

### Linkage Infrastructure, Equipment and Facilities Grants

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**LE140100040**      **Prof Allan Pring**, Prof Joseph G Shapter, Prof Shizhang Qiao, Prof Colin L Raston, Prof David A Lewis, Prof Martin J Kennedy, Prof Thomas Nann, A/Prof Amanda V Ellis, A/Prof Nigel J Cook, A/Prof Heike Ebendorff-Heidepriem

2014	\$1,375,000.00
<b>Total</b>	<b>\$1,375,000.00</b>

**Primary Field of Research**  
**Partner/Collaborating/  
Eligible Organisation(s)**  
**Administering Organisation**

1007      NANOTECHNOLOGY  
  
The Flinders University of South Australia, University of South Australia  
The University of Adelaide

**Project Summary**

An advanced electron microscope facility for nanomaterials, functional materials and minerals: Recent advances in electron microscopy provide instruments that can resolve at the atomic level and image both morphologically and chemically at these resolutions. These modern instruments are also less complex to operate therefore allowing many more researchers to access them directly. The High Resolution Scanning Transmission Electron Microscope will allow a complete, nano-scale characterisation of natural and synthetic materials in a broad range of scientific, engineering and industrial applications. The Field Emission Scanning Electron Microscope will provide nano-science users with a tool that can image many of the processes in the formation of these nanostructures and particles.

### Discovery Grants

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**DP140103650**      **Prof Stephen C Donnellan**, Dr Philip J Piper, Dr Kenneth P Aplin

2014	\$177,074.00
2015	\$190,171.00
2016	\$98,715.00
<b>Total</b>	<b>\$465,960.00</b>

**Primary Field of Research**  
**Administering Organisation**

2101      ARCHAEOLOGY  
The University of Adelaide

**Project Summary**

The emergence of agriculture, a key transformational event in human history, seems to have occurred significantly later in island SE Asia than surrounding regions. However, the early stages of agriculture may be archaeologically 'invisible' in the tropics due to simple material culture and housing. This project proposes to use the recent evolutionary history of agricultural rodent pests, all of which emerged in situ from among a native rodent fauna, as a proxy for the origins and spread of agriculture, and its subsequent intensification. This project will use phylogeography and population genetics to infer the history of contemporary rodent populations, combined with archaeozoological and ancient DNA analyses of prehistoric samples to test our inferences.

DP140102765

A/Prof Joel Brugger, Prof Allan Pring, Prof Pavel Bedrikovetski

2014	\$105,000.00
2015	\$90,000.00
2016	\$90,000.00
<b>Total</b>	<b>\$285,000.00</b>

**Primary Field of Research**  
**Administering Organisation**

0402 GEOCHEMISTRY  
The University of Adelaide

**Project Summary**

Olympic Dam (OD) is a supergiant Cu-U-Au-Ag-REE ore deposit, containing more than a trillion Australian dollars worth of metals, and hosted by hematite-rich breccia in South Australia. Yet, key aspects of the geochemistry of OD-style deposits remain poorly understood. This project will conduct innovative experiments to address the role for fluorine in Fe, U and REE transport at OD, and the role of fluid-rock interaction in generating the unusually oxidised Fe-Cu mineral assemblages and in controlling U grades and distribution. The fundamental information gained will underpin intense on-going research aimed at discovering new OD-style orebodies and at creating new ore-processing technology that are environmentally sustainable and able to access lower-grade ores.

DP140100307

Dr Gregory J Jordan, **Prof Robert S Hill**

2014	\$117,000.00
2015	\$120,000.00
2016	\$110,000.00
<b>Total</b>	<b>\$347,000.00</b>

**Primary Field of Research**  
**Administering Organisation**

0603 EVOLUTIONARY BIOLOGY  
University of Tasmania

**Project Summary**

How Australia came to be dominated by open, tough-leaved vegetation is an old but still highly controversial question, especially with recent developments in molecular biology that challenge paradigms established from the fossil record. The project will test this new molecular paradigm with innovative use of characteristics of fossil leaves to identify the timing and drivers of the evolution of Australia's open vegetation. The integration of new and rigorous evidence derived from living and fossil plants will provide the clearest evidence yet for the origins of Australian environments. This has ramifications for understanding plant responses to past and future climate changes.

DP140104161

**Prof John A Long**, A/Prof Katherine M Trinajstic, Dr Lars Schmitz, Dr Zerina M Johanson, Dr Gavin C Young, Prof Dr Min Zhu

2014	\$127,000.00
2015	\$110,000.00
2016	\$110,000.00
<b>Total</b>	<b>\$347,000.00</b>

**Primary Field of Research**

0602 ECOLOGY

**Funded Participants:**  
**Administering Organisation**

The Flinders University of South Australia

**Project Summary**

This project aims to discover primary new data to pinpoint the timing, anatomical origins and phylogenetic significance when two key sensory systems first appeared in modern vertebrates: electroreception and specialised nocturnal vision. Such abilities today allow high diversity of vertebrates to co-exist within the same geographical range, for example on tropical reefs or rainforest communities, through careful temporal niche partitioning where reliance on other sensory systems takes over from vision and olfaction as the principal method of prey detection. This project aims to elucidate how the modern fish diversity was shaped by such significant early evolutionary events.

### Future Fellowship Grants

FT130101329

**Dr Diego García-Bellido** (Hon Res Associate & postdoc with Mike Lee & Jim Gehling)

2013	\$93,859.00
2014	\$183,981.50
2015	\$172,970.50
2016	\$165,696.00
2017	\$82,848.00
<b>Total</b>	<b>\$699,355.00</b>

**Primary Field of Research**

0602 ECOLOGY

**Funded Participants**

FT1 Dr Diego García-Bellido

**Administering Organisation**

The University of Adelaide

**Project Summary**

The Cambrian 'Explosion', half a billion years ago, is regarded as one of the most important events in the history of the Earth, when most major animal groups first appear in the rock record, and for which South Australia has recently become a significant source of spectacular fossils. However, important questions remain regarding their Ediacaran roots, the speed of evolution at the time, and the environments in which the radiation took place. Studying the fossil evidence in the light of present-day ecological frameworks, and in comparison with modern behavioural and morphological analogues, as well as living relatives, can help us better assess our understanding of this first radiation of animals.

FT130101965

**Dr Kate L Sanders** (Postdoc with Mike Lee)

2013	\$91,905.00
2014	\$177,870.00
2015	\$171,930.00
2016	\$165,405.00
2017	\$79,440.00
<b>Total</b>	<b>\$686,550.00</b>

**Primary Field of Research**

0603 EVOLUTIONARY BIOLOGY

**Funded Participants**

FT1 Dr Kate L Sanders

**Administering Organisation**

The University of Adelaide

**Project Summary**

This project will uncover the genetic variation and demographic histories that allow rapid adaptation and speciation in natural populations. It will leverage the powerful framework provided by Indo-Australian sea snakes, and new gene sequencing technologies, to reconstruct the evolutionary histories of genes, populations and species. Using this data, it will address inter-related key questions that are critical to effective biodiversity conservation but have rarely been evaluated in the same taxon. It will address what genetic changes are involved in adaptive shifts and speciation, whether these originate de novo or from pre-existing variation and how gene flow and changes in population size promote or constrain adaptation and speciation.

FT130101728

**Dr Gavin J Prideaux** (Honorary Research Associate)

2013	\$94,095.00
2014	\$187,842.50
2015	\$184,100.00
2016	\$175,807.50
2017	\$85,455.00
<b>Total</b>	<b>\$727,300.00</b>

**Primary Field of Research**

0603 EVOLUTIONARY BIOLOGY

**Funded Participants**

FT1 Dr Gavin J Prideaux

**Administering Organisation**

The Flinders University of South Australia

**Project Summary**

Australia's biota is a product of its unique heritage, tectonic history and most especially its climate. Over the past five million years it has been beset by a series of intense climatic shifts driven by a combination of global and regional factors. This project will be the first to track faunal responses to environmental changes across this critical interval. It will establish the dynamics of the origin of the modern southern vertebrate fauna, analysing changes in diversity, diet and community structure. By exploring associations between phases of faunal turnover and key climatic transitions, it will bring a Southern Hemisphere perspective to evolutionary models of Cenozoic faunal change largely generated to date from Northern Hemisphere data.

## Discovery Early Career Researcher Award Grants

DE140100220

**Dr Paul M Oliver**

2014	\$126,647.00
2015	\$124,266.00
2016	\$124,236.00
<b>Total</b>	<b>\$375,149.00</b>

**Primary Field of Research**

0603 EVOLUTIONARY BIOLOGY

**Funded Participants**

DECRA Dr Paul M Oliver

**Administering Organisation**

The Australian National University

**Project Summary**

This project will use new statistical techniques for analysing patterns of biological diversification to test how time, environmental change and evolutionary adaptation shape the accumulation of biodiversity in a continental setting. A supermatrix of genetic and ecological data for Australia's most diverse terrestrial vertebrate group (lizards and snakes) will be compiled. This will allow the testing of the macroevolutionary responses to key environmental changes through the Cainozoic (rapid climatic transgressions and aridification), the relationship between lineage age and species diversity and the effects of major ecological shifts on rates of speciation, extinction and morphological diversification.