



NEWS

Graham Farquhar wins Kyoto prize in Basic Sciences



Owen Atkin (Head of Plant Sciences, RSB), Allen Rodrigo (Director, RSB), Graham Farquhar, and ANU VC Brian Schmidt celebrate Graham's Kyoto prize win. Image Sharyn Wragg.

Graham Farquhar (PS) has won the Kyoto prize in Basic Sciences, for his life's work in plant biophysics and photosynthesis, which has involved research on water-efficient crops and the impacts of climate change. He is the first Australian to win the prestigious award, for fields not traditionally honoured with a Nobel Prize. Read more here.

(Not) just another award



Meisha Holloway-Phillips (Farquhar group, PS) reflects on the announcement of Graham Farquhar's Kyoto Prize.

It could easily be remembered as the trifecta of awards; the icing on the cake; the ultimate recognition of a lifetime of personal genius; and these are all worthy reasons. Graham's science contribution has been foundational for plant science, paving the way for many applications and methods to be developed to investigate carbon and water fluxes at both the leaf and ecosystem level. His ability to express in mathematical notation what we experimentalists struggle to observe in totality has ensured, for example, that the light and dark cycles of photosynthesis are intimately linked and relatable to gas exchange measurements, and that the activity of an individual leaf has effect in global observations. And then there's the implicit factors that make this award much more than just citations – Graham's the most objective, rigorous, generous and curious person I've ever met. He's the only supervisor I know who will call you up at 11pm at night to check an equation with you and it will be because you desperately



Graham Farquhar, first Australian to win the Kyoto prize. Image Stuart Hay. (See: News Item).

need it to finalise your results. He is genuine about seeing other people succeed and he is devoted to ensuring the science is right. But beyond the personal achievement, this award firmly recognises and elevates the important role plant science has in shaping our future. Of the 579 Nobel prizes awarded (1901-2016) and 258 Kyoto prize winners (1985-2017), only 11 have been directly associated with plant science and fewer still have been agronomists or physiologists. There is a shortage of students interested in plant science, especially in the more applied domains of agricultural science where I sprouted from. We live in an age where "thank a farmer for your next meal" needs its own campaign, where 29% of primary school children in Britain think cheese comes from plants, and where we are still asking the question "do you believe in climate change?". This award provides us with an opportunity to communicate the importance of plant science to the world and we are very lucky to have, as our ambassador, Graham Farquhar.

Megan McDonald wins Peer Prize for Women in Science 2017

Congratulations to Megan McDonald



(Solomon group, PS), who has won the 2017 Peer Prize for Women in Science, for her work on ToxA in wheat. The competition is organised by the Thinkable

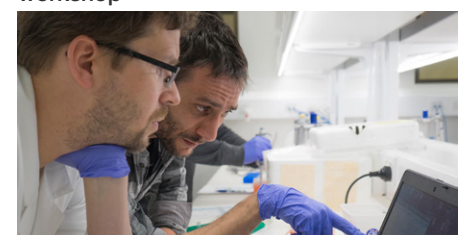
Academy, and winners are decided by votes from their peers, who are defined as those who have authored a peer-reviewed article within the scientific literature.

Megan's entry, entitled 'A selfish gene: how a single gene threatens wheat', included a video produced by Sharyn Wragg and Tom Davis, both of RSB IT. You can watch it here.

Biology Olympiad team heads to the UK

Juliey Beckman (BTLC) is heading to Warwick, UK, next month, with a team of four top biology students from high schools in Victoria and NSW, for the annual Biology Olympiad competition. Over seven days the students will sit written and practical exams, while Juliey, the Deputy Director of the Australian Biology Olympiad, and other chaperones, will be busy with exam oversight, exam translation, and adjudication panels.

ANU Nanopore MinION sequencing workshop



Carsten Kulheim and David Kainer (both Foley group, E&E) at the MinION workshop. Image: Sharyn Wragg.

The ANU Nanopore MinION Sequencing

DECRA Fellow profile: Rob Sharwood (Furbank group, PS)



Research background

I completed my BSc (Molecular Biology and Biochemistry) at ANU and from this degree I was particularly interested in plant science and wanted to keep close to my farming background. Not knowing what to do over summer I walked into RSBS and asked if there were any summer research projects and after receiving a list I read through all of the projects and John Andrews project to investigate Rubisco was really appealing. So from there I began my research career and transitioned into Honours at ANU to engineer Rubisco in plant chloroplasts by plastid transformation. I continued on to complete my PhD with Spencer Whitney and Susanne von Caemmerer by engineering foreign Rubisco's into tobacco and determining the physiological impact. After my PhD I completed postdocs at Cornell University, Western Sydney University and was then awarded my DECRA in 2013 to come back to ANU.

Current research interests

Overall my main interest is to improve crop productivity in key crops such as rice, wheat and cotton through discovering new solutions to cope with future climate change. My current projects include: Improving photosynthesis of Eucalyptus trees to cope with future extreme climates, improving cotton productivity to cope with hotter and drier climates by interrogating natural variation within varieties and species, chloroplast RNA biology to understand nuclear/organelle interactions which is important for engineering chloroplasts, and exploring natural variation in Rubisco catalysis and photosynthesis within cyanobacteria, algae and C4 plants.

What do you see as challenges for your field of research?

Some challenges include research grants for basic science, interacting with industry and longevity of academic positions.

What do you enjoy most about research?

Three things I enjoy most are collaborations - I have many national and international collaborations on exciting projects, generating new solutions to improve crop productivity and making discoveries to advance my field.

Who are your science heroes?

Rosalind Franklin, Graham Farquhar, Susanne von Caemmerer and Andrew Benson.

What else do you have underway?

Competing in Ironman Teams events!

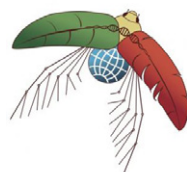
Workshop was held in the EcoGenomics and Bioinformatics Facility (EBL) this month. The Nanopore MinION is a portable DNA sequencer that uses protein pore technology to directly sequence single DNA molecules. It connects via USB to your personal laptop and allows for long read sequencing at your own lab bench, or potentially in the field. A total of 25 participants from across Australia and a couple from New Zealand met for three days and successfully produced and analysed sequences from their own and/or test samples. Huge thanks goes to the organisers **Ben Schwessinger** (Rathjen group, PS), **Steve Eichten** (Borevitz group, PS and E&E), and **Megan McDonald** (Solomon group, PS), as well as trainers Ken McGrath (AGRF QLD) and Louise Judd (UniMelb) who produced an excellent workshop and converted many more users to the MinION portable sequencing cult. - **Niccy Aitken**, EcoGenomics & Bioinformatics Lab (EBL) Facility Manager.



Louise Judd (UniMelb), Thomas Wong (Rodrigo group, CBBU), Maxim Nekrasov (BRF, JCSMR), Steve Eichten (Borevitz group, PS) and Niccy Aitken (Moritz group, E&E, EBL facility manager) at the MinION workshop. Image Sharyn Wragg.

Renewal of the ANU-CSIRO Centre for Biodiversity Analysis

The Centre for Biodiversity Analysis has



Centre for Biodiversity Analysis

been renewed for a further three years, with contributions from ANU (RSB, CMBE and DVCR) and CSIRO (National Research Collections).

The core focus of the CBA is incorporating genomics, bioinformatics and spatial modelling into understanding the evolution of Australia's biodiversity and its protection. In its first five years, the CBA has built an interactive research community across around 60 ANU and CSIRO labs, and has used its modest resources to develop collaborations through visiting scientists, seminars and the delivery of 13 training workshops, four

annual conferences and seed funding of 30 Ignition Grants, with 107 researchers and students involved in an Ignition project to date. [Click here](#) to read more about CBA achievements.

Over 2017-20 the CBA will continue to build on their activities of the last five years and, depending on the interests of CBA members and participants, provide opportunities to broaden the Centre's focus to include wider applications of evolutionary biology. New activities will include funding for cross-disciplinary synthesis working groups and targeted recruitment of joint ANU-CSIRO Honours and PhD students, with the aim, along with continuing activities, of further strengthening interactions across ANU and CSIRO via the National Agriculture and Environmental Science Precinct. The CBA has just announced a new round of Ignition grants; TEA Talks (Techniques in Evolutionary Analysis) will recommence in August; and its 5th annual conference, Genomics and Collections: Adaptation to Macroevolution, will be held in September. Please contact CBA Coordinator Claire Stephens if you would like to be included on the CBA's email list or visit the CBA website for more information. - **Claire Stephens**, CBA Coordinator.

Coral bleaching on the Great Barrier Reef Video

Jennie Mallela (Jennions group, E&E) worked with Sophie Lewis (Fenner) and Colleges of Science media specialist Jimmy Walsh to put together a video explaining their research on coral reef bleaching on the Great Barrier Reef.

Outreach News



Jennie Mallela (Jennions group, E&E) did some outreach at the ANU University Preschool and Childcare Centre, for World Oceans Day, this month.

Twenty-two science students from Melrose High School visited RSB this

month. They spent time with **Megan Head** (E&E) and E&E PhD and Masters students; **Gavin Huttley** (CBBU and E&E) and **Niccy Aitken** (E&E and EBL facility manager); **Derek Collinge** (Pogson group, PS) and the ARC Centre for Plant Energy Biology. **Andras Keszei** (BTLC) delivered a practical session in the teaching lab in the afternoon, along with **Melanie Trinick** and the BTLC lab team.

Awards and Grants

Jennie Mallela (Jennions group, E&E) has been awarded the second level Fellowship of the Higher Education Academy. The second level denotes those with solid teaching experience across all facets of teaching and learning in higher education.

Leyton group (BSB) Masters student **Jing Zhang** was awarded an ANU-China Scholarship Council PhD scholarship. She will take up the scholarship later this year in the Leyton group.

PhD student **Fernanda Alves** (Langmore group, E&E) has won the 2017 Professor Allen Keast Research Award worth \$5000.

Weliton Menario Costa (Kruuk group, E&E) has won a grant from the Holsworth Wildlife Research Endowment from the Ecological Society of Australia. PhD student Weliton is studying the behaviour of eastern grey kangaroos to see if reproduction and survival are influenced by personality traits such as how bold, sociable or exploratory they are.

Nur Abdul Bahar (Atkin group, PS) has been awarded New Phytologist travel grant and Student Fellowship award from the Association for Tropical Biology and Conservation.

IN THE MEDIA

News of **Graham Farquhar's** Kyoto prize was widely covered by the media here in Australia and also in Japan. The story was featured on Australian radio stations including ABC stations nationwide, ABC TV ABC News and Prime stations all over the country and in various newspapers and websites including The Australian, Canberra Times, ABC Online and The Australian Academy of Science website. It was also widely viewed and shared on social media, including an ANU Facebook page that reached more than 96,000 people.

Research led by **Carsten Külheim** (Foley group, E&E) on red river gums threatened by rising CO₂ levels was featured widely on radio throughout the country, including

an interview on the ABC flagship AM current affairs program.

Kai Chan and **Estee Tee** (both Pogson group, PS) appeared on ABC TV this month, talking about the discovery that chloroplasts can sense drought stress and signal to the plant to take action to mitigate it. Kai was also interviewed on ABC news radio and the story was covered in the Canberra Times, ABC online, and other outlets.

NEW APPOINTMENTS

Carsten Külheim will join the Rodrigo group (CBBU) next month to work on new experimental designs for next-generation sequencing.

The Zeil group (E&E) welcomes PhD student **Jesse Wallace**, who will be joining a European Union funded project won by Eric Warrant, Lund University. The project aims to unravel the navigational mechanisms underlying Bogong moth migration.



Yu Zhou joins the Whitney group (PS) this month as a PhD student. Her project is entitled 'Exploring the evolutionary protein landscape of Rubisco towards improving plant photosynthesis'.



Kalya Subasinghe joins the Gardner group (E&E) as a PhD student. She will be working on the spatial-temporal dynamics of avian morphology in response to climate change. Kalya recently completed her MSc at the University of Kelaniya, Sri Lanka.



PHDS SUBMITTED

Alaa Alzahrani (Arckell group, E&E) 'Identification and characterisation of genes which are critical for murine gastrulation'.

Bokyung (Bo) Choi (Linde & Crisp groups, E&E) 'Systematics and evolution of *Melaleuca sensu lato* (Myrtaceae)'.

Ashley Jones (Millar group, PS) 'Identification of long non-coding RNAs in *Arabidopsis thaliana* and inter-genus hybrids'.

PHD AWARDED

Jaime Simbaqueba (Jones group, PS) 'Analysis of *Fusarium oxysporum* effectors

shared between strains that infect cape gooseberry and tomato'.

PAPERS ACCEPTED

Benjamin B, He J, Zhao Q ... Butler TJ *et al.*, Cross-ethnic meta-analysis identifies association of the *GPX3-TNIP1* locus with amyotrophic lateral sclerosis, *Nature Communications*.

da Costa ACL, Rowland L, Oliveira RS *et al.*, Meir P, Stand dynamics modulate rainfall recycling and mortality risk in droughted tropical forest, *Global Change Biology*.

Crisp PA, Ganguly D, Smith AB, Murray KD, Estavillo GM, ... Borevitz JO, Eichten SR, Pogson BJ, *et al.*, Rapid recovery gene downregulation during excess-light stress and recovery in *Arabidopsis*, *The Plant Cell*.

Escalona HE, Zwick A, Li H-S, ... Jermiin LS, *et al.*, Molecular phylogeny reveals food plasticity in the evolution of true ladybird beetles (Coleoptera: Coccinellidae: Coccinellini), *BMC Evolutionary Biology*.

Jennions MD, Fromhage L, Not all sex ratios are equal: the Fisher condition, parental care and sexual selection, *Philosophical Transactions of the Royal Society Series B*.

Jennions MD, Szekely T, Beissinger S, Kappeler P, Sex ratios, *Current Biology*.

McQueen A, Naimo AC, Teunissen N, Magrath RD, Delhey K, Peters A, Bright birds are cautious: seasonally conspicuous plumage prompts risk avoidance in male superb fairy-wrens, *Proceedings of the Royal Society, Biology*.

Osmond B, Chow WS, Wyber R, Zavafer A, Keller B, Pogson BJ, Robinson SA, Relative functional and optical absorption cross sections of PSII and other photosynthetic parameters monitored *in situ*, at a distance with a time resolution of a few seconds, using a prototype Light Induced Fluorescence Transient (LIFT) device, *Functional Plant Biology*.

Ranjard L, Withers SJ, Brunton DH, Parsons, S, Ross HA, Geographic patterns of song variation reveal timing of song acquisition in a wild avian population, *Behavioural Ecology*.

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