

New South Wales

Macquarie University

FT0992161 Dr J Alroy

Approved Project Title **Quantifying the Tree of Life's Diversity with the Paleobiology Database**

2009 : \$ 98,600
2010 : \$ 197,200
2011 : \$ 197,200
2012 : \$ 197,200
2013 : \$ 98,600

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation Macquarie University

Project Summary

The Paleobiology Database is the Internet's key source of scientific data on the fossil record. It records names and classification of fossil organisms and the ages, locations, and environments of the places that yield these fossils. It has often been used to estimate the number of species existing at different points in geological time. Macquarie will house the Database as it is expanded to record evolutionary relationships of many species. This information will help to estimate dates of origination for major groups such as mammals and birds. It will also help to show whether mass extinctions tend to target old groups with few surviving species, which will help to predict which groups will survive the current mass extinction.

FT0990447 Dr A Dosseto

Approved Project Title **The response of soil and river processes to climate change and human activity in Australia**

2009 : \$ 85,800
2010 : \$ 171,600
2011 : \$ 171,600
2012 : \$ 171,600
2013 : \$ 85,800

Primary RFCD 2603 GEOCHEMISTRY

Administering Organisation Macquarie University

Project Summary

This project will provide a much needed quantitative understanding of how soils and rivers have responded and adapted to climate change and human activity in Australia. The outcomes will inform models to predict how our environment is likely to adapt to new conditions in the future as a result of indirect (global warming) and direct (intensive land use) human-related stresses. This project will assess the extent and rate of depletion of soil resources in Australia and also contribute to the innovative character of Australian research through the development and implementation of a new approach to study soil and river processes.

FT0990983 Dr MA Kosnik

Approved Project Title **Quantifying the effects of western colonisation on Great Barrier Reef molluscan communities**

2009 : \$ 85,800
2010 : \$ 171,600
2011 : \$ 171,600
2012 : \$ 171,600
2013 : \$ 85,800

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation Macquarie University

Project Summary

Dead shells provide a record of the pre-colonisation Great Barrier Reef (GBR) ecosystem. Using this record this research will determine what the GBR looked like before James Cook and the first fleet arrived in Australia. This study will also sample living molluscs to quantify the current state of these communities. Together these data will provide environment managers and stakeholders with the first quantitative estimates of human impacts on this world heritage ecosystem. This project will address the questions: Do protected areas return to a pre-colonial state or do they represent another non-natural state? What type of management scheme results in communities most similar to the pre-colonial state?

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0990622 Dr RP Mildren

Approved Project Title **Raman conversion in diamond: Next generation long and far infrared and terahertz lasers**

2009 : \$ 98,600
2010 : \$ 197,200
2011 : \$ 197,200
2012 : \$ 197,200
2013 : \$ 98,600

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation Macquarie University

Project Summary

Through the creation of practical and powerful long wave infrared and terahertz lasers, this project will enable more rapid progress in many fields of science and technology, and in important medical, environmental and safeguarding applications of national priority. Australia also stands to benefit economically via commercialization of diamond-based Raman lasers and instruments into the market. The project will produce highly-trained researchers and students in the theory, design and development of diamond sources, enhance Australia's existing strengths in waveguide optics and photonics, and place Australia at the forefront of research in long-wave infrared and terahertz science.

FT0991243 Dr JR Rabeau

Approved Project Title **Room-temperature quantum microscopy for advanced nanoscale imaging**

2009 : \$ 85,800
2010 : \$ 171,600
2011 : \$ 171,600
2012 : \$ 171,600
2013 : \$ 85,800

Primary RFCD 2499 OTHER PHYSICAL SCIENCES

Administering Organisation Macquarie University

Project Summary

Original, inspired and most often cross-disciplinary efforts are the only way to solve some of nature's most obscure mysteries. Successful development of high-resolution quantum microscopy will lead to a range of benefits for the community and the nation; from graduate student training in cutting edge technology, building links between academic, industry and government groups to providing new insights and approaches into disease identification and therapy. This project aims to demonstrate a world-first in imaging sensitivity, and success will directly enhance Australia's global reputation as a leader in innovation and collaboration.