

Summary of Discovery Projects Proposals for Funding to Commence in 2009

Victoria

The University of Melbourne

DP0988246 A/Prof S Akbarzadeh; Prof A Saeed; Dr KA Baxter

Approved Project Title **Citizenship and belonging among Muslims in Australia and the United Kingdom**

2009 : \$ 87,000
2010 : \$ 98,000
2011 : \$ 108,000
2012 : \$ 47,000

Primary RFCD 4402 RELIGION AND RELIGIOUS TRADITIONS

Administering Organisation The University of Melbourne

Project Summary

This project will explore how Muslims in Australia and the United Kingdom understand their relationship to the state. Utilizing publications and interviews with Muslim intellectuals active in the public domain this project will illuminate how modern Muslims respond to the issues of citizenship, identity and national belonging. These issues are of vital importance in a multicultural state. By exploring the spectrum of Muslim opinion, this project will foster a greater understanding of the challenges and opportunities generated by Muslim settlement in the West.

DP0988377 Dr A Andrianopoulos

Approved Project Title **Genetic and epigenetic control of developmental competence.**

2009 : \$ 110,000
2010 : \$ 90,000
2011 : \$ 90,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

Development is an important biological process of life and understanding development has important medical and economic benefits for Australia. This research aims to study development using a simple, easily manipulated and well established experimental organism, a fungus, as a model for development in other organisms, including humans. In addition, fungi directly impact on life at many levels. Fungi can be pathogens of humans, other animals or plants significantly affecting our health, agriculture and industry. Fungi are also beneficial to other organisms, especially to many plants, and are used to manufacture pharmaceuticals and enzymes used in the health and biotechnology industries.

DP0988044 A/Prof P Auger; Prof G Dowling; Prof TM Devinney

Approved Project Title **The Value of CSR to Close Stakeholders: A Discrete Choice Modelling Approach**

2009 : \$ 50,000
2010 : \$ 40,000
2011 : \$ 50,000
2012 : \$ 50,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation The University of Melbourne

Project Summary

Increasingly corporations are being called to account for their social impact, not just reactively in the sense of compliance but also proactively to the degree that they are seen to be socially innovative. This project is important in assessing the degree to which such pressure is both warranted and effective. It is one thing for a society to wish that its corporations act in socially responsible ways, but quite another if employees, investors, analysts and customers do not respond positively to such initiatives.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0988242 Dr TJ Baldwin; A/Prof S Bird
Approved Project Title **Online linguistic exploration: deeper, faster, broader language documentation**
2009 : \$ 57,000
2010 : \$ 59,000
2011 : \$ 60,000
Primary RFCD 3802 LINGUISTICS
Administering Organisation The University of Melbourne

Project Summary

This project will develop a new online mode for collaborative linguistic research. Linguists will be able to harness the power of natural language processing techniques for their study of the world's languages. A demonstration system will be developed, permitting linguists to locate examples of syntactic constructions in a large database of parsed text, and to explore similarities across different languages. The project will also encompass a selection of minority languages for which only a small amount of data is available.

DP0986752 Dr AS Barnard
Approved Project Title **Environmental stability of nanoscale materials for catalysis and sensing**
2009 : \$ 180,000
2010 : \$ 155,000
2011 : \$ 155,000
2012 : \$ 150,000
2013 : \$ 135,000
Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS
QEII Dr AS Barnard
Administering Organisation The University of Melbourne

Project Summary

After two decades of research, the first wave of 'nanotechnology' consumer products are entering the market, and large quantities of nanoparticles (less than millionth of a centimetre in size) are now being produced annually. However, before any new product can be manufactured, we need to know how stable engineered nanomaterials are before we bring them into our home, or we find them (unintentionally) free in our waterways and other ecosystems. For the first time, this project uses high performance supercomputing and advanced theoretical modelling to predict the stability of nanomaterials under a wide range of environmental conditions, to help safe guard Australia from potential 'nano-hazards' associated with these tiny pieces of matter.

DP0986107 A/Prof P Batterham; Prof MW Parker
Approved Project Title **Functional and regulatory analysis of n-acetylcholine receptors, key targets of insecticides**
2009 : \$ 140,000
2010 : \$ 120,000
2011 : \$ 120,000
Primary RFCD 2702 GENETICS
Administering Organisation The University of Melbourne

Project Summary

Agriculture is one of Australia's mainstay industries and a major user of insecticides. However, current insecticides suffer a number of significant deficiencies, including collateral damage in the environment and insect resistance. One of the major targets for insecticides are a class of neuronal receptors, found in organisms ranging from worms to man. Our work will provide a detailed biological understanding of these receptors leading to better ways of developing new insecticides. Similar receptors in humans are the target for nicotine and associated with neurological disorders such as schizophrenia and autism. Thus our work will also increase our understanding of important human receptors associated with disease.

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DP0984313 Dr CY Beaton-Wells; Dr CE Parker; Dr FS Haines; Prof DK Round

Approved Project Title **A cancer on our economy? An empirical interdisciplinary study of the criminalisation of serious cartel conduct in Australia**

2009 : \$ 100,000

2010 : \$ 140,000

2011 : \$ 100,000

Primary RFCD 3904 LAW ENFORCEMENT

Administering Organisation The University of Melbourne

Project Summary

Serious cartel conduct is seen as highly damaging to Australia's economic welfare but only recently has it been regarded as criminal. This research will inform public debate about the impetus and justification for this major shift in competition law policy and enforcement. It will provide robust empirical evidence about public opinion and business behaviour and derive insights into whether criminalisation will promote greater compliance with the law. It will assist in refining practical implementation measures to ensure the effectiveness of a criminal regime and it will aid legislators and regulators in policy-making, regulatory design and enforcement in relation to competition law and business regulation more generally.

DP0988972 Prof PL Bhalla

Approved Project Title **Understanding the control of male germ-line development by the germline-restrictive silencing factor in plants**

2009 : \$ 166,000

2010 : \$ 166,000

2011 : \$ 166,000

2012 : \$ 166,000

2013 : \$ 166,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

The world population is currently increasing at an unprecedented rate, with a concomitant requirement to double the food production from the same amount of arable land. To ensure global political and social stability, equitably increasing sustainable food production without compromising environmental integrity remains a major challenge. This proposal investigates the molecular mechanisms underlying male germ line initiation and development in plants. Switching off male gamete development in some crop plants will create male sterile lines, which, when crossed with genetically distinct lines, will have the potential to produce hybrids that yield 20-30 percent more crop without additional inputs.

DP0988179 Dr SC Biddulph

Approved Project Title **The prospects for justice in the legal reform of police administrative detention powers in China**

2009 : \$ 100,882

2010 : \$ 108,415

2011 : \$ 111,951

Primary RFCD 3903 JUSTICE AND LEGAL STUDIES

APD Dr SC Biddulph

Administering Organisation The University of Melbourne

Project Summary

Australia's security and economic well-being is becoming increasingly closely tied to China. Australia has a strong interest in China's continued economic well-being, as well as promoting the rule of law and valuing the protection of human rights. The effective legal protection of human rights is of vital concern to our relationship, to China's long term stability and to China's increasing participation in international human rights fora. This project will enhance our understanding of struggles to effect legal reform of contentious police powers and to improve protection of citizens' rights through reforming law enforcement practices. It will contribute to ongoing Sino-Australian cooperation to promote human rights protection.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986980 Dr EJ Bieske; Dr EG Robertson; Prof JM Lisy

Approved Project Title **Lighting up the charged brigade: laser spectroscopy of protonated and metal-containing complexes**

2009 : \$ 100,000
2010 : \$ 80,000
2011 : \$ 80,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation The University of Melbourne

Project Summary

Increasingly, the design of new pharmaceuticals uses computer modeling to account for the shapes of molecules and how they interact with their surroundings. The strongest forces between molecular components are those that involve charged chemical species known as ions. In this project, we will develop advanced laser-based techniques to study in unprecedented detail how molecules respond to the presence of nearby charge, or to acquiring charge themselves. Understanding the nature of these attractions, and the structural changes that they induce eventually results in more accurate computer models. This has relevance to fields that include the architecture of proteins, recognition of signaling molecules in the brain, and drug development.

DP0984915 Dr A Blencowe

Approved Project Title **The development of unique cyclic polymers**

2009 : \$ 100,000
2010 : \$ 90,000
2011 : \$ 80,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

APD Dr A Blencowe

Administering Organisation The University of Melbourne

Project Summary

The project will yield cyclic polymers with a large range of commercial and industrial applications (e.g. drug delivery, contamination clean-up, nano-wires, sensors) that will result in positive economic and social benefits for Australia. The research will lead to increased employment opportunities within the manufacturing industry and R&D, and also underpin and extend Australia's leading position in the development of innovative polymeric and advanced materials. The resulting materials will provide new and improved technological innovations for commercial products, delivering benefits direct to the public. Furthermore, there is potential development of spin-off companies - leading to further investment in Australian science and industry.

DP0984225 A/Prof MA Bogoyevitch

Approved Project Title **New peptides to probe protein kinase functions**

2009 : \$ 90,000
2010 : \$ 40,000
2011 : \$ 40,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

Project Summary

We are building on our expertise in biochemistry, molecular biology and biotechnology, to develop and exploit new technologies that enable the discovery and characterisation of new peptides that probe protein kinase functions. An important application of work will be in the development of new leads for drug design, as highlighted by the success of some protein kinase inhibitors as drugs. The immediate benefits of our research will come with enhanced interactions in the international academic and biotechnology arenas and with the training of post-graduate and post-doctoral staff. This research training will greatly enrich Australian biotechnology expertise.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984947 Dr JS Bolton

Approved Project Title **The first two billion years: the structural, chemical and thermal evolution of the intergalactic medium**

2009 : \$ 95,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

APD Dr JS Bolton

Administering Organisation The University of Melbourne

Project Summary

This Discovery Project will aid the development of world class observational programmes within Australia. The Murchison Widefield Array and Australian Square Kilometre Array Pathfinder, both projects which are heavily involved in intergalactic medium science, are the focus of international collaboration and funding which benefits the Australian scientific community. This proposal will provide a theoretical complement to these endeavours. Furthermore, the research is expected to involve at least one Ph.D. student and two honours students. The students will obtain highly transferable numerical modelling skills which are widely applicable in commerce and industry.

DP0985921 A/Prof L Bourke; Dr JE Taylor; Prof JS Humphreys; Prof J Wakeman

Approved Project Title **Beyond the Workforce Crisis: Advancing Conceptual Understanding in Rural and Remote Health**

2009 : \$ 40,000

2010 : \$ 49,000

Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES

Administering Organisation The University of Melbourne

Project Summary

This research will document a theoretical framework for understanding how and why rural health differs. Understanding the causes of rural health issues will lead to more effective strategies in rural health education, research, policy, and practice. This framework has benefit to national, state and local policies and programs in rural health across the country because it will provide understanding of what works, why it works and what else is needed. Contributing to understanding the rural health context is key to improving rural health curriculum, designing meaningful research, supporting practitioners appropriately and developing rural health policies that increase the workforce, access to services and the overall rural health status.

DP0985963 Prof AI Bush; Dr RA Cherny; Prof JF Mercer

Approved Project Title **Neural Copper Homeostasis: the role of the Alzheimer Amyloid-beta Precursor Protein**

2009 : \$ 130,000

2010 : \$ 100,000

2011 : \$ 100,000

Primary RFCD 3207 NEUROSCIENCES

Administering Organisation The University of Melbourne

Project Summary

Alzheimer's disease (AD) is creating a growing burden upon Australian medical resources. Copper plays an important role in the development of AD, and drugs designed to adjust brain copper levels are being tested for AD treatment and show therapeutic benefits. This project will determine how copper is involved in AD so that more effective drugs can be developed. Focus will primarily be on copper-binding proteins central to AD, including amyloid-beta, and their role in AD development. Upon completion of this project, we expect to better understand neural copper metabolism in health and in AD pathology, with outcomes directly applicable to therapeutic AD intervention.

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DP0987011 A/Prof LA Cameron; Dr M Shah; Ms RS Purnamasari

Approved Project Title **Community-Led Sanitation Interventions :The Role of Social Capital**

2009 : \$ 170,000

2010 : \$ 130,000

2011 : \$ 94,000

Primary RFCD 3402 APPLIED ECONOMICS

APD Ms RS Purnamasari

Administering Organisation The University of Melbourne

Project Summary

The economic and social wellbeing of its neighbours is important for Australia. This interest is often expressed through financial aid and the sharing of expertise. This research aims to enhance the effectiveness of financial aid by investigating the extent to which social capital is important in determining the success of a community-led development project. Thus, this research contributes to a body of knowledge that informs development policy, leading to more effective use of aid funds and to a more prosperous and safe region.

DP0986577 A/Prof MW Cantoni; Dr L Ntogramatzidis

Approved Project Title **Modelling and estimation methods for discrete multi-dimensional systems**

2009 : \$ 95,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

APD Dr L Ntogramatzidis

Administering Organisation The University of Melbourne

Project Summary

Multi-dimensional signal processing plays a role in a variety of application areas, ranging from remote sensing for environmental monitoring and geological mapping, to medical imaging and the automatic control of industrial processes. The success of the project will provide mathematical tools for the advancement of the state-of-the-art in these broad areas.

DP0985744 Dr RA Caruso; Prof Y Cheng

Approved Project Title **Flexible dye-sensitised solar cells on polymer substrates**

2009 : \$ 290,000

2010 : \$ 190,000

2011 : \$ 190,000

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

The expected outcomes of the project are the preparation and development of flexible solar cells. The resulting portable and compact solar cells could be incorporated in fabrics opening the solar cell market to the clothing industry. The products and mechanisms developed are envisaged to be amenable to large scale-up in industry. Hence, at a future date, there is the potential to fabricate the cells in Australia and then export the materials and technology. This will benefit the Australian economy through employment of Australians and income generated through exports.

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DP0986384 Prof DY Chan; Dr RR Dagastine; Prof F Grieser; Prof GW Stevens; Dr S O'Shea; Prof Dr H Butt; Dr E Klaseboer

Approved Project Title **An integrated study of dynamic interactions in soft matter systems**

2009 : \$ 140,000

2010 : \$ 135,000

2011 : \$ 145,000

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

Established Australian pharmaceutical, dairy and food processing industries and growing high-value biotechnology and nanotechnology rely on the processing and control of a generic class of materials called Soft Matter. Cost driven demands for high throughput and increasing water and energy conservation requirements will be met by advances in the underpinning engineering science pursued in this project. In addition to increasing the international competitiveness of Australian industries in high value products, the research outcomes also add to the knowledge capacity of the nation for future technological developments.

DP0987570 Prof AF Christie; Prof DM Studdert; Prof P McIntyre; Dr CM Dent

Approved Project Title **Drug Companies, their Patenting Strategies and High-Cost Pharmaceuticals: An Empirical Investigation**

2009 : \$ 140,000

2010 : \$ 70,000

2011 : \$ 80,000

Primary RFCD 3901 LAW

Administering Organisation The University of Melbourne

Project Summary

Pharmaceuticals are a vital part of clinical services that maintain and improve Australia's health; they are also costly, absorbing a substantial proportion of the national health expenditures. By conferring market protections, the patent system helps the manufacturers of pharmaceuticals to recoup the high costs of research associated with developing new products. Abuses of the patent system by pharmaceutical manufacturers have the potential to stifle competition and inappropriately raise the costs of pharmaceuticals to society. This innovative, cross-disciplinary, research will investigate the existence of abusive patents and, if necessary, propose reforms that will prevent further abuse and reduce the size of the health budget.

DP0988563 Dr J DeGier; Dr SO Warnaar; Prof A Lascoux

Approved Project Title **Polynomial representations of the Hecke algebra**

2009 : \$ 95,000

2010 : \$ 95,000

2011 : \$ 95,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

Project Summary

This project will offer a great opportunity for talented students to engage in internationally competitive research in mathematics. In addition, through international collaboration, this project will be able to deliver an online database with software libraries which will be a world benchmark for computation with multivariate polynomials.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986228 Dr JM Devlin; Dr CA Hartley; Prof GF Browning; Dr JR Gilkerson

Approved Project Title **Structural and functional investigations into a novel chemokine binding protein encoded by evolutionarily diverse alphaherpesviruses**

2009 : \$ 118,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFCD 3005 VETERINARY SCIENCES

APD Dr JM Devlin

Administering Organisation The University of Melbourne

Project Summary

The outcomes of this project will help control disease caused by alphaherpesviruses, including disease in livestock (horses and poultry) and wildlife (kangaroos and wallabies). This will enhance animal health and welfare and will also benefit the associated industries. Livestock industries are critically important to the Australian economy (equine and poultry industries annually contribute approximately \$7.7 and \$2.6 billion respectively to our GDP). Wildlife species are crucial to Australian ecosystems and feature in the Australian tourism industry. This project is expected to strengthen international research collaborations and further enhance Australia's reputation as a world-class leader in research and biotechnology.

DP0985397 Prof S Dey; A/Prof GN Nair; Mr AS Leong

Approved Project Title **Resource-aware Signal Processing and Control Algorithms for Networked Sensor Systems**

2009 : \$ 130,000

2010 : \$ 95,000

2011 : \$ 105,000

Primary RFCD 2801 INFORMATION SYSTEMS

APD Mr AS Leong

Administering Organisation The University of Melbourne

Project Summary

Networked sensing and control is an important technology for Australia's future. Applications range from monitoring wildlife habitats to safety management of large civil structures. This project will lead to sustainable engineering solutions for these applications and provide key fundamental performance limits. Beyond the creation of new theory and algorithms, the national and community benefits will include: (i) enhancement of Australia's reputation for innovative Engineering research through quality publications and international collaborations; and (ii) improvement of the research and development capability in the ICT sector through rigorous training of postgraduate students and postdoctoral fellows.

DP0987494 Dr RJ Dixon; Prof GC Lim; Prof D Shepherd

Approved Project Title **State & territory economic performance and national economic policy**

2009 : \$ 59,000

2010 : \$ 45,000

2011 : \$ 47,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

The research is intended to provide a better understanding of the relationship between national and state & territory economic behaviour in Australia and the relative strengths of common and idiosyncratic factors affecting economic performance across the states and territories. The results of the research will help to inform both national and sub-national economic policies and hence contribute to better economic and social outcomes in Australia.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987867 Prof KG Dovey; Dr KS Shaw; Dr SN Wood

Approved Project Title **Planning the 'creative' city: reconciling global strategies with local subcultures**

2009 : \$ 125,000

2010 : \$ 115,000

2011 : \$ 115,000

Primary RFCD 3704 HUMAN GEOGRAPHY

APD Dr KS Shaw

Administering Organisation The University of Melbourne

Project Summary

Increasing land values in all major Australian cities are placing pressure on local creative initiatives. Displacement of small cultural producers and the consequent dispersal of local networks is damaging to the urban social and economic fabric. This research will assess the challenges to strong and thriving creative subcultures in gentrifying cities. By identifying cases of best practice in Australia, and with reference to similar practices overseas, the project will expand the range of regulatory and negotiating tools available to state and local governments to maintain their valuable creativity and local cultural diversity.

DP0985143 A/Prof GF Egan; Dr LA Johnston; Dr M Gavrilesu; Mr EP Duff

Approved Project Title **Investigating evidence of control system dynamics in visuomotor skill acquisition using multimodal functional magnetic resonance imaging.**

2009 : \$ 85,000

2010 : \$ 85,000

2011 : \$ 85,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

This project brings together mathematical and engineering methods with cognitive neuroscience in a novel way to better understand the fundamental processes associated with brain imaging, and the acquisition of motor skills. An improved understanding of the function of regions within the motor network will have a direct benefit for the rehabilitation of patients suffering motor deficits from developmental causes, following traumatic brain injuries, and after stroke and other neurodegenerative diseases. The outcomes of the research will also contribute to our understanding of the complexity of brain networks involved in motor skill acquisition.

DP0987360 Prof MA Elgar

Approved Project Title **The evolution of elaborate antennae in insects**

2009 : \$ 80,000

2010 : \$ 40,000

2011 : \$ 40,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation The University of Melbourne

Project Summary

This project will address several neglected but fundamental issues in the field of chemical communication and insect diversity. These include the evolutionary importance of receptor structures in a communication system, and the basis of diversity in one of the most defining characteristics of insects: antennae. The moth species in the proposed experiments are commercial pests of crops and therefore understanding of the evolutionary processes shaping their communication systems and mating behaviour will contribute to better predictive knowledge of the effects of control measures used against them. The project will also involve international collaboration to learn and develop new a technique in the analysis of pheromone communication.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987070 Dr N Erkal

Approved Project Title **Scarcity of Ideas and Design of Optimal Incentive Schemes for Innovation**

2009 : \$ 50,000

2010 : \$ 40,000

2011 : \$ 26,140

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

Since innovation is the driving force behind economic growth, enhancing its innovative capacity is an important consideration for Australia. From an economics point of view, this requires the design of optimal incentive schemes in the institutional structures which are central to promoting innovation. The proposed research aims to achieve exactly this by developing a definition of innovativeness and analyzing its implications. Its results will contribute to the policy discussions on innovation in Australia and will enhance the academic interactions between Australian and international universities.

DP0987637 Mr C Fenwick; Dr W van Caenegem; Prof CJ Arup; Dr CM Dent

Approved Project Title **'Nothing Can Be Created Out of Nothing': Workers, Their Know-How and the Employment Relationships that Support Them**

2009 : \$ 90,000

2010 : \$ 70,000

2011 : \$ 50,000

Primary RFCD 3901 LAW

Administering Organisation The University of Melbourne

Project Summary

The importance of innovation, either in the form of intellectual property or know-how, to the Australian economy cannot be over-stated. Unlike statutory intellectual property schemes, worker-created know-how is both 'incentivised' and controlled through the contractual provisions of the worker-employer relationship. This project, through its empirical focus, will explore if (and how) the law, as it relates to know-how, promotes innovation in the workplace. Through the development of guidelines for best practice and reform proposals to fill gaps in the law, this research will increase the potential for innovation in all worker-employer relationships which will, in turn, maximise this country's creative and technological capability.

DP0986594 Asst Prof JR Fisher; A/Prof B Biggs; Prof DA Rosenthal; Prof TD Dwyer; Mr GJ Casey; Mr T Tran; Dr Nt Nguyen

Approved Project Title **Maternal mental health and anaemia as determinants of infant health and development in resource constrained settings**

2009 : \$ 75,000

2010 : \$ 80,000

2011 : \$ 65,000

Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES

Administering Organisation The University of Melbourne

Project Summary

A healthy start to life is an explicit Australian priority. Maternal health is a major determinant of the health and development of infants. This international collaborative project will contribute evidence about two maternal health conditions: mental disorders and anaemia, and their effects on infant health and development, through research in Vietnam where both are prevalent. The findings will inform interventions to improve the health of mothers and infants in all resource-constrained settings, including among indigenous and refugee groups in Australia. It will advance Australia's international relations by strengthening a partnership with Viet Nam and contributing to a World Health Organization priority area.

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DP0988944 Prof PJ Forrester; Dr CM Ormerod

Approved Project Title **The Sakai scheme-Askey table correspondence, analogues of isomonodromy and determinantal point processes**

2009 : \$ 90,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

Project Summary

The Australian mathematical sciences enjoys two research groups with active interests on Painleve equations in applied mathematics which are able to address difficult problems. Such a problem is to give a formulation of Sakai's 2001 classification of the Painleve equations in a form most suitable for applications. For this links will be made with a seemingly distinct area of mathematics - the Askey table from the theory of hypergeometric orthogonal polynomials. A number of tractable PhD projects are suggested by this proposal.

DP0985970 A/Prof GV Franks; Prof WA Ducker; Prof FF Lange

Approved Project Title **Controlling Anisotropic Growth of Metal Oxide Crystals in Aqueous Solution by Selective Adsorption of Small Molecules**

2009 : \$ 100,000

2010 : \$ 90,000

2011 : \$ 105,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

The proposed research will enhance our ability to make both light emitting diodes (LEDs) and piezoelectric actuators from ZnO. LEDs are a high efficiency light source that save energy compared to conventional illumination sources and can be fabricated in thin films. The proposal is to also bring the technology for device fabrication to Australia where it can ultimately be used to broaden the economic base of the country. The knowledge of crystal growth rate and crystal morphology control can be applied to improvements in the efficiency of alumina production which is already an important contributor to Australian exports.

DP0984815 Dr JD Gehman; Prof F Separovic; Prof JD Wade

Approved Project Title **Membrane-associated structure and the effect of metals on Abeta peptide from Alzheimer's disease**

2009 : \$ 160,000

2010 : \$ 90,000

2011 : \$ 110,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation The University of Melbourne

Project Summary

Alzheimer's disease currently affects 5% of Australians over 65, and will triple by year 2050 without an effective therapy. Much research to understand the causes of the disease has focused on the distinctive amyloid deposits found in patients' cerebral tissue. Recent evidence suggests that nerve cell death is actually directly caused by soluble forms of the protein fragments and metals that form these deposits. We will investigate the specific molecular structure of these fragments with metals in relation to vesicles which mimic the nerve cell surface. This information may facilitate future biomedical efforts work to develop therapies, as well as develop general techniques to study similar structural problems.

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DP0986166 Prof KP Ghiggino; Dr TD Bell
Approved Project Title **Energy transforming polymers: from single molecules to devices**
2009 : \$ 130,000
2010 : \$ 100,000
2011 : \$ 100,000
Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)
Administering Organisation The University of Melbourne

Project Summary

Climate control and the rapidly increasing demand for energy is driving the search for alternative sustainable energy sources. Flexible plastics will be a primary component of the new generation of solar harvesting and energy conversion materials. The objective of this project is to gain an understanding of the way polymers interact with light and can convert absorbed solar energy into electrical power and other useful forms of energy. The outcomes of the project will allow the improved design of plastics for applications in solar energy conversion.

DP0987850 Dr LC Godden; Dr J Peel; Prof RJ Keenan
Approved Project Title **Responding to Climate Change: Australia's Environmental Law and Regulatory Framework**
2009 : \$ 56,000
2010 : \$ 81,000
2011 : \$ 89,000
Primary RFCD 3901 LAW
Administering Organisation The University of Melbourne

Project Summary

Climate change presents Australia with unparalleled sustainability challenges. Impacts on environmental resources will require an integrated legal and socio-economic regulatory response. An effective and adaptable environmental law framework will be crucial for adaptation and mitigation measures. The project addresses this need by undertaking a comprehensive, interdisciplinary evaluation of Australia's legal capacity to respond to climate change, so identifying appropriate governance structures and regulatory tools. This analysis is vital to positioning Australian environmental law to manage climate change impacts and associated social, ecological and economic costs and to ensure compliance with international obligations.

DP0986404 Prof PG Hall; Dr AM Delaigle; Dr AP Robinson
Approved Project Title **Inverse and related problems in statistics**
2009 : \$ 263,000
2010 : \$ 201,000
2011 : \$ 213,000
2012 : \$ 137,220
2013 : \$ 173,220
Primary RFCD 2302 STATISTICS
QEII Dr AM Delaigle
Administering Organisation The University of Melbourne

Project Summary

Modern statistical inverse problems arise in fields from astronomy and biology to engineering and finance. Sometimes the problems involve the analysis of small samples of very high dimensional data, and are central to information acquisition in areas such as genomics and signal analysis. All these topics are of significant national importance, and their solution will bring national and community benefits. In addition, the program to which the proposal will lead will be used extensively for research training. In Australia, where the demand for research-trained statisticians greatly exceeds supply, this contribution to the nation and the community will be particularly important.

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DP0984862 A/Prof SV Hanly; A/Prof JS Evans; Prof S Dey; Prof DN Tse

Approved Project Title **Closing the Gap: Fundamental Capacity Limits for Interfering Wireless Networks and Practical Methods to Get There**

2009 : \$ 205,000

2010 : \$ 140,000

2011 : \$ 140,000

2012 : \$ 130,000

Primary RFCD 2805 DATA FORMAT

Administering Organisation The University of Melbourne

Project Summary

Enhancing communication networks to achieve broadband data rates is now a national priority. Wireless communications is hugely important, with mobile phones, wireless computers, and wireless Internet access to homes, all rapidly growing areas. This project addresses the fundamental bottleneck of interference between links in wireless networks. Wireless unplugs the user and allows him/her to roam, and to set up ad-hoc networks with other users. This research will thus contribute to Australia's increased productivity. Just as importantly, this project addresses fundamental research; it will increase Australia's knowledge base and provide training for students and researchers in how to think about communications problems.

DP0985049 Dr K Harvey

Approved Project Title **How does Fat cadherin control organ size in Drosophila, and cancer in humans?**

2009 : \$ 110,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

The primary function of Fat cadherin is to dictate the appropriate size of organs in developing animals. Deficiency in the fat gene results in vastly overgrown organs and can lead to the formation of cancer in humans. Our study will provide important insights into how the size of organs are controlled during development. Our research findings will have important implications for several aspects of human health and biology, and will increase our understanding of diseases that arise due to aberrant tissue growth, such as cancer. Our research findings will thus be of substantial national benefit, given that cancer is now the biggest cause of death in Australia, and that more than 88,000 Australians are diagnosed with cancer each year.

DP0984681 Dr A Heryanto; Dr E Baulch

Approved Project Title **Middle Classes, New Media and Indie Networks in Post Authoritarian Indonesia**

2009 : \$ 110,000

2010 : \$ 103,406

2011 : \$ 87,000

Primary RFCD 4203 CULTURAL STUDIES

APD Dr E Baulch

Administering Organisation The University of Melbourne

Project Summary

The study shall deepen Australians' appreciation of a little-known but strategically-placed facet of Indonesian society. It shall enhance understanding of the opinions, worldviews and cultural productions of young Indonesians, and of the culturally specific character of their digital engagements. In its focus on urban middle class Indonesians, the project shall produce new and detailed knowledge about the cultures and lifestyles of one of Australia's most important higher education markets, and its role in the society. Finally, the project shall deepen the Australian public's understandings of Indonesia as an increasingly complex, disjunctive society.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984905 Dr A Heryanto

Approved Project Title **Pop Cultures in Indonesia: a New Asian Politics of Pleasure and Identity**

2009 : \$ 87,000

2010 : \$ 62,000

2011 : \$ 35,000

Primary RFCD 4201 LANGUAGE STUDIES

Administering Organisation The University of Melbourne

Project Summary

The study addresses one of National Research Priorities (Goal 4 'Safeguarding Australia'), by better 'understanding our region and the world', and boosting Australia's 'soft power'. Recent changes in Indonesia render much of our knowledge about that society outdated. The study will deliver a significant contribution to the urgent revitalisation of Indonesian and cultural studies. It will hopefully elevate the quality of our public debate about the world's largest Muslim populated country and Australia's neighbour, by paying serious and overdue attention to the brightest sides of contemporary Indonesia that have occupied the minds of one hundred millions or so ordinary people there.

DP0987227 Dr AF Hill

Approved Project Title **Role of the GxxxG domain in the function of mammalian prion proteins**

2009 : \$ 120,000

2010 : \$ 120,000

2011 : \$ 120,000

Primary RFCD 3203 MEDICAL BIOCHEMISTRY AND CLINICAL CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

Prion proteins have been associated with a number of diseases of humans and animals (such as Creutzfeldt-Jakob Disease in humans and BSE, or 'mad-cow' disease in cattle) which have had major public health, social and economic consequences in countries where they have been detected. This project will identify mechanisms by which a highly conserved region of the prion protein plays a role in the conversion to the disease associated form. This will provide avenues for identifying the normal function of the prion protein, and increase our knowledge of prion biology. This will benefit both in terms of healthy ageing and in protecting the agriculture sector from prion diseases in farmed animals.

DP0985013 Prof AA Hoffmann; Dr C Robin; Dr WJ Kennington

Approved Project Title **Testing the DNA decay hypothesis of ecological specialization**

2009 : \$ 220,000

2010 : \$ 200,000

2011 : \$ 210,000

2012 : \$ 150,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

Australia's biodiversity has been increasingly threatened by climate change and fragmentation from habitat loss. To conserve biodiversity we need to identify species most at risk of extinction. One way species avoid extinction is to evolve and adapt to changing conditions, however, it now appears that many species have a limited adaptive potential. Here we develop and test a new idea that helps to predict species most threatened by climate change and other types of stresses. We also identify the sets of genes that are involved in adapting to dry/cold conditions and toxins. This information provides a rapid way of identifying species most at risk and least likely to adapt, and a new perspective on Australia's biodiversity.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986635 Prof LC Hollenberg; A/Prof SP Russo; Prof G Klimeck; Prof S Rogge

Approved Project Title **Single atom defined nanostructures: atom-electronics beyond the miniaturization limit**

2009 : \$ 200,000

2010 : \$ 140,000

2011 : \$ 160,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of Melbourne

Project Summary

The emerging era of atom-electronics promises to revolutionise microelectronics in the 21st century by going beyond the conventional miniaturization limit of microelectronics. Emerging atom level fabrication and control techniques offer the promise of building devices whose fundamental components are built atom-by-atom and function under completely new rules. This Discovery Project will apply critical new theoretical tools, in partnership with leading experimental groups, to enable the exploration of this technology and the creation of new and innovative applications which will have far reaching implications in all areas of society and significant national benefit.

DP0987461 Prof MJ Hynes

Approved Project Title **Global genetic regulation of carbon metabolism in filamentous fungi.**

2009 : \$ 125,000

2010 : \$ 110,000

2011 : \$ 110,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

Project Summary

Fungi are of great importance in medicine, agriculture and industry. They are used extensively for food, antibiotic and chemical production and, increasingly, for generating cheap substrates for bioethanol. However many are serious pathogens of plants and humans. Understanding how fungi control their metabolism is of fundamental importance for their more effective use or control. This project takes advantage of a fungus that is easily studied in the laboratory by advanced genetic techniques to identify the ways in which genes are turned on and off in response to changes in the nutrients available. By comparing DNA sequences the results are readily applied to fungi of economic importance.

DP0986345 A/Prof GR Kalb; Prof J Creedy; Dr L Cai; Dr J van de Ven

Approved Project Title **Effects on Labour Supply, Savings and Welfare of the July 2007 Policy Changes to Superannuation and the Age Pension**

2009 : \$ 90,000

2010 : \$ 40,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of Melbourne

Project Summary

This proposal's central question falls within the priority goal of 'Strengthening Australia's social and economic fabric'. Understanding the effects of alternative superannuation tax arrangements is crucial in view of concerns regarding aggregate private savings and labour force participation in an ageing economy. Low savings or participation could have implications for sustained economic growth. This project's outcomes will provide an indication of the potential effects of policies on labour supply and savings. After further modifications, the model developed in this project can also address other questions in the context of life-cycle decisions under uncertainty, such as labour supply, fertility or health.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985337 A/Prof AT Kenyon

Approved Project Title **Defamation and Privacy: Law, Media and Public Speech**

2009 : \$ 50,000

2010 : \$ 50,000

2011 : \$ 50,000

2012 : \$ 40,000

2013 : \$ 40,000

Primary RFCD 3901 LAW

Administering Organisation The University of Melbourne

Project Summary

This project investigates important recent legal changes in defamation and privacy, laws which can considerably limit public speech. It addresses the urgent need in law for a more sophisticated understanding and evaluation of the practices of media professionals. It will assist lawyers and judges apply the changed laws, contribute to scheduled reviews of legislation, assist publications and journalists deal with risks of legal liability, develop critical academic and legal debates about the media, and clarify the parameters of lawful public speech. It promotes better legal understanding of popular media forms, which have key roles in contemporary economies and public debate.

DP0985623 Dr EH Krenske

Approved Project Title **Exploring new roles for phosphorus radicals in health, environment, and technology**

2009 : \$ 78,591

2010 : \$ 83,000

2011 : \$ 83,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

APD Dr EH Krenske

Administering Organisation The University of Melbourne

Project Summary

Several practical outcomes will arise from this project. Information on processes that contribute to genetic disease and cancer will be derived through studies of the role of phosphorus radicals in DNA damage. Processes that lead to the degradation of natural and synthetic materials in the environment will be explored. Clean reactions will be developed for the fabrication of advanced materials (e.g. pharmaceuticals). These innovations will expand Australia's international profile in a growing research area. The project will also address three of Australia's National Research Priorities, contribute to the training of researchers in Free Radical Chemistry, and initiate research collaborations with institutions in France and the USA.

DP0987558 A/Prof M Kuijper

Approved Project Title **Smart coding for improved performance of complexity constrained devices**

2009 : \$ 85,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFCD 2805 DATA FORMAT

Administering Organisation The University of Melbourne

Project Summary

The technical innovations of this project have the potential to have an immediate impact on compression technology. The overall expected outcome of the project consists of new compression algorithms for the Australian telecommunications industry. The novel outcomes of the project lead to better quality images in video mobile communications applications. As such, the project operates at the forefront of innovative next generation mobile video telephony.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986211 Prof SF Macintyre

Approved Project Title **Australia's post-Second World War reconstruction reassessed, 1941-1949**

2009 : \$ 192,000
2010 : \$ 110,000
2011 : \$ 105,000
2012 : \$ 78,590
2013 : \$ 160,000

Primary RFCD 4301 HISTORICAL STUDIES

APF Prof SF Macintyre

Administering Organisation The University of Melbourne

Project Summary

The project will provide a better understanding of a major phase of Australian history. While there is substantial awareness of the national effort in the Second World War, the magnitude of the commitment to apply the same spirit to secure peace and redeem sacrifice is less widely recognised. This project will assess the substantial innovation in national government to meet augmented expectations and explore the domestic and international context of such actions. It will thus enhance awareness of mid-century social, political and cultural transitions, particularly as they relate to issues that continue to shape our national and international experience.

DP0984649 Prof PR Martin; Dr AB Metha; A/Prof UH Grunert; Mr PA Bedggood

Approved Project Title **Functional imaging of colour pathways in the living eye**

2009 : \$ 220,000
2010 : \$ 135,000
2011 : \$ 135,000

Primary RFCD 2705 ZOOLOGY

APD Mr PA Bedggood

Administering Organisation The University of Melbourne

Project Summary

In order to repair or regenerate a diseased eye, we require knowledge of the normal pattern or nerve cell connections, and knowing how biology solves the problem of colour vision can be used to improve the design of artificial vision systems. The adaptive optics machine we will build in this project can be used to image nerve cells, fine blood vessels, and nerve fibre bundles in the normal and diseased eye. This will improve Australia's research and development capacity in this new area of medical diagnostics. Our machine will be made available to other Australian laboratories and will improve the national capacity for making further scientific discoveries about how the visual system works.

DP0987589 Prof VL Martin

Approved Project Title **The US Interest Rate Conundrum and its Implications for Australia**

2009 : \$ 70,000
2010 : \$ 50,000
2011 : \$ 50,000

Primary RFCD 3404 ECONOMETRICS

Administering Organisation The University of Melbourne

Project Summary

The project generalises existing factor models of interest rates. The project will result in several benefits nationally as well as internationally. As U.S. interest rates and U.S. monetary policy in general are important determinants of interest rates in Australia, the project will lead to an improved understanding of the international mechanism linking interest rates. This will also provide a better framework in which to understand and monitor monetary policy in Australia. An important aspect of the project is the development of new testing procedures that improve upon existing nonparametric methods.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984577 Prof I Marusic; Dr C Manzie; Prof M Krstic
Approved Project Title **Practical wall-turbulence drag reduction through adaptive control**
2009 : \$ 220,000
2010 : \$ 150,000
2011 : \$ 170,000
Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING
Administering Organisation The University of Melbourne

Project Summary

Long term increases in the price of aviation fuel disproportionately impacts on Australian carriers, given our geographic isolation and the resulting greater percentage of long-haul flights. The resulting higher fares will also have a direct impact on international tourism to Australia. One way to reduce the impact of rising fuel cost, and to reduce CO2 and other emissions at the same time, is to decrease drag on aircraft. This project will develop understanding in wall turbulence and adaptive control, and use this to experimentally demonstrate active reductions in skin friction drag. The results are equally applicable to a range of other applications including sea transport, pipe flows and combustor designs.

DP0987972 Prof K Mavromaras; Prof JW Freebairn; A/Prof BW Headey; Dr Y Tseng; A/Prof K Bender; Prof I Theodossiou
Approved Project Title **International comparisons of retirement decisions and well-being of mature age populations: applied micro-economic analyses**
2009 : \$ 100,000
2010 : \$ 100,000
2011 : \$ 100,000
2012 : \$ 90,000
Primary RFCD 3402 APPLIED ECONOMICS
Administering Organisation The University of Melbourne

Project Summary

Australia needs a pension reform to promote longer working lives of mature people in a health- and productivity-enhancing way, that is also financially sustainable. This study uses cutting-edge methodology and data to analyse decisions surrounding how mature people disengage from employment towards their eventual permanent retirement, and how these decisions relate to their health and well-being. It compares and contrasts Australia with the UK, Germany and the US to derive lessons for developing evidence-based pension reform. International comparative research enables the identification of important policy, institutional and/or cultural differences and lessons that may well be missed by single country studies.

DP0985600 Dr MA McCarthy; Dr PA Vesk
Approved Project Title **Synthesising prior information for ecological research and management**
2009 : \$ 80,000
2010 : \$ 70,000
2011 : \$ 70,000
Primary RFCD 3008 ENVIRONMENTAL SCIENCES
Administering Organisation The University of Melbourne

Project Summary

While using existing information to design studies and compare results, ecologists rarely use existing information in their analyses. We will combine the results of previous ecological studies to summarise the existing information. We will test how well the traits of plants and animals can be predicted from previous research, and the benefit of this existing information for environmental management. By taking advantage of the wealth of previous ecological research, our project can save time and money for ecological research by scientists and environmental management by federal and state agencies. This will fundamentally change the way that ecology is conducted.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987640 A/Prof AE McLaren

Approved Project Title **Ethnoecology and the State in Regional China**

2009 : \$ 76,923
2010 : \$ 34,000
2011 : \$ 42,000

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation The University of Melbourne

Project Summary

This project will enhance Australian knowledge about diversity amongst Han Chinese communities in the way that they have adapted to their environment, a diversity that underpins the responsiveness of Chinese populations to environmental transformation in the contemporary period. It will also strengthen Australia's reputation as a centre for the study of regional cultures within the Chinese landmass, provide additional insights into the lower Yangzi delta, which is one of the most affluent regions of China today, and build up Australia's capacity to train postgraduates with an understanding of China's great regional diversity.

DP0987765 Dr SN McLaren; Prof MA Sandiford

Approved Project Title **Thermal structure and evolution of the Australian continent**

2009 : \$ 206,000
2010 : \$ 160,000
2011 : \$ 155,000
2012 : \$ 157,000
2013 : \$ 157,000

Primary RFCD 2602 GEOPHYSICS

ARF Dr SN McLaren

Administering Organisation The University of Melbourne

Project Summary

Australia contains 40% of the world's known uranium resources. Uranium, with thorium and potassium, are heat-producing elements which affect the way temperature varies within the Earth. Outcomes from this project will lead to a better understanding of the potential for geothermal energy in Australia and provide a framework for assessing Australia's uranium resource. Understanding the crustal thermal regime is also fundamental to our knowledge of many earth processes. The project will enhance Australia's international research standing, provide training for an early career researcher and contribute to the development of an environmentally sustainable Australia, a National research priority.

DP0987299 A/Prof JE McLeod; Dr KJ Wright

Approved Project Title **Educating the Adolescent: An historical study of curriculum, counselling and citizenship in Australia 1930s -70s**

2009 : \$ 120,000
2010 : \$ 110,000
2011 : \$ 105,000

Primary RFCD 3301 EDUCATION STUDIES

APD Dr KJ Wright

Administering Organisation The University of Melbourne

Project Summary

This project is a history of the education of Australian adolescents during the mid-twentieth century (1930s-70s). It investigates international and Australian practices and debates concerning how best to prepare adolescents for citizenship; and examines changing ideas about the 'good student', and the role of school curriculum and counselling services in shaping student values and wellbeing. Combining documentary and oral history research, it provides historical perspectives on these topical issues, which will benefit policy, teacher education and teaching practice. It will create an oral history archive for, and deepen community and professional knowledge of, an important period of Australian educational history.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987396 Dr MS Miller

Approved Project Title **Three-dimensional evolution of the Banda Arc: effects of the collision of the Indo-Australian plate with the active Banda volcanic arc**

2009 : \$ 80,000

2010 : \$ 70,000

2011 : \$ 70,000

2012 : \$ 60,000

Primary RFCD 2602 GEOPHYSICS

APD Dr MS Miller

Administering Organisation The University of Melbourne

Project Summary

National benefits are associated with the advance of basic science by addressing fundamental tectonic problems on the geodynamics of convergent plate boundaries. In particular, the specific study area would provide a better understanding on the tectonic environment of Australia in the context of the Asia-Pacific region. In the future, outcomes of this research could potentially be used to reconstruct the tectonic history of Australia using the Banda region as a modern analogue.

DP0988210 Prof W Moran; Dr SD Howard; Prof AR Calderbank

Approved Project Title **Mathematical Foundations of Distributed Radar**

2009 : \$ 135,000

2010 : \$ 130,000

2011 : \$ 125,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation The University of Melbourne

Project Summary

Conventional military threats to Australia are large or fast moving objects such as ships and aircraft and conventional radar systems are designed to handle such threats. Recent global political shifts have changed the threats to include objects that are small and slowly moving, such as people, small vehicles and boats. Advances in radar hardware make feasible small, low-powered, devices with inherently reduced performance in comparison to deployed systems. Methods for information integration over a dispersed system of such small devices, design of suitable waveform suites and clever local signal processing algorithms will be developed to achieve the performance improvements the hardware offers, to handle the new threats.

DP0987971 Prof WA Morrison; Dr AJ O'Connor; A/Prof EW Thompson

Approved Project Title **Tissue distraction: A novel approach to enhance tissue growth for soft tissue engineering purposes**

2009 : \$ 170,000

2010 : \$ 140,000

2011 : \$ 140,000

Primary RFCD 2915 BIOMEDICAL ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

This project will provide new tissues for the expanding field of regenerative medicine to treat numerous tissue defects and

1. Benefit the health & economic well being of Australian society by rapidly supplying organs and tissues.
2. Benefit the academic community by a multidisciplinary approach, involving several academic Institutions in the fields of surgery, tissue engineering, physiology, morphology, polymer chemistry & biomolecular engineering that will produce basic scientific data with a practical application. Post-graduate students and staff will train & gain significant knowledge in this area.
3. Benefit industry through new product development and IP. This project advances a platform technology with multiple applications.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986522 Dr SN Mueller; Dr WR Heath
Approved Project Title **Imaging of immune responses to pathogens in vivo.**

2009 : \$ 189,000
2010 : \$ 160,000
2011 : \$ 160,000
2012 : \$ 160,000
2013 : \$ 160,000

Primary RFCD 3202 IMMUNOLOGY
QEII Dr SN Mueller
Administering Organisation The University of Melbourne

Project Summary

This proposal represents an excellent opportunity for Australian science to participate in state-of-the-art research into the immune system and to be internationally competitive with the best researchers in the field. By combining advanced microscopy techniques with well developed biological models used by researchers at the University of Melbourne, this project will greatly improve our understanding of the dynamic interactions that occur between cells of the immune system during infectious diseases. The insight provided by this project will facilitate the design of better vaccines for protection against diseases, including influenza.

DP0985325 Prof P Mulvaney
Approved Project Title **Nanocrystal Electronics: A Sol-Gel Approach**

2009 : \$ 270,000
2010 : \$ 170,000
2011 : \$ 150,000
2012 : \$ 100,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)
Administering Organisation The University of Melbourne

Project Summary

Australia is building capability in printable electronics, which will supersede traditional semiconductor fabrication methods. The main goals are to mass produce key electronic structures such as display devices, solar cells and sensors using cheaper, non-clean room based technologies via ink-jet printing and other high throughput methods. The integration of sol-gel based materials into roll-to-roll manufacturing will advance Australian manufacturing capabilities and generate new jobs in the rapidly growing printable electronics field.

DP0987379 A/Prof A Ndalianis
Approved Project Title **Children of Frankenstein: Science Fiction, Automata and the Emergence of Robot Realities**

2009 : \$ 99,000
2010 : \$ 20,000
2011 : \$ 20,000

Primary RFCD 4203 CULTURAL STUDIES
Administering Organisation The University of Melbourne

Project Summary

Entertainment technologies are integral to everyday life and they play a crucial role in acclimatizing the public to new technologies. This project provides a unique account of the role played by creative industries in developing cutting-edge technologies that include robots, and film and computer game special effects that rely on artificial intelligence. The computer game industry in Australia is developing into a very profitable industry and attracts an audience far greater than that of the cinema. Like film effects designers, game programmers are implementing artificial intelligence into their games. By considering Australian industries within an international context, much can be learned about our role as innovators on a global scale.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985388 Prof D Nestic; Dr Y Tan; Dr C Manzie; Prof IM Mareels
Approved Project Title **Extremum seeking control: analysis, design and applications**
2009 : \$ 135,000
2010 : \$ 100,000
2011 : \$ 110,000
Primary RFCD 2301 MATHEMATICS
Administering Organisation The University of Melbourne

Project Summary

Optimal control is one of the central pillars in the field of automatic control, but is prevented from use in many engineering applications due to the computational complexity and system knowledge requirements typically associated with the technique. Extremum seeking promises the performance of an optimal approach, but with the benefit of real time implementation and very relaxed requirements on the system knowledge. Through improved understanding of extremum seeking algorithms, applications from vehicle dynamics to emissions reduction to manufacturing processes will benefit with greater levels of performance and robustness.

DP0986118 A/Prof ME Nicholls; Prof JL Bradshaw
Approved Project Title **Left of centre: Attentional distortions in the mental representation of space in healthy and clinical populations**
2009 : \$ 103,000
2010 : \$ 46,500
2011 : \$ 90,000
2012 : \$ 88,000
Primary RFCD 3801 PSYCHOLOGY
Administering Organisation The University of Melbourne

Project Summary

Stroke patients cost the Australian economy \$1.3bn pa in addition to their social burden, but effective diagnosis and rehabilitation is impeded by a lack of fundamental research into the cognitive and neural mechanisms that underlie attentional disorders. Our research will provide significant new insights into how the brain deploys attention in external and imagined space and will lead to more effective management and treatment of stroke victims. Our new test of attentional disorders is independent of a patient's inability to see or move and will enable more effective diagnosis. Our research provides the fundamental knowledge base for our discipline and is vital for developing the next generation of Australia's cognitive neuroscientists.

DP0984456 Dr GE Overland; Dr CH Barry; Prof TW Pogge
Approved Project Title **The Responsibilities of the Affluent to Address Global Poverty**
2009 : \$ 79,000
2010 : \$ 90,000
2011 : \$ 120,000
Primary RFCD 4401 PHILOSOPHY
Administering Organisation The University of Melbourne

Project Summary

Australia is a wealthy country surrounded by less developed countries. This project will serve as a guide to a morally defensible Australian foreign policy and in particular as an aid for policy makers working on foreign assistance, international trade, and environmental policy. It is important to observe that in order to safeguard Australian national security it is prudent to address the issue of global poverty. Although terrorists and other threats seem seldom to be motivated by considerations of fairness, sympathy with and support for their actions seems often rooted in the perception that they are acting on behalf of the poor and impoverished.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0988985 A/Prof MC Patterson
Approved Project Title **Relatively Speaking: Kinship Matters in Vanuatu**
2009 : \$ 85,000
2010 : \$ 80,000
2011 : \$ 43,000
Primary RFCD 3703 ANTHROPOLOGY
Administering Organisation The University of Melbourne

Project Summary

Where the absence of state welfare makes reliance on kin a necessity, the same obligations are seen by Aid donors in the Pacific as inhibiting economic advancement and civil probity. An understanding of whether or not transformations and/or continuities in the field of kinship, marriage and gender are implicated in the future development of a nation like Vanuatu in which Australia invests considerable aid and the stability of which is consequential in the region, demonstrates a clear national interest in this project.

DP0987730 Prof PE Pattison; Dr GL Robins; Dr E McBryde; A/Prof M Hellard
Approved Project Title **The structure and dynamics of social contact for human disease transmission models**
2009 : \$ 136,000
2010 : \$ 176,000
2011 : \$ 138,000
2012 : \$ 100,000
Primary RFCD 3801 PSYCHOLOGY
Administering Organisation The University of Melbourne

Project Summary

The methodological advances of this project will enable new insights in important social research. They will not only add significantly to national capacity in the modelling of complex social systems but they will also yield practical scientific outcomes in a significant policy domain in Australia and overseas. In Australia, response to diseases such as HIV, HCV and TB need new approaches, and the threat of pandemic influenza is significant.

DP0987855 Dr S Petrou; Prof B Jarrott; Dr CE Cameron; Dr B Canard
Approved Project Title **Novel target of amiloride analogues - picornaviral RNA polymerase**
2009 : \$ 180,000
2010 : \$ 60,000
2011 : \$ 60,000
Primary RFCD 3203 MEDICAL BIOCHEMISTRY AND CLINICAL CHEMISTRY
Administering Organisation The University of Melbourne

Project Summary

Picornaviruses cause a range of diseases such as poliomyelitis, meningitis, myocarditis, hepatitis A, neonatal sepsis and common cold. No antiviral treatment is available for these infections. Nearly 50% of antiviral drugs used in medicine are viral polymerase inhibitors; however picornaviral RNA polymerase has been largely overlooked as a drug target. We have discovered a group of compounds that inhibit picornaviral RNA polymerase. This project aims to define the inhibition mechanism and to evaluate a potential use of these compounds for antiviral drug development.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986235 A/Prof D Phillips; Dr M Honda

Approved Project Title **The Cosmogenic ²¹Ne Exposure Dating Method: Calibration for Application to Volcanic Chronology, Landscape Evolution and Palaeo-Climate Change**

2009 : \$ 75,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 2601 GEOLOGY

Administering Organisation The University of Melbourne

Project Summary

Accurate calibration of the Neon 21 cosmogenic dating method will provide a powerful tool for dating young volcanic rocks, eroded or buried surfaces and glacier/ice retreat. This research will have considerable social, national and economic benefits for volcanic hazard assessment, studies of ore systems buried beneath thick soil cover, landscape evolution, soil erosion, and paleo-climate change. In addition, this research will position Australian science at the forefront of cosmogenic dating research and provide essential training for the next generation of Earth Scientists.

DP0988427 Dr P Pivonka; Prof DW Smith

Approved Project Title **Multi-scale modeling of transport through deformable porous materials**

2009 : \$ 170,000

2010 : \$ 140,000

2011 : \$ 140,000

Primary RFCD 2908 CIVIL ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

Understanding solute transport through porous materials is essential because it provides a technical basis for answering many important questions in society today-how can humans avoid 'brittle bones', how to design durable infrastructure, how to safely store wastes (e.g. hazardous and municipal). Solution of each of these problems requires innovation in model development, new method of analysis, and insightful interpretation of results. While theoretical developments of this project are general, in the sense that they are not restricted to particular engineering disciplines, the four chosen applications closely align with two major research priorities namely An Environmental Sustainable Australia and Promoting and Maintaining Good Health.

DP0987731 Prof R Powell

Approved Project Title **Building the thermodynamic framework for modelling the Earth**

2009 : \$ 79,000

2010 : \$ 80,000

2011 : \$ 83,000

2012 : \$ 79,000

2013 : \$ 79,000

Primary RFCD 2601 GEOLOGY

APF Prof R Powell

Administering Organisation The University of Melbourne

Project Summary

The Earth holds resources essential for society, such as metals and petroleum, but it also presents risks to society, such as earthquakes and volcanoes. To understand these, we need to understand how the Earth works, and not just at or close to the Earth's surface where these things are found or are felt. This fellowship aims to provide the framework and the tools for modelling the processes involved in how the Earth works. Such tools will, for example, dramatically improve our ability to understand, and therefore to find, ore deposits.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986271 A/Prof GG Qiao

Approved Project Title **Building advanced polymeric nanotubes for targeted drug delivery**

2009 : \$ 60,000

2010 : \$ 50,000

2011 : \$ 50,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

Advanced drug delivery devices have major commercial applications in fighting diseases like cancer and infectious viruses. The success of this project will provide fundamental knowledge for the design of new drug delivery devices based on polymeric nanotubes. The project will also further advance Australia's nano- and bio-technological research and industries. This project will also provide additional benefit for developing controlled release systems in drug delivery and artificial vessels, and improve sensitivity in molecular sensors. The pioneering work proposed will ensure that Australia remains at the forefront of innovative scientific research within the rapidly advancing disciplines of nanotechnology and novel macromolecular design.

DP0986774 Prof A Ram

Approved Project Title **Representation Theory: Path models and decompositions**

2009 : \$ 130,000

2010 : \$ 100,000

2011 : \$ 100,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

Project Summary

The research in this proposal develops tools for capitalising on the benefits of symmetry in large complex systems. These techniques and processes are applicable for solving complex problems in large interactive systems. This project will involve young researchers and train them for problem solving in a wealth of fields, including management, the sciences, the financial industries, and the development of technologies. The research is in one of the most active cutting edge areas of pure mathematics and will contribute to maintaining Australia's position as a leading nationality in research in representation theory and its applications.

DP0984833 Prof S Reilly; Prof M Onslow; Dr A Packman; A/Prof MA Wake; Prof M Prior; A/Prof EL Bavin; Dr PA Eadie; Dr O Ukoumunne; Dr SL Block; Mr AP Vogel

Approved Project Title **Stuttering in childhood: Patterns of recovery and persistence**

2009 : \$ 115,000

2010 : \$ 121,000

2011 : \$ 98,000

Primary RFCD 3210 CLINICAL SCIENCES

Administering Organisation The University of Melbourne

Project Summary

This project will benefit the 1 in 20 Australian children who stutter and their families. We will learn for the first time how stuttering impacts on child development in the early school years and document the relationship between stuttering and other childhood conditions. The study will produce much needed information about recovery from stuttering and stuttering persistence. Therefore new knowledge will result to inform the scientific community and provide professionals and families with much needed evidence-based information about stuttering progression. Together this information will inform intervention approaches and help direct resources to those children who need them most.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987668 Prof AJ Robertson
Approved Project Title **Policy-Based Reasoning in Private Law**
2009 : \$ 38,931
2010 : \$ 50,000
2011 : \$ 50,000
Primary RFCD 3901 LAW
Administering Organisation The University of Melbourne

Project Summary

The Australian community devotes a great deal of attention to improving the regulation of commercial and consumer relations through participative, public processes such as law reform commissions and parliamentary inquiries. The important role of judicial law-making in regulating economic and social relations is often overlooked. This project will examine the way in which the pursuit of policy goals influences judicial law-making in the private law sphere. The project will make an important contribution to the international debate about the legitimacy of policy considerations in judicial-making in private law, and the extent of the legitimate law-making role of the courts in a democratic system.

DP0985167 Prof DT Runia; Prof J Mansfeld; Prof O Primavesi
Approved Project Title **Aetiana: laying foundations for the study of the history of ancient philosophy Part 2**
2009 : \$ 62,000
2010 : \$ 63,000
2011 : \$ 65,000
2012 : \$ 57,000
Primary RFCD 4401 PHILOSOPHY
Administering Organisation The University of Melbourne

Project Summary

Ancient philosophy is one of the pillars of the tradition of western thought. It has made a magnificent contribution to reflection on lasting problems in the areas of science, ethics, theory of knowledge, metaphysics and logic. The Socratic tradition of discussion on how we should live is a striking example of how ancient philosophy remains directly relevant to issues in our society today. Research that strengthens our knowledge in this area will thus be of considerable benefit to the community. Australia will also benefit from the international scholarly cooperation and the training of younger scholars that will take place in carrying out the project.

DP0986104 A/Prof JE Sader
Approved Project Title **The Mechanics of Nanoscale Devices**
2009 : \$ 140,000
2010 : \$ 120,000
2011 : \$ 120,000
Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS
Administering Organisation The University of Melbourne

Project Summary

Australian developments in biosensing, medical diagnostics, clean energy, communication and security technologies, are rapidly growing due to our mounting capacity in nanoscale fabrication. Vital for evolution of next-generation nanodevices is an understanding of how mechanical processes operate at such small scales. This application will contribute to this scientific knowledge base. This will in turn assist Australian industries to progress these applications and devices, leading to economic, social and technological gains for the Australian community.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987573 Prof AV Sanson; Dr CO Olsson; Ms DF Smart

Approved Project Title **Investigating positive developmental transitions in emerging adulthood within the Australian Temperament Project cohort: Models, temporal patterns and predictors**

2009 : \$ 130,000

2010 : \$ 130,000

2011 : \$ 130,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

Project Summary

Follow-up of the Australian Temperament Project (ATP) cohort provides a rare opportunity for robust investigation of positive development in emerging adulthood. High rates of risk taking and health disruption characterise this period. Identification of successful personal and social adjustment characteristics will reveal the potential for positive development to prevent or ameliorate adjustment difficulties. Analysis of the extensive ATP dataset will identify child and adolescent predictors of positive development. The resulting knowledge of the role of earlier life characteristics and circumstances for positive development can help frame new health promotion initiatives. The study will also advance theory by developing an integrated model of positive development.

DP0987003 Dr PB Seddon; Prof G Shanks; A/Prof R Scheepers; Mr PJ Reynolds

Approved Project Title **Competing on Business Analytics**

2009 : \$ 151,000

2010 : \$ 119,000

2011 : \$ 138,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of Melbourne

Project Summary

Business analytics can provide Australian organisations with a means to gain competitive advantage in the face of increasing global competition. By using the Business Analytics Success Model, Australian organisations will be able to understand better how to gain competitive advantage with business analytics. The model is an original contribution in an important area of information systems research and will contribute to university teaching and research training. The empirical data and rigorous research protocols will enhance Australia's reputation as a leader in the area of organisational use of business-analytic systems.

DP0988725 Dr W Shieh

Approved Project Title **Optical Multiple-Input Multiple-Output Communication Systems**

2009 : \$ 100,000

2010 : \$ 80,000

2011 : \$ 100,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of Melbourne

Project Summary

Optical multiple-input multiple-output (MIMO) systems exploit a simple yet powerful principle of diversity to improve the capacity and robustness of optical networks. This proposal focuses on making the most use of two polarisation modes intrinsic to the fiber by applying MIMO techniques to the optical communication systems. This project can potentially create many commercial opportunities in Australia in the area of integrated photonic circuits and high-speed digital signal processing. The funding support of these research activities will further enhance Australia's international ICT reputation in this emerging field.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0988112 A/Prof K Shields; Prof N Olekalns; Prof K Lee

Approved Project Title **Australian Real Time Data: Construction, Analysis and Implications for Real Time Policy Making**

2009 : \$ 108,000

2010 : \$ 83,000

2011 : \$ 77,000

Primary RFCD 3404 ECONOMETRICS

Administering Organisation The University of Melbourne

Project Summary

This first comprehensive macroeconomic real time database for Australia recording the actual data available to policy makers at the time of making decisions will serve as a standard reference for accurate ex post macroeconomic policy evaluation and for accurate forecasts and decision making which are robust to data revisions. The free database will be of interest to Australian researchers, economists, forecasters and policy makers. Readily applicable and interpretable forecasts of the business cycle and the current state of the Australian (and US) economy (e.g. likelihood of recessions or inflation) will be of direct relevance to Australian policy-makers in Government, the Reserve Bank of Australia, and to the Australian decision-makers.

DP0986010 Prof IH Simmonds; Prof DJ Karoly

Approved Project Title **Storm activity in the Arctic and implications for rapid climate change in polar regions**

2009 : \$ 140,000

2010 : \$ 110,000

2011 : \$ 110,000

Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation The University of Melbourne

Project Summary

Australia's weather and climate is influenced in a myriad of ways by Antarctica and its environs. The complex manners in which weather systems interact with polar processes are fundamental in understanding these links. The dramatic changes which the Arctic has undergone in recent years present a very valuable environmental framework for understanding how the complex polar weather - climate connections change during a period of rapid change. This is of great national and community benefit in that it will lead to a fuller understanding of the polar regions, and present a broader context in which precipitation and other changes over southern Australia can be understood.

DP0988001 Prof DW Smith; Dr BS Gardiner; Prof AJ Grodzinsky

Approved Project Title **Engineering cartilage homeostasis in health and disease**

2009 : \$ 80,000

2010 : \$ 75,000

2011 : \$ 75,000

Primary RFCD 2915 BIOMEDICAL ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

Arthritis is a common, painful and often debilitating disease affecting 16% of the Australian population and costing this community \$11 billion every year. It is not well understood why cartilage degenerates into joint disease, nor how it may be reversed - partly due to the large number of mechanisms involved. This project aims to overcome this complexity by developing a computational model of cartilage that can integrate the various mechanisms of cartilage degradation. New experiments will be used to validate the model and test predictions. The model developed will provide fundamental insights into what is required for the maintenance of healthy cartilage, and what happens in injury-induced degradation of cartilage.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986222 Dr GK Such

Approved Project Title **Synthesis and Functionalisation of Advanced Polymer Films and Particles.**

2009 : \$ 100,000

2010 : \$ 100,000

2011 : \$ 100,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

APD Dr GK Such

Administering Organisation The University of Melbourne

Project Summary

Scientific and technological advances at the frontiers of nano- and biotechnology are poised to revolutionise the scope of treatment and healthcare options. This project will involve the synthesis of engineered polymer building blocks with the capability for multifunctional and intelligent response. These smart polymers will then be assembled into responsive nanostructured materials for drug delivery and biosensing applications. These materials are expected to have health benefits for Australian citizens and will contribute to a world-leading nanobiotechnology industry. The project will also provide development opportunities for young scientists and will also foster multidisciplinary collaborations within both Australia and abroad.

DP0984419 Dr NA Thieberger; Dr R Nordlinger

Approved Project Title **Doing great things with small languages: Safeguarding Indigenous language material of Australia's region by clever use of new technology**

2009 : \$ 122,000

2010 : \$ 150,000

2011 : \$ 155,000

2012 : \$ 167,000

2013 : \$ 125,000

Primary RFCD 3802 LINGUISTICS

QEII Dr NA Thieberger

Administering Organisation The University of Melbourne

Project Summary

This project will provide a responsible record of Indigenous and endangered languages from both Australia and from Vanuatu. It will build understanding of the cultures in which those languages are spoken and enhance links between Australia and its neighbours by providing access to field recordings made by researchers since the 1950s, thus enhancing Australia's security. It will also keep Australia at the forefront of the application of new technologies to linguistic research by developing a methodology for language documentation of significance for the discipline as a whole.

DP0987767 Prof RS Tucker; A/Prof C Lim; Dr G Shen; Dr AV Tran; Dr E Wong

Approved Project Title **Delivering Next-Generation Broadband Internet Access to Australia: Integration of Broadband Optical and Wireless Networks**

2009 : \$ 205,000

2010 : \$ 140,000

2011 : \$ 140,000

2012 : \$ 190,000

2013 : \$ 195,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of Melbourne

Project Summary

Provision of broadband services is a high priority for the Australian government as evidenced by a range of initiatives costing more than \$4 billion. Especially, the integration of optical and wireless broadband access will potentially provide inexpensive and efficient solutions to customers. Building on the strength of existing photonics and wireless industries in Australia, direct and indirect outcomes of this project can lead to new business opportunities and will further strengthen the growing local telecommunication industries. It is also anticipated that national and international collaboration will generate further research activities and significantly enhance the existing reputation of Australian research capabilities.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986324 Dr DJ Varney; Dr PA Eckersall; Dr CF Hudson; Prof BL Hatley

Approved Project Title **Theatre in the Asia-Pacific: Regional Culture in a Modern Global Context**

2009 : \$ 84,000
2010 : \$ 75,000
2011 : \$ 40,000

Primary RFCD 4101 PERFORMING ARTS

Administering Organisation The University of Melbourne

Project Summary

This project contributes to Australian understandings of other countries in its region and promotes an Asia-literate society. Its focus on theatre and performance cultures of the Asia-Pacific deepens our understanding of the issues, both social and aesthetic, that characterise regional-specific responses to a shared global context. With its focus on innovative theatre and performance, that both conserve the region's rich cultural heritage and express its creativity, the project analyses recent trends in performing arts in the region. The outcomes will inform the academic community and future cultural policies of national organisations including Asialink and the Australia Council.

DP0985673 Dr DN Veitch; Prof FL Baccelli

Approved Project Title **Enabling Reliable, Efficient, and Secure Networks: Next Generation Measurement for the Internet**

2009 : \$ 150,000
2010 : \$ 80,000
2011 : \$ 95,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of Melbourne

Project Summary

Like the electricity network, the Internet is a core infrastructure connecting society, and so must be reliable, efficient, and secure. A gap in bandwidth supply is like a blackout in terms of lost business, productivity and essential data. Inefficiency increases costs as more equipment is needed for the same service, and poor security threatens both the economic and personal spheres, limiting freedom and adding cost. A raw material of network health and security is network measurements showing what is going on. However, current methods cannot cope with the size and speed of today's Internet. This project will provide the measurement breakthroughs necessary to ensure that networks are reliable, secure, and fairly priced.

DP0986247 A/Prof TR Vidyasagar; Prof Dr UT Eysel; Dr ZF Kisvarday

Approved Project Title **Thalamo-cortical organisation in visual information processing**

2009 : \$ 115,000
2010 : \$ 90,000
2011 : \$ 90,000

Primary RFCD 3207 NEUROSCIENCES

Administering Organisation The University of Melbourne

Project Summary

This study will: (1) Increase our basic understanding of visual function that can help to explain many clinical perceptual disturbances. (2) Help in providing a detailed picture of intracortical neuronal networks that can form the basis for a prosthesis for the blind. (3) Discover the principles of neural organization underlying functions such as figure-ground segregation and perceptual learning which can inspire practical algorithms for robotic vision. (4) Train graduate students and postdoctoral fellows in state of the art techniques in a stimulating intellectual environment

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987282 Prof RR Volkas
Approved Project Title **Branes and unification**
2009 : \$ 95,000
2010 : \$ 95,000
2011 : \$ 95,000
Primary RFCD 2403 ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS;
PLASMA PHYSICS
Administering Organisation The University of Melbourne

Project Summary

This project will explore theories which hypothesise that our universe is a 3-dimensional mem-(brane) residing in higher dimensional space. We will construct completely realistic theories and find ways to test them experimentally. This project is at the forefront of international developments in our understanding of the universe - an area that has grown in importance following the construction of the Large Hadron Collider at the European Giant accelerator laboratory. The project will expose postgraduate students to exciting developments in this fascinating field of physics.

DP0988343 Prof RR Volkas; Dr NF Bell; Prof T Gherghetta; Prof BH McKellar; Dr GC Joshi
Approved Project Title **The standard model of particle physics and beyond in the era of the Large Hadron Collider**
2009 : \$ 260,000
2010 : \$ 180,000
2011 : \$ 180,000
Primary RFCD 2403 ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS;
PLASMA PHYSICS
Administering Organisation The University of Melbourne

Project Summary

This project will enhance the nation's intellectual culture and international standing through the study of original ideas about the nature of our universe. The advent of the Large Hadron Collider era, courtesy of the giant European accelerator laboratory called CERN, will revolutionise particle physics in the next few years. High achieving students are very excited by the research questions addressed in this proposal, so it will add significantly to the pool of highly-trained young Australians. They emerge as general problem solvers and flexible thinkers of high calibre in addition to becoming experts in particular areas. The big fundamental questions to be considered are also of great fascination to the general public.

DP0985703 A/Prof I Volkmer; Dr R Hassan; Dr M Hadlow; Dr K Schönbach; Dr S Bose; Prof R Teer-Tomaselli; Dr S Niedermayer; Dr L Zwimpfer; Ms S Pascoe
Approved Project Title **Global Youth & Media - Notions of Cosmopolitanism in the Global Public Space**
2009 : \$ 190,000
2010 : \$ 90,000
2011 : \$ 150,000
Primary RFCD 4001 JOURNALISM, COMMUNICATION AND MEDIA
Administering Organisation The University of Melbourne

Project Summary

As Australia repositions itself in the globalized world of the 21st century, an understanding of new global communication spheres is increasingly important. Our research into the mediated experience and expectations of globalization among 14-17 year olds in 12 countries is explicitly concerned with the possibilities of future world citizenship among the most highly networked generation to date. Its findings will be of value to education, media and cultural policy makers in Australia. Through the data and analysis it will provide insights into the changing forms of national and global citizenship, national and global public space, and the integration of both into regional identities and communications.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984586 A/Prof JP Walker; Mr R Panciera; Dr D Ryu; Prof DA Gray; Dr TJ Jackson

Approved Project Title **Active-passive microwave soil moisture remote sensing: Towards sustainable land and water management from space**

2009 : \$ 250,000
2010 : \$ 190,000
2011 : \$ 100,000

Primary RFCD 2605 HYDROLOGY

Administering Organisation The University of Melbourne

Project Summary

Soil moisture is a highly critical resource for the Australian agricultural economy which is stressed by climate change. Daily monitoring of paddock scale soil moisture from space represents a powerful tool to inform land management, allowing accurate crop yield and pasture growth predictions. At the continental scale, soil moisture information will result in better weather, climate and extreme flood prediction skill and the ability to assess the effects of future climate change on Australia. It is therefore imperative that active-passive soil moisture retrieval algorithms be developed specifically for the Australian environment in order to take full advantage of the SMAP remote sensing mission when it is launched in 2012.

DP0988711 Dr AR Weeks

Approved Project Title **Genetic variation without sex: frequency-dependent selection and the maintenance of variation in asexual organisms**

2009 : \$ 120,000
2010 : \$ 110,000
2011 : \$ 110,000
2012 : \$ 110,000
2013 : \$ 105,000

Primary RFCD 2702 GENETICS

ARF Dr AR Weeks

Administering Organisation The University of Melbourne

Project Summary

The proposed research will gain insight into one of the most fundamental yet puzzling questions in evolutionary biology and determine the generality of frequency-dependent selection as a mechanism for maintaining variation in asexual organisms. The results will have broad appeal, both internationally and nationally, and will also provide insight into why most species reproduce sexually. The results will also help in the development of two asexual species as environmental indicators by linking clones with specific environmental changes. These indicator clones could then be adopted by natural resource managers to monitor environmental pollution and contamination.

DP0987738 A/Prof AW Western; Dr MR Grace; Prof JJ McDonnell; Prof RE White

Approved Project Title **An integrated investigation of nutrient generation and delivery processes and pathways from paddock to small catchment scales**

2009 : \$ 140,000
2010 : \$ 120,000
2011 : \$ 120,000
2012 : \$ 60,000

Primary RFCD 2605 HYDROLOGY

Administering Organisation The University of Melbourne

Project Summary

Improving water quality, primarily through reducing nutrient concentrations, remains a massive challenge for effective catchment management in Australia. Through a multidisciplinary approach including soil science, hydrology and aquatic chemistry, this project will develop an integrated catchment system understanding of water quality behaviour. This understanding will greatly improve the scientific underpinning of catchment water quality management and prediction, thus supporting improvements in the sustainability of Australia's water management. The work will focus on catchments with high intensity livestock grazing, which tend to be located in high rainfall areas near coasts where significant issues of water quality management exist.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986162 Dr E Weyer

Approved Project Title **Algorithms for change detection based on finite sample system identification theory**

2009 : \$ 140,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2909 ELECTRICAL AND ELECTRONIC ENGINEERING

Administering Organisation The University of Melbourne

Project Summary

Detection of abrupt changes has many important applications. One particular application that will be investigated is leak detection in irrigation channels. As agriculture accounts for about 80% of Australia's water usage, the timely detection of leaks means that corrective actions can be taken early which will lead to large water savings and significant environmental benefits. The developed methods can be designed with any false alarm rate. This is important since frequent false alarms lead to wasted resources and operators will stop using the system. The technology once developed can be transferred to many other application areas such as urban water supplies, pipelines for oil and gas, and the process and manufacturing industries.

DP0986954 Dr AJ Whiting

Approved Project Title **Lawyers, Civil Society and the State in Post-colonial Malaysia**

2009 : \$ 70,000

2010 : \$ 75,000

2011 : \$ 75,000

2012 : \$ 60,000

Primary RFCD 3903 JUSTICE AND LEGAL STUDIES

APD Dr AJ Whiting

Administering Organisation The University of Melbourne

Project Summary

This study investigates how Malaysian lawyers have mobilized to defend core legal values in response to key political events in Malaysian history. It will contribute to Australian understanding of civil society and the rule of law in our regional neighbour and build bridges between Malaysian and Australian lawyers and scholars. The development of deeper respect for the rule of law in this region plays an important role in increasing regional stability and creating a safe and more predictable environment. Understanding the role that lawyers play in this process is a vital component of regional security.

DP0985214 A/Prof JD Woodhead; Dr S Frisia; Dr A Blyth

Approved Project Title **Ancient weather stations of Australia: charting a continent's descent into aridity and its ecological consequences**

2009 : \$ 100,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation The University of Melbourne

Project Summary

Australia has an enviable reputation as a leading innovator in geochronological and geochemical studies and this research will reinforce that standing. The outcomes will promote a better understanding of Australia's arid continent, contribute to studies of global climate change, and provide new insights into the response of ecosystems to such events. In these ways, the project addresses directly our current national research priorities 'water - a critical resource', 'responding to climate change and variability' and 'the sustainable use of Australia's biodiversity'.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986311 A/Prof CG Young; A/Prof ML Kirk

Approved Project Title **New Frontiers in Molybdenum Chemistry: Electronic Structure and Molybdoenzyme Function**

2009 : \$ 145,000

2010 : \$ 110,000

2011 : \$ 110,000

Primary RFCD 2502 INORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

Project Summary

Molybdenum enzymes play key roles in biology and environmental, biogeochemical and meteorological processes. This international, multidisciplinary project will employ advanced synthetic, instrumental and theoretical techniques to establish the link between electronic structures and molybdenum enzyme behaviour and function. The insights gained will inform the continuing development of agricultural, veterinary and medical treatments for diseases associated with enzyme dysfunction; these outcomes would be of enormous economic and societal benefit to Australia. The training of skilled scientists, access to advanced overseas facilities, and international recognition of Australian research, are important immediate benefits of the project.

DP0987349 Dr AI Yue; Dr OS Khoo; Dr BM Smail

Approved Project Title **The History of Asian Australian Cinema: Diaspora, Policy and Ethics**

2009 : \$ 95,000

2010 : \$ 50,000

2011 : \$ 33,000

Primary RFCD 4103 CINEMA, ELECTRONIC ARTS AND MULTIMEDIA

Administering Organisation The University of Melbourne

Project Summary

This interdisciplinary project will develop a history of the representation of Asians in Australian cinema. Understanding this history promotes an engaged citizenry, facilitates intercultural communication and strengthens Australia's social fabric. It will enhance Australia's capacity to engage in the Asian region. Examining the creative film developments of Asian Australian filmmakers will promote an innovative cultural economy. The study on how film agencies and archives have managed Asian Australian cinema is a resource for policy and film makers in the industry. The new diasporic cinema studies framework developed will consolidate Australia's established reputation in cinema studies and advance international film scholarship.

DP0986320 Dr A Zalesky; Dr M Yucel; Dr C Westin

Approved Project Title **Charting connectivity in the healthy and diseased brain**

2009 : \$ 80,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

APD Dr A Zalesky

Administering Organisation The University of Melbourne

Project Summary

Australia's endemic mental health burden is predicted to escalate as its population ages. This project will: (1) endow medicine with a diagnostic capability enabling earlier and more-accurate diagnosis of brain disorders and mental illnesses; and, (2) pinpoint brain circuit disruptions telltale of particular diseases. This is a world-first and promises a scientific basis for new-generation therapies and treatments. This project will enable the APD to disseminate the specialist knowledge acquired as an ARC Fellow at Harvard in 2008 to Australian researchers, thereby advancing Australia's international standing in science.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985851 Prof CF Zika; A/Prof SM Broomhall; Dr JS Spinks

Approved Project Title **Reading the signs: disaster, apocalypse and demonology in European print culture, 1450-1700**

2009 : \$ 129,000

2010 : \$ 58,943

2011 : \$ 89,000

2012 : \$ 94,000

Primary RFCD 4301 HISTORICAL STUDIES

APD Dr JS Spinks

Administering Organisation The University of Melbourne

Project Summary

Religious identity and belief have been critical to understanding, explaining, controlling and also exploiting natural disaster within the cultures of early modern Europe. Religion continues to shape responses today to phenomena such as climate change, drought and pandemic. By exploring religious responses to natural disaster, this project will both promote Australia's high international reputation for early European research, and also offer new perspectives for contemporary public discussion of natural disasters and the fears they generate. It will foster cross-institutional research, and in mounting a major public exhibition, promote awareness of Australia's rich artistic and historical collections.

DP0985322 Prof M Zukerman; A/Prof M Palaniswami; Dr LL Andrew; Dr Z Rosberg; Prof G Chen

Approved Project Title **Efficient and Fair Traffic Control for a Multi-Service Internet**

2009 : \$ 195,000

2010 : \$ 130,000

2011 : \$ 130,000

2012 : \$ 180,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of Melbourne

Project Summary

Australia relies very heavily on its telecommunications infrastructure due to its geographic dispersion. For the same reason, it cannot afford to invest in inefficient infrastructure.

Our novel and practical Internet congestion control scheme will overcome current weaknesses in the Internet, and will enable the Australian telecommunication service industry to provide a better quality of service to the customers (including Australian industries and rural communities) and at lower cost. This project will put Australia on the international stage as a leading contributor to Internet technology. We will provide training for PhD students and postdoctoral fellows in the important area of Internet traffic engineering and control.