THE LINNEAN SOCIETY OF NEW SOUTH WALES

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The Linnean Society of NSW Research Grants

The Joyce W. Vickery Scientific Research Fund

Applicants must select the most appropriate funding source and apply to one fund only. Council reserves the right to transfer any application to another fund where this is relevant and improves the likelihood of success.

Information and forms are available from the relevant web page for each fund. All grant applications to be emailed to: linnsoc@iinet.net.au

Further information and application forms for all grants can be obtained from the Secretary of the Society by telephoning (02) 9662 6196, by requesting it via email at linnsoc@iinet.net.au, or by writing to the address above.

Appeal for Donations

The Council of the Linnean Society of NSW is keen to increase this form of direct financial support to the scientific community - to professionals, students and amateur researchers alike. The only way it can do this is by increasing the capital of the JOYCE W. VICKERY SCIENTIFIC RESEARCH FUND and thus augmenting the interest used for direct support of scientific research.

The Linnean Society seeks donations from individuals, institutions or organisations sympathetic to the purposes for which the fund is currently being used. All such donations, **which are tax-deductible**, will be gratefully received by the Linnean Society of New South Wales and used to support original scientific research in Australasia. Give yourself a tax break and help a struggling research student, as most of the funds go to students. **Please make cheques payable to the "Linnean Society of NSW".**

The Joyce W. Vickery Scientific Research Fund

Grants from the Joyce W. Vickery Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

1. Applications will be accepted from postgraduate and Honours degree students at recognised Australian universities who are undertaking full-time or part-time higher degree studies with a biological emphasis.

2. Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in the Biological Sciences.

3. In awarding grants, the Council of the Society will assess:
   a) the quality of the project
   b) the applicant's ability to carry it out
   c) a realistic costing and timetable
   d) the likelihood that successful completion of the research will lead to publication.

4. The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year. Not more than 50% of this income to be distributed as grants; the remainder will be capitalized to increase the Fund.
Individual grants will not normally exceed $2,500 for Members and $1,500 for non-members.

5. Applicants need not be members of the Society, but other things being equal, preference will be given to members.

6. The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

7. Grantees are required to make a report to the Linnean Society at the end of the project and to justify their expenditure. Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

8. Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

9. Applications must be typed on the Fund's application form and may be accompanied by no more than three (3) pages of additional information, plus references and a list of the applicant's relevant publications over the previous five years. The form is obtainable from this website, or can be sent to you by contacting the Secretary.

10. Applicants should email their signed applications to: linnsoc@iinet.net.au

11. The Society's decision is final and no correspondence will be entered into once successful applicants have been announced.

12. Advice to Applicants: Unsuccessful applicants usually fail because of inadequate explanation of what hypothesis is being tested, or why the project is important, and how it would add to knowledge in that particular discipline. The proposed budget must also be fully justified. Students are strongly urged to seek help from their supervisor, or someone versed in the art of writing grant applications, if they are doing this for the first time. It would also be wise to have the application reviewed before submission.

13. Deadline: The deadline for applications will be 1st March each year, although in exceptional circumstances, applications for genuine emergency support may be considered at any time. However, considerations for such applications are entirely at Council discretion.

Dr Joyce Winifred Vickery M.B.E. (1908-1979)

Joyce Vickery, one of Australia's leading botanists and a pioneer Australian woman scientist, spent most of her working career (before and after retirement) at the National Herbarium of New South Wales, Royal Botanic Gardens. Joyce Vickery (appointed Assistant Botanist in 1936) actively supported the new Chief Botanist, R.H. Anderson, in raising the standards of one of Australia's oldest and most important botanical centres.

Her appointment broke new ground in several ways. Joyce Vickery was the first woman to be appointed as a scientific professional officer in the NSW Public Service and she flatly refused to accept the lower starting salary for a female officer. She held out for, and gained, a more appropriate higher salary based on qualifications rather than sex!

Dr Vickery was an ardent early supporter of the Nature Conservation cause in N.S.W. and was closely involved in the campaign to set up the then Kosciusko State Park, Elouera Bushland Reserve (now Berowra Valley Bushland Park) and Muogomarra Sanctuary. Her practical support included a generous donation of an adjacent block to enlarge the Elouera Reserve.

As an interesting sidelight, Dr Vickery's botanical knowledge was put to good use in the forensic field in the notorious "Bradley Case". Her presentation of evidence led to the conviction of the murderer of young Graham Thorne based on the evidence of plant fragments associated with his dwelling. This forensic contribution was later recognised by the award of an M.B.E.

In 1960 Joyce Vickery also received the Clark Medal of the Royal Society of N.S.W. in recognition of her many contributions to botanical science in Australia.

History of the Fund

The fund began in 1952 with a donation of 10 pounds from Mr Armstrong of Nyngan after he read an article in the Graziers Association journal. The research fund remained static until 1971 when the Linnean Society received an anonymous donation of $1000. From then until 1978 two anonymous donations of $1000 were received annually. It became an open secret that the donor was none other than Dr Joyce W. Vickery, a member of the Linnean Society since 1930 and an active Council member since 1969 and latterly its Honorary Treasurer, 1971-1978.

Joyce Vickery's long-term aim was to revitalise a fund which could actively support scientific research in the natural sciences and achieve some worthwhile objective for the Society. She envisaged a time when the capital invested would produce sufficient interest to support good scientific research projects. Following her death in May 1979 the Linnean Society's Scientific Research Fund received a substantial boost of almost $34,000 from Joyce Vickery's estate, raising the capital to a level where the fund could become operational.

Shortly afterwards, by unanimous decision of Council, the fund was renamed the JOYCE W. VICKERY SCIENTIFIC RESEARCH FUND in recognition not only of her financial generosity but also her many years of active support for the Society.

John Francis Noble Award

Each year the Council of the Linnean Society of NSW may designate one of the recipients of the Joyce W. Vickery Scientific Research Fund as the recipient of the John Francis Noble Award.

John Francis Noble (1916 – 2011)

In March 2012, the Linnean Society of NSW received a donation of $50,000 from the estate of the late John Francis Noble. The bequest has been invested in a separate term deposit, with half the annual interest to be made available from within the Vickery Fund, and the interest is to be made available to students for invertebrate research. John Noble clearly recognised the importance of supporting invertebrate research generally, and, as part of this, he wanted to encourage and support spider research.

Grants Awarded

Since 1980 the Society has made available annually, in individual grants to research workers throughout Australia, a proportion of the interest from the capital invested in the Joyce W. Vickery Scientific Research Fund. The remainder is reinvested to increase the capital and to try to maintain the value of the fund against the effects of inflation. How successfully this has been achieved can be judged from the following figures:

Year	Capital invested	No. grants	Total Awarded
1980	$49,914	1	$300
1981	$56,186	3	$1,235
1982	$63,284	9	$3,331
1983	$68,182	10	$3,020
1984	$74,510	7	$2,813
1985	$79,353	12	$5,240
1986	$83,343	16	$4,590
1987	$92,204	17	$8,160
1988	$99,933	17	$6,782
1989	$104,963	13	$6,250
1990	$114,167	20	$8,552
1991	$135,894	13	$6,417
1992	$144,044	13	$5,924
1993	$154,173	10	$5,126
1994	$160,009	16	$5,850
1995	$166,595	16	$6,100
1996	$176,042	12	$6,450
1997	$241,758	11	$5,730

Year	Capital invested	No. grants	Total Awarded
1998	$242,046	12	$7,700
1999	$242,325	22	$5,900
2000	$265,699	26	$6,250
2001	$256,012	9	$5,500
2002	$281,010	19	$8,100
2003	$305,875	15	$7,700
2004	$315,638	17	$7,050
2005	$322,982	19	$7,800
2006	$336,672	16	$7,400
2007	$347,733	13	$8,404
2008	$363,638	13	$9,408
2009	$397,177	6	$7,465
2010	$418,914	13	$12,020
2011	$437,492	11	$9,551
2012	$502,218	13	$12,200
2013	$528,484	13	$13,050
2014		10	$12,600

2014 Awards

Recipient: BARRY, Dr Katherine L (Macquarie University)
Project: Cryptic male choice in a sexually cannibalistic praying mantis.
Synopsis: Praying mantids are a suitable group of insects to further investigate the potential for strategic ejaculation because there is evidence that females mate multiple times in the wild. In the praying mantid, the female is known to mate many times. Males are known to be able to adjust their ejaculate if in competition with other males in an attempt to gain an advantage. Female quality is known to be significant, i.e. do males adjust ejaculate according to the condition of the female, i.e. ejaculate more sperm if the female is in good condition with a larger number of eggs. In this proposed study, we will use the false garden mantid *Pseudomantis albofimbriata* to investigate the effect of sperm competition risk via female quality on male ejaculatory expenditure. Mating experiments with well-fed and not so well fed females will be followed to assess the number of sperm in the ejaculate and number and condition of the offspring.
Awarded: $1,400.00

Recipient: BOAST, Dr Alexander P (University of Adelaide)
Project: Ancient DNA and coprolite analysis of the kakapo *Strigops habroptilus.*
Synopsis: The once widespread kakapo of New Zealand is now reduced to a few small populations, but there are abundant skins, skeletal material and coprolites in collections. This project, using ancient DNA, will focus on the coprolites to investigate genetic diversity, diet and the parasite community over the last 3,000 years.
Awarded: $1,200.00

Recipient: BOISSEAU, Romain, P.G.E (University of Sydney)
Project: Investigating the mechanism through which cannibalised males inhibit female remating in the Australian redback spider, *Latrodectos hasselti.*
Synopsis: Some traits are costly, in terms of Darwinian "struggle for survival" but favourable for reproductive success. Cannibalism of the male must be an extreme example. In the redback spider, *Latrodectus hasselti*, the male "somersaults" to a position that facilitates being eaten during copulation. This allows longer copulation and somehow reduces subsequent female receptivity, thus reducing sperm completion. Other cannibalistic spiders also show this reduced receptivity, but little is known about it. Experiments with mating trials will investigate the nature and mechanism of this reduced receptivity.
Awarded: $600.00

Recipient: BOND, Peter (University of Queensland)
Project: Marine debris ruins inshore environments
Synopsis: Project: Marine debris ruins inshore environments
Pollution of plastic items has a widespread detrimental environmental impact. The broken-down fragments are of particular concern because they can be ingested by marine life. Further breakdown in the gut may release toxic substances. Fish, concentrating on the hardyhead will be sampled from inshore environments off North Stradbroke Island. Growth parameters, reproduction, diets and habitat will be assessed, as little is known of these factors for most species. Contents of the gut will be analysed to see what they have been eating. Samples of intestines will be analysed for the presence of mercury and arsenic. Polluted and pristine environments will be compared. Reproductive organs will also be inspected to evaluate the effects of exposure to marine debris. This work will be crucial for fisheries management. Hardyheads are used for bait and are an important part of the diet of commercial fish species. The results will be communicated to the North Stradbroke communities.
Awarded: $1,400.00

Recipient: FABRICANT, Dr Scott (Macquarie University) (John Noble award for Invertebrate Research)
Project: Evolution of colour change and thermoregulation in *Kosciuscola* grasshoppers.
Synopsis: The chameleon grasshopper (*Kosiuscola tristis*) of the Australian Alps, including Tasmania, is unique among the acridid grasshoppers: it changes colour with temperature. It is black when cold and bright turquoise when hot. Thinner patches of cuticle (Slifer's patches) and colour granules that can be rearranged according to temperature are features of the cuticle that can assist in thermoregulation in grasshoppers. Only the males show this change, but males and females have the same intracellular structure. There are four species in the genus, arranged according to altitude. Only *K. tristis* shows this colour change. This project will use electron microscopy images of the cuticle and epidermal cells of all for species to determine how the structure relates to thermoregulation.
Awarded: $1.400.00

Recipient: GEARY, William L (Deakin University)
Project: Fire and the drivers of predator interactions in a semi-arid mallee environment.
Synopsis: Fire drives habitat succession and is an important agent of ecosystem structure and function. The predator guild is also an important agent. Top predators (dogs/dingos) suppress smaller predators (foxes, cats) and large herbivores (kangaroos). In the absence of the large predators, the native fauna is known to suffer because of the prevalence of foxes. Some predators take advantage of a post fire landscape and increase prey consumption along the burnt/unburnt ecotone. These complex relationships will be investigated in the Victorian mallee region using four survey methods: camera trapping, scat surveys, track surveys and unmanned aerial vehicles (UAVs) to obtain a more accurate assessment of the community dynamics. The use of UAVs has the potential to revolutionise landscape ecology.
Awarded: $1,000.00

Recipient: LEVIN, Rachel (University of New South Wales)
Project: Comparative transcriptomics and genetic engineering of *Symbiodinium* as a strategy to reduce coral bleaching due to Anthropogenetic warming.
Synopsis: Rising sea surface temperatures due to anthropogenic climate change induces expulsion of the endosymbiotic *Symbiodinium,* leading to coral bleaching. Coral bleaching threatens the survival of coral reefs worldwide, and the frequency and duration of bleaching events is escalading. The first part of this project plans to identify the genes responsible for the heat stress response of *Symbiodinium* through comparative transcriptomic experiments at ambient and elevated temperatures with two *Symbiodinium* clade C1 strains known to have different thermal tolerances . The results of these experiments will contribute to our understanding of the gene networks underlying the heat stress response in *Symbiodinium* and are expected to highlight candidate genes for the second part of this project, genetic engineering of *Symbiodinium*.
Awarded: $ 1,800.00

Recipient: O'HANLON, Dr James (Macquarie University)
Project: Chemical basis of ant attraction and its function as an egg dispersal strategy in Phasmatodea.
Synopsis: Chemical basis of ant attraction in and its function as an egg dispersal strategy in the Phasmatodea.
Synopsis: Australia is a global hotpot for a biological phenomenon known as myrmecochory − a mutualistic adaptation where plants rely on foraging ants to disperse their seeds. Some plant seeds have a fleshy, food reward appendage (elaiosome) that attracts ants that then transport them to their nests, hence effecting dispersal. Certain stick and leaf insects (Phasmatodea) use a convergent dispersal strategy for their eggs. A fleshy appendage on the eggs of some stick insects, termed

"capitulum", functions analogously to the plant seed elaiosome. Five major chemical components of the ant attractant have been identified. Experiments will be done to determine which one(s) attract ants. These experiments have been done on plant seeds and the results will be compared with those from plants to determine if phasmids use the same chemicals or if they have evolved different attractants. Phasmids already resemble plants (sticks). Could this be another example of convergent evolution?
Awarded: $650.00

Recipient: ROBERTS, Georgina (Latrobe University)
Project: Long-term adaptability of *Vombatus ursinus* (common wombat) in south-western Tasmania – an investigation using stable isotopic analysis in the archaeological record.
Synopsis: Project: Long-term adaptability of *Vombatus ursinus* (common wombat) in south-western Tasmania – an investigation using stable isotope analysis in the archaeological record. Bone collection from caves range in age from ~ 35,000 BP to ~ 11,000 BP. Wombats made up about 30% of the diet of the Aborigines (Bennetts wallaby made up 70%). Stable isotope analysis of tooth enamel uses the ratio of stable oxygen to stable carbon isotopes that can be related to the environment where the enamel was formed. Sequential analysis can reveal events within the lifetime of the individual (seasonal patterns, migration, weaning events), based on known growth rates of the teeth. Wombats have rootless teeth that grow continuously, allowing preservation of a high-resolution record of the stable isotopes. This project will use high-resolution sequential analysis to derive local climate in the last two years of the individual's life and hence climatic change from ~ 35,000 BP to ~ 11,000 BP (through the last glacial period). The stable isotopes can also indicate changes in diet and hence changes in the vegetation.
Awarded: $2,400.00

Recipient: SOLEY, Dr Fernando (Macquarie University)
Project: Predator-prey interactions between an araneophagic assassin bug (*Stenolemus giraffa*; Hemiptera: Reduviidae) and a theridiid spider (*Parasteatoda* sp).
Synopsis: The aim of this project is to characterize the interactions between *Stenolemus giraffa* and *Parasteatoda* sp., in order to better understand how differences between spider prey can shape the strategies used by araneophagic predators. The best known predators of spiders are other spiders. Some even prey on spiders in webs. Some assassin bugs also prey on web-building spiders. How do they do it? Some produce vibrations that mimic prey caught in the web to lure the spider to the edge of the web and some use stealth to catch the spider. The spider species differ in their response to web invasion and some even counter attack. Reports of experiments done with different assassin bugs and different spider species are not comparable. It is thought that the nature of the web influences strategies, e.g. assassin bugs lure spiders with dense webs out to the edge. Further observations will be carried out in the field (East Kimberley region).
Awarded: $750.00

2013 Awards

Recipient: Armbrecht, Linda H (Macquarie University)
Project: Phytoplankton characterization and related biogeochemical processes in a biological hotspot: Solitary Island Marine Park, Eastern Australia.
Synopsis: In the light of climate change, the global subtropical western boundary currents are experiencing an above-average sea surface temperature warming. The East Australian current, which transports warm tropical water masses to temperate latitudes, is one of these currents. As the physical parameters of the East Australian current have changed over the past 60 years, changes are expected for the inhabitants of the currents, the free-floating phytoplankton. This research will

provide the first detailed taxonomic phytoplankton survey in the Solitary Island Marine Park region, an area that is regarded as a hotspot for climate change. By sampling throughout a complete annual cycle, covering various oceanographic regimes, and along an elaborated sampling design, temporal and regional small-scale variations in phytoplankton distribution will be determined. This dataset will comprise the first comparison to the Port Hacking Station (Sydney) and in addition, reveal further information about phytoplankton microhabitats and carbon, nitrogen and silica uptake and export, which cannot be determined from depth-integrated net sampling.
Awarded: $450.00
Note: ***The above recipient has also received an award from the William Macleay Microbiology Scientific Research Fund.***

Recipient: Bass, Nathan (Macquarie University)
Project: Social preferences and individual recognition in adult Port Jackson sharks.
Synopsis: This project primarily aims to investigate the demographic and behavioural traits underpinning the social structure of Port Jackson shark aggregations, such as sex, size/age, relatedness and familiarity. Specifically, we hypothesise that the social preferences of Port Jackson sharks will be influenced by size and familiarity, but not by sex or genetic relatedness. This project also aims to identify the cues that adult Port Jackson sharks use for the recognition of individual conspecifics. Specifically, we **hypothesise** that Port Jackson sharks are capable of individual recognition and that this individual recognition is achieved through chemical and visual cues.
Awarded: $1,000.00

Recipient: Giles, Jenny (University of Queensland)
Project: Increased representation of rare tropical Australian chondrichthyan fauna in shark fin identification methods
Synopsis: The reliable identification of severed shark fins at any point in harvest or trade depends on the comprehensive representation of possible species in the reference material, and is of particular importance in forensic casework. While the harvest and trade of shark fins is becoming increasingly regulated in Australia and globally, the difficulty of identifying which fins come from which species when encountered at any stage of processing remains a significant hurdle to enforcing these laws. In fisheries scenarios where seized fins are intact with the skin on, image-based field guides can potentially be used to detect prohibited fins by allowing a non-expert to match a fin shape to an image. However, determining that a fin truly does not belong to another species in a legal case would rely on further verification.
Awarded: $1,200.00

Recipient: Marcus, Lara (University of Tasmania)
Project: Environment and biological factors driving whale shark occurrence and abundance at the Ningaloo Reef, Western Australia.
Synopsis: Conservation of important iconic marine species such as sharks is a high priority in Australian waters. The world's largest fish, the whale shark, is also one of the least-known shark species. It aggregates seasonally in certain coastal waters throughout the world's tropical and temperate seas including the Ningaloo Reef (Western Australia). Very limited data exists on the reasons for whale shark aggregations, however it is believed that whale shark movements are associated to water conditions and to peaks in preferred prey abundance.
Awarded: $500.00

Recipient: Mason, Robert Alan Burton (University of Queensland)
Project: Does ocean acidification enhance coral bleaching, and if so, why?
Synopsis: Coral bleaching is the expulsion of symbiotic dinoflagellate algae by their hosting coral animals, and is a process that is occurring with increasing frequency and severity due to climate

change. Coral bleaching is triggered by higher than average sea temperatures combined with high light levels. Recent evidence suggests that ocean acidification will exacerbate coral bleaching caused by temperature stress. However, this evidence is controversial amongst most reef scientists and will remain so until further evidence and a mechanistic explanation are put forward. This proposed project aims to clarify whether ocean acidification does indeed enhance coral bleaching, and if so, to identify probable mechanisms by which this effect occurs.
Awarded: $1,000.00

Recipient: McElroy, David J (University of Sydney)
Project: Determining direct and indirect effects of a contaminant-based disturbance on succession ecology using marine biofilms and invertebrates as a model system.
Synopsis: Terrestrial run-off has led to an increase in the concentration of contaminants in coastal waters. Species exhibit differential tolerances to heavy metal contaminants such as copper. This disparity exerts selection pressure on intolerant species and may lead to the restructuring of communities. Thus, predicting the consequences of disturbance scenarios for the way an ecosystem functions is increasingly important for understanding the processes that govern the way nature responds to change.
Awarded: $1,500.00

Recipient: Munroe, Samantha E M (James Cook University)
Project: Migratory and dietary patterns of *Rhizoprionodon taylori* in coastal environments using stable isotope analysis.
Synopsis: As high trophic level consumers, sharks are crucial maintainers of ecosystem structure and function. To understand the effect sharks have on marine ecosystems, it is important to quantify relationships with their environment, specifically resource use and diet. Similarly, this data is required to understand how environmental or anthropogenic changes will affect the sustainability of species. Shark behaviour, in particular the degree of specialization expressed, can have a large impact on species vulnerability to anthropogenic pressures. This project aims to address these knowledge gaps and define the diet and habitat specialization of a poorly understood, highly abundant species, the Australian sharpnose shark, *Rhizoprionodon taylori*, in multiple inshore bays using stable isotope analysis.
Awarded: $750.00

Recipient: O'Dwyer, Katie (Otago University) **(John Noble award for Invertebrate Research)**
Project: Matching host-parasite biogeographical patterns: a comparative study of marine snails and their trematode parasites.
Synopsis: Biogeographical patterns provide a window into the processes shaping species distribution across a wide range of scales. Such patterns have been relatively well documented throughout Australasia, in particular for coastal marine organisms. However, past research has focused exclusively on free-living plants and animals, and not on the biogeographical patterns of their parasites and diseases. The factors shaping the distribution of parasites are not necessarily the same as those acting on their hosts; we need to understand the dispersal forces acting on the former if we are to manage and conserve the latter. This project will investigate the distribution of parasites in a common group of marine snails occurring across several known biogeographical zones in Australian coastal areas.
Awarded: $1,400.00

Recipient: Pearson, Sarah K (Flinders University)
Project: Using molecular methods to investigate parasites within a social host (gidgee skink).
Synopsis: This project aims to use molecular methods to detect parasites within gidgee skinks (*Egernia stokesii*). The project objectives are to 1) determine the absence/presence of parasites

(*Plasmodium, Cryptosporidium, Giardia, Hemolivia,* and nematodes) within gidgee skink blood samples, and 2) where parasites are present, measure the degree of parasite infection. Disease is an increasing conservation concern. Sociality adds complexity to disease dynamics, where living in a group may increase the spread of parasites through a population. Genetic diversity acts as a buffer to disease; diversity of immune genes may be a means of host defence against novel parasites.
Awarded: $1,000.00

Recipient: Sanger, Jennifer C (University of Tasmania)
Project: Epiphyte diversity over varying spatial scales in three climatic zones in eastern Australia.
Synopsis: Epiphytes, plants which grow on other plants for support, are a highly diverse group, representing up to 10% of the world's vascular plant diversity. In Australia, there are c. 380 vascular epiphyte species, with the vast majority confined to a very small proportion of the continent: the humid tropical regions in the north-east. Non-vascular epiphytes, such as bryophytes (the group consisting of mosses, liverworts and hornworts), are also highly abundant and diverse in Australia's humid tropical region, as well as in the temperate rainforests of southern Australia. Epiphytes, having no direct contact with the ground, rely on regular moisture inputs from fog and rainfall. Therefore, they are highly sensitive to relatively small changes in precipitation and will be greatly affected by climate change. Asplenium nidus, the most common epiphyte in the tropical areas of north-eastern Australia, has high rates of mortality during long dry periods. Such periods are likely to increase in frequency and intensity under climate change. This project will examine the variation in epiphyte diversity across different scales, ranging from micro-habitats through to landscape scale.
Awarded: $1,750.00

Recipient: Sowersby, William G (Monash University)
Project: The role of personality and polymorphisms in maintaining population variation.
Synopsis: Understanding the mechanisms that maintain variation intraits under natural selection within animal populations is a major challenge for evolutionary theory. Genetically determined colour polymorphisms, which occur when multiple, discrete colour forms are found within an interbreeding population, are a readily visible example of variation. Two hundred red devil cichlids will be collected from Hazelwood Pondage, Latrobe Valley, Victoria, and transported to aquarium facilities at Monash University, Clayton. Laboratory based behavioural experiments will determine where each individual sits along major personality axes.
Awarded: $500.00

Recipient: Umbers, Kate (Macquarie University)
Project: Warning colouration and startle display in a colourful katydid.
Synopsis: Many species flash bright colours to deter potential predators by performing a warning startle display. Startle displays are intriguing because the animal must choose to reveal their bright colours or not, depending on their perceived threat. *Acripeza reticulata* is a large (up to 4 gr) katydid (Orthoptera: Tettigoniidae) found predominantly in the Australian Alps that performs an impressive red and blue startle display when disturbed. This project will quantify the behaviour and colour of the startle display of *Acripeza reticulata*.
Awarded: $1,000.00

Recipient: Vogel, Sandra (University of New South Wales)
Project: Making healthy chicks: the MHC as an immunogenetic marker to augment population genetic studies of Little Penguins (Eudyptula minor).
Synopsis: Little Penguins (*Eudyptula minor*) are iconic sea birds native to Australia. Population declines have been reported at numerous locations including Manly in Sydney Harbour. Here, the only known remaining mainland colony of penguins in NSW has been listed as an endangered population under the Threatened Species Conservation Act, and areas of North Harbour have

been declared “critical habitat” for the population. Declines in penguin numbers have mainly been attributed to human impacts such as urbanization, introduction of feral predators and climate change. In the second half of 2012, a total of 300 genetic samples have been collected from eight different Little Penguin populations in NSW. By sequencing the Major Histocompatibility Complex (MHC) in adults and chicks, we will be able to verify whether individual Little Penguins show preference for mating with partners carrying different MHC variants to themselves.
Awarded: $1,000.00

2012 Awards:

Recipient: Ajani, Penelope (Macquarie University)
Project: Microalgal biodiversity in the coastal waters of New South Wales, Australia.
Synopsis: Nearly half of the world’s oxygen and approximately 40% of photosynthesis is carried out by phytoplankton. There is an imperative to understand the changes that a warmer world will have on phytoplankton ecology, however Australia boasts few phytoplankton ecologists and fewer taxonomists. Species belonging to the cosmopolitan *Pseudo-nitzschia*, have been implicated in biotoxic episodes in NSW oyster-growing estuaries, although the toxicity and taxonomy of individual taxa remains unclear.
Awarded: $1,000.00

Recipient: Katherine L Barry (Macquarie University)
Project: Extreme reproductive conflict: sexual cannibalism, female deception, and the evolution of male mate choice
Synopsis: The primary aims of this project are to investigate female-imposed sexual conflict and its effect on male mating strategies. It will address the intersection of two of the most enigmatic phenomena in the evolution of reproductive strategies: sexual cannibalism and male mate choice. Sexual cannibalism represents an extreme manifestation of sexual conflict in polygynous systems, and male mate choice in systems without paternal care continues to challenge our understanding of gender roles within the framework of sexual selection.
Awarded: $1,400.00

Recipient: Déaux, Eloïse C (Macquarie University)
Project: Quantifying the form and function of dingo (*Canis lupus dingo*) vocalizations
Synopsis: The Canidae family includes 36 species of wild dogs. Representatives of this family are found on all continents except for Antarctica. Species occur in most environments such as the Arctic fox in arctic regions, the New Guinea singing dog occupying tropical forest areas and the African wild dog occurring in arid regions of Africa. The central question of this research is to determine if dingo vocal communication is really restricted to three vocal classes. It is though that dingoes are a social canid species, have large sized groups and seem to display a vertical hierarchy within their pack. We also aim to provide the first quantitative description of this species’ vocal system.
Awarded: $700.00

Recipient: Delgado-Vélez, Carlos (University of Wollongong)
Project: Spatial dynamics of bird-parasite interactions along a gradient of urbanization.
Synopsis: Integrating ecological and physiological approaches, my PhD project seeks to analyse the distribution of ectoparasites, haemosporidians and other endoparasites along an urbanization gradient in New South Wales, Australia, and explore the potential role of parasites and immune status in determining urban-bird communities. My PhD will investigate the spatial dynamics of bird-parasite interactions in the Illawarra and Sydney regions to determine the relationship between infestation loads, host traits, health and body condition in order to determine how parasites affect

bird communities along a gradient of urbanization.
Awarded: $700.00

Recipient: Dennison, Siobhan (Macquarie University)
Project: Mating system, group structure and inbreed avoidance in a social lizard: The Great Desert skink (*Liopholis kintorei*)
Synopsis: The Great Desert skink (*Liopholis kintorei*), an icon of the Australian outback, is unique among all reptiles because it cooperatively constructs and maintains extensive burrow systems in which close kin live. This is a level of reptilian cooperation and parental care unknown anywhere else in the world, and yet little is known about the population and group dynamics within this social species. The aim of this project is to:
a.) Characterize the mating system and group structure of *Liopholis kintorei* and b.) Examine potential inbreeding avoidance mechanisms.
Awarded: $1,400.00

Recipient: Fabricant, Scott A (Macquarie University)
Project: Predator perception as a source of population divergence in colour patterns of the aposematic Hibiscus Harlequin Bg (*Tectocoris diopthalmus*).
Synopsis: It is hypothesized that aposematic warning colours are maintained in a species by frequency-based stabilizing selection. This should lead to a uniform aposematic pattern between individuals maximizing individual and group fitness. However, the reality is that natural populations often show high degrees of colour variation between individuals and between populations. To our primate eyes, the Harlequin Bug's bright iridescent blue and vibrant orange colouring appears quite conspicuous against its green leaf background. However, the efficacy of an aposematic signal is entirely dependent on the receiver physiology and perceptive ability of the predator.
Awarded: $1,100.00

Recipient: Kohli, Gurjeet S (University of NSW)
Project: Diversity and distribution of the genus *Gambierdiscus* (Dinoflagellata) in New South Wales, Australia.
Synopsis: The genus *Gambierdiscus* Adachi et Fukuyo (Gonyaulacales, Dinoflagellata, Alveolata) is one of approximately 2500 species of this group (Dinoflagellata) of marine protists. Species of *Gambierdiscus* are considered to be epibenthic, and are generally found attached to seagrass, macroalgae, sand and coral rubble, however they can also occur in the plankton. *Gambierdiscus* is one of a number of genera of benthic dinoflagellates that produce toxic polyketide compounds, including polyether ladder compounds, macrolides and alkaloids. These toxins can accumulate in the flesh of small invertebrates and filter feeding organisms, and again in those higher in the food chain, and then affect fish, marine mammals, birds and humans. Ciguatoxins (CTX) and Maitotoxins (MTX) are polyether polyketide compounds and are the causative agent of the Ciguatera Fish Poisoning (CFT). Ciguatera Fish Poisoning (CFT) is the most common seafood-related toxin disease worldwide, with an estimated 50,000 to 500,000 cases per year, mainly occurring in tropical countries. The main aim of this study is to conduct a sampling trip along the coast of New South Wales and collect samples from several different sites to identify any species of *Gambierdiscus* present in this water.
Awarded: $500.00

Recipient: Letten, Andrew D (University of NSW)
Project: How does fine-scale climate variability influence patterns of plant community diversity?
Synopsis: In addition to predicted shifts in mean temperature and precipitation, anthropogenic climate change is expected to result in increased intra-annual climate variability and lead to a greater frequency of extreme weather events. Despite widespread awareness of these related yet

distinct forecast scenarios, most studies at the interface of climate change and biodiversity science have focused solely on the ecological consequences of shifts in mean climate variables, rather than elevated variability around the mean. In collaboration with my PhD supervisor at UNSW, Professor David Keith, and additional supervisors from the Australian Museum and the University of Technology Sydney, I propose to conduct innovative research to explore the influence of climate variability on patterns of functional, phylogenetic and species diversity in temperate plant communities of Wollemi National Park and Yengo National Park (NSW).
Awarded: $1,200.00

Recipient: McCurry, Matthew R (Monash University)
Project: Morphological convergence in tooth morphology during terrestrial-marine transitions.
Synopsis: Transitions in habitat from a terrestrial to a marine environment have occurred a number of times throughout evolutionary history. Convergence in dental morphology has been described qualitatively across a wide range of marine species, with conical tooth morphologies being particularly common in marine tetrapods. This study will aim to examine the morphology of teeth within groups that have undergone transitions to a marine environment. The functionality of different dental morphologies will also be examined in order to gain an understanding of how evolution shapes biological structure as a result of different physical and ecological conditions. Potential groups to include within this study include crocodilians, pinnipeds, delphinids, whales, varanids and mosasaurs, ichthyosaurs sauropterygians.
Awarded: $500.00

Recipient: Prychid, Chrissie (University of New England)
Project: Floral development in the Roundhead Bristle Rush *Chorizandra sphaerocephala* R. Br. (Cyperaceae, Mapanioidea), a beautiful native Australian sedge.
Synopsis: Flowering plants are one of the most successfully diverse groups of organisms on the planet. They are critical to life and yet flowers generally possess just four distinct floral organ types, conservatively arranged in a specific order: female organ/s, surrounded by male organs, surrounded by an inner whorl of petaloid/perianth structures, surrounded by an outer whorl of petaloid/perianth structures. We aim, for the first time, to obtain a complete ontogenetic data series on the development of the floral structures in the Roundhead Bristle Rush (Cyperaceae, Mapanioidea), a member of the uniquely different Mapanioidea, one of the two subfamilies of the sedges, a large but relatively understudied monocot plant family, with the goal of deciphering the morphological character homology of the reproductive structures.
Awarded: $1,500.00

Recipient: Rendon-Castaneda, Dalila A (CSIRO)
Project: Predator/prey interactions between the wolf spider *Tasmanicosa leukartii* (Araneae: Lycosidae) and different life stages of the cotton bollworm *Helicoverpa armigera* (Lepidoptera: Noctuidae). **Synopsis:** Genetically modified cotton (Bt cotton) containing a gene from the bacteria *Bacillus thuringiensis* cotton was introduced to Australia in 1996 to control one of its main pests, the larvae of *Helicoverpa* moths. However, genes present in field populations of *Helicoverpa armigera* have the potential to confer high levels of resistance to BT toxins. Within ground spiders, wolf spiders (family Lycosidae) are the most abundant, making up over 60% of ground spider community in Australian cotton agroecosystems. The predator-prey interactions between wolf spiders and the different life stages of *Helicoverpa* are poorly understood. The aim of this study is to describe the predator-prey interactions between the wolf spider *Tasmanicosa leukartii* (Araneae: Lycosidae) and different life stages (late instar larva, pupa, recently emerged adult) of *Helicoverpa armigera* in controlled enclosures.
Awarded: $700.00

Recipient: Smith, Helen M (University of Sydney)
Project: Replacing natives with exotics: wildlife responses to black rat invasion in the Sydney Harbour National Park.
Synopsis: The invasion of non-native species into foreign ecosystems is one of the biggest challenges for conservation and restoration biologists. The Black Rat *Rattus rattus* is a major threat to global and local biodiversity and is particularly devastating on islands where endemic fauna and flora have not evolved defence mechanisms. The project aims to examine the impacts of Black Rats on native fauna and flora, and the ecological changes that occur following the return of the native Bush Rat.
Awarded: $800.00

Recipient: Danswell Starrs (Australian National University)
Project: Thieves in the night: does nocturnal egg predation exert early mortality in nest-guarding fish? **Synopsis:** Given the very high levels of mortality during the early life history of fishes, any shifts in processes at this stage can have critical impacts on the replenishment and sustainability of populations. A study on smallmouth bass (*Micropterus dolomieu*) in the USA found that males guarding nests enjoy low nest predation by invasive round gobies (*Neogobius melanostomus*), which otherwise consume all eggs within 15 minutes if the guarding male is absent. The aims of this research project is to determine if Oriental weatherloach are egg predators and whether nest-guarding Purple spotted gudgeons can defend their eggs from this invasive species.
Awarded: $700.00