



## NEWS

### Big Questions in Biology - Inaugural RSB Public Forum



Moderator Rod Lamberts (CPAS) (left) with RSB public forum panellists, from left: Adrienne Nicotra, Marcel Cardillo, Craig Moritz and Carsten Külheim (Image: Katharine Pierce).

Australian biodiversity, its past, present and future was the theme of the first in a series of RSB public forums tackling 'Big Questions in Biology', held in the Robertson Lecture Theatre this month. Four speakers, **Marcel Cardillo** (EE), **Craig Moritz** (EE), **Carsten Külheim** (Foley and Crisp groups, EE), and **Adrienne Nicotra** (EE) each gave a short presentation about their research, and this was followed by a panel discussion moderated by **Rod Lamberts**, Deputy Director of the Centre for Public Awareness of Science (CPAS).

Around 140 people, most of whom were not from the RSB, attended the session, which was followed by refreshments.

The forum was organised by **Stefan Bröer** (BSB), with assistance from **Katharine Pierce** (SCAPA), **Mel Norris** and **Terri Richardson**. Other helping hands included **Shannon van Seville**, **Christine Larsen**, **Jenny Rath**, **Stephen Fairweather** (Bröer group, BSB), **Emily Rodrigo**, **Louis Ranjard** (Rodrigo group, CBBU), **Thomas Wong** (Rodrigo group, CBBU) and **Jeremy Weinman**.

If you were unable to attend but would like to catch up with the discussion, you can listen to the podcast.

### Book launch

RSB celebrated the publication of **Lindell Bromham's** (EE) second textbook on molecular evolution and phylogenetics this month. According to Lindell, the aim of this book is to provide a friendly and accessible introduction to the background knowledge that phylogenetic analyses are built on - such as mutation, selection and drift - as well as



ANU parasitologists on their stand at Science in ACTION. From left, Juliana Anokye (JCSMR), Edwin Tjhin (van Dooren group, BSB), Melanie Ridgway (Maier group), Marie Kitano (JCSMR), Anna Yu (Maier group, BSB). (Image: Alex Maier) (See: News)

to provide a non-threatening (equation-free!) description of the methods used. With lots of colour photos and diagrams, the book has an easy conversational style, and contains lots of recent examples from the scientific literature, including a wealth of Australian biodiversity. The launch was attended by academics from many disciplinary areas across campus and from CSIRO, as well as a cabal of enthusiastic children who helped to launch the book onto the turtle pond.



Lindell Bromham launches her new book into the turtle pond in the Banks Courtyard, with the help of a group of enthusiastic children (Image: Sharyn Wragg).

### CGMB Opening



ANU Vice Chancellor Brian Schmidt and CSIRO Chief Executive Larry Marshall prepare to cut the ribbon on the new collaborative research centre. (Image: Stuart Hay).

The new ANU-CSIRO Centre for Genomics, Metabolomics and Bioinformatics (CGMB)

was officially opened at the end of last month. ANU Vice Chancellor **Brian Schmidt** and CSIRO Chief Executive **Larry Marshall** cut the red ribbon and then toured the Ecogenomics and Bioinformatics Lab (EBL), in the RN Robertson Building, and the Mass Spectrometry Facility in the Research School of Chemistry.



EBL Manager Niccy Aitken (Moritz group, EE), CSIRO Chief Executive Larry Marshall and ANU Vice Chancellor Brian Schmidt during the tour of the EBL. (Image: Stuart Hay).

The CGMB is located at various sites on the ANU campus and the neighbouring CSIRO Black Mountain facility, and will make use of the National Computational Infrastructure (NCI). It receives funding from the federal government Science and Industry Endowment Fund (SIEF).

Director of the CGMB, **Eric Stone** (CBBU), said "We are looking to foster advances essential to food security and environmental stewardship in the face of climate change, population growth and land degradation." More information and pictures [here](#).

### Science in ACTION

Biology at ANU was represented by three groups at the annual two-day Science in ACTION event at the Old Bus Depot in



## Group leader profile: Rob Lanfear (EE)



### Group research focus

My group focusses on three areas united by an interest in understanding molecular evolution. Our longest standing projects focus on understanding why some lineages evolve faster than others. We focus on speciose clades of organisms like birds, flowering plants, and more recently (with a very slightly narrower focus) eucalypts and acacias. We also look to extend and develop our understanding of the theory in this area, so that we can make and test quantitative predictions. Our second area of research was motivated by some of the challenges of measuring rates of molecular evolution, and involves developing new methods in phylogenetics. This work involves efforts to build and select better models of molecular evolution, and has recently grown into pushing some of the boundaries of phylogenetic inference. Finally, we study the accumulation of somatic mutations within individual plants. For this, we leverage the latest sequencing and inference methods to try and catch mutations right at their source, so that we can test hypotheses about the causes and consequences of somatic mutation.

### Teaching and research achievements

I hope that our current work on somatic mutations will be our biggest contribution so far - this is an area in which I think we are really improving our ability to measure and understand a critical aspect of biology. I'm also loving the challenge of running a course (I teach the Biology, Society, and Ethics third year course), but my teaching achievements are limited to surviving my first half of a semester of real teaching - I've been lucky to be a pure researcher until now.

### What do you enjoy most about teaching?

The thing I enjoy the most about teaching is that it makes learning new things a key part of my job. Teaching a bioethics course also means that I get to expose students to a huge variety of challenging and unsolved societal and ethical issues. Invariably, my teaching also influences my research directions, which helps keep a broad range of projects going in my group.

### What else do you have underway?

I've just started a collaboration here at ANU to use artificial intelligence to try and solve some open problems in phylogenetics. This may or may not work, but it's great fun and allows me to polish up of the now-ancient techniques I learned during my masters in Artificial Intelligence, before I got hooked on biology.

Kingston. RSB parasitologists manned the Australian Society for Parasitology booth (see main photo), and the Centres of Excellence for Plant Energy Biology and Translational Photosynthesis were also there. Activities on the three stands included DNA extraction, 3D goggles and computer modelling, parasite matching and microscopy, face painting that represented different parasites, infra-red cameras, 'Lollecule' making, photosynthesis displays and much more.



Clarissa Negrini (Atkin group, PS), Arun Yadav (Pogson group, PS) and You Zhang (Atkin group, PS) help young visitors extract DNA from strawberries at the Plant Energy Biology stand. (Image: Mel Norris).

**Alisha Duncan**, from the Centre for Translational Photosynthesis, reported that more than 1200 school students visited the show on the Friday schools day, with more than 420 visiting their stall. **Estee Tee**, from the Centre for Plant Energy Biology, said that students were lined up 5-6 deep to have a go at DNA extraction on their stand.

The Saturday event was also popular, with an estimated 4-5000 visitors.



Natalia Bateman (Furbank group, PS), Sophie Holland (Whitney group, PS), and Annamaria De Rosa (Evans group) at the CoE for Translational Photosynthesis stand at Science in ACTION. (Image: Mel Norris).



Estee Tee (Pogson group, PS) and Emmanuel Young (Whitney group, PS) at Science in ACTION. (Image: Mel Norris).

### Plant Functional Diversity field trip to Kioloa

Early this month, **Marilyn Ball** (PS) took 21 students from her Plant Functional Diversity course to the ANU Kioloa Campus for the weekend. **Mike Crisp** (EE) and **Alexander Schmidt-Lebuhn** (CSIRO)

gave impromptu lectures about particular plant species and families as the class explored the wet sclerophyll forest on the site. On Saturday night, students prepared and gave presentations on the identification of various plant groups and then competed in a plant-based quiz, which was narrowly won by 'The Fiddleheads', who were all awarded 3D postcards of the Kioloa region. - **Dave Rowell** (BTLC and EE).



Undergraduates Madison Fink and Nic Johnson identifying plants in the lab at Kioloa (Image: Dave Rowell) (see news item).

### Science meets street art

Street art representing the research and discoveries of local young scientists was painted on a wall next to the Kingston bus depot, during Science Week. **Daniela Perez** (Backwell group, EE), **Damien Esquerre** (Keogh group, EE) and **Dominique Potvin** (Magrath group, EE) were part of the group selected to collaborate one-on-one with a street artist, to produce an artwork that represented their research. More pictures and information [here](#).



Daniela Perez with the street artist who created the representation of her research - a robotic crab - on a wall near Kingston bus depot. (Image supplied by Daniela Perez).

### Gurindji Freedom Day celebration

A morning tea organised by Lindell Bromham (EE) to celebrate Australia's recognition of indigenous land rights raised \$275 for the Karungkarni Art and Culture Centre.

### Congratulations

**Melanie Ridgway** (Maier group, BSB) was runner-up for CMBE at the College of Science 3MT (three minute thesis) final. She won \$500, and will compete at the ANU

3MT final on 14 September at Llewellyn Hall.

**Andrew Cockburn** (EE) has been elected to be the next President of the International Society for Behavioural Ecology, and will serve from 2018-2020.

### Grants

**Peter Solomon** (PS) has been awarded \$50,000 through the ANU [Discovery Translation Fund 2.0](#), to work on novel bio-herbicides with [Biotelliga Ltd](#), in New Zealand.

**Russell Dinnage** (Cardillo group, EE), **Marcel Cardillo** (EE) & **Gavin Huttley** (EE, CBBU), together with Owain Edwards from CSIRO, have been awarded a CBA Ignition Grant: 'Characterizing the evolutionary and ecological diversity of invertebrates in the monsoonal vine thickets of the Kimberley'.

## IN THE MEDIA

A PNAS paper led by **Kai Xun Chan** (Pogson group, PS) and **Barry Pogson** (PS) in collaboration with **Peter Mabbitt** and **Colin Jackson** (RSC) on a biochemical mechanism for oxidative stress sensing in chloroplasts during drought stress, which could lead to the development of drought-proof crops, was reported in more than 40 media outlets and reached an estimated audience of 500,000 people. Their work was featured in interviews on [Win Network News](#), ABC National Radio, and SBS Radio; as well as in various online articles including [ABC News Online](#) and [Xinhua](#).

**Nick Matzke** (Moritz group, EE) appeared on an episode of Fuzzy Logic Science Show, produced by Canberra's radio 2XX recently. The show is available as a podcast [here](#).

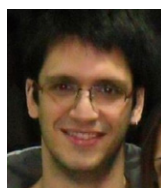
A wetlands management report co-authored by **Dan Starrs** (Divisional Visitor, EE) and former RSB HDR student **Anke Maria Hoefer** (Keogh group, EE) was reported in the [Canberra Times](#).

## WELCOME

The Atkin group (PS) welcomes **Onoriode Coast** as a new postdoc working within the ARC Centre of Excellence in Plant Energy Biology. Dr Coast joins the ANU from CSIRO in Narabri, where he worked as a crop physiologist from 2013-2016, with his



PhD being done at the International Rice Research Institute (IRRI) and the University of Reading (2012). At the ANU, Dr Coast will apply his expertise to projects on temperature responses of metabolism in crop plants.



**Victor Tagliacollo** is a new postdoc in the Lanfear group (EE) who will be working on phylogenetic methods. He's here for six months on an Endeavour fellowship.

**Oliver Binks** will join the Meir group (PS) in September as a postdoc. He has worked on the responses to drought by



Amazonian rainforest, focussing on foliar responses to water stress. He will extend this research in Australia, and he began testing

new ideas in the Daintree rainforest (N. Queensland) this month on a Stable Isotopes in Biosphere Systems course with some RSB colleagues. Oliver received his PhD from the University of Edinburgh UK, and his BSc from Aberdeen University, UK. He arrives with his young family.

## PHDS SUBMITTED

**Buddhima Kariyawasam**

**Batuwaththagamage** (Atkin Group, PS) 'Physiological Mechanisms Underlying Growth and Nitrogen Productivity in Rice'.

**Tepsuda (Keng) Rungrat** (Pogson Group, PS) 'Genetic Basis of Natural Variation in Photoprotection in Arabidopsis'.

## PAPERS ACCEPTED

Anderson, C, Khan, MA, Catanzariti, A-M, Jack, CA, Nemri, A, Lawrence, GJ, Upadhyaya, NM, Hardham, AR, Ellis, JG, Dodds, PN, Jones, DA, Genome analysis and avirulence gene cloning using a high-density RADseq linkage map of the flax rust fungus, *Melampsora lini*, *BMC Genomics*.

Andrews, C, Kruuk, L, Smiseth, P, Evolution of parental care: phenotypic and genetic correlations between parent and offspring traits, *Behavioural Ecology*.

Bapst, DW, Wright, AM, Matzke, NJ, Lloyd, GT, Topology, divergence dates, and macroevolutionary inferences vary between different tip-dating approaches applied to fossil theropods (Dinosauria), *Biology Letters*.

Binks, O, Meir, P, Rowland, L, da Costa, ACL, Vasconcelos, SS, Oliveira, AAR, Ferreira, L, Mencuccini, M, Limited acclimation in leaf anatomy to experimental drought in tropical rainforest trees, *Tree Physiology*.

Callaby, R, Toye, P, Jennings, A,...Kruuk, LEB, *et al.*, Seroprevalence of respiratory viral pathogens of indigenous calves in Western Kenya, *Research in Veterinary Science*.

Froy, H, Walling, CA, Pemberton, JM, Clutton-Brook, TH, Kruuk, LEB, Relative cost of offspring sex and offspring survival in a polygynous mammal, *Biology Letters*.

He, X, Nguyen, CV, Pratap, M, Zheng, Y, Wang, Y, Nisbet, DR, Williams, RJ, Rug, M, Maier, AG, Lee, WM, Automated Fourier space region-recognition filtering for off-axis digital holographic microscopy, *Biomedical Optics Express*.

Matzke, NJ, Trait-dependent dispersal models for phylogenetic biogeography, in the R package BioGeoBEARS, *Integrative and Comparative Biology*.

Matzke, NJ, Wright, A, Inferring node dates from tip dates in fossil Canidae: the importance of tree priors. *Biology Letters*.

O'Sullivan, OS, Heskell, MA, Reich, PB, ... Zhu, L, Egerton, JJG, Bloomfield, KJ, ..., Abdul Bahar, N, ..., Meir, P, Turnbull, MH, Atkin, OK, Increasing severity of heat-waves and the risk to leaf metabolism across biomes, *Global Change Biology*.

Shih, P, Hemp, J, Matzke, NJ, Fischer, W, Crown group Oxyphotobacteria postdate the rise of oxygen, *Geobiology*.

Yuan, Z-Y, Zhou, W-W, Chen, X ...Matzke, NJ, *et al.*, Spatiotemporal Diversification of the True Frogs (Genus *Rana*): A Historical Framework for a Widely Studied Group of Model Organisms, *Systematic Biology*.

## NOTICES

The University has requested that all areas complete a stocktake of their chemical holdings, partly to validate the CMS entries and partly to assess the scope of re-labelling needed under the GHS requirements that begin at the end of the year. The Compliance team is carrying this out with the assistance of Divisional STO teams. To schedule your area, contact [compliance.rsb@anu.edu.au](mailto:compliance.rsb@anu.edu.au).