

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Victoria

### The University of Melbourne

**DP1097253** A/Prof P Ali; Prof IM Ramsay

**Approved Project Title** **Safeguarding the financial well-being of Australians by improving financial literacy: Implications for consumer protection laws**

**2010 :** \$ 85,000

**2011 :** \$ 95,000

**2012 :** \$ 96,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

#### Project Summary

The project will contribute to a broader understanding of the role of financial literacy in Australia and its relationship with Australia's financial services and consumer protection laws. Having financially literate consumers facilitates the uptake and development of innovative financial products. This is essential for promoting an innovation culture and economy. Higher levels of financial literacy also enable consumers to plan better for their and their families' financial well-being. This also has national benefit as it means that consumers are better prepared to deal with the adverse financial consequences of job-loss, illness, disablement or death, thus reducing the stresses and demands on Australia's social welfare safety net.

**DP1094301** A/Prof AM Allen; Prof WG Thomas; Dr DN Bowser

**Approved Project Title** **Unravelling the sub-nuclear complexity of the brain.**

**2010 :** \$ 121,000

**2011 :** \$ 121,000

**2012 :** \$ 121,000

**Primary RFCD** 2705 ZOOLOGY

**Administering Organisation** The University of Melbourne

#### Project Summary

Understanding the function of the brain is a major frontier of scientific research. The ability to increase knowledge of brain function is reliant upon the development of novel methods. This application will develop a novel approach for understanding the function of particular nerve cells. One outcome will be demonstration of the applicability of a novel method of benefit to all brain researchers. Another outcome will be increased understanding of one brain region that is known to contribute to the development of cardiovascular disease. It is expected that increased knowledge of brain function will lead to novel theories of brain disease and therapeutic strategies.

**DP1092637** A/Prof NB Allen; Dr S Whittle; Dr MB Yap; Dr LB Sheeber; Dr DL Foley; Dr P Dudgeon; Dr AM Chanen; Prof C Pantelis

**Approved Project Title** **Genes, neuroanatomy and family process: Predicting adolescent anxiety and depression**

**2010 :** \$ 90,000

**2011 :** \$ 109,400

**2012 :** \$ 90,000

**2013 :** \$ 90,000

**Primary RFCD** 3801 PSYCHOLOGY

APD Dr MB Yap

**Administering Organisation** The University of Melbourne

#### Project Summary

Whilst significant gains in outcomes have been obtained in other areas of health by focusing on early intervention and prevention, in the mental health field this approach has been limited by the paucity of developmentally targeted treatment and prevention strategies. This study will provide unique information regarding the risk processes that are operating during early and late adolescence, and will inform us about how the family environment can act to modulate the impacts of biological vulnerability on risk for mental disorder. This project will contribute to our understanding of who, and what, to target in early intervention and prevention strategies.

**DP1093327** A/Prof ED Bant; Prof M Bryan

**Approved Project Title** **The Principles of Proprietary Remedies**

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Project Title

2010 : \$ 59,000

2011 : \$ 69,000

2012 : \$ 40,000

Primary RFCD 3901 LAW

Administering Organisation The University of Melbourne

## Project Summary

Property rights are central to Australia's social fabric and critical to its economy. At this time of financial crisis, when personal bankruptcy and corporate insolvency are on the rise, it is essential to know exactly who owns what, when and why. Yet Australian law is unclear and often inconsistent as to when and why the law imposes property rights in favour of a plaintiff over assets held by a defendant and what those rights should be. This project will address this intolerable uncertainty by determining the proper criteria for the conferral of property rights by law.

DP1095099 A/Prof E Barberio; Prof M Artuso

Approved **Silicon and Diamond Pixel Detectors**

## Project Title

2010 : \$ 90,000

2011 : \$ 90,000

2012 : \$ 100,000

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

Administering Organisation The University of Melbourne

## Project Summary

Australia participates actively in the frontier field of high-energy particle physics, which aims to understand the fundamental building blocks of matter, their origins and interactions. This field excites the best minds in the scientific community and provides excellent training for young scientists. To maintain our position in this field we must continue the development of the powerful instrumentation required for high-energy experiments. This project will satisfy that role. The application of particle detector expertise to diamond technologies will produce new innovations, from which Australian industries will benefit through partnership with this project.

DP1095295 Prof P Batterham; Dr PJ Daborn

Approved **Dissecting insect gut function to understand insecticide detoxification**

## Project Title

2010 : \$ 115,000

2011 : \$ 100,000

2012 : \$ 100,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

## Project Summary

Massive quantities of chemical insecticides are used daily to control the insect pests that threaten agriculture, human health and the welfare of domestic pets. Insects readily evolve resistance to these chemicals reducing the effectiveness of pest control, increasing the amount of chemical used and increasing costs to consumers. This project examines the way in which insects adapt to the extreme stress imposed on them by chemical insecticides. A thorough understanding of this adaptation process is required before insecticide resistance can be effectively managed or prevented.

DP1092527 Dr NF Bell; A/Prof JF Beacom

Approved **Discovering New Particle Physics with Dark Matter and Astrophysical Neutrinos**

## Project Title

2010 : \$ 60,000

2011 : \$ 60,000

2012 : \$ 60,000

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

Administering Organisation The University of Melbourne

## Project Summary

This project will place Australia at the forefront of pure basic research, and will forge connections with key

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

international institutions. What is the Universe made of? How did it evolve? We address fundamental questions about our Universe, drawing on recent and forthcoming experimental data. We will contribute to Australia's skill base via the training of the best and brightest postgraduate students. These students will be equipped with the skills to act as original thinkers on general problems in the wider community. Fundamental questions about the nature of our Universe engage the intellectual curiosity of the general public and inspire the next generation of scientists.

**DP1095388** Dr M Bode

**Approved Project Title** **General theory for eradicating multiple invasive species from threatened island ecosystems**

**2010 :** \$ 88,000

**2011 :** \$ 80,182

**2012 :** \$ 80,182

**Primary RFCD** 3008 ENVIRONMENTAL SCIENCES

APD Dr M Bode

**Administering Organisation** The University of Melbourne

## Project Summary

Invasive species threaten many of Australia's unique flora and fauna. Our island ecosystems have evolved in the absence of mammalian predators, and are therefore particularly vulnerable. When both cats and rats invade an island, they can quickly decimate the populations of native species, particularly seabirds, and threaten them with extinction. Unfortunately, poorly planned eradication of these invasive species can destabilise the complex island ecosystems, further endangering the native species. The results of this project will help conservation managers to plan eradication strategies that cost-effectively eradicate populations of two introduced species, without threatening native wildlife.

**DP1095772** Prof GF Browning

**Approved Project Title** **Avoiding the immune response: lessons from 'simple' bacteria**

**2010 :** \$ 125,000

**2011 :** \$ 125,000

**2012 :** \$ 125,000

**Primary RFCD** 3005 VETERINARY SCIENCES

**Administering Organisation** The University of Melbourne

## Project Summary

Some of the most important bacterial diseases of domestic animals are caused by mycoplasmas. Improved control of these diseases would significantly improve agricultural productivity by reducing losses associated with reduced feed conversion efficiency and increased susceptibility to other diseases, as well as improve animal welfare and public health, by reducing the need for antibiotic therapy to control these diseases in food producing animals.

**DP1093211** Prof MA Burgman; Dr RJ Elith

**Approved Project Title** **Modelling species distributions for a changing world**

**2010 :** \$ 113,972

**2011 :** \$ 113,972

**2012 :** \$ 113,972

**2013 :** \$ 113,972

**2014 :** \$ 113,972

**Primary RFCD** 3008 ENVIRONMENTAL SCIENCES

ARF Dr RJ Elith

**Administering Organisation** The University of Melbourne

## Project Summary

Understanding the impacts of climate change and invasive species on the distribution and persistence of species is an issue of global and national significance and concern. This project will provide tools essential for the effective management of Australia's ecosystems by delivering clear guidelines and practical methods that will substantially improve the modelling of future species distributions.

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**DP1094586** Prof VN Burgmann

**Approved Project Title** **Workers of the world: International labour movement responses to globalization**

**2010 :** \$ 30,000

**2011 :** \$ 30,000

**2012 :** \$ 30,000

**Primary RFCD** 3701 SOCIOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

Industrial relations was the most significant issue in the 2007 federal election. The return of the Labor Government suggests the majority of Australians wished to preserve workers' rights to bargain collectively for better wages and working conditions. This project speaks directly to such concerns by analysing the global forces that have prompted anti-worker policies internationally and the worldwide responses on the part of labour movements. It will also incorporate Australian scholarship and subject-matter into a major comparative study for an international audience, at a time when the global political pendulum has swung in the direction of confronting corporate excesses and improving employees' living and working standards.

**DP1096699** Prof AN Burkitt; Prof JH Manton; Dr DB Grayden

**Approved Project Title** **Understanding cortical processing: Neuronal activity and learning in recurrently connected networks**

**2010 :** \$ 65,000

**2011 :** \$ 60,000

**2012 :** \$ 60,000

**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

**Administering Organisation** The University of Melbourne

## Project Summary

This project addresses fundamental cross-disciplinary issues of information processing and control in large-scale biological neural systems. This is an area of research that is at the cutting edge of intelligent processing systems. An understanding of these mechanisms would have considerable implications in areas that span a range of complex biological and artificial neural systems, including the rapidly growing fields of robotics, machine learning, and adaptive control, all with applications in diverse areas of economic importance. The project will provide students with training at an international level within Australia, thus helping ensure Australia maintains and extends its science and technology base.

**DP1094516** Dr BA Burton

**Approved Project Title** **Algorithms and computation in four-dimensional topology**

**2010 :** \$ 125,000

**2011 :** \$ 125,000

**2012 :** \$ 125,000

**2013 :** \$ 125,000

**2014 :** \$ 125,000

**Primary RFCD** 2301 MATHEMATICS

QEII Dr BA Burton

**Administering Organisation** The University of Melbourne

## Project Summary

This project will establish Australia as a world leader in computational topology, particularly in the all-important areas of topology in three and four dimensions. In four dimensions this work will be truly groundbreaking; until now the field has seen little development due to the complexity of the algorithms and computations required, and the applicant is in the unique position of having the necessary tools to make significant progress in a feasible time frame. In three dimensions this project will strengthen the distinguished computational topology community in Melbourne, led by pioneers such as Rubinstein, Goodman, Hodgson as well as the applicant himself.

**DP1093678** A/Prof R Buyya

**Approved Project Title** **Megha: Utility-Oriented Federation of Cloud Computing Environments for Scaling of Application Services**

**2010 :** \$ 100,000

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**2011 :** \$ 90,000  
**2012 :** \$ 90,000  
**Primary RFCD** 2803 COMPUTER SOFTWARE

**Administering Organisation** The University of Melbourne

## Project Summary

In the next 20 years, service-oriented computing will play an important role in shaping the industry, impacting the way business is conducted and how services are delivered and managed. This paradigm will have major impact on the services economy, which contributes significantly towards Australia's GDP. With the increased demand for delivering services to a large number of users, providers are looking for novel ways of hosting their application services on Clouds at low cost while meeting users' quality of service expectations. This project develops novel utility-oriented technologies for federation of Clouds to support scaling of application services and thereby, transform the Australian service industry and economy.

**DP1096225** A/Prof R Cappai

**Approved Project Title** **Delineating the functional role of the amyloid precursor protein's copper binding domain**

**2010 :** \$ 100,000  
**2011 :** \$ 100,000  
**2012 :** \$ 100,000  
**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

This study will define how the interaction between copper and the amyloid precursor protein (APP) molecule regulates copper homeostasis and APP metabolism. Since copper homeostasis is tightly regulated and vital for normal cellular function, understanding the regulation copper homeostasis is important for basic biology. Moreover, APP is directly involved in causing Alzheimer's disease and therefore understanding the interaction between APP and copper has potential benefits for community health by combating aging and Alzheimer's disease.

**DP1094957** Prof FR Carbone

**Approved Project Title** **Studies on peripheral T cell memory**

**2010 :** \$ 359,000  
**2011 :** \$ 315,000  
**2012 :** \$ 375,000  
**2013 :** \$ 300,000  
**2014 :** \$ 300,000  
**Primary RFCD** 3202 IMMUNOLOGY  
APF Prof FR Carbone

**Administering Organisation** The University of Melbourne

## Project Summary

Success in vaccination depends on the ability of the immune system to remember prior encounter with an infectious agent. This immune memory appears to work well for certain infections but not others, essentially meaning that for these diseases, effective vaccines remain unavailable. This application describes experiments based on a new leukocyte or white blood cell population that has been overlooked in studies of immune memory. The work involves identifying how they are formed and how they behave within the body. This work will therefore contribute to the development and production of new-generation vaccines to these so far uncontrollable infectious diseases.

**DP1094147** Prof F Caruso; A/Prof GG Qiao

**Approved Project Title** **Engineered nanostructured materials via continuous polymer assembly for advanced bioapplications**

**2010 :** \$ 170,000  
**2011 :** \$ 170,000  
**2012 :** \$ 180,000  
**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** The University of Melbourne

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Project Summary

The development of new and flexible processes is critical to the design and construction of advanced materials for future applications in nano- and biotechnology. This project will develop innovative and versatile "bottom-up" nanotechnology techniques to afford nanostructured materials with unprecedented properties. This project has the potential to revolutionise current approaches for forming surface coatings, films and advanced particles, leading to significant outcomes in diverse areas, including drug delivery, biomaterial implants and biocatalysis. The project will contribute to the development of a robust Australian nanotechnology industry, with the advanced materials developed expected to have health benefits for Australian citizens.

**DP1093529** Prof DJ Clarke; A/Prof FW Sahlström; Prof Y Cao; Prof X Wu

**Approved Project Title** **Learning outcomes in mathematics and science classrooms in Australia, Finland and China: Interrogating the alignment of curriculum, instruction and assessment**

**2010 :** \$ 135,998

**2011 :** \$ 120,000

**2012 :** \$ 136,180

**2013 :** \$ 75,000

**Primary RFCD** 3302 CURRICULUM STUDIES

**Administering Organisation** The University of Melbourne

## Project Summary

Our capacity to promote effective instruction depends upon our ability to recognize and assess useful knowing and to identify the instructional practices through which such knowing is engendered. International achievement tests are impacting educational policy in Australia, with significant attention on top-performing Finland and the consistent success of Asian classrooms. Recent research has raised concerns about what forms of knowing (i) find their expression in student test performance, or (ii) remain unrevealed by most available forms of testing (particularly international testing). This project looks closely at classroom practices and learning outcomes in China, Finland and Australia to provide new guidance on these issues.

**DP1096301** Prof CA Coady

**Approved Project Title** **Humanitarian intervention and the conflict between national and international responsibility**

**2010 :** \$ 96,000

**2011 :** \$ 125,000

**2012 :** \$ 56,000

**Primary RFCD** 3601 POLITICAL SCIENCE

**Administering Organisation** The University of Melbourne

## Project Summary

The project will address the question of how the Australian government can maintain its reputation as a good global citizen without compromising its ethical standing with the Australian people. It will provide valuable insights into the privatization of military force and the increasingly common use of civilian contractors, and may provide information to the Australian Defence Force on the ethically appropriate level of force protection for future humanitarian and peace-keeping missions, in addition to motivating the more efficient use of ADF resources. Finally, the project will further Australia's reputation as the source of high quality innovative research in applied philosophy, and especially military ethics.

**DP1093410** A/Prof CS Cobbett; Dr JF Golz; Dr AJ Meyer

**Approved Project Title** **Glutathione, a major antioxidant in plants: translocation between tissues and transport within cells.**

**2010 :** \$ 110,000

**2011 :** \$ 110,000

**2012 :** \$ 110,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

Plants are continually exposed to environmental stress. In agriculture this may include high and low temperature, pathogens, soil toxicity and excess light. The ways in which plants deal with environmental stress influence their productivity. Understanding these mechanisms is an important goal that can contribute to better strategies to manage plant responses to environmental stress in agricultural species.

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**DP1093646** Dr PM Colman; Dr BJ Smith; Dr WD Fairlie

**Approved Project Title** **Novel compounds to disrupt protein-protein interactions**

**2010 :** \$ 80,000

**2011 :** \$ 80,000

**2012 :** \$ 80,000

**Primary RFCD** 3203 MEDICAL BIOCHEMISTRY AND CLINICAL CHEMISTRY

**Administering Organisation** The University of Melbourne

## **Project Summary**

Many diseases involve aberrant interactions between proteins. Strategies to inhibit such interactions have potential as tool reagents for biological research but also as new therapies. Most drugs currently used in the clinic are small organic molecules, though these typically are not effective at disrupting protein complexes, hence alternatives are required. This proposal to examine foldamers as a novel strategy for inhibiting protein: protein interactions could lead to the development of new drugs for the treatment of diseases where the current traditional approaches have proven ineffective.

**DP1094706** Prof J Damousi

**Approved Project Title** **Greek War Stories: Trans-nationalism, war trauma and migration**

**2010 :** \$ 140,000

**2011 :** \$ 100,000

**2012 :** \$ 127,972

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** The University of Melbourne

## **Project Summary**

Australian history is dominated by stories of populations who have fled or migrated from war zones. Understanding the adjustment of such groups and the place of war memories and stories within these communities is crucial to understand their experiences and the challenges they confront in adapting to a new society. This study will assist in further enhancing our understanding of the ways in which many lives have been fragmented by this experience and by the emotional impact of migration. It will also make a contribution towards broadening our comprehension of the enduring legacies of war migration on the second generation.

**DP1092671** Dr SC Evans

**Approved Project Title** **Executive Power under the Australian Constitution: definition, delimitation and accountability**

**2010 :** \$ 40,000

**2011 :** \$ 83,000

**2012 :** \$ 90,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

## **Project Summary**

The executive branch of government is the central actor in protecting Australia from terrorism and crime, as it is in other countries. The executive is also central to defence, immigration control as well as critical domestic policy domains. Understanding the nature and scope of executive power, and how it is regulated and rendered accountable, is therefore vital to good governance and successful protection of Australian interests. This project will provide the first integrated, broadly-based and comparatively-informed analysis of executive government under the Constitution since the emergence of Australian constitutional nationalism in the High Court in the 1990s and since the executive assumed expanded powers in the post 9/11 world.

**DP1096391** Dr L Feketeova

**Approved Project Title** **Formation, structure and chemistry of non-covalent complexes of biomolecules via mass spectrometry**

**2010 :** \$ 80,182

**2011 :** \$ 80,182

**2012 :** \$ 80,182

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**Primary RFCD** 2503            ORGANIC CHEMISTRY  
APD                                Dr L Feketeova

**Administering Organisation** The University of Melbourne

## Project Summary

The studies proposed address fundamental issues which are essential to developments in biotechnology and related industries and of implication for human health and disease, with special attention to mechanisms of Deoxyribonucleic acid (DNA) damage, for example through Ultraviolet (UV) A and B. This has a special resonance for our sunburnt nation. The work, using world class Australian Research Council funded instrumentation, will carry out breakthrough science, exploiting and enhancing existing national strength in biological science with a strong interdisciplinary element. This project will also maintain and enhance Australia's international research profile through its novelty and new overseas collaborations. The project will equip talented young scientists with a spectrum of skills.

**DP1095291**            Dr OE Foda; Prof AJ Guttman

**Approved Project Title**            **Green functions, correlation functions and differential equations**

**2010 :**                    \$ 120,000

**2011 :**                    \$ 120,000

**2012 :**                    \$ 120,000

**Primary RFCD** 2301            MATHEMATICS

**Administering Organisation** The University of Melbourne

## Project Summary

Classical and quantum exact solutions are established cornerstones in Australian applied mathematical research. In this project, we will:- 1). Address long standing open problems, whose resolution will add to mathematical knowledge and enhance Australia's reputation as a leading contributor to these topics; 2). List concrete and tractable sub-projects that will engage young scientists, whose training we are particularly keen on, in vigorous and internationally competitive research; 3). Facilitate collaborations between various Australian research groups, all of whom are very well positioned to contribute to it; 4). Bring leading scientists to visit Australia to the benefit of the entire Australian mathematical community.

**DP1096791**            Dr MT Foster; Prof JC Hathaway

**Approved Project Title**            **The law of refugee status: a theoretical and comparative analysis**

**2010 :**                    \$ 71,000

**2011 :**                    \$ 105,000

**2012 :**                    \$ 110,000

**Primary RFCD** 3901            LAW

**Administering Organisation** The University of Melbourne

## Project Summary

This Project will make a significant contribution to international refugee law scholarship, thus consolidating Australia's place as a centre for excellence in international refugee law. In addition, the Project will have immediate practical relevance for individual refugee status determination in all states parties to the Convention, especially Australia, in its utility for practitioners, advocates and decision-makers. It will also provide a principled basis for future policy development in Australia and abroad. It will therefore make a significant contribution to an area of law that is vital to Australia's future and to the international community as a whole.

**DP1095858**            Dr BG Fry; A/Prof WC Hodgson

**Approved Project Title**            **Molecular toxinology of Australia's lesser known venomous snakes**

**2010 :**                    \$ 57,000

**2011 :**                    \$ 57,000

**2012 :**                    \$ 57,000

**Primary RFCD** 2701            BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

This proposal represents a tremendous opportunity for biodiscovery from venomous snakes. This will be achieved through the researchers' unique approach of investigating previously unmapped venom systems for

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divergent, bioactive proteins. An understanding of venomous animal protein evolution great potential in drug discovery and other commercial applications. This project will provide Australian graduate and post-graduate students with finely tuned skills in cutting edge methodological techniques and a fluent understanding of molecular evolution, preparing them to be internationally competitive scientists.

**DP1094676** A/Prof L Gangadharan; Dr N Erkal; Dr N Nikiforakis

**Approved Project Title** **Relative income, social preferences, and charitable giving: An experimental analysis**

**2010 :** \$ 73,703

**2011 :** \$ 63,849

**2012 :** \$ 45,729

**Primary RFCD** 3499 OTHER ECONOMICS

**Administering Organisation** The University of Melbourne

### Project Summary

Understanding people's incentives to give to others (i.e., what motivates private donations) is important in regulating social interactions, achieving fair outcomes, and designing optimal responses to natural disasters like floods and bushfires. Australia's social and economic fabric is strengthened by good public policies relating to redistribution and taxation. The cross-cultural aspect of our study will increase awareness about differing beliefs across countries about the determinants of income and how policy makers can use this information to design appropriate policies to help people in need. This research project will also increase the level of academic interactions between Australian and foreign universities.

**DP1095010** Prof JS Gans; Dr K Lim; Dr CC de Fontenay; Dr RA Mollard

**Approved Project Title** **Economic interactions between scientists and commercial interests and their impact on scientific knowledge dissemination: a theoretical and empirical investigation**

**2010 :** \$ 219,706

**2011 :** \$ 134,805

**2012 :** \$ 129,805

**2013 :** \$ 124,015

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

**Administering Organisation** The University of Melbourne

### Project Summary

In recent decades, the debate between scientists, policy-makers and businesses on the usefulness of scientific discoveries has been intense. Despite its clear economic implications, there has been very little economic modeling of the interactions between scientists and firms on key choices such as publication rights and licensing agreements associated with patent protection. These choices impact on the diffusion of scientific knowledge and their productive applications. This project will examine those interactions both at a theoretical and empirical level with the goal of generating insights into whether and how public policy makers should regulate or leave unchecked the commercialisation of science.

**DP1095815** Dr N Ganter

**Approved Project Title** **Generalized group characters**

**2010 :** \$ 125,000

**2011 :** \$ 125,000

**2012 :** \$ 125,000

**2013 :** \$ 110,000

**2014 :** \$ 110,000

**Primary RFCD** 2301 MATHEMATICS

**ARF** Dr N Ganter

**Administering Organisation** The University of Melbourne

### Project Summary

With its numerous international visitors, Ganter's program will be a significant gain for Melbourne as a centre of science and research. Students at all levels will benefit from training in a scientific environment of world-rank. Ganter plans to build a research community in her field, involving individuals across the nation; this will be a good addition to the Australian research landscape. Finally, she hopes that her past experience in working with minority students will enable her to contribute to creating a more diverse research community in pure mathematics in

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Melbourne and across Australia.

**DP1092444** Prof RB Gasser; Prof PW Sternberg; Dr AC Loukas

**Approved Project Title** **Elucidating a key developmental switch in Haemonchus contortus using a massively parallel picolitre reactor sequencing-coupled genomic and bioinformatic platform**

**2010 :** \$ 110,000

**2011 :** \$ 90,000

**2012 :** \$ 90,000

**Primary RFCD** 3005 VETERINARY SCIENCES

**Administering Organisation** The University of Melbourne

## Project Summary

The national/community benefits of this project include enhanced focus on animal and human health biotechnology through the development of safe anti-parasite compounds/vaccines; improved and sustainable control of key parasites with decreased risk of induction of drug resistance; increased profitability of agricultural animal production; consolidation of a technology platform for further applications in genomics and post-genomics of pathogens of global significance and construction of a pipeline for the validation of drug targets; capturing the benefits from fundamental research and strengthening links between fundamental and applied research; and increasing the quality and quantity of scientifically skilled people in biotechnology.

**DP1095364** Prof T Gherghetta

**Approved Project Title** **The Origin of Mass at the Large Hadron Collider**

**2010 :** \$ 110,000

**2011 :** \$ 90,000

**2012 :** \$ 90,000

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

**Administering Organisation** The University of Melbourne

## Project Summary

The Large Hadron Collider is an enormous worldwide effort to understand the building blocks of the Universe. This project will help strengthen world-class research capacity in one of the most exciting frontiers of basic research. It will excite more high-achieving students to pursue careers in science increasing the number of talented graduates in Australia. In addition the big fundamental questions addressed in this research are of great fascination to the general public and will help to further advance the public education of science.

**DP1092861** Prof AJ Gleadow; A/Prof BP Kohn; Dr JM Fletcher; Prof TM Harrison; A/Prof PW Reiners

**Approved Project Title** **The dynamic evolution of sheared continental margins**

**2010 :** \$ 100,000

**2011 :** \$ 100,000

**2012 :** \$ 110,000

**Primary RFCD** 2601 GEOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

This project will contribute to the fundamental science of understanding plate tectonic processes, and also have important practical implications for the oil and gas resources that are developed and hosted in continental margin settings. The study is therefore relevant to the National Research Priority goal of 'Developing Deep Earth Resources'. The project will also enhance our national scientific standing by addressing important scientific questions of global significance, and by establishing strong international collaborations with prominent researchers outside Australia. In addition, the work will help sustain a world-leading research capability and provide a training ground for a new generation of younger scientists in Australia.

**DP1094717** Prof PA Gleeson

**Approved Project Title** **The structure and function of the trans-Golgi network: role of golgins and G proteins**

**2010 :** \$ 110,000

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2011 : \$ 110,000

2012 : \$ 110,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of Melbourne

## Project Summary

This research will provide a better understanding of the secretory pathway of all eukaryotic cells, a process of broad biological and biomedical significance. It will also contribute to a better understanding of how a cell works, including how cell membranes are organization, how the transport processes of the cell are regulated and how proteins are targeted to their intracellular destination. Further, this work will utilize the frontier technology of RNA interference as a genetic tool to investigate functions of genes. By training post-graduate students and post-doctoral staff, it will contribute to the expertise of cell biology in Australia. International collaborations will enhance connections with overseas researchers.

DP1093502 Prof ME Goddard; Prof PM Visscher

Approved Project Title **Why is most of the genetic variance for complex traits undetected by large powerful screens of common variants?**

2010 : \$ 120,000

2011 : \$ 120,000

2012 : \$ 120,000

Primary RFCD 2702 GENETICS

Administering Organisation The University of Melbourne

## Project Summary

The genomics revolution has made it possible to measure thousands of DNA variants in individuals. These variants have been associated with phenotypic outcomes in a range of species. Paradoxically, even very large studies have only accounted for a fraction of the resemblance between relatives that we know exist. Our study will test three specific hypotheses to explain this paradox. A better understanding about the genetic architecture for complex traits will improve the efficiency of gene mapping methods, including applications in humans for traits related to productive ageing and a healthy start to life, will lead to more efficient selection programs in agricultural populations and will inform us with respect to past evolutionary events.

DP1094530 Dr JQ Goodger; Prof IE Woodrow; Prof BL Moeller

Approved Project Title **Organisation and function of embedded oil glands in eucalypts**

2010 : \$ 120,000

2011 : \$ 155,000

2012 : \$ 120,000

2013 : \$ 110,000

2014 : \$ 110,000

Primary RFCD 2704 BOTANY

ARF Dr JQ Goodger

Administering Organisation The University of Melbourne

## Project Summary

Some eucalypt leaves contain large quantities of essential oils, which have been extracted for commercial purposes for many years. Advancement of this industry, however, requires basic research directed at enhancing both the yield of oil and the range of valuable constituents. This project will make use of a new protocol for isolating and purifying the foliar oil-producing glands to identify a new suite of oil gland constituents and to understand the way in which they are made and deployed in the gland. The research will also contribute to our general understanding of oil gland structure and function.

DP1094830 Dr DB Grayden; Prof AN Burkitt

Approved Project Title **Bio-inspired speech analysis: Specialised information processing of vocalisations in the auditory brainstem**

2010 : \$ 60,000

2011 : \$ 60,000

2012 : \$ 60,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation The University of Melbourne

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Project Summary

This project has the potential to benefit bionic ear and hearing aid users through the development of signal processing methods that mimic the amazing abilities of the brain. Speech perception performance by bionic ear users has reached a plateau and these new strategies could produce the breakthrough needed to provide the next increase in performance. The benefit for greater improved hearing has enormous benefit and potential for improving the quality of life of the hearing impaired, especially those with severe and profound hearing loss. In addition, the algorithms may provide more robust automatic speech recognition, making this technology more useful in everyday situations; the markets that this would open up are enormous.

**DP1094632** Prof WE Griffiths; A/Prof D Chotikapanich; Prof DP Rao

**Approved Project Title** **Econometric estimation and analysis of country, regional and global income distributions**

**2010 :** \$ 127,552

**2011 :** \$ 100,000

**2012 :** \$ 166,302

**Primary RFCD** 3404 ECONOMETRICS

**Administering Organisation** The University of Melbourne

## Project Summary

The project will provide valuable information on characteristics of the income distribution for Australia, and the distributions for countries of socio-economic significance to Australia. The findings will enable Australian government and non-government organisations and international agencies to assess the effects of various policies such as those designed to reduce world poverty. The project can help Australia understand the most immediate needs of countries in the region, information that is useful for formulating Australian policy responses that can alleviate poverty and lead to improved living standards in the region, thereby creating a harmonious and safer environment within the Asia-Pacific region.

**DP1092693** A/Prof MN Guillemin; A/Prof LH Gillam; Prof DA Rosenthal; Mr P Stewart

**Approved Project Title** **Trust me - I'm a researcher: The role of trust in the human research enterprise**

**2010 :** \$ 60,000

**2011 :** \$ 74,000

**2012 :** \$ 130,000

**Primary RFCD** 4401 PHILOSOPHY

**Administering Organisation** The University of Melbourne

## Project Summary

We assume a relationship of trust between researchers and their participants. But what does this mean for researchers and participants, and for the ethics committees who make judgements about the ethics of the research? This project will benefit prospective research participants by providing them with information about how to determine the trustworthiness of researchers and what is expected in a trusting research relationship. It will also benefit researchers in understanding how to strengthen trust in research relationships and articulating how ethics committees can make well-founded judgements about the trustworthiness of researchers. The findings will also contribute to training programs for both ethics committees and researchers.

**DP1096296** Prof SK Halgamuge; Prof R Kruse

**Approved Project Title** **Near Unsupervised Learning for Early Discovery of Novel Patterns: Methods, Scalability and Label Dependability**

**2010 :** \$ 90,000

**2011 :** \$ 90,000

**2012 :** \$ 90,000

**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

**Administering Organisation** The University of Melbourne

## Project Summary

This project aims to predict the unknown class labels using the existing small number of class labels. The outcomes of the project have direct relevance to the economy, environment, energy and health sectors due to the abundance of data coming out of these areas. For example, if an oncogene, a gene that can cause cancer when mutated can be found using data with only few labels and a large amount of unlabelled data, the costs and time needed for lab experimentation can be greatly reduced enabling pharmaceutical companies to develop corresponding medicines quicker. It will not only save more lives but also generates millions of dollars of income.

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1094801** A/Prof S Han; A/Prof RJ Green; A/Prof NP Low; Prof KB O'Connor; Dr M Wang

**Approved Project Title** **Configuring low carbon cities: an exploration of the role of spatial parameters in monocentric and polycentric examples in China**

**2010 :** \$ 144,000

**2011 :** \$ 105,000

**2012 :** \$ 120,000

**2013 :** \$ 112,000

**Primary RFCD** 3101 ARCHITECTURE AND URBAN ENVIRONMENT

**Administering Organisation** The University of Melbourne

## Project Summary

This project will firstly strengthen Australia's position in Greenhouse Gas (GHG) reduction practices and research. Secondly, the project will provide timely information relevant to debates about GHG emission control with an economy that grows fast and has the potential to emit a volume equivalent to the global total. Thirdly, the collaborative nature of the effort (linking up with scholars in China) will not only strengthen relations between the two countries but also contribute to the internationalisation program of Australian universities. Fourthly, the project will also assist to train future generations of China-literate Australian scholars.

**DP1094010** A/Prof DC Harris; Dr HY Kew

**Approved Project Title** **A new class of statistical methods for analysing long memory time series models with heteroskedasticity**

**2010 :** \$ 61,164

**2011 :** \$ 64,327

**2012 :** \$ 67,490

**Primary RFCD** 3404 ECONOMETRICS

**Administering Organisation** The University of Melbourne

## Project Summary

This project will result in a class of statistical methods that will aid policy makers and financial analysts when examining and predicting key international and Australian macroeconomic and financial variables that exhibit long memory. Leading applications of long memory modelling in the literature include GDP, CPI, asset pricing models, stock returns, exchange rates and interest rates. It will be possible to robustly and efficiently analyse such series in the presence of changes in variability, such as the overall reduction in variability that has occurred since the 1970's, called the "Great Moderation". The utility of the new methods will be demonstrated by a robust and efficient analysis of the Purchasing Power Parity hypothesis.

**DP1097204** Dr DJ Harvie; A/Prof MR Davidson

**Approved Project Title** **Simulating two-phase electrodynamic flows in droplet-based microfluidic circuit elements**

**2010 :** \$ 90,000

**2011 :** \$ 90,000

**2012 :** \$ 90,000

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** The University of Melbourne

## Project Summary

The knowledge, data and analysis tools developed within this project will facilitate the economical production of electrodynamically controlled integrated droplet-based microfluidic devices for critical high-demand applications such as: genome sequencing; protein evolution, synthesis and crystallisation; micro-structured pharmaceuticals; disposable devices for biomedical analysis; portable point-of-entry (biochem)security analysis devices. Hence this project is an investment in enabling technologies to benefit Australia's growing biotech, pharmaceutical and micro/nanotechnology sectors. Tangible community benefits (e.g., in improved diagnostic technologies, pharmaceuticals) will result.

**DP1092852** Dr RL Hester

**Approved Project Title** **Neural and cognitive studies of reward sensitivity and its influence on addiction-related behaviour**

**2010 :** \$ 35,000

**2011 :** \$ 40,000

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

2012 : \$ 45,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Melbourne

## Project Summary

The proposed research aims to contribute to current scientific thinking on the influence of reward sensitivity on cognitive performance. Cognitive neuroscience research on this relationship is of major scientific interest because heightened reward sensitivity is a significant predictor of risk for a number of Australia's major social and economic problems. The findings of this project will contribute to the debate about how to manage such problems.

DP1093713 Dr LA Hitchcock; Prof A Maeir

Approved Project Title **In the Wake of the Sea Peoples, In the Footsteps of Goliath: Excavating the Philistine Site of Tell es-Safi/Gath**

2010 : \$ 134,000

2011 : \$ 194,000

2012 : \$ 210,000

Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

Administering Organisation The University of Melbourne

## Project Summary

This project brings Australian research into the current scholarly debates on Philistine identity, a quickly growing sub-discipline in Mediterranean archaeology. Marginalized in the Bible as decadent, current research sees the Philistines as a cosmopolitan culture resulting from migration from Cyprus and the Aegean, and interaction with the local Canaanite population. In addition, Australian collaboration and interaction with Israeli colleagues and students will contribute to a more positive perception of the Jewish community in Australia, which has been the recent target of anti-Semitic activities as a result of the Israeli government's invasion of Gaza.

DP1096912 Prof G Hjorth; Dr LD Reeves

Approved Project Title **Rigidity in measured group theory and geometric group theory**

2010 : \$ 60,000

2011 : \$ 60,000

2012 : \$ 60,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

## Project Summary

Elite universities throughout the world have all made a point of being leaders in the field of pure mathematics. Geometric group theory and orbit equivalence are currently topical areas which attract many of the best young pure mathematicians as is demonstrated by recent invited talks at the International Congress of Mathematicians. This project will foster the development of these fields in Australia as well as nurturing existing efforts and international links. This proposal will also provide training and research experience for Australian honours and graduate students in mathematics.

DP1094497 Prof AB Holmes; Prof AW Burgess; Dr BL Catimel

Approved Project Title **Synthesis of phosphatidylinositol and inositol polyphosphate derivatives to probe key signalling proteins associated with cell growth and cancer**

2010 : \$ 180,000

2011 : \$ 180,000

2012 : \$ 180,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation The University of Melbourne

## Project Summary

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

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1095323** Prof Y Kashima; Dr SM Laham; Dr NO Haslam; Prof EA Sonenberg; A/Prof F Dignum

**Approved Project Title** **Implicit transmission of embodied culture**

**2010 :** \$ 122,000

**2011 :** \$ 106,000

**2012 :** \$ 119,000

**Primary RFCD** 3801 PSYCHOLOGY

APD Dr SM Laham

**Administering Organisation** The University of Melbourne

## Project Summary

Is a culturally diverse, yet socially integrated community possible? In multicultural societies such as Australia, this is a pressing and significant question. To form and maintain a vibrant and prosperous community in the face of globalization, it is essential to understand the fundamental processes by which cultures are formed and transformed in everyday social activities. This project examines one such process, implicit cultural transmission, proposed to function in the nonconscious transmission of cultural information. Understanding the dynamics of this subtle, yet pervasive, mode of cultural influence is central to a full appreciation of how one's own culture and those of others' integrate and flourish.

**DP1092675** Prof BE Kemp

**Approved Project Title** **Systems therapeutics for metabolism: AMPK isoform specific drugs**

**2010 :** \$ 120,000

**2011 :** \$ 120,000

**2012 :** \$ 115,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

Living cells have to maintain a steady balance between energy production and consumption in order to function properly. A key regulator of energy balance is an enzyme known as 5' AMP-activated protein kinase (AMPK), which regulates the burning and storage of fuels such as fat and sugars, in response to changes in energy demand. This project will provide a major advancement in our understanding of the regulation of AMPK at the molecular level, and lay the foundations for the development of more effective drugs to treat energy balance disorders such as obesity and Type 2 diabetes. Furthermore, this proposal will contribute to enriching Australia's international profile and competitiveness in this important area of research.

**DP1093552** Prof DV Kent

**Approved Project Title** **Fathers and Friends: Patronage and Patriarchy in Renaissance Florence**

**2010 :** \$ 50,000

**2011 :** \$ 50,000

**2012 :** \$ 26,000

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** The University of Melbourne

## Project Summary

This study of patronage and patriarchy in Renaissance Florence, analysing social networks and structures and the relationship between politics, the state, personal behaviour and cultural innovation, addresses issues central to understanding how cultures are constructed. Since the entwined structures and discourses of power, state, and culture that shaped our nation were laid down in Renaissance Europe, the quality of life in our multi-cultural communities, the negotiation of our changing relation to the global community, and current public discussions about philanthropy and the investment of cultural capital would benefit from this project, which will add to Australia's investment in international research at the highest level.

**DP1093815** A/Prof SE Kentish; Dr AJ Hill

**Approved Project Title** **Tuning Membrane Chemistry for Desalination and Water Reuse Applications**

**2010 :** \$ 100,000

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

2011 : \$ 100,000  
2012 : \$ 110,000  
Primary RFCD 2906 CHEMICAL ENGINEERING

**Administering Organisation** The University of Melbourne

## Project Summary

Climate change has led to a dramatic reduction in the availability of fresh water in southern Australia. Consequently, seawater desalination and wastewater recycling facilities are growing in number and size throughout the country. This project will directly benefit operation of these facilities by providing insight into the fundamentals of the membranes they utilise. The development of better predictive models of performance will lead to more efficient water production. The project will specifically evaluate the ability of these membranes to retain dangerous contaminants such as endocrine disrupting chemicals and boric acid. Ultimately, the project will lead to lower costs for water production in Australia and better guarantee of supply.

**DP1093230** Prof MJ Keough

**Approved Project Title** **Understanding the ecological resilience of nearshore marine communities**

2010 : \$ 120,000  
2011 : \$ 110,000  
2012 : \$ 120,000  
Primary RFCD 2707 ECOLOGY AND EVOLUTION

**Administering Organisation** The University of Melbourne

## Project Summary

Our thinking about climate change and its effects on marine ecosystems is shifting from considering how we can prevent it occurring to understanding how natural systems might adapt to climate change, or how we might improve the ability of these ecosystems to recover, that is, their resilience to change. In many shallow water ecosystems, one or a few key species provide habitat structure that in turn determines the abundance of a wide range of other species. This proposal will take two important temperate marine 'engineers' and identify the factors that make them most resilient.

**DP1096134** Dr G Khairallah

**Approved Project Title** **Catalytic currency: the role of size-reactivity relationships of simple and mixed 'coinage' metal clusters in C-C bond forming reactions**

2010 : \$ 130,000  
2011 : \$ 110,000  
2012 : \$ 110,000  
2013 : \$ 110,000  
2014 : \$ 108,000  
Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)  
ARF Dr G Khairallah

**Administering Organisation** The University of Melbourne

## Project Summary

Chemicals have a profound influence on our daily lives. For instance, the petrol we use in our cars, the plastics used for our shopping bags or the margarine we eat. A common theme of all these products is the use of catalysts in their industrial manufacture. Thus, this Australian Research Council funded project aims to shed light on the role of some catalysts in breaking and forming chemical bonds and attempts to set rules to develop new and improved ones. Improved catalysts will not only reduce the cost of goods manufacturing, but will also reduce waste products and energy consumption. This research will also train new scientists and contribute to the enhancement of Australia's research profile.

**DP1096379** Prof IP King

**Approved Project Title** **Technological innovation, trade liberalization, unemployment, and policy design**

2010 : \$ 53,398  
2011 : \$ 53,067  
2012 : \$ 55,016  
Primary RFCD 3402 APPLIED ECONOMICS

**Administering Organisation** The University of Melbourne

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Project Summary

Australia, like all economies, is heavily influenced by technological changes and shifting trade patterns. Understanding these influences, and the impact they have on the distribution of income, the unemployment rate, and the job mix, is very important for the design of appropriate policy initiatives. The proposed research aims to achieve exactly this by developing a mathematical model which incorporates technological change, trade, and unemployment. The model will be used to analyse the effects of these changes and, thus, to design optimal policy. The results from this project should also stimulate policy discussions both within Australia and abroad - enriching academic relations between domestic and international universities.

**DP1093148** Dr TP Lane; Prof MJ Reeder

**Approved Project Title** **The dynamics and predictability of fire weather over southern Australia**

**2010 :** \$ 80,000

**2011 :** \$ 65,000

**2012 :** \$ 65,000

**Primary RFCD** 2606 ATMOSPHERIC SCIENCES

**Administering Organisation** The University of Melbourne

## Project Summary

As illustrated by the recent Victorian bushfires, Australia has one of the most severe fire climates in the world. Fires play a major role in modifying our landscape, affecting native flora and fauna, and damaging infrastructure and property. Effective fire fighting and fire management relies heavily on the prediction of fire weather and the impact of atmospheric conditions on fire behaviour. This project investigates some of the key processes that cause local enhancements in fire weather in regions of complex terrain like southern Australia.

**DP1093819** Dr B Lang; Prof J Damousi; Dr K Sutton

**Approved Project Title** **Making the case: the case study genre in sexology, psychoanalysis and literature**

**2010 :** \$ 241,000

**2011 :** \$ 205,000

**2012 :** \$ 77,000

**2013 :** \$ 103,000

**Primary RFCD** 4202 LITERATURE STUDIES

**APD** Dr K Sutton

**Administering Organisation** The University of Melbourne

## Project Summary

Questions of sexual subjectivity continue to concern scholars in the humanities and social sciences today as they did in the 19th and early 20th centuries. An astonishing number of discourses around the self with regard to love, sex and desire originated in the European and American debates to be studied here. With its focus on the case study and its modalities this project will benefit Australian scholars working in the fields of literary and cultural studies, psychoanalysis as well as historical studies. Mapping the circuits of knowledge through which the sexed subject became a topic to be written about in the West will lead to a better understanding of the confluence of disciplinary knowledge, as well as their transnational dimensions.

**DP1093006** A/Prof JM Lewis; Prof M Considine

**Approved Project Title** **How governments innovate: Networks, normative frames and leadership styles**

**2010 :** \$ 86,000

**2011 :** \$ 104,000

**2012 :** \$ 140,000

**2013 :** \$ 107,000

**Primary RFCD** 3602 POLICY AND ADMINISTRATION

**Administering Organisation** The University of Melbourne

## Project Summary

This project addresses the national research priority goal of promoting an innovation culture and economy. Understanding the development and uptake of innovative ideas is critical for maximising Australia's creative capability. Improving our understanding of how policy leaders frame innovation, who they source innovative policy ideas from and how, and what individual and collective resources they draw upon is key to understanding the factors conducive to innovation and its acceptance. This project will provide vital information on structures and

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

processes for encouraging and managing innovation, and will lead to more responsive pathways for innovation, better governance systems and better policy outcomes.

**DP1094843** Dr A Limosani; A/Prof MC Kruse

**Approved Project Title** **Searching for Supersymmetry in the Universe with the A Toroidal Lagre Hadron Collider ApparatuS (ATLAS) experiment at the Large Hadron Collider**

**2010 :** \$ 105,000

**2011 :** \$ 95,000

**2012 :** \$ 90,000

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

**APD** Dr A Limosani

**Administering Organisation** The University of Melbourne

## Project Summary

Australian researchers have been involved with the A Toroidal Lagre Hadron Collider ApparatuS (ATLAS) experiment at the Large Hadron Collider since the early 1990's. They have had significant roles in ATLAS hardware design and construction, software development, and in the deployment of a data computing grid, thereby paving the way for groundbreaking discoveries surrounding the fundamental laws and origin of our universe. By performing a search for Higgs bosons, required in many models of particle physics but which have so far not been observed, this research embodies the final step on this road to discovery. The huge publicity surrounding the discovery potential at the Large Hadron Collider will raise the international awareness and stature of basic research in Australia.

**DP1093372** Prof TC Lindsey; A/Prof PJ Nicholson

**Approved Project Title** **Drugs, law and criminal procedure in Southeast Asia: A comparative analysis**

**2010 :** \$ 100,000

**2011 :** \$ 94,000

**2012 :** \$ 87,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

## Project Summary

Australians accused of major drugs offences in Southeast Asia face very serious penalties, including death or life imprisonment. There is, however, a lack of accurate information in Australia regarding how drugs trials are conducted in the region, let alone detailed knowledge of applicable laws and procedure. There is now an acute need for detailed comparative material on criminal laws and judicial processes in Indonesia, Vietnam and Singapore, so better support can be provided both for Australians facing drug-related charges and for Australian governments in developing policies and strategies in response to the issues these trials create.

**DP1093038** Prof E Manias; Dr AF Williams; A/Prof D Liew

**Approved Project Title** **Effective communication and improved patient safety: Addressing the complexities of managing high risk medications in metropolitan and regional hospitals**

**2010 :** \$ 140,000

**2011 :** \$ 140,000

**2012 :** \$ 155,000

**Primary RFCD** 3212 PUBLIC HEALTH AND HEALTH SERVICES

**Administering Organisation** The University of Melbourne

## Project Summary

Current costs of hospital-related incidents are around AU\$2 billion per year, and the most common cause of these incidents is ineffective communication. Medication incidents relating to use of high risk medications are particularly critical because of the increased severity of patient outcomes. High risk medications are administered in busy environments, and involve patients who are cared for by many different health professionals in technologically complex settings. These factors increase the likelihood of more medication incidents. The unique knowledge obtained will inform policies and identify strategies for better communication. Health professionals and patients can adopt these strategies to improve medication safety.

**DP1094355** Dr FA Martin; Dr T Lewis; A/Prof R Harindranath; Prof W Sun; Prof JG Sinclair

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**Approved Project Title**      **The role of lifestyle television in transforming culture, citizenship and selfhood: Australia, China, Taiwan, Singapore and India**

**2010 :**                      \$ 116,000

**2011 :**                      \$ 120,000

**2012 :**                      \$ 81,000

**2013 :**                      \$ 100,000

**Primary RFCD**      4001                      JOURNALISM, COMMUNICATION AND MEDIA

**Administering Organisation**      The University of Melbourne

## **Project Summary**

Television now reaches 97% of the population in China and Indian TV is among the world's fastest growing industries. Despite its dominance as a media form in our region, in Australia we know little about the social and cultural dimensions of television in Asia. By researching lifestyle TV – a genre concerned with promoting new forms of lifestyle and consumption – this project will help us comprehend the shifting cultural, economic and social dynamics of our region, contributing to Research Priority 4. Through engagement with Asian cultures and scholarship, it will also help position Australian media research as relevant both regionally and internationally and will help to inform Australian TV producers of new developments in the region.

**DP1093585**              Prof I Marusic; A/Prof A Ooi; Prof MS Chong; Dr N Hutchins; Dr JP Monty; Prof DI Pullin; Mr D Chung

**Approved Project Title**      **Unravelling the scale interactions of wall turbulence: experiment, physical modelling, next-generation numerical simulation**

**2010 :**                      \$ 210,000

**2011 :**                      \$ 180,000

**2012 :**                      \$ 190,000

**Primary RFCD**      2918                      INTERDISCIPLINARY ENGINEERING

**Administering Organisation**      The University of Melbourne

## **Project Summary**

Turbulent fluid flows near solid surfaces are present in many areas of everyday life: from the drag experienced on air, sea and road vehicles, to governing the mixing processes in combustion chambers, and in the transport of pollutants and particulates in our cities and towns. Unfortunately our understanding of these complex flows is limited, and hence so to is our ability to model or control them. This project addresses this problem with the goal of providing new physical insights and models that can be used for efficient and accurate numerical simulations. The simulations will not only compute the average statistics but also the time-varying properties, which are crucial in many engineering and environmental processes.

**DP1093041**              Prof GE McPherson; Prof JW Davidson; Prof MS Barrett; Dr R Faulkner

**Approved Project Title**      **Creating musical futures in Australian schools and communities: Refining theory and planning for practice through empirical innovation**

**2010 :**                      \$ 90,000

**2011 :**                      \$ 90,000

**2012 :**                      \$ 108,000

**2013 :**                      \$ 85,000

**Primary RFCD**      4101                      PERFORMING ARTS

**Administering Organisation**      The University of Melbourne

## **Project Summary**

This proposal forms a logical and much needed extension of the Commonwealth Government's (2005) National Review of Music Education. It will establish international leadership for Australian music education research by constructing the most complete picture of children's motivation to study music ever attempted. A series of interconnected studies will refine theory in ways that can be used to mobilize public awareness of the life-long sense of wellbeing and enjoyment that artistic appreciation and participation in music can offer, and future efforts to promote more effective strategies for the provision of music education for all young people in Australia and beyond.

**DP1095379**              Dr J Moss; Prof GM Cullity; Dr I Hirose; Dr S Keller

**Approved Project Title**      **Egalitarian Responses to Climate Change**

**2010 :**                      \$ 67,500

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

2011 : \$ 61,000

2012 : \$ 50,000

2013 : \$ 40,000

Primary RFCD 4401 PHILOSOPHY

Administering Organisation The University of Melbourne

## Project Summary

The project will offer significant insights into the effects of climate change and adaptation policy on the disadvantaged at a time when there is significant policy change in this area. The project will develop a philosophical framework for assessing whether current and proposed carbon trading schemes are just. In addition, the project will also consider the important political issue of whether democratic participation in the formation of climate policy is required and in what ways.

DP1092666 Prof JR Mould

Approved **Dark matter and the velocity field of galaxies in the local universe**

## Project Title

2010 : \$ 120,000

2011 : \$ 120,000

2012 : \$ 120,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation The University of Melbourne

## Project Summary

Unidentified dark matter outweighs the luminous matter (stars, gas, and galaxies) by several times. Dark matter is detected by its gravitational effects in the Universe. Two recent surveys have been completed using unique Australian facilities, the HI Parkes All Sky Survey and the Six Degree Field galaxy survey. The flow field of galaxies will be measured from these surveys. This project will provide a return on the community investment in these surveys, by mapping the distribution of dark matter. This work, together with a successor survey, the Australian Square Kilometre Array Pathfinder all sky survey, scheduled to begin in 2013, will put Australian astronomers clearly in the lead in understanding the distribution of dark matter.

DP1096843 Prof P Mulvaney; Prof JE Sader

Approved **Repulsive van der Waals forces and Brownian ratchet motors: manipulating thermal and quantum Fluctuations**

2010 : \$ 145,000

2011 : \$ 140,000

2012 : \$ 140,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation The University of Melbourne

## Project Summary

A fundamental problem with miniaturizing machines and mechanical devices below the micron scale is the issue of friction and lubrication. One way to completely circumvent the need for lubrication is to use a little-studied phenomenon known as 'repulsive van der Waals forces', to create materials that fundamentally repel each other in certain fluid environments. This effect is very large at the nanoscale and this proposal examines how such forces can be used to make 'lubricant free' motors and nanomachines. This will open up the possibility of building small and portable sensors, actuators, microfluidic devices and eventually active drug delivery systems for health applications.

DP1094326 Prof D Nestic

Approved **Analysis and Design of Networked Control Systems**

## Project Title

2010 : \$ 108,000

2011 : \$ 105,000

2012 : \$ 105,000

2013 : \$ 84,000

2014 : \$ 80,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

## Project Summary

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

Drive-by-wire cars, fly-by-wire aircraft and sensor/actuator wireless networks in process and manufacturing industries are just a few examples of emerging networked control technologies that are currently reshaping our world. These technological advances have a vast potential to reduce the cost, weight and volume of engineered systems, simplify their maintenance and installation and their novel architectures and features may enable us to address significant environmental and socio-economic challenges, such as an increased demand for energy and other limited resources. This project will develop a systematic design methodology for networked control systems that will be essential in ensuring that its full potential is exploited.

**DP1094328** Dr PT Norbury; Mr NN Do

**Approved Project Title** **Moduli spaces**

**2010 :** \$ 100,000

**2011 :** \$ 100,000

**2012 :** \$ 100,000

**Primary RFCD** 2301 MATHEMATICS

APD Mr NN Do

**Administering Organisation** The University of Melbourne

## Project Summary

This project will offer a great opportunity for Australian researchers and students to engage in internationally competitive research in mathematics. Moduli spaces are fundamental to our understanding of mathematics and modern mathematical physics. It is crucial that Australian scientists and students take active part in these developments. The training of Honours and PhD students in various aspects of moduli spaces, and in the mathematics and mathematical physics that it addresses, is an integral part of this application.

**DP1096025** Prof KA Nugent; A/Prof LJ Allen; A/Prof A Roberts; A/Prof RE Scholten

**Approved Project Title** **High-resolution electron diffraction imaging for the nanosciences**

**2010 :** \$ 250,000

**2011 :** \$ 250,000

**2012 :** \$ 250,000

**Primary RFCD** 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

**Administering Organisation** The University of Melbourne

## Project Summary

This project will develop new ways of seeing structure at the atomic level, to yield new imaging approaches needed for frontier developments in nano-science and nanotechnology. These areas are critical to Australia's future economic development and it is only through significant improvements in imaging capacity that we will be able to sustain this country's outstanding record in scientific innovation. The project will obtain intellectual leverage from the expertise of the team of Chief Investigators, utilizing state-of-the-art infrastructure available in Australia and abroad, and provide a professional and broad training environment for our best and brightest graduate students.

**DP1095054** A/Prof AM O'Connell; A/Prof ML Stewart; Dr MS Harding

**Approved Project Title** **Defining, regulating and taxing the not-for-profit sector in Australia: Law and policy for the 21st century**

**2010 :** \$ 92,000

**2011 :** \$ 110,000

**2012 :** \$ 184,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

## Project Summary

The not-for-profit sector is crucial to the economy and social inclusion in Australia. The sector's role and significance is growing but it struggles with complex and disparate taxation requirements and piecemeal supervision by state and federal governments. This project addresses both the needs of the sector and public expectations of it by comprehensively researching legal definition, regulation and tax rules and recommending appropriate reform, thereby making a significant contribution to National Priority Research area, Promoting and Maintaining Good Health and Well Being, Priority Goal 4, 'understanding and strengthening key elements of Australia's social and economic fabric'.

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1093476** Dr DN Oetomo; Prof O Khatib; Dr PV Lee; Prof MP Galea

**Approved Project Title** **Robotic gait assistive strategy for people with paraplegia: Generating balanced and human-like gait on a bipedal system**

**2010 :** \$ 150,000

**2011 :** \$ 100,000

**2012 :** \$ 102,000

**Primary RFCD** 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

**Administering Organisation** The University of Melbourne

## Project Summary

The outcomes of the project will contribute significantly to the fundamental understanding of bipedal mechanisms, robotics, and the dynamics of human gait. This research is unique in Australia and it will strengthen Australia's research standing in robotics and health-sciences. The immediate application of the outcomes will contribute significantly to the musculoskeletal and psychological health of people with spinal cord injury, as well as the basic locomotion capability around the house to carry out their daily tasks more independently and conveniently. Hence it will directly contribute to improving their quality of life and substantially reducing health-care costs and carer responsibilities in the community.

**DP1093256** Prof M Olekalns; Prof PL Smith

**Approved Project Title** **Currencies of Exchange: Social Utility Functions and Strategic Decisions in Negotiation**

**2010 :** \$ 70,000

**2011 :** \$ 70,000

**2012 :** \$ 80,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

Negotiators' strategy choices are influenced by their concern about economic and social outcomes. As negotiation relationships develop, social outcomes such as reputation become increasingly influential. However, individuals differ in their willingness to trade reputation for financial gain. We investigate two factors, negotiation context and underlying relationship, that affect the relative weights assigned to economic and social outcomes. We link differences in these weights to differences in negotiators' strategy choices and study how weights and behaviours change over time. This enables us to identify the elements of negotiation best practice, which allows negotiators to protect both their economic and reputational outcomes.

**DP1095452** A/Prof M Palaniswami; A/Prof C Leckie; Prof Dr P Havinga

**Approved Project Title** **Trustworthy Sensor Networks: Theory and Implementation**

**2010 :** \$ 50,000

**2011 :** \$ 50,000

**2012 :** \$ 50,000

**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

**Administering Organisation** The University of Melbourne

## Project Summary

The fundamental importance of this project is that we are developing algorithms for wireless sensor networks (WSNs) that provide accurate and trustworthy data to Australian researchers and users, so that they have confidence in the analysis of their data. The algorithms developed in this proposal will become essential for any large scale WSN. The research significantly leverages the resources of our international partners who complement our work with several million dollars of investment. The result will put Australia on the international stage as a significant contributor to WSN technologies. By training PhD students, the project will also enrich local expertise in the technologies.

**DP1095131** Dr LR Palmer

**Approved Project Title** **Reconnecting with water: Lessons from a diverse economy**

**2010 :** \$ 55,000

**2011 :** \$ 50,000

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

2012 : \$ 50,000

Primary RFCD 3704 HUMAN GEOGRAPHY

Administering Organisation The University of Melbourne

## Project Summary

In 2008, the Australian government identified as one of its major development themes water and sanitation services in the Asia Pacific region. Focusing on the complex socio-cultural circumstances impacting on the implementation of water and sanitation policies in Timor Leste, this research will provide an in-depth account of the current barriers and potential opportunities for moving forward and successfully achieving positive outcomes in this area. It will identify effective conceptual and methodological approaches for advancing community engagement and the development of adaptive management strategies which could be applied to achieve greater understandings, sustainability and aid effectiveness elsewhere.

DP1095366 Prof MG Pandey; Prof E Seeman; A/Prof RK Begg; Dr PV Lee; Dr R Zebaze

Approved **Non-invasive assessment of hip fracture risk in elderly people**

## Project Title

2010 : \$ 145,000

2011 : \$ 180,000

2012 : \$ 220,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Melbourne

## Project Summary

No falls, no fractures - this will be the main benefit of the proposed research. The most significant outcome will be new computational tools to improve current understanding of the biomechanics of falls and bone fragility in elderly people, which, in turn, will help to reduce healthcare costs associated with the treatment and management of hip fractures. Realistic models and computer simulations of human movement can play a pivotal role in three of Australia's largest industries: healthcare, through the diagnosis and treatment of movement disorders; sports, through the development of personalized training programs for elite athletes; and entertainment, through the development of video/digital games and animated films.

DP1094192 A/Prof J Polese; Dr VN Volkoff; Prof JP Keating

Approved **Vocational studies in school - does it matter if I'm a girl and if I'm poor?**

## Project Title

2010 : \$ 95,000

2011 : \$ 83,000

2012 : \$ 86,334

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation The University of Melbourne

## Project Summary

The growth of VET in Schools has been associated with government policy to promote an innovation culture and economy, to increase secondary retention, and to strengthen transition from school to tertiary study, training and work. This study seeks to examine the effectiveness of VETiS, from a gender and SES perspective, in strengthening participation, fostering student engagement and facilitating effective transition. It does so by analysing national VETiS data, followed up by a longitudinal study of students in 12 schools (small, large, single sex, co-educational, metropolitan and non-metropolitan). It uniquely combines a system-wide perspective with a detailed and qualitative school-level view.

DP1096288 Prof S Praver; Dr AD Greentree; Dr S Tomljenovic-Hanic; Prof A Hoffman; Dr JM Smith

Approved **Fabrication strategies for diamond-based quantum devices: concepts to applications**

## Project Title

2010 : \$ 220,000

2011 : \$ 180,000

2012 : \$ 180,000

2013 : \$ 120,000

2014 : \$ 120,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

ARF Dr S Tomljenovic-Hanic

Administering Organisation The University of Melbourne

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Project Summary

Twenty first technology must respond to the imperatives of low-power, high speed, and integrated functionality. The application of our most advanced scientific understanding is required to meet these imperatives: quantum physics. Quantum information Science is radically altering our understanding of physics, and is ripe to change engineering and technology. One of the most promising material platforms for exploiting quantum effects is diamond, and our project seeks to transition diamond from its role as scientific testbed, to the material of choice for quantum technologies

**DP1094962** Prof GG Priest; A/Prof G Restall; Prof Dr F Berto; Mr Z Weber

**Approved Project Title** **Paraconsistent Foundations of Mathematics**

**2010 :** \$ 100,000

**2011 :** \$ 100,000

**2012 :** \$ 100,000

**Primary RFCD** 4401 PHILOSOPHY

**Administering Organisation** The University of Melbourne

## Project Summary

In the English-speaking world, Australia is already the most prominent centre for paraconsistent research, known for development of radical new ideas advanced here in the last few decades. The program is ready to mature into its next phase, making important and lasting contributions to logic, philosophy, and mathematics. The Australian academy will derive international recognition for impressive new mathematics, and innovative philosophical explanations of truth and proof.

**DP1094656** Dr R Raimondo

**Approved Project Title** **Economics of continuous-time financial markets and endogenous pricing**

**2010 :** \$ 26,079

**2011 :** \$ 26,079

**2012 :** \$ 26,079

**Primary RFCD** 3401 ECONOMIC THEORY

**Administering Organisation** The University of Melbourne

## Project Summary

This research has the potential to benefit society by improving the accuracy of pricing in securities markets. First, because the research leads to specific predictions about the interaction of prices for different type of assets, it should lead to more accurate pricing across markets, such as housing, stocks and bonds, which currently function largely independently. Second, it should lead to more accurate pricing of derivatives in the situations where the exercise price of the derivatives differs significantly from the current price of the underlying stock.

**DP1096309** Dr PJ Rayner; Prof DJ Karoly

**Approved Project Title** **Assimilation of trace atmospheric constituents for climate (ATACC): Linking chemical weather and climate**

**2010 :** \$ 210,000

**2011 :** \$ 180,000

**2012 :** \$ 180,000

**2013 :** \$ 200,000

**2014 :** \$ 170,000

**Primary RFCD** 2606 ATMOSPHERIC SCIENCES

**APF** Dr PJ Rayner

**Administering Organisation** The University of Melbourne

## Project Summary

Changes in atmospheric ozone and carbon dioxide affect many aspects of surface climate from changes in ultraviolet radiation (ozone) to long-term changes in temperature (carbon dioxide). Better mapping of these gases will help us understand, predict and manage these changes. For ozone, it will clarify the link between ozone and surface weather. For carbon dioxide, improved knowledge of the impact of tropical deforestation, land clearing and changes in the southern ocean on atmospheric CO<sub>2</sub> will support sustainable development in Australia and our region. The project hence addresses the priority goal 'Responding to climate change and variability' under the National Research Priority 'An Environmentally Sustainable Australia'.

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1094277** Dr C Roever; A/Prof CA Elder

**Approved Project Title** **Diagnosing cross-cultural communicative ability in English as a second language to improve language learning and social integration**

**2010 :** \$ 41,000

**2011 :** \$ 58,000

**2012 :** \$ 33,000

**Primary RFCD** 3802 LINGUISTICS

**Administering Organisation** The University of Melbourne

## Project Summary

This project benefits a number of stakeholders. Its main long-term benefit will be to second language learners of English in Australia, particularly migrants and international students, who are most in need of training in cross-cultural communication to facilitate their settlement in the Australian community. As a consequence, the project benefits Australia as a whole by making migrants' skills more quickly and readily available to the labour market, and allowing them to contribute more fully to the community. The project outcomes can also be adapted for other languages and address the national research priority of safeguarding Australia by helping to enhance understanding of the region.

**DP1095760** Prof JH Rubinstein; A/Prof CD Hodgson; Dr S Tillmann

**Approved Project Title** **Triangulations in dimension three: algorithms and geometric structures**

**2010 :** \$ 120,000

**2011 :** \$ 125,000

**2012 :** \$ 100,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

## Project Summary

Perelman recently won a Fields medal for the solution of the geometrisation and Poincare conjectures on three-dimensional spaces, using a very deep heat flow method to find optimal geometries on these spaces. The project will develop a new constructive approach to building these optimal geometric structures. This will lead to effective algorithmic methods to distinguish three-dimensional spaces, with applications to the study of knots and links (for example, knotted DNA molecules) and to mathematical physics. The project will also provide new techniques to study important problems in the classification of three-dimensional spaces, such as the virtual Haken conjecture.

**DP1094986** Prof D Samson

**Approved Project Title** **Boards of directors and the governance of emergence risk**

**2010 :** \$ 150,000

**2011 :** \$ 130,000

**2012 :** \$ 130,000

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

**Administering Organisation** The University of Melbourne

## Project Summary

Australian firms systematically under-invest in innovation and other future-oriented activities. An underlying premise of this research is that, in part, this is because they do not systematically include emergence risk in their governance activities. If we find that this is the case, one impact of this research will be to contribute to a rethinking of the roles and practices of boards of directors. A consequence of this will be that Australian corporations will become more competent in the management of innovation and other future-oriented activities.

**DP1094465** A/Prof JY Scheerlinck

**Approved Project Title** **Investigation of the resilience of immune memory to manipulation by pathogens**

**2010 :** \$ 120,000

**2011 :** \$ 120,000

**2012 :** \$ 120,000

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**Primary RFCD** 3005 VETERINARY SCIENCES

**Administering Organisation** The University of Melbourne

## Project Summary

Vaccines have a major impact on the wellbeing of humans as well as productivity and welfare of veterinary species and pets. New vaccines have therefore a tremendous effect on both the economy and the community. Here we investigate in how far an adjuvanted vaccine can influence the type of immune response induced during subsequent infection when the pathogen has developed mechanisms to subvert the induced protective immune response. This question has profound implications for all vaccine and adjuvant development activities, as the resilience of immune memory is not yet considered an important parameter in the design of adjuvants yet it is fundamental to the successful of vaccines against many pathogens.

**DP1094005** Prof G Shanks; Dr PB Seddon; Mr PJ Reynolds; Prof LP Willcocks

**Approved Project Title** **The Impact of Strategy on Business Analytics Success**

**2010 :** \$ 200,000

**2011 :** \$ 200,000

**2012 :** \$ 200,000

**2013 :** \$ 150,000

**2014 :** \$ 100,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

APF Prof G Shanks

**Administering Organisation** The University of Melbourne

## Project Summary

The successful implementation of business analytics systems will enhance the ability of Australian organisations to operate and compete efficiently and effectively within Australia and globally. By understanding the capabilities that lead to improved firm performance and their relationship to strategy, organisations can use the theoretical model to plan for business analytics systems implementation. The model is an original contribution in an important area of information systems research and will enhance Australia's reputation as a leader in the area of organizational use of information systems.

**DP1095065** A/Prof M Shields; Dr DW Johnston

**Approved Project Title** **Socioeconomic status and health in Australia: An econometric investigation into causality and pathways**

**2010 :** \$ 50,000

**2011 :** \$ 50,000

**2012 :** \$ 20,000

**Primary RFCD** 3402 APPLIED ECONOMICS

**Administering Organisation** The University of Melbourne

## Project Summary

This project aims to provide new policy-relevant research focusing on the role of socioeconomic status (SES) in determining health outcomes for children and adults in Australia, and in reducing health-related inequalities. This project will use high-quality Australian longitudinal data and the most advanced econometric models to provide new insights into the pathways underlying the SES gradient. The project will also use similar data for Britain as a valuable comparison point. The research will contribute to a better understanding of health outcomes relating to a healthy start to life and strengthening Australia's social and economic fabric.

**DP1095579** Prof GJ Simpson

**Approved Project Title** **A Conceptual History of War Crimes Trials**

**2010 :** \$ 85,000

**2011 :** \$ 84,000

**2012 :** \$ 80,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

## Project Summary

Promoting justice around the globe is an end in itself as well as a means of avoiding the sort of mass social

## Summary of Discovery Projects Proposals for Funding to Commence in 2010

disruption that threatens the global commonwealth (and, therefore, Australia). It is imperative that this system be exposed to a critical historical analysis. The project will clarify precisely what is at stake in Australia's long commitment to war crimes law and establish Australia as a global centre for international criminal justice at a transformative moment in the history of the international legal order. The specific aim is to write an intellectual history of international law's encounter with the problem of evil and the possibility of rehabilitation and redemption through criminal trial.

**DP1097262** Prof MB Singh

**Approved Project Title** **Epigenetic programming of plant sperm cells**

**2010 :** \$ 120,000

**2011 :** \$ 120,000

**2012 :** \$ 120,000

**Primary RFCD** 2702 GENETICS

**Administering Organisation** The University of Melbourne

### Project Summary

Most of the grains and seeds that form the world's food supply are the result of the successful functioning of sperm and egg cells during fertilisation. This proposal aims to investigate the nature of sperm cell genome programming in plants and unravel molecular processes that give these cells their unique identity. This innovative and challenging research will also provide an excellent opportunity for training the next generation of scientists. The outcomes of this proposal will enhance Australia's international lead in this field and will pave the way toward the development of new approaches for sustaining and enhancing crop productivity under changing environmental conditions.

**DP1094289** Prof MS Smith; Prof PJ Danaher; Dr TS Dagger

**Approved Project Title** **New methods for analysing marketing Databases in the age of digital media**

**2010 :** \$ 215,000

**2011 :** \$ 132,000

**2012 :** \$ 120,000

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

**Administering Organisation** The University of Melbourne

### Project Summary

This is a time of enormous and rapid change in many areas of Australian business due to the introduction and widespread dissemination of digital media. It has resulted in the accumulation of large integrated databases of customer information and their transactions. Firms in all countries, particularly those challenged by distance and size, like Australia, are now seeking to find ways to make better use of their voluminous information so as to make efficiency gains in their business processes, strategic decision-making and customer relationship management. Our project aims to contribute to the ARC priority research goal of smart information use by developing new methodologies for the analysis of these large integrated databases.

**DP1092908** Dr D Stuart-Fox

**Approved Project Title** **Colour polymorphisms and speciation: linking macroevolutionary patterns with microevolutionary processes**

**2010 :** \$ 130,000

**2011 :** \$ 130,000

**2012 :** \$ 110,000

**2013 :** \$ 110,000

**2014 :** \$ 110,000

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

ARF Dr D Stuart-Fox

**Administering Organisation** The University of Melbourne

### Project Summary

Polymorphic species with many different colour forms have inspired biological inquiry since Aristotle. This project takes advantage of remarkable variation in male throat coloration in the South Australian tawny dragon lizard to contribute to a fundamental, yet unresolved, question in biology: what are the evolutionary processes generating biodiversity? This research will reinforce Australia's outstanding reputation in the fields of Ecology and Evolution and contribute to the training of internationally competitive postgraduate students. It will also improve our

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

understanding of the biology and genetic diversity of a fascinating Australian reptile and its habitat, within a region of national biodiversity significance.

**DP1095928** Prof RV Teese; A/Prof SP Lamb; Ms A Reupold

**Approved Project Title** **A Tale of six cities: Explaining social inequality in secondary school systems: an international comparative study**

**2010 :** \$ 120,000

**2011 :** \$ 98,000

**2012 :** \$ 148,000

**2013 :** \$ 90,000

**Primary RFCD** 3301 EDUCATION STUDIES

APD Ms A Reupold

**Administering Organisation** The University of Melbourne

## Project Summary

Australia is frequently compared with other Organisation for Economic Co-operation and Development (OECD) countries as 'only average' in equity. But why? League tables don't explain this and commentators are vague. What good are comparisons if they don't improve student outcomes through better understanding and better policies? This study shows why inequality persists in six countries. It highlights the role of curriculum as a vehicle for distinguishing between students in more or less sharp ways and of selective schooling as a vehicle for gaining access to the most discriminating paths in the curriculum. It points to ways in which schooling can operate more equitably without sacrificing quality.

**DP1093663** Dr J Tham; Prof B Costar; Dr GD Orr

**Approved Project Title** **Dollars and democracy: The dynamics of Australian political finance and its regulation**

**2010 :** \$ 34,000

**2011 :** \$ 50,000

**2012 :** \$ 45,000

**Primary RFCD** 3601 POLITICAL SCIENCE

**Administering Organisation** The University of Melbourne

## Project Summary

This project will provide a foundation for meeting the complex challenge of realising democratic principles given the various flows of money in politics. Its analyses reform recommendations, and data will serve the national benefit by enabling the political and electoral system to better advance the democratic functions of parties; the principles of transparency, equality and liberty; and the prevention of corruption and its perception. The public availability of its data will enhance political reporting and accountability. It will also contribute significantly to the international literature on political finance through its comparative examination of theoretical explanations and democratic principles.

**DP1097119** A/Prof GR Tsetskhladze

**Approved Project Title** **Australian research at Pessinus, sacral city of Cybele, the great mother goddess: myth and reality**

**2010 :** \$ 219,000

**2011 :** \$ 195,000

**2012 :** \$ 201,000

**2013 :** \$ 195,000

**2014 :** \$ 195,000

**Primary RFCD** 4302 ARCHAEOLOGY AND PREHISTORY

**Administering Organisation** The University of Melbourne

## Project Summary

This international multi-disciplinary project to investigate ancient Pessinus in modern Turkey will enrich the standing of Australia in the world as one of the foremost countries in the study of Anatolian and classical archaeology. It offers an exceptional opportunity for Australian students to learn and experience archaeology in the field alongside their peers and scholars of international reputation from several countries. The multi-ethnic character of the site will form a good ancient parallel for the diversity of modern-day Australia. The project will advance Australian-Turkish cultural contacts and potentially deepen economic relations through encouraging tourism to a new part of Turkey

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1095477** Prof JS Van Deventer; Dr JL Provis

**Approved Project Title** **Separating gold from silica by tailored hydrometallurgical processes**

**2010 :** \$ 160,000

**2011 :** \$ 150,000

**2012 :** \$ 160,000

**Primary RFCD** 2907 RESOURCES ENGINEERING

**Administering Organisation** The University of Melbourne

## **Project Summary**

Australia is one of the world's largest producers of gold, and the ability to more efficiently separate gold from its ores will benefit the Australian economy by maximising the value of every tonne of ore which is removed from the ground. Inefficiencies in processing technology can lead to the loss of gold from extraction processes, and the reasons for some of these losses are poorly understood but are believed to be related to interactions between gold and silicate minerals. We will study these interactions with a view towards improving the percentage of gold present in the ores which is able to be extracted and used.

**DP1096084** Dr DN Veitch; A/Prof SV Hanly; Prof FL Baccelli

**Approved Project Title** **Overseeing the internet: new paradigms of network measurement**

**2010 :** \$ 115,000

**2011 :** \$ 100,000

**2012 :** \$ 100,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Administering Organisation** The University of Melbourne

## **Project Summary**

Like the electricity network, the Internet is a core infrastructure, and so must be reliable, efficient, and fairly accessible. A gap in bandwidth supply is like a blackout in terms of lost business and productivity. Inefficiency increases costs as more equipment is needed for the same service, and an inability to police network providers distorts economics and strangles access to the best services. Network health can only be assessed through measurements, however, current methods are incapable of measuring some of the most important metrics, for instance whether a provider is conforming to its contract. This project will provide the breakthroughs necessary to ensure that network behaviour can be accurately and comprehensively assessed.

**DP1093395** Dr RF Waller; Prof GI McFadden

**Approved Project Title** **Investigations of Australian Hematodinium species (sp.): a dinoflagellate parasite damaging major crustacean fisheries in Australia and worldwide**

**2010 :** \$ 110,000

**2011 :** \$ 100,000

**2012 :** \$ 95,000

**Primary RFCD** 3007 FISHERIES SCIENCES

**Administering Organisation** The University of Melbourne

## **Project Summary**

The dinoflagellate Hematodinium species (sp.) causes a deadly infection in crustaceans worldwide and a recent outbreak in Shark Bay, WA highlights its importance in Australian waters. This project will provide a first nationwide survey of commercially important crustacean stocks enabling the Australian fisheries authorities to assess the full scale of the problem. Also, we will develop a simple, easy-to-use tool for diagnosis and management of Hematodinium sp. This project will expand the diversity of parasites studied in Australia by including this relatively poorly studied but damaging group. This project will also foster interdisciplinary collaborations within Australia, and internationally.

**DP1093345** Prof AG Wedd; Dr F- Arnesano

**Approved Project Title** **Chemistry of the Transport of Nutrient Copper in Biological Cells**

**2010 :** \$ 180,000

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

2011 : \$ 160,000  
2012 : \$ 150,000  
Primary RFCD 2502 INORGANIC CHEMISTRY

**Administering Organisation** The University of Melbourne

## Project Summary

Nutrient trace metals such as copper are needed for enzymes by living organisms but are toxic in excess. Defects in copper metabolism cause Menkes and Wilson diseases in humans and there are direct connections to neurodegenerative diseases (eg, Alzheimer, Parkinson, Creutzfeldt-Jakob, motor neuron diseases). It is crucial to understand how healthy cells control toxic but essential copper so that enlightened intervention is possible when disturbances of copper metabolism become pathological. The chemistry of key molecules will be studied to reveal their essential properties and thereby to understand the molecular basis of the copper-linked diseases.

**DP1095831** Dr CC Westerland

**Approved Project Title** **Homotopy theory: interactions with representation theory and moduli spaces**

2010 : \$ 50,000  
2011 : \$ 50,000  
2012 : \$ 50,000  
Primary RFCD 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

## Project Summary

This proposal will involve young researchers and train them for problem solving in many fields, including management, the sciences, the financial industries, and the development of technologies. Furthermore, many of the projects in this proposal are collaborative and interdisciplinary. It is the CI's sincere hope that this proposal can help bolster communication amongst the wealth of topology, number theory, and mathematical physics experts in Australia. The research in these exciting areas of mathematics will contribute to maintaining Australia's position as a research leader in pure mathematics.

**DP1094895** Dr AM Whittaker; Dr H Chee

**Approved Project Title** **Medical travel in Asia: Therapeutic quests for hearts and hips**

2010 : \$ 52,000  
2011 : \$ 73,000  
2012 : \$ 59,000  
Primary RFCD 3703 ANTHROPOLOGY

**Administering Organisation** The University of Melbourne

## Project Summary

This project is of relevance to Australia not only as a source country of medical tourists seeking services overseas but as a country increasingly concerned to market its services in the region. An empirical study of this trade will provide greater understanding of the social impact of medical travel for our citizens. As an ageing population, it is expected that increased numbers of Australians may choose to pursue such treatments in the region. This study will contribute to Research Priority Four through a better economic, social and political understanding of our region. It will enhance Australia's international reputation for scholarship in the social sciences.

**DP1093356** Dr SJ Williams; Prof MJ McConville

**Approved Project Title** **Mannosyl transfer processes in leishmania and mycobacteria**

2010 : \$ 110,000  
2011 : \$ 110,000  
2012 : \$ 110,000  
Primary RFCD 2503 ORGANIC CHEMISTRY

**Administering Organisation** The University of Melbourne

## Project Summary

The human diseases leishmaniasis and tuberculosis are caused by infectious microorganisms. We will target pathways to the biosynthesis and degradation of parasite-specific mannose containing metabolites that play

## Summary of Discovery Projects Proposals for Funding to Commence in 2010

essential roles in the ability of these pathogens to cause disease. We will develop new ways to study these pathways, and will synthesize novel substrates and inhibitors that will allow the development of antituberculosis and antileishmanial drugs. This project will contribute to our national competitiveness in the newly emerging area of chemical biology.

**DP1093665** Dr Al Wirth; Prof J Zobel

**Approved Project Title** **Efficient Synchronisation of Large Repositories**

**2010 :** \$ 90,000

**2011 :** \$ 90,000

**2012 :** \$ 80,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

Accuracy and maintenance of vast quantities of data are essential for any modern society. The economy, health institutes and industries, and our defence and legal systems rely on having data being distributed widely and securely, and on queries being answered accurately and quickly. Complete synchronisation of databases is often impossible due to the limitations of internet bandwidth. Better compression techniques have the potential to allow critical data to be distributed much more efficiently; we anticipate in some applications that the size of a compressed file could be reduced tenfold or more compared to previous best methods, leading to dramatic savings.

**DP1095497** Prof MP Wooden; Prof P Lynn; Dr JR Frick

**Approved Project Title** **Assessing and enhancing the quality of longitudinal survey data**

**2010 :** \$ 115,000

**2011 :** \$ 115,000

**2012 :** \$ 115,000

**Primary RFCD** 3705 DEMOGRAPHY

**Administering Organisation** The University of Melbourne

### Project Summary

Australia has begun investing heavily in the collection of population-wide longitudinal survey data. Most of that effort has focused first on collection and dissemination and second on analysis, with scant attention paid to the quality of data collected. This is unfortunate given that longitudinal surveys exhibit many problems (e.g., attrition, panel conditioning, and seam effects) that are not relevant in more ubiquitous cross-section of surveys. Without adequate resources devoted to these methodological issues, the quality of substantive research will be questioned and interest from potential users decline. Maximizing the investment being made in longitudinal data thus requires a complementary investment in methodological research.

**DP1094132** Prof JG Wyn; Prof LC Andres

**Approved Project Title** **Young people negotiating risk and opportunity: A reassessment of transition pathways**

**2010 :** \$ 230,914

**2011 :** \$ 210,000

**2012 :** \$ 247,944

**2013 :** \$ 190,000

**2014 :** \$ 240,000

**Primary RFCD** 3301 EDUCATION STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

The research will make a direct contribution to the development of more integrated policies that impact on young people across the domains of education, youth affairs, health and community. The depth and breadth of the analysis addresses the need for evidence-based policy to change chronic patterns of inequality in young people's transitions during their post-school years, broadening the focus from study and employment to include health and wellbeing. It relates directly to strengthening Australia's social and economic fabric .