

In a three-page (max) research statement please outline your proposed research, why you are well-placed to deliver this programme given your previous experience and publications and why the School of Life and Environmental Sciences (SOLES) would provide an excellent research environment for the work (for example, identifying synergy with current research in SOLES).

• **Why Sydney?**

My career in science has always been driven by curiosity about nature, eagerness to share what I have learned, and enthusiasm to train others to investigate the world around them. These ideas can be translated into a professional context as the desire to do world-class research, the motivation to teach the next generation, and the will to build a globally recognised research group. Together, these themes form the motivation for my application to be a Lecturer at the University of Sydney. There is no other university better suited to leverage my unique abilities as a researcher, educator and mentor, and none with greater opportunities and better undergraduates in a more exciting city.

• **Proposed Research Directions**

My research interests span evolutionary scales, helping to link micro and macroevolutionary processes. At the shallow end of this timescale I have used genomic data and extensive field work to unravel complex stories of speciation, introgression, and migration among populations and closely related species (see publications (pub. 31, 26, 22, 13 in CV). These shallow-scale projects have helped us to better understand how species—the fundamental units of biodiversity—interact and evolve at local and continental scales. At deeper scales, my research has sought to understand the imbalances in richness and diversity across organismal groups by testing ideas of biogeographic asymmetry (32, 29, 21), character displacement (pub. 30, 25, 23), and ecological opportunity (37, 36, 30). These are themes I hope to continue working on, which cover exciting evolutionary ideas at the intersection of phylogenetics, speciation, and trait evolution. I believe many of these ideas are interesting to undergraduate and postgraduate students because they are approachable and organism focused, but can provide important transferable skills (e.g. bioinformatics, computer coding) that will prove useful beyond a career in research science.

My current work focuses on building a world-class phylogenomic and phenomic dataset of Australia's ~1,500 species of reptiles and amphibians. Using this unique dataset I am investigating the evolution of high dimensional morphologies to understand their tempo, mode, and drivers. Two foundational empirical and methodological papers for this project have just been published in *Current Biology* (36, 37) and adorn their respective covers. Given the scale of these data, I anticipate they will be a lucrative reservoir for continued research by myself, colleagues, and—hopefully—early career (undergraduate, postgraduate) researchers. This project is a natural large-scale summation of the type of work I find thrilling and hope to pursue during the next step in my career.

As my research interests expand I have recently begun working with applied conservation organisations, land owners, and indigenous ranger groups. As part of an existing DECRA application, planned work will develop a genomic understanding of the impact of invasive cane toads on monitor lizards across northern Australia and includes collaborations with the Museum and Art Gallery NT, the Larrakia Rangers—an aboriginal community ranger group, and the Australian Wildlife Conservancy—Australia's largest non-profit wildlife conservation organisation. Building the engagement of a diverse set of stakeholders is essential for the broadscale goals of this project. With already pledged support from the *Threatened Species Initiative*, I hope to develop a molecular

understanding of population diversity and genetic health that can be used for the informed conservation of these species. A logical and exciting extension of this research would be to collaborate with experimental geneticists to consider the applicability of gene editing and gene drives in eliminating the susceptibility of these monitor lizards to cane toad toxins. We live in exciting times at the nexus of genomics, ecology, and conservation and I look forward to extending ideas in these directions.

• An Unparalleled Platform

The macroevolutionary questions I ask and empirical systems I study are easy to communicate because the questions are intuitive and the systems are familiar (who hasn't seen a blue tongue skink or a goanna?). The University of Sydney is an eminently visible institution with a broad public reach. I would relish the opportunity to use this network—amplified by relationships with other Sydney and Australian institutions—to share my findings far and wide. I believe that one of the most valuable things we can do as scientists is public engagement and outreach. If our science fails to be effectively communicated to a broad audience, its value is severely restricted, and both the scientific community and the public suffer. Over five years in Canberra, I volunteered to speak in more than a dozen classrooms talking about careers in science, climate change, and the evolution of Australia's unique vertebrate fauna. To expand the audience of my scholarly research, I have worked alongside ANU and the NHM's media departments to create individualized media releases to accompany our publications. Each paper provides an additional chance to draw attention to cool science in the news. This has helped our research to be featured in national and international print media (ABC, Canberra Times, IFL Science, New Scientist) and the radio (ABC News), and increase the visibility of our work. Along with our research and media releases, I illustrate and animate short videos that present our findings in a visually engaging way, and these have helped to garner thousands of additional views of our papers. To encourage attendance at ANU's PhD Seminar Series, I designed and drew seminar posters to advertise the talks. These posters help to highlight the amazing research being undertaken by ANU's early career researchers, and integrate art and science in a natural way. As the beating cultural heart of Australia, Sydney presents opportunities to build relationships with industry and arts organisations that do not exist elsewhere. These roles do not need to be exclusively academic, and might instead engage community and alumni, or strengthen existing bonds with local businesses.

• Collaboration: Complementing Excellence

When we look across the animal kingdom we notice an incredible diversity of species in myriad forms. Big creatures and small creatures, colorful and drab, found across land, sea and air. I have made a career out of asking how this diversity has come to be, how we can link these species through relatedness, and what dictates its imbalances. The University of Sydney's School of Life and Environmental Science has an incredibly strong body of faculty researchers that cover diverse fields from behavioural ecology to molecular evolution and beyond. I believe my interests in empirical phylogenomics, macroevolution, and population genetics complement existing specialties. As a student, reading papers on molecular clocks by Prof. Simon Ho and reproductive evolution by Assoc. Prof. Camilla Whittington helped to form some of my own research ideas. The opportunity to work alongside and collaborate with these creative scientists and the many other SOLES faculty would be a dream. While I excel in knowledge of empirical Australian systems, my strong quantitative background and experience in comparative methods will likely benefit other research programs in SOLES. Departments which see regular collaboration between colleagues make for a more energised and convivial environment, and my enthusiasm, knowledge, and collegiality would contribute to a positive workplace culture.

• Building a Research Group

Building a research program comes with the thrilling prospect of supervising Honours, Master's, and PhD students, and I am very keen to support students and early career scientists in my lab. My experiences from working in large and engaged labs is that students learn a tremendous amount from their lab community, sharing knowledge, collaborating, and supporting one another. My own career has benefited greatly from being surrounded by other clever and creative students and postdocs who have become some of my most productive collaborators and closest friends. I feel that it is important to nurture the excitement of budding scientists by providing a positive and engaging experience that encourages students to think independently and take ownership of their own research.

By living and studying across three continents, I have a strong network of collaborators and an extended reach to aid in recruiting students and research funding. I also have a different background and set of experiences that should complement the existing academic staff. My path to becoming a research scientist and academic has been far from direct, traversing jobs in field ecology and running footwear, but this adventure has given me an ability to connect with a broad cross-section of society. And while I would never expect every trainee I work with to become an evolutionary biologist, I can promise them valuable skills in biology and genetics, persuasive writing, an ability to think quantitatively, and a level of computer literacy that together will be beneficial for any profession that interests them.

• Funding My Research

To continue my exciting research I have plans to apply for grants under a number of funding sources. I have developed applications for both ARC DECRA and Discovery EOI streams that will be submitted in the next available rounds. I also anticipate building funding proposals for the Hermon-Slade Foundation and the Australian Biological Resources Study (ABRS). If I am successful in this faculty search at the University of Sydney, I would be excited to submit these applications as soon as eligibility allows. This would also expand my ability to synthesise grant and research ideas with other members of SOLES, which is a thrilling concept.

The focus of much of my research to date has been blue-sky science, however, I am increasingly interested in the applied elements of biodiversity, genomics, and conservation research. These ideas and projects have been developed in direct collaboration with on the ground conservation agencies and land managers, which is likely to both improve project outcomes and funding prospects. I have strong ties to nearly all state museum collections, who can prove valuable partners for linkage-type grants. My broadening interests will make new funding sources available, and I intend to leverage those opportunities through ARC Linkage and local, state, and federal government. As an example of these goals, I have recently been awarded funding to generate reference genomic resources for two endangered Australian monitor lizards under the *Threatened Species Initiative*. These data will provide critical infrastructure for proposed conservation genomic and genome evolution studies, and are indicative of my ability to successfully branch out into new research directions.