Chris Fulton appointed to marine park advisory committee

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Barry Pogson elected next Head of Plant Sciences Division

Staff from the RSB Division of Plant Sciences elected Barry Pogson (PS) to be the next Head of Division, beginning 1 July 2019. He takes over from Owen Atkin (PS), who will focus on his new role as 2019 Vice-Chancellor’s Entrepreneurial Fellow.

New book by Lindell Bromham and Marcel Cardillo

Congratulations to Lindell Bromham and Marcel Cardillo (both E&E), whose book ‘Origins of Biodiversity’ was published this month by Oxford University Press.

Biology Olympiad medallists now ANU undergrads

Three of the four Biology Olympiad 2018 international competition medallists started their undergraduate degrees at ANU this year. Two moved here from Melbourne as a consequence of their experience and training here at ANU in summer and April in 2018. All three have also helped with mentoring the new 2019 National Biology Olympiad Team.

Two are PhB students majoring in Biology and one has commenced a double degree: engineering/science. - Julley Beckman, BTLC

World Bee Day

Ryszard Maleszka, Anton Pemmer (Rotarian), Steve Hill (Past District Governor Rotarian) and Mick Gentleman (ACT Minister for Planning) at the World Bee Day event at Government House.

Ryszard Maleszka (BSB) was a guest at a reception hosted by the Governor General Sir Peter Cosgrove and Lady Cosgrove in the Government House to celebrate World Bee Day. This international event was proclaimed in 2017 after the UN approved Slovenia’s proposal to observe it on May 20 in honour of Anton Janša, a pioneer of modern apiculture who was born on this day in 1734. The key aim of this initiative is to raise awareness of how human activities impact beneficial insects. Members of the ACT Government, ambassadors, inventors and scientists were in attendance. - Ryszard Maleszka (BSB)

Master of Biotech course taught by EMCRs

The main photo on this page shows participants and teachers from the Master of Biotechnology course ‘Advanced Research Techniques’, on a break during their mini-conference held at RSB on 21 May. This mini-conference was part of the 12-unit BIOL8702 course which is led and delivered by five Early and Mid-Career Researchers (EMCR) of the RSB: Arun Yadav (Pogson group, PS), Jason Ng (Mathesius group, PS), Matthew Johnson (Leyton group, BSB), Angela McGaughran (Moritz group, E&E) and Darren Wong (Peakall group, E&E) under the broader guidance of the Course Convenor, Tony Millar (PS). For the last two years, these EMCRs have jointly undertaken the teaching responsibilities of this course, including curriculum development, lecture delivery, and assignment and practical development and implementation. To further expand the scope of the students’ learning outcomes, novel topics such as use of genomic tools in crop breeding, personalised medicine and insertional mutagenesis have been introduced. For details please refer to this weblink.- Arun Yadav (Pogson group, PS).

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Mass spectrometry at the RSB/RSC
JMSF: MASSive development in a Spectrum of areas

There have been so many exciting developments in the RSB/RSC Joint Mass Spectrometry Facility (JMSF) recently that it warrants a special RSB newsletter article. Firstly, in mid-2018, a new MS Technical Officer, Joe Boileau (Joe), an Honours graduate with proteomics expertise from the Djordjevic group at RSB, joined the team, now four people strong. Over the summer, Joe completed a challenging university unit ‘Electricity and Electronics’ to build capacity in the JMSF for development of custom electronic and mechatronic hardware to save capital costs and enable new lines of research. With this training, Joe has already saved us ~$8k by making an accurately temperature-controlled nanoflow column oven worth ~$10k commercially for <$1k using open-source electronics, CAD design, 3D-printing and some CNC metal fabrication work by Link Williams at the RSC/RSB Workshop. Joe is now working on a new approach to make high-performance nano UHPLC columns.

Joe Boileau is now working on a new approach to make high-performance nano UHPLC columns. The recent rapid increases in column performance has improved dramatically since establishment of the RSB/RSC Joint Mass Spectrometry Facility and is on an upward trajectory.

Figure 1. Timeline of mass spectrometer acquisitions at RSB, RSC and JCSMR over the past 30 years. Mass spectrometers acquired by RSB, RSC and JCSMR are mapped onto a 30-year timeline. The mass resolving power (ability to discriminate between similar masses – a key performance parameter of mass spectrometers) of MS instruments in the precinct has improved dramatically since establishment of the RSB/RSC Joint Mass Spectrometry Facility and is on an upward trajectory. The variety of available analytical techniques is also improving in 2019 with the introduction of Ion Mobility Spectrometry (IMS, the capacity for the separation of equal mass samples according to their cross-sectional area), two-dimensional gas chromatography (providing unparalleled chromatographic separation of complex mixtures), thermal desorption and advanced robotic sample prep automation and hybrid quadrupole / orbitrap / QTOF MS enabling intricate dissection of complex biomolecules inside the mass spectrometer. Instruments in bold are known to have been supported by ARC LIEF. However, funding information could not be found for most instruments acquired before 2008.
its ion mobility functionality which allows ions of equal mass to be separated based on their cross-sectional areas. After lengthy negotiations, the JMSF is also anticipating the likely replacement of its faulty Thermo Orbitrap Elite instrument with one of the most powerful instruments on the market – a Thermo Orbitrap Fusion tribrid instrument worth ~$1M. Moreover, to process the new torrents of large proteomic and metabolomic datasets, the JMSF is currently setting up a powerful new 48-core/96-thread 384 GB RAM Dell PowerEdge data analysis server, funded through the RSB Small Equipment Scheme. RSB’s mass spectrometry capabilities are growing rapidly (see Figure 1) and further growth is expected in coming years. With these developments, the JMSF will help RSB researchers push the boundaries of world-class biological research. - Adam Carroll, Manager, JMSF.

Giant Pumpkin competition

The RSB Giant pumpkin weigh-in was held on Friday May 3rd. As expected, it was an evening of high excitement with over 100 people in attendance. Standing in for Allen, who was swanning around the world, Owen Atkin (PS) gave a welcome speech and presided over the prize-giving, as well as awarding the “Director’s Choice” Prize. The drought and heatwave took its toll this year and so we didn’t see the monsters we saw last year, but 23 pumpkins were entered for judging. The results were:

1st Prize: Luke and Thea O’Loughlin (Fenner) 11.2kg
2nd Prize: E&E 11.5kg
3rd Prize: Clive Palmer. The Director’s Choice went to Thea and Luke O’Loughlin (Fenner).

Thanks to Owen Atkin, and to Tim Butler (RSB compliance), Felix Smits (Langmore group, E&E) and Kevin Yang (ANU biology undergrad) for working behind the scenes to make this a successful and enjoyable evening. - Dave Rowell, E&E.

Outreach News

Chris Fulton (E&E) discussed the role of spiny crayfish in keeping high country streams healthy with the Canberra Anglers Association (see image above), who are keen to get involved in a citizen science partnership to track the occurrence of this threatened species throughout the ACT and NSW.

Megan Head (E&E) and Maider Iglesias-Carrasco (Head group, E&E) have been awarded €1500 from the European Society for Evolutionary Biology (ESEB) Outreach Fund, for an outreach project called ‘Life in Eucalypts’. The project includes a talk for families about the importance of eucalypts in shaping Australian biodiversity, an article in Australasian Science magazine and a photography competition that aims to get people to document the invertebrate life in the Eucalypts around them.

Congratulations

Jenny Graves (E&E) has been elected a Foreign Associate of the US National Academy of Sciences.

Barry Pogson (PS) received the ANU Vice-Chancellor’s Award for Excellence in Supervision at a ceremony at Kambri this month.

Awards

Angela McGaughan (Moritz group, E&E) won a Young Investigator Award to attend the 2019 Society for Molecular Biology and Evolution conference in Manchester, England.

Alicia Grealy (Langmore group, E&E), Clare Holley (CSIRO) and Naomi Langmore (E&E) have received a CBA Ignition Grant ($10,000) for their research on ‘Barcoding and capture-based approaches for eggshell genomics to improve biodiversity assessment in Australian birds’.

Chris Fulton (E&E) and Peter Unmack (UC) won a CBA Ignition grant to study ‘Can environmental selection on physiological phenotypes help explain the success of invasive species in Australian rainbowfishes?’

Three RSB student projects also received CBA Ignition grants. They are:

‘The role of honey bee microbiome evolution in adaptation to environmental stress’, Sasha Mikheyev (E&E), Kiera O’Halloran (Mikheyev group, E&E) and colleagues at CSIRO and OIST.

‘What do humans and insects have in common? Using advances in human genetics to understand insecticide resistance in the cotton bollworm, Helicoverpa armigera’, Angela McGaughan (Moritz group, E&E) and colleagues at CSIRO and JCSMR.

‘Building a reference genome for a non-model species: Wahlenbergia ceracea’, Rocco Notarnicola (Kruuk group, E&E), Loeske Kruuk (E&E), Benjamin Schwessinger (PS), Diep Ganguly (Pogson group, PS) and Alexander Schmidt-Lebuhn (CSIRO).

Two RSB CBA Synthesis Group bids were also funded - ‘Using expert elicitation to identify impacts of climate change on Australian species’ (app development), Adrienne Nicotra (E&E), Rachel Slatyer, Sonya Geange (both Nicotra group, E&E) and partners in other institutions and agencies, and ‘Genomic empowerment of Australian bee systematics, taxonomy, conservation and diversity’ (workshop), Sasha Mikheyev (E&E), Saul Cunningham and Julian Brown (Fenner) and many others.

IN THE MEDIA

Research by Lindell Bromham (E&E), Marcel Cardillo (E&E), Xia Hua (Bromham group, E&E) and colleagues that shows a link between climate and language diversity was reported by SBS News and other outlets including Phys.org and The Tribune India.

Chris Fulton (E&E) discussed why we need to control the invasive common carp as part of the many actions needed to restore native fishes of the Murray-Darling Basin during primetime on ABC Radio Drive.
WELCOME
We welcome Yansheng Li, who started a one-year post-doctoral fellowship in the Mathiesius group (PS), awarded by the Chinese Academy of Science. Yansheng is an Assistant Professor from the Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences, Harbin, China. He will work on the connection between root exudates, soil microbiome changes and nodulation in Medicago.

Welcome Steven Worthington, who joins RSB IT as a casual for the next four months. He will be working in client services, helping with Windows 10 upgrades and anti-virus rollout. Steve has a background in electronics and arts, and you can see some of his work here.

FAREWELL
Farewell to Joy McDermid (BTLC Team) who is retiring from the University to enjoy a life of leisure. Joy has provided enormous help to staff/UG/Hons students. She will be sorely missed and we wish her all the best for her retirement. Helen Wong will take over Joy’s role as Coursework Senior Student Admin Officer. We also like to welcome Jay Prentice to the team. Jay will take over Helen’s role as HDR Senior Student Admin Officer. He will start on 11 June.

We also wish to farewell Isabelle Ferru (BTLC), who will be moving back to France in July. Isabelle has played a key role in the biomedical curriculum, with significant convening and/or teaching responsibilities in three courses as well as an online masters course. She will still teach the latter, BIOL8021 Health & Wellbeing, but will remain a member of RSB. She will also be sorely missed by both staff and students and we wish her well. - Susan Howitt (Head, Biology Teaching & Learning Centre).

Lou Gaffey (RSB Technical Services) has taken a six-month secondment at ANU Facilities and Services.

PHDS SUBMITTED
Ross Dennis (Furbank group, PS) ‘The role of primary carbohydrate metabolism in wheat grain dormancy and germination’.

Damien Esquerré Gheur (Keogh group, E&E) ‘Old World Serpents and New World Dragons: The Evolutionary Dynamics of Pythons and Liolaemid Lizards’.

Meng Zhang (Maier group, BSB) ‘Trafficking and function of Maurer’s clefts proteins and Maurer’s clefts biogenesis’.

Yicheng Zhu (Huttley group, E&E) ‘Novel techniques for measuring the effect of neighbouring bases on mutation and its application’.

PHDS AWARDED
Kevin Murray (Borevitz group, PS) ‘New computational methods and plant models for evolutionary genomics’.

Stefanie Oberprieler (Moritz group, E&E) ‘Incorporating terrestrial invertebrates in conservation planning: diversity, distribution and cross-taxon congruence in an Australian tropical savanna landscape’.

Angelin Samuel (Gordon group, E&E) ‘Genotypic and survival characteristics of Escherichia coli phylogroup B2 from water’.

PAPERS ACCEPTED


Fox RJ, Donelson JM, Schunter C, Ravasi T, Gaitan-Espitia J-D, Beyond buying time: the role of plasticity in phenotypic adaptation to rapid environmental change, Philosophical Transactions of the Royal Society, Series B.

Hsiao Y, Tsai C-L, Cephalothrix simplexcornis (Wittmer, 1993) rev. stat. et comb. n.: a resurrected soldier beetle (Coleoptera, Cantharidae) from Taiwan based on morphological and molecular data, Zootaxa.

Morrissey M, Bonnet T, Analogues of the fundamental and secondary theorems of selection, assuming a log-normal distribution of expected fitness, Journal of Heredity.


Schrempt D, Minh BQ, von Haeseler A, Kosiol C, Polymorphism-aware species trees with advanced mutation models, bootstrap, and rate heterogeneity, Molecular Biology and Evolution.

Skeels A, Cardillo M, Equilibrium and non-equilibrium phaia in the radiation of Hakea and the drivers of diversity in Mediterranean-Type Ecosystems, Evolution.


