

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

## Victoria

### Monash University

**DP0879909** A/Prof BM Attwood

**Approved Project Title** **Dispossession, history and restorative justice: a comparative study of three settler societies**

**2008 :** \$ 58,046

**2009 :** \$ 36,614

**2010 :** \$ 22,411

**Primary RFGD** 4301 HISTORICAL STUDIES

**Administering Organisation** Monash University

#### Project Summary

By comparing how the property rights and sovereignty of aboriginal people were treated in British colonies of settlement in Australia, New Zealand and Canada in the nineteenth century, how this process was understood and registered in stories narrated by contemporaries and their descendants, and how the settler societies of Australia, New Zealand and Canada have tried to deal with the consequences of their histories in the last thirty or so years, this project will shed new light on Australian history and contribute to ongoing debate about this country might best tackle the work of restorative justice.

**DP0878744** Dr PJ Baker; Dr ER Cook; Dr JM Lough

**Approved Project Title** **Reconstructing the historical frequency and intensity of Australian droughts: A multi-species dendrochronological approach**

**2008 :** \$ 170,000

**2009 :** \$ 148,000

**2010 :** \$ 145,500

**Primary RFGD** 2707 ECOLOGY AND EVOLUTION

**Administering Organisation** Monash University

#### Project Summary

Drought directly and indirectly impacts every Australian. Severe droughts devastate rural communities, lead to increased water restrictions and bushfire activity, slows the national economy and threatens diverse ecosystems. Our research will improve understanding of where, when, and how intensely droughts have occurred across eastern Australia in the past. The results will provide unique insights into the processes that generate Australian droughts and how future droughts might be anticipated. The results will provide farmers, hydrologists, and policy-makers with better data on long-term variability in water supplies to improve local, regional, and national water planning initiatives and infrastructure development.

**DP0877916** Dr C Balazs; Dr M Carena; Prof CE Wagner

**Approved Project Title** **Dark Matter Discovery**

**2008 :** \$ 115,000

**2009 :** \$ 114,000

**2010 :** \$ 109,000

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

**Administering Organisation** Monash University

#### Project Summary

Dark matter research is fundamental breakthrough science, thus its National and Community benefits can only be indirect. This, nevertheless, does not reduce the importance of these benefits. The proposed program strengthens Australian fundamental science by extending it in a new direction, and considerably boosts the quality of theoretical dark matter research in Australia. Since a large part of the proposed work is expected to be performed in international collaboration, positive results will increase the Australian presence on the international astro-particle physics scene. Successful students involved in this project are also expected to assume leading roles in international dark matter research.

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

**DP0878756** Dr SV Bhosale

**Approved Project Title** **Construction and Use of Yoctowells as Vessels for Catalysis, Sensing and Artificial Photosynthesis**

**2008 :** \$ 130,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**2011 :** \$ 84,986

**Primary RFCD** 2599 OTHER CHEMICAL SCIENCES

APD Dr SV Bhosale

**Administering Organisation** Monash University

### Project Summary

Yoctowell recognition systems are likely to form the basis of a new generation of biosensors, high throughput screening systems for identification of nucleotides and as energy transduction systems. As a result, this research will be relevant to technological advances in the areas of biotechnology and nanotechnology. Researching functional yoctowells containing photoactive and redox-active components will contribute to the major effort in basic research on smart optoelectric that are needed today to meet tomorrow's energy demands in a sustainable way.

**DP0877088** Prof AM Bond

**Approved Project Title** **Large amplitude Fourier transformed voltammetry: paths towards more efficient data evaluation strategies, enhanced insights and innovation in dynamic electrochemistry**

**2008 :** \$ 220,000

**2009 :** \$ 216,000

**2010 :** \$ 242,000

**2011 :** \$ 220,000

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

**Administering Organisation** Monash University

### Project Summary

Electrochemistry represents an enabling discipline in many branches of science. The aim of this research is to integrate the collective skills of an international consortium of experts in electrochemistry, electrical engineering, computing and mathematics in order to implement a blueprint proposed for innovation in electrochemical science. In the national interest, the project will facilitate global participation in cutting-edge science derived from electrochemical concepts, provide commercial opportunities in the area of scientific instrumentation and promote technology exchange with Australian and international leading-edge research organizations.

**DP0879251** Dr JL Bowman; Dr MG Heisler; Prof DR Smyth

**Approved Project Title** **Understanding how auxin and dorsoventral patterning are coordinated in plants**

**2008 :** \$ 192,000

**2009 :** \$ 200,000

**2010 :** \$ 187,500

**2011 :** \$ 202,000

**2012 :** \$ 176,000

**Primary RFCD** 2702 GENETICS

ARF Dr MG Heisler

**Administering Organisation** Monash University

### Project Summary

This study will help reveal for the first time how the outgrowth of leaves, flowers and floral organs is coordinated by tissue patterning genes and the plant growth hormone auxin. All plants grow in this way, and our findings, made using a model laboratory plant, will be applicable to crop species as well. Thus we will both expand our core knowledge of how multicellular organisms are constructed, and also generate possibilities for modifying the patterns of leaf and flower development in agricultural and horticultural species. Crops with larger leaves, or flowers of different structure, may result.

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

**DP0881848** Dr A Buckle

**Approved Project Title** **Development of high-throughput in silico methods for protein structure determination by X-ray crystallography**

**2008 :** \$ 80,000

**2009 :** \$ 80,000

**2010 :** \$ 80,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** Monash University

### Project Summary

This work will have major outcomes for structural biology research at a national and international level. The ability to perform MR calculations using an exhaustive set of search models will offer a timesaving of weeks to months in a typical successful structure determination. Further, significant insights will be gained into the use of high-performance GRID computing in protein structure determination by X-ray crystallography. This knowledge has considerable impact on our ability to undertake high quality structural biology research - a key area in the majority of biological research programmes.

**DP0877706** Prof B Caine

**Approved Project Title** **History and the Individual Life: Autobiography, Biography and the history of the self in the British World c1750 -1980**

**2008 :** \$ 141,702

**2009 :** \$ 138,440

**2010 :** \$ 109,192

**2011 :** \$ 103,629

**2012 :** \$ 88,348

**Primary RFCD** 4301 HISTORICAL STUDIES

**APF** Prof B Caine

**Administering Organisation** Monash University

### Project Summary

In providing a new way of linking autobiography and biography with the history of identity and of the self, this project will open new avenues for the study of history which will be important in Australia and internationally. Its focus on the British world will also bring Australian writing and experience into a broader international framework. At a time when biography is so very popular and widely read, it offers the possibility of bringing academic scholarship closer to questions of general interest to the community and thus re-enforcing the significance of academic research in the humanities.

**DP0881773** A/Prof AL Chaffee; Prof SK Bhargava

**Approved Project Title** **Carbon dioxide conversion over nanostructured mixed metal catalysts**

**2008 :** \$ 105,000

**2009 :** \$ 104,000

**2010 :** \$ 99,000

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

**Administering Organisation** Monash University

### Project Summary

Nanocatalysts are particles of very small size that have the ability to accelerate chemical reactions. This project will develop nanocatalysts to convert carbon dioxide into other small molecules to provide new options for managing greenhouse gas emissions.

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

**DP0877382** Prof WD Cook; Prof CN Bowman; Dr TF Scott; Dr SH Thang; Dr J Sun

**Approved Project Title** **Novel network polymers with photoinduced plasticity**

**2008 :** \$ 190,000

**2009 :** \$ 190,000

**2010 :** \$ 180,000

**2011 :** \$ 100,000

**Primary RFCD** 2505 MACROMOLECULAR CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

The production of crosslinked polymers (thermosets and rubbers) is a multi-billion dollar industry and these polymers are irreplaceable in their use in numerous applications in the household goods, medical, electronics, automotive and construction industries. However, they shrink during solidification causing internal stresses which weaken them and they can not be reshaped, repaired or recycled. This study will develop a novel range of crosslinkable polymers which can change shape on irradiation by light (or by heating) for use in applications ranging from repairable composites, stress-free lens, non-shrinking dental filling materials and light-sensitive actuators which will have significant benefit to industry.

**DP0877782** Dr B David; Prof J Geneste; Dr KM Marsaglia; Dr H Plisson

**Approved Project Title** **Archaeology of the Gulf Province Lowlands, Papua New Guinea**

**2008 :** \$ 180,000

**2009 :** \$ 175,000

**2010 :** \$ 170,000

**2011 :** \$ 130,000

**2012 :** \$ 90,000

**Primary RFCD** 4302 ARCHAEOLOGY AND PREHISTORY

QEII Dr B David

**Administering Organisation** Monash University

### Project Summary

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

**DP0878968** Dr AG Dyer; Prof M Rosa

**Approved Project Title** **Colour visual processing by honeybees: solutions for decision making in complex environments**

**2008 :** \$ 117,306

**2009 :** \$ 117,306

**2010 :** \$ 117,306

**2011 :** \$ 117,306

**2012 :** \$ 117,306

**Primary RFCD** 3207 NEUROSCIENCES

QEII Dr AG Dyer

**Administering Organisation** Monash University

### Project Summary

Honeybees are a cost and time efficient animal model for testing how information is processed in a miniature brain containing less than 0.01% of the number of cells found in a human brain. Bees use their ultraviolet, blue and green colour vision to efficiently find flowers in complex environments. This project investigates how colour information is processed by bees, and develops computer models to evaluate how novel solutions might be applicable for robotic vision. The model also allows for testing of how environmental factors, like changes in climate, might affect the way in which bees choose to visit certain flower types, including plants that have important environmental and economic impacts.

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

**DP0877914** Dr J Elaridi; Dr DC Jackson; Dr C Elvin

**Approved Project Title** **New polymerisation processes for the synthesis of novel biopolymers**

**2008 :** \$ 120,000

**2009 :** \$ 100,000

**2010 :** \$ 95,000

**2011 :** \$ 95,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY

APD Dr J Elaridi

**Administering Organisation** Monash University

### Project Summary

Synthetic peptide-based vaccines, formed via polymerisation of small bioactive motifs, possess several advantages over traditional approaches and promise to be the multi-disease targeting vaccines of the future. Disease targets will include influenza and hepatitis C viruses and a toxin from enteropathogenic Escherichia coli. These three diseases are in desperate need of novel vaccine approaches and the chemistries described in this proposal represent a conceptual leap over traditional, and so far ineffective approaches investigated thus far. Synthetic antifreeze proteins and bioelastomers will also be constructed using our catalysis driven polymerisation process and applied to unmet medical and industrial needs.

**DP0880120** Dr AR Evans

**Approved Project Title** **Megafauna and mega-extinction: assessing palaeocommunity change using dental complexity and shape analyses**

**2008 :** \$ 200,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**2011 :** \$ 100,000

**2012 :** \$ 100,000

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

ARF Dr AR Evans

**Administering Organisation** Monash University

### Project Summary

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

**DP0880369** Dr DK Galloway; Prof D Chakrabarty; Prof A Cumming

**Approved Project Title** **Fundamental Physics from Accreting Neutron Stars**

**2008 :** \$ 85,000

**2009 :** \$ 85,000

**2010 :** \$ 85,000

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

**Administering Organisation** Monash University

### Project Summary

This is a bold and novel program with the potential for results which will be highly significant to physicists worldwide. The expected outcomes will demonstrate that Australia's high-energy research ability is on par with the world's best. The techniques of X-ray astronomy are increasingly a standard part of the professional astronomer's toolkit, although Australia has a limited track record in recent years. This DP will boost the multiwavelength capability of local astronomers by attracting a talented postdoc with experience in X-ray astronomy to Australia, as well as supporting a broader effort to transfer such skills to local students and researchers.

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

**DP0877438** Dr KM Gray; Prof BJ Tonge; Prof SL Einfeld

**Approved Project Title** **Behaviour and emotional problems in young children with developmental delay**

**2008 :** \$ 100,000

**2009 :** \$ 100,000

**2010 :** \$ 110,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** Monash University

### Project Summary

This research will provide health professionals, researchers and service providers with a reliable and valid measure to assess behaviour in young children with developmental delay. This will be the first instrument of its kind worldwide. The study will provide the largest and most comprehensive survey of behaviour and emotional problems in young children with developmental delay internationally to date. It will provide information on the types of treatment that are needed for these children and what support is needed for their families. The outcomes of this study have the potential to promote the best possible start in life and long term mental health of this group of at risk and disadvantaged young Australians.

**DP0881757** Dr K Hauck

**Approved Project Title** **Modelling the Quality of Hospital Care in Australia**

**2008 :** \$ 58,986

**2009 :** \$ 58,986

**2010 :** \$ 58,986

**2011 :** \$ 58,986

**Primary RFCD** 3402 APPLIED ECONOMICS

APD Dr K Hauck

**Administering Organisation** Monash University

### Project Summary

It is estimated that substandard quality of hospital care causes around 4,500 deaths and 12,500 cases of permanent disability per year. Results from the study will support the implementation of quality control programs to help prevent unnecessary harm to patients, improve the quality of hospital care, and more generally, promote the objectives of the Australian health care system. The envisaged outcomes advance national research priorities by improving health care provided to children and the elderly. The Fellowship will help alleviate the shortage of health economists in Australia by improving my own skills and supporting me to train junior staff.

**DP0878765** A/Prof BP Hollingsworth; A/Prof X Zhao; Prof JR Richardson; A/Prof MN Harris

**Approved Project Title** **Health Production Functions: Effects of Socioeconomic and Lifestyle Factors on Health Status**

**2008 :** \$ 52,000

**2009 :** \$ 57,000

**2010 :** \$ 67,500

**Primary RFCD** 3402 APPLIED ECONOMICS

**Administering Organisation** Monash University

### Project Summary

Improving the health and wellbeing of individuals is a priority for the Australian government. Empirical knowledge on the determinants of health is crucial for effective allocation of public health funds. We propose a thorough economic investigation into the interrelationships between self-assessed health, chronic conditions, obesity, private insurance status, and socioeconomic and lifestyle factors, using advanced microeconomic techniques and comprehensive national and Victorian health surveys. We will link the micro-level findings to economic and policy implications for the Australian health sector and society. The research will be valuable in the design and evaluation of health promotion programs.

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

**DP0877327** Prof K Hourigan; Prof MC Thompson; A/Prof SB Hooper; Dr JT Pearson; A/Prof RG Evans; Dr KM Denton; Dr T Leweke

**Approved Project Title** **Engineering Imaging and Supercomputer Prediction of Biofluid Flows**

**2008 :** \$ 110,000  
**2009 :** \$ 120,000  
**2010 :** \$ 120,000

**Primary RFCD** 2915 BIOMEDICAL ENGINEERING

**Administering Organisation** Monash University

### Project Summary

The potential of the information gained from the lung imaging for improving the diagnosis and monitoring of adult respiratory diseases, such as emphysema, pulmonary fibrosis and asthma, is enormous. Abnormalities in the structure and function of the kidney circulation are likely key factors causing hypertension, so a detailed understanding of the kidney circulation is required before we can cure or prevent hypertension. The research underpinning cardiovascular and renal flows will assist in the understanding of hypertension, a major risk factor for cardiovascular disease, which accounts for approximately 40% of all deaths in Australia and particularly high for dialysis patients.

**DP0877517** Prof K Hourigan; Dr GA Thouas; Dr K Woollard; Prof SI Simon; Dr JP Chin-Dusting

**Approved Project Title** **Advanced fluid mechanics modelling of complex leukocyte-endothelial interactions**

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

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** Monash University

### Project Summary

This project adopts an interdisciplinary approach toward understanding the mechanical interactions between blood cells and vessel walls, under different hydrodynamic conditions. Outcomes will have downstream benefits to vascular biology in relation to diagnosis of problems such as atherosclerotic plaques. These vascular problems are associated with several major health problems including coronary heart disease, hypertension, stroke, diabetes and kidney dysfunction.

**DP0877777** Dr B Hutchins; Prof DC Rowe

**Approved Project Title** **Struggling for Possession: The Control and Use of Online Media Sport**

**2008 :** \$ 62,000  
**2009 :** \$ 57,500  
**2010 :** \$ 62,300

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

**Administering Organisation** Monash University

### Project Summary

Policy debates about the private ownership of sport content by media companies and sports organisations, and citizens' rights of access to content in new media environments, are characterised by considerable regulatory and legal uncertainty. This Project will identify and analyse the sources of this uncertainty, and provide informed, evidence-based policy direction. There is a pressing need for such evidence, with regulatory authorities already expressing concern over the locking up of exclusive content rights by major media companies. This Project also contributes to the conceptual development of Communication and Media Studies in a key area of national popular culture - sport.

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

**DP0878194** Dr HR Irving; Dr CA Gehring

**Approved Project Title** **Guanylate cyclases - an expanding family critical in plant growth and development**

**2008 :** \$ 95,000

**2009 :** \$ 95,000

**2010 :** \$ 95,000

**Primary RFCD** 2704 BOTANY

**Administering Organisation** Monash University

### Project Summary

The enzyme guanylate cyclase (GC) forms an important signalling molecule. We have identified unique GC molecules from higher plants. We shall use strategic basic research to determine the biological importance of these novel molecules in plant growth and development. We have formed an international team to achieve these goals and also to develop strong scientific links between Australia and other countries such as South Africa. The outcomes will provide new insight into the biological function of the novel GCs. Consequently, the new knowledge is critical to the development of novel biotechnological approaches to benefit sustainable agriculture in Australia.

**DP0880072** Dr EI Izgorodina

**Approved Project Title** **Computational approaches to selection and design of ionic materials**

**2008 :** \$ 83,648

**2009 :** \$ 83,648

**2010 :** \$ 83,648

**Primary RFCD** 2914 MATERIALS ENGINEERING

APD Dr EI Izgorodina

**Administering Organisation** Monash University

### Project Summary

Advanced batteries, fuel cells and solar cell technologies are beginning to use ionic liquids/plastic crystals as electrolytes due to their superb stability and valuable properties. As a broad class these ionic materials have only been known for the last 10 years or so and there is much to learn about their structure and properties. The project will develop and advance quantum chemical techniques for selection and design of ionic materials with the goal of developing electrolytes for a range of applications from advanced metal batteries, solar cells to fuel cells. These applications will have impact on energy efficiency and energy conservation by enabling CO<sub>2</sub> replacing technologies.

**DP0878195** Prof RA Jarvis; Prof I Zukerman; Dr J Alexandersson; Prof Y Shirai

**Approved Project Title** **Multi-sensory Fusion and Understanding in Robotic Assistive Technology Environments**

**2008 :** \$ 110,000

**2009 :** \$ 105,000

**2010 :** \$ 100,000

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

**Administering Organisation** Monash University

### Project Summary

The research will yield improved international standing through scientific advances disseminated through high impact refereed publications and open source software. The synergy between Language Technology and Robotics will attract post-graduate students in these areas, and potentially commercialisation interest. The demonstration prototype will provide proof of concept of an application that improves the capabilities of human-centric environments, especially for people with limited mobility or cognitive function. The deployment of this research will extend the independence of such people beyond the time when they may otherwise need to be institutionalized, which will benefit both them and the remainder of society.

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

**DP0879508** Prof C Jones; Dr A Stasch

**Approved Project Title** **Bulky Guanidines for the Stabilisation of Reactive Low Oxidation State Metal Complexes**

**2008 :** \$ 132,000

**2009 :** \$ 122,000

**2010 :** \$ 114,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

The proposed research will benefit Australia by creating a knowledge base in an internationally important area of chemistry. Through an integrated and interdisciplinary approach, the exploitation of technologies arising from the research programme will be explored. In addition to the academic community, these technologies will benefit hi-tech industries including pharmaceutical and fine chemicals concerns which will gain from the application of the proposed compounds to chemical synthetic methodologies. Moreover, bio-inorganic chemists will have access to new classes of chemical compounds that could mimic the action of enzymes in nature.

**DP0878483** Dr MJ Kitchen

**Approved Project Title** **Determination of lung morphology from X-ray phase contrast radiographs**

**2008 :** \$ 80,425

**2009 :** \$ 85,062

**2010 :** \$ 84,583

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

APD Dr MJ Kitchen

**Administering Organisation** Monash University

### Project Summary

Current methods of imaging the lung rely heavily on low contrast images obtained with chest radiography or computed tomography. This research will develop new X-ray phase contrast imaging techniques capable of providing a tenfold contrast increase over conventional chest radiography at a fraction of the X-ray dose of computed tomography. Methods of extracting quantitative information on lung morphology and pathology from phase contrast chest radiographs will be developed during this research. Eventual outcomes are likely to lead to improved methods of detecting lung disease and injury for both biomedical and clinical studies.

**DP0881011** Prof FC Klebaner

**Approved Project Title** **Modelling with stochastic differential equations**

**2008 :** \$ 80,000

**2009 :** \$ 80,000

**2010 :** \$ 75,000

**Primary RFCD** 2302 STATISTICS

**Administering Organisation** Monash University

### Project Summary

We will develop methodology for modelling and analysis of phenomena subjected to random and uncertain influences, such as behaviour of investors in the market, evolution of economy, values of stocks and ant colonies. This methodology will enable scientists to achieve more accurate description and analysis of their models and provide better understanding of these phenomena. Creating the tools for understanding such complex systems will have far reaching benefits both nationally and internationally and will allow Australia to strengthen its position in international research. The project will also provide for postgraduate training and international scientific exchange.

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

**DP0878805** Prof PA Komesaroff; Prof D Castle; Prof WR Blood; Dr SL Thomas; Dr J Hyde

**Approved Project Title** **Being 'fat' in today's world: A socio-cultural investigation of overweight and obesity.**

**2008 :** \$ 135,202

**2009 :** \$ 160,000

**2010 :** \$ 115,987

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

**Administering Organisation** Monash University

### Project Summary

What does it feel like to constantly struggle with your weight? Over 60% of Australians are overweight or obese, and many of these have battled with their weight for most of their adult lives. In an innovative approach to obesity, researchers at Monash University, the University of Melbourne, the University of Canberra and Deakin University are investigating the poignancy of experience of living with obesity in Australia. The aim of the study, which also includes a review of how obesity is represented by Australian newspapers, will use narratives to provide public health, health promotion and media strategies which resonate with the lived reality of obese and overweight people.

**DP0878220** Prof SJ Langford; Prof KP Ghiggino

**Approved Project Title** **Porphyrin Based Supramolecular Assemblies and Arrays III - Model Systems for the Construction of Photosynthetic Mimics and Devices**

**2008 :** \$ 140,000

**2009 :** \$ 140,000

**2010 :** \$ 130,000

**Primary RFCD** 2599 OTHER CHEMICAL SCIENCES

**Administering Organisation** Monash University

### Project Summary

Solar cells that convert light to electricity are an excellent solution to bringing energy to remote locations with abundant sunlight. This research proposal aims to provide an intellectual grounding in the development of molecular systems and supramolecular arrays that are capable of such solar energy conversion (photovoltaics & artificial photosynthesis) or that have potential applications in photonics. Developments in this project may also lead to breakthroughs in areas such as nano-scale computing and cleaner and more sustainable energy production

**DP0877317** Prof JC Lattanzio; Dr L Siess; Dr MP Gil Pons

**Approved Project Title** **Super-AGB Stars: the Missing Link?**

**2008 :** \$ 110,000

**2009 :** \$ 104,000

**2010 :** \$ 99,000

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

**Administering Organisation** Monash University

### Project Summary

By being the first to investigate a specific class of stars, Australia will also be the first to reap the scientific rewards from the many applications that will follow - including the chemical history of the Galaxy and how globular clusters form. We will also develop large-scale computing tools using the latest in cluster computing technology to study the multi-dimensional character of a special class of supernova explosion. We extend a fruitful collaboration with a super-computer centre in the US and also train graduate students in advanced computing techniques for Australia's future, in both science and other applications and technologies.

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

**DP0878102** Dr KL Loveland; Dr Y Miyamoto; Prof NB Hecht; Prof Y Yoneda

**Approved Project Title** **Novel roles for importin alpha proteins in the nucleus**

**2008 :** \$ 177,000  
**2009 :** \$ 177,000  
**2010 :** \$ 177,000  
**2011 :** \$ 177,000  
**2012 :** \$ 177,000

**Primary RFCD** 2702 GENETICS  
**ARF** Dr Y Miyamoto  
**Administering Organisation** Monash University

### Project Summary

The project will provide fundamental new information about how changes in cell function are influenced by importin (IMP) alpha proteins, both through changes in gene transcription and through alterations to intracellular transport. These findings will inform areas of national priority that include Aging Well, Aging Productively with specific regard to cellular stress responses, and A Healthy Start to Life in the context of production of healthy, genetically intact sperm. This project draws together an international team to investigate a phenomenon with implications for new understanding of normal developmental processes and the response of cells/tissues to disease conditions.

**DP0881137** Dr DW Lupton

**Approved Project Title** **Brønsted Acid Activated Chiral Brønsted Bases: Catalysts for Enantioselective Photochemical and Aminyl Radical Reactions.**

**2008 :** \$ 105,000  
**2009 :** \$ 101,000  
**2010 :** \$ 99,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY  
**Administering Organisation** Monash University

### Project Summary

In coming years the Australian pharmaceutical industry will face unprecedented challenges regarding the generation of wealth in an environmentally sustainable fashion. This proposal aims to address these issues through the development of a range of organocatalytic methods, which will provide access to valuable materials in a sustainable manner. While the new technologies derived from these studies will deliver general benefits in the area of chemical synthesis, more localised benefits will be achieved through the synthesis of the biologically significant Grandisine natural products, which have a possible role in the management of chronic pain.

**DP0878567** Dr J Lydon; Prof LW Russell

**Approved Project Title** **Aboriginal Visual Histories: Photographing Indigenous Australians**

**2008 :** \$ 90,000  
**2009 :** \$ 80,000  
**2010 :** \$ 70,000  
**2011 :** \$ 60,000

**Primary RFCD** 3799 OTHER STUDIES IN HUMAN SOCIETY  
**Administering Organisation** Monash University

### Project Summary

This project will strengthen our understanding of Australia's place in the world and enhance our capacity to interpret ourselves by showing how we have been perceived internationally through visual imagery - and specifically what is unique about Australia and its indigenous people through international eyes. It will explore how we have represented ourselves and the place of Aboriginal people, both historically and in the present. It will help us to engage with our neighbours and the wider global community. Collaboration with Aboriginal descendant communities will address their current aspirations regarding this important aspect of their heritage.

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

**DP0877427** Prof JB Madsen  
**Approved Project Title** **Human Capital, Innovations and Economic Growth**  
**2008 :** \$ 66,000  
**2009 :** \$ 68,500  
**2010 :** \$ 72,000  
**Primary RFCD** 3402 APPLIED ECONOMICS  
**Administering Organisation** Monash University

### Project Summary

This project examines the effects of human capital on economic growth and international knowledge spillovers and the social returns to schooling. Furthermore, the project investigates the role played by human capital and innovations in explaining why Australia has not been able to maintain its leading position in the world over the past 135 years. To that end human capital is estimated for the OECD countries. The project addresses Research Priority 3 by examining the role played by education in promoting an innovative culture and enhancing the capacity to absorb world frontier technology.

**DP0878012** Prof P Maitra; A/Prof BA Inder; Prof R Ray  
**Approved Project Title** **Living Standards, HIV/AIDS and its Impact on the Next Generation**  
**2008 :** \$ 50,000  
**2009 :** \$ 45,000  
**2010 :** \$ 45,000  
**Primary RFCD** 3402 APPLIED ECONOMICS  
**Administering Organisation** Monash University

### Project Summary

The spread of HIV /AIDS is a major international challenge, particularly for developing countries. Its direct impact is mostly among working-age adults, leading to significant loss of labour income and capacity to care for children. Australia has made a sizeable aid commitment in this area and to addressing poverty and nutritional deprivation more generally. Through improved understanding of the interrelationships between wealth, HIV / AIDS and its impact on children, the project will provide valuable insight to guide Australia's aid efforts, as well as contributing to global efforts to understand the epidemic and its potential effects on the next generation.

**DP0878866** Prof LH Manderson; Prof P Liamputtong; Dr EA Hoban  
**Approved Project Title** **Immigration and parenting among Cambodian and Iraqi women in Australia**  
**2008 :** \$ 133,000  
**2009 :** \$ 130,000  
**2010 :** \$ 129,000  
**Primary RFCD** 3703 ANTHROPOLOGY  
APD Dr EA Hoban  
**Administering Organisation** Monash University

### Project Summary

Immigration will continue to contribute to Australia's social, cultural and economic fabric. By provide immigrant women with the opportunity to articulate their lived experiences as immigrants and mothers, this study will contribute to our understanding of ways to enhance their social inclusion and resilience. By identifying ways to support newly settled women and their families, the study will contribute to policies and programs, ensuring a healthy start to life for their children and promoting and maintaining their health, with economic and social benefits to Australia as a whole.

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

**DP0878680** Prof AB Markus

**Approved Project Title** **Cultural maintenance, cultural change: a comparative history of Yiddish Melbourne**

**2008 :** \$ 69,729

**2009 :** \$ 77,808

**2010 :** \$ 50,165

**Primary RFCD** 4203 CULTURAL STUDIES

**Administering Organisation** Monash University

### Project Summary

Given the aging of the Australian population, immigration remains a vital national concern - indeed, its significance is likely to increase over the coming decades. This context makes clear the national and community benefit of research into the effectiveness of immigration policy and the experience of immigrants. This study will be of particular importance for its innovative approach to evaluation of the successes and failures of policy, of the factors which facilitate immigrant success, and the adaptation to Australian life of members the second and third generation.

**DP0877320** Dr JP McCormack

**Approved Project Title** **Computational Creativity: an evolutionary ecosystem approach**

**2008 :** \$ 70,000

**2009 :** \$ 60,000

**2010 :** \$ 65,000

**Primary RFCD** 4103 CINEMA, ELECTRONIC ARTS AND MULTIMEDIA

**Administering Organisation** Monash University

### Project Summary

The creative industries are at the forefront of a 21st century economy. For Australia to play a leading role, artists and designers require innovative software systems that support original creative practice. Creativity is a highly sought-after yet little understood phenomena. This research will advance our understanding of creativity, developing imaginative new ways of working with technology: enabling creative outcomes that are difficult or impossible to achieve with existing software tools. In a global and rapidly changing industry, this project will give Australian creative practitioners and software developers a competitive edge, enhancing our international reputation as a leader in this area.

**DP0879533** A/Prof J McCulloch; Prof M Peel

**Approved Project Title** **Justice for All: A History of the Victorian Community Legal Centre Movement**

**2008 :** \$ 76,672

**2009 :** \$ 91,106

**2010 :** \$ 93,002

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** Monash University

### Project Summary

Community legal centres have identified and addressed ways of improving access to justice for a range of groups. A historical study of a movement that successfully harnessed volunteers and created partnerships between experts and communities will produce important insights into strategies for continued success in legal centres, as well as other government and non-government organisations. The study will assist centres by documenting their strengths and challenges, encouraging self-reflection, and providing opportunities for discussion of present and future objectives. By focusing on capacity building and volunteering, and the links between the legal profession and citizens, the study will strengthen Australia's social fabric.

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

**DP0880448** Dr NG McKinnon; Prof JC Bigelow  
**Approved Project Title** **Mereological Composition and Material Constitution**  
**2008 :** \$ 95,134  
**2009 :** \$ 91,361  
**2010 :** \$ 86,891  
**Primary RFCD** 4401 PHILOSOPHY  
**APD** Dr NG McKinnon  
**Administering Organisation** Monash University

### Project Summary

This project embodies a number of advances in metaphysics, which is a field of research in which Australia enjoys a considerable international reputation. Our work on material constitution will also further Australia's reputation in the philosophy of mind; some of the most celebrated 20th Century contributions in the philosophy of mind have been written by Australian philosophers.

**DP0877171** Prof BM McSherry; A/Prof PD Keyzer; Prof SK Blay; Prof J Petrila; Dr R Darjee  
**Approved Project Title** **Preventive Detention of High Risk Offenders: The Search for Effective and Legitimate Parameters**  
**2008 :** \$ 74,000  
**2009 :** \$ 135,000  
**2010 :** \$ 70,000  
**Primary RFCD** 3901 LAW  
**Administering Organisation** Monash University

### Project Summary

This Project will provide Australian policymakers with proposals for the management and treatment of high risk offenders that adopt international best practice standards and which are constitutionally valid and consistent with Australia's international legal obligations. It seeks to help safeguard the community from offenders considered at high risk of causing harm.

**DP0879239** A/Prof B Meyer; Dr A Dussutour; Prof DG Green  
**Approved Project Title** **Adaptiveness of self-organised decision making**  
**2008 :** \$ 100,000  
**2009 :** \$ 95,000  
**2010 :** \$ 90,000  
**2011 :** \$ 85,000  
**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING  
**Administering Organisation** Monash University

### Project Summary

Complex systems are an important international research focus in many disciplines, and their engineering applications are plentiful. The new mathematical approach developed by this project will enable different disciplines for the first time to communicate using a common formal framework. This will open the path to a generalized understanding of self-organized systems in dynamic environments. Creating the tools for a unified interdisciplinary approach will allow Australia to gain a stronger position in biomimetic engineering and to take a lead in international research on collective behavior.

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

**DP0878954** Prof I Moosa; Prof P Silvapulle

**Approved Project Title** **New Approaches to Modelling Operational Risk in the Light of the Basel II Accord**

**2008 :** \$ 70,852

**2009 :** \$ 41,327

**2010 :** \$ 45,346

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

**Administering Organisation** Monash University

### Project Summary

The outcome of this project will be useful for Australian banks, because they will be required by the Basel II Accord to calculate capital to be held against operational risk. The benefits will accrue to Australian banks as the results should help them understand the effects of operational risk and how to manage it more effectively. The benefits will also accrue to the Australian Prudential Regulatory Authority, by providing some guidelines on the implementation of the Accord. The outcome of this project, which quantifies the risks due to crime and terrorism, will be useful for the Australian community at large.

**DP0878501** A/Prof LN Moresi; Dr DR Stegman; Asst Prof A Lenardic

**Approved Project Title** **Large-scale three dimensional deformation of the lithosphere by subduction and mantle flow**

**2008 :** \$ 185,000

**2009 :** \$ 99,000

**2010 :** \$ 99,000

**Primary RFCD** 2601 GEOLOGY

**Administering Organisation** Monash University

### Project Summary

We will be modelling of the dynamics of the Earth's crust and shallow lithosphere in response to the huge stresses created by plate motions. For Australia these stresses are transmitted from the distant plate boundaries, but they have a direct controlling influence on the evolution of the petroleum rich basins of Australia. These basins have reached maturity; further exploration will be in deep water where geophysical prospecting methods are unreliable. Model-driven "exploration geodynamics" methods such as those we are developing will be needed to support traditional exploration techniques in these areas.

**DP0877255** Prof KS Murray

**Approved Project Title** **Nanomagnetic Molecular Materials**

**2008 :** \$ 189,000

**2009 :** \$ 188,000

**2010 :** \$ 195,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

This research project involves the preparation of new molecular magnets using metals such as manganese and vanadium and a study of their physical properties. Metal compounds of the cluster type are significant since they are nanoscale in size and offer new quantum features, with an improved understanding of the magnetic properties as a primary outcome and long term possible use in future quantum computers. This fundamental study provides excellent training to post-graduate students and makes them ideally suited to take jobs in advanced materials, an area being emphasised in Australia's nanotechnological future.

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

**DP0878454** Dr AP Neild; Dr T Ng

**Approved Project Title** **Effective Microfluidic Cell Sorting using Synergistic Acoustic and Optical manipulation**

**2008 :** \$ 85,000  
**2009 :** \$ 75,517  
**2010 :** \$ 50,000

**Primary RFCD** 2499 OTHER PHYSICAL SCIENCES

**Administering Organisation** Monash University

### Project Summary

The fluorescence-activated cell sorting technique alone represented a US\$860 million market in worldwide diagnostic and life science research devices for 2004. The development of a faster and cheaper device with similar efficacy, as per the objective of this work, has the potential of supplanting immunological methods of cell sorting and thus yield substantial economic returns to the nation. The research activities in this project will strengthen Australia's research standing in the fields of microfluidics and lab-in-a-chip technologies. On a broader platform, it will contribute to Australia's high standing in the field of biotechnology.

**DP0877417** Dr N Nicholls

**Approved Project Title** **Scientific basis for improved climate predictions on seasonal and climate-change timescales.**

**2008 :** \$ 135,968  
**2009 :** \$ 260,000  
**2010 :** \$ 244,000  
**2011 :** \$ 235,000  
**2012 :** \$ 135,968

**Primary RFCD** 2606 ATMOSPHERIC SCIENCES

APF Dr N Nicholls

**Administering Organisation** Monash University

### Project Summary

This project would lead to improved accuracy of Australian climate predictions, leading to benefits in many sectors. Increasing the accuracy of seasonal climate predictions across March-May, a crucial time for decision-making in Australian agriculture but a time when the forecasts exhibit little skill, would lead to large economic/societal benefits. Separating the factors influencing tropical cyclones is essential to determine whether global warming is changing Australian tropical cyclones, a crucial climate change question. Separating the influences of atmospheric circulation variations and other factors on climate changes and impacts should improve climate impact predictions, leading to enhanced economic benefits.

**DP0878893** Prof CT Nyland; Prof CE Hartel; Prof G Standing; A/Prof JC Zhu

**Approved Project Title** **Enterprise Labour Flexibility, Worker Security and Wellbeing: China and India Compared**

**2008 :** \$ 98,000  
**2009 :** \$ 89,000  
**2010 :** \$ 82,000

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

**Administering Organisation** Monash University

### Project Summary

Arguably China and India are currently the two nations most likely to reshape employment practices and the nature of work globally in the coming years. Sections of the Australian community who will benefit from the research include politicians, employees and employers as all three require a detailed knowledge of the labour policies and practices of these two major trading partners as they continue to confront the unending problem of labour market management and workplace reform. The research will also be of value to investors considering investing in either country and who need to make decisions regarding where to invest and how investments might be optimised.

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

**DP0877232** Dr MH Premaratne; Prof AJ Lowery; Prof GP Agrawal; Prof B Jalali

**Approved Project Title** **Design and Experimental Demonstration of Ultrabroadband Silicon Optical Amplifiers**

**2008 :** \$ 125,000

**2009 :** \$ 115,000

**2010 :** \$ 105,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Administering Organisation** Monash University

### Project Summary

The current success of the electronics industry rests on pillars made from the low cost, high performance and flexibility of silicon compounds. Silicon-based optics provides a new platform for the monolithic integration of optics and electronics. In this project, a multi-disciplinary team consisting of pioneers of nonlinear optics and siliconized photonics build a next-generation broadband silicon optical amplifier which can open the door to a new low-power, wide-bandwidth, high-speed and ultra-small optoelectronic devices. The technological advances arising from this project will provide Australia with critical capabilities for future commercial ventures and strengthen Australia's stake in the multi-trillion dollar semiconductor industry.

**DP0879480** Dr JM Pringle

**Approved Project Title** **Advanced Ionic Materials for Organic Photovoltaics.**

**2008 :** \$ 135,000

**2009 :** \$ 154,000

**2010 :** \$ 149,000

**2011 :** \$ 150,000

**2012 :** \$ 130,000

**Primary RFCD** 2914 MATERIALS ENGINEERING

QEII Dr JM Pringle

**Administering Organisation** Monash University

### Project Summary

Australia will greatly benefit from the development of improved solar energy technology, as a means of addressing the issue of climate change as a result of continued fossil fuel use. Solar power is also advantageous as it also allows electricity to be generated locally where it is needed, which is particularly important for the many remote areas of Australia. The climate in Australia is ideally suited for the electricity production through photovoltaics, and this project will focus on improving the performance of these devices to enable their widespread use.

**DP0879501** Dr PG Ranjith; A/Prof DW Airey; Dr JK Kodikara; Dr SX Choi; Dr A Bouazza; Dr A El-Zein

**Approved Project Title** **Hydro-mechanical interactions in coal geo-sequestration of carbon dioxide**

**2008 :** \$ 105,000

**2009 :** \$ 104,000

**2010 :** \$ 89,000

**Primary RFCD** 2907 RESOURCES ENGINEERING

**Administering Organisation** Monash University

### Project Summary

One of the most critical environmental issues facing society is that of global warming because of increasing concentrations of carbon dioxide released from burning of fossil fuels. Storage of CO<sub>2</sub> in the ground, geo-sequestration, offers the promise of significant reductions in atmospheric CO<sub>2</sub> release, particularly from coal fired power stations which produce 40% of Australia's CO<sub>2</sub> emissions. The proposed project will lead to greater understanding and reduced risks during the injection and storage of CO<sub>2</sub> in deep unmineable coal deposits. This will contribute to national efforts to reduce global warming, safeguard the Australian coal industry, and allow continued electricity generation from coal-fired plants.

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

**DP0878447** Dr TA Reuter; Dr GL Acciaioli

**Approved Project Title** **Revitalisation Movements in Contemporary Indonesia: Nativist Reworkings of Custom and Religion in Reaction to Decentralisation, Islamisation and Globalisation**

**2008 :** \$ 90,000

**2009 :** \$ 85,000

**2010 :** \$ 85,000

**Primary RFCD** 3703 ANTHROPOLOGY

**Administering Organisation** Monash University

### Project Summary

Australia needs to understand the ethno-cultural diversity of its neighbour Indonesia to appreciate the wider pluralist context in which political Islam, including the terrorist fringe (e.g. JI), operates. Understanding of emergent social movements among Indonesian minorities highlights the constraints upon political Islam and divergent pressures upon Indonesian national integrity, crucial issues for formulating foreign policy. It also provides comparative understanding of Indonesian movements parallel to those harnessing Indigenous and migrant aspirations in Australia, which is central to domestic policies insuring minority rights in a multiculturalist framework.

**DP0877961** Prof MJ Rhodes; Dr KP Hapgood

**Approved Project Title** **Design of granule microstructure in fluidised bed granulation: Modelling & experimental realisation**

**2008 :** \$ 130,000

**2009 :** \$ 130,000

**2010 :** \$ 130,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

**Administering Organisation** Monash University

### Project Summary

Production of granules with engineered microstructure is a common industrial problem. This project focuses on understanding how to control the microstructure of granules - including size, porosity, composition - produced by fluidised bed granulation by developing systematic, science based design rules. Designer granules can be used to develop and fast-track the development of innovative microstructured products for niche markets and the next generation of high-value agricultural, food and pharmaceutical industries. This unique project clearly contributes to the National Research Priority of 'Frontier Technologies' and will further enhance Australia's world-class excellence in both powder fluidisation and granulation research.

**DP0878965** Prof M Rosa

**Approved Project Title** **Understanding how the primate brain processes visual information**

**2008 :** \$ 142,000

**2009 :** \$ 142,000

**2010 :** \$ 142,000

**Primary RFCD** 3207 NEUROSCIENCES

**Administering Organisation** Monash University

### Project Summary

Being able to see is a crucial aspect of our daily lives, which happens so effortlessly that it tends to be taken for granted. In comparison with other animals and artificial systems, the primate visual cortex is unsurpassed in its capacity to interpret complex and dynamic environments, in a manner that is fast and computationally robust. Discovering how this happens in terms of interactions between cells in the brain can help us design more efficient artificial systems capable of vision. This in turn can have profound implications for the creation of new technologies such as artificial eyes, autonomous robots, and intelligent sensors, and may also result in future benefits for medical science.

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

**DP0878044** Prof J Rossjohn

**Approved Project Title** **A structural investigation into the peptide-loading complex molecular machine**

**2008 :** \$ 240,000  
**2009 :** \$ 238,000  
**2010 :** \$ 235,500  
**2011 :** \$ 235,000  
**2012 :** \$ 235,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** Monash University

### Project Summary

The proposed research program, using laboratory-based and synchrotron-based radiation, will provide fundamental insight into a process central to immunity, namely antigen presentation. Investigating the process of Antigen presentation is important, as it will further our understanding how a cell is "ear-marked" for being infected by viruses or bacteria. Such knowledge will increase Australia's international research standing.

**DP0880570** Prof LW Russell; Prof ML Langton; Dr Z Ma Rhea

**Approved Project Title** **Food, Traditional Aboriginal Knowledge and the Expansion of the Settler Economy**

**2008 :** \$ 65,000  
**2009 :** \$ 75,000  
**2010 :** \$ 70,000

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** Monash University

### Project Summary

This project will strengthen our understanding of Australian Indigenous-settler history by focusing on the role of food and traditional Aboriginal food knowledge. It will also represent a timely engagement with worldwide debates about the role of Indigenous knowledge in a modern world. As well as producing scholarly outcomes including books the project will establish and maintain a data-base of this knowledge which will be accessible to Indigenous communities, scholars, land users and managers. A further benefit will be the repatriation of knowledge and information located in archives and other repositories to descendant Aboriginal communities in culturally sensitive, socially and historically contextualised Community Reports.

**DP0878962** A/Prof RA Russell

**Approved Project Title** **Manoeuvrable burrowing robots for underground search**

**2008 :** \$ 65,000  
**2009 :** \$ 65,000  
**2010 :** \$ 65,000

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

**Administering Organisation** Monash University

### Project Summary

It is very difficult to locate items that have been buried underground or to find out their condition without digging them up. There are a number of situations involving leaking underground chemical storage tanks, and pipelines together with improperly disposed of chemical containers where chemical leaks can pose dangers to the environment and human health. This project aims to develop a robotic system that can burrow through the ground and home in on sources of leaking chemicals. Such a system could pinpoint the sources of leaks without requiring extensive excavations.

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

**DP0877497** Prof PJ Scammells; Prof A Christopoulos; Dr BL Flynn

**Approved Project Title** **Allosteric modulators as novel probes of G-Protein coupled receptor function**

**2008 :** \$ 100,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

This research will provide novel mechanistic understanding on the function of one of the largest protein families in the mammalian genome, and the most important family with respect to drug targets. The insights gained thus have direct relevance to drug discovery. The discovery of novel G protein-coupled receptor (GPCR) allosteric enhancers will not only lead to potentially new therapeutic agents, but can significantly value-add to other national research efforts focusing on GPCR structural biology.

**DP0877310** Dr F Sharifian

**Approved Project Title** **Aboriginal-English speaking students' (mis)understanding of school literacy materials in Australian English**

**2008 :** \$ 85,000

**2009 :** \$ 39,000

**2010 :** \$ 20,000

**Primary RFCD** 3802 LINGUISTICS

**Administering Organisation** Monash University

### Project Summary

Aboriginal students have a right to quality education that gives them skills for full participation in Australian society. However, in the past the education system in Australia has largely failed to improve educational outcomes for Aboriginal students and has to a large extent failed to equip teachers of Aboriginal children with the relevant professional development that they need. This project will directly focus on this issue of highest national priority and will make an attempt to explore Aboriginal-English speaking students' understanding of school materials. The results will be used in Aboriginal teacher education.

**DP0878823** Dr M Smyth; Dr P Kaur; Prof IJ Jackson

**Approved Project Title** **The role of palmitoylation in hair follicle and epidermal stem cell biology**

**2008 :** \$ 82,000

**2009 :** \$ 75,000

**2010 :** \$ 75,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** Monash University

### Project Summary

A proteins activity can be shaped by sugar, phosphate and lipid modifications. This proposal will investigate the effects of the lipid modification called palmitoylation, about which we know very little. Our preliminary experiments suggest that palmitoylation is crucial for normal skin biology. We will explore its effects on the biology of the proteins which are modified, the cells in which they are found and the tissues in which they reside. Understanding more about these modifications will help us to learn more about the biology of our skin and will help us to understand diseases which affect our largest organ.

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

**DP0880214** Prof DR Smyth; Dr M O'Brien

**Approved Project Title** **Genetic control of floral architecture**

**2008 :** \$ 88,000

**2009 :** \$ 88,000

**2010 :** \$ 83,000

**Primary RFCD** 2702 GENETICS

APD Dr M O'Brien

**Administering Organisation** Monash University

### Project Summary

Different flowers have different designs, and so the design must ultimately be controlled by genes. We have identified a gene that keeps sepals separate, and promotes the initiation of petals. We think it does this by a novel growth suppression mechanism, and will now deduce its molecular and cellular basis. This will help maintain Australia's strength in fundamental plant biology. Also, by understanding how sepals and petals arise in a model laboratory species, we can generalise for many species, including economic plants. Thus it may be possible to make designer crops through targeted genetic changes to their floral structure.

**DP0877424** A/Prof RD Snyder; Dr CN Low; Prof JK Ord; Dr JW Taylor

**Approved Project Title** **Forecasting with single source of randomness state space models**

**2008 :** \$ 84,000

**2009 :** \$ 70,000

**2010 :** \$ 77,000

**Primary RFCD** 3404 ECONOMETRICS

**Administering Organisation** Monash University

### Project Summary

The framework developed in this project, for identifying and extrapolating trends, seasonal patterns and economic cycles in time series, has a large and diverse range of useful applications in Australia. Some examples include its potential use in the development of appropriate monetary policy, its use to better inform finance markets of risk levels associated with shares, its use to forecast demand in supply chains to provide a better service to customers, and its use in call centres to better tailor staff schedules to meet customer calls.

**DP0879472** Dr RJ Stancliffe

**Approved Project Title** **The origins of carbon-enhanced metal-poor stars**

**2008 :** \$ 88,648

**2009 :** \$ 84,648

**2010 :** \$ 84,648

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

APD Dr RJ Stancliffe

**Administering Organisation** Monash University

### Project Summary

The proposed research will help to strengthen the excellent reputation Australia has in the field of stellar physics. Many of the world's foremost observers work in Australia and it is vital that their observational work obtains the theoretical support that it deserves. This project will provide the evolution and nucleosynthesis information that will guide the interpretation of observational work and make predictions for future observations. The applicant will also help it the training of graduate students, helping to provide expertise to the next generation of Australian astronomers.

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

**DP0881570** Dr MJ Stone  
**Approved Project Title** **Development and Characterization of Chemokine Receptor Mimics**  
**2008 :** \$ 110,000  
**2009 :** \$ 110,000  
**2010 :** \$ 110,000  
**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY  
**Administering Organisation** Monash University

### Project Summary

The proposed research will provide important fundamental insights into the molecular events underlying inflammatory diseases and cancer metastasis. The innovative nature of the research and the significance of the results will enhance Australia's international research standing. Moreover, the insights gained from this work will contribute to the development of therapies that will ultimately enhance the quality of life for Australians.

**DP0878801** Prof D Suter; A/Prof A Bab-Hadiashar  
**Approved Project Title** **Statistical Methods of Model Fitting and Segmentation in Computer Vision**  
**2008 :** \$ 135,000  
**2009 :** \$ 93,000  
**2010 :** \$ 104,000  
**2011 :** \$ 90,000  
**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING  
**Administering Organisation** Monash University

### Project Summary

Electronic sensors such as cameras and lasers can provide a rich source of information about the position, shape, and motion of objects around us. However, to extract this information in a reliable, automatic, and accurate way requires a sophisticated statistical theory of the process. Example applications include: video surveillance (better automatic detection of moving people and vehicles and of characterising what those people and vehicles are doing), industrial prototyping and inspection (measuring the size and shape of objects), urban planning (laser scanning streetscapes to create computer models of cities), entertainment industry (movie special effects and games), etc.

**DP0880458** Dr J Taliadoros  
**Approved Project Title** **Sacred Rules, Secular Revelations: The Conceptions of Rights in Pre-Modern Europe**  
**2008 :** \$ 92,000  
**2009 :** \$ 88,700  
**2010 :** \$ 88,000  
**Primary RFCD** 4301 HISTORICAL STUDIES  
APD Dr J Taliadoros  
**Administering Organisation** Monash University

### Project Summary

This project provides a deeper understanding of the origins of and background to contemporary debates on the role of religion in law, and vice-versa. This is particularly relevant at a time when law and human rights face questions about their moral and normative qualities. It will contribute to debates about the origins of the humanities in higher learning by reminding us that such studies had their origins in resolving practical problems and conflicts, rather than esoteric ends. This project will further reinforce Australia's reputation for integrating sound scholarship with innovative methodology and inter-disciplinarity in pre-modern European studies.

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

**DP0878304** Prof MC Thompson; Prof AO Trounson; Dr GA Thouas

**Approved Project Title** **Fluid mechanical and biological studies of a stem cell bioreactor**

**2008 :** \$ 134,000

**2009 :** \$ 64,000

**2010 :** \$ 64,000

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** Monash University

### Project Summary

The project has generic benefits toward the improvement of cell and tissue based approaches to diseases which involve replacement of dysfunctional, injured or missing tissues. This is currently a global effort with the overall aim of improving medicine by improving methods in biological sciences. The development of improved bioreactors and other biotechnologies will also have commercial benefits toward the development of efficient production systems to replace existing systems which are labour intensive and time consuming.

**DP0878736** Dr MA Tomlinson

**Approved Project Title** **God, Blood, Country: An Ethnographic Study of Christian Institutions and Political Processes in Fiji**

**2008 :** \$ 20,000

**2009 :** \$ 76,503

**2010 :** \$ 46,331

**Primary RFCD** 3703 ANTHROPOLOGY

**Administering Organisation** Monash University

### Project Summary

This Discovery project addresses the Australian government's commitments to law and justice in the Pacific by seeking to understand Christian institutions' roles in national political processes, focusing specifically on Fiji. Understanding the ways that citizens of the region see links between religious and political authority is a vital first step toward understanding present conflicts and potential means of securing peace.

**DP0879710** Prof MG Wallace; A/Prof MJ Garcia de la Banda

**Approved Project Title** **Analysing model transformations for combinatorial problems**

**2008 :** \$ 80,000

**2009 :** \$ 80,000

**2010 :** \$ 75,000

**Primary RFCD** 2803 COMPUTER SOFTWARE

**Administering Organisation** Monash University

### Project Summary

Maximising the benefits of limited resources is crucial for our industry, our hospitals, our security and our environment. This is achievable through a technology called combinatorial optimisation, which also supports wiser investment, better engineering, and even accelerated bio-informatics. Applying the technology is highly skilled and effort intensive, so most of its potential benefits are unrealised. This project will break down some of the barriers which make it hard to use. The ultimate goal is to let the user state the problem in simple terms, and the computer work out how best to solve it. Our vision is for groups and organisations large and small to reap the benefits of combinatorial optimisation.

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

**DP0877305** Dr H Wang; Prof C Li

**Approved Project Title** **Crystalline Mesoporous Metal Oxides for Solid Oxide Fuel Cell Electrodes**

**2008 :** \$ 90,000

**2009 :** \$ 90,000

**2010 :** \$ 90,000

**Primary RFCD** 2914 MATERIALS ENGINEERING

**Administering Organisation** Monash University

### Project Summary

Our crystalline mesoporous electrodes will help realise the full potentials of solid oxide fuel cells. Such advanced fuel cell technology will drastically increase the power generation efficiency, and reduce CO2 emissions from present power plants, thereby transforming Australian energy industry and improving our environment. The design and development of novel crystalline mesoporous materials that find widespread industrial applications will advance Australia's knowledge and skill base, and help Australia's high-tech industries to stay competitive, including the development of new high-tech industries in Australia.

**DP0879279** A/Prof MC Wilce; Dr JA Wilce; Dr M Gorospe; Prof B Williams

**Approved Project Title** **Protein-mRNA interactions and their role in post-transcriptional regulation**

**2008 :** \$ 242,000

**2009 :** \$ 240,000

**2010 :** \$ 237,500

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** Monash University

### Project Summary

The research outcomes will be of fundamental importance in the field of gene regulation, and as such will result in publications in high-profile international journals and continue to contribute to Australia's outstanding international reputation in biological research. Students and research associates that have the opportunity to work on this project will be trained in the use of state-of-the art technologies in biochemistry, scientific rigour and presentation skills and thus contribute to the quality of our national workforce. Furthermore, applications that arise from this work will contribute to Australia's intellectual property and future development of biotechnological industry.

**DP0880323** Dr DJ Wilson

**Approved Project Title** **Closed Circuit Television Surveillance, Security Networks and Australian Public Space**

**2008 :** \$ 30,000

**2009 :** \$ 30,000

**Primary RFCD** 3904 LAW ENFORCEMENT

**Administering Organisation** Monash University

### Project Summary

This project will make a significant contribution to our understandings of how visual surveillance systems impact upon the way public spaces are experienced and utilised. By examining the social impacts of surveillance this study will facilitate the development of security measures that facilitate greater inclusiveness and community cooperation. It will also assist the development of security measures cognizant of local variation and potential social consequences.

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

**DP0878464** Dr BR Wood; Prof AO Trounson; Prof CC Bernard

**Approved Project Title** **Molecular characterization of stem cell differentiation and oocyte maturation using synchrotron infrared spectroscopy and Atomic Force Microscopy/Raman imaging**

**2008 :** \$ 123,000  
**2009 :** \$ 133,000  
**2010 :** \$ 123,000  
**2011 :** \$ 123,000  
**2012 :** \$ 123,000

**Primary RFCD** 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)  
 QEII Dr BR Wood

**Administering Organisation** Monash University

### Project Summary

There are currently no molecular based methods to assess oocyte maturation and stem cell differentiation at the single cell level. Consequently the need for such techniques is critical in placing Australia at the forefront in this rapidly expanding field. Such technology would give Australia a leading edge in stem cell and oocyte research and ultimately assist in discovering disease cures for debilitating neurodegenerative diseases and spinal chord injury, while techniques for determining the viability of oocytes may have important implications for future in vitro fertilization programs. The intellectual property and technologies developed from this research could also have potential to impact on the global market.

**DP0880874** A/Prof A Zaslavsky; Dr S Krishnaswamy; Dr MM Gaber

**Approved Project Title** **Adaptive data stream processing in heterogeneous distributed computing environments using real-time context**

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

**Primary RFCD** 2801 INFORMATION SYSTEMS  
 APD Dr MM Gaber

**Administering Organisation** Monash University

### Project Summary

This project falls within the ARC research priority goal, Smart Information Use. The innovative contributions of this project through the development of adaptive data stream mining algorithms for heterogeneous devices will have an impact on a range of emerging application areas such as:

1. Meeting time-critical, intelligent information needs of the mobile workforce (e.g. mobile healthcare professionals, stockbrokers).
  2. Improving Intelligent Transportation Systems via in-vehicle analysis and crash prevention.
  3. Facilitating 'on-board' analysis in sensors that monitor the environment and patients.
- The project will enhance Australia's leading international role in the area of data stream processing in distributed computing environments.

**DP0880086** A/Prof X Zhao; A/Prof BA Inder; Prof AM Jones; Prof C Hsiao

**Approved Project Title** **Impacts of Population Ageing and Prevalence of Chronic Illnesses on Labour Market Outcomes and Health Service Utilisation**

**2008 :** \$ 70,000  
**2009 :** \$ 60,000  
**2010 :** \$ 70,000

**Primary RFCD** 3402 APPLIED ECONOMICS

**Administering Organisation** Monash University

### Project Summary

The Australian population is ageing due to the combined effects of increasing life expectancy and decreasing birth rate. The prevalence of major chronic illnesses including diabetes, heart disease and mental health conditions has also increased consistently. With a suite of state-of-the-art econometric and simulation models, we propose the first comprehensive analysis at the individual level of the complex relationships between health status, chronic illnesses, labour market decisions, private health insurance status, and health service utilisations of older Australians. The research will enhance the technical rigour and capacity for analysing a range of health and ageing related policies and issues.