



RESEARCH HIGHLIGHTS

Drone research: The ANU node of the Australian Plant Phenomics Facility is leading research into developing the Australian Scalable Drone Cloud. **Tim Brown** explains: "Drone technology is being deployed across many settings, including agricultural research and management, environmental monitoring, geosciences and more, but the data generated can be complex and hard to use."

This research is supported by the Australian Research Data Commons and will focus on best practice for drone data analysis. "The ability to standardise 3D geospatial data-gathering, processing and analysis via technologies built specifically for the cloud will significantly improve the accessibility, reusability, and interoperability of drone data for application across industry, research and public sectors" explains Tim.

Volunteering for COVID-19 diagnosis.

A team of scientists including **Sarah Rottet** (PS), **Diep Ganguly** (PS), **Aude Fahrer** (BSB), **Suyan Yee** (PS), **Wil (Wei) Hee** (PS) volunteered to contribute their molecular biology expertise and knowledge to fighting the Covid-19 pandemic. Using their free time during the shutdown, they worked together (while still social distancing) to develop several diagnostic tools to easily identify CoViD-19 cases, as well as address several of the supply shortage problems the world was facing, in terms of testing kits and nasal swabs. Further details can be found on page 2 of this newsletter.



Images: Aude Fahrer, Diep Ganguly, Sarah Rottet, Suyan Yee, Wil Hee, Aaron Smith, Nay Chi Khin and Tony Millar.



Lauren Ashman's study organisms. Main image: the beetle *Rhytiphora lateralis* by Stuart Harris, smaller beetle images, *R. lateralis* and *R. penthea* sourced from ANIC.

PHDS APPROVED

Congratulations to **Pawan Parajuli** (BSB, Verma Group) who has been awarded a PhD on: Study of bacteriophage-encoded glucosyltransferase (gtr) genes in *Shigella flexneri* serotype 1c.



"Congratulations to Pawan for producing an excellent thesis which unravelled the mystery of the origin of a newly-emerged serotype of *S. flexneri*!"
Naresh Verma, supervisor.

PHDS SUBMITTED

Congratulations to **Jessica Fenker** (E&E, Moritz Group) who handed in her PhD on the "Evolution of reptile diversity in tropical savannas — a study across scales and continents". Jess explains: "The ANU Research School of Biology is really a special place. Being part of a supportive group, a multicultural and collaborative department, and advanced scientific circle are what I most enjoyed during my PhD – together with the opportunity to do fieldwork in amazing places, learning new skills and bring new information about the incredible savannas



ecosystems. I learned a lot. And I learned more than just science - I learned about new cultures and new ways to see life. Thanks E&E, Craig and the Moritz Group for the amazing time together!"

GRANTS

Kara Youngentob and **Karen Ford** (E&E) have received a grant of \$275,000 from the Minderoo Foundation for their project "Minimising bushfire effects on wildlife: Managing koalas in post-fire landscapes."

In addition, the Koala team received \$100,000 from Two Thumbs Wildlife Trust to support koala conservation research in the name of the pilots who lost their lives fighting fires over Two Thumb's Sanctuary: Captain Ian McBeth, Paul Hudson and Rick DeMorgan. Finally, they received about \$10,000 from the wider public via a donation scheme set up by ANU to support koala rescue activities.



Paul the Koala - photo by Marta Yebrá

IN THE MEDIA

Chris Sanderson (E&E) is the project manager for the Butterflies Australia project and tells us how they got their very own stamp. Butterflies

Australia is a national citizen science project aimed at collecting sightings of butterflies to use for research and conservation.

The project was funded by the citizen science grants from the Department of Industry, Science, Energy and Resources. We can be found at www.butterflies.org.au, and <https://www.facebook.com/ausbutterflies/> on Facebook. We have a free app on Android and iOS that has a field guide, and people can upload their butterfly sightings also. We've had a fantastic first six months of operation, launching coincidentally in one of the best butterfly emergence events in a decade on the east coast of Australia! We've reached our first 5,500 verified sightings already, and look forwards to many more in the next few years.



How did the butterfly get on the stamp?

We were fortunate to be invited by the Australian Citizen Science Association <https://citizenscience.org.au/> to be part of a pitch to Australia Post for a stamp issue raising awareness of citizen science in Australia. Our project was one of the lucky four who were chosen to be featured on a stamp! The stamp design is based off our logo, but features a Spotted Jezebel (*Delias aganippe*), one of our beautiful endemic butterfly species which can be found in most states and territories, is arid adapted, and also strikingly beautiful. We thought it made a pretty great representative of Australia's butterflies!

Jessica Fenker a PhD student and herpetologist (E&E, Moritz Group) had an ECR *feature* in the Journal of Biogeography.

PhD student **Lauren Ashman** (E&E, Rowell Group) had her research hit the news with *Beetle mania!* Lauren is studying longhorn beetle taxonomy.

Jennie Mallela (E&E) was interviewed for a podcast on coral bleaching for the ANU Climate Change Institute. You can hear the podcast [here](#).

Alex Maier (BSB) and Anna Sophie Jurgens *showcase* the comic cultural history of

parasites - "Love the parasite you're with - the entertaining life of unwelcome guests from flea circuses to Aliens".

Drones in the news: The ANU node of the **NCRIS** funded Australian Plant Phenomics Facility (APPF) has been making the news with press releases on "*Drone cloud: establishing a national ecosystem for drone data management*" and "*Elevating Australia's drone enabled geoscience*"

Kara Youngentob and **Karen Ford** (E&E) and their Koala focused research is in *the news* with a recent article in *The Age* highlighting the urgent need for a Koala recovery plan across Australia.

TRAINING UPDATE

RSB ECRs are offering a biological data science course to upgrade staff and students' quantitative skills. During the first six weeks over 200 participants were trained in R, Python, bash, statistics and bioinformatics. Sessions are video recorded and can be watched later [here](#), while feedback is provided anytime via Slack. The next few courses will cover workspace management, SnakeMake, Conda, maps and multivariate analyses in R. More information and sign-in [here](#). Thank you from Timothee Bonnet on behalf of the organizing committee: Megan McDonald, Tom Davis, Nidhi Menon, Jana Sperschneider, Kevin Murray, Saul Newman, Benjamin Schwessinger, Teresa Neeman, Robert Cope, Marcin Adamski, Eric Stone et al.

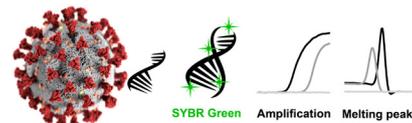
CAMPUS NEWS

Ben Corry (BSB), John Debs (RSPHys), and Celine d'Orgeville (RSAA) were recently elected as the CoS representatives on the *ANU Academic Board*. Please don't hesitate to contact Ben if you would like to raise any RSB issue related to ensuring the University maintains the highest standard in teaching, scholarship and research. Ben explains "*Currently we are facing a number of challenges and it is more important than ever to ensure that the University maintains integrity in our teaching and research, especially if we are to thrive in a difficult environment. I am particularly interested in ways we can learn from our experiences of remote teaching and breaks in research to improve what we do in the long term. Please don't hesitate to contact any of us if you would like to raise any issue related to ensuring the University maintains the*

highest academic standards."

HDR Update: Don't be lonely in lockdown! The *HDR update* is a full listing of all events and activities open to HDR candidates at ANU. These are free, exclusive opportunities develop your professional skills and meet other people from around campus.

VOLUNTEERING FOR COVID-19 DIAGNOSIS



(Continued from page 1) **Suyan Yee, Wei (Wil) Hee & Sarah Rottet** explain how the RSB team are Developing a Rapid Screening Test for CoViD-19 (SARS-CoV-2). Like the rest of the world, Australia has been hit hard by the CoViD-19 global pandemic. Among the affected are institutions, such as the Australian National University (ANU). All teaching was moved online and delivered remotely, the University was swiftly closed on the 30th of March to help contain the spread of the virus and research was suddenly halted. The closure impacted everyone, especially our research scientists. Most of our plant material had to be discarded, which was another setback on years of research, following the hailstorm damage on our glasshouses earlier this year. The transition to 'working from home' also had its difficulties, given lab-based research is not particularly a 'work from home' gig.

One such diagnostic test, which was developed within the two months of lockdown volunteer work, included a rapid SYBR-Green-based one step qPCR assay to detect SARS-CoV-2 from saliva. This method omits the labour-intensive RNA extraction step, and combines the reverse transcription and qPCR steps into a one-step, one-pot reaction, with the aim of making it a high-throughput screening test. The use of a SYBR-Green-based technique instead of a hydrolysis probe-based qPCR also allows for the investigation of primer specificity and amplification efficiency. Through our research, we found a set of primers not currently used in any existing diagnostic kit that would be an excellent candidate for specifically screening against CoViD-19. Collecting and testing saliva also means that the discomfort associated with, and the training required to administer a

nasopharyngeal swab can be avoided. The plan was to develop a CoViD-19 screening test that is cheaper, more accurate, easier to use, scalable and comfortable. Ultimately, our new assay reduces costs down to \$4 per sample. However, the caveat is that due to the low number of active cases in Canberra, our diagnostic assay has not been vetted against infected patient saliva samples; only non-infected samples spiked with naked SARS-CoV-2 viral RNA. As such, we ultimately recommend this SYBR-Green qPCR method as a complementary and confirmatory test used alongside existing diagnostic kits for screening for CoViD-19 cases. Our research can be found on [bioRxiv](#).

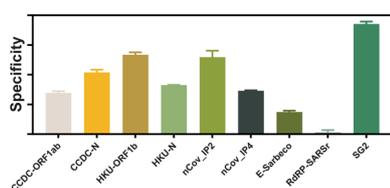


Figure: A total of nine primer pairs were evaluated for their specificity (ΔCT). The Sigma-Aldrich designed SG2 primers proved to be the most promising pair. Figure adapted from [Ganguly et al., 2020](#).

As we write this, phased reopening for the ANU has started, restrictions on gatherings are slowly being lifted, and life is gradually returning to a new definition of 'normal'.

PAPERS ACCEPTED

Alves, F., N.E. Langmore, R. Heinsohn and D. Stojanovic. 2020. Self fumigation of nests by an endangered avian host using insecticide-treated feathers increases reproductive success more than tenfold. *Animal Conservation*.

Barua, A. and A.S. Mikheyev. 2020. Toxin expression in snake venom evolves rapidly with constant shifts in evolutionary rates. *Proceedings of the Royal Society B* 287: 20200613.

Braby, M.F., M. Espeland, C.J. Müller, R. Eastwood, D.J. Lohman, A. Kawahara, et al. 2020. Molecular phylogeny of the tribe Candalidini (Lepidoptera: Lycaenidae): systematics, diversification and evolutionary history. *Systematic Entomology* 45: 703-722.

Brandão, R.A., J. Fenker, B.E.P.d.C. Lopes, V.M.d.A. de Sena and B.D. Vasconcelos. 2020. Diet of terrestrial anurans in an ephemeral and simplified habitat during the dry season in the Brazilian Cerrado. *Ethology Ecology & Evolution*: 1-24.

Campos Pereira, M. and P.D. Cooper. 2020. A novel head capsule labial gland lobe in the black field cricket *Teleogryllus commodus* (Walker). *Journal of Insect Science*.

De Kauwe, M.G., B.E. Medlyn, A.M. Ukkola,

M. Mu, M.E. Sabot, A.J. Pitman, et al. 2020. Identifying areas at risk of drought-induced tree mortality across South-Eastern Australia. *Global Change Biology*.

Hsiao, Y. 2020. A taxonomic study of *Cucujus Fabricius, 1775* from Asia (Coleoptera: Cucujidae), with descriptions of new species and notes on morphological classification. *Insect Systematics & Evolution* 1: 1-51.

Huang X, Jebb D, Pippel M, Hughes GM, Lavrichenko K, Devanna P, et al. 2020. Reference quality genomes of six bats illuminate the genomic determinants and evolution of unique adaptations in bats. *Nature* <https://doi.org/10.1101/836874>.

Jermiin, L.S., R.A. Catullo and B.R. Holland. 2018. A new phylogenetic protocol: Dealing with model misspecification and confirmation bias in molecular phylogenetics. *Nucleic Acids Research Genomics and Bioinformatics* (in press) [<https://doi.org/10.1101/400648>]: 400648.

Jigisha, M. Iglesias-Carrasco, A. Vincent and M.L. Head. 2020. Disentangling the costs of mating and harassment across different environments. *Animal Behaviour*.

Jones, S., L. Rowland, P. Cox, D. Hemming, A. Wiltshire, K. Williams, et al. 2020. The impact of a simple representation of non-structural carbohydrates on the simulated response of tropical forests to drought. *Biogeosciences*: 1-26.

Magrath, R.D., T.M. Haff and B. Igic. 2020. Interspecific communication: gaining information from heterospecific alarm calls. In: T. Aubin and N. Mathevon, editors, *Coding strategies in vertebrate acoustic communication*. Springer. p. 287-314.

Martin, S., K.N. Youngentob, R.G. Clark, W.J. Foley and K.J. Marsh. 2020. The distribution and abundance of an unusual resource for koalas (*Phascolarctos cinereus*) in a sodium-poor environment. *PLOS ONE* 15: e0234515. doi:10.1371/journal.pone.0234515.

Massaro, A. and P.D. Cooper. 2020. The effect of sideroxylonol-A on feeding of steelblue sawfly, *Perga affinis affinis* Kirby (Hymenoptera: Pergidae), larvae. *Australian Journal of Zoology*.

Medina I, Vega Trejo R, Wallenius T, Esquerre D, Leon C, D. Perez, et al. 2020. No link between nymph and adult colouration in shield bugs: weak selection by predators. *Proceedings of the Royal Society B*.

Mohamed AR, Chan CX, Ragan MA, Zhang J, Cooke I, Ball EE, et al. 2020. Comparative transcriptomic analyses of the coral symbionts *Chromera* and *Symbiodiniaceae*. *Environmental Microbiology Reports* DOI: 10.1111/1758-2229.12859.

Nakagawa, S., M. Lagisz, R.E. O'Dea, J. Rutkowska, Y. Yang, D.W. Noble, et al. 2019. The orchard plot: cultivating a forest plot for use in ecology, evolution and beyond.

Research Synthesis Methods. NE, L. 2020. Song in female birds. *Current Biology*.

O'Loughlin, C.G., S.K. Courtney Jones, M.E. Jenkins and C.E. Gordon. 2020. The effects of inter-fire interval on flora-fauna interactions in a sub-alpine landscape. *Forest Ecology and Management*.

Olsen, P. and P. Menkhurst. 2020. A recent investigation highlights the importance of honesty in ornithology and conservation. *Emu-Austral Ornithology*: 1-3.

Radersma, R., D.W. Noble and T. Uller. 2020. Plasticity leaves a phenotypic signature during local adaptation. *Evolution Letters*. Rowell, T., M.J.L. Magrath and R.D. Magrath. 2020. Predator-awareness training in terrestrial vertebrates: progress, problems and possibilities. *Biological Conservation*.

Severini, A.D., A.P. Wasson, J.R. Evans, R.A. Richards and M. Watt. 2020. Root phenotypes at maturity in diverse wheat and triticale genotypes grown in three field experiments: Relationships to shoot selection, biomass, grain yield, flowering time, and environment. *Field Crops Research* 255: 107870.

Taylor, C.J. and N. Langmore, E. 2020. Feeling the pressure: How do brood parasitic cuckoos reconcile conflicting environmental and host selection pressures on egg size investment? *Animal Behaviour*.

Touchon, M., A. Perrin, J. Sousa, B. Vangchhia, S. Burn, C. O'Brien, et al. 2020. Phylogenetic background and habitat drive the genetic diversification of *Escherichia coli*. *PLOS Genetics*.

Veliz-Vallejos DF, Kawasaki A and M. U. 2020. The presence of plant-associated bacteria alters responses to N-acyl homoserine lactone quorum sensing signals that modulate nodulation in *Medicago truncatula*. *Plants*.

Wanelik, K.M., J.S. Griffin, M.L. Head, F.C. Ingleby and Z. Lewis. Breaking barriers? Ethnicity and socioeconomic background impact on early career progression in the fields of ecology and evolution. *Ecology and Evolution*.



Drone photo: the Australian Plant Phenomics Facility.

This newsletter is archived at biology.anu.edu.au/news-events/newsletter.
Layout: Jennie Mallela
Editing: Scott Keogh & Jennie Mallela