

# Summary of Discovery Projects Proposals for Funding to Commence in 2007

## Victoria

### Monash University

**DP0771338** Dr V Abramov

**Approved Project Title** **Queueing systems and their application to telecommunication systems and dams**

**2007 :** \$82,030

**2008 :** \$82,030

**2009 :** \$82,030

**Primary RFCD** 2302 STATISTICS

APD Dr V Abramov

**Administering Organisation** Monash University

#### Project Summary

The aim of this project is to investigate the behaviour of large queueing systems under critical load conditions and solve problems related to large telecommunication systems, information technologies and dams. The project will have significant economic and social benefits. It will lead to the solution of high priority problems of optimal control of water resources, as well as problems in design technology of high speed telecommunication networks. It will suggest new more profitable approaches to known problems such as effective bandwidth problem, analysis and design of computer networks, optimal control of dams, and anticipate not ordinary results and solutions. It will contribute to the mathematical culture in Australia and worldwide.

**DP0773741** Prof DA Abramson

**Approved Project Title** **A Unified Grid Programming Methodology for Global e-Science**

**2007 :** \$179,367

**2008 :** \$159,367

**2009 :** \$149,367

**2010 :** \$199,821

**2011 :** \$199,821

**Primary RFCD** 2803 COMPUTER SOFTWARE

APF Prof DA Abramson

**Administering Organisation** Monash University

#### Project Summary

This project will contribute to the national benefit in three important ways. First, we will build a set of novel e-Science applications as demonstrator projects in areas of national priority. These will have enormous economic impact in areas ranging from environmental management to health. Second, we will build software infrastructure that will have both commercial and strategic value in its own right. Third, we shall build a critical mass of expertise that bridges the physical sciences and computer science. The support provided to this proposal will allow multi-disciplinary teams to address scientific problems of significant scale.

**DP0770266** Dr S Akbarzadeh; Prof A Saikal; Prof J Piscatori; Mr Bj MacQueen

**Approved Project Title** **Democratizing the Middle East: implications of Washington's policies**

**2007 :** \$112,001

**2008 :** \$156,001

**2009 :** \$113,001

**2010 :** \$57,773

**Primary RFCD** 3601 POLITICAL SCIENCE

APD Mr Bj MacQueen

**Administering Organisation** Monash University

#### Project Summary

Regime change has been justified by the coalition of willing as beneficial to the promotion of democracy and stable governance in the Middle East. It is, therefore, important to examine how effective this project has been. Australia's foreign policy towards the region resembles that of the United States, including military intervention in Iraq and Afghanistan. This involvement warrants an assessment of the way state building has set these two societies on a democratic trajectory, and whether they are serving as beacons of democracy in their neighbourhood. It is in Australia's national interests to have a realistic assessment of its foreign policy impact in the Middle East and Central Asia.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0772937** A/Prof J Armstrong; Prof AJ Lowery

**Approved Project Title** **Optical Orthogonal Frequency Division Multiplexing (OOFDM): a breakthrough for ultra-broadband optical fibre systems and infrared wireless personal-area networks**

**2007 :** \$150,000

**2008 :** \$140,000

**2009 :** \$120,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Administering Organisation** Monash University

### Project Summary

Optical-OFDM provides Australia with an opportunity to develop a new, high-tech, easy-to-export technology with a very large market potential spanning three key communications markets: wireless personal-area networks, local-area networks and long-haul (80-4000 km) optical networks. It is based on innovative Australian technology generated from two research strengths: photonics and OFDM. OFDM is already the basis of most non-optical broadband systems, including digital broadcasting and ADSL. Patent applications have been filed. One application enables bandwidths to rural and remote communities to be quadrupled without laying new cables. By launching off this local market Australian industry can develop a world leading industry.

**DP0771940** Dr SR Batten

**Approved Project Title** **Reactive Coordination Polymers and Supramolecules**

**2007 :** \$90,000

**2008 :** \$90,000

**2009 :** \$90,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

Large discrete or infinite assemblies of molecules will be designed and produced by self-assembly processes. Through careful design of the precursors, these nano-sized assemblies will be chemically reactive. The new techniques pioneered in this study will allow the design of new advanced materials, such as homogeneous multicentre catalysts (analogous to biological enzymes), industrially important heterogeneous catalysts, nanoscale molecular sieves, molecular sensors and switches, or materials that show unusual host-guest chemistry.

**DP0772981** Dr J Beringer; A/Prof JM Hacker; Prof K Paw U; Dr BG Neiningger; Dr LB Hutley

**Approved Project Title** **Patterns and processes of carbon and water budgets across northern Australian landscapes: From point to region**

**2007 :** \$255,000

**2008 :** \$270,000

**2009 :** \$143,000

**Primary RFCD** 2799 OTHER BIOLOGICAL SCIENCES

**Administering Organisation** Monash University

### Project Summary

Quantifying carbon sources and sinks and understanding the underlying processes are pre-requisites to informed policy decisions, especially as nations seek to develop strategies to manage carbon emissions and sequestration. Australia is unique because of its poor soils and high climate variability and is likely to have patterns and process of carbon that are globally different. We focus on Australia's Top-End region, but will develop tools/methods that can be applied to other important Australian hot-spots. This project will support the existing National Carbon Accounting System by providing new information on processes and spatial variability and regional budgets of carbon and water budgets that underpin our international commitments.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0773627** Dr SP Bottomley

**Approved Project Title** **Molecular Investigations into Polyglutamine Repeat Proteins**

**2007 :** \$107,000

**2008 :** \$100,000

**2009 :** \$93,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** Monash University

### Project Summary

The proposed research program, will provide significant fundamental insight into the processes that control protein aggregation and disease. Investigating processes central to protein aggregation is important, as it will further our understanding of these critically-important events and our understanding of disease processes. Such knowledge will increase Australia's international research standing, as well as having the potential to generate novel therapies, that prevent neurodegeneration.

**DP0771232** Dr JL Bowman

**Approved Project Title** **Manipulation of transcription factors that control plant architecture**

**2007 :** \$220,210

**2008 :** \$208,000

**2009 :** \$195,000

**Primary RFCD** 2702 GENETICS

**Administering Organisation** Monash University

### Project Summary

This project will provide fundamental knowledge about how plant body plans are constructed and elaborated. In particular this proposal could influence agriculture in two manners. First, we will examine the ability to control infestations of parasitic plants in the field using the expression of small RNA molecules and second, we will determine whether manipulation of expression of specific transcription factors can alter the characteristics of secondary growth plants.

**DP0771183** Dr SE Boyd

**Approved Project Title** **Computational techniques for protease research**

**2007 :** \$87,000

**2008 :** \$82,000

**2009 :** \$80,000

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

APD Dr SE Boyd

**Administering Organisation** Monash University

### Project Summary

Protease research is an area of intensive research in Australia. Correctly assessing the mechanisms of protease function is crucial not only for improving our health through medical research and drug development, but also to multiple national areas of research and development, including biotechnology, agriculture, and industries such as the dairy industry. This project will develop innovative computational techniques to advance understanding of how proteases function by redressing a common research assumption that can significantly affect the accuracy of protease function prediction. The outcomes will improve fundamental research into proteases, and enable improved research and development in the many fields that rely on protease work.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0773688** Prof X Chen

**Approved Project Title** **Ink jet microfluidic spray drier for making high quality microencapsulated bioactive particles and nanosized particles**

**2007 :** \$140,000  
**2008 :** \$140,000  
**2009 :** \$120,000

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** Monash University

### Project Summary

The proposal addresses National Research Priority area 3 (Frontier Technology). This work will develop a new, simple and effective method for producing designer smart particles that have better functional properties as well as improved uniformity for application in the food and pharmaceutical industries. The project will train graduates who will be able to make a high-level contribution to these Australian industries. This will also mark a development in Australia's nanotechnology capability in the bio-area.

**DP0771334** Dr D Chotikapanich; Prof WE Griffiths

**Approved Project Title** **Bayesian Inference for Welfare Comparisons of Income Inequality and Poverty**

**2007 :** \$65,000  
**2008 :** \$53,236  
**2009 :** \$55,000

**Primary RFCD** 3404 ECONOMETRICS

**Administering Organisation** Monash University

### Project Summary

The major expected outcome of this research is an array of techniques for making welfare comparisons involving income inequality and poverty within a framework of Bayesian inference. Various applications of the techniques are expected to yield useful information on inequality comparisons over time and space and on changes in the level of poverty. Given that reduction in levels of inequality and poverty is a matter of major concern, the development of suitable measurement techniques has immense potential for national benefit. In addition, the project will serve as a vehicle for training two PhD students, and hence will contribute to the small pool of highly trained econometricians with expertise in measuring income inequality.

**DP0773722** Dr CS Clements; Dr A Brooks

**Approved Project Title** **Investigation of the fundamental roles of class Ib MHC (major histocompatibility complex) molecules in immunity**

**2007 :** \$156,000  
**2008 :** \$145,000  
**2009 :** \$144,000  
**2010 :** \$144,000  
**2011 :** \$144,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

QEII Dr CS Clements

**Administering Organisation** Monash University

### Project Summary

The proposed research program, using laboratory-based and synchrotron-based radiation, will provide insight into the roles of a poorly understood class of immune molecules. This will improve our understanding of the regulation of immunity, and the knowledge gained will increase Australia's international research profile.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0773532** Dr TG Dwyer  
**Approved Project Title** **Constrained numerical optimisation techniques for automatic graph drawing**  
**2007 :** \$58,728  
**2008 :** \$58,728  
**2009 :** \$58,728  
**Primary RFCD** 2801 INFORMATION SYSTEMS  
**Administering Organisation** Monash University

### Project Summary

Network visualisation (graph drawing) is an enabling technology that is valuable to many important Australian interests. This project aims to develop new techniques that are more easily adapted to specific applications than current methods. There are a range of benefits in developing this technology including but not limited to: improved mapping of terrorist networks that can aid early identification of security threats; improved design and analysis of communication networks, either for the telecommunications industry or for emergency and disaster management scenarios such as bushfires; improved access to biological network databases used in the study of metabolic processes critical to drug development and genetic research.

**DP0773221** Dr JR Friend; Dr M Sitti  
**Approved Project Title** **Asymmetrically Twisted Structures to form High-Power Rotary Micromotors for In-Vivo Swimming Microrobots**  
**2007 :** \$120,000  
**2008 :** \$100,000  
**2009 :** \$80,000  
**Primary RFCD** 2499 OTHER PHYSICAL SCIENCES  
**Administering Organisation** Monash University

### Project Summary

Major surgery is traumatic and risky, but often the only choice for the most serious of diseases that affect older people. In this study, we aim to provide doctors with a means to avoid major surgery and extend the capabilities of doctors to diagnose and treat patients using non- and minimally-invasive procedures: a powerful micromotor carrying its own power supply and a special flagellar propeller to swim within the vascular and digestive systems of the human body to perform tasks via remote control. We also aim to understand the mechanisms underlying the operation of our motor system and flagellar motion in fluids to assist in the understanding of twisted blade structures and propulsion in fluids on the micro-scale.

**DP0770359** Prof DG Green  
**Approved Project Title** **Emergence of robust, stable structures via computation within natural networks**  
**2007 :** \$180,856  
**2008 :** \$165,856  
**2009 :** \$165,206  
**2010 :** \$81,754  
**2011 :** \$84,633  
**Primary RFCD** 2801 INFORMATION SYSTEMS  
**Administering Organisation** Monash University

### Project Summary

An ever-increasing challenge for modern society is the sheer complexity of vast infrastructures. Unexpected, and sometimes catastrophic, behaviour often emerges from interactions between elements of large systems. As a result, highly complex systems such as the Internet, international finance markets, and power grids are highly susceptible to costly problems such as cascading failures, inefficiency, and critical sensitivity. High-tech industries, such as biotechnology and information networking, also face problems in coordinating swarms of interacting agents. This project will contribute to solving such problems by identifying and adapting solutions from nature.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0771180** A/Prof E Gullone; A/Prof NJ King

**Approved Project Title** **The development of emotion regulation strategies and their relationships with psychological wellbeing: A long-term follow-up study.**

**2007 :** \$95,400

**2008 :** \$93,500

**2009 :** \$91,200

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

**Administering Organisation** Monash University

### **Project Summary**

A largely neglected area, emotion regulation in young people will be comprehensively examined. The first of its kind worldwide, this research will provide a rich understanding of the development of emotion regulation over the course of development from late childhood to early adulthood. An understanding of the role played by emotion regulation in wellbeing will provide important foundations for the development of intervention and prevention strategies that incorporate emotional functioning processes. This is predicted to result in a marked increase in the efficacy of existing prevention and intervention efforts which will lead to significant health care cost savings and social benefits, particularly for our youth.

**DP0770857** Dr TE Hall; Dr IM Wanless; Dr AZ Tirkel

**Approved Project Title** **Information security and digital watermarking with Latin squares**

**2007 :** \$82,977

**2008 :** \$76,381

**2009 :** \$63,987

**Primary RFCD** 2804 COMPUTATION THEORY AND MATHEMATICS

**Administering Organisation** Monash University

### **Project Summary**

The importance of digital information is increasing constantly. Audio, video, and still image data dominate our daily lives. Such information has commercial and strategic importance. It is invaluable in crime prevention: for example, video from security cameras. The protection of commercially valuable material against piracy and sensitive information against security breaches is vital to our economy and our safety. This project addresses these issues, by developing new, secure watermarks and fingerprints to protect digital information. Such watermarks can also protect radio communication channels, which is important due to the rising demand for wireless connectivity.

**DP0770462** Dr KP Hapgood

**Approved Project Title** **Granulation of hydrophobic powders: design and control of granule structure**

**2007 :** \$60,000

**2008 :** \$40,000

**2009 :** \$35,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

**Administering Organisation** Monash University

### **Project Summary**

This unique project will further enhance Australia's established world-class excellence in granulation research, and will assist in setting up a new school of excellence in granulation at Monash University. The innovative use of normally problematic material properties to produce 'designer granules' is a clear example of a 'Frontier Technologies' that can be used to develop 'Advanced Materials' for the next generation of agricultural, food and pharmaceutical industries, particularly for delivery of hydrophobic drugs. The innovative ideas presented in this proposal are expected to provide multiple opportunities for collaboration with national and international research institutions and pharmaceutical companies.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0773921** Dr EL Hartland; Prof RM Robins-Browne; Prof G Frankel

**Approved Project Title** **Host cell targets of bacterial virulence effectors**

**2007 :** \$90,000

**2008 :** \$88,000

**2009 :** \$85,000

**Primary RFCD** 2703 MICROBIOLOGY

**Administering Organisation** Monash University

### Project Summary

The research described in this proposal will result in a better understanding of the cell biology of host-pathogen interactions. We are in a unique position to analyze the importance of protein/protein interactions between bacterial virulence determinants and host cell proteins using a range of cell biology techniques to address the fundamental, molecular basis of the host-pathogen interaction. In addition we will construct a new genetic tool to identify novel bacterial virulence determinants. We anticipate that a greater knowledge of the factors that contribute to the host-pathogen interaction will provide new insights into the subversion of host cell processes by bacterial pathogens of animals, plants and humans.

**DP0772235** A/Prof BP Hollingsworth; A/Prof MN Harris; Prof P Maitra; Dr K Hauck; Dr J Wildman; Dr P Contoyannis

**Approved Project Title** **Modelling Inequalities in Health in Australia in the Area of Obesity**

**2007 :** \$90,000

**2008 :** \$70,000

**2009 :** \$70,000

**Primary RFCD** 3402 APPLIED ECONOMICS

**Administering Organisation** Monash University

### Project Summary

This research will contribute to a body of knowledge that informs government policy and falls under a National Research Priority - Promoting and Maintaining Good Health. Obesity is a serious health problem among adult Australians and the situation is likely to worsen if left unchecked. The first task in addressing this issue is to identify who is at risk. In this project we will use multiple and robust techniques to examine this issue. Our research will therefore help in targeting public resources to those that can really benefit, as we hypothesise markets in health do not clear efficiently for a multitude of reasons.

**DP0773861** Dr JK Kodikara

**Approved Project Title** **Modelling of shrinkage crack development in porous media**

**2007 :** \$55,000

**2008 :** \$45,000

**2009 :** \$40,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** Monash University

### Project Summary

Australia has interesting land formations comprising various reactive soils and rock. The formation of cracking patterns due to material shrinkage during either drying or cooling has a significant influence on their origin and subsequent behaviour. The shrinkage cracks significantly affect the performance of buildings, roads and buried pipelines. The possibility of their formation is important in many engineering designs, ranging from few millimetres thick material film to hundreds of metres long clay barriers used in hazardous waste landfills. Despite their wide-spread significance, quantitative methods to predict the crack formation and interpretation are not yet available, and this project will provide a solution to this problem.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0771578** A/Prof SJ Langford; Dr BM Abbott  
**Approved Project Title** **Investigations into the Versatility of Peptide Nucleic Acid Conjugates**  
**2007 :** \$147,000  
**2008 :** \$117,000  
**2009 :** \$110,000  
**Primary RFCD** 2599 OTHER CHEMICAL SCIENCES  
**Administering Organisation** Monash University

### Project Summary

Neurodegeneration and cancer are two of the greatest frontiers in modern medicine. They impose significant medical, financial and social burdens on sufferers, carers and the wider community. Novel technologies with the ability to help diagnosis, enlighten researchers to the biological principles governing the disease and that can make a contribution to prevention, quality of life issues and survival of sufferers are of utmost importance. This project aims to make a significant contribution to these areas using antisense technologies against some previously studied targets.

**DP0770651** Prof AH Lynch; Asst Prof JJ Cassano; Dr J Maslanik; Dr A Rinke; Dr J Bareiss; Prof Dr K Dethloff  
**Approved Project Title** **Interactions between small scale cyclones and sea ice and their role in the Southern Ocean climate system**  
**2007 :** \$80,000  
**2008 :** \$60,000  
**2009 :** \$50,000  
**Primary RFCD** 2606 ATMOSPHERIC SCIENCES  
**Administering Organisation** Monash University

### Project Summary

The Southern Ocean cyclone belt has a strong influence on Australian weather and climate. This project will allow improvements in the understanding of intense small scale cyclones in the region. Importantly, the research will highlight key sensitivities in the coupling between these atmospheric circulations and the underlying sea ice. Further, the compilation of an updated Southern Ocean cyclone climatology will provide a basis for evaluating future changes in cyclone distribution and frequency of occurrence in the Antarctic region. Finally, by leading this unique international collaboration with German and US scientists, the profile of Australian scientists in Antarctic atmospheric research will be strongly enhanced.

**DP0771672** Prof RC Mac Nally; Dr BW Brook; Dr B Leung; Dr R Sabbadin  
**Approved Project Title** **Applying search theory for eradicating invasive species**  
**2007 :** \$130,000  
**2008 :** \$125,000  
**2009 :** \$120,000  
**Primary RFCD** 2707 ECOLOGY AND EVOLUTION  
**Administering Organisation** Monash University

### Project Summary

Invasive species have major economic and environmental impacts in Australia and are a major cause of extinctions worldwide. Monitoring is crucial for the timely control of invasive species in sensitive environments. Early detection increases the probability of eradication and increased accuracy in detection reduces the impact of control programs on non-target species. Efficient monitoring also is crucial in determining whether eradication has succeeded. Search Theory has been applied for over 60 years in a wide range of non-biological monitoring problems, resulting in large increases in target detection rates. Gains of a similar magnitude in invasive species detection would greatly enhance Australia's capacity to manage these threats.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0772667** Dr JP McCormack; Dr A Dorin; Mr TC Innocent  
**Approved Project Title** **Design after Nature: Generative Models for Digital Media**  
**2007 :** \$93,000  
**2008 :** \$72,000  
**2009 :** \$84,000  
**Primary RFCD** 4103 CINEMA, ELECTRONIC ARTS AND MULTIMEDIA  
**Administering Organisation** Monash University

### Project Summary

The outcomes of this project address current problems in digital media design. This research will nurture emerging Australian expertise and scholarship in computational creativity. Creative industries are making an increasingly important contribution to the global economy. Related projects overseas demonstrate the potential for tangible commercial benefits as a direct result of research investment in this field. The practical outcomes of this research find application in fields such as computer games, digital animation effects and new media arts. This inter-disciplinary project will enhance collaborative links between the research communities of Computer Science, Art and Design.

**DP0772993** A/Prof CJ Mews; Dr KA Green; Dr JM Pinder  
**Approved Project Title** **Medieval Virtue Ethics and the Formation of the Feminine Moral Subject: Jeanne of Navarre to Marguerite of Navarre (1285-1550)**  
**2007 :** \$104,991  
**2008 :** \$100,000  
**2009 :** \$84,991  
**Primary RFCD** 4301 HISTORICAL STUDIES  
**Administering Organisation** Monash University

### Project Summary

This research will generate fresh community awareness of the importance of teaching ethics in everyday rather than academic language, with a particular relevance to women, thus contributing to the national debate about what constitutes values education. By showing how famous women writers were not isolated individuals, but adapted an established tradition of communicating ethics to women, the research will contribute to contemporary debates about the relevance of the teaching of ethics. The project will develop further existing close connections between Australian scholars and researchers in both Europe and the USA.

**DP0773170** Dr JP Millie  
**Approved Project Title** **Preaching Islam: politics, performers and publics in Indonesia.**  
**2007 :** \$89,030  
**2008 :** \$83,030  
**2009 :** \$81,030  
**Primary RFCD** 4402 RELIGION AND RELIGIOUS TRADITIONS  
APD Dr JP Millie  
**Administering Organisation** Monash University

### Project Summary

Mass preaching gatherings held by Indonesia's Muslims can draw crowds of up to two hundred thousand people, and are used by Indonesia's political constituencies, mainstream and fringe, to further their goals. An understanding of how political groupings utilise orations to further their interests will add to Australia's awareness of the political dimensions of Islam in contemporary Indonesia. Politicised preaching has repercussions for Indonesia's internal security and political stability; this research will increase Australia's knowledge on this critical topic by focussing on orations staged in sensitive political environments: rural communities, the urban poor and army barracks.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0770932** Prof AJ Milner; Prof AE Benjamin; Prof VN Burgmann; A/Prof CE Rigby; Dr CH Weller; Prof IM Buchanan

**Approved Project Title** **How Australians have imagined the future; possibilities for an ecologically sustainable society**

**2007 :** \$185,711  
**2008 :** \$196,065  
**2009 :** \$178,317

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** Monash University

### Project Summary

In a society like ours, which is subject to more or less continuous and often rapid social change, the question of how to imagine the future is of paramount importance. The study of how better and worse futures have been imagined for Australia, and how they still continue to be imagined, is therefore a central research question for the humanities in this country. More specifically, one of the key themes in our research will be the relationship between culture, ecology and utopia or dystopia. Much of our work will be quite deliberately oriented towards the future possibilities for an ecologically sustainable society.

**DP0771488** Dr SE Murray

**Approved Project Title** **Books as Media: The Cultural Economy of Literary Adaptation**

**2007 :** \$47,759  
**2008 :** \$62,860  
**2009 :** \$64,776

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** Monash University

### Project Summary

The project will benefit three key Australian communities: (1) researchers; (2) cultural creators; and (3) cultural policy-makers. (1) The project builds upon Australia's existing research excellence in Media and Cultural Studies and cross-blends this with emerging research strengths in publishing studies and book history. (2) Australian authors, publishers and screen producers who seek access and exposure to international audiences will gain a detailed understanding of how adaptation's global economy functions. (3) The project informs Australia's cultural policy framework by focusing on enhanced marketing and promotion of Australian cultural content rather than input assistance schemes.

**DP0773650** Dr DM Paganin

**Approved Project Title** **Generalized imaging systems incorporating hybrid hardware-software optics**

**2007 :** \$77,000  
**2008 :** \$80,000  
**2009 :** \$83,000

**Primary RFCD** 2404 OPTICAL PHYSICS

**Administering Organisation** Monash University

### Project Summary

Fundamental optics research underpins the commercial optical technologies of tomorrow. Modern examples of such evolution, from the fundamental to the commercial, include lasers, LED traffic lights, thin-screen computer monitors and digital cameras. The recent advent of accessible powerful computers, together with recent advances in optical physics, promise a powerful merging of computing and optical technologies into so-called virtual optical systems in which the computer processes optical information in a manner very similar to lenses. In particular, the computer may be used to decode distorted images provided by an imperfect imaging system.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0771445** Prof DS Poskitt; Dr CL Skeels; Dr G Forchini  
**Approved Project Title** **Estimation and Inference in Weakly Identified Models**  
**2007 :** \$100,000  
**2008 :** \$80,000  
**2009 :** \$100,000  
**Primary RFCD** 3404 ECONOMETRICS  
**Administering Organisation** Monash University

### Project Summary

Economic and social systems are made up of interacting components leading to complex structures that are difficult to predict and manage. Consequently policy analysis and decision-making must be informed by statistical analysis of data. In many situations the informational content of observations is minimal; examples of such situations are found in the areas of education, health, finance and various aspects of macroeconomic analysis. This project aims to develop methods of estimation and inference that make more efficient use of the information available in data. This will lead to more precise statistical analyses, resulting in a clearer understanding of economic and social systems, and better informed policy analysis and decision-making.

**DP0770854** Dr J Purdey  
**Approved Project Title** **A study of the scholarship on Indonesia in Australia and its implications for foreign policy**  
**2007 :** \$84,766  
**2008 :** \$77,030  
**2009 :** \$77,030  
**Primary RFCD** 4301 HISTORICAL STUDIES  
APD Dr J Purdey  
**Administering Organisation** Monash University

### Project Summary

This project explores Australia's scholarly engagement with Indonesia and the impact of disciplinary, political and moral influences on their interpretations and knowledge. The importance of Indonesia for Australia has never been more acute. The impact of instability in Indonesia on Australia's own security and place in the region cannot be understated. It is essential that we have the tools for interpreting and understanding cultural, religious and political differences. Australian scholars have a deep and lasting engagement with Indonesia. Investigation of the debates within the field of Indonesian studies will help us to interpret better the perceptions and politics informing our study.

**DP0773299** Prof JR Richardson; Dr R Borland; Prof RA Cummins; Prof HE Herrman; Asst Prof R Hurworth; Prof BA Swinburn; A/Prof ET Vos  
**Approved Project Title** **Developing methods for benefit measurement in health-related economic analyses and their use in selecting public health promotional programs**  
**2007 :** \$240,000  
**2008 :** \$240,000  
**2009 :** \$240,000  
**Primary RFCD** 3212 PUBLIC HEALTH AND HEALTH SERVICES  
**Administering Organisation** Monash University

### Project Summary

The program involves the creation, validation and use of a suite of instruments for evaluating outcomes of health promotional programs, including adult and childhood obesity, depression and smoking - areas that are universally recognised as being of importance for the Australian community. The program will provide multiple scoring algorithms for each of the instruments in order to test the sensitivity of results to assumptions made about social values, and will produce Australian estimates of the person trade-off weights used in the Australian and Victorian Burden of Disease studies (which presently use Dutch PTO weights).

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0772124** Dr AJ Robinson; Prof WR Jackson

**Approved Project Title** **New methods for the synthesis of stable cyclic peptides**

**2007 :** \$100,000

**2008 :** \$90,000

**2009 :** \$90,000

**Primary RFCD** 2503 ORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

This proposal will design, synthesise and evaluate novel carbocyclic analogues of cyclic peptides which have application in the treatment of pain, diabetes management, malaria, and cancer therapy and diagnosis. The carbocyclic analogues will have improved biostability and will also provide the opportunity for oral administration. Carbocyclic analogues of insulin could lead to improved treatment of Australia's 1.2 million diabetics including many Aboriginal Australians who are particularly susceptible to Type II diabetes and its debilitating complications.

**DP0772191** Dr L Schroeter; Prof JC Bigelow; Mr L Humberstone

**Approved Project Title** **Two-Dimensional Semantics and the Foundations of Philosophy**

**2007 :** \$96,614

**2008 :** \$96,614

**2009 :** \$96,614

**2010 :** \$96,614

**2011 :** \$96,614

**Primary RFCD** 4401 PHILOSOPHY

ARF Dr L Schroeter

**Administering Organisation** Monash University

### Project Summary

This project investigates fundamental philosophical questions concerning the relation between our minds and the world and the possibility of rational inquiry. The project represents a significant advance in the theoretical understanding of a broad range of central philosophical issues and it has important implications for the nature and methods of scientific inquiry. The project will contribute to the international research profile of Australia, consolidating its place as a leader in this domain.

**DP0772478** Dr L Shen

**Approved Project Title** **Multi-Scale Model-Based Simulation of Glass Fragmentation under Blast Loading**

**2007 :** \$44,618

**2008 :** \$28,618

**2009 :** \$28,618

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** Monash University

### Project Summary

It is estimated that most injuries from bomb blasts can be attributed to airborne sharp glass fragments. The proposed project will help us gain better understanding of glass failure mechanism under impact/blast loading. The results from the proposed project are expected to help in developing more effective blast-resistant transparency, ensuring the reliability and quality of buildings and facilities, mitigating injury or death due to flying glass fragments, and eventually enhancing public safety and security.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0774525** Prof J Sheridan

**Approved Project Title** **Characterising and suppressing vortex induced vibration**

**2007 :** \$90,000

**2008 :** \$80,000

**2009 :** \$80,000

**Primary RFCD** 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

**Administering Organisation** Monash University

### Project Summary

Vortex-Induced Vibration has become the design limiting factor in offshore design of elements such as the flexible pipelines that bring oil and gas to the surface. With rising oil and gas prices it is becoming more economic to explore such resources in deeper waters, which exacerbates the problem. Currently, high factors of safety must be used in the design of such pipelines because of our current lack of understanding of when the vibrations occur and their frequency and amplitude. This study will provide insight into the character of such vibrations and also look at means of suppressing them.

**DP0772763** Dr P Spedding

**Approved Project Title** **The Dissemination and Control of Clandestine Writing in England 1695--1774**

**2007 :** \$82,030

**2008 :** \$77,030

**2009 :** \$77,030

**Primary RFCD** 4202 LITERATURE STUDIES

APD Dr P Spedding

**Administering Organisation** Monash University

### Project Summary

The literary underworld of the eighteenth century is the subject of serious academic pursuit internationally by literary historians, historians of sex and sexuality, philosophers and feminists. Australia's reputation will be enhanced by participating in this rapidly evolving field. Australia already has an internationally significant profile in bibliography and eighteenth-century literary studies due to a combination of outstanding scholars and resources. This project will enhance Australian strength in, and contribution to, the world-wide study of these two subjects. This study will also be informed by, and contribute to, the contemporary philosophical, religious and ethical debate concerning the distribution of contentious material.

**DP0771700** Prof L Spiccia; Dr S Mukhopadhyay; Dr G Dismukes; Dr GF Swiegers

**Approved Project Title** **Bio-inspired Catalysts for Water Oxidation**

**2007 :** \$99,000

**2008 :** \$96,000

**2009 :** \$97,000

**Primary RFCD** 2502 INORGANIC CHEMISTRY

**Administering Organisation** Monash University

### Project Summary

Successful completion of the project will result in the development of devices that utilise redox active manganese clusters to catalyse the oxidation of water. This achievement would place us at the forefront of international efforts to develop devices that can split water into hydrogen and oxygen, an endeavour which has the potential to solve pressing energy demands. As an added benefit, these devices can be adapted for the purposes of carrying out the catalytic oxidation of organic substrates, for which a variety of industrial and environmental applications can be envisaged.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0770390** Dr V Stamatov  
**Approved Project Title** **Physics of combustion of multicomponent alternative transport fuels**  
**2007 :** \$90,000  
**2008 :** \$80,000  
**2009 :** \$80,000  
**Primary RFCD** 2999 OTHER ENGINEERING AND TECHNOLOGY  
**Administering Organisation** Monash University

### Project Summary

Reducing Australian reliance on imported fuels, especially oil, will enhance the Australian long term energy outlook and the national energy security, and will assist Australia to reach future greenhouse gas emission targets. At a local level, the production of alternative transport fuels has the potential to provide rural Australia with a sustainable biomass-based industry. The establishment of fast growing wood plantations to supply the needs of the new industry can assist regions of low rain-fall and high salinity to recover. Exporting advanced Australian alternative fuels technology to other countries with similar energy and environmental problems will further enhance the economic and social benefit to Australia.

**DP0774389** Dr A Stasch  
**Approved Project Title** **Polyanionic carbon ligands in metal complexes as new reagents in organometallic and inorganic chemistry**  
**2007 :** \$126,614  
**2008 :** \$111,614  
**2009 :** \$111,614  
**2010 :** \$96,614  
**2011 :** \$96,614  
**Primary RFCD** 2502 INORGANIC CHEMISTRY  
ARF Dr A Stasch  
**Administering Organisation** Monash University

### Project Summary

The proposed research will benefit Australia by creating a knowledge base in an internationally important area of chemistry. It addresses fundamental questions in organometallic chemistry that will be of great significance for chemical synthesis as well as for a greater understanding of structure and bonding. Through an integrated and interdisciplinary approach, the exploitation of technologies arising from this research programme will be explored. In addition to the academic community, these technologies will benefit hi-tech industries including pharmaceutical and fine chemical concerns which will gain from the use of polymetalated carbon species in organic and inorganic synthesis, catalysis and the development of new materials.

**DP0772837** Dr PJ Sunnucks; Dr MR Kearney; Ms M Norgate; Dr W Porter  
**Approved Project Title** **Understanding responses to climate change: a mechanistic approach integrating functional genetics, physiology and biophysical models for the Common brown butterfly**  
**2007 :** \$80,000  
**2008 :** \$80,000  
**2009 :** \$80,000  
**Primary RFCD** 2799 OTHER BIOLOGICAL SCIENCES  
**Administering Organisation** Monash University

### Project Summary

We will dissect the interaction between an Australian butterfly and changing climate. This will make significant contributions to the national research priorities Responding to climate change and variability and Sustainable use of Australia's biodiversity. We will address the known deficits in standard approaches to predicting futures for biota. We will provide an Australian species in which the mechanisms of response to climate change are understood in detail. Our outputs will be directly applicable to other butterflies: 19 threatened taxa in Australia. The novelty of our approach will be of marked international interest, and will train Australian researchers in a new way of predicting biological impacts of climate change.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0770531** Dr K Suzuki; Prof K Aoki

**Approved Project Title** **Novel nanostructured alloy membranes for hydrogen permeation: Advanced materials technology for renewable energy**

**2007 :** \$100,000

**2008 :** \$90,000

**2009 :** \$90,000

**Primary RFCD** 2914 MATERIALS ENGINEERING

**Administering Organisation** Monash University

### Project Summary

Hydrogen purification by alloy membranes is a key technology in maintaining the greenhouse gas emission low while using the fossil fuels including coal for energy generation. However, the alloys currently available for the membrane separation are mostly based on a costly precious metal palladium, making the application of the technology limited. The proposed non-equilibrium material processing will enable us to fabricate novel nanocomposite niobium-based alloys to which excellent hydrogen permeation characteristics are expected with high economic viability. Successful development of the proposed alloys could enhance the competitiveness of the Australian coal industry worldwide.

**DP0774617** Prof A Tsoi; Dr M Hagenbuchner; Prof M Gori; Prof F Scarselli

**Approved Project Title** **Data structures which change with time, a machine learning approach**

**2007 :** \$140,000

**2008 :** \$135,000

**2009 :** \$130,000

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

**Administering Organisation** Monash University

### Project Summary

Visibility of web pages, based on page importance, on the Internet controls their accessibility by users which is critical for e-Commerce applications. The page importance depends on its contents and its link structure to other web pages, both of which can be time varying. This project proposes a novel model in which time varying aspects of the changes to contents and their link structures are captured, thus allowing us a better understanding of how these influence the page importance over time. It will also allow us insight on how to improve the visibility of web pages.

**DP0772733** Dr CE Verevis; Dr DM Williams; Dr N King

**Approved Project Title** **Australian Film Theory and Criticism**

**2007 :** \$51,534

**2008 :** \$36,682

**2009 :** \$50,000

**Primary RFCD** 4203 CULTURAL STUDIES

**Administering Organisation** Monash University

### Project Summary

Australian film theory and criticism has burgeoned over the past thirty years, but there is no dedicated book-length study of the field. This research project will fill the gap, not only tracing the specificity of Australian film theory and criticism but also reasserting its place on the international scholarly agenda. In tracing the critical positions, personalities and institutions that have shaped film theory and criticism in this country, this project will at once disseminate and preserve (for scholars and the general public alike) the legacy of those critical intellectuals who have striven to understand the nation's most popular art and entertainment form, the cinema.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0772238** Prof GI Webb

**Approved Project Title** **Discovering justified knowledge from data**

**2007 :** \$114,442

**2008 :** \$124,000

**2009 :** \$108,000

**2010 :** \$59,000

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

**Administering Organisation** Monash University

### Project Summary

Knowledge discovery from data has assumed a critical role in numerous areas of science, commerce and public administration. However, its effectiveness is limited by the undesirable propensity of current techniques to make many false, as well as real, discoveries. This research will rectify that problem, a critical outcome given the potential cost of making decisions or setting policy using flawed information. For example, it may prevent the adoption of ineffective strategies for addressing land degradation; inappropriately targeted public health expenditure; expensive development and clinical trialing of drugs which prove ineffective; and wasted police and security investigations into unfounded suspicions of criminal or terrorist activity.

**DP0773563** Prof RA Weber; Dr SK Milton

**Approved Project Title** **Improving the Effectiveness of Conceptual Model Validation Work**

**2007 :** \$58,000

**2008 :** \$56,000

**2009 :** \$48,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

**Administering Organisation** Monash University

### Project Summary

Errors or omissions in conceptual models often lead to significant problems when information systems are being built. Prior research has shown the cost of fixing the consequences of such errors or omissions grows exponentially as a function of how late they are discovered. Thus, significant economic benefits arise if they are identified early in the system development process. The project outcomes will facilitate early prevention and detection of errors or omissions in conceptual models. They will also contribute to attainment of the national priority goal of smart information use through improved data management.

**DP0773160** Dr PA Webley; Prof D Zhao; Dr X Zhang

**Approved Project Title** **Advanced hierarchical materials for separation applications**

**2007 :** \$185,000

**2008 :** \$185,000

**2009 :** \$185,000

**2010 :** \$155,000

**2011 :** \$155,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

ARF Dr X Zhang

**Administering Organisation** Monash University

### Project Summary

The proposed project represents an international collaboration between Monash University and Fudan University and builds on the research strengths within these two Institutions in nano-materials research and applications. The proposed research will lead to a new class of materials for use in the chemical and biological industries, making their operation more efficient and permitting new separations to be performed. The research will also pioneer new techniques for use in nano-engineering materials and falls within one of Australia's National Research Priorities: Frontier Technologies for Building and Transforming Australian Industries.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0770588** Dr B Winther-Jensen

**Approved Project Title** **Switchable interfaces**

**2007 :** \$115,000

**2008 :** \$100,000

**2009 :** \$100,000

**Primary RFCD** 2914 MATERIALS ENGINEERING

APD Dr B Winther-Jensen

**Administering Organisation** Monash University

### Project Summary

The discovery project will challenge some of the most demanding issues regarding adhesion and molecular separation: - Surfaces that can release/prevent bio-film formation can provide novel solutions for corrosion-protection, implants, anti-fouling in medical devices as well as in industrial piping and reactors. - Materials for separation on the molecular level, which can bring new possibilities for fast and selective processes to the pharmaceutical industry. The novel combination of the two materials research fields - plasma-polymerisation and electroactive materials- will lead to an international capability at the forefront of separation and adhesion research.

**DP0771070** Dr BB Wong

**Approved Project Title** **Sexual signalling and parental care: A life-history perspective**

**2007 :** \$90,000

**2008 :** \$88,000

**2009 :** \$85,000

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

**Administering Organisation** Monash University

### Project Summary

I will use a fish, the Australian desert goby, to gain pivotal insights into male reproductive investment. Under-appreciated as potential study subjects, desert gobies are ideal because males must make important reproductive decisions regarding how much effort to spend on mate attraction and parental care but, importantly, they must do so within the constraints imposed by desert-living. The likely impact of my work in the field of behavioural ecology will improve Australia's research capacity and profile. By using an Australian species, my research will also raise awareness and understanding of extraordinary fishes living in habitats vulnerable to human impact.

**DP0770741** Dr Y Yang

**Approved Project Title** **Learning Semi-Naive Bayesian Classifiers from Numeric Data**

**2007 :** \$60,332

**2008 :** \$62,461

**2009 :** \$64,585

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

**Administering Organisation** Monash University

### Project Summary

This project addresses research priority 3, offering frontier technologies. It will deliver better and faster classification technologies that greatly help accomplish many real-world tasks including medical diagnosis, fraud detection, spam filtering and webpage search, where accurate and fast classification is critical to save life, increase efficiency, reduce crime and conserve resources. Hence this project addresses priority 4 as well, better safeguarding Australia from disease and crime. This project will also support a young research group of international standing. It will train the involved researchers to attain a high level of proficiency and excellence in machine learning research and development.

## Summary of Discovery Projects Proposals for Funding to Commence in 2007

**DP0770260** Dr DR Zion; A/Prof LR Briskman; Dr B Loff

**Approved Project Title** **Caring for Asylum Seekers in Australia: Bioethics and Human Rights**

**2007 :** \$70,000  
**2008 :** \$45,000  
**2009 :** \$55,000

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

**Administering Organisation** Monash University

### **Project Summary**

Australia's policy of mandatory detention has been criticised at home and abroad. This research will bring together both empirical and reflective material about that policy by those who have seen its effects first hand, which will make an important contribution to national self-definition. The research process itself will bring together practitioners who have worked in the field, many of whom have expressed the need for recording their experiences, and guidelines as to how to practice in the future when human rights issues form a part of clinical practice. As such, the project will contribute to other areas of healthcare where such issues are present, such as indigenous health, mental health, and the care of other vulnerable populations.