



NEWS

Evolutionary History and Conservation

A one-day discussion meeting on "Evolutionary History and Conservation" was held in RSB on the 4th of May. This was an interdisciplinary examination of the way that evolutionary information from phylogenies is being increasingly used to inform conservation strategy. Speakers represented a wide range of viewpoints from philosophy, conservation, policy & management, ecology and phylogenetics. Talks clarified the philosophical concepts underlying the use of phylogenetic measures in conservation, such as preserving "option value" for future generations, as well as investigating and critiquing the methods used to estimate and compare evolutionary distinctness in order to prioritise conservation effort. - Lindell Bromham (EEG).

Outreach news



Rod Peakall and Tom Semple (Peakall group, EEG) talking with members of the public at the Questacon Sci Night recently. (Image Sharyn Wragg) (see news item).

Denisse Leyton (BSB), Dave Rowell (EEG) and Owen Atkin (PS) gave talks to high schools this month. Denisse spoke to students at Merici College in Braddon, ACT, Owen talked to Melrose High students about plants and climate change, and Dave gave the first RSB 'virtual talk' to St Clare's College in Sydney. Tom Davis (IT) worked with Dave to set up the link, and Dave was able to show specimens and answer student questions, as well as talk on screen and show slides.

Adults also had the opportunity to enjoy some RSB expertise, with Rod Peakall (EEG) and his group at the adults only 'Sci Night' at Questacon. The theme of the evening was 'Sperms and Germs - scientifically transmitted information', and featured displays and talks.

RSB Mass Spectrometers relocated

We are pleased to announce that the merging of the RSB and RSC Mass Spectrometry Facilities has been completed (See main



Technical Officer Anitha Jeyasingham, Mass Spectrometry Officer Thy Truong and Stephen Watt, Manager of the Joint Mass Spectrometry Facility, in the new facility. (Image: Sharyn Wragg) (See: News)

image). Located in building 138 of the RSC, the Joint Mass Spectrometry Facility (JMSF) offers a range of mass spectrometry instruments including GC-MS and GC-MSMS technologies and LC-MS single quadrupole, time-of-flight and now Orbitrap technologies. With specialisation in Proteomics, Metabolomics and Synthetic (single) Molecule analysis, the JMSF will offer a centralised hub to foster and grow mass spectrometry applications across the two schools and the wider Analytical Precinct between the ANU and CSIRO.

For any questions on the facility please contact Stephen Watt by email or on 02 6125 79 69. - Steve, Anitha and Thy.

Statistician at RSB one day a week

The RSB Executive committee has approved a one-year trial for Terry Neeman, a statistician with the ANU Statistical Consulting Unit (SCU), to be based one day a week at the RSB. She will be at the RSB from 9-5 on Wednesdays, from 18 May, based in the Ecogenomics and Bioinformatics Lab (EBL), on the ground floor of the Robertson Building. To make an appointment with Terry, email her, or click here.



RSB mentoring program for HDR students now up and running

Marlene Reichel (PS) and Elena Martin-Avila (PS) have set up a new mentoring scheme for HDR students across the RSB. The program is designed so PhD students

within the 3 divisions of RSB are supported in their professional development by Early- and Mid-Career Researchers.

The first introductory session was successfully held on May 6th, with over forty participants and 21 mentor-mentee pairs formed (many thanks again to all the mentors for their time and effort!). The program will run as a pilot until the end of the year, with the aim to make it a permanent support for HDR students within RSB in the near future. - Marlene Reichel and Elena Martin-Avila

Congratulations



Bob Furbank (PS) (pictured above) has been awarded an honorary Doctor of Science degree by the University of Wollongong. Bob graduated with a BSc (Hons) from UOW in 1979, going on to complete a PhD at ANU. The doctorate was awarded in recognition of his outstanding scholarship in plant biology and his national and international service to sustainable agricultural development and innovation.

PhD student Kenneth Webster (Cooper group, EEG) has received a place at the COTE (Continental to Coastal Ecosystems) Cluster of Excellence 2016 summer school Ecology and Global Changes. The summer school will be



## Group leader profile: Gavin Huttley



### Group research focus

The lab is dominantly focussed on developing statistical and computational techniques for the examination of genetic variation. In particular, we seek to understand processes that affect mutation. Understanding how to best model mutation is a critical precursor to identifying the operation of natural selection in the distribution of genetic variation.

### Research achievements

We have demonstrated that the compaction of DNA into chromatin likely underpins the observation of an oscillation (along a DNA sequence) of genetic divergence, and thus mutation.

In our efforts to model the influence of neighbouring bases on mutation we exposed a serious flaw in a widely used model for detecting the occurrence of natural selection. We devised a new model that fixes the identified flaw and exhibits very robust performance.

We have shown that a common assumption - substitutions are time-reversible - systematically biases estimates of genetic distance. This problem impacts on all analyses that utilise genetic distances, when the evolution of the DNA sequences being considered violates this assumption. Unfortunately, that violation appears to be quite common.

### What do you enjoy most about teaching, and what is your focus?

The focus of my teaching is to help students develop their statistical and computational thinking. What I enjoy is seeing students use these skills to think critically and, ultimately, draw robust conclusions

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

Driven by stunning advances in our capacity to generate data there is an increasing reliance, across all of science, on computing and statistical analysis of large data. Numerous challenges result. One is that the scale of these data sets is exposing serious flaws with models whose application is widely entrenched. Recognising and "fixing" these flaws is essential. Another challenge concerns training the next generation of biologists. Training them as highly skilled biologists while also providing them with sufficient training in statistics and computing is essential if they are to realise the opportunities opened up by these technological advances.

hosted by the University of Bordeaux from 6 to 10 June 2016. COTE brings together several French research agencies; including groups working on agroecology, environmental research and economics, to deliver joint research programmes and education.

**John Rivers**, PhD student in the Pogson group (PS), has been accepted to compete in the Australian French Entrepreneurship Challenge next month.



This competition pits interdisciplinary teams of PhD students against one another to come up with the best 'innovative' business idea in 24 hours.

The ideas will then be judged by a panel, like on the television show 'Shark Tank'. The Australian Academy of Science runs the competition, and the application process was competitive from all over Australia.

### Awards

**Tamara Kayali Browne** (BTLC) has been awarded a Vice-Chancellor's Citation for Outstanding Contribution to Student Learning, for her work on the course, *Biology, Society and Ethics*.

**Vivien Rolland** (divisional visitor, PS) won a poster prize at the C4 Conference last month, with a poster entitled 'Engineering chloroplast targeting to improve photosynthesis in C3 crop plants'. The prize was sponsored by the Journal of Experimental Botany.

### Grants

**Lindell Bromham** (EEG), **Xia Hua** (Bromham group, EEG) and **Marcel Cardillo** (EEG), along with Simon Greenhill from the ANU College of Asia and the Pacific have been awarded a grant to investigate 'The influence of environment on global patterns of language diversity'. The Transdisciplinary & Innovation grant from the ARC Centre of Excellence for the Dynamics of Language, is worth \$18,325.

Two PhD students from the Peakall group (EEG), **Tom Semple** and **Alyssa Weinstein**, have both recently had grant success, securing additional funding for their projects on wasp/orchid pollination and evolution. Alyssa was awarded \$5000 from the Australian Systematic Botany Society while Tom received two smaller grants totalling \$2750 from the Linnean Society of NSW and the Australian Biological Resource Study.

## IN THE MEDIA

Research published this month by **Angelika Broer** (Broer group, BSB), **Farid Rahimi** (DSTO, BSB) and **Stefan Broer** (BSB) has had widespread media attention. Their discovery of a mechanism for blocking the supply of a vital nutrient to cancer cells, and thereby preventing tumour growth, was reported by the ABC, Canberra Times, Daily Mail, Times of India, and Xinhua, among many others.

**Tamara Browne's** (BTLC) paper, 'A role for philosophers, sociologists, and bioethicists in revising the DSM' will be published as a Philosophical Case Conference in Philosophy, Psychiatry and Psychology, which means most of the journal issue will be devoted to her paper, eight peer commentaries on it, and her response.



Dan Starrs (EEG) with a baby carp, similar in size to the ones accidentally introduced into Lake Burley Griffin. Dan was interviewed by ABC News this month, for an article, podcast and news item about carp in Lake Burley Griffin. (Image: Tom Lowrey, ABC News) (See: In the media).

**Dan Starrs** (divisional visitor, EEG) was interviewed by ABC News about the success and spread of carp in Lake Burley Griffin. The article appeared in the Curious Canberra column online, in response to the question: 'How did carp end up in Lake Burley Griffin?' and was aired as a news item on 16 May. It is also available as a podcast.

**Dominique Potvin's** (Magrath group, EEG) work on the effect of noise on reproduction in songbirds was reported in PhysOrg, and Canadian newspapers.

## PHDS SUBMITTED

**Debora Veliz Vallejos** (Mathesius group, PS), 'The Effect of Quorum Sensing Signals on Nodulation of *Medicago trunculata*.'

**Amanda Edworthy** (Langmore Group, EEG) 'Ecology and Conservation of Endangered Forty-Spotted Pardalotes.'

**Renate Zelger** (Maier Group, BSB) 'Malaria Detection: From Biomarker Identification and Characterisation to Application.'

## PHDS AWARDED

**Jehangir (Jerry) Ahmed** (Arkell Group, EEG) 'Mapping Domains for ZIC3 Molecular Function.'

**Helen Bellchambers** (Arkell Group, EEG) 'Wnt

This newsletter is archived at [biology.anu.edu.au/news-events/newsletter](http://biology.anu.edu.au/news-events/newsletter).

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Editing: Stefan Bröer & Mel Norris

Responsive SUMOylation Regulates ZIC Protein Activity to Promote Murine Neural Crest Specification.'

**Christina Delay** (Djordjevic Group, PS) 'The Roles of C-Terminally Encoded Peptides in Arabidopsis Root Development.'

**Rodney Eyles** (Djordjevic Group, PS) 'MicroRNA Involvement in Root Organ Formation and Function in *Medicago truncatula*.'

**Bee Fong Gunn** (Crisp Group, EEG) 'Phylogenomics of the Coconut (*Cocos Nucifera* L.).'

**Iliana Medina** (Langmore Group EEG) 'Macroevolutionary Outcomes of Coevolution between Avian Brood Parasites and Their Hosts.'

**Camile Moray** (Bromham Group, EEG) 'Evolutionary Patterns of Salt Tolerance in Angiosperms.'

**Trevor Murray** (Magrath Group EEG) 'From Flapping to Fear: The Production and Function of the Nonvocal Acoustic Alarm of the Crested Pigeon, *Ocyphaps lophotes*.'

**Nadiatul Akmal Mohd Radzman** (Djordjevic Group PS) 'MtCEP1 Peptides Regulate Lateral Organ Development in the Model Legume, *Medicago truncatula*.'

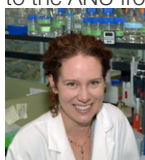
**Viridiana Silva Perez** (Evans Group PS) 'Screening Genetic Variation for Photosynthetic Capacity and Efficiency in Wheat.'

## NEW APPOINTMENTS

**Rob Lanfear** will join the RSB as Senior Lecturer in July 2016. His primary appointment will be in EEG, and he will have a secondary affiliation with the CBBU. He is a Future Fellow, currently at Macquarie University, with expertise in molecular evolution and comparative genomics.



**Megan Hemming** (PS) joins the ARC Centre of Excellence for Translational Photosynthesis as the Chief Operating Officer. Megan comes to the ANU from the CSIRO, where she has been a Senior Research Scientist in plant genetics and genomics. She also has a background in research program management, including financial, contractual and IP management, client relationship management and industry engagement. Megan believes that diversity and inclusion are key drivers of real innovation, and is a passionate advocate for women in science.



## WELCOME

Welcome to the Huttley group (EEG, CBBU) PhD students **Helmut Simon** (below left)

and **Yicheng Zhu** (below right). Helmut is studying theoretical population genetics, quantifying the distribution of genetic variation in growing populations. Yicheng is working on the development of statistical models for understanding the contribution of sequence neighbourhood to mutation.



## PAPERS ACCEPTED

Bahar, NHA, Ishida, FY, Weerasinghe, LK, Bloomfield, KJ, Meir, P, Long, BM, Evans, JR and Atkin, OK, *et al.*, Leaf-level photosynthetic capacity in lowland Amazonian and high-elevation, Andean tropical moist forests of Peru, *New Phytologist*.

Bohman, B, Flematti, GF, Barrow, RA, Pichersky, E, Peakall, R, Pollination by sexual deception - it takes chemistry to work, *Current Opinion in Plant Biology*.

Branco, R, Pearsall, E-J, Rundle, CA, White, RG, Bradby, JE, Hardham, AR, Quantifying the plant actin cytoskeleton response to applied pressure using nanoindentation, *Protoplasma*.

Cardillo, M, Skeels, A, Spatial, phylogenetic, environmental and biological components of variation in extinction risk: a case study using *Banksia*, *PLoS One*.

Feng, X, Feakins, SJ, Liu, Z, Meir, P, *et al.*, Source to sink: Evolution of lignin composition in the Madre de Dios River system with connection to the Amazon basin and offshore: Lignin evolution in Amazon, *Journal of Geophysical Research: Biogeosciences*.

Furbank, RT, Walking the C4 pathway: past present and future, *Journal of Experimental Botany*.

Girardin, CA, Malhi, Y, Doughty, CE, Metcalfe, DB, Meir, P *et al.*, Seasonal trends of Amazonian rainforest phenology, net primary productivity, and carbon allocation.: Seasonal trends of Amazonian forests. *Global Biogeochemical Cycles*.

Gullan, PJ, Williams, DJ, A new pupillarial scale insect (Hemiptera: Coccoidea: Eriococcidae) from *Angophora* in coastal New South Wales, Australia, *Zootaxa*.

Johnson, MO, Galbraith, D, Gloor, E, Meir, P, *et al.*, Variation in stem mortality rates determines patterns of aboveground

biomass in Amazonian forests: implications for dynamic global vegetation models *Global Change Biology*

Kruijt, B, Meir P, *et al.*, Modelling Amazonian Carbon Budgets and Vegetation Dynamics in a Changing Climate. In: *Interactions Between Biosphere, Atmosphere and Human Land Use in the Amazon Basin*, Ed L Nagy, *Ecological Studies Volume X*, Springer-Verlag.

Ng, JLP, Truong, TT, Hocart, CC, Mathesius, U, Quantifying auxin metabolites in young root tissue of *Medicago truncatula* by liquid chromatography electrospray-ionisation quadrupole time-of-flight (LC-ESI-QTOF) tandem mass spectrometry, *Bioprotocols*.

Ng, JLP, Mathesius, U, Measuring auxin transport capacity in seedling roots of *Medicago truncatula*, *Bioprotocols*.

Petersen, W, Kulzer, S, Engels, S, Rug, M, Maier, AG, *et al.*, J-dot targeting of an exported HSP40 in Plasmodium falciparum-infected erythrocytes, *International Journal for Parasitology*.

Potvin, D, Coping with a changing soundscape: avoidance, adjustments and adaptations, *Animal Cognition*.

Rek, P, Magrath, RD, Multimodal duetting in magpie-larks: how do vocal and visual components contribute to a cooperative signal's function?, *Animal Behaviour*.

Rowland, L, Zaragoza-Castells, J, Bloomfield, KJ, Atkin, OK, Meir, P, *et al.*, Scaling leaf respiration with nitrogen and phosphorus in tropical forests across two continents, *New Phytologist*.

van de Pol, M, Bailey, LD, McLean, N, Rijdsdijk, L, Lawson, CR, Brouwer, L, Identifying the best climatic predictors in ecology and evolution, *Methods in Ecology and Evolution*.

von Caemmerer, S, Furbank, RT, Strategies for improving C4 photosynthesis, *Current Opinion in Plant Biology*.

## NOTICES

The list of approved surface/equipment disinfectants for use in our Quarantine Approved Premises has been just modified by the Department of Agriculture and Water Resources to provide some additional permitted treatments.