

Trends in the ARC 2002-2007

Simon Haberle

Below is an outline of the successful grants in the latest ARC Discovery, Linkage and LIEF round (funded for 2008-2012). Congratulations to all those who were successful. These included one APF, six ARF/QEII fellowships, seven APD's, and three APAI's, which is an excellent result for early career researchers. The successful grants included twenty four Discovery, five Linkage and four LIEF grants. As in previous years I've compared the results of this years round with the previous five years and there are some interesting trends and encouraging signs of continued ARC support for Quaternary research. Just to note that my interpretation of what constitutes Quaternary research projects is fairly broad and incorporates all archaeology-related projects as well (though these are distinguished in the analysis).

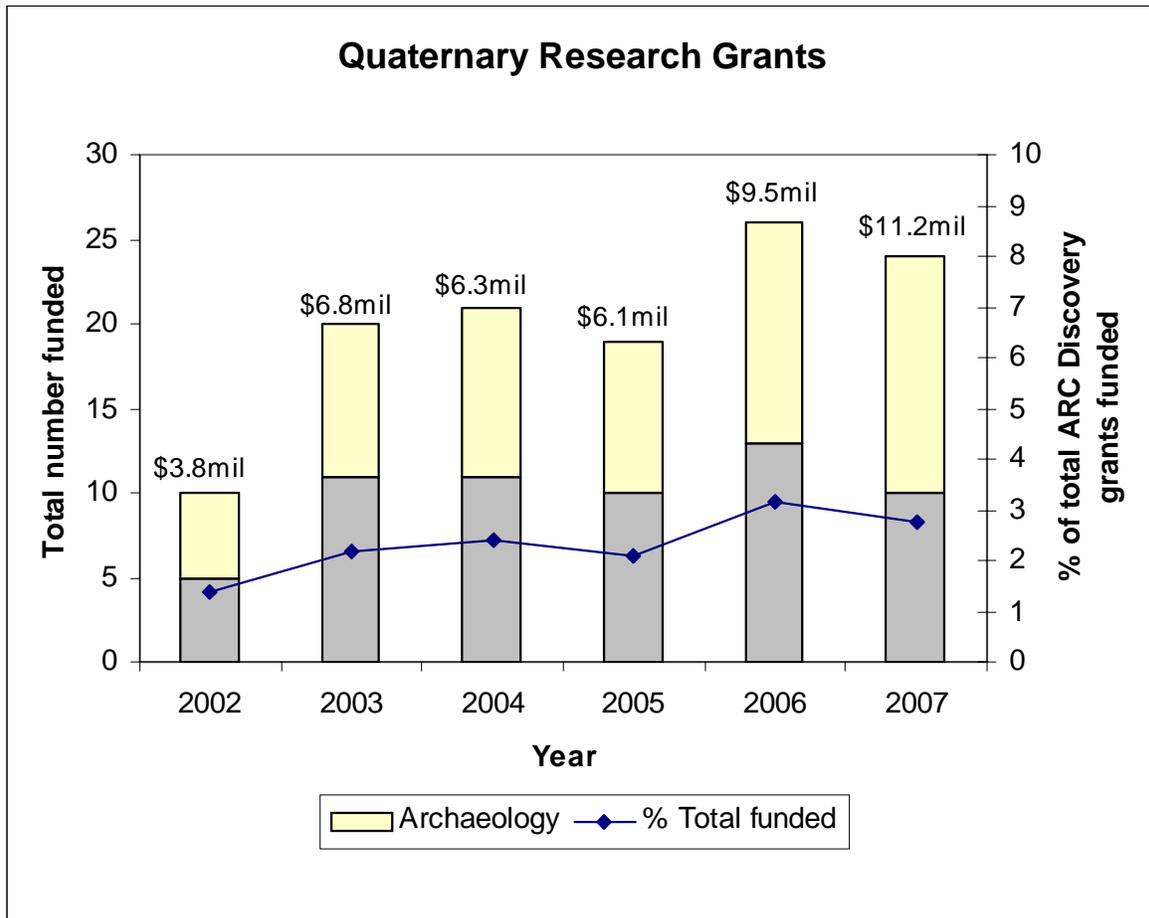
In general the trends in Discovery grant funding can be summarised as follows (Fig. 1):

- (i) total number of grants and funding continues to increase (~3-fold) in a stepwise fashion since 2002
- (ii) funding of around \$11.2mill for Discovery grants in Quaternary research was achieved this year and is the highest awarded so far
- (iii) components of archaeology continue to feature strongly in over 50% of Quaternary research applications
- (iv) of the 14 successful archaeology grants only 1 could be considered as Australian field-based research (~similar to previous years)
- (v) the number of institutions administering grants remains relatively stable at 12 (similar to previous years)
- (vi) the gender balance continues to be weighted towards male principle CI's though this year the most successful grantees, receiving 3 grants each (including Linkage and LIEF), are female.

- (vii) Australia's megafauna (faunal extinctions) seems to be the most popular recent topic with 8 projects (~\$3mil) dealing with this issue over the last 2 years.

Overall, this is a very positive result for Quaternary research in Australia, reflecting a vibrant and increasingly relevant area of research. Certainly, these projects are increasingly capturing the attention of the current ARC board of assessors with a significant rise in percentage of total grants awarded from 1% in 2002 to ~3% in 2006-2007. The infrastructure to enable this trend to continue has also received a boost this year with grants for equipment and most significantly new funding provided for Australia's re-entry into the Ocean Drilling Program assured for the next 5 years. This last factor, along with the network funding available (but perhaps not widely accessed as yet) from the three most relevant ARC Networks (Environmental Futures Network, Earth System Science Network and the Network for Vegetation Function) all provide a framework for exploring new ideas and collaborations across the broad palette of Quaternary research. For those applicants who missed out this year this must provide incentive to try and try again.

Figure 1. Quaternary Research ARC Discovery Grants announced in 2002-2007. The bar graphs show total number of Quaternary Research grants funded, the line shows % this represents of total number of grants allocated in that year, and a figure for the total funding in million dollars allocated to Quaternary Research projects appears above each year. Data from the ARC annual reports 2002-2007 (http://www.arc.gov.au/ncgp/dp/dp_outcomes.htm).



Successful ARC grants announced in 2007 for 2008-2012

DISCOVERY GRANTS

ARCHAEOLOGY AND PREHISTORY / ANTHROPOLOGY

CI's: Dr DK Curnoe; Prof PS Tacon; Dr SD Mooney; Dr DA Penny; Mr J Xueping; Dr R Pan; Dr D Fink; Dr AI Herries (ARF)

The Late Pleistocene Peopling of East Asia and Associated Climate Environment History

The University of New South Wales: 2008, \$150,000; 2009, \$140,000; 2010, \$140,000; 2011, \$130,000; 2012, \$105,000

Project Summary

This project will contribute to an environmentally sustainable Australia through understanding the long term history of climate change centred on the monsoon weather system and the scale and magnitude of environmental change and its long term impacts on human inhabitants in East Asia and Australasia. It helps to safeguard Australia by enhancing our capacity to interpret and engage with our region through greater understanding of societies and cultures. It will improve understanding of the long term history and relationships of major groups of people across our region. Many benefits will derive from scientific, educational and cultural exchange between Australia and our neighbour China.

CI's: A/Prof AV Betts; Prof VN Yagodin; Dr FJ Kidd (APD)

A study of a newly discovered corpus of early Central Asian wall paintings

The University of Sydney: 2008, \$140,000; 2009, \$130,000; 2010, \$130,000; 2011, \$125,000

Project Summary

We will examine the development of mural art in Central Asia through study of a remarkable corpus of newly discovered wall paintings from a massive two thousand year old temple/palace. This extensive collection of images is the largest and best preserved early cycle of art yet discovered in Central Asia. Detailed iconographic study of the paintings will provide an extensive new database for scholars working on the history and culture of the ancient world. A broader study of Central Asian wall painting based on our work will benefit all those interested in the Classical world and its Asian and Iranian counterparts.

CI: Dr MJ Carter (APD)

With or without pots: Investigating the archaeology of human settlement on Santa Isabel, western Solomon Islands.

The University of Sydney: 2008, \$85,000; 2009, \$80,000; 2010, \$60,000; 2011, \$58,986

Project Summary

Following the recent civil unrest in the Solomon Islands, the SI National and Provincial Governments, as well as community bodies, have identified a better understanding of the past and the revival of traditional systems and knowledge (Kastom) as a route to stability and cohesion throughout the region. This study responds to direct requests from the Santa Isabel community for assistance with archaeological research and the recording of cultural histories. By assisting a Pacific neighbour to develop a more durable, internally generated basis for social and economic development, Australia not only encourages security in the region, but also increases its engagement with and understanding of adjacent cultures.

CI: Mr DH Evans (APD)

Hydraulic Systems and State Development in Early Cambodia: Mapping the Engineered Landscapes of the Khmer Using Remote Sensing.

The University of Sydney: 2008, \$95,000; 2009, \$90,000; 2010, \$80,000

Project Summary

Due to recent discoveries, Australian research at Angkor, in Cambodia, has gained increasing visibility worldwide. The ARC funded Greater Angkor Project (Discovery) and Living With Heritage project (Linkage) have produced results of international significance, developed strong long term partnerships with Cambodian agencies and UNESCO, and have pioneered the large scale mapping of World Heritage listed sites using airborne imaging radar systems in collaboration with NASA. This project will extend these partnerships, consolidate Australia's leading position in radar analysis methods, and continue to produce results with global implications for the understanding and management of World Heritage sites.

CI: Mr AR Brumm (APD)

A reassessment of early human stone technology from a Southeast Asian perspective.

University of Wollongong: 2008, \$100,000; 2009, \$95,000; 2010, \$85,000

Project Summary

The study of early stone technology is crucial to our understanding of human evolution worldwide, providing insight into the capabilities of our earliest ancestors. Current models focus on the evidence from Africa and Europe, potentially marginalising the importance of eastern Asia in the global development of early human stone technology. This impacts how nations and communities in our region interpret themselves to the world and reduces the impetus of innovative research on this subject. The proposal aims to establish detailed comparisons between Southeast Asian and 'Western' technologies, providing a suitable framework through which current preconceptions can be more rigorously assessed.

CI: Dr D Frankel; Dr JM Webb

Diversity, interaction and change in prehistory: the third millennium BCE in Cyprus.

La Trobe University: 2008, \$152,000; 2009, \$130,000; 2010, \$130,000; 2011, \$70,000

Project Summary

This project will enhance the high reputation Australians have developed over many years in Mediterranean archaeology, maintaining and broadening Australia's cultural and economic relationships with Cyprus. It will be relevant to both scholars and the general public in Cyprus and the large Cypriot community in Australia. It will involve the training of students from both Australian and Cypriot universities in all aspects of archaeological fieldwork, laboratory analysis and research.

CI's: Dr B David (QEII); Prof J Geneste; Dr KM Marsaglia; Dr H Plisson

Archaeology of the Gulf Province Lowlands, Papua New Guinea.

Monash University: 2008, \$180,000; 2009, \$175,000; 2010, \$170,000; 2011, \$130,000; 2012, \$90,000

Project Summary

This project involves international collaboration between PNG, French, US, Canadian & Australian researchers, and thus contributes to constructive international links between these countries. These collaborations are at local community and national institutional levels, and involve mutual participation in field and laboratory research. They also provide opportunities for numerous PNG and Australian archaeology students to gain valuable fieldwork experience and training in archaeological methods and in working in partner relationships involving scientific researchers and Indigenous communities. This research will contribute to National Identity in investigating prehistoric cultural links with PNG at NE Australia's doorstep.

CI's: Dr SH Bedford (QEII); Prof MJ Spriggs

Persistence and transformation in Ancestral Oceanic Society: the archaeology of the first 1500 years in the Vanuatu archipelago.

The Australian National University: 2008, \$275,356; 2009, \$249,821; 2010, \$273,532; 2011, \$244,847; 2012, \$285,189

Project Summary

Supporting research programs with smaller Pacific Island neighbours fosters Australia's relationship with those countries generally. The project will contribute to regional capacity building in the areas of archaeology, heritage studies and management. This research will enhance understanding of the region's deep human past and the way it articulates historically with the rest of the world. It will advance Australia's understanding of its nearest neighbours as well as provide those neighbours with information that goes towards strengthening national identity. The proposed research has direct relevance to ongoing debates within Australian and World archaeology and related disciplines, and fosters international collaborative links.

CI: Dr JA Cameron (ARF)

Indian Textile Technology as archaeological evidence for population movements in Early Southeast Asia.

The Australian National University: 2008, \$110,000; 2009, \$124,000; 2010, \$120,000; 2011, \$105,000; 2012, \$98,643

Project Summary

This project uses archaeological textiles to investigate population movements in the late prehistoric period of Southeast Asia. It involves collaborative links between researchers from the Institute of Archaeology in Vietnam, the Centre for Southeast Asian Prehistory in Ho Chi Minh City, the Fine Arts Department of Thailand and museums and archaeological institutions in South India. It not only profiles Australian expertise in Southeast Asia but facilitates high levels of communication and the exchange of ideas.

CI's: Dr SL O'Connor; Dr AR McWilliam

Cultural and Environmental Shifts in Late Holocene East Timor: Evidence for Climate Change?

The Australian National University: 2008, \$143,000; 2009, \$140,000; 2010, \$97,000

Project Summary

This project will address the NRP goal of responding to climate change and variability by advancing our knowledge and understanding of recent climate change in our region. An investigation of climate change, environmental impact and human adaptation in East Timor over the last 1000 years will improve our understanding of such issues in neighbouring tropical Australia. Our climate is already highly variable and we can expect future climate change to have significant influence both on Australia's environment and her communities. This project has policy development implications and will further enhance Australia's international reputation as a research base for environmental studies.

CI's: Dr SL O'Connor; Dr SJ Fallon

Impacts of Catastrophic Marine Inundation Events (CMIEs) on the Prehistoric Archaeological Record of the Australian Coastline.

The Australian National University: 2008, \$130,000; 2009, \$125,000; 2010, \$120,000

Project Summary

This project will enhance Australia's ability to respond to future Catastrophic Marine Inundation Events (CMIEs) from tsunamis and cyclonic storm surges. CMIEs represent a major natural hazard endangering Australian coastal populations and infrastructure. Disaster risk assessments and management strategies for coastal communities need data with time depth. This project will produce high resolution dating and stratigraphic evidence on the effects of CMIEs on the North West Shelf WA coastline over 100 to 1000 year timescales.

CI's: Dr MJ Prebble; Dr NA Porch

Using fossil insects and plants to recognise past human impacts on Pacific island biodiversity.

The Australian National University: 2008, \$60,751; 2009, \$68,431

Project Summary

This project will enhance our ability to characterise human impact on island biodiversity. It will develop novel research methods that can be applied in the Australian context to understand changes in biodiversity that come with human impact. The contemporary emphasis on biosecurity in the protection of Australia's unique environment against human introduced exotic pests and diseases can be better understood in the context of past introductions. Our project will demonstrate the role Australian archaeologists and natural scientists can play in understanding the spread of humans across the Pacific and the environmental consequences of colonisation. It will increase collaboration between research institutions in the Australia/Pacific region.

CURATORIAL STUDIES

CI's: A/Prof RJ Sloggett; A/Prof AG Sagona; Ms D Lau

Archaeological conservation: the development of analysis and assessment protocols for adhesives used on archaeological pottery

The University of Melbourne: 2008, \$40,737; 2009, \$38,398; 2010, \$38,398

Project Summary

The development of routine adhesive testing and assessment methodologies will provide conservation laboratories with the relevant knowledge to test adhesives before use. This will result in the timely identification of formulation changes, thus preventing the use of inferior adhesive products that no longer perform to conservation standards. This preventive approach is highly cost effective and will have a positive impact on the preservation of archaeological pottery and other cultural collections. Furthermore, the expertise developed with this project can be extended to adhesives used to repair other cultural materials and contemporary collections made from synthetic polymer based materials.

CULTURAL STUDIES

CI's: Prof PS Tacon; Dr J Ross; Dr AG Paterson; Dr SK May (APD)

Picturing change: 21st Century perspectives on recent Australian rock art, especially that from the European contact period.

Griffith University: 2008, \$155,000; 2009, \$150,000; 2010, \$150,000; 2011, \$110,000

Project Summary

Australia, long known for its prehistoric rock art of world heritage value, will now also be known for its unique and diverse body of contact rock art. This project will benefit tourism in remote regions, many of which are or are near World Heritage Areas (eg.

Kakadu, Uluru, Blue Mountains). Contemporary indigenous knowledge about important cross cultural landscapes will be synthesised along with other new knowledge to assist with the protection of sites, the development of new management plans and applications to place particular groups of sites on a new UNESCO World Heritage rock art list. Aboriginal participants will receive research skills training and both individuals and communities will reconnect to significant remote places.

GEOLOGY/ GEOCHEMISTRY

CI's: Dr LJ Arnold (APD); Dr RD MacPhee; Dr H Poinar

Pleistocene evolutionary dynamics and past environments of Siberia: Reconstructions using luminescence dating of ancient DNA sedimentary archives.

University of Wollongong: 2008, \$115,000; 2009, \$114,000; 2010, \$109,000

Project Summary

This study will yield critical new insights into faunal environment interactions in Siberia and their long term implications for the evolution and extinction of Siberia's biota. These fundamental issues are of relevance to Australian archaeology, palaeontology and biogeography, and so our discoveries are of direct interest to Australian researchers studying these disciplines. The methodological advancements in OSL dating and DNA techniques that will accompany this research will enhance Australia's international scientific standing and create new opportunities for collaborative initiatives in both cutting edge scientific research and consulting activities.

CI's: Prof RG Roberts (APF); Prof AR Chivas; Dr MD Petraglia

Monsoons and migrations: Quaternary climates, landscapes and human prehistory of the Arabian peninsula and the Indian subcontinent.

University of Wollongong: 2008, \$155,000; 2009, \$130,000; 2010, \$125,000; 2011, \$110,000; 2012, \$100,000

Project Summary

By providing important new data on the initial dispersal of Homo sapiens from Africa to Australia via Arabia and India, this project will improve our knowledge of the time depth of cultural connections between indigenous Australians and other societies. It will provide a long term perspective on the impact of climate change on hunter gatherer communities, and will contribute to NRP Safeguarding Australia by increasing our understanding of cultures in Arabia and India. Technical advances made in this study will benefit researchers worldwide, increase capacity for commercial services, and enhance Australia's international standing in the geosciences. We will also train high quality research students and create new collaborative initiatives.

CI's: Prof K Grice (QEII); Prof RE Summons; Dr RJ Twitchett

Characteristics of organic matter formed in toxic, sulfide rich modern and ancient environments.

Curtin University of Technology: 2008, \$140,000; 2009, \$190,000; 2010, \$170,000; 2011, \$85,000; 2012, \$75,000

Project Summary

This project will help scientists understand past climate changes and understand the mechanisms of global warming. This in turn will improve our ability to forecast future climate change, and help Australia manage current threats to its biodiversity. Furthermore, this research involving Australia's major petroleum rocks will increase the ability to identify crude oil sources, to the benefit of petroleum exploration in Australia and world wide. Importantly, this project will enable students and young professionals to be trained in state of the art technologies, leading to quality scientists ready for employment in geoscience industries, and raising the profile of science careers in Australia.

CI's: Prof MA Williams; Dr MR Talbot; Dr JC Woodward; Prof GA Duller; Prof MG Macklin

Environmental impacts of climate change in the Nile basin over the past 30,000 years.

The University of Adelaide: 2008, \$90,000; 2009, \$80,000; 2010, \$80,000

Project Summary

There is growing international and national concern over the possible environmental, economic and social impacts of global and regional climate change. This project brings together a multi disciplinary team of internationally recognised research leaders and the resources they command to investigate the environmental impacts of climatic changes in the Nile basin over geologically recent times. The outcome will be a more comprehensive understanding of how a major river system responds to global and regional climate change, and will provide an enhanced conceptual basis for anticipating how drainage systems such as the Murray Darling could respond to future change.

ECOLOGY AND EVOLUTION

CI's: Dr PJ Baker; Dr ER Cook; Dr JM Lough

Reconstructing the historical frequency and intensity of Australian droughts: A multi species dendrochronological approach.

Monash University: 2008, \$170,000; 2009, \$148,000; 2010, \$145,500

Project Summary

Drought directly and indirectly impacts every Australian. Severe droughts devastate rural communities, lead to increased water restrictions and bushfire activity, slows the national economy and threatens diverse ecosystems. Our research will improve understanding of where, when, and how intensely droughts have occurred across eastern Australia in the past. The results will provide unique insights into the processes that generate Australian

droughts and how future droughts might be anticipated. The results will provide farmers, hydrologists, and policy makers with better data on long term variability in water supplies to improve local, regional, and national water planning initiatives and infrastructure development.

CI: Dr AR Evans (ARF)

Megafauna and mega extinction: assessing palaeocommunity change using dental complexity and shape analyses.

Monash University: 2008, \$200,000; 2009, \$100,000; 2010, \$100,000; 2011, \$100,000; 2012, \$100,000

Project Summary

This research will address an important issue of national interest the causes of the extinction of the Australian megafauna. By furthering research on the causes of this historic event, valuable insights will be gained into possible causes of current extinction events and the future impact of climate change. It will bring to Australia new technologies and methods developed overseas by an Australian researcher, and put Australia at the forefront of several areas of research including 3D scanning and analysis. This project will form part of an international collaboration called the MorphoBrowser, an exciting advance in the study of biological diversity. This will help maintain Australia as a pre eminent country for palaeontology research.

CI: Dr GJ Price (APD)

Constructing a temporally constrained palaeoecological model of Quaternary faunal evolution and extinction in eastern Australia.

The University of Queensland: 2008, \$100,000; 2009, \$100,000; 2010, \$100,000

Project Summary

Increased climatic variability and human induced environmental degradation have had severe impacts on biodiversity, socio economic sustainability and possibly our own future survival, thus attracting global attention. his study will help unravel the causes of the extinctions of Australia's large size animals (megafauna) during the periods of last glaciation and earliest human colonisation of Australia. Investigating the causes of megafauna extinction is essential for an understanding of how those prehistoric events shaped the modern biota, and for the development of conservation strategies for our endemic faunas in an era of increased climatic and environmental variability and vulnerability.

CI's: Prof BW Brook; Prof CN Johnson

Reconstructing past population dynamics to understand human and climatic impacts in prehistory.

The University of Adelaide: 2008, \$213,000; 2009, \$213,000; 2010, \$198,000

Project Summary

More than 100 species have become extinct since humans first colonised Australia, and over 1000 are considered threatened. This research will determine the factors most strongly governing the interaction

between humans and native fauna in Australia over the last 46 millennia. Our approach is powerful and novel because it will effectively draw together multidisciplinary evidence on natural resource exploitation and habitat alteration by ancient people, and the influence of dramatic climatic shifts on the Australian biota. Information on past biological responses to environmental change is critical to properly contextualising the current impact, and long term consequences of, threats such as global warming, habitat loss and invasive species.

OCEANOGRAPHY

CI's: Dr SM Eggins; Dr BN Opdyke; Prof J Zachos; Dr A Russell

Atmospheric CO₂, global temperature, and surface ocean acidity response to fossil carbon burning: insights from an ancient analogue.

The Australian National University: 2008, \$90,000; 2009, \$114,000; 2010, \$109,000

Project Summary

Sequestration of anthropogenic CO₂ emissions by the oceans and the impacts of resulting ocean acidification and greenhouse warming upon marine ecosystems are vital to understanding the course of future environmental change. This research will improve knowledge of the biological and chemical responses in the ocean to past changes in atmospheric CO₂ levels and increased ocean acidity. This will assist in predicting the consequences of different fossil fuel burning scenarios for climate and marine life, especially the future viability of organisms like corals, molluscs, and calcareous plankton that underpin key tourism and marine production systems.

LINKAGE GRANTS

ARCHAEOLOGY AND PREHISTORY / ANTHROPOLOGY

CI's: Prof TA Murray; Dr PW Davies (APDI)

An Archaeology of Institutional Confinement: the Hyde Park Barracks 1848-1886.

La Trobe University: 2008, \$78,648; 2009, \$78,648; 2010, \$78,648

Collaborating/Partner Organisation(s): Historic Houses Trust of NSW

Project Summary

This project has three benefits. First, it will help Australians understand more about the history of government care for the sick and the destitute, an issue that strongly resonates in the contemporary community. Second, by focusing on the archaeology of migration we can improve our understanding of its consequences. Third, the visitors to the Hyde Park Barracks Museum will be better able to understand the richness and diversity of the archaeological and historical records of early Australian history. This will enhance the heritage value of archaeological assemblages that present significant challenges to those who seek to display or interpret them.

CI: Dr SL O'Connor

Bayini, Macassans, Balanda and Bininj: A Case Study of Indigenous Cultural Heritage Management and Tourism in West Arnhemland Northern Territory.

The Australian National University: 2008, \$77,800; 2009, \$72,200; 2010, \$80,000

APA(I) Award(s): 1

Collaborating/Partner Organisation(s): Department of the Environment and Water Resources; Bushfires Northern Territory.

Project Summary

Contact between cultures is a defining theme in history and is especially relevant to contemporary Australia. The timing of contact between South East Asians and Europeans with Aboriginal communities in Arnhem Land is of great historical significance to Australia. This knowledge will enhance the national heritage registration efforts for cultural heritage places in the region. Conservation efforts will be undertaken for the first time for these potentially world heritage significant Indigenous cultural heritage places. Indigenous communities will potentially make significant economic gains from developing sustainable land management and cultural tourism initiatives through the results and skills obtained from his project.

CI's: Prof GJ Hugo; Dr B Craig

The development and testing of a theory of the processes that shape material culture diversity using a New Guinea dataset

The University of Adelaide: 2008, \$70,000; 2009, \$60,000

Collaborating/Partner Organisation(s): OK Tedi Mining Limited, South Australian Museum

Project Summary

Australian museums hold approximately 150,000 artefacts from the Pacific. Estimates of overseas holdings suggest another 500,000. From these collections, objects are selected for research or exhibition based on restricted themes. No attempt has yet been made to utilise these collections in a comprehensive way to maximise their research potential. This has now been done for the north central region of New Guinea and the available information provides the opportunity to develop a theory of the processes that bring about diversity of material culture. Such a theory would be of international significance for ethnologists and archaeologists and add value to publicly funded collections.

ANALYTICAL CHEMISTRY

CI's: Dr CE Lenehan; Dr JS Quinton; Dr P Jones; Prof A Pring; Mr A Durham

Chemical Fingerprinting for Geological and Geographical Provenancing of Ochre Minerals used by Australian Aboriginals.

The Flinders University of South Australia: 2008, \$50,000; 2009, \$50,000; 2010, \$50,000

Collaborating/Partner Organisation(s): South Australian Museum, Artlab Australia.

Project Summary

Aboriginal peoples have used ochre in their most meaningful cultural interactions. This usage is reflected in other cultures, but the richness and complexity of the Australian evidence is unique. This partnership of analytical and surface chemists with the museum curators and conservators provides an ideal opportunity to utilize a range of techniques for the unambiguous provenancing of ochre from an artefact, artwork or an archaeological site. The result will be a greatly enriched understanding of the way in which Aboriginal Australians interacted with one of this country's key resources and should yield fresh conclusions about this country's cultural past.

GEOCHEMISTRY

CI's: Dr RT Bush; Dr P Slavich; Dr SG Johnston (APAI); Prof LA Sullivan; Dr ED Burton

Impacts of climate change on coastal floodplain wetland biogeochemistry and surface water quality.

Southern Cross University: 2008, \$80,000; 2009, \$84,000; 2010, \$82,000

Collaborating/Partner Organisation(s): NSW DPI, Richmond River County Council, Northern Rivers Catchment Management Authority

Project Summary

The most vulnerable Australian landscapes to global warming driven sea level rise are our low lying coastal floodplains. Seawater inundation dramatically affects soil chemistry and water quality. Over 74,000 km² of the low lying coastal floodplains of Australia contain acid sulfate soils. For these soils, seawater inundation has the potential to greatly enhance the release of acidity, with a high capacity to severely degrade wetlands, estuaries and farmland. This project will directly contribute to our national capacity to assess and manage impacts from climate change, providing greater protection of our coastal floodplains resources.

LARGE INFRASTRUCTURE AND EQUIPMENT FUND

GEOLOGY

CI's: Prof RJ Arculus; Prof P De Deckker; Dr NF Exon; Prof ME Barley; Dr JJ Brocks; Dr MB Clennell; Prof A Cooper; Prof JR Dodson; Dr RN Drysdale; A/Prof CL Fergusson; A/Prof JM Hergt; Dr WR Howard; Prof AP Kershaw; Prof TC McCuaig; A/Prof RD Muller; Dr IR Poiner; Prof SY O'Reilly; Dr JM Webster; Dr CJ Yeats; A/Prof PM Vasconcelos; Dr JD Stilwell

Australian Membership of the Integrated Ocean Drilling Program.

The Australian National University: 2008, \$1,200,000; 2009, \$1,200,000; 2010, \$1,200,000; 2011, \$1,200,000; 2012, \$1,200,000

Partner Organisations & Collaborating Organisations:

The Australian National University, CSIRO, MARGO, Macquarie University, James Cook University, The University of Adelaide, The University of Melbourne, Monash University, The University of Newcastle, The University of Queensland, The University of Sydney, University of Tasmania, The University of Western Australia, University of Wollongong, AIMS, ANSTO

Project Summary

Membership of the Integrated Ocean Drilling Program (IODP) will provide high leverage access to the largest, and most effective international geoscience program. Results from drilling within Australia's marine jurisdiction will give understanding of the oceans' state under past climates through high resolution records of the range of oceanographic and biological responses to climate change, the role of the deep biosphere in shaping oil and gas deposits, hydrothermal and igneous processes involved in ore genesis, and enhanced understanding of some of the world's largest earthquake and tsunami generating processes.

GEOCHEMISTRY

CI's: Prof K Grice; Dr PF Grierson; Dr PF Greenwood; Dr JJ Brocks; Prof D Zhang; A/Prof A Heitz

A novel isotope facility to characterise high molecular weight fractions of natural organic matter in soils, sediments, water, petroleum and coal.

Curtin University of Technology: 2008, \$160,000

Partner Organisations & Collaborating Organisations: Curtin University of Technology, The University of Western Australia, The Australian National University, CRC WQT, John de Laeter State Centre of Mass Spectrometry

Project Summary

This facility will improve our ability to forecast environmental responses to future climate change, and help Australia manage current threats to its biodiversity. Furthermore, this research will increase the ability to identify crude oil sources, to the benefit of petroleum exploration in Australia. This facility will also contribute to an improved understanding of controls on water quality and will help to protect our precious freshwater resources, already under intense pressure from climate change. Importantly, this project will enable students and young professionals to be trained in state of the art technology, leading to quality scientists ready for employment in industry.

CI's: Prof AR Chivas; Prof RG Roberts; Dr Z Jacobs; Prof CV Murray Wallace; Dr KE Westaway; Prof MJ Morwood; Prof GC Nanson; A/Prof BG Jones; Dr PF Carr; Dr HV McGregor; Prof CD Woodroffe; A/Prof SD Golding; A/Prof J Zhao; Dr K Yu; Dr JM Pandolfi; Dr GP Halverson; Prof MA Williams; Dr PA Gell; Dr DJ Chittleborough; Prof JR Dodson; Dr D Fink; Dr Q Hua; Dr EJ Hodge; Dr TM Esat; Prof MT McCulloch

A stable isotope mass spectrometer for novel determinations of past temperatures.

University of Wollongong: 2008, \$250,000

Partner Organisations & Collaborating Organisations:
University of Wollongong, The University of Queensland, The University of Adelaide, Australian Nuclear Science & Technology Organisation, The Australian National University

Project Summary

Much of the Australian landscape is subject to a dry and evaporative climate, making it very difficult to use conventional geochemical techniques to estimate past temperatures, even on short timescales of tens to hundreds of years. The application of a new isotopic technique to preserved carbonate minerals (soil carbonate, shells in rivers, lakes and the ocean) avoids the difficulty of this variable evaporation, and directly measures past temperatures. This will have a profound effect on our understanding of environmental changes on both short and long time scales, and permit a better understanding of the hydrological balances within the landscape.

PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

CI's: Prof PA Lay; Prof D McNaughton; Prof Dr T Maschmeyer; Prof DT Potts; Prof MV Swain; Prof GE Grau; Prof TC Sorrell; Dr IM Ramzan; Prof J Beardall; Prof CC Bernard; Dr CP Marshall; Dr A Dutkiewicz; Dr DA Penny; Dr BR Wood; Dr W Yang; Dr L Soon; Dr D Traini; Dr EA Carter

Integrated Vibrational Spectroscopic Mapping for Archeological, Biological, Geological, Materials, and Medical Research.

The University of Sydney: 2008, \$ 400,000

Partner Organisations & Collaborating Organisations:
The University of Sydney, Monash University

Project Summary

The expected benefits that will arise will include: green chemical processes with improved environmental and economic impacts; improved treatments and diagnoses of diseases; understanding of fundamental geological processes; identification of the earliest forms; studies of archaeological artefacts; evolution of life on Earth; the design of improved dental materials. Ultimately, this research will include economic and social benefits in; industrial processes; the mining industry; medicine; and dentistry. An understanding of the origin and early evolution of life on Earth also has many social implications.

LINKAGE INTERNATIONAL AWARDS

GEOCHEMISTRY

CI's: Prof K Grice; Prof P Ward

Chemostat experiments to mimic toxic environments associated with mass extinction events.

Curtin University of Technology: 2008, \$10,000;
2009, \$ 8,450

Collaborating Countries: USA

Project Summary

This project will help scientists understand past climate changes and understand the mechanisms of global warming. This in turn will improve our ability to forecast future climate change, and help Australia manage current threats to its biodiversity. Importantly, this project will enable students and young professionals to be trained in state of the art technologies, leading to quality scientists ready for employment in geoscience industries, and raising the profile of science careers in Australia.