that small piece of knowledge has given me more confidence. I subsequently discussed this with senior male colleagues who also admitted to suffering from imposter syndrome. It made me realise that we are all human at the end of the day and we all have the same insecurities and fears. Now, when imposter syndrome sneaks up on me, I remind myself that many of us suffer from cracks in our confidence, I recognise it and then dismiss it. If we all admit we suffer from imposter syndrome every now and then, then perhaps it won't hold us back!

ANU Entrepreneurial Fellow for 2019, Owen Atkin, speaks at the opening of the Centre for Entrepreneurial Agri-Technology, in 2018. (See: News Item)

Hands-on molecular lab fundamentals course

An Introduction to Molecular Lab Fundamentals course was successfully run in the EBL this month. 10 Honours and PhD students spent three days in the EBL lab learning hands on about DNA extraction methods, PCR and agarose gels. All students are now well prepared for their genetics projects. - **Niccy Aitken**, EBL Manager

Indigenous Cultural Awareness course

Pat Backwell (E&E) ran a CORE Cultural Learning workshop for RSB staff and students this month. Participants worked through the first two modules of the CORE program, which have now been completed by twelve RSB staff and students. For those who missed out, there will be another workshop next semester.

Group leader profile: Dan Noble (E&E)

Metabolic processes are an essential and universal feature of life; they provide all the available energy organisms have to invest in growth, reproduction and survival. It therefore comes as no surprise that understanding the factors affecting energy production is of major interest to biologists – energetic costs and gains form the foundation of theory across a diversity of research fields, from sexual selection to behavioural, population and community ecology. Rates of energy turnover and investment by individuals provide powerful explanations for diverse biological patterns including why larger fish are important for population sustainability, patterns of ageing and why animals behave and look so different.

My research group explores how early developmental experiences impact physiology and metabolic function using targeted experimental manipulations of early life stages in ectotherms combined with large-scale meta-analytic and comparative approaches. We explore how physiological changes brought about by developmental responses cascade to affect life-history and fitness – insights that are critical to ascertain the long-term consequences of such changes. My team is currently exploring how thermal and resource environment interact to impact metabolism, and subsequently life-history, using a few widespread model lizards species that vary in ecology. We are using integrative, interdisciplinary tools to elucidate answers to proximate and ultimate questions in this area.

What I enjoy most from teaching and research is working on difficult problems from new perspectives with a team of collaborators that have unique skills and insights. I strongly believe that working together across disciplinary boundaries leads to innovative, high-impact research and training. It constantly amazes me just how much more effective learning is when working with a team of people discussing and working towards a common problem. I think we are in an exciting period of time where combing tools across disciplines will really be able to help us understand very complex biological phenomena that I hope will lead to more powerful predictive frameworks.

I think one of the major challenges in my field is a lack of integrative, longitudinal studies. Much of the current work being done is piecemeal, making it really hard to understand how developmental responses orchestrate changes to physiology that subsequently affect life-history. The reason for this is that different aspects of physiology can trade-off in important ways, and ignoring key players in physiological processes, and how they are also shaped by more immediate responses to the environment, makes it difficult to understand any resulting phenotypic consequences. Of course, we can't measure everything. As such, we need to also develop new tools to circumvent the high-dimensionality of experiments and new ways to efficiently measure (non-invasively) aspects of organismal physiology. Getting this balance right will allow for some exciting new questions to be tackled – propelling our understanding of the role developmental environments play in orchestrating life-long changes to physiology and life-history.

Grants and Awards

Congratulations to **Karen Ford** and **Kara Youngentob** (both Foley group, E&E), who have been awarded a NSW Natural Resources Commission Grant of $157,000, to determine the effects of regeneration harvesting on habitat nutritional quality for koalas.

Diep Ganguly (Pogson group, PS) was awarded a prestigious CSIRO Future Science Fellowship in Synthetic Biology for his proposal 'Developing Synthetic BioCapacitors to Regulate mRNA stability and protein translation'. Diep will undertake this fellowship in the Pogson lab (PS).

Hee-Jin Noh (Langmore group, E&E) has been awarded a Holsworth Wildlife Research Endowment of $5,525 from the Ecological Society of Australia.

Rosie Harris (Fulton group, E&E) has been awarded $1500 from the Joyce Vickery Scientific Research Fund by the Linnean Society of NSW for her Masters research on the drivers of biodiversity in tropical macroalgal forests.

David Duchêne (Moritz group, E&E) has been awarded the Alan Wilton Award, by the Genetics Society of Australasia. The award recognises outstanding contributions to the field of genetics research by Australasian scientists early in their career.

Carl McCombe and **Daniel Yu**, both Honours students in the Williams group (PS), have each been awarded AINSE (Australian Institute of Nuclear Science and Engineering) Honours Scholarships Stipends worth $5,000. This will support collaborative work that the group is undertaking with beamline scientist Daniel Eriksson, of the Australian Nuclear Science and Technology Organisation's Australian Synchrotron.

James Kondilios received the Forest & Wood Production Australia Award as part of the Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry 2019 Awards. Working in the Borevitz lab, James will use the funding to look at genetic variation in *Eucalytus globulus* and how this might inform plantation managers on which varieties to plant in preparation for expected climatic condition in 2030 and beyond.

James is completing an undergraduate degree in genetics at ANU. He also works as a data scientist on a casual basis in the Borevitz (PS) group.

Outreach News

This month RSB hosted schools from Queensland and the South Coast of NSW. **Kevin Yang**, ANU biology undergrad and Questagame intern took students and teachers from Tullawong State High School near Brisbane on a tour of campus looking for sightings using the Questagame app, followed by a Q and A session about life at ANU.

Alex Maier (BSB) ran an interactive talk about parasites of all kinds with a group of years 11 and 12 students from Bega HIgh School.

Dave Rowell (E&E) addressed the Queanbeyan branch of the Country Womens Association on the evolution and traditional uses of native *Brachychiton* species, and propagation and grafting techniques.

Caitlin Byrt (PS) presented on 'A molecular view of the menus of our ancestors and great grandchildren' as part of the Tasting Australia event, Imagining the Future of Food, in Adelaide this month. Caitlin also sampled chips made from farmed crickets and saltbush, before a sell-out crowd at the Hallet Cove Civic Centre. While the cricket chips were 'tangy', Caitlin recommends the saltbush chips, which were delicious. The panel of speakers included Andrew Lowe (University of Adelaide), Caitlin Byrt (ANU) and Kristen Messenger (from Bugs n Slugs) and the discussion ranged from ways to reduce food waste, to how gene-editing technologies will be used to improve food crops in the future, and discussion of eating more farmed insects.

Jennie Mallela (Rodrigo group, CBBU) ran a pub quiz as part of the Environment in the Pub event at Smith's Alternative, this month.

IN THE MEDIA

Inside Science interviewed **Megan Head** (E&E), for an article about her group's research showing that infecting females with an STD might give male animals an advantage. Read the article here.

Naomi Langmore (E&E) was interviewed by Australian Geographic about why research on bird song has focused on male song and neglected female song, and how we should go about redressing the balance.

Chris Fulton (E&E) has been engaged in the public debate on the equitable design and management of NSW marine parks. The ABC and The Guardian both reported on concerns about the independence of the marine park advisory body.

Xiaojun Yuan's (Leyton group, BSB) PhD project was the focus of an article in The Australian Society for Microbiology ACT/ NSW newsletter Syntrophy.

WELCOME

Hannah Carle joins the Meir group (PS) this month as a PhD student. She comes to RSB by way of a BSc Adv (Hons) at Monash University and a position as a Science Communicator at the Scienceworks Museum in Victoria. She will be working in Patrick Meir's group investigating the drought resilience of Malaysian tropical forests. Her project will involve a collaboration with the South East Asia Rainforest Research Partnership.

Welcome to **Ayesha Wellawatta**. Ayesha joined the Masle group (PS) mid-March on a PhD International Scholarship, after completing Honours in Plant Physiology and Biochemistry and a research project on herbal medicine. Ayesha's interests are in systemic signalling in the integration of endogenous developmental controls and abiotic stress.

NEW APPOINTMENTS

Sasha Mikheyev (E&E) has been appointed Associate Dean (International) for the College of Science. This position (0.2FTE) takes a lead role in developing and implementing an international strategy for the Joint Colleges, including the establishment of institutional-level relationships with tertiary and research institutions overseas.

Shannon van Sebille, RSB Building Coordinator left RSB this month for a continuing Project Officer role within the University's Facilities and Services Division. **Matt Sutton** has taken over as interim RSB Building Coordinator, and his existing position, RSB Technical Services Team Leader, will be backfilled by Technical Services team members **Sarah Talbot** and **Ben Durant** during his absence.

Steve Zabar joined the RSB Technical Services team, from RSB Plant Services, this month.

PHDS SUBMITTED

Zoe Reynolds (Cardillo group, E&E) 'Effects of fire on bird diversity in semi-arid woodland.'

PHDS AWARDED

Sabrina Chin (Mathesius group, PS) 'The role of flavonoids in the interaction between *Medicago truncatula* and *Meloidogyne javanica*.'

Nadya Farah (Jones group, PS) 'Functional Characterisation of the Flax Rust AvrP/AvrP123 Avirulence Protein.'

PAPERS ACCEPTED

Arnold PA, Nicotra AB, Kruuk LEB, Sparse evidence for selection on phenotypic plasticity in response to temperature, *Philosophical Transactions of the Royal Society B*.

Binks, O, Mencccini M, Rowland L *et al*. & Meir P, Foliar water uptake in Amazonian trees: evidence and consequences, *Global Change Biology.*

Bloomfield KJ, Cernusak LA, Eamus D, ... Egerton JJG, ... Hayes L, ... Zhu L, Atkin OK, The validity of optimal leaf traits modelled on environmental conditions, *New Phytologist*.

David R, Byrt CS, Tyerman SD, *et al.*, Roles of membrane transporters: connecting the dots from sequence to phenotype, *Annals of Botany*.

Evans KM, Vidal-García M, Tagliacollo VA, Taylor SJ, Fenolio DB, Bony patchwork: mosaic patterns of evolution in the skull of electric fishes (Apteronotidae: Gymnotiformes), I*ntegrative and Comparative Biology*.

Fulton CJ, Abesamis R, Berkström C, *et al*., Form and function of tropical macroalgal reefs in the Anthropocene, *Functional Ecology*.

Higgins D, Dennis A, Stoddard A, Maier A, Howitt S, "Power to empower": conceptions of teaching and learning in a pedagogical co-design partnership, *Higher Education Research and Development*.

Hu Y, Green GS, Milgate A, Stone EA, Rathjen JP, Schwessinger B, Pathogen detection and microbiome analysis of infected wheat using a portable DNA sequencer, *Phytobiomes Journal*.

Javed K, Fairweather SJ, Amino acid transporters in the regulation of insulin secretion and signalling, *Biochemical Society Transactions*.

Munns R, Passioura JB, Colmer TD, Byrt CS, Osmotic adjustment and energy limitations to plant growth in saline soil, *New Phytologist.*

Nor, SMM, Huxham M, *et al.* & Meir P, Jackson G, Exceptionally high mangrove root production rates in the Kelantan Delta, Malaysia; an experimental and comparative study, *Forest Ecology and Management.*

O'Leary BM, Asao S, Millar AH, Atkin OK, Core principles which explain variation in respiration across biological scales, *New Phytologist.*

Parajuli P, Rajput M, Verma N, Plasmids of *Shigella flexneri* serotype 1c strain Y394 provide advantages to bacteria in the host, *BMC Microbiology*.

Rungrat T, Almonte A, Cheng R, Gollan P, Stuart T, Aro E-M, Pogson B, Borevitz J, Wilson P, A genome-wide association study of non-photochemical quenching in response to local seasonal climates in *Arabidopsis thaliana*, *Plant Direct*.

Sellami S, Le Hir R, Thorpe MR, *et al.*, Arabidopsis natural accessions display adaptations in inflorescence growth and vascular anatomy to withstand high salinity during reproductive growth, *Plants.*

Thornhill AH, Crisp MD, Külheim C, *et al*., A dated molecular perspective of eucalypt taxonomy, evolution and diversification, *Australian Systematic Botany.*

Tyerman SD, Munns R, Fricke W, ... Byrt C, *et al.*, Energy costs of salinity tolerance in crop plants, *New Phytologist.*

Way DA, Photosynthesis: Just the right temperature, *Nature Ecology & Evolution*.

Ying H, Hayward DC, Cooke I, Wang W, Moya A, Siemering KR, Sprungala S, Ball EE, Forêt S, Miller DJ, The whole genome sequence of the coral *Acropora millepora*, *Genome Biology & Evolution*.

This newsletter is archived at biology.anu.edu.au/news-events/newsletter.
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