

# Summary of Discovery Projects Proposals for Funding to Commence in 2008

## Victoria

### The University of Melbourne

**DP0877221** A/Prof LJ Allen; Prof AI Kirkland

**Approved Project Title** **Imaging in three dimensions beyond the nanoscale**

**2008 :** \$ 102,278

**2009 :** \$ 97,033

**2010 :** \$ 94,000

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

**Administering Organisation** The University of Melbourne

#### Project Summary

After two decades of research the first wave of applications in nanotechnology and nanobiology is breaking. The economic stakes are high: nanostructured electronics and photonics will be the next epoch after transistors (1947) and the microprocessor (1971), and designer therapies and drugs will be in high demand. Immediately key to further progress in both areas is the ability to characterize structure in three dimensions at and beyond the nanoscale. This research project places Australia at the forefront in this endeavour, builds on the national knowledge and skills base in atomic resolution imaging and expands international collaborative research links.

**DP0878136** A/Prof NB Allen; Dr M Yucel; Dr SJ Wood; Dr DI Lubman; Dr P Dudgeon; Dr BJ Harrison; Ms S Whittle

**Approved Project Title** **Brain development during adolescence and the emergence of depression: A longitudinal MRI study.**

**2008 :** \$ 125,000

**2009 :** \$ 110,000

**2010 :** \$ 113,000

**2011 :** \$ 60,000

**2012 :** \$ 30,000

**Primary RFCD** 3801 PSYCHOLOGY

APD Ms S Whittle

**Administering Organisation** The University of Melbourne

#### Project Summary

Traditionally mental health services have focused on established disorders. 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 inability to predict who is likely to go on to develop serious mental disorder. This study will provide critical information for understanding the risk processes that are operating during the critical phase of early adolescence, and will therefore make a fundamental contribution to our understanding of who, and what, to target in early intervention and prevention strategies.

**DP0880637** Prof IP Anderson; Dr CJ Freemantle; Prof J Ozanne-Smith; A/Prof JL Halliday; Ms J Gallagher; Ms M Davey; Ms ME Sullivan; Ms PT Muth

**Approved Project Title** **A mortality profile of Victoria's Aboriginal (and non-Aboriginal) children 1998-2008 using an innovative method and research process**

**2008 :** \$ 170,000

**2009 :** \$ 156,000

**2010 :** \$ 99,866

**2011 :** \$ 100,000

**2012 :** \$ 100,000

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

ARF Dr CJ Freemantle

**Administering Organisation** The University of Melbourne

#### Project Summary

The development of a population mortality profile of Victoria's children that includes accurate Indigenous identification will provide robust information to assess the effectiveness of programs interventions and policies aimed at reducing preventable deaths in children. This research will contribute to state, national and international imperative to improve the collection of Aboriginal death information in order to allow meaningful comparisons between Australian jurisdictions and Aboriginal people globally. The consistent input of the Aboriginal community and relevant experts in all phases of the project will enable and strengthen links with those who can influence government and policy makers to effect change.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877632** A/Prof M Ashokkumar; Prof F Grieser; Prof PV Kamat; Prof K Vinodgopal

**Approved Project Title** **Composite nanomaterials for environmental remediation and fuel cell applications**

**2008 :** \$ 210,000

**2009 :** \$ 170,000

**2010 :** \$ 165,000

**Primary RFCD** 2599 OTHER CHEMICAL SCIENCES

**Administering Organisation** The University of Melbourne

### Project Summary

Australia, in response to a mounting global awareness, needs to find cost effective energy storage sources to replace fossil fuels. The program will significantly add to research that provides fundamental advances in energy storage, in the form of fuel cells, and in the remediation of organic pollutants. It will also contribute to the future development of technologies in these areas that will have substantial benefits to the broader community. The program will provide expert training for future chemists and connect them into leading international research groups led by our PIs.

**DP0880705** Dr J Bailey; Prof G Dong

**Approved Project Title** **Comparative analysis and exploration of collections of data clusterings**

**2008 :** \$ 75,000

**2009 :** \$ 72,000

**2010 :** \$ 68,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

Data clustering is an important technique for extracting knowledge from complex datasets. It is widely used by Australian science, government and industry, in areas such as genomics, proteomics, crime analysis, marketing and customer profiling. This project will develop new techniques that will allow users to explore and analyse collections of data clusterings. This will improve the current generation of clustering software and allow deeper investigation of challenging and complex data.

**DP0879730** Prof JF Bateman; Dr PG Farlie

**Approved Project Title** **Rapid functional analysis of genes involved in skeletal development**

**2008 :** \$ 97,000

**2009 :** \$ 97,000

**2010 :** \$ 97,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Abnormalities of the skeleton are of enormous clinical significance in terms of both number of individuals affected and the cost of treatment. Data derived from this project will underpin targeted research on the mechanisms of inherited and common diseases of cartilage and bone, yielding novel diagnostic and therapeutic targets. In addition, the improved knowledge of cartilage and bone cell development will inform new approaches for developing stem cell therapies and the production of novel biomaterials for the repair of bones and joints. The outcomes of this study will therefore benefit the full spectrum of society from infants to the aged.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879216** A/Prof D Bennett

**Approved Project Title** **Consumer Culture: the influence of economics on modern theories and practices of sexual psychology**

**2008 :** \$ 77,000

**2009 :** \$ 44,000

**2010 :** \$ 50,000

**Primary RFCD** 4203 CULTURAL STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

The project has implications for a wide range of public debates in Australia today, including debates about the ethics and psychology of the pornography industry and the pervasive use of the 'sex sells' principle in marketing and entertainment. It will produce new knowledge and understanding of how psychological theory has been used to rationalise the commercialisation of sex in consumer culture and how modern rhetoric of sexual liberation have been shaped by the very economic concerns they purport to repudiate. Finally, the project will advance the knowledge-base of key disciplines in the new humanities and enhance Australia's reputation for groundbreaking research in cultural history and analysis.

**DP0879816** Dr O Bernard

**Approved Project Title** **Regulation of the actin cytoskeleton by LIM kinase 2**

**2008 :** \$ 65,000

**2009 :** \$ 65,000

**2010 :** \$ 65,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Because the regulation of actin cytoskeleton is essential for many cellular processes including cell motility and the normal function of neurons, it is of great importance to understand its regulation. Elucidation of the molecular and biological mechanisms underlying the actin cytoskeleton including cell motility may enable the identification of novel therapeutic targets for the treatment of diseases such as cancer metastasis, Alzheimer disease (AD) and/or Multiple Sclerosis (MS) in which the regulation of the actin cytoskeleton is affected.

**DP0877470** Dr EJ Bieske

**Approved Project Title** **Understanding and controlling ion-neutral interactions**

**2008 :** \$ 125,000

**2009 :** \$ 114,000

**2010 :** \$ 114,000

**Primary RFCD** 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

**Administering Organisation** The University of Melbourne

### Project Summary

Australia faces significant environmental and technological challenges including development of clean, sustainable energy sources and technologies that do not adversely affect the terrestrial atmosphere. This project seeks to facilitate a cleaner, greener future through investigations of fundamental chemical interactions responsible for hydrogen storage in solid media, and atmospheric processes responsible for the production and destruction of ozone. In both cases, the key interactions between ions and neutral molecules will be elucidated through high-resolution laser studies. Ensuing experimental data will play a crucial role in controlling and predicting ion-neutral interactions in technological and environmental contexts.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877877** Dr L Bond; A/Prof E Frydenberg; Ms NV Firth

**Approved Project Title** **Success despite learning difficulties: The effectiveness of a coping program for adolescent students**

**2008 :** \$ 54,783

**2009 :** \$ 50,000

**2010 :** \$ 50,000

**Primary RFCD** 3301 EDUCATION STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

Despite skilled teaching and average general ability, people with specific learning difficulties (SLD) will never learn to read or write with ease. As approximately 10 percent of the population has SLD, the higher than average risk of negative life outcomes for these people is of significant social and economic cost to the community. Expected outcomes of this study are theory and practice that can assist schools to implement programs that help Australian adolescent students with SLD to be empowered and successful in school and adult life. This will be of significant long-term national and community benefit.

**DP0877704** Dr C Boskovic

**Approved Project Title** **New approaches to bistable spin clusters**

**2008 :** \$ 100,000

**2009 :** \$ 90,000

**2010 :** \$ 90,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

**Administering Organisation** The University of Melbourne

### Project Summary

Future advances in data storage technology and other areas of electronics depend on the miniaturisation of the relevant components. The goal of this project is to create materials where individual molecules can be the units of magnetic memory for high density data storage or the switches in electronic devices. Fundamental research in these areas is being pursued vigorously overseas and Australian involvement through this project is important for the possibility of local development of devices based on the new materials. The students and postdoctoral fellows involved in this work will receive world class training in the synthetic and physical techniques that underpin the emerging fields of molecular magnetism and molecular electronics.

**DP0881742** Mr JA Broberg; Prof Z Tari

**Approved Project Title** **Coordinated and Cooperative Load Sharing between Content Delivery Networks**

**2008 :** \$ 105,000

**2009 :** \$ 105,000

**2010 :** \$ 105,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

APD Mr JA Broberg

**Administering Organisation** The University of Melbourne

### Project Summary

Popular web services can experience severe downtimes as the result of heavy traffic. Enabling coordinated and cooperative content delivery between existing Content Delivery Networks (CDNs) will allow a CDN provider to rapidly 'scale-out' without investing in new infrastructure, to meet both flash crowds and anticipated increases in demand. Improved cost effectiveness, performance and locality for providers and end-users can be achieved by leveraging existing infrastructure provided by other CDNs, creating economies of scale that were previously impossible. This is crucial for uses on the so-called edges of the internet (e.g. Australia) that depend on a small number of expensive data links to the major data centres in Europe and the USA.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878537** A/Prof CA Brown; A/Prof JC Handley; A/Prof AS Lamba

**Approved Project Title** **Share Buybacks and Information Asymmetry: Winners and Losers**

**2008 :** \$ 51,000

**2009 :** \$ 56,000

**2010 :** \$ 36,000

**Primary RFCD** 3503 BANKING, FINANCE AND INVESTMENT

**Administering Organisation** The University of Melbourne

### Project Summary

This study is the first to examine the effectiveness of existing regulations governing share buybacks in Australia. The results will be important for understanding how domestic capital market regulation affects the international competitiveness of Australian companies through their relative cost of capital. It will also assist in ensuring that capital market integrity is increased through the optimal design of regulation and improved market transparency, and thereby encourage greater participation by investors. The results will assist regulatory agencies in designing market surveillance that identifies signs of insider trading or market manipulation associated with corporate capital management activities.

**DP0880501** A/Prof R Buyya; Dr J Abawajy

**Approved Project Title** **InterGrid: Peering Architecture and Policies for Internetworking Disparate Grids**

**2008 :** \$ 75,000

**2009 :** \$ 72,000

**2010 :** \$ 69,000

**Primary RFCD** 2803 COMPUTER SOFTWARE

**Administering Organisation** The University of Melbourne

### Project Summary

Grid computing enables the creation of Cyberinfrastructure for e-Research applications. It is recognised as one of the top five emerging technologies that will have a major impact on the quality of science and society over the next 20 years. Several nations around the world including Australia have developed their own national Grids based on the notion of virtual organisations. These dispersed Grid initiatives have resulted in Grid islands without any support for peering arrangements between them. This limitation will not allow us to realise full potential of the Grid computing paradigm. This InterGrid project aims to revolutionise Grid computing by developing new technologies for peering of Grids.

**DP0880036** Prof C Cameron; Dr PJ Nicholson

**Approved Project Title** **Testing Court Reform Projects in Cambodia and Vietnam**

**2008 :** \$ 100,000

**2009 :** \$ 108,000

**2010 :** \$ 67,000

**Primary RFCD** 3903 JUSTICE AND LEGAL STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

Financial assistance for court reform projects in ASEAN countries is among Australia's foreign aid priorities, consuming highly sought-after aid dollars. This research will make recommendations aimed at increasing the efficacy of aid-assisted court reform projects. By paying particular attention to indigenous perspectives of successes and failures of such projects, the research will contribute to Australia's understanding of the legal and judicial contexts in two of its Southeast Asian neighbours. The research will inform Australia's aid investments in Cambodia and Vietnam, the region and internationally. It will enhance Australia's ability to achieve more effective design, implementation and evaluation of court-related aid interventions.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877360** Prof F Caruso; Dr AP Johnston  
**Approved Project Title** **Engineering and Assembly of Bioinspired Nanostructured Materials**  
**2008 :** \$ 360,000  
**2009 :** \$ 405,000  
**2010 :** \$ 340,000  
**2011 :** \$ 285,000  
**2012 :** \$ 285,000  
**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING  
APD Dr AP Johnston  
**Administering Organisation** The University of Melbourne

### Project Summary

Scientific and technological advances at the frontiers of nano- and bio-technology are poised to revolutionise healthcare and medicine. This project will involve the design, synthesis and engineering of functional biopolymer building blocks. These 'smart' biopolymers will then be assembled into responsive, nanostructured materials for targeted drug delivery and biosensing applications. These materials are expected to ultimately have health benefits for Australian citizens and contribute to the development of a robust Australian nanobiotechnology industry. The project will also provide excellent opportunities for the development of outstanding young scientists and will foster exciting, multidisciplinary collaborations.

**DP0877428** Dr RA Caruso; Dr V Luca  
**Approved Project Title** **Synthesis of functionalised metal oxide beads with hierarchical pores for radionuclide and metal sequestration**  
**2008 :** \$ 145,000  
**2009 :** \$ 144,000  
**2010 :** \$ 139,000  
**Primary RFCD** 2914 MATERIALS ENGINEERING  
**Administering Organisation** The University of Melbourne

### Project Summary

The central aim of this project is to fabricate nanostructured materials to address the worldwide issue of nuclear waste. These novel materials, with tailored porosity and surface functionality, will decrease both radioactive waste volume and the potential for environmental risk. The collaboration between the Caruso group at the University of Melbourne and the Luca group at ANSTO will educate more scientists and students in the areas of nuclear science and engineering, and the environmental impact of nuclear power generators. Such expertise is currently in high demand around the world, thereby enhancing Australia's position in the global nuclear field.

**DP0879113** Dr ME Cassidy-Welch  
**Approved Project Title** **Crusade, displacement and the aftermath of war in medieval France**  
**2008 :** \$ 30,398  
**2009 :** \$ 28,061  
**2010 :** \$ 56,885  
**Primary RFCD** 4301 HISTORICAL STUDIES  
**Administering Organisation** The University of Melbourne

### Project Summary

The integration of displaced peoples into our national community is of significant concern to contemporary Australians. This research project will benefit Australians by adding to our understanding of experiences of displacement, the personal and cultural consequences of war, and the ways in which past societies have dealt with those displaced as a result of conflict. The medieval war on heresy which precipitated experiences of displacement in southern France provides an insightful and informative parallel to current concerns about the aftermath of ideological conflict.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879603** Prof DJ Clarke; Prof RW Tytler

**Approved Project Title** **An investigation of causal relations between complex classroom practices and science learning using high capacity new research technologies and multiple theory-testing**

**2008 :** \$ 100,000

**2009 :** \$ 80,000

**2010 :** \$ 100,000

**2011 :** \$ 50,000

**Primary RFCD** 3302 CURRICULUM STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

The strategic importance of science and the need for high-quality science teaching is being highlighted at national and state levels. A variety of science education initiatives have been funded by government to address this priority. Policy makers and curriculum developers rightly demand that the advocacy of educational innovations be supported by empirical evidence, which, to now, has been limited by available research methods. This study exploits recent advances in the sophistication of educational theories, research designs and available technology to generate much more compelling evidence of the effectiveness of specific classroom practices for improving student knowledge and understanding of science.

**DP0879336** A/Prof CS Cobbett

**Approved Project Title** **Mechanisms of zinc transport and homeostasis in plants**

**2008 :** \$ 105,000

**2009 :** \$ 105,000

**2010 :** \$ 105,000

**Primary RFCD** 2702 GENETICS

**Administering Organisation** The University of Melbourne

### Project Summary

Zinc deficiency is a widespread factor limiting crop production and affects many soils of southern Australia and around the world. Genetic techniques can be used to identify zinc-efficient crop breeds able to grow well under zinc deficient conditions and able to efficiently deliver zinc to cereal grains to alleviate nutritional zinc-deficiency in humans. This project will identify new genes important in zinc transport and homeostasis in plants and will ultimately allow their role in zinc efficient crops to be assessed. This will contribute to more rapid and directed strategies in breeding zinc efficient crops.

**DP0880760** Dr SB Cole

**Approved Project Title** **The revival of Tudor church music 1880-1930: choral traditions, Roman Catholicism and English national identity**

**2008 :** \$ 65,786

**2009 :** \$ 65,786

**2010 :** \$ 62,486

**2011 :** \$ 58,986

**Primary RFCD** 4101 PERFORMING ARTS

**APD** Dr SB Cole

**Administering Organisation** The University of Melbourne

### Project Summary

Early English choral music is still a vibrant part of musical life, and continues to be performed by professional and amateur choirs around the world, from the Tallis Scholars (singing, at the time of writing, to sold-out houses around Australia) to the choir of Wangaratta Cathedral. It is part of Australia's cultural heritage. The Tudor music revival brought this music out of obscurity into the position it occupies today. It has, therefore, had a profound impact, but remains largely unexamined. This project will make a major Australian contribution to international music scholarship and will also be of interest to amateur choral enthusiasts in Australia, the US and the UK.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879237** Prof SR Cubitt; Dr D Palmer; Mr LG Walking

**Approved Project Title** **Genealogies of digital light**

**2008 :** \$ 94,000

**2009 :** \$ 108,000

**2010 :** \$ 170,000

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

**Administering Organisation** The University of Melbourne

### Project Summary

The first interdisciplinary account of practice in light technologies, this project will look in detail at the innovation process in the techniques and technologies used in depicting, recording and projecting light. It will explore how contemporary digital media imitate, advance or retreat from the achievements of older techniques and devices; how accidental artefacts of specific media become desirable outcomes in others; and how these past processes impact on design and innovation of new tools. Outcomes will include print and online publications, a conference and collaboration between three universities.

**DP0879036** Dr RR Dagastine

**Approved Project Title** **Forces in high salt concentrations: from mineral processing to proteins**

**2008 :** \$ 140,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

**Administering Organisation** The University of Melbourne

### Project Summary

The outcomes of this program will have significant contributions to the fundamental understanding of colloidal science, the study of particle suspensions. This project will help answer longstanding questions in the food, pharmaceutical and mining industries, two of which are primary industries for Australia. In these industries, innovative solutions can substantially improve productivity, increasing export potential and reducing the environmental impact. The outcomes of this work, in the form of high impact papers and conference presentations, will continue to build and enhance Australia's international research reputation and in time engage industries to transfer and commercialization of the present fundamental study.

**DP0879979** A/Prof B Dave; Mr J Moloney; A/Prof MN Billingham

**Approved Project Title** **Design in Context: Augmented Reality Technology to Improve the Quality and Performance of Architecture.**

**2008 :** \$ 176,007

**2009 :** \$ 78,484

**2010 :** \$ 69,399

**Primary RFCD** 3101 ARCHITECTURE AND URBAN ENVIRONMENT

**Administering Organisation** The University of Melbourne

### Project Summary

This project will develop tools and knowledge to assess and improve the environmental performance and visual impact of design proposals prior to construction. The design simulation technology proposed here will allow stakeholders to concurrently test socio-cultural and functional performance over time, will allow more informed decision making and make a significant contribution to the social, cultural and economic life of Australia. The augmented reality technology to be developed in this project also has significant potential for applications in other domains and industries such as landscape and parks management.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879293** Dr MF Duffy; Prof GV Brown

**Approved Project Title** **Transcriptional control of antigenic variation in the malaria parasite Plasmodium falciparum**

**2008 :** \$ 98,202

**2009 :** \$ 98,202

**2010 :** \$ 98,202

**Primary RFCD** 2703 MICROBIOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Malaria is a major health concern for the Australian Defence Personnel recently deployed in East Timor, Afghanistan and the Solomon Islands and is endemic in our immediate neighbours Indonesia and Papua New Guinea. Australia is susceptible to malaria and climate change could extend the mosquitos range to large population centres of Northern Australia causing malaria in Australia. This study would clarify how malaria parasites evade the host's immune response and help to protect Australia by providing drug targets for the control of this invasive disease.

**DP0880515** A/Prof GJ Dusting; Prof WA Morrison

**Approved Project Title** **Optimising vascularisation of tissue engineering chambers for construction of robust tissues**

**2008 :** \$ 159,000

**2009 :** \$ 157,000

**2010 :** \$ 154,500

**Primary RFCD** 2915 BIOMEDICAL ENGINEERING

**Administering Organisation** The University of Melbourne

### Project Summary

We have produced a device that has commercial application in several fields of basic science, biotechnology and bioengineering. When its full potential is achieved, our innovative organ chamber will strengthen Australia's standing in the biotechnology field and enrich specific applications. The knowledge gained from understanding the growth of blood vessels will benefit several fields including chemical bioengineering, tissue engineering and repair, polymer chemistry, therapeutics in many areas (like cancer, heart disease, diabetes), hormone manufacture for agricultural, veterinary and medical purposes and cosmetics manufacture. The project will train several post-doctoral fellows and PhD students in this cutting edge field of research

**DP0881667** Dr PA Eckersall

**Approved Project Title** **Revolution and the everyday: performative interactions in art, theatre and politics in 1960s Japan**

**2008 :** \$ 40,676

**2009 :** \$ 11,251

**2010 :** \$ 26,378

**Primary RFCD** 4101 PERFORMING ARTS

**Administering Organisation** The University of Melbourne

### Project Summary

The study of Japanese culture and society contributes to greater understanding of our region and the world, a goal of the national research priority: Safeguarding Australia. Enhanced cultural understanding underpins Australia's capacity to engage with Japan, one of Australia's most important economic markets and strategic partners. Moreover, the study of arts and social life demonstrates the important contributions made by the arts to social and economic productivity. Creative arts underpin innovation and growth and are dynamic sectors of global cultural and economic production.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879610** Prof MA Elgar; Dr E Van Wilgenburg; Dr N Tsutsui

**Approved Project Title** **Sociality and a sense of smell: receptor organ evolution in ants**

**2008 :** \$ 75,000

**2009 :** \$ 75,000

**2010 :** \$ 75,000

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

**Administering Organisation** The University of Melbourne

### Project Summary

This research provides novel insights into social recognition in insects by capitalising on a new technique to investigate the role of chemosensory detection of contact pheromones. The primary impact will be to ensure that Australia maintains its high research profile in this field, and by contributing to research training through supervising and mentoring research students. Finally, our research will contribute to our understanding of the 'success' of major trans-global ant pest species, information that could prove useful in management strategies.

**DP0878126** Prof ND Evans; Dr BF Kelly; Dr A Rumsey; Dr AC Schalley; Prof Dr SC Levinson; Dr NJ Enfield

**Approved Project Title** **Social cognition and language - the design resources of grammatical diversity**

**2008 :** \$ 120,000

**2009 :** \$ 100,000

**2010 :** \$ 140,000

**2011 :** \$ 40,000

**Primary RFCD** 3802 LINGUISTICS

**Administering Organisation** The University of Melbourne

### Project Summary

This project will (a) improve Australia's capacity to interact and communicate with other cultures (b) promote advanced training and research (including 9 doctoral students) on the languages of our region (c) carry out extensive new research on 20 languages of the Pacific region, most of which represent gravely endangered cultural traditions (d) draw on the design solutions identified in these languages to develop models appropriate to the social cognition element of human-computer and computer-computer interfaces

**DP0877125** Prof BL Fehlberg

**Approved Project Title** **Post-separation parenting and financial settlements: the long-term financial impacts of shared care**

**2008 :** \$ 157,000

**2009 :** \$ 142,000

**2010 :** \$ 244,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

### Project Summary

This proposal's focus on financial and parenting arrangements over time is both important and timely given increasing focus on shared post-separation parenting in Australia and internationally. By considering the impact of changes in shared care over time on financial decisions made at separation (especially property division), this proposal will establish how to embody in financial arrangements the long-term changes associated with shared parenting. This will enable us to empower separating couples, their advisers and courts to make financial settlements which reduce the potentially adverse financial and social impacts of post-separation financial arrangements on children, carers, and our social security system.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881415** Prof PJ Forrester  
**Approved Project Title** **Integrable structures in models of complex systems**  
**2008 :** \$ 90,000  
**2009 :** \$ 86,000  
**2010 :** \$ 82,000  
**Primary RFCD** 2301 MATHEMATICS  
**Administering Organisation** The University of Melbourne

### Project Summary

The CI is in the happy circumstance of having almost completed (now in the proof reading stage) a large monograph on random matrices commissioned by Princeton University Press. This gives great international profile to the CI, and more generally Australian mathematical sciences in the subject matter of the proposal. To build on this base it is essential that significant new results, impacting on the work of others, continue to be obtained by the CI. All indications are that the new ideas relating integrable structures and random matrices underpinning this proposal will fulfil this goal. For the postdoctoral researcher involved the stimulating atmosphere of discovery should provide ideal training in mathematical research.

**DP0879953** A/Prof GV Franks; Prof PJ Scales  
**Approved Project Title** **A new paradigm in near-net-shape advanced ceramic component processing**  
**2008 :** \$ 140,000  
**2009 :** \$ 127,000  
**2010 :** \$ 124,000  
**Primary RFCD** 2914 MATERIALS ENGINEERING  
**Administering Organisation** The University of Melbourne

### Project Summary

The raw materials for high performance ceramics (such as alumina and zirconia) are readily available and produced in Australia. Nearly all of these raw materials are exported. The development of processing to make high value added ceramic components from these raw materials will result in greater profit and more jobs for Australians. The proposed research is to develop a novel innovative process to drive a value adding ceramic processing industry in Australia.

**DP0879065** A/Prof PR Gooley; Dr TD Mulhern; Dr S Buchanan; Prof H Oschkinat  
**Approved Project Title** **Investigating the subunit interactions of a molecular protein import machine**  
**2008 :** \$ 127,000  
**2009 :** \$ 127,000  
**2010 :** \$ 127,000  
**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY  
**Administering Organisation** The University of Melbourne

### Project Summary

The project will provide fundamental knowledge of how sophisticated natural molecular machines interact with their substrates in plants and animals. It will also provide the basis for training of students and personnel in a range of structural biology technologies including several that are not commonly used by biologists, but make use of two major facilities that have been invested in by our government, namely the Australian Synchrotron and the OPAL Research Reactor.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880466** Dr AD Greentree; Dr WJ Munro

**Approved Project Title** **Solid Light: Frontiers and applications of solid-state Cavity Quantum Electro-Dynamics**

**2008 :** \$ 200,000  
**2009 :** \$ 180,000  
**2010 :** \$ 180,000  
**2011 :** \$ 200,000  
**2012 :** \$ 163,000

**Primary RFCD** 2404 OPTICAL PHYSICS

QEII Dr AD Greentree

**Administering Organisation** The University of Melbourne

### Project Summary

Our understanding of quantum mechanics directly fuels new technology. We are on the verge of a new revolution in technology, where the aspects of quantum physics that we haven't been able to understand are now within technological reach. Our concept of solid-light joins two of the most important branches of physics, and in so doing develops a new technology of diamond-based quantum processors that will be built in Australia. This will benefit the Australian scientific community by providing devices to solve important quantum problems, and benefit the wider community by growing a new industry based around diamond quantum nanoscience.

**DP0878494** Dr DE Grocke; Prof S Bloch; Prof D Castle

**Approved Project Title** **Songs for Life: Group Music Therapy for Serious Mental Illness (SMI)-a Randomised Control Trial**

**2008 :** \$ 70,000  
**2009 :** \$ 75,000  
**2010 :** \$ 85,761

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

**Administering Organisation** The University of Melbourne

### Project Summary

Twenty per cent of Australians will be diagnosed with a mental illness at some point in life, and are entitled to a range of therapeutic interventions that will improve socialisation and quality of life. The proposed randomised controlled trial will be the largest study of music therapy and serious mental illness to date, and will set a benchmark for future research. The principal outcome will be a Manual of the Group Music Therapy intervention, which will be disseminated to community programs throughout Australia and internationally, for people with serious mental illness, and others who are reliant on community care.

**DP0878503** Prof PG Hall

**Approved Project Title** **Theory and application of computer-intensive, nonparametric statistical methods**

**2008 :** \$ 120,000  
**2009 :** \$ 115,000  
**2010 :** \$ 110,000  
**2011 :** \$ 80,000  
**2012 :** \$ 70,000

**Primary RFCD** 2302 STATISTICS

**Administering Organisation** The University of Melbourne

### Project Summary

The availability of increasingly powerful computing equipment continues to have a dramatic impact on statistical methods and thinking. These developments, combined with new technologies for generating data, are driving substantial changes in statistics, ranging from the types of problems being solved to the sorts of methods used to solve them. Both the problems and their solutions are of substantial national and community benefit. They will be the subject of high-level research supported by this proposal.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877359** Dr SA Hemphill; Dr L Bond; A/Prof JW Toubmourou; Dr SE Drew

**Approved Project Title** **How does school discipline affect student behaviour, wellbeing, and educational progress?**

**2008 :** \$ 200,000

**2009 :** \$ 70,000

**2010 :** \$ 200,000

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

**Administering Organisation** The University of Melbourne

### Project Summary

Schools have a vital role to play in student achievement, health and wellbeing, particularly for disadvantaged students. How schools respond to student misbehaviour can greatly impact on students in the short- and long-term. This project will advance knowledge about the impact of school discipline approaches on students and staff. The findings will have important implications for Australian students, parents and teachers/educators. We aim to inform the evidence-base for school discipline approaches to encourage methods that assist students to remain connected to school and will ultimately improve educational achievements, school retention, and student and staff wellbeing.

**DP0879736** Dr SS Ho; Prof K Tam

**Approved Project Title** **Location-Based Personalisation in Mobile Commerce (M-Commerce)**

**2008 :** \$ 63,000

**2009 :** \$ 60,000

**2010 :** \$ 73,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

M-commerce, though playing an important role in future competitiveness of Australia, suffers a low user demand. While location-based services have taken off in Europe, they are still at their infancy in Australia. In terms of IT access, Australia is ranked lower than many Asian countries. Our work gains an understanding of users' concerns and expectations of location-based services, which leads to better application designs and thus a wider adoption. An examination of users' attitude towards personalised content and concerns about data privacy provides insights to Australian legislation in relation to telemarketing and data-driven marketing. National benefits will stem from a balance between telemarketing efficiency and users' benefits.

**DP0877800** A/Prof GJ Howlett; Prof WA Ducker; A/Prof DE Dunstan

**Approved Project Title** **Macromolecular Self-Assembly of Amyloid Fibrils**

**2008 :** \$ 145,000

**2009 :** \$ 144,000

**2010 :** \$ 139,000

**Primary RFCD** 2505 MACROMOLECULAR CHEMISTRY

**Administering Organisation** The University of Melbourne

### Project Summary

The misfolding of proteins is a key issue in public health. Common diseases, such as Alzheimer's disease, type 2 diabetes, and heart disease are associated with protein misfolding, and have a major impact on society. The use of proteins as therapeutic drugs is now common ( e.g. as vaccines, for immune disorders) but they can be rendered ineffective or harmful by protein misfolding. Through this project, we will enhance the fundamental understanding of the processes of protein assembly in solution, at solid surfaces, and under shear.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881675** Prof D Hunter; A/Prof M Richardson; Prof J Thomas

**Approved Project Title** **Amateur Hour: The Sociolegal Construction of Amateur Media**

**2008 :** \$ 120,000

**2009 :** \$ 30,000

**2010 :** \$ 60,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

### Project Summary

This project addresses Research Priority 3, specifically the priority goal of Promoting an Innovation Culture and Economy. The rise of amateur networked production is a highly significant transformation in Australia's cultural and media industries. Innovation policy provides incentives for the socially-optimal production of new works, but amateurs do not produce for commercial gain, and may not respond to commercial incentives of intellectual property. The project articulates motivations, incentive and conditions for amateur content production.

**DP0877871** Dr ST Huntington

**Approved Project Title** **Fractal Based Index Profiles for a New Class of Optical Fibre**

**2008 :** \$ 95,000

**2009 :** \$ 90,000

**2010 :** \$ 85,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Administering Organisation** The University of Melbourne

### Project Summary

Australia has a strong base in photonics serving technological advanced areas of perimeter security, minimally invasive surgical applications, high resolution imaging and optical sensing . Our photonic companies need novel fibre optic advances to stay competitive internationally in order to open new marketing opportunities being driven by market pull. The present innovation will add single fibre solution, fractal based technology, an Australian scientific advance, to the range of technologies supporting our advanced materials-photonics companies.

**DP0880069** Dr L Jacobi

**Approved Project Title** **Bayesian Analysis of Treatment Effects in Experiments with Imperfect Compliance**

**2008 :** \$ 37,518

**2009 :** \$ 29,000

**Primary RFCD** 3404 ECONOMETRICS

**Administering Organisation** The University of Melbourne

### Project Summary

This research has a potential to benefit society by providing methods to evaluate the effectiveness of medical treatments and socio-economic and health related interventions and policies based on experiments with imperfect compliance. The proposed methods are directly relevant to the second national research priority, as they can be used to test potential measures for preventative health care and to evaluate measures for strengthening Australia's social and economic fabric. The usefulness of our methods is demonstrated in the analysis of the effectiveness of a training program for the unemployed in alleviating negative mental health effects from job loss.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880813** Dr PH Janssen; Prof JH Frazer; A/Prof GJ Treloar; Dr N Demirbilek

**Approved Project Title** **Demonstrating the feasibility of designing sustainable buildings using evolutionary systems**

**2008 :** \$ 154,178

**2009 :** \$ 74,238

**2010 :** \$ 74,238

**Primary RFCD** 3101 ARCHITECTURE AND URBAN ENVIRONMENT

**Administering Organisation** The University of Melbourne

### Project Summary

The design approach proposed in this research will result in two key areas of national benefit. First, the research will enable Australian built environment design professions to become more competitive in both domestic and international markets. There is a growing demand for environmentally-friendly buildings and the proposed design approach will enable Australian firms to be at the cutting edge of sustainable design. Second, the research will enable the Australian built environment to become more sustainable. The proposed approach will enable buildings to be designed that perform well, that are cost effective and that minimise their environmental impact.

**DP0880699** Dr RB Johnston; A/Prof S Howard; Prof EA Sonenberg; A/Prof R Scheepers; Dr PB Seddon; Prof SM Nelson

**Approved Project Title** **Cross-Community Information Systems: Understanding Technology-Practice Fit in Healthcare**

**2008 :** \$ 54,566

**2009 :** \$ 52,417

**2010 :** \$ 67,571

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

This project addresses unsolved issues of usability of e-health information systems across diverse stakeholder communities that need to coordinate to deliver the expected revolution in patient-centred health care. The project will help realise the Nation's large investment in e-health by improving the likelihood of system acceptance, thus making a significant contribution to facilitating the important institutional transformations expected of these systems. The timeliness, depth and breadth of the study will yield outcomes that will enhance Australia's research reputation. This project directly addresses the 'smart information use' and 'promoting and maintaining good health' national research priorities

**DP0879445** Dr J Jones

**Approved Project Title** **Rural women, cross-racial collaboration and life writing in the Country Women's Association of New South Wales, 1956-1996.**

**2008 :** \$ 100,000

**2009 :** \$ 85,000

**2010 :** \$ 85,000

**Primary RFCD** 4203 CULTURAL STUDIES

APD Dr J Jones

**Administering Organisation** The University of Melbourne

### Project Summary

In an era when race relations in Australia are usually characterised by misunderstanding and conflict, this project brings to light a story of co-operation and hope. Investigating six Indigenous branches of the Country Women's Association in NSW from the 1950s uncovers collaborations between rural Aboriginal and white women that transgressed social barriers and launched two significant Aboriginal matriarchs and authors into their public lives. This timely social and literary history project revalues conservative rural women's writing and activism, contributing to the reconciliation process and to the social health of Australia.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878575** A/Prof MS Joshi; Prof DC Dickson; Dr DG Pitt

**Approved Project Title** **The pricing and risk management of reverse mortgages in the Australian market.**

**2008 :** \$ 70,000

**2009 :** \$ 72,000

**2010 :** \$ 74,000

**Primary RFCD** 3503 BANKING, FINANCE AND INVESTMENT

**Administering Organisation** The University of Melbourne

### Project Summary

This project will develop new methodologies for the pricing of reverse mortgages and will examine how sensitive prices are to demographic and financial assumptions in our models. This will increase transparency in the reverse mortgage market for retired Australians and ensure they get a fair deal. Increasing pricing transparency will also reduce risks to the issuing banks both by facilitating securitization and by allowing more accurate modelling of capital costs for mortgages that remain on their balance sheet.

**DP0880494** Dr C Kao

**Approved Project Title** **Complexity-manageable methodologies and efficient computational tools for analysis and design of large-scale systems**

**2008 :** \$ 85,000

**2009 :** \$ 80,000

**2010 :** \$ 75,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

The tools to be developed in this project have impact on a broad range of disciplines, including system analysis, feedback control technology, signal processing, communication network, and information theory. Practically, the success of this project will create cutting edge technologies applicable to design and management of important infrastructures of the modern society such as communication networks, transportation systems, electrical power grids, and collaborative intelligent machines, and water distribution networks. Success of this project will bring novel methodologies and computational tools which help engineers to systematically design and validate the performance of their engineering systems.

**DP0879451** Dr MA Kendrick; A/Prof D Phillips

**Approved Project Title** **Volatile recycling at the crust-mantle interface: Evidence from halogens and noble gases in deep-crustal fluids.**

**2008 :** \$ 132,306

**2009 :** \$ 131,306

**2010 :** \$ 126,306

**2011 :** \$ 117,306

**2012 :** \$ 117,306

**Primary RFCD** 2603 GEOCHEMISTRY

**QEII** Dr MA Kendrick

**Administering Organisation** The University of Melbourne

### Project Summary

- 1) The technique proposed for this study is of proven interest to the mineral exploration industry. This project will: i) increase knowledge of the deep-crustal fluids often implicated in giant hydrothermal ore deposits; and ii) develop laser ablation, which will increase the techniques applicability to Australia's oldest ore deposits. These outcomes will further benefit the mineral exploration industry.
- 2) The experimental data can be applied to testing the long-term storage of CO<sub>2</sub> by geo-sequestration.
- 3) The proposed research is extremely topical and will be presented at international conferences and in high impact journals raising the profile of Australian science.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880557** Prof MJ Keough; Dr DJ Marshall

**Approved Project Title** **Do costs of dispersal reduce connectivity in marine invertebrate populations?**

**2008 :** \$ 139,092

**2009 :** \$ 136,794

**2010 :** \$ 120,308

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

**Administering Organisation** The University of Melbourne

### Project Summary

Current approaches to marine management - designing marine reserves, understanding pest incursions, and managing fisheries, acknowledge that marine animals exist in isolated local populations, connected by dispersal. Dispersal is crucial for local populations to persist or be managed sustainably, but our understanding remains poor and often limits our management. Most current approaches to estimating connectivity are adequate only if all dispersers are equally successful at establishing. Dispersal, however, is risky or costly, and we propose that these costs reduce the success of colonists from more distant populations. If this is correct, persistence of local populations may rely disproportionately on other nearby local populations.

**DP0879459** Prof Dr P Kofman; Dr HW Chan; Prof BD Grundy

**Approved Project Title** **Three Decades of Financial Distress and Corporate Restructuring in Australia**

**2008 :** \$ 32,000

**2009 :** \$ 38,000

**2010 :** \$ 34,537

**Primary RFCD** 3503 BANKING, FINANCE AND INVESTMENT

**Administering Organisation** The University of Melbourne

### Project Summary

Corporate financial distress is costly and disruptive to Australia's economy. While shareholders are the first to lose, the flow-on effects include bankruptcies, unemployment, and a negative impact on economic growth. By analysing three decades of Australian experience we aim to gain a deeper understanding of the dynamics underlying financial distress and corporate restructuring. The potential benefits include improvements to corporate practice in responding to financial distress, improvements to ASX governance (regarding listing rules and transparency in particular for small-capitalization firms), and ultimately to economic policy by elucidating the corporate sector's dynamic response across the business cycle.

**DP0880215** Prof R Kotagiri; Dr L Kulik; Dr E Tanin; Dr R Zhang; Prof H Samet; Prof H Jagadish

**Approved Project Title** **EPOS: Efficient Processing of Moving Object Streams in Data Management Systems**

**2008 :** \$ 160,000

**2009 :** \$ 155,000

**2010 :** \$ 150,000

**2011 :** \$ 125,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

Advanced moving object data management systems are becoming a core technology for a large variety of applications such as traffic management and inventory tracking. These applications play a ubiquitous, critical role in our daily lives. In the same way as the first prototype of a relational database paved the way for successive relational database management systems, we envision that EPOS will form the foundation for a new generation of moving object databases. EPOS is designed to process a large number of concurrently running continuous monitoring queries on a massive set of moving objects with frequent updates.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878200** A/Prof KA Landman  
**Approved Project Title** **Mathematical modelling in developmental biology**  
**2008 :** \$ 140,000  
**2009 :** \$ 133,000  
**2010 :** \$ 127,000  
**2011 :** \$ 120,000  
**2012 :** \$ 78,648  
**Primary RFCD** 2399 OTHER MATHEMATICAL SCIENCES  
APF A/Prof KA Landman  
**Administering Organisation** The University of Melbourne

### Project Summary

Modern observational techniques in biology and medicine generate a wealth of genetic and molecular detail. Mathematical modelling integrates and synthesises this information to provide insight into how complex biological processes are coupled to produce experimentally observed behaviour. Mathematical modelling generates experimentally testable predictions that can be used to verify the validity of the models. This program is dedicated to exciting opportunities for advancing our knowledge of normal and abnormal developmental processes, especially in embryonic growth. Understanding these processes will lead to prediction and treatment of congenital disorders and contribute to a healthy start to life.

**DP0878422** Prof SA Leech; Prof SG Sutton; Prof V Arnold; A/Prof J Rose  
**Approved Project Title** **Accelerating Expertise Development Using Knowledge Structures and Expert Systems**  
**2008 :** \$ 160,000  
**2009 :** \$ 160,000  
**2010 :** \$ 112,000  
**Primary RFCD** 3501 ACCOUNTING, AUDITING AND ACCOUNTABILITY  
**Administering Organisation** The University of Melbourne

### Project Summary

There is a shortage of experts among many professional fields in Australia, a problem that is starting to be further exacerbated by a large number of pending retirements. Professions dependent on high-level experts operating in complex decision domains face potential devastation and may fail to continue to exist within Australia. The proposed research directly addresses this looming crisis by presenting a replicable methodology for rapid expertise development that is to be demonstrated within the Australian insolvency environment. However, the methodology will be easily portable to other knowledge work professions facing similar crisis conditions.

**DP0880004** A/Prof AM Lewis; Dr AW Hurley  
**Approved Project Title** **Love narratives in contemporary German literature since 1990**  
**2008 :** \$ 78,648  
**2009 :** \$ 78,648  
**2010 :** \$ 78,648  
**Primary RFCD** 4202 LITERATURE STUDIES  
APD Dr AW Hurley  
**Administering Organisation** The University of Melbourne

### Project Summary

This study of love in contemporary German literature will lead to deeper insights into intimacy in one of our major European trading partners, as it undergoes a period of economic uncertainty and social change. It will enhance our understanding of the varied ways in which individuals, as well as national literatures in the western tradition, respond to the challenges of globalization. Through examining the semantics of modern love and what love means to different sections of society (friendship, passion, marriage, sex etc.) in a contemporary European culture that bears many similarities to our own, this project will bring benefits to Australians' understanding of how the meaning of love evolves over time.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877973** Dr JM Lewis

**Approved Project Title** **Academic networks and performance frameworks: Comparing the impact of policy on knowledge generation across disciplines and countries**

**2008 :** \$ 95,000

**2009 :** \$ 77,000

**2010 :** \$ 95,000

**Primary RFCD** 3602 POLICY AND ADMINISTRATION

**Administering Organisation** The University of Melbourne

### **Project Summary**

Australian universities are central to the infrastructure that develops and fosters human talent and encourages innovation, through producing research, providing training, and transferring the knowledge they generate to government and the Australian community. This proposal falls with National Research Priority 3 - promoting an innovation culture and economy. It will provide an essential framework for immediate use in examining the consequences of the new research performance and funding arrangements being introduced in 2007, and assessing the impacts of policies that encourage collaboration. The comparisons with three other countries with similar policy goals will generate insights on how policy can best support knowledge generation.

**DP0878227** Dr V Likic; Prof MJ McConville

**Approved Project Title** **Characterization of metabolic networks in a microbial pathogen**

**2008 :** \$ 88,000

**2009 :** \$ 133,000

**2010 :** \$ 148,000

**Primary RFCD** 2703 MICROBIOLOGY

**Administering Organisation** The University of Melbourne

### **Project Summary**

New methods are needed to understand complex cellular processes such as metabolism. This proposal will support the development of methods in metabolite profiling and flux analysis that provide a global view of metabolic networks in cells and complement other profiling approaches, such as proteomics and transcriptomics. The development of these approaches (collectively termed Systems Biology) is essential for maintaining Australia science at the forefront of international efforts (National Research Priority 3; Breakthrough science). This project will also directly contribute to our understanding of metabolism of an important human pathogen and provide training to young Australian scientists.

**DP0880031** Prof AM Lillis; A/Prof SW Anderson

**Approved Project Title** **An empirical analysis of structural cost management decision making**

**2008 :** \$ 34,000

**2009 :** \$ 20,000

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

**Administering Organisation** The University of Melbourne

### **Project Summary**

This study analyses the rationale adopted by firms in implementing cost management choices with significant social and economic consequences. Layoffs, across-the-board cost cuts and off-shoring are significant influences on workforce participation levels in the Australian economy. This study explores the factors associated with firms and managers that lead to systematic preferences for certain types of cost management responses. In analysing these decisions in a range of organizational settings, and seeking to establish best practice benchmarks in innovative cost management practice, this study directly supports the government's workforce participation agenda.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877418** A/Prof TJ Lithgow

**Approved Project Title** **Reducible complexity in the molecular machines of humans and bacteria**

**2008 :** \$ 181,352

**2009 :** \$ 191,352

**2010 :** \$ 181,352

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Firstly, we will provide detailed knowledge of the surface membrane proteins of an important class of bacteria, the alpha-proteobacteria. Secondly, excellent outcomes are provided for the training of postgraduate students and research staff: this project entails frontier technology, and the transfer of technological capabilities not currently available in Australia. Thirdly, our studies on non-pathogenic species of alpha-proteobacteria is timely for National security: species of alpha-proteobacteria were amongst the first organisms trialled as biological weapons by the USA and the former Soviet Union, and these pathogenic species remain rated as Class 3 organisms by the Centers for Disease Control.

**DP0880067** Dr TG Luckins

**Approved Project Title** **A History of Cosmopolitanism in Australia, 1850-2000**

**2008 :** \$ 85,497

**2009 :** \$ 91,558

**2010 :** \$ 79,998

**Primary RFCD** 4301 HISTORICAL STUDIES

**APD** Dr TG Luckins

**Administering Organisation** The University of Melbourne

### Project Summary

Examining the diverse cultural practices and ideas that have characterised cosmopolitanism in Australia will illuminate Australian history in significant new ways and contribute a settler society experience to emerging international scholarship on cosmopolitanism. The project will offer fresh interpretations of people's perceptions of themselves in a settler society within the wider global community; enhance understandings of diversity and toleration in Australian history; and provide historical background to the social and cultural consequences of globalisation.

**DP0881598** Prof SW Marginson

**Approved Project Title** **University position-taking strategies in the global environment: a cross-country study of the Asia-Pacific region**

**2008 :** \$ 85,000

**2009 :** \$ 78,000

**2010 :** \$ 80,000

**2011 :** \$ 75,000

**Primary RFCD** 3301 EDUCATION STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

Much of Asia is developing, modernising and globalising at a rapid pace. Higher education, science and research are central and are growing even more rapidly. The Asia-Pacific has great long-term geo-strategic significance for Australia, including education exports which earn \$7 billion per year in the region. Our capacity to understand, to cooperate with and to compete with Asian universities within the worldwide field of higher education will closely affect our future. This project provides the first hard data on the global operations of leading universities in ten Asian nations and will be of value to government, business and education.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881609** Prof SW Marginson; Prof M Considine

**Approved Project Title** **Boundary making and strategy making in knowledge-forming organisations**

**2008 :** \$ 95,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 3602 POLICY AND ADMINISTRATION

**Administering Organisation** The University of Melbourne

### **Project Summary**

Government policy is devoted to bettering linkages between university research and commercial product development in the knowledge economy. Yet little is known of relationships between university and non-university knowledge forming organisations (KFOs) and what policies and resources sustain and adjust the border between them. Different countries approach these issues in distinctive ways, in part because of public policy, in part through different endogenous dynamics. Using case study research in five countries, the project will identify ways the division of labour between different KFOs can be optimised, while sustaining their respective strengths, and maximising the opportunities for strategy and innovation.

**DP0877923** Dr A McKendrick

**Approved Project Title** **Understanding the consequences of normal ageing on visual form perception.**

**2008 :** \$ 40,000

**2009 :** \$ 30,000

**2010 :** \$ 30,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** The University of Melbourne

### **Project Summary**

Australia has an ageing population. Within the elderly, vision is a key sense that contributes significantly to the maintenance of independence, mobility and participation in society. This project will enhance our knowledge of the impact of ageing on vision. The research findings are important to a variety of disciplines involved in planning for our ageing population; for example: the design of living/working spaces for the elderly, information technology, and the design of technology to assist with independent living. This project will train students in visual psychophysics, continuing the strong international reputation and output of Australian scientists in this discipline.

**DP0880065** Prof AM Moffat; Dr AN Vo

**Approved Project Title** **Static and Dynamic Query Pruning Techniques for Complex Text Retrieval Systems**

**2008 :** \$ 82,918

**2009 :** \$ 80,000

**2010 :** \$ 80,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

APD Dr AN Vo

**Administering Organisation** The University of Melbourne

### **Project Summary**

Targeted access to the right information is a goal of all organizations, regardless of their type, and improved methodologies for implementing information retrieval systems have widespread and tangible benefits. Australian researchers have been highly successful in this area of information searching for more than two decades, and this project will reinforce that position. By developing techniques for providing faster search, even in the presence of complex query variants and distributed implementations, we will be able to advise the suppliers of such services on how to provide a maximally useful product.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879737** Dr GR Moloney; A/Prof ME Seviar

**Approved Project Title** **CP Symmetry Violation in Strange B Meson decays at the Belle Experiment**

**2008 :** \$ 110,000

**2009 :** \$ 110,000

**2010 :** \$ 110,000

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

**Administering Organisation** The University of Melbourne

### Project Summary

This research exploits very recent development in high energy physics to formulate new tests on the limits of our understanding of matter-antimatter symmetry violation in our universe. The researchers have internationally recognised expertise in distributed Grid computing, which has been pioneered by the high energy physics community, and is now finding wide deployment in other scientific fields. Deployment of a Belle Data Grid will provide true international interoperability with national Grid infrastructure, and substantial opportunity for expanded international collaboration on research infrastructure. High Energy Physics also provides post-graduate students with the best possible exposure to leading international researchers.

**DP0879996** Dr EG Moore

**Approved Project Title** **Novel Lanthanide Complexes and Polymeric Luminescent Chelates for Biomedical Imaging and Bioassay**

**2008 :** \$ 125,000

**2009 :** \$ 89,000

**2010 :** \$ 92,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

APD Dr EG Moore

**Administering Organisation** The University of Melbourne

### Project Summary

The development of advanced materials and frontier technologies such as the luminescent chelates proposed here is essential for Australia's evolution as a competitive nation in fields such as biomedical imaging and clinical diagnostics. For example, the total expenditure on fluorescent reagents in 2004 exceeded US\$1.5 billion, with an estimated 25% annual growth. With proven applications in diagnostic immunoassay and high throughput screening, the use of luminescent lanthanide complexes allows significant improvements over traditional fluorophores, facilitating miniaturisation and ultimately leading to reduced costs for the consumer.

**DP0878269** Prof W Moran; Dr B La Scala; Dr IV Clarkson; Prof BG Quinn; Dr SD Howard; Prof AR Calderbank

**Approved Project Title** **Information Geometry and Compressive Sensing for Radar and Communications**

**2008 :** \$ 208,000

**2009 :** \$ 205,000

**2010 :** \$ 175,000

**2011 :** \$ 175,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

Australia's vast distances, thin population and extensive sea approaches force us to place heavy reliance on telecommunications and the remote sensing that radar and other modalities can provide. This project will enhance capabilities in sensing to provide more reliable, robust and cost effective communications and surveillance over a wide area.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879356** Prof BJ Muir

**Approved Project Title** **Nuanced recollection and representation: the political and rhetorical strategies of The Peterborough Chronicle**

**2008 :** \$ 122,897

**2009 :** \$ 55,459

**2010 :** \$ 71,600

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

This study will enhance our understanding of essential aspects of historical writing in Anglo-Saxon and early Norman England. The analysis, to be presented in a digital facsimile presentation of this invaluable historical document, will be published in Oxford University's new Bodleian Digital Texts Series. This series, produced at The University of Melbourne with The Bodleian Library as collaborator, sets the standard internationally for the digital analysis and presentation of materials preserved in manuscript form, and consequently is establishing the University as a centre of excellence for this kind of work.

**DP0877700** Prof M Olekalns; Prof C Kulik

**Approved Project Title** **Competent but Less Likeable: Social Stereotypes and Strategic Choices in Negotiation**

**2008 :** \$ 40,000

**2009 :** \$ 30,000

**2010 :** \$ 44,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Women may be disadvantaged by the greater opportunities for negotiating employment conditions that Work Choices provides. Relative to their male peers, women receive lower starting salaries and smaller increases. This is costly for women, who leave the workforce with less financial security. The gender gap is also costly for organisations, who face increased dissatisfaction and turnover. Women can improve their outcomes through negotiation, but the assertive tactics that improve their economic outcomes are likely to generate social reprisals in the workplace. This project will benefit employers and employees alike, by identifying strategies that assist women to improve their economic outcomes while buffering them from social reprisals.

**DP0880022** Prof PJ Otto

**Approved Project Title** **Gothic Fiction and Imagined Worlds: Popular Literature, Emotion, and the transformation of experience in modernity**

**2008 :** \$ 95,483

**2009 :** \$ 96,893

**2010 :** \$ 83,292

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

This project revises our understanding of Gothic Fiction, the most important prose genre of the late-eighteenth and early-nineteenth centuries. Its ground-breaking argument and innovative methodology help develop Australia's international reputation in Romantic studies, while expanding the methodological repertoire of literary studies. The project adds to our culture by contributing to debates about the 'truth' status of (and relation between) emotions, literature, and imagined worlds. It adds to our understanding of the present, through its revisionary account of a key stage in the development of contemporary notions of experience, the fictive, imagined/virtual worlds, and the modern crisis of representation.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878705** Prof MG Pandy; Dr R Baker; Prof HK Graham; Mr J Merritt

**Approved Project Title** **Patient-specific Computational Tools for Diagnosing and Treating Gait Disorders in Children with Cerebral Palsy**

**2008 :** \$ 150,000  
**2009 :** \$ 105,000  
**2010 :** \$ 95,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

This proposal addresses one of the most fundamental and difficult questions related to the treatment of children with cerebral palsy: Why do these children walk in a crouched position, with excessively bent hips and knees? High-fidelity, patient-specific computer simulations of walking can help to answer this question and, in so doing, can improve the outcomes of orthopaedic surgeries designed to correct movement abnormalities in these patients. Realistic computer simulations of human movement can play a pivotal role in healthcare through patient rehabilitation; in sports, through the development of personalized training programs for elite athletes; and in entertainment, through the creation of video games and animated films.

**DP0877454** A/Prof PA Pearce

**Approved Project Title** **Exact solution of generalized models of polymers and percolation in two dimensions**

**2008 :** \$ 94,000  
**2009 :** \$ 94,000  
**2010 :** \$ 90,000  
**2011 :** \$ 87,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

Originating with the work of Rodney Baxter, Australia is the world leader in exactly solvable lattice models in two dimensions. This project, in strategic basic research, aims to continue this tradition and extend it by solving exactly new classes of two-dimensional lattice models involving nonlocal degrees of freedom. Since this will lead to new universal classes of thermodynamic behaviours for a diverse range of polymer-like systems, the potential for exploitation and commercialization is almost limitless. Potential applications include percolation of contaminants through aquifers, the spatial spread of epidemics and bushfires, the tertiary recovery of oil and filtering drinking water.

**DP0878303** A/Prof WA Phillips; Dr NJ Clemons; Dr RC Fitzgerald

**Approved Project Title** **The role of retinoic acid signalling in the development of the oesophageal epithelium**

**2008 :** \$ 78,000  
**2009 :** \$ 78,000  
**2010 :** \$ 78,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Melbourne

### Project Summary

Oesophageal adenocarcinoma (OAC) is a disease with increasing incidence. The majority of patients with OAC are diagnosed when the cancer is at a late stage and therefore treatment options are limited, meaning the disease is almost invariably fatal. OAC arises from the precancerous condition, Barrett's oesophagus, which occurs as a consequence of chronic reflux, although the key processes driving its development are unknown. This project aims to better understand the critical first step in the progression to cancer and thus expand the scope for the development of therapies, particularly those aimed at early intervention, and tools that predict progression.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879466** Dr P Pivonka; Prof TJ Martin; Dr CR Dunstan  
**Approved Project Title** **Bone regulation - cell interactions to disease**  
**2008 :** \$ 85,000  
**2009 :** \$ 85,000  
**2010 :** \$ 85,000  
**Primary RFCD** 2915 BIOMEDICAL ENGINEERING  
**Administering Organisation** The University of Melbourne

### Project Summary

Many bone disorders such as osteoporosis, Paget's disease and cancer related bone diseases are directly related to disruption of communication pathways between bone cells leading to imbalances in bone remodeling. Although these disorders are common and cause considerable suffering, in most cases little is known about the mechanisms responsible for dysfunctional remodeling. Understanding the communication network between bone cells and their interaction with drugs is essential in order to develop new therapies and to effectively design novel biological compatible bone implants. This research proposal closely aligns with national research priority two, i.e., promoting and maintaining good health (ageing well, ageing productively).

**DP0879972** Prof GG Priest  
**Approved Project Title** **The One and the Many - the Path Through Contradiction**  
**2008 :** \$ 157,296  
**2009 :** \$ 157,296  
**2010 :** \$ 262,296  
**2011 :** \$ 193,732  
**2012 :** \$ 157,296  
**Primary RFCD** 4401 PHILOSOPHY  
APF Prof GG Priest  
**Administering Organisation** The University of Melbourne

### Project Summary

Australia has a major presence on the international philosophical world out of all proportion to its size (comparable to that which it has in sport). It is known for its development of radical new ideas and forthright approaches. One area in which this is particularly the case is logic and its philosophical applications. The present project is a high profile example of this, and will further enhance Australia's international intellectual profile.

**DP0879738** Dr JL Provis  
**Approved Project Title** **Geopolymers for nuclear applications**  
**2008 :** \$ 80,000  
**2009 :** \$ 80,000  
**2010 :** \$ 80,000  
**2011 :** \$ 80,000  
**Primary RFCD** 2914 MATERIALS ENGINEERING  
APD Dr JL Provis  
**Administering Organisation** The University of Melbourne

### Project Summary

With the pressing need for the reduction of Greenhouse emissions from electricity generation in Australia, one option that must be seriously considered is nuclear energy. However, the issue of waste storage is a highly significant one that must be addressed. Geopolymeric cements are expected to perform much better than traditional Portland cements in nuclear applications, both for solidification of radioactive wastes and also for the construction of underground waste storage bunkers. This project will use Australia's strong existing knowledge in geopolymers research, and apply it to the development of materials to fill the need for environmentally secure waste storage solutions.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878713** Dr SA Ralph  
**Approved Project Title** **Chromatin barriers in Plasmodium falciparum gene regulation**  
**2008 :** \$ 100,005  
**2009 :** \$ 101,773  
**2010 :** \$ 100,000  
**Primary RFCD** 2702 GENETICS  
**Administering Organisation** The University of Melbourne

### Project Summary

Malaria is a major world disease that kills around 2 million people annually. The genome of the causative agent has now been completely sequenced, but we still know very little of how and why some genes are activated while their neighbours are turned off. I will study the DNA barriers that separate such genes, and the proteins that interact with these regions to better understand how genetic regulation functions in these parasites. A better understanding of gene regulation in malaria parasites will help us to better combat the tricks utilised by this and other organisms to elude our immune systems.

**DP0877703** Ms HM Rhoades; Prof SL Swain  
**Approved Project Title** **The Helping Court: Examining the Early History of the Family Court of Australia**  
**2008 :** \$ 130,000  
**2009 :** \$ 150,000  
**2010 :** \$ 70,000  
**Primary RFCD** 3901 LAW  
**Administering Organisation** The University of Melbourne

### Project Summary

This project will benefit the many Australian families involved in divorce by analysing the process by which the Family Court of Australia, designed to reduce the acrimony and costs associated with fault-based adversarial processes, so quickly became a focus for criticism and violence. By identifying continuity and change in both the issues underlying disputes in the family law system and the strategies adopted to overcome them it will help to stabilise dispute resolution policies and reduce the need for review and adjustment in the future.

**DP0878279** A/Prof MA Rizzacasa; A/Prof HM Huegel  
**Approved Project Title** **Synthesis of Myxobacteria Metabolites and Analogues**  
**2008 :** \$ 115,000  
**2009 :** \$ 114,000  
**2010 :** \$ 109,000  
**Primary RFCD** 2503 ORGANIC CHEMISTRY  
**Administering Organisation** The University of Melbourne

### Project Summary

The proposal will study the synthesis of novel natural product analogues that could possess superior biological activities to the natural compounds. In addition, new chemistry may be developed which could be utilised to synthesise a number of bioactive molecules from myxobacteria.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878268** A/Prof A Roberts; Prof GW Baxter; Dr TJ Davis

**Approved Project Title** **Nanophotonic resonators: Metamaterials, extraordinary transmission & sensing**

**2008 :** \$ 140,000

**2009 :** \$ 139,000

**2010 :** \$ 114,000

**Primary RFCD** 2404 OPTICAL PHYSICS

**Administering Organisation** The University of Melbourne

### Project Summary

This project brings together Australia's strengths in nanotechnology, photonics and sensor technology and complements existing national research programs in nanophotonics. Research into new optical materials, developing novel insights and demonstrating the performance of new devices, will contribute to Frontier Technologies, while innovation in sensor technology falls under the Safeguarding Australia national research priority. This project will enhance Australia's international reputation in science and ensure we remain at the leading edge of one of the newest and most vibrant areas of physical optics. It will capitalise on the expertise of the investigators and gain leverage from Australia's investment in nanofabrication infrastructure.

**DP0878681** Dr JV Ross

**Approved Project Title** **Stochastic methods for studying models of infection and abundance**

**2008 :** \$ 65,000

**2009 :** \$ 62,000

**2010 :** \$ 62,000

**2011 :** \$ 60,000

**Primary RFCD** 2302 STATISTICS

APD Dr JV Ross

**Administering Organisation** The University of Melbourne

### Project Summary

The outcomes of this project will have immense benefit to Australia. They impact upon two areas of national importance, namely ensuring an environmentally sustainable Australia, and safeguarding Australia. In particular, the project will provide models, methodology and optimal strategies for sustainable use of Australia's biodiversity, for protecting Australia from invasive diseases and pests, and for protecting Australia from terrorism and crime. Special focus will be given to the control of invasive species, the control of emerging infections, and the optimal allocation of resources. The current risks posed by invasive diseases and pests, and the alarming rate of destruction of biodiversity, warrant urgent funding of this project.

**DP0878061** Dr G Shen

**Approved Project Title** **Translucent Optical Networks: Architecture, Design, Operation, and Survivability**

**2008 :** \$ 78,648

**2009 :** \$ 78,648

**2010 :** \$ 78,648

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

APD Dr G Shen

**Administering Organisation** The University of Melbourne

### Project Summary

Australia is a geographically disperse country. Long-haul optical transport networks are key communication infrastructure between metropolises. Our research aims to discover cost-effective network architecture and planning and operational strategies for optical transport networks, which is beneficial to the deployment and operation of Australian telecommunication networks. In addition, viewing the sparse connectivity of Australian backbone transport networks, the research on network survivability will provide effective strategies for Australian transport networks to survive any network failures due to natural disasters or terror attacks, thereby providing reliable network services to Australian.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880203** Dr W Shieh; Dr B Krongold  
**Approved Project Title** **Coherent Optical Orthogonal Frequency-Division Multiplexing**  
**2008 :** \$ 85,000  
**2009 :** \$ 80,000  
**2010 :** \$ 75,000  
**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES  
**Administering Organisation** The University of Melbourne

### Project Summary

Coherent optical orthogonal frequency-division multiplexing (CO-OFDM) incorporates the benefits of OFDM to compensate for distortion and monitor the channel conditions in long-haul optical links. The advantages of CO-OFDM can help meet the challenges of future optical networks that Australia depends upon for its information infrastructure and economic growth. Australia is currently at the forefront of optical OFDM technology, and the continuation of these research activities will further improve Australia's international ICT reputation. Furthermore, in the course of the project, a senior research associate and multiple highly-skilled students will be trained and exposed to techniques and innovations in this exciting field.

**DP0879758** A/Prof RJ Sloggett; A/Prof AG Sagona; Ms D Lau  
**Approved Project Title** **Archaeological conservation: the development of analysis and assessment protocols for adhesives used on archaeological pottery**  
**2008 :** \$ 40,737  
**2009 :** \$ 38,398  
**2010 :** \$ 38,398  
**Primary RFCD** 4003 CURATORIAL STUDIES  
**Administering Organisation** The University of Melbourne

### Project Summary

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

**DP0880080** Prof PL Smith; Prof R Ratcliff  
**Approved Project Title** **An Integrated Theory of Attention and Decision Making**  
**2008 :** \$ 74,000  
**2009 :** \$ 74,000  
**2010 :** \$ 74,000  
**Primary RFCD** 3801 PSYCHOLOGY  
**Administering Organisation** The University of Melbourne

### Project Summary

Biologically, the fundamental computational task carried out by the human brain is the translation of perception into action. To perform this translation, attentional processes select relevant stimuli from the environment and decision processes then identify the selected stimuli. This project develops an integrated theory of attention and decision making in simple visual tasks, which will help us understand how these tasks are carried out in the brain. Understanding how these tasks are performed biologically will aid in the design of autonomous information-gathering and decision-making agents whose actions simulate human behaviour.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880810** Prof LS Sterling; Dr F Vetere; A/Prof S Howard

**Approved Project Title** **Socially Oriented Requirements Engineering - Software Engineering meets Ethnography**

**2008 :** \$ 70,000

**2009 :** \$ 70,000

**2010 :** \$ 65,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** The University of Melbourne

### Project Summary

The project should lead to the design and development of better software/information and communications technologies in the homes of Australians, that encourage flexible social interactions, and has been designed with the user in mind.

**DP0880859** Prof A Stone

**Approved Project Title** **Freedom of Expression in Democratic States: A New Theoretical Direction**

**2008 :** \$ 26,817

**2009 :** \$ 60,000

**2010 :** \$ 34,000

**2011 :** \$ 47,000

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

### Project Summary

Modern democratic states must protect freedom of expression while also responding to the harms caused by hateful, violent and dangerous form of speech - a problem accentuated by increasing racial, religious and ethnic conflict and the threat of (and responses to) terrorism.

The project is important because it aims to develop a theory of freedom of expression that - free from the distorting influence of the United States jurisprudence - can explain and guide the courts in other democratic countries. Its comparative and theoretical innovation will place Australian scholarship at the forefront of a central problem in modern political life and enrich scholarly and public debate.

**DP0877887** Dr K Stubbs

**Approved Project Title** **To gain insight into the molecular mechanisms involved in antibiotic resistance shown by Gram-negative bacteria.**

**2008 :** \$ 88,648

**2009 :** \$ 88,648

**2010 :** \$ 88,648

**Primary RFCD** 2503 ORGANIC CHEMISTRY

APD Dr K Stubbs

**Administering Organisation** The University of Melbourne

### Project Summary

Bacterial infections can strike anyone and usually the body's immune system, which is designed to fight infection, defeats the invading bacteria. Sometimes however, the burden of infection proves too great, so these infections can prove fatal. For 50 years, we have relied on antibiotics to successfully treat the majority of common bacterial infections. As a result, emphasis must be placed on the disquieting reality whilst enjoy the use of antibiotics, an inescapable cost is the development of bacterial resistance. The increasing prevalence of bacterial tolerance against beta-lactams is a problem and as a result is a most pressing health issue.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878412** Prof GN Taylor

**Approved Project Title** **Leading the Australian High Energy Physics Program into a New Era of Discovery**

**2008 :** \$ 145,000  
**2009 :** \$ 145,000  
**2010 :** \$ 135,000  
**2011 :** \$ 140,000  
**2012 :** \$ 120,000

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

**APF** Prof GN Taylor

**Administering Organisation** The University of Melbourne

### Project Summary

In this project, Australia's high energy physics program lead scientist will focus on coordination of the major ATLAS experiment at the newest particle accelerator the LHC, in its critical first years of operation from the end of 2007. The Fellowship will provide for participation in future developments of the field internationally, crucial due the very long lead times involved. Finally, the project will take advantage of well developed linkages to develop an accelerator science program in Australia, in support of future operation and developments of the Australian Synchrotron as well as future HEP.

**DP0877483** Prof DA Thomas; Dr MN Brazil; A/Prof JS Evans

**Approved Project Title** **Optimal Deployment of Wireless Sensor Networks**

**2008 :** \$ 85,000  
**2009 :** \$ 85,000  
**2010 :** \$ 80,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

Wireless sensor networks consist of coordinated sensing devices that offer us new ways to understand and interact with the physical world. Australia is a leading player in developing such networks. For a given technology, the key to both optimising the quality of area monitoring and minimising the cost of a sensor network lies in deciding how best to deploy the sensors. We aim to develop powerful new methods to get the best performance from a planned sensor network. This will enhance Australia's research role in this area and directly benefit applications such as national security and environmental monitoring.

**DP0879058** Prof SJ Trigg; A/Prof AL Lynch; Dr L D'Arcens; Prof JM Ganim

**Approved Project Title** **Medievalism in Australian Cultural Memory**

**2008 :** \$ 94,747  
**2009 :** \$ 81,306  
**2010 :** \$ 75,086  
**2011 :** \$ 90,324

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

This project will provide the first long-range analysis of Australian cultural responses to the medieval period, and the first comparative study of Australia's relationship with international medievalism. It will show how Australians have used reference to the medieval past, both favourable and hostile, to articulate our complex relation to European tradition and our aspirations to a distinctive national culture. The published research will offer an original perspective on the development of Australian cultural identity and will enhance public understanding of our British and European heritage, in the context of contemporary debates about republicanism, the monarchy, and ethnic and cultural diversity.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879291** Prof RS Tucker; Dr KJ Hinton

**Approved Project Title** **A Green Internet - telecommunications technologies and their environmental impact**

**2008 :** \$ 100,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**2011 :** \$ 100,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Administering Organisation** The University of Melbourne

### Project Summary

This project will solve problems of direct importance to Australia and the wider international community. It will enable continued growth of broadband Internet services in Australia and elsewhere, while minimizing the environmental impact of this growth. The project will significantly advance Australia's participation in Information and Communications industries through an increase in the knowledge and skills base in telecommunications technologies and their environmental impact. The outcomes of the research will be in technologies that are well-matched to the needs and interests of Australian companies.

**DP0880320** Prof JS Van Deventer

**Approved Project Title** **Gel interactions in geopolymers for sustainable construction**

**2008 :** \$ 100,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 2914 MATERIALS ENGINEERING

**Administering Organisation** The University of Melbourne

### Project Summary

This project will benefit Australia by enabling reliable production of environmentally friendly construction materials. These materials, geopolymer cements, have been developed to the point where they are beginning to be commercialised in Australia, but the factors controlling their performance and durability are only beginning to be well understood. Geopolymer cements are made using ash from coal-fired power stations, and are competitive with traditional Portland cement in terms of both performance and cost. This project will use recently developed experimental techniques and Australian research expertise in this field, and will lead to significant environmental and cost savings in the construction industry.

**DP0878158** A/Prof B Vo; Prof AJ Baddeley; A/Prof A Doucet

**Approved Project Title** **Performance evaluation and characterisation for filtering in multi-object system**

**2008 :** \$ 95,000

**2009 :** \$ 90,000

**2010 :** \$ 85,000

**Primary RFCD** 2301 MATHEMATICS

**Administering Organisation** The University of Melbourne

### Project Summary

The project falls within the National Research Priority of 'Safeguarding Australia' and associated research priority goal of 'Transforming Defence Technology'. The project outcomes will provide cutting edge technology in surveillance, and monitoring of potential threat in our air, sea, and land space. Fast, reliable information enable our personnel to make timely, intelligent judgements, and appropriate responses in the event of a threat, thereby maintaining Australia's operational advantage. Other application areas that benefits from our research include radar, sonar, guidance, navigation, air traffic control, image processing, oceanography, autonomous vehicles and robotics, remote sensing, and biomedical research.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880553** A/Prof B Vo; Prof D Suter

**Approved Project Title** **Visual tracking of multiple objects: A stochastic geometrical approach**

**2008 :** \$ 80,000

**2009 :** \$ 80,000

**2010 :** \$ 75,000

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

**Administering Organisation** The University of Melbourne

### Project Summary

Reliable real-time visual multiple-object tracking techniques will open up new applications that enhance the quality of life such as driving safety, traffic monitoring, home security, security and surveillance of public facilities. These new applications have huge commercial potentials, and the technology developed from this project will provide the catalyst for vibrant new industries to grow. In addition, the expertise developed from the project will provide a competitive edge for Australian industries in aerospace, oceanography, robotics, remote sensing, and biomedical engineering.

**DP0879212** A/Prof JP Walker; Prof JD Kalma; Dr DJ Barrett; Prof R Gurney; Dr YH Kerr; Dr E Kim; Prof J Le Marshall

**Approved Project Title** **MoistureMap: A soil moisture monitoring, prediction and reporting system for sustainable land and water management**

**2008 :** \$ 240,000

**2009 :** \$ 240,000

**2010 :** \$ 220,000

**2011 :** \$ 210,000

**Primary RFCD** 3001 SOIL AND WATER SCIENCES

**Administering Organisation** The University of Melbourne

### Project Summary

Knowledge of the spatial and temporal variation of surface and root zone soil moisture content is critical to environmental sustainability and risk adverse farm management. A paddock scale soil moisture prediction tool will allow i) grain growers to make informed decisions of what to plant and when, based on likely germination rates and crop yield, ii) graziers to be proactive regarding management of stocking rates based on likely pasture growth, and iii) better weather and climate prediction skill. At regional scales moisture information can be used to support claims of drought exceptional circumstances.

**DP0880244** Dr M Wang; Prof MJ Webber

**Approved Project Title** **The geography of labour market dynamics: Competition between new migrants and laid-off workers in China's urban labour markets**

**2008 :** \$ 100,000

**2009 :** \$ 132,000

**2010 :** \$ 85,000

**2011 :** \$ 45,000

**Primary RFCD** 3704 HUMAN GEOGRAPHY

**Administering Organisation** The University of Melbourne

### Project Summary

The project proposes contributions: 1 To our knowledge of our region, especially of sources of conflict within China, and how Chinese labour markets operate (and are different in different places). 2 To understanding Australian society, by contributing to knowledge about the effects of categories of citizenship on labour market performance. 3 To Australia's place in international social science, by linking western debates about migration and labour markets to the conditions of societies in transition. 4 To closer cultural ties between Australia and China, by collaborative research with scholars in China. 5 To the training of future generations of scholars of China.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879951** Dr SO Warnaar; Prof A Ram  
**Approved Project Title** **Macdonald polynomials: Combinatorics and representations**  
**2008 :** \$ 80,000  
**2009 :** \$ 80,000  
**2010 :** \$ 75,000  
**Primary RFCD** 2301 MATHEMATICS  
**Administering Organisation** The University of Melbourne

### Project Summary

This proposal is part of the aim to build a world class research team in algebraic combinatorics and combinatorial representation theory at the University of Melbourne, led by the two CI. These fields are currently experiencing very rapid growth and development, and a strong Australia based team will further enhance the country's strong reputation in combinatorics and algebra.

The project will also provide a perfect training ground for Higher Degree Students with interests in pure mathematics as well as computer algebra and symbolic computation.

**DP0880485** Prof RL Webster  
**Approved Project Title** **Gravitational Lensing Studies of Quasars**  
**2008 :** \$ 111,000  
**2009 :** \$ 114,000  
**2010 :** \$ 118,000  
**Primary RFCD** 2401 ASTRONOMICAL SCIENCES  
**Administering Organisation** The University of Melbourne

### Project Summary

Australia's premier optical and near-IR telescopes are the 8-metre Gemini telescopes in Chile and Hawaii. We will use these superb facilities to study the structure of distant quasars. These images are enhanced by gravitational lensing, which acts as a 'natural telescope' to magnify the central region of the quasars. Our new techniques will develop our understanding of one of the most enigmatic objects in the universe. Several PhD students will be trained in both observational and theoretical astrophysics during the course of this DP.

**DP0877156** Prof AG Wedd; Dr PS Donnelly; Prof NJ Robinson  
**Approved Project Title** **Molecular Probes for Bio-Metals**  
**2008 :** \$ 130,000  
**2009 :** \$ 130,000  
**2010 :** \$ 130,000  
**Primary RFCD** 2502 INORGANIC CHEMISTRY  
**Administering Organisation** The University of Melbourne

### Project Summary

The nutrient trace metals are essential to life. Problems with the metabolism of iron, copper and zinc are associated with neuro-degenerative diseases such as Alzheimer's, Parkinson's and CJD (Creutzfeldt-Jakob disease). This proposal will develop molecular probes for detection of iron, zinc, copper, manganese and nickel within biological cells. The work will allow examination of the molecular roles of these bio-metals in unprecedented detail and lead to a better understanding of their roles in normal metabolism and in disease.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881171** Prof SG Wheatcroft; Dr SL Morgan; Prof C O Grada

**Approved Project Title** **The causes and consequences of the great famines of the last two centuries in Russia, China, Ireland and elsewhere**

**2008 :** \$ 150,000

**2009 :** \$ 160,000

**2010 :** \$ 170,000

**2011 :** \$ 60,000

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** The University of Melbourne

### Project Summary

Famines have huge human, economic, social and cultural costs. A better understanding of the multi-faceted dimensions of past famines - the interplay between politics, economics, environment and culture in causing and shaping the response to famine events - will better inform public policy in regard to analogous large-scale crises, including the impact of flu pandemics and climate change. The comparative study of the causes, progress, responses to and effect of the great famines of the last two centuries might serve to better inform our understanding and response to such events.

**DP0877762** A/Prof G Wigglesworth; Dr JH Simpson

**Approved Project Title** **A longitudinal study of the interaction of home and school language in three Aboriginal communities**

**2008 :** \$ 100,000

**2009 :** \$ 120,000

**2010 :** \$ 150,000

**2011 :** \$ 100,000

**2012 :** \$ 25,000

**Primary RFCD** 3802 LINGUISTICS

**Administering Organisation** The University of Melbourne

### Project Summary

The importance of language skills cannot be underestimated, and contribute to 'a healthy start to life'. In multilingual Indigenous communities, children must negotiate the complexities of different languages used for different purposes. This project will provide detailed insights into how children manage differences between home and school language, the kinds of problems they encounter when they enter the school system, and how their languages develop over the first four crucial years of school which provide the foundation for the children's future education. Their ability to manage the language of school underpins their ability to lead successful and engaged lives as adults.

**DP0877716** Dr SJ Williams; A/Prof OL Woodman

**Approved Project Title** **Understanding the cardioprotective effects of flavonols**

**2008 :** \$ 85,000

**2009 :** \$ 85,000

**2010 :** \$ 85,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY

**Administering Organisation** The University of Melbourne

### Project Summary

Heart attack and stroke are a major cause of death and disablement in Australia. Current therapies do not treat the underlying causes of these diseases. In this project we will investigate a promising new drug treatment for these diseases and will determine how this poorly understood drug acts to reduce damage to the heart. This project will lead to new treatments for cardiovascular diseases and will enhance our understanding of the causes of these disease states.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878119** Dr S Winter

**Approved Project Title** **Intelligent Self-Organizing Transport**

**2008 :** \$ 55,000

**2009 :** \$ 55,000

**2010 :** \$ 55,000

**Primary RFCD** 2910 GEOMATIC ENGINEERING

**Administering Organisation** The University of Melbourne

### Project Summary

The project aims to develop smart transport solutions for Australia's sprawling mega-cities with their complex challenges to provide mobility and equitable access, and with their susceptibility to failure in cases of disasters. In particular, the project will develop software establishing intelligent and self-organizing transport management in urban environments. The project has potential to increase the mobility of citizens, even in low-density suburbs, by reducing the desire for individual car traffic at the same time. Since a self-organizing transport management works ad-hoc, it can be deployed also in devastated areas, e.g., after disasters.

**DP0878545** A/Prof CA Witting

**Approved Project Title** **The Liability of Corporate Groups**

**2008 :** \$ 36,449

**2009 :** \$ 47,584

**2010 :** \$ 73,585

**Primary RFCD** 3901 LAW

**Administering Organisation** The University of Melbourne

### Project Summary

The importance of a re-examination of the rules of limited liability has been demonstrated in many recent cases of corporate wrongdoing and collapse. This has been highlighted by the restructuring of the James Hardie Group of companies, the conscious aim of which was the decision to free the group of its asbestos liability 'legacy'. Were it not for government intervention, thousands of persons injured by asbestos products would have gone without compensation. One means by which such unfairness can be avoided is by reform to the rules of limited liability. This project will explore the means by which this could be achieved.

**DP0877325** Dr WW Wong

**Approved Project Title** **Novel organic materials for efficient low-cost solar cells**

**2008 :** \$ 55,000

**2009 :** \$ 44,000

**2010 :** \$ 39,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY

**Administering Organisation** The University of Melbourne

### Project Summary

Finding sources of renewable energy is the greatest challenge faced by mankind in the coming decades. Solar energy has the potential to provide a large fraction of the world's energy needs. The successful development of a solar technology capable of large scale energy production will reduce our dependence on non-renewable energy sources, such as fossil fuels, leading to the reduction of greenhouse gas emissions and a sustainable environment. The harnessing of solar energy involves a number of frontier technologies that will enhance Australia's strengths in research and innovation. There is also potential for the creation of a world-class industry in solar energy that has both economic and environmental benefits.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879350** Dr DR Wood

**Approved Project Title** **The Structure and Geometry of Graphs**

**2008 :** \$ 117,306

**2009 :** \$ 117,306

**2010 :** \$ 117,306

**2011 :** \$ 117,306

**2012 :** \$ 117,306

**Primary RFCD** 2301 MATHEMATICS

QEII Dr DR Wood

**Administering Organisation** The University of Melbourne

### Project Summary

Graphs are ubiquitous mathematical structures that model relational information such as information flows, transportation networks, and biochemical pathways. It is often desirable to have a geometric representation of a graph. For example, a programmer will better understand a computer program if the flow of information within the program is represented by a visually appealing drawing. The focus of the project will be the interplay between graph structure theory and geometric properties of graphs. Moreover, the project will have significant applications to other area of mathematics and computer science, including computational complexity, analysis of data structures, and three-dimensional information visualisation.

**DP0877954** Dr S Wyithe; Prof RJ Sault; Prof J Hewitt

**Approved Project Title** **Imaging the Dark Ages of the Universe and understanding the early evolution of the universe**

**2008 :** \$ 145,000

**2009 :** \$ 144,000

**2010 :** \$ 139,000

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

**Administering Organisation** The University of Melbourne

### Project Summary

There is one large gap in our understanding of the early evolution of the universe, namely, when did the first sources of light appear? Resolution of this puzzle requires new theoretical and observational strategies. Several international initiatives are now beginning to tackle the problem, including a major new radio telescope in Western Australia. This collaboration will provide a significant Australian contribution at the forefront of modern cosmology.

**DP0880429** Dr J Yong; Dr A Palangkaraya; Prof JW Freebairn

**Approved Project Title** **Effects of Private Health Insurance on Health Care Usage and Health Outcomes in Australia**

**2008 :** \$ 33,750

**2009 :** \$ 28,695

**2010 :** \$ 45,384

**Primary RFCD** 3402 APPLIED ECONOMICS

**Administering Organisation** The University of Melbourne

### Project Summary

Australians spend more than \$7 billion each year on private health insurance (PHI), of which government subsidies amount to more than \$2 billion. There is, however, little understanding of how PHI affects health care usage and health outcomes. Having PHI is likely to result in better health for the insured, but more health resources are also likely to be used. Moreover, the health of the uninsured could be adversely affected if health resources available to the public hospital sector are reduced. This research will inform health policymaking on the effects of subsidising PHI on health care usage and health outcomes.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0877799** Prof AC Young  
**Approved Project Title** **Urban images and the appearance of city spaces**  
**2008 :** \$ 60,000  
**2009 :** \$ 38,000  
**2010 :** \$ 57,721  
**Primary RFCD** 3903 JUSTICE AND LEGAL STUDIES  
**Administering Organisation** The University of Melbourne

### Project Summary

This project will constitute the first study of street art as a new genre of cultural practice in city spaces. Street art is becoming an increasingly important issue for social policy and for youth culture. With many advocating a punitive approach to street art, the stakes for young people are high, risking criminalization in carrying out their art practices. The project will examine the emergence of street art and has significant strategic value in its capacity to inform balanced policy development and to improve understanding of the effects of and motivations behind street art.

**DP0878755** Dr HM Young; Prof JC Bornstein  
**Approved Project Title** **Electrical activity in early enteric neuron development**  
**2008 :** \$ 162,854  
**2009 :** \$ 146,354  
**2010 :** \$ 136,354  
**Primary RFCD** 3207 NEUROSCIENCES  
**Administering Organisation** The University of Melbourne

### Project Summary

Intestinal movements and secretion are critical to the good health and nutrition of both humans and animals. These functions are regulated by a large nervous system contained within the intestinal wall, the enteric nervous system. This project will identify how enteric nerve cells develop and how their behaviour influences the development of other enteric nerve cells. This is will provide an important base for more applied research aimed at developing treatments for diseases like chronic constipation and irritable bowel syndrome. It will also contribute to the growing knowledge about how epigenetic factors can modify genetically programmed development within the nervous system.

**DP0880250** Dr R Zhang; Dr J Bailey; Prof R Kotagiri  
**Approved Project Title** **SeqSeeker: a search engine for large numbers of very long sequences**  
**2008 :** \$ 81,000  
**2009 :** \$ 78,000  
**2010 :** \$ 75,000  
**Primary RFCD** 2801 INFORMATION SYSTEMS  
**Administering Organisation** The University of Melbourne

### Project Summary

Large sets of very long sequences arise in many important domains. Well known examples are time series sequences in financial markets and meteorology and DNA and protein sequences in biology. This project will develop a search system, SeqSeeker, that can perform search on massive databases of such sequences. This will allow experts from many domains to get more value from their data and to investigate datasets which are currently beyond the reach of today's technology.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880152** Dr X Zhang  
**Approved Project Title** **Interfacial Nanofluids**  
**2008 :** \$ 125,000  
**2009 :** \$ 118,000  
**2010 :** \$ 119,000  
**Primary RFCD** 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)  
**APD** Dr X Zhang  
**Administering Organisation** The University of Melbourne

### **Project Summary**

The fundamental understanding of Colloid and Surface Chemistry will be significantly enhanced through the understanding of the formation and properties of interfacial nanofluids. In addition, this project will provide the knowledge of the influence of nanofluids on the lubrication and the surface interaction. The future results will likely have great impact on the development of miniature devices, lab-on-a-chip and microfluidics or nanofluidics systems, water treatment, minerals processing, the food industries, pumping of fuel and water, and other processes. And the research described in this proposal will help to maintain the high international profile of Australian science in the field of Colloid and Surface Research.