Describe how your skills and experience will meet the requirements of the role and what value you will bring to the University of Sydney

The University of Sydney and the School of Life and Environmental Science have an outstanding track record of research and teaching that I believe I can complement. My unique professional background of academic and nonacademic positions have helped me to become a successful scientist with a strong research program (37 publications collecting 860+ citations; 13 research awards totalling $675,000+) and distinctive teaching philosophy. I am an emerging research leader in macroevolution and comparative methods, expanding into genomics, and am eager to join an active academic community where I can teach, research, and train the next generation of Australian scientists.

☐ A PhD in ecology, evolutionary biology, or related field.

In 2015 I completed my Master's degree and moved from the USA to Australia to pursue a PhD after being awarded a highly competitive International Postgraduate Research Fellowship. I earned my PhD in Biology in 2019 from the Australian National University (Division of Ecology & Evolution), focussing on the macroevolution of Australia's unique fauna. Undertaking a PhD at ANU allowed me the opportunity to broaden my research interests and develop the computational skills that are essential for my current work in genomics and comparative evolutionary methods.

☐ A demonstrated track record of research excellence as evidenced by national/international publications

I am a highly productive researcher (37 publications) with a proven ability to lead projects (11 first author) and collaborate at both local and international scales (75% of publications include international collaborators). My research has been published in some of evolutionary biology's top journals (Impact Factor > 8) including Systematic Biology (publications 21, 23, 26, 32), Nature Ecology & Evolution (20), PLoS Biology (27), and Current Biology (36, 37). This in addition to publications in other high-impact journals such as PLoS Genetics (22), Proceedings of the Royal Society B (17), Molecular Phylogenetics and Evolution (13, 19, 34), Evolution (15, 18, 29), and Biology Letters (30). To date there have been more than 850 citations of my work resulting in a field-weighted citation impact score of 2.3 indicating that my work attracts ~200% of the citations expected compared to the global average in my field. Importantly, I have coauthored 11 papers led by under/post-graduate students, emphasizing my attitude towards mentorship and collaboration.

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 (pub. 31, 26, 22, 13). For example, in a PLoS Genetics paper I co-first-authored (22) during my PhD we used genomics of Australian burrowing frogs to identify polyploid species, estimate their likely origins, and uncover instances of historical hybridisation to untangle the evolutionary tree of this group. In the process we discovered that tetraploid species hybridise more frequently, show greater genetic diversity, and appear more buffered from the likely effects of climate change. 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. They have also helped to clarify taxonomy and describe new species (28, 12-2), and build frameworks for prioritising systematics research in the face of a growing global biodiversity crisis (27).

At deeper scales, my research has sought to understand the imbalances in richness and diversity across organismal groups. To test ideas of biogeographic asymmetry, character displacement, and ecological opportunity, I have developed methods to model these processes. This has helped us to

understand how interspecific competition can drive diversification at continental scales (pub. 15, 23, 29, 30), or how diversity can instead be dictated by abiotic processes (15, 17, 34). As part of my Marie Curie Fellowship, my work has focused on understanding the evolution of high dimensional morphologies and how they contribute to global and community diversity. In two papers (36, 37) just published in Current Biology (and adorning their respective covers), I investigated the adaptive morphological landscape of two very different groups. In the first project, we identified how morphological bursts contribute disproportionately to the evolution of novel phenotypes in a group of Australian skinks. In the second, we traced the temporal trends in morphological diversification of a family of beetles with more than 30,000 species. Across this enormous group we were able to generalise that morphological disparity is dictated by ecological transitions, but remains divorced from species richness. Importantly, both works relied on combining genomics with dense phenotypic sampling (linear and geometric morphometrics), helping to showcase the diverse set of skills that make me an in-demand collaborator.

☐ **A demonstrated track record of securing research funding**

Scientific funding is a highly competitive environment and I have been successful in attracting both large (>$100k) and small (<$10k) grants. Currently I am funded by an independent Marie Sklodowska Curie Actions fellowship (>$330k), often considered one of Europe's most competitive Early Career research and innovation awards. Prior, I was employed as a postdoctoral researcher and named collaborator on two Australian Research Council grants (DP210100820–$496k; DP190100293–$454k) to Professor Scott Keogh at ANU. These ARC Discovery Projects relied heavily on methods and analytical approaches I designed during my PhD, and so I contributed significantly to the proposals. Just recently I was awarded a sequencing grant through the Threatened Species Initiative to cover the generation of two reference genomes and four transcriptomes of two endangered monitor lizard species from northern Australia. I have also had success with smaller grants from both domestic (Australian Department of Environment–$3k; Bioplatforms Australia–$5k) and international agencies (American Australian Association–$11k, Idea Wild–$1.5k). I am committed to pursuing funding and will be applying through ARC DECRA and Discovery EOI streams in the next available rounds.

☐ **Relationships with academic, industry, and professional organisations**

Throughout my career I have enjoyed building connections and collaborations across a variety of backgrounds. To date, my research has relied heavily on museum collections and so one of my largest communities is an international network of natural history museums. I have been a Research Associate and contributor to the Western Australian Museum in Perth for more than a decade, Curatorial Technician at the Australian National Wildlife Collections in Canberra, Research Fellow at the Natural History Museum in London, and in 2022 was offered the position of Curator of Terrestrial Vertebrates at the Museum and Art Gallery of the Northern Territory in Darwin, which I declined to take up my Marie Sklodowska Curie Fellowship at the Natural History Museum in London. Through field work I have contributed specimens to museum and university collections in Jamaica, St. Lucia, Malaysia, Australia, USA, United Kingdom, and Australia, and in the process have built lifelong collaborations with curators, staff, and researchers across continents. Domestically, I have ongoing collaborations with researchers at many major Australian collections (WAM, SAMA, QM, MAGNT, ANIC) and a number of universities (ANU, UCanberra, Griffith Uni, UAdelaide, UWollongong, Monash Uni.).

My professional network extends into non-academic organisations as well. I have consulted for the Atlas of Living Australia, and recently collaborated with the Australian BioCommons to develop a new highly-reproducible, efficient, and automated genomics pipeline called pipesnake

(35). At the Natural History Museum in London, I have worked extensively with the education and outreach teams to develop popular science materials. I have consulted on the development of new museum galleries and exhibits, answered questions on their YouTube channel, led tours through the museum collections, and designed and carried out an 18-part lecture series on snakes as part of the NHM's new Naturally Curious subscription courses. These opportunities have helped me to incorporate the skills and interests of different industries, broaden my own public reach, enlightened me on the monetization and economics of science, and taught me a huge number of new skills. As my research interests expand I have recently begun working with applied conservation organisations, land owners, and indigenous ranger groups. 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.

☐ **A track record of teaching: lectures, tutorials, lab-based practicals, and face-to-face, hybrid, and online modes**

Teaching and training the next generation is the backbone of any university department. I feel strongly that passion and enthusiasm are essential tools for teaching any subject irrespective of medium. Throughout my career I have always enjoyed teaching, coaching, and mentoring, all the way from youth soccer through to postgraduate courses. Before I even started my Master's work I lectured on rainforest biodiversity and ecology in the Wet Tropics of Far North Queensland. Since then, I have taught—both formally and informally—in at least half a dozen university courses, ranging from Introductory Biology and Introductory Genetics to specialised courses on Evolution, Comparative Anatomy, and Vertebrate Biodiversity. In these roles I have built and delivered lectures, designed and marked assignments and examinations, planned and executed laboratory practicals, and organised field trips. Along the way I have mentored dozens of students through written and oral assessments, and learned to identify what resonates with students.

Outside of my official academic and research roles, I also regularly speak in less formal engagements. I am a strong advocate for science communication: at the NHM I feature in videos that have been watched thousands of times, I speak with local primary school classes (~3x yearly), volunteered with the National Youth Science Forum while a PhD student, and in 2018 I was named by the Science Educators Association of the ACT as their ***Hero of Science***. I also engage in virtual outreach and am a scientist member of the non-profit Skype-a-Scientist organisation, which has connected me with classrooms in the USA, Thailand, and Myanmar.

While I have not had the opportunity to lead an entire academic course independently, I am considered an effective and engaging presenter. As a testament to my public speaking abilities I was awarded the Ernst Mayr award from the Society of Systematic Biologists at the Second Joint Congress of Evolutionary Biology in 2017 in Montpellier, France. This award is considered evolutionary biology's most esteemed student award, and followed my recognition as a finalist for the award in 2016. I also won the Best Student Talk award at the 9th World Congress of Herpetology in 2019 in Christchurch, New Zealand. I have delivered more than 10 invited seminars, including talks for international conferences and virtual meetings. In addition, I run a course on incorporating design principles into scientific figures. The course—Communicating Through Figures—encourages academics to consider how we approach visual elements of our research to more effectively communicate our science. Testaments to the course's success are the wonderfully improved paper figures and presentations I have seen from recent participants. All materials are freely available from my GitHub account.

☐ **Experience in research supervision including honours and HDR students**

Throughout my PhD and postdoc experiences I have relished the opportunity to mentor and support junior researchers. During my time at ANU I actively took a senior role in collaborating with more junior scientists, and these collaborations (pub. 34, 31, 29, 26-24, 19, 12, 7; many ongoing) have been extremely fulfilling. I particularly enjoyed mentoring an American undergraduate student named George Gurgis through his first independent research project, and ultimately his first publication (25). George's project focused on the ecomorphological divergence of a group of lizards—pygopod geckos—that are very near and dear to my own heart. Keeping George focused and motivated through the COVID epidemic was challenging, but seeing him complete his work and publish his findings was fantastic. A few weeks after he finished he sent me a photo of a new tattoo on his arm—one of the gecko heads I had illustrated for his paper. While I have not supervised any students formally, during my postdoc at ANU I played a major mentorship role for two PhD students, Carlos Pavón Vazquéz and Sarin (Putter) Tiatragul. Both have been tremendously successful, with Carlos a new Associate Professor at Mexico's most respected university (Universidad Nacional Autónoma de México), and Putter a postdoc at ANU. This experience helped me identify that I am keen to take on Honours, Master's, and PhD students, with the goal of building a successful and productive research program. Between 2020–2022 I served as a committee member and examiner for three Master's and Honours students while at ANU. This role involved quarterly meetings to discuss proposals, goals, progress, and successes and difficulties along the way. For two of these students it also meant navigating the difficulties of research, study, and self-care during COVID lockdowns and university shutdowns. Earlier this year I was invited to act as the external examiner for a doctoral thesis at Cambridge University. Viva assessments in the UK require a focused review of written thesis materials and a three-hour oral examination, which I carried out with one internal examiner. All of these experiences, particularly working with international students, have helped me to better understand how we supervise students and prepare them to succeed in reaching their goals.

☐ **Excellent time management, demonstrated written and oral communication skills, collegiality**

One of my greatest strengths in my profession as a scientist is my ability to communicate effectively. I love to deliver talks, and find that engaging the audience helps to convey the message and bring them into our realm of research. My experience collaborating and communicating extends beyond public lectures, talks at scientific meetings, and research projects. Being a good scientist, teacher, parent, and partner demands being efficient with your time, and I believe I have been successful in juggling these many tasks. In 2018 I organized and led the reptile team in the ACT Bush Blitz, which required communicating goals and regulations to team members, acquiring equipment, permits, and ethics approval, liaising with state and Bush Blitz officials, and organizing a public outreach day at the Australian National Botanic Gardens. Our Bush Blitz Public Day at the Australian National Botanic Gardens drew several hundred Canberrans young and old to learn about the organismal diversity that surrounds them in the nation's capital. We organized species identification activities, coloring books of local wildlife, and even live animals to demonstrate some of the amazing invertebrate, plant, and reptile wildlife found in their backyards.

My experiences working in the field domestically and abroad have taught me the necessity of being able to communicate with people from all walks of life. This has often meant liaising with landholders to request access to their property, informing them of the work we planned to carry out, and emphasising the value of their contributions to our work. During research in Malaysia and the Caribbean this meant organising local guides for transport, field assistance, or to gain local

knowledge, while carefully negotiating language and cultural barriers. Balancing the interests of all parties is the only way to maintain healthy working relationships. Working as a research associate of the Western Australian Museum in Perth for more than a decade has given me a another unique perspective of the importance of communication at higher organisational levels. In practice this allowed me the opportunity to engage with Traditional Owners, landowners, and officials in other government environmental positions.

As research scientists we also need to communicate effectively in writing. My publishing and grant-writing track record speaks to this ability, but perhaps moreso, I have had three separate papers highlighted as 'Most Read' articles for the year and journal in which they were published (26, 23, 18). My extensive Australian and international network of collaborators speaks to my collegiality, and I revel in the diversity of their backgrounds. I have made a concerted effort to be a more inclusive collaborator and in the past two years (9 publications) more than a third of my coauthors have been women or gender-diverse individuals. This has included varied research backgrounds from computer scientists, to ecologists, public servants, and curators.

☐ **Relevant work, health, and safety requirements**

I have an exemplary record of satisfying all required work, health, and safety assessments at all previous places of employment. I have Permanent Residency status in Australia (visa subclass 801, granted October 2021), allowing me to live and work in Australia indefinitely.

☐ **Recognition of standing in field (e.g. fellowships, awards, prizes)**

I am an early career researcher (5 years post-PhD with a 9 month career interruption) on a steep academic trajectory who is highly regarded in the fields of evolutionary biology and herpetology. In early 2020 I was contacted by Dr. Natalie Cooper at the Natural History Museum London and encouraged to apply for a fellowship under the highly competitive Marie Skłodowska Curie Actions scheme, which I was ultimately awarded. The MSCA Independent Fellowship by which I am currently funded has provided me two years of salary and research money which I have used to study the genomics and morphological evolution of Australian reptiles. During this time I have also been working as the methods development lead for the phylogenomics branch of our federally funded reptile genomics initiative (Australian Amphibian and Reptile Genomics). During my PhD I was awarded the Ernst Mayr award by the Society of Systematic Biologists in recognition of the quality and creativity of research completed over the course of my PhD. These current roles and past prizes are reflective of my standing in both the Australian and global evolutionary biology communities, and my ability to successfully acquire large grants for ambitious projects.

☐ **Capacity to stimulate, engage, and educate undergraduate students using a range of media and through excellent communication skills**

Students learn in many different ways, and so identifying successful paths of communication and tailoring practices to the audience is fundamental to effectively sharing knowledge. In addition to my training as a scientist, I am also a visual artist and understand the value in communicating through different media. My short course on how we can be more effective visual communicators is indicative of my diverse teaching toolkit. Increasingly, educators need to be flexible in their teaching methodologies, adapting to the changing needs of students and requirements of the outside world. This means accepting that virtual instruction is here to stay and embracing the ways it can enrich our learning experience (ease of access to materials, multimedia and digital activities). To hone my skills as an excellent communicator I regularly share my work through science outreach via news outlets, YouTube, and social media. These are places where efficiency is key and the thousands of views, shares, and engagements suggest I have been successful. For example, our recent Nature 101

episode answering viewer questions about snakes already has more than 1.5k views.

Teaching Philosophy. My experiences as an educator have taught me to always emphasise how extraordinary our knowledge and abilities are, and to never undervalue a well timed joke. I believe it is essential to both challenge our students and foster a supportive learning environment that is free of judgment, so that students feel comfortable and motivated to learn. Given the right opportunities, all students can allow their curiosity to bloom and engage with the material constructively. This is most visible in independent projects, where creative freedom helps complex topics to really stick. In teaching an upper-level undergraduate evolution course, I saw this time and time again as students chose a taxon of their interest to sequence and combine with existing GenBank data. Of their own accord, students collected insects from windowsills, went to fish markets to sample produce, and even contacted the local zoo to ask for material from rare and endangered species. Their "fieldwork" meant they were more invested in the outcomes of the projects and how the process worked, and paid dividends for their learning.

As a presenter, I have always relied on a potent combination of strong visuals and attention-grabbing examples. Together these can provide a key to unlock complex ideas and theories, and allow students to make the connections, and the next steps on their own.