Victoria

The University of Melbourne

DP0770931 Dr TJ Baldwin; Prof I Zukerman; Prof EA Sonenberg; A/Prof S Bird; Dr SH Balbo

Approved Project Title **Personalised Content Delivery for Assisted Navigation of Information Rich, Physical Environments such as a Museum**

2007 : $110,000
2008 : $110,000
2009 : $105,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation The University of Melbourne

Project Summary

The research will yield improved international standing through scientific advances disseminated through high impact refereed publications and open source software. The collaborations within the project will make Melbourne a hub for research in user modeling and language technology. This will attract post-graduate students in these areas, and potentially commercialisation interest. The demonstration prototypes will provide proof of concept of eventual applications that improve the capabilities of the environments in which we live. These applications, which can be investigated by follow-up projects, will in turn encourage collaborations with Australian companies seeking to build innovative software applications.

DP0770337 Dr MA Bellgrove; Dr CD Chambers

Approved Project Title **The cognitive neuroscience of executive control: behavioural, physiological and genetic mechanisms**

2007 : $110,000
2008 : $99,000
2009 : $110,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

How genes influence our human abilities to think, reason and control behaviour has puzzled scientists for decades. The human genome project has allowed us to ask how individual genes influence these capacities. Understanding the genetics of these abilities provides a solid platform from which to launch gene discovery projects in clinical disorders where these abilities are compromised. The current project is directly relevant to the genetics of mental disorders, such as attention deficit hyperactivity (ADHD), that place a large burden, both financially and emotionally, on our society. Understanding the genes and biological pathways that increase risk for mental disorders will ultimately lead to improved treatments for these conditions.

DP0772302 Prof JI Borland; Dr AJ Clarke; Dr RH Hillberry; Dr LL Uren

Approved Project Title **New perspectives on Australian economic history: Geography, institutions and major episodes**

2007 : $65,000
2008 : $95,000
2009 : $65,000

Primary RFCD 3403 ECONOMIC HISTORY AND HISTORY OF ECONOMIC THOUGHT

Administering Organisation The University of Melbourne

Project Summary

This project will contribute directly to an improved knowledge of the determinants of the structure of economic activity, and macroeconomic performance and economic growth in Australia. Having a better understanding of the main influences on Australian economic growth will assist in the development of policies to promote these outcomes. The project will also make a significant addition to international knowledge in the field of new comparative economic history by adding an extra body of evidence to cross-country perspectives on the determinants of national economic performance that draws on Australia's distinctive geography and institutions. Finally, the project will provide valuable research training and skills.

DP0772671 Prof MA Burgman

Approved Project Title **New models for predicting species' distributions**

2007 : $90,000
2008 : $90,000
2009 : $90,000

Primary RFCD 3008 ENVIRONMENTAL SCIENCES

Administering Organisation The University of Melbourne

Project Summary

This project will deliver new and more robust methods for generating the information that underpins sound conservation and resource management decisions, with particular focus on new statistical techniques to predict species' distributions. Results will be relevant to a wide range of applications including management of rare and/or threatened species and ecosystems, setting realistic targets for species and ecosystem restoration, improved management of pest species, and sustainable harvesting of species. Emphasis will be placed on transfer of knowledge to users, fostering the development of new skills among Australian environmental and conservation managers, and contributing to the sustainable use of our biodiversity.

DP0771815 Dr AN Burkitt; Dr DB Grayden

Approved Project Title **Temporal Pattern Learning and Recognition in Neural Systems**

2007 : $80,000
2008 : $75,000
2009 : $70,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation The University of Melbourne

Project Summary

This project is relevant to the National Research Priority area of Frontier Technologies and addresses fundamental cross-disciplinary issues of how neural systems learn patterns that change with time, which is at the cutting edge of intelligent processing systems. Applications are in rapidly growing fields of automatic speech processing, robotics, machine learning and intelligent systems, all with applications in areas of economic importance. Application to cochlear implant speech processing will provide benefit for the hearing impaired. The project will provide students with training at an international level within Australia, thus helping ensure Australia maintains and extends its science and technology base into the future.

DP0770177 Dr GA Burley

Approved Project Title **Understanding and controlling the construction of molecular electronic and photovoltaic devices using nucleic acids**

2007 : $200,893
2008 : $180,000
2009 : $180,000
2010 : $150,000
2011 : $130,000

Primary RFCD 2503 ORGANIC CHEMISTRY

QEII Dr GA Burley

Administering Organisation The University of Melbourne

Project Summary

The efficient generation and use of energy is arguably the most pressing problem the world faces today. This project will enable the construction of molecular electronic and energy generation devices with increased efficiency, and will impact the fields of bio-organic chemistry and material science. Australia will benefit from the cheap and efficient energy produced by these new environmentally benign energy generation and transducing devices. A secondary benefit will arise when these devices are applied to medical diagnostics for early detection of diseases. Economic and environmental benefits for the Australian community and Australia's development as a knowledge-based economy will be the result.

DP0774029 Dr R Buyya

Approved Project Title **Quality of Service-based Scheduling of e-Research Application Workflows on Global Grids**

2007 : $113,000
2008 : $106,000
2009 : $100,000
Primary RFCD 2803 COMPUTER SOFTWARE

Administering Organisation The University of Melbourne

Project Summary

e-Research has the potential to offer Australia significant economic and social benefits as it enables researchers from different disciplines and organisations to engage in collaborative scientific investigation. In e-Research environments, users need to have secure access to remote resources owned by different organisations. Since these resources are not directly under the control of e-Research applications, they need to negotiate with resource providers for access time, duration, and the level of quality of service expected to make sure that the interlinked operations are performed as required. This project develops information and communications technologies that enable the creation of such e-Research environments.

DP0772790 A/Prof A Capling

Approved Project Title **The New Politics of Trade: Complexity, Innovation and Policy Development in the Asia Pacific Region**

2007 : $52,000
2008 : $45,000
2009 : $51,000
Primary RFCD 3602 POLICY AND ADMINISTRATION

Administering Organisation The University of Melbourne

Project Summary

In Australia and the Asia Pacific region the negotiation of bilateral, regional and multilateral trade agreements has become a central element of the foreign economic policies of many countries. The outcomes of the project will have particular relevance for Australia: understanding how our trade partners determine their trade agendas, and being able to identify potential allies and obstacles to the securing of bilateral trade agreements, is crucial for the successful negotiation and conclusion of trade agreements. This project will contribute to our understanding of how the processes of globalization are reconfiguring interactions between government, business and civil society both within and across national boundaries.

DP0771096 A/Prof CT Chantler; Dr JD Gillaspy; Dr LT Hudson; Prof JD Silver; Prof IP Grant

Approved Project Title **Critical Tests of Quantum Electro-Dynamics (QED) in heavy atomic systems**

2007 : $150,000
2008 : $150,000
2009 : $150,000
Primary RFCD 2403 ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS; PLASMA PH

Administering Organisation The University of Melbourne

Project Summary

The 2005 Nobel prize was awarded for high-precision spectroscopy and a critical test of QED in light atomic systems. This led to dramatic applications to constants of nature and Quantum Optics. Our research has also developed state-of-the-art detector and spectrometer technology in pursuit of fundamental knowledge, but in the X-ray regime. We will make major progress for heavy atomic systems. Applications include the development of a few-electron calibration lamp, widely discussed as a new energy standard. These studies provide data, physical insights and highly skilled personnel for Australia's future in frontier technologies. Our fundamental research has led to two orders of magnitude improvement in mammographic diagnostic accuracy.

DP0772650 Prof JG Clement; Mr CL Thomas; Dr IR Gordon; Dr S MIYASAKA

Approved Project Title **3D analysis of facial features for proof of identity across Australia's ethnically diverse population**

2007 : $100,000
2008 : $90,000
2009 : $84,000

Primary RFCD 3904 LAW ENFORCEMENT

Administering Organisation The University of Melbourne

Project Summary

The forensic sciences concerned with establishing Human identity play a vital role in safeguarding Australia. Certainty in Human identification is required by police and intelligence agencies because knowing the identity of perpetrators (or potential perpetrators) of crime allows effective preventative intervention. This is particularly important during surveillance operations and in the context of border protection. When crime has already been committed, the identification of victims and perpetrators is important for the exoneration of the innocent and successful prosecution of the guilty. The full utilisation of 3D morphometric analysis of faces will provide criteria robust enough for legal proof of identity.

DP0772440 Mr I Coller

Approved Project Title **Europe and Identity: A transcultural history of European communities in the Islamic world 1685-1800**

2007 : $91,776
2008 : $83,523
2009 : $97,438
2010 : $57,973

Primary RFCD 4301 HISTORICAL STUDIES

APD Mr I Coller

Administering Organisation The University of Melbourne

Project Summary

This project originates from the pressing need to reconceptualize histories in the context of multicultural societies. To address the mutual hostility of the historical narratives reinforced by recent global political events, we must open European history, and particularly the crucial period of the Enlightenment, to an inclusive cultural dialogue about the past. This project is built on a strong track record of dialogue with a region from which Australia is too often disconnected, despite the significant Arab and Turkish communities within the Australian polity. Recent conflicts have reinforced the urgency of opening this cross-cultural dialogue within our own multicultural cities.

DP0771091 Dr S Cooney; Dr SC Biddulph; A/Prof Y Zhu

Approved Project Title **Enforcement of Chinese Employment Law: Regulatory Innovation and Wage Arrears**

2007 : $60,000
2008 : $40,000
2009 : $40,000

Primary RFCD 3901 LAW

Administering Organisation The University of Melbourne

Project Summary

Australia's security and economic well-being is closely bound up with China. It is in Australia's interests that China develops a sound legal system as the foundation of a prosperous, humane and stable society. The pervasive failure to pay Chinese workers their correct wages tests the capacity and credibility of Chinese law. An assessment of the legal system's response to the wage problem will provide specific insights on securing compliance with the employment law in China, benefiting Australian foreign policy makers, traders, investors and overseas development organisations. It will facilitate collaborative work between China and Australia on strengthening the regulatory capacity of Chinese institutions.

DP0773501 A/Prof BA Creed; A/Prof JJ Hoorn

Approved Project Title **Cinema and Civilisation: Science, Progress and Empire in Early Film**

2007 : $129,000
2008 : $86,000
2009 : $83,000

Primary RFCD 4103 CINEMA, ELECTRONIC ARTS AND MULTIMEDIA

Administering Organisation The University of Melbourne

Project Summary

This study will explore the role of early film in disseminating the Western ideals of progress, science and technology in the colonial nations of Australia's region. Early films made about Indonesia, Indochina, Australia, Papua New Guinea, Malaysia and Singapore as well as India and North Africa will be studied. The study will reveal Australia's dual roles as a recipient of the civilising mission and later as a propagator of this knowledge in its own sphere of influence. Such an understanding will lead to a fuller comprehension of the relative meaning of terms such as 'progress', 'science' and 'civilisation' in Australia and its region.

DP0772003 Dr PJ Daborn

Approved Project Title **Insect development : the role of cytochrome P450s**

2007 : $153,000
2008 : $143,000
2009 : $133,000
2010 : $133,000
2011 : $133,000

Primary RFCD 2702 GENETICS

ARF Dr PJ Daborn

Administering Organisation The University of Melbourne

Project Summary

Pest insects vector human diseases such as malaria and impose a massive burden in agriculture due to control costs and production losses. The intelligent control of insect pests requires an understanding of their development that is controlled by hormones. This project will provide an in depth understanding of insect hormone synthesis/degradation that is controlled by a class of enzymes, the cytochrome P450s. This will increase the potential for new insect-specific control strategies with a decreased environmental impact.

DP0771800 Dr J Dickenson

Approved Project Title **Managing trust: a comparative historical study of political accountability in Australia.**

2007 : $59,773
2008 : $57,773
2009 : $57,773
2010 : $57,773

Primary RFCD 4301 HISTORICAL STUDIES

APD Dr J Dickenson

Administering Organisation The University of Melbourne

Project Summary

Some Australian political leaders have acknowledged a crisis in their trust relationship with voters and seek ways to fix it. By historicising the 'crisis of trust' thesis, and testing its assumptions, I expect to demonstrate that, far from being alienated from voters, representatives both reflect and shape society's notions of trustworthiness. This knowledge offers political leaders new ways of approaching their relationships with voters in order to redress the trust dilemma. It also provides fresh, more positive ways of conceptualising trust relations generally, offering a way forward from the present cynicism, for a variety of trust relationships to be made anew.

DP0773135 Dr PS Donnelly

Approved Project Title **Copper Radiopharmaceuticals for Molecular Imaging of Alzheimer's Disease**

2007 : $80,000
2008 : $80,000
2009 : $80,000
Primary RFCD 2502 INORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

The expected outcome of this research is to develop molecular agents to allow non-invasive diagnostic imaging of senile plaques associated with the onset of Alzheimer's disease. This will contribute to a better understanding of the disease, assist in early diagnosis and help assess new intervention strategies. Alzheimer's disease is the most common form of dementia and affects over 160,000 Australians. The imaging agent market is a niche biotechnology industry in which Australia already has an international presence. The proposed research will lead to innovations to ensure Australia remains internationally competitive in this area. This research has potential social and economic benefits for the nation.

DP0772854 A/Prof BJ Downes; Dr J Lancaster

Approved Project Title **Resource patchiness, dispersal and species co-occurrence: an experimental and levels-of-evidence approach in some lowland streams**

2007 : $90,000
2008 : $80,000
2009 : $85,000
Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation The University of Melbourne

Project Summary

Millions of dollars are being spent on rehabilitating river ecosystems that have often been highly simplified by human activities. It is important that such rehabilitation be well-grounded in sound ecological knowledge. We will test how the availability of essential resources of food and living space affect the identity and density of species present. We expect to provide practical advice allowing managers to enhance biodiversity in streams surrounded by, and serving, agricultural areas. Likewise, we will be able to advise on the consequences of excessive water extraction on the likely success of such rehabilitation in rivers with highly variable flows.

DP0771697 A/Prof RW Eckersley

Approved Project Title **Regime interplay: from conflict to integration in overlapping international regimes**

2007 : $36,000
2008 : $39,000
2009 : $36,000
Primary RFCD 3601 POLITICAL SCIENCE

Administering Organisation The University of Melbourne

Project Summary

This project furthers the National Research Priority of An Environmentally Sustainable Australia, particularly the subsidiary goal of meeting Australia's Kyoto targets. The project will recommend ways of improving the integration of international trade and environmental regimes to enable the Australian government to tackle national environmental problems and risks, such as climate change, and encourage the "greening" of Australian industry without fear of retaliatory trade sanctions or unfair competitive advantages accruing to other nations. Successful national environmental policies, particularly in the complex area of climate change, are dependent upon the integration of environmental and economic policies at the international level.

DP0772525 Dr C Evans; A/Prof EJ Gaze

Approved Project Title **Non-Discrimination Laws and Religious Freedom: Current Conflicts and Future Directions**

2007 : $42,000
2008 : $40,000
2009 : $80,000

Primary RFCD 3903 JUSTICE AND LEGAL STUDIES

Administering Organisation The University of Melbourne

Project Summary

Achieving the right balance between adequately protecting religious freedom while staying true to principles of non-discrimination is far from easy. This project will advance understanding and analysis of religious freedom and equal treatment in Australia, in principle, in law and empirically. In the context of community tensions along ethno-religious lines, it will benefit Australia to have the issues at stake described and clarified. The project will identify the relevant interests at stake and develop policy recommendations for their protection. The aim is to contribute to inter-religious (and inter-cultural) harmony, as an element of safeguarding Australia.

DP0772013 Prof J Frow

Approved Project Title **The importance of the fictional character in literary theory and cultural practice**

2007 : $54,264
2008 : $50,258
2009 : $20,000

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation The University of Melbourne

Project Summary

This project is a theoretical research project which aims to make significant and innovative contributions to research excellence in literature and the history of ideas. This research focuses on the fictional character, one of the central categories of literary theory. The benefits flowing from it will primarily be an enhanced understanding of the workings and the history of a category that informs every domain of cultural practice.

DP0772814 Dr BG Fry; Dr JA Norman; A/Prof WC Hodgson

Approved Project Title **Evolutionary venomics: Venom system diversification in the animal kingdom**

2007 : $147,000
2008 : $148,000
2009 : $140,000
2010 : $140,000
2011 : $140,000

Primary RFCD 2702 GENETICS

QEII Dr BG Fry

Administering Organisation The University of Melbourne

Project Summary

This proposal represents a tremendous opportunity for biodiscovery from the Australian toxic fauna. This will be achieved through the researcher's unique approach of investigating previously unmapped venom systems for divergent, bioactive proteins. An understanding of venomous animal protein evolution has practical implications for the treatment of envenomations - an enormous problem in Australia - as well as great potential in drug discovery and other commercial applications. This project will provide Australian graduate and post-graduate students with finely tuned skills in cutting edge methodological techniques and a fluent understanding of molecular evolution, preparing them to be internationally competitive scientists.

DP0771223 Prof JS Gans; A/Prof MD Ryall

Approved Project Title **Developing a Coalitional Approach to Business Strategy and Industrial Organisation: Theory and Empirical Operationalisation**

2007 : $95,000
2008 : $95,000
2009 : $95,000
Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation The University of Melbourne

Project Summary

Recent advances in game theory have had an impact on understanding the strategic implications of some business actions. However, of considerable more use to business would be a set of tools that can identify strategic opportunities taking into account all of the reactions from rivals and others in the market place. This project will use coalitional game theory to develop those tools and then take those tools and operationalise them utilising Australian data. The end result will be new studies of the strategic environment facing Australian business and recommendations that will hopefully improve the productivity of Australian industry.

DP0770639 Prof KD Gelder

Approved Project Title **Evaluating the Australian Popular Fiction Archive: A Definitive Critical History and Bibliography of Early to Late Colonial Genre Writing**

2007 : $105,727
2008 : $136,935
2009 : $140,735
Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation The University of Melbourne

Project Summary

This project analyses and evaluates Australian popular or genre fiction from the early to the late colonial period: from around the 1840s to the beginning of World War Two. It will chart a comprehensive history of colonial Australian genre fiction for the first time, producing two critical monographs and an online bibliography and digital archive which will function as major reading, research and teaching resources. Understanding colonial popular fiction as a field of writing that expressed colonial sensibilities and performed colonial predicaments, this project will also demonstrate the formative role it played in the task of settlement and nation building.

DP0773117 Prof PA Gleeson

Approved Project Title **The functional organisation of the trans-Golgi network: From cultured cells to physiological systems**

2007 : $90,000
2008 : $88,000
2009 : $85,000
Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

This research will result in a better understanding of the secretory pathway of all eukaryotic cells, a process of broad biological and biomedical significance. It will impact on cell biology in the broadest sense, from membrane biogenesis to lipid domain organization, as well as membrane transport, protein structure and protein targeting. Furthermore, this work will utilize and develop frontier technologies of live cell imaging and RNA interference as a genetic tool to investigate functions of a protein family. By training post-graduate students and post-doctoral staff, it will contribute to the expertise of cell biology in Australia. International collaborations will enhance connections between Australia and overseas research.

DP0772623 Prof JA Griffiths; Dr S Aguirre Rincon

Approved Project Title **Urban Soundscapes in Renaissance Spain**

2007 : $43,294
2008 : $40,000
2009 : $43,147

Primary RFCD 4101 PERFORMING ARTS

Administering Organisation The University of Melbourne

Project Summary

This project will contribute to understanding the cultural history of Spain and augment awareness of urban soundscapes in order to better understand our past and develop urban space in the future. The project will examine European musical behaviour in urban centres 400-500 years ago. The project will interpret history in a way that is engaging and relevant to contemporary readers in Australia and throughout the world. It will also assist in positioning Australian research at the international cutting edge through the development of an innovative form of urban music history and associated methodologies.

DP0771849 Prof PA Grimshaw; Dr AJ Brown-May

Approved Project Title **Faith, gender and cultural exchange: Australian missions in comparative perspective, 1800-1930.**

2007 : $82,318
2008 : $74,626
2009 : $51,118

Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of Melbourne

Project Summary

The project will permit a fresh understanding of Australia's core tradition of British Christianity, an important cultural heritage which influences current views of national identity and which is of increasing significance in the face of the insecurities of globalisation. Through illuminating understandings of social, cultural and religious issues, in particular in relation to gendered aspects of religious faithwithin cross-cultural encounters , it will contribute to greater understanding of societies and cultures across the Asia-Pacific region. It will foster international scholarly interchange, dissemination of its findings giving increased profile for Australia within the fields of colonial studies, gender and mission history.

DP0774251 Dr KA Gross; Prof J Keskinen

Approved Project Title **Guided droplet deposition: Microfabrication of advanced materials**

2007 : $90,000
2008 : $80,000
2009 : $70,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

The progress of micro and nanofabrication is opening an array of new opportunities with a new degree of freedom for manufacturing. This process will complement the existing micromanufacturing facilities in Melbourne. While metal printing and deposition of polymers is presently available, the guided droplet deposition will extend current capabilities to include ceramics and high melting temperature metals. Direct application to medical devices will provide a more effective surface for improved performance and allow the incorporation of smart and sensor materials for multifunctional devices.

DP0774670 Dr KA Gross; Prof SE Graves

Approved Project Title **Advanced micro-architecture and nanotopography for enhanced tissue growth in scaffolds**

2007 : $80,000
2008 : $60,000
2009 : $60,000

Primary RFCD 2915 BIOMEDICAL ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

Tissue engineering scaffolds offer an urgently needed synthetic biomaterials solution to overcome disease transmission from donor transplants. This work will combine biomaterial chemistry and designed surface topography to trigger bone formation within a scaffold for the first time in the world. Collaboration with national research leaders on stem cell and animal testing of the new scaffolds will provide the necessary interdisciplinary approach to generate a new product for patients in need of bone regeneration. Australia will benefit from the contribution to medical science, the development of a new device for rapid prototyping tissue engineering scaffolds, retain biomaterials research expertise, and generate new biomedical products.

DP0771639 Prof C Hardy; Dr S Maguire

Approved Project Title **Managing Transformational Change: A Discursive Approach**

2007 : $24,000
2008 : $20,000
2009 : $21,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation The University of Melbourne

Project Summary

This research program will help to improve business competitiveness, which is predicated on the ability to manage transformational change, and add to the Australian repertoire of effective change practices. It will provide insights into social innovation which depends upon effective inter-organizational collaboration by organizations from different sectors to bring about social change. It will help managers in diverse organizations deal with issues of sustainability and human health which depend upon managerial capacity in addition to scientific endeavours. It will help locate Australia as a centre of expertise in the use of discourse analysis in organization and management theory.

DP0771200 Dr NO Haslam; Dr P Bain

Approved Project Title **Dehumanization: Understanding the attribution of lesser humanness to others**

2007 : $89,000
2008 : $86,000
2009 : $90,000
2010 : $88,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

The proposed research will contribute to an improved understanding of the subtle ways in which humanness is denied to members of some social groups. These processes contribute to intergroup antagonism and intolerance, and to a failure to take adequate moral account of other people's suffering. Understanding dehumanization can enhance our ability to recognize and overcome its manifestations in public life and the community. Scientifically, the proposed work will contribute to the nation's reputation as a world leader in the psychological study of intergroup relations.

DP0770245 Prof AA Hoffmann; Prof L Partridge

Approved Project Title **Identifying genes causing thermal evolution of ectotherm body size**

2007 : $120,000
2008 : $120,000
2009 : $120,000
2010 : $100,000
2011 : $100,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

Cold-blooded animals increase in body size as they are found in populations at greater distances from the equator. These patterns are due to populations adapting to temperature. The aim of this project is to identify the genes involved in this adaptation process. We will do this by taking advantage of a well-studied body size cline in the vinegar fly on the east coast of Australia, and by building on an international collaboration between a leading UK and two Australian research groups. In doing so we will provide an explanation at the molecular level for one of the great unresolved phenomena in biology: why do cold-blooded animals get bigger in the cold? The research also leads to the potential to manipulate body size in animals.

DP0770715 A/Prof LC Hollenberg

Approved Project Title **Quantum Nanotechnology: Concepts to Devices**

2007 : $77,030
2008 : $190,030
2009 : $189,030
2010 : $84,030
2011 : $84,030

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

APF A/Prof LC Hollenberg

Administering Organisation The University of Melbourne

Project Summary

Just as the technological advances of the past few decades at the micro level fundamentally changed our lives, so too the emerging era of 'quantum nanotechnology' promises to revolutionise our society in the 21st century. This Fellowship will explore and develop critical areas of quantum nanotechnology - absolutely secure communication, nanoscopic level imaging, and exponentially fast computers. Such technology will have far reaching applications in all areas of society and provide significant National benefit.

DP0770668 Prof AB Holmes; Prof AW Burgess; Dr BL Catimel

Approved Project Title **Identifying mitogenic signalling proteins with phosphatidyl inositol lipids**

2007 : $200,000
2008 : $210,000
2009 : $220,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

Health care of an ageing population is a national priority of the community. In order to understand the factors that control cell growth and death in cancer cells signalling proteins can be identified and studied and compared with model systems from quiescent cells. Using phospholipids attached to 'fishing lines' we can search for, identify and study the function of all the downstream signalling proteins in activated cancer cells. This will provide the basic information for drug discovery processes to target specific molecules that inhibit and control the function of the signalling proteins implicated in the growth of cancer cells.

DP0772543 Prof JL Hopper; Prof MA Reuter; Prof J Langford

Approved Project Title **Expert judgment of environmental health risks from exposures to contaminants in urban water systems**

2007 : $94,000
2008 : $94,000
2009 : $94,000

Primary RFCD 3009 LAND, PARKS AND AGRICULTURE MANAGEMENT

Administering Organisation The University of Melbourne

Project Summary

Sustainable urban water policy requires informed risk management procedures for health and environmental risks from exposures to many contaminants in urban water systems. This research articulates with the National Water Quality Management Strategy and national guidelines for drinking and recycled water; and it shows barriers to successful community adoption of new sustainable water technologies. Technical advances in modelling expert opinion will contribute to improved standardised risk assessment frameworks throughout government. The research is fundamental for better decision-making for regulators, suppliers, and managers and it will influence the international development of similar guidelines for sustainable urban water use.

DP0772068 Prof RM Huggins; Dr G Qian; Dr A Robinson

Approved Project Title **Statistical Analysis of Some Partially Observed Processes Arising in Ecological Research**

2007 : $65,000
2008 : $60,000
2009 : $55,000

Primary RFCD 2302 STATISTICS

Administering Organisation The University of Melbourne

Project Summary

The expected outcomes of this project are the provision of statistical methods to draw important information from samples from wild animal populations and the training of researchers to conduct high quality statistical ecological research. The national benefit lies on the availability of the developed techniques and researchers from this project to the society for finding better ways of managing Australia's ecological systems and making Australia environmentally sustainable.

DP0770567 A/Prof GR Kalb; Prof J Creedy

Approved Project Title **The effects of the tax and social security system on labour supply and social welfare**

2007 : $110,000
2008 : $115,000
2009 : $120,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

This research will provide independent assessment of the work-incentive effects of government policies in the area of income tax, social security and childcare costs. Capacity constraints may threaten sustained economic growth in Australia. Understanding and supporting the drivers of work force participation is stated in the National Research Priorities as being vital. In addition to the empirical results, the project provides a set of tools that can be used to evaluate new policies with respect to the effects on labour supply, income distribution and social welfare. This will provide timely and independent evidence on which to evaluate new policies and therefore increase the quality of the debate on tax and social security policy.

DP0771924 Dr MR Kearney; Prof CC Moritz

Approved Project Title **Hybridization, polyploidy and the evolution of parthenogenesis in the Australian desert**

2007 : $120,406
2008 : $95,000
2009 : $90,000
Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

This project considers the ecology and evolution of Australian animals that reproduce by parthenogenesis, i.e. without sex. These animals have long fascinated evolutionary biologists for the clues they provide about the role of sex in evolution. The Australian desert is a hot-spot for parthenogenesis, providing a unique opportunity to study the ecological and evolutionary forces favouring the loss of sex. Our research will exploit Australian cases of parthenogenesis to understand how genetic changes associated with the transition to parthenogenesis affect ecological success. This will significantly extend our understanding of both the role of sex in evolution, and of the evolutionary history of the Australian arid zone.

DP0771094 Dr SE Kentish; Dr M Ashokkumar

Approved Project Title **Surfactant Effects In Sonoprocessing**

2007 : $80,000
2008 : $80,000
2009 : $80,000
Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

This project will provide the fundamental science required to further develop a range of ultrasonic applications within the Australian food industry, for wastewater treatment and in medical science. In particular, it will assist more applied research currently sponsored by both the Victorian government STI initiative and the CSIRO Food Futures Flagship, which considers the use of ultrasound to assist in bioactives separation, food emulsification and membrane operations. The development of ultrasound contrast agents (surfactant coated microbubbles) also has the potential to increase both the length and quality of life for many Australians. The work addresses both National Research priorities and the CSIRO Food Futures Flagship goals.

DP0772648 Prof MJ Keough

Approved Project Title **Post-settlement mortality as a filter for variable settlement in marine invertebrates**

2007 : $90,000
2008 : $88,000
2009 : $85,000
Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation The University of Melbourne

Project Summary

Most marine organisms have a planktonic dispersive stage. Recruitment from this stage into adult populations is a key process. Variations in recruitment affect our ability to manage fisheries, plan national parks, and predict environmental impacts. Our ability to understand variation in recruitment is limited by our poor understanding of one key component of recruitment, post-settlement mortality. I will take several common, economically important, marine invertebrates, and determine how strongly post-settlement mortality affects overall recruitment. By looking at several species, I will be able to identify general patterns applicable to a wider range of species.

DP0770381 Dr TP Lane; Dr MJ Manton; Dr ST Siems; Dr PT May; Dr C Jakob

Approved Project Title **Tropical convection and its contribution to climate variability**

2007 : $77,000
2008 : $79,000
2009 : $82,000
Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation The University of Melbourne

Project Summary

This research will provide the necessary data to test and improve the representation of tropical convective clouds in weather forecast and climate simulation models. This will lead to more robust estimates of future climate change, and improved prediction of precipitation in the Australian tropics. This project will also provide training to undergraduate and postgraduate students in using modern computer models; such models will be a key component of weather forecasting in the future.

DP0772827 Dr DM Leslie

Approved Project Title **Spiritual and cross-cultural elements in contemporary Australian art**

2007 : $69,773
2008 : $67,773
2009 : $67,773
2010 : $62,773
Primary RFCD 4199 OTHER ARTS
APD Dr DM Leslie

Administering Organisation The University of Melbourne

Project Summary

This project will benefit the Australian community through new research on Australian art as an arena for the expression of spirituality. Its exploration of the spiritual and cross-cultural aspects of seven outstanding contemporary Australian artists, especially in relation to Aboriginal Art and Asian Art, will provide a strong basis for further comparative research on the history of the relationship between art and spirituality in contemporary Australian art. The resulting book and conference papers will make the fruits of this research widely known in the community.

DP0771426 Dr N Levy; Dr JM Kennett

Approved Project Title **Neuroethics: The Practical and the Philosophical**

2007 : $55,118
2008 : $65,118
2009 : $65,118
Primary RFCD 4401 PHILOSOPHY

Administering Organisation The University of Melbourne

Project Summary

The benefits of the project are twofold: practically, it will enable us to better regulate, personally and socially, the new technologies that the sciences of the mind are already producing; intellectually, it will enable us to better understand human agency in the light of the new knowledge generated by the sciences of the mind, and it will help to maintain Australia's reputation as an international leader in applied ethics and in philosophy of mind and agency.

DP0770283 A/Prof TJ Lithgow; Dr V Likic

Approved Project Title **Mitochondrial biogenesis: the evolution of molecular machines**

2007 : $110,000
2008 : $105,000
2009 : $100,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

Benefits from this research program fall into two discrete types. Firstly, excellent outcomes are provided for the training of postgraduate students and research staff. This project entails cutting edge technology, and the development of skills not common in Australia. Secondly, detailed knowledge will be gained of molecular machines and the way in which they may differ in human cells and in the cells of human cell parasites, with implications for the treatment of human disease.

DP0772781 A/Prof GS Lynch; Prof DA Williams

Approved Project Title **Regulating calcium handling in skeletal muscle - implications for muscle contraction, injury and repair, ageing and development**

2007 : $103,810
2008 : $97,000
2009 : $90,000

Primary RFCD 3206 MEDICAL PHYSIOLOGY

Administering Organisation The University of Melbourne

Project Summary

Understanding the mechanisms regulating calcium in skeletal muscle has important relevance for studying muscle growth and development, injury and repair, and for identifying therapeutic targets and potential therapies for ageing-related disorders, reconstructive surgery, sporting and workplace injuries, and muscle diseases. Combining cell physiology, fluorescence microscopy and digital imaging technologies for studying multicellular tissues such as skeletal muscle will enhance the international competitiveness of Australian biological research. The research will optimise development of gene delivery systems that may find eventual application for muscle wasting disorders and conditions where muscle weakness compromises quality of life.

DP0771163 Prof E Malcolm; Dr J Waller; Dr AD MacKinnon

Approved Project Title **A history of psychiatric institutionalisation and community care in Australia, 1830s-1990s**

2007 : $100,186
2008 : $60,770
2009 : $77,712

Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of Melbourne

Project Summary

A vigorous debate is underway in Australia currently over the policy of closing mental institutions and caring for the mentally ill in the community. Whereas doctors, politicians and journalists have contributed to this debate, regularly resorting to history to bolster their arguments, historians themselves have had relatively little to say. A genuinely national history of mental health care simply does not exist. This study provides that comprehensive history, in the belief that policy making in such a vital area of health cannot be undertaken effectively without an informed understanding of the successes and failures of the last 150 years.

DP0771068 A/Prof E Manias; Prof P Dunning

Approved Project Title **Towards safe care and consumer engagement: addressing the complexities of communication processes for managing medications in hospitals**

2007 : $57,000
2008 : $58,000
2009 : $30,000
Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES

Administering Organisation The University of Melbourne

Project Summary

Ineffective communication is the most common cause of medication problems in Australia. This study focuses on how health professionals of various disciplines including medicine, pharmacy and nursing communicate with each other about medications. Integral involvement of consumers and family members will ensure that health and social outcomes are considered from different perspectives, which are therefore likely to be successful. Examination of communication processes will help lead to safe care and consumer involvement. The unique knowledge obtained will inform policies in various clinical settings and identify strategies for better communication. Health professionals and consumers can adopt these strategies to improve medication safety.

DP0772653 Dr KJ McDonald

Approved Project Title **Islamic movements in secular societies: grammars of experience**

2007 : $70,000
2008 : $70,000
2009 : $70,000
Primary RFCD 3701 SOCIOLOGY

Administering Organisation The University of Melbourne

Project Summary

There is increasing public debate about the place of Islam in western societies, but little reference to lived experience. At a same time, we are witnessing new forms of Islamic movements and experiences, in particular among a 'global generation' of young people. This study explores forms of tension and grammars of creativity, assisting actors make sense of and communicate their experience. It also grapples with new global forms of violence that profoundly impact personal experience. This project aims at understanding new forms of social creativity, as well as new types of tension, and to assist rethinking both contemporary security and citizenship.

DP0772760 Dr KE McGregor

Approved Project Title **Islam and the Politics of Memory and Identity in Post-Authoritarian Indonesia**

2007 : $83,208
2008 : $73,901
2009 : $37,280
Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of Melbourne

Project Summary

This project will make a vital contribution to understanding the past and present of Indonesia, Australia's most significant neighbour. The project investigates the legacy of competition between two of the most influential ideological and political forces in Indonesian history, communism and Islam, and examines their continuing significance to contemporary Indonesian identities. My analysis will profile the diverse range of Islamic opinions in Indonesia on reconciliation and provide broader comparative insights into the processes of dealing with traumatic pasts.

DP0773016 Em/Prof TA McMahon

Approved Project Title **Understanding and modelling of interannual hydroclimatic variability in the context of historic streamflow**

2007 : $65,000
2008 : $65,000
2009 : $65,000

Primary RFCD 2605 HYDROLOGY

Administering Organisation The University of Melbourne

Project Summary

Recent persistently dry conditions in Australia have triggered water restrictions in major cities and re-emphasised the importance of water to this country. This project represents an integrated package of research that will enhance our understanding of interannual hydroclimatic variability, and its implications for land and water resources systems. The methodologies and model developed here will directly lead to more informed decision making for sustainable use and management of Australia's increasingly scarce natural resources to cope with changing climate over a range of time scales. This is particularly important for Australia because of its higher interannual hydroclimate variability compared to elsewhere in the world.

DP0772759 Dr S McQuire; A/Prof N Papastergiadis; Prof SR Cubitt

Approved Project Title **Public screens and their transformation of social interactions in public spaces**

2007 : $134,000
2008 : $110,000
2009 : $124,000

Primary RFCD 3701 SOCIOLOGY

Administering Organisation The University of Melbourne

Project Summary

This project will provide the first Australian analysis of public interaction with large electronic screens. The installation of large screens in public spaces is rapidly expanding in cities around the world. Our project will explore the potential for these screens to support new cultural practices and generate new social interactions. The research involves a cross-cultural comparison of screens in Europe, Asia and North America, along with the 'Big Screen' in Federation Square, Melbourne. The strategic value of the project is its capacity to inform public policy, and to improve understanding of the dynamics of public culture in mediated societies.

DP0772078 Prof AM Moffat; Prof J Zobel

Approved Project Title **Methodologies for Designing and Evaluating Information Retrieval Experiments**

2007 : $145,000
2008 : $152,000
2009 : $146,000
2010 : $113,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of Melbourne

Project Summary

Australian researchers have been highly successful in the area of information searching for more than two decades. This project will reinforce that position. By developing better measures of how retrieval systems such as web search engines perform, we will be able to advise the providers of such services on how to structure software so as to maximize the utility gained by their customers. Targeted access to the right information is a goal of all organizations, regardless of their type, and improved methodologies for conducting information retrieval experiments will have widespread and tangible benefits. The techniques developed will also be applicable in fields such as document categorization, text summarization, and machine learning.

DP0772057 Ms ML Moir; Dr PA Vesk; A/Prof LA Hughes; Dr DA Keith

Approved Project Title **Predicting co-extinction risk of invertebrates on endangered plants**

2007 : $80,000
2008 : $80,000
2009 : $80,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation The University of Melbourne

Project Summary

Co-extinction occurs when a dependent species goes extinct with the loss of its host species. A recent overseas modelling study suggested losses to global biodiversity through this mechanism may be high, but only when a large number of hosts are extinguished. However, estimates were constrained because there are no datasets with insects sampled from endangered plants. Thus, the accuracy of the estimates remains unknown, particularly for Australian insects. This project will provide the most accurate estimate to date by sampling endangered plants and identify management strategies for sustaining viable populations of endangered insects, thereby conserving Australia's biodiversity.

DP0770440 Prof M Olekalns; Prof PL Smith

Approved Project Title **A Relational Model of Strategic Choice in Negotiation**

2007 : $45,800
2008 : $47,800
2009 : $50,500

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

Poorly managed negotiations have negative consequences for both individuals and organisations. They create negative emotions, damage relationships, and may require costly and time-consuming third-party interventions. An important, yet neglected, aspect of negotiations is the underlying relationship between the parties. In this project, we examine how risks to the underlying relationship, specifically, perceived trustworthiness or its lack, affect negotiators' strategy choices. Each of the risks that we identify can be offset by selecting appropriate strategies. We develop and test a model that helps negotiators identify these risks and make strategic choices that protect their interests without damaging the relationship.

DP0770640 Prof AM Orford

Approved Project Title **Cosmopolitanism and the Future of International Law**

2007 : $148,454
2008 : $120,000
2009 : $100,000
2010 : $80,000
2011 : $140,000

Primary RFCD 3901 LAW

APF Prof AM Orford

Administering Organisation The University of Melbourne

Project Summary

Questions about the theoretical foundation and practical effect of international law are extremely timely and of direct interest to Australia. Dominant conceptions of law have proved inadequate for understanding the capacity of international law to respond to the threats and challenges of our time. This project will assist Australians to participate more actively in generating new institutions, concepts and frameworks which will shape the future of international law. It will ensure that international law and institutions can better respond to the questions raised and the demands made on Australia by humanitarian crises, economic globalization and the movement of peoples.

DP0770705 A/Prof AL Owczarek; Dr I Jensen; Dr AD Rechnitzer

Approved Project Title **Searching for solvability in Statistical Mechanics and beyond using advanced Enumerative Combinatorics**

2007 : $178,200
2008 : $178,200
2009 : $178,200
2010 : $178,200
2011 : $178,200

Primary RFCD 2301 MATHEMATICS

QEII Dr AD Rechnitzer

ARF Dr I Jensen

Administering Organisation The University of Melbourne

Project Summary

Standard models in lattice statistical mechanics provide basic models of a large variety of physical systems from polymers to the spread of forest fires. The ability to write down some kind of solution to these problems provides inestimable insight into their generic and universal behaviour. This project aims to expand the types of "solution" that mathematicians and physicists can write down.

DP0772838 Prof MG Pandy; Prof IM Mareels; Dr JW Fernandez

Approved Project Title **A Control Systems Approach for Understanding Human Locomotion**

2007 : $108,000
2008 : $102,000
2009 : $100,000

Primary RFCD 2301 MATHEMATICS

APD Dr JW Fernandez

Administering Organisation The University of Melbourne

Project Summary

This proposal addresses fundamental, difficult questions in the context of human movement: How do muscles move our limbs during walking? How do the nervous system and muscles work together to control movement? Realistic computer simulations of human movement can help answer these questions and, in so doing, can play a pivotal role in three of Australia's largest industries: healthcare, through clinical gait analysis and gait rehabilitation (diagnosis and treatment of movement disorders); sports, through the development of personalized training programs for elite athletes; and entertainment, through the development of video/digital games and animated films (creation of virtual life-like actors).

DP0770301 Prof MW Parker

Approved Project Title **Molecular analysis of glutathione transferase interactions with drugs and physiological ligands**

2007 : $90,000
2008 : $88,000
2009 : $85,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

Proteins called glutathione transferases protect us from toxic molecules that we ingest, breathe in or are by-products of normal metabolism. The same proteins also bind to many types of drugs leading them to be excreted from the body. In this project molecular structures of glutathione transferases bound to anti-cancer drugs will be determined as the basis for devising inhibitors of the protein that will make drugs much more effective.

DP0770888 Dr MA Perugini; Dr CA Hutton; A/Prof JA Gerrard

Approved Project Title **Dissociation of a Tetrameric Enzyme with Interface-Targeted Peptides**

2007 : $90,000
2008 : $88,000
2009 : $85,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

With antibiotic resistance on the rise, there is an urgent need to develop new antibiotics and an equally urgent need to characterise new antibiotic targets. One such target is dihydrodipicolinate synthase (DHDPS) which catalyses the critical step in lysine and cell wall biosynthesis in bacteria. This proposal aims to generate new drugs targeting DHDPS for effective and rapid treatment of bacterial infections, including gastroenteritis. Recent statistics show that over 5 million Australians suffer from gastroenteritis each year and hospitalisation for this infection is nearly seven times higher for indigenous than non-indigenous children. Accordingly, this research has the potential to assure a healthier future for millions of Australians.

DP0771028 A/Prof J Polesel; Prof JP Keating; Prof RV Teese

Approved Project Title **Vocational Education and Training in Schools: Cultural Resistance and the Academic Tradition**

2007 : $78,000
2008 : $110,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation The University of Melbourne

Project Summary

This study seeks to relate how well different models of VET in Schools delivery (in different settings) work towards achieving the objectives of improved participation, more effective transitions and engagement of reluctant learners. It also seeks to assess how effectively the different ways of delivering VET are meeting governments' objectives to build Australia's skills base and provide young people with effective pathways. This study will provide education and training systems with valuable data on the effectiveness of this major policy innovation for different student groups. It will do so by analysing three major school leaver data-bases, followed up by qualitative studies in 12 schools in Victoria, New South Wales and Queensland.

DP0774121 Dr JR Rabeau; Dr MJ Sellars

Approved Project Title **Diamond based single spin detector**

2007 : $107,030
2008 : $97,030
2009 : $87,030

Primary RFCD 2404 OPTICAL PHYSICS

APD Dr JR Rabeau

Administering Organisation The University of Melbourne

Project Summary

It is expected that the development of the diamond based spin detector will further enhance Australia's international reputation as a significant contributor to the broad field of nanotechnology. The spin detection technology will have many applications in a variety of fields that rely on nanoscale precision measurement of single quantum systems.

Single spin detection will also be a pivotal tool in the push to produce quantum information technologies, a field that has been invested in heavily by the Australian government. This device will significantly enhance the potential success of a range of projects related to such nanoscale science.

DP0771017 Prof MB Renfree; Dr AJ Pask

Approved Project Title **How does the unilaminar blastocyst form an embryo?**

2007 : $90,000
2008 : $88,000
2009 : $85,000
Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

Marsupials are synonymous with Australia and they are scientifically amazing. An understanding how the single-layered marsupial blastocyst cells are directed to form the complex organisation of an embryo would help us understand the biology underlying the developmental potential of all cells. Understanding these processes is not only of great fundamental interest to developmental biology but also for the development of embryonic stem cell lines. This research will continue Australia's high profile in reproductive biology using one of our iconic native mammals. A greater understanding of marsupial reproduction will also contribute to management of our threatened marsupial populations.

DP0770408 A/Prof MA Rizzacasa

Approved Project Title **Biomimetic and Methodology Based Total Synthesis of Bioactive Natural Products**

2007 : $100,000
2008 : $100,000
2009 : $100,000
Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

The proposal will study the synthesis of novel natural products that possess biological activities. Most significantly, this project will deliver compounds with anticancer activity. In addition, chemistry may be developed which could be utilised to synthesise a number of bioactive molecules. The rewards of the synthesis of compounds and application for the treatment of cancer and other diseases are enormous for the community and in the education and training of scientists.

DP0772708 Prof JH Rubinstein; Dr J DeGier

Approved Project Title **Statistical Topology and its Application to Deriving New Geometric Invariants**

2007 : $110,000
2008 : $85,000
2009 : $75,000
2010 : $65,000
2011 : $65,000
Primary RFCD 2301 MATHEMATICS
QEII Dr J DeGier

Administering Organisation The University of Melbourne

Project Summary

This project will offer a great opportunity for talented students to engage in internationally competitive research. Statistical topology, which combines ideas in topology, geometry and statistical mechanics is becoming a rapidly increasing branch of mathematics, with many emerging applications in bio-informatics, computer science and theoretical physics.

DP0770031 Dr SM Russell; Dr HE Richardson

Approved Project Title **A novel role for the proteins Scribble & Dlg in the formation of cell protrusions and their effects on cell function**

2007 : $90,000
2008 : $88,000
2009 : $85,000
Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

Dlg and Scribble are recently discovered proteins that are required during development, immune regulation, neural signalling and tumour suppression. Understanding how they work will enable the development of diagnostic and therapeutic tools that have the potential to influence an enormous range of diseases, from cancer to immunodeficiencies and autoimmune diseases. Researchers at the PeterMac perform world-leading research into the biology of Scribble and Dlg, and their role in cancer biology and immune function. The mechanistic insight provided by this project will continue that tradition, and facilitate translation of our basic research into clinical applications in important disease areas.

DP0773186 Dr R Saffery; Prof A Choo; Dr P Kalitsis; Dr J Craig

Approved Project Title **Taming the intruders: the domestication of Tigger transposable elements in mammals**

2007 : $79,000
2008 : $79,000
2009 : $79,000
Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

It has become apparent that most of the DNA that makes us what we are is actually comprised of the remnants of invading parasitic DNA acquired over time. A continual battle exists between host which tries to silence or remove this DNA, and the parasite that tries to multiply and spread. We are currently investigating an intriguing aspect of this process that involves host genomes 'domesticating' parasitic DNA to provide novel functions, thereby facilitating the evolution of specific characteristics within species.

DP0773040 A/Prof AG Sagona; Dr G Tsetskhladze; Mr CL Ogleby; Dr C Sagona

Approved Project Title **A study of the archaeology of Caucasian Iberia with implications for grazing management in Australia**

2007 : $48,818
2008 : $50,000
2009 : $50,000
Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

Administering Organisation The University of Melbourne

Project Summary

This multi-disciplinary project will promote a younger generation of talented postgraduate and undergraduate students in a wide variety of fields, including archaeology, geomatic engineering, conservation of material culture, environmental and other natural sciences. The highlands of the Caucasus, located in a bioclimatic zone with a long history of alpine grazing, can also provide answers to questions such as the effect of grazing on biodiversity and the rehabilitation of fragile ecosystems, which may inform management and conservation activities in analogous highland country in Australia. The project will also ensure that exhibitions illustrating the rich heritage of Caucasus will reach Australian shores.

DP0771366 Dr B Sarcevic; Dr HE Richardson

Approved Project Title **Unveiling and characterisation of a fundamental pathway important in cell division**

2007 : $150,000
2008 : $140,000
2009 : $130,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

This work will have a major impact by producing top quality research that addresses a fundamental biological question of relevance to all organisms. The research will advance understanding of genetic factors important in foetal and early childhood development and proliferative disorders that occur during ageing. This work will provide intellectual and practical training to Honours and PhD students and postdoctoral researchers in the disciplines of Molecular Genetics, Molecular & Cellular Biology, Developmental Cell Biology, Mass Spectrometry and Proteomics, which will be of immense benefit to their scientific careers and the Australian scientific community.

DP0774407 A/Prof G Schwann; Prof GC Lim; Dr Q Zeng

Approved Project Title **Consumption, Financial Wealth and Housing Wealth over the Long Run**

2007 : $73,000
2008 : $59,983
2009 : $61,028

Primary RFCD 3503 BANKING, FINANCE AND INVESTMENT

Administering Organisation The University of Melbourne

Project Summary

Our research gives economic policymakers a better understanding of the linkage between housing and financial market fluctuations and economic stability in Australia. In this, it focuses on how long run social trends have helped or hindered macroeconomic stability. It promotes a deeper knowledge of consumption patterns across different age groups, with a focus on financial security of retirees. Finally, we make a basic contribution to basic research by developing new techniques for examining panel datasets.

DP0771005 Prof A Scott; A/Prof H Britt; Dr PH Jensen

Approved Project Title **Blended payment systems for doctors: evaluation of an experiment**

2007 : $80,000
2008 : $85,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

The results of the study will provide new evidence for health care policy makers in Australia (and internationally) on the effects of changing the remuneration system for GPs on the costs and quality of health care provided. The study will examine effects in the national priority and national health priority areas of preventive health care and chronic disease. The results will be relevant to other countries, such as the US and UK, where blended payments schemes exist for GPs but have not been evaluated.

DP0771805 Dr PB Seddon; Ms SK Cullen; Prof LP Willcocks

Approved Project Title **Managing IT Service Provision and Sourcing in Australia, 2010-2019**

2007 : $118,540
2008 : $98,540
2009 : $83,540

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of Melbourne

Project Summary

Commoditization of IT and increasing globalization mean that the best ways to organize IT service provision in Australian organizations are changing rapidly. By studying the way IT is managed in 12 large Australian organizations over three years (2007-9), the primary benefit expected for this study is that we will be able to offer sound advice to Australian Chief Information Officers on the best ways to structure and manage IT service provision in Australian organizations. As a secondary benefit, we will be able to offer advice to students, on careers in IT, and to Information Systems Departments in Australian universities, on desirable curriculum content for the next decade.

DP0770354 A/Prof M Shields

Approved Project Title **New Econometric Evidence on the Roles of Socio-Economic Characteristics and Lifestyle Choices in Determining Child and Adult Health Outcomes**

2007 : $45,000
2008 : $37,000
2009 : $50,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

This research is directly relevant to the National Research Priority 'Promoting and Maintaining Good Health'. It will provide detailed information on issues such as the extent of socio-economic differentials in child and adult health, the role of income redistribution in reducing health inequalities, the effectiveness of the national health system in protecting the health of children from the poorest families, and the role of lifestyle choices in determining health outcomes. Attention will be paid to the effects of alcohol consumption, smoking, exercise and diet in the context of adult and childhood obesity. There will also be new insights on the relative importance of 'nature' versus 'nurture' in determining child health.

DP0773207 Prof IH Simmonds

Approved Project Title **Tropical and mid- and high latitude cyclones in a time of climate change: New insights and integration**

2007 : $110,000
2008 : $110,000
2009 : $110,000

Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation The University of Melbourne

Project Summary

Significant national and community benefits will be derived. Australian weather and climate variability, particularly with respect to rainfall, is influenced dramatically by meteorological features in the tropics and the extratropics. Enhanced understanding of these and their interactions will lead to increased comprehension of the causes of Australian rainfall variability and trends. There are also benefits in that the project's timing is very opportune and will be able to derive benefit for Australia by participation in a number of large international programs. The personnel and students will derive considerable profit from expose to these.

DP0771504 Mr R Sinha

Approved Project Title **Efficient Algorithms for In-memory Sorting, Searching and Indexing on Modern Multi-core Cache-based and Graphics Processor Architectures**

2007 : $82,030
2008 : $82,030
2009 : $82,030

Primary RFCD 2801 INFORMATION SYSTEMS

APD Mr R Sinha

Administering Organisation The University of Melbourne

Project Summary

This project clearly belongs to one of the national research priority goals, Smart Information Use. The copy-based techniques and work on sorting and searching will considerably impact the development of in-memory algorithms in cutting-edge computer architectures. Efficient suffix trees and suffix sorting have myriad applications in string-processing and will be of high interest to bioinformatics companies. The sortdex project will develop novel algorithms that will be used by enterprise search engine companies to develop applications for libraries and organisations dealing with large databases. Algorithms using the graphics processor as a co-processor have important applications in the high-growth field of computer graphics and games.

DP0772015 Prof CO Sowerwine; A/Prof SK Foley

Approved Project Title **Women and self-development in French history; implications for Australian women's experience**

2007 : $58,000
2008 : $55,000
2009 : $50,000

Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of Melbourne

Project Summary

Our culture values individualism for all but assigns women more responsibility than men for caring for others. Women are caught in a double bind between two conflicting roles, self-development and self-sacrifice. We seek to historicise the development of the self for women in nineteenth-century France, a period which has had an immense impact on contemporary gender roles and the way we understand the gendered self today. We will produce an international comparative history of women's self-hood which demonstrates its importance for women today.

DP0772787 Prof KC Stacey

Approved Project Title **The Shallow Teaching Syndrome in School Mathematics - towards practical ways that will engage students more deeply**

2007 : $52,964
2008 : $51,721

Primary RFCD 3302 CURRICULUM STUDIES

Administering Organisation The University of Melbourne

Project Summary

Australian governments have made considerable investment in international comparative studies of student achievement in mathematics. One of the findings is that an average Australian lesson exhibits the 'shallow teaching syndrome', having relatively lower complexity, higher repetition and less mathematical reasoning than high-achieving countries. This project will interview curriculum leaders and textbook writers, and analyse both traditional textbook and innovative curriculum materials. This will help to understand the reasons for the syndrome and recommend practical ways in which lessons that engage students more deeply, can be encouraged.

DP0772689 Prof GW Stevens

Approved Project Title **Influence of Impurities in Commercial Solvent Extraction Processes**

2007 :	$180,000
2008 :	$140,000
2009 :	$120,000
2010 :	$100,000
2011 :	$100,000

Primary RFCD 2906 CHEMICAL ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

This project directly supports the solvent extraction industry in Australia. This industry is responsible for generating in excess of $600M annually of export earnings for Australia. This type of technology can be applied in the recovery of base metals such as coper, nickel, cobalt, etc and in the environmental area for the clean up of heavy metals from waste water. Solvent extraction has the advantage of high selectivity that enables metals to be recovered and recycled, thus reducing the wastage of these metals in, for example, the chromium plating process.

DP0770828 Prof GN Taylor; Dr E Barberio; A/Prof ME Sevior; Dr SN Tovey; Dr KE Varvell; A/Prof LS Peak

Approved Project Title **Frontier Experiments in High Energy Physics**

2007 :	$450,000
2008 :	$450,000
2009 :	$400,000
2010 :	$300,000

Primary RFCD 2403 ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS; PLASMA PH

Administering Organisation The University of Melbourne

Project Summary

This project will support physicists in the expected era of discovery in the knowledge of fundamental particles that makes up our Universe. Having participated in developing the giant $½ billion ATLAS experiment, Australian scientists will be making major discoveries in this era. ATLAS will hunt down the Higgs boson, to understand the origin of mass of fundamental particles. It will also search for particles to explain Dark Matter, which makes up 25% of our Universe. ATLAS will search for undiscovered laws of nature to help us unify our understanding of the forces of nature. Excellent training and enhhancement of public interest, international cooperation and networking, and national pride will be provided by this project.

DP0771714 A/Prof J Thompson

Approved Project Title **Ethics of Historical Relationships: Evaluating Ethical Claims Based on History**

2007 :	$44,024
2008 :	$69,968
2009 :	$70,794
2010 :	$37,192

Primary RFCD 4401 PHILOSOPHY

Administering Organisation The University of Melbourne

Project Summary

Demands based on history, ideas about historical obligations, concerns about historical identity, what it is means and what duties it might require, are common causes of dispute within and among nations. This project, by developing an ethical theory that can make well-founded judgments about the legitimacy of a wide range of historical claims, and by showing how the theory can be applied to particular cases, will provide a better understanding of the nature of these disputes and how they might be resolved.

DP0770425 Dr P Tombesi; Mr AE Hutson

Approved Project Title **A special talent for technological innovation? Analysing the other public function of the Australian Parliament House**

2007 : $88,226
2008 : $111,257
2009 : $57,248

Primary RFCD 3101 ARCHITECTURE AND URBAN ENVIRONMENT

Administering Organisation The University of Melbourne

Project Summary

Major projects build lessons for the future and draw upon past lessons. Australia's New Parliament House represents a building of enormous scale and complexity, constructed within a tight time period, which provided unprecedented opportunities for Australia's construction industry to examine and transform its own practices. By producing a detailed history of the procurement process of the building and a systematic assessment of its industrial influence over time, this research project will amplify the importance of intellectual investment made through technical innovation in public buildings. The project will also help Australia maximise its creative and technological capacity by understanding and accepting factors conducive to innovation.

DP0773163 Prof JA Trinder; Dr C Worsnop; Dr M Morrell

Approved Project Title **Age and Gender Related Changes in Motor Control of the Upper Airway Muscle Genioglossus During Sleep**

2007 : $79,700
2008 : $68,500
2009 : $86,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

Obstructive Sleep Apnoea (OSA) is the repetitive obstruction of the airway during sleep. Obstructions occur because muscles of the upper airway fail to keep the airway open during inspiration. The disorder is associated with cardiovascular disease and cognitive and behavioural impairment. The prevalence of the disorder increases in older adults, contributing to age-related health and behavioural problems. However, age-related changes differ in men and women. We believe the high prevalence of OSA in older adults is due to age and gender related changes in the activity of muscles in the upper airway. We will study the behaviour of the upper airway muscle genioglossus during sleep in young, middle-aged and older men and women.

DP0770565 A/Prof JM White; Prof CA Reed

Approved Project Title **Structures and Properties of beta-R3M (M = Si, Ge, Sn)- and beta-Chalcogenyl-substituted Carbenium Ions**

2007 : $90,000
2008 : $90,000
2009 : $40,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

The benefits of this work are many-fold. The scientific knowledge gained will be invaluable to all scientists working in organic chemistry; mechanistic chemists who will learn from the science, and synthetic organic chemists who can utilise the results when planning strategies for the synthesis of complex drugs. Another major benefit of this research is in the training of young scientists. The students who work on this proposal gain invaluable experience in many areas of chemistry, ranging from synthetic chemistry to structural chemistry and theoretical chemistry. They will also gain experience in important physical techniques from NMR spectroscopy to X-ray crystallography.

DP0770955 Prof DA Williams

Approved Project Title **Transduction of neuronal signals by brain macroglial cells: implications for neuronal function**

2007 : $90,000
2008 : $88,000
2009 : $85,000

Primary RFCD 3206 MEDICAL PHYSIOLOGY

Administering Organisation The University of Melbourne

Project Summary

Study of mechanisms regulating brain cell (neuron and glial) communication is essential for understanding of normal brain function and transformations that occur in neurodegenerative states and age-related disorders. Mechanisms underlying neuron-glia communication are not well understood. By combining cell physiology, digital imaging technologies, and genetically designed and delivered molecules we will enhance our understanding of this brain cell communication and critical roles played by intracellular calcium. This will enhance international competitiveness of Australian biological research and provide novel insight of glial function in neurodegeneration and potential for specific therapeutic intervention in disease.

DP0770580 Dr J Williams; Dr CL Skeels; Prof JC van Ours; Dr RL Pacula

Approved Project Title **An Econometric Analysis of Labour Market, Health and Educational Consequences of Cannabis Use**

2007 : $100,000
2008 : $90,000
2009 : $100,000

Primary RFCD 3404 ECONOMETRICS

Administering Organisation The University of Melbourne

Project Summary

This research will provide comprehensive empirical knowledge about the linkages between cannabis use, health, education, employment and earnings in Australia. Understanding these linkages is important because although cannabis is a commonly used drug, it is unclear how its use impacts on these important aspects of overall wellbeing and productivity. The knowledge gained from this research will contribute towards designing policies that encourage Australians to make choices that lead to positive pathways, so that they may achieve healthy lifetime outcomes. Productive and healthy outcomes for individuals will contribute to healthy economic outcomes for Australia.

DP0770839 Dr SJ Williams; A/Prof M McConville

Approved Project Title **Mannose metabolism in pathogenic microorganisms**

2007 : $90,000
2008 : $80,000
2009 : $80,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

Current treatments for tuberculosis and leishmaniasis are failing due to chronic underinvestment by the private sector and public agencies over many decades. The causative agents, the microorganisms Leishmania spp and Mycobacterium tuberculosis, respectively, use sugar processing pathways that differ from humans, and thus represent targets for new drugs. We will study two related sugar-processing biochemical pathways in these organisms. We will develop new ways to measure enzyme activity using mass spectrometry, and new reagents to clone several biosynthetic enzymes. Our work will lay a foundation for new antibiotics to combat these insidious diseases, and will foster Australian expertise in chemical biology and innovative basic science.

DP0771644 A/Prof JL Willis; Prof PJ Goad; Prof A Adams

Approved Project Title **Australia's role in modern hospital design 1925-1960; developing a heritage framework**

2007 : $69,459
2008 : $73,459
2009 : $79,376

Primary RFCD 3101 ARCHITECTURE AND URBAN ENVIRONMENT

Administering Organisation The University of Melbourne

Project Summary

The national benefit of this project will be the greater understanding of how the built form - from the micro to the macro level - of Australian hospitals have brought together aspects of social reform, medicine and architecture to become key community buildings. Economic benefit may be derived from: 1) the transfer of this knowledge to current hospital architects and planners through greater understanding of the past and incorporation of innovative ideas and practices; 2) the creation of robust heritage frameworks for considering preservation and adaptive re-use of hospital buildings; and 3) to demonstrate the benefits of global engagement to Australian architecture and society.

DP0773097 Prof CJ Wilson; Prof JC Burg; Dr PD Bons; Dr MW Jessell; Prof K Stuewe

Approved Project Title **Microscale evolution of deformed rocks and glaciers**

2007 : $105,000
2008 : $105,000
2009 : $105,000

Primary RFCD 2601 GEOLOGY

Administering Organisation The University of Melbourne

Project Summary

Scientific outcomes from this research have significant implications for predictions on material properties and are applicable to rock behaviour in mineralised systems, a focus of Australia's minerals industry, and the development of new materials for the Australian manufacturing industries. It will help maintain Australia's excellent international research reputation in the fields of microstructural geology and glaciology.

DP0774288 Dr BA Wintle; Dr MA McCarthy

Approved Project Title **Optimal environmental monitoring under severe uncertainty.**

2007 : $100,000
2008 : $90,000
2009 : $90,000

Primary RFCD 3008 ENVIRONMENTAL SCIENCES

APD Dr BA Wintle

Administering Organisation The University of Melbourne

Project Summary

Environmental monitoring is a type of quality control that informs managers about the health of the environment and about how well their management systems are performing. Because it is a critical, but expensive, component of sustainable management, it is important to ensure value for resources spent on monitoring and that environmental impacts will be detected if they are occurring. We argue that current approaches to environmental management ensure neither efficiency nor environmental security. The aim of the project is to develop theories and techniques to make monitoring both cost effective and reliable, thereby providing monetary savings and better environmental outcomes.

DP0770545 Dr JC Wolfendale; Prof CA Coady; Dr RJ Sparrow

Approved Project Title **A study of Australia's ability to train soldiers to be effective and ethical**

2007 : $200,000
2008 : $110,000
2009 : $130,000

Primary RFCD 4401 PHILOSOPHY

APD Dr JC Wolfendale

Administering Organisation The University of Melbourne

Project Summary

This project addresses the ARC's priority goals Protecting Australia from Terrorism and Crime and Transformational Defence Technologies. In the fight against terrorism and as defence technologies evolve it is crucial to uphold the Australian military's ethical commitments and international reputation. Australian soldiers must be responsive to rapidly changing threats in ways that maintain the military's core ethical commitments. By assessing current military practices in light of these commitments this project enhances the military's ability to train soldiers to be effective and ethical fighters. The internationally important outcomes of this project will also enhance Australia's high standing in the area of applied ethics.

DP0771638 Dr S Wyithe; Prof RL Webster; Prof T Padmanabhan

Approved Project Title **Formation of Supermassive Black Holes**

2007 : $107,446
2008 : $92,446
2009 : $92,446
2010 : $57,446
2011 : $57,446

Primary RFCD 2401 ASTRONOMICAL SCIENCES

QEII Dr S Wyithe

Administering Organisation The University of Melbourne

Project Summary

One of the most remarkable discoveries in astronomy is the observation that supermassive black holes, weighing as much as a billion suns, are found in the centers of galaxies, including our own Milky Way. Astronomers do not understand how these black holes came to be, or their role in the evolution of galaxies. This Discovery Project will address these issues by analysing data on supermassive black holes from the local and early universes. Black holes fascinate students both young and old. This Discovery Project will train a new generation of young Australian astronomers at the leading edge of astrophysics.

DP0770585 Dr J Xie

Approved Project Title **Novel Photo-Catalysts for Water Oxidation: Linking Nature to New Technologies**

2007 : $92,030
2008 : $87,030
2009 : $87,030

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

APD Dr J Xie

Administering Organisation The University of Melbourne

Project Summary

Photosynthesis is the catalytic process used by biology to convert the sun's light into energy. This project aims to mimic photosynthesis with cheap and robust molecules. The approach has great potential for development of renewable energy production and benign industrial chemical processes. The project will bring Australia to the international forefront of this field. It will provide excellent research training in a range of scientific skills for Australian research students.

DP0771231 Prof L Yates

Approved Project Title **School knowledge, working knowledge and the knowing subject: a review of state curriculum policies 1975-2005**

2007 : $80,000
2008 : $52,000
Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation The University of Melbourne

Project Summary

Schooling is a central institution for forming the knowledge, workers and citizens of Australia's future, and this is a period of widespread curriculum change. This project's systematic review of state differences is an important resource for moves in a 'nationally consistent' direction. The project charts what is and is not being taken up in relation to new vocational agendas and new conceptions of knowledge. It provides a fresh perspective on Australian curriculum emphases, competing agendas, issues to be addressed and makes possible a more realistic appraisal of the conditions in which innovation and reform need to be developed.

DP0771430 Dr AN Zelikin

Approved Project Title **Disulfide Cross-linked Hollow Polymer Capsules for Drug Delivery**

2007 : $100,000
2008 : $90,000
2009 : $90,000
Primary RFCD 2915 BIOMEDICAL ENGINEERING
APD Dr AN Zelikin

Administering Organisation The University of Melbourne

Project Summary

The project is expected to deliver an un-paralleled drug delivery opportunity which will benefit the pharmaceutical industry, biomedical science and biotechnology. Young scientists will be trained bringing about skilled workers for Australian science and industry. The project will build on the existing as well as establish new collaborations between scientific institutions and industry. The project will result in novel intellectual property on which new technologies and spin-off companies will emerge, leading to increased employment opportunities in Australia and investment in Australian science and industry.