

Summary of Discovery Projects Proposals for Funding to Commence in 2009

Victoria

Monash University

DP0985641 Dr J Ang

Approved Project Title **Consumption Volatility and Financial Openness in the Developing World**

2009 : \$ 55,000

2010 : \$ 20,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation Monash University

Project Summary

The analysis performed in this project will shed some light on how financial openness affects consumption volatility in developing countries. The results of this project have direct relevance for the formulation of financial sector policies in developing countries as well as Australia, given its close association with the developing world. Designing appropriate financial sector policies helps promote financial stability, and this exerts a beneficial effect on economic growth. This is broadly in line with the Australian policy makers' objective of promoting growth and enhancing stability.

DP0984399 Dr G Athanasopoulos; Prof DS Poskitt; Prof F Vahid; Dr TC Kam

Approved Project Title **Vector ARMA Models and Macroeconomic Modelling: Some New Methodology and Algorithms**

2009 : \$ 105,000

2010 : \$ 114,000

2011 : \$ 110,000

2012 : \$ 58,943

Primary RFCD 3404 ECONOMETRICS

APD Dr G Athanasopoulos

Administering Organisation Monash University

Project Summary

Economic variables are strongly related to each other, as well as being strongly related to their recent history. As a result, good dynamic multivariate models are crucial for effective policy making and forecasting in areas of vital national importance such as monetary and fiscal policy, environmental policy and tourism. Our project advances the frontiers of knowledge in multivariate time series modelling. The outcome of this project will be immediately useful for macroeconomic policy makers such as the Reserve Bank of Australia and the Treasury, and for industry bodies such as Tourism Australia.

DP0985636 Dr F Bezhan

Approved Project Title **The Jihadi, Revolutionary and Anti-war Fiction in Afghanistan, 1978-2007**

2009 : \$ 65,507

2010 : \$ 64,418

2011 : \$ 80,245

2012 : \$ 50,739

2013 : \$ 49,285

Primary RFCD 3601 POLITICAL SCIENCE

ARF Dr F Bezhan

Administering Organisation Monash University

Project Summary

Afghanistan is a key area of global security concerns. An analysis of three decades of jihadi, revolutionary and anti-war literature (1978-2007) will provide an understanding of how different political groups, particularly the jihadis, utilised literature to further their interests. Australia needs to understand the underlying cultural debates that persist in Afghanistan in order to engage effectively with regional security and counter-terrorism. Despite media controls, the jihadis promoted their cause through published literary sources, imitating the growing Islamic literature of the Middle East. Literature, with its compelling metaphors and allusions, remains one of the main forms of furthering or opposing Islamist goals in Afghanistan.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984795 A/Prof RT Boer

Approved Project Title **The Criticism of Heaven and Earth**

2009 : \$ 45,000

2010 : \$ 46,000

2011 : \$ 47,000

Primary RFCD 4402 RELIGION AND RELIGIOUS TRADITIONS

Administering Organisation Monash University

Project Summary

Two issues have returned with vigour to public debate: the role of religion in secular society and the relation between theology and political theory. This project provides a much needed reference work that sets the current debates within a long and rich tradition. Apart from enabling us to avoid the mistakes of the past, it also brings to the fore forgotten solutions to such issues. Further, given the central role of many of these critics in a range of disciplines, the series will have repercussions across a wide range of discussions within Australia and abroad. Finally, is a further step in international leadership emanating from Australia.

DP0985567 Prof AM Bond; Dr LL Martin

Approved Project Title **Electrochemically, photochemically and magnetically tuneable organic semi-conducting electrodes for probing biologically important redox chemistry and catalysis**

2009 : \$ 160,000

2010 : \$ 90,000

2011 : \$ 110,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation Monash University

Project Summary

Newly developed tuneable, semi-conductor electrode materials will facilitate substantial advances in electrochemistry. The almost unprecedented levels of flexibility with respect to metal and organic constituents will facilitate insights into biologically important electron transfer and coupled catalytic processes and promote commercial opportunities for sensor development. Electrochemistry represents an enabling discipline in science. The project offers the opportunity for high quality multi-disciplinary doctoral training, integration of skills of scientists from different backgrounds and opportunities to work in world-class national and international infrastructure in the areas of chemistry, biological chemistry and materials science.

DP0984998 Dr LM Brady

Approved Project Title **The Kaurareg Archaeological Project, south-Western Torres Strait, Australia**

2009 : \$ 110,000

2010 : \$ 100,000

2011 : \$ 110,000

2012 : \$ 58,943

Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

APD Dr LM Brady

Administering Organisation Monash University

Project Summary

This project will be used to foster a greater awareness of the history of Aboriginal occupation in the Torres Strait islands, as well as furthering our understanding of past and present relationships between groups in Torres Strait, Cape York and Papua New Guinea. The research seeks to understand the southern-most limits of early Papuan influences into the Torres Strait islands and investigate the notion of a distinctive Aboriginal signature in the archaeological record from the Kaurareg Archipelago (south-Western Torres Strait islands). This project will also record contemporary perspectives from the traditional owners of the Kaurareg Archipelago (the Kaurareg Aboriginal community) to better understand interregional relationships today.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987374 Dr FA Capitanio; Dr C Faccenna

Approved Project Title **Coupled subduction dynamics and continent deformations: understanding the Asian and Red Sea tectonics.**

2009 : \$ 95,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFCD 2601 GEOLOGY

APD Dr FA Capitanio

Administering Organisation Monash University

Project Summary

Modeling slab pull forces and lithospheric deformation provides a new insight in the dynamics of plate tectonics. Unraveling the self-consistent formation of faults, rifts, shear zones and up to passive margin will further the understanding of our planet. Furthermore the application of these models to specific geological contexts will support the exploration and assessment of inaccessible Earth's resources, such as hydrocarbons pools, located along the deep Australian continent margins, and diamonds and ore deposits, associated with continental shear zones, which potential is still to be fully discovered.

DP0984539 Dr I Cartwright; Prof CT Simmons

Approved Project Title **Connected Water in Semi Arid Environments**

2009 : \$ 70,000

2010 : \$ 70,000

2011 : \$ 75,000

Primary RFCD 2605 HYDROLOGY

Administering Organisation Monash University

Project Summary

Water is undoubtedly our most valuable resource, and continued economic and social development is critically dependant on water resources. Ephemeral rivers in semi-arid areas that lie above the water table commonly recharge the underlying aquifers. In much of the Murray Basin of southeast Australia, river recharge has provided rare fresh groundwater that is both a potential source of water for irrigation and domestic supply and a buffer to saline regional groundwater entering the rivers as baseflow. This project will allow the risk to these groundwater lenses from landuse changes and river regulation to be quantified as well as constraining whether the water resources may be used sustainably.

DP0985120 Dr C Chen; Dr DN Oetomo

Approved Project Title **A Novel Reconfigurable Unlimited Spherical Motion Generator**

2009 : \$ 80,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 2903 MANUFACTURING ENGINEERING

Administering Organisation Monash University

Project Summary

The main contribution of this research lies in the National Research Priority of Frontier Technologies for Building and Transforming Australian Industries. The main outcome is a strategy to produce unlimited spherical motion with high precision. It is an innovative solution that is applicable to many cutting edge research and industry problems. Immediate application is expected to produce a faithful motion simulation, for flight, astronaut, and vehicle control training. It would potentially improve the quality of human resources and the quality of Australian industry, both civil and military. This project would also enhance the Australian competitive technological edge in developing advanced mechatronic systems.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987632 Dr S Chen; A/Prof K Suzuki; Dr JJ Garitaonandia

Approved Project Title **Origin of ferromagnetism in zinc-oxide semiconductors: A vital element to spintronics**

2009 : \$ 100,000

2010 : \$ 100,000

2011 : \$ 100,000

Primary RFCD 2914 MATERIALS ENGINEERING

APD Dr S Chen

Administering Organisation Monash University

Project Summary

Zinc-oxide is a semiconductor which could potentially be applied for a new concept known as spintronics - a hybrid technology of electronics and magnetics. The advantages of spintronic devices would be nonvolatility, increased data processing speed, decreased electric power consumption and increased integration densities compared with conventional semiconductor devices. A vital element to realizing this concept is a new class of semiconductor which exhibits magnetism. It has been reported that zinc-oxide doped with transition metal shows magnetization, however, its authenticity remains controversial. We will try resolving this problem by developing a fundamental understanding of the origin of ferromagnetism in zinc-oxide semiconductor.

DP0985781 A/Prof G Davies

Approved Project Title **Digital dissent in the People's Republic: the language of protest and criticism in Sino-cyberspace**

2009 : \$ 70,000

2010 : \$ 70,000

2011 : \$ 60,000

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation Monash University

Project Summary

As Australia's relations with China continue to deepen, it is vital for Australia to acquire in-depth knowledge of how rapidly China is changing as a consequence of digital information flows. The project provides that knowledge through its analysis of digital dissent. The project explores how non-state players in the People's Republic respond and react to urgent problems in their midst. It will also shed light on present-day tensions in China between state and civil society. More specifically, the project will deepen Australia's critical engagement with China by focussing on such issues of consequence as censorship, corruption, environmental pollution, governance reform and calls for democracy and human rights.

DP0986937 Prof RJ Devenish

Approved Project Title **Autophagy and the nucleus**

2009 : \$ 110,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation Monash University

Project Summary

Autophagy is a degradation pathway that is essential for survival, internal change (differentiation and development) and maintenance of physiological equilibrium (homeostasis). Moreover autophagy serves to protect higher organisms against infections, cancer and neurodegeneration. This project seeks to better understand the mechanism by which parts of the nucleus can be degraded by autophagy and how this relates to diseases which may involve defects in, or abnormal degradation of nuclear components. Benefit will accrue from a contribution to knowledge with future potential to impact on disease, as well as strengthening links with the international network working in the field of autophagy.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986783 Prof PB Dixon; Dr S Schreider; Dr GM Wittwer; Prof A Wentzell

Approved Project Title **Water derivatives: conceptualisation, price modelling and economic impacts**

2009 : \$ 60,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation Monash University

Project Summary

Introducing water options is likely to provide farmers with more choices on trading their water allocation and enhance water price certainty. Recent seasons have accentuated the potential benefit of water options: regions with highly secure water in the past have suffered repeated shortfalls in allocations. Water options would alter the behaviour of water managers who would need to ensure sufficient carryover to future seasons to allow for drought. Options markets may improve the allocation of water between competing users. Such markets, by reducing uncertainty, may reduce excessive adjustment costs arising from drought by improving water access security.

DP0987989 Dr AG Dyer

Approved Project Title **Organization and Plasticity of Visual Processing in a Miniature Brain**

2009 : \$ 85,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation Monash University

Project Summary

To recognise objects a brain must have an internal representation of most likely object appearance. Two ways in which brains may possess this information include a hard wired template system, and/or the neuroplasticity to learn novel objects. Recent investigations on honeybee vision show that this animal can learn to recognise very difficult objects, although currently we do not know how the miniaturised bee brain manages these tasks. This project will reveal changes that occur in the processing of visual objects by the bee's brain with increasing experience, with potential applications including robotics or building interfaces between sensors and biological systems.

DP0985432 Dr G Forchini

Approved Project Title **Identification and inference in nonparametric models**

2009 : \$ 50,000

2010 : \$ 50,000

2011 : \$ 50,000

Primary RFCD 3404 ECONOMETRICS

Administering Organisation Monash University

Project Summary

This project will develop reliable methods for identification, estimation and inference of nonparametric models for the evaluation of economic policies on outcome variables of interest. This econometric methodology will allow a better understanding of the quantitative effects of an economic policy which will result in better informed policy decisions. The results will have applications to labour market policies, health care policies and education policies among others. The project will also provide national benefits in terms of building up the local stock of researchers trained in the area of identification and estimation of nonparametric models; it will further improve the international reputation that Australia has in econometric theory.

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DP0986357 Dr GM Forde; Prof M Plebanski
Approved Project Title **Biodegradable immuno-therapeutic nanoparticles**
2009 : \$ 160,000
2010 : \$ 130,000
2011 : \$ 130,000
Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING
Administering Organisation Monash University

Project Summary

The national benefit relates directly to Promoting and Maintaining Good Health through preventative healthcare as this project will develop a new vaccine delivery platform that will contribute to preventing a host of diseases such as viral infections and malaria. The health benefits of better vaccines directly enhance a Healthy Start to Life and Ageing Well. This area of nanoparticle therapies is a global 'hot spot' and this multi-disciplinary team could make huge and rapid progressions in this area of therapeutics. New intellectual property in the area of therapeutic particle production is the cornerstone of this project and could deliver lasting economic benefits through the creation of new health products and patents.

DP0986205 Prof M Forsyth; Prof DR MacFarlane; Dr PC Howlett
Approved Project Title **Interphase Engineering of Reactive Metal Surfaces Using Ionic Liquids**
2009 : \$ 350,000
2010 : \$ 200,000
2011 : \$ 200,000
Primary RFCD 2914 MATERIALS ENGINEERING
Administering Organisation Monash University

Project Summary

Corrosion is a multi-billion dollar problem for all developed countries which limits the use of a number of advanced, light weight alloys in applications ranging from aircraft components to artificial hip-joints. The outcomes of this project will be surface treatments which will enable a range of these applications including magnesium alloys in a wider range of engineering uses, magnesium for advanced metal batteries and coatings for medical implant applications. Many of these applications will make a significant contribution to reducing our greenhouse gas emissions.

DP0985433 Dr JS Forsythe; Mr DR Nisbet; Prof MK Horne; A/Prof DI Finkelstein; Prof MS Shoichet
Approved Project Title **Using nanostructured biomaterials and stem cells to repair spinal cord injuries**
2009 : \$ 132,000
2010 : \$ 102,000
2011 : \$ 102,000
2012 : \$ 152,000
Primary RFCD 2915 BIOMEDICAL ENGINEERING
APD Mr DR Nisbet
Administering Organisation Monash University

Project Summary

There is currently no effective cure for spinal cord injuries and the consequences to the patient are devastating. Spinal cord injuries affects limb, bowel, bladder and sexual function, and many people with these injuries struggle to maintain their independence. Because people can live for many years after spinal cord damage, the financial and social costs are immense, as many are dependent on the help of others for their survival. This proposal tackles this urgent problem by applying advanced nanostructured materials with stem cells, to assist the body in the repair of the spinal cord following injury.

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DP0984563 Prof DT Garrioch
Approved Project Title **Confraternities and religious culture(s) in Enlightenment Paris**
2009 : \$ 65,000
2010 : \$ 39,000
2011 : \$ 43,000
Primary RFCD 4301 HISTORICAL STUDIES
Administering Organisation Monash University

Project Summary

Understanding how religious culture interacts with economic and social change is important in a world where such change presents huge challenges, which is one reason why religious history is undergoing a revival in Australia and internationally. This project will expand this area of research, and in doing so will also reinforce Australia's outstanding international reputation for innovative and independent work in French, urban, and religious history.

DP0985927 Prof Dr JS Gillespie; Prof RP Peerenboom
Approved Project Title **Pushing against globalisation: Understanding how state and non-state actors in socialist transforming East Asia shape global laws and regulations**
2009 : \$ 79,000
2010 : \$ 79,000
2011 : \$ 49,000
Primary RFCD 3903 JUSTICE AND LEGAL STUDIES
Administering Organisation Monash University

Project Summary

Improving trade and investment with China and Vietnam is among Australia's foreign affairs and trade priorities. The predictive model will assist Australian policy makers and business investors/exporters to understand how China and Vietnam are likely to deal with transnational treaty obligations such as the World Trade Organisation and bilateral trade agreements. The project will shed light on domestic resistance to legal globalisation-an inquiry that has been overlooked by existing research. It will also inform important theoretical debates about the role non-state actors play in shaping the regulatory environment in the world's most dynamic economies and improve postgraduate research and teaching programs.

DP0987832 Prof DG Green; Prof HA Abbass
Approved Project Title **Dual phase evolution in networks**
2009 : \$ 160,000
2010 : \$ 90,000
2011 : \$ 110,000
Primary RFCD 2801 INFORMATION SYSTEMS
Administering Organisation Monash University

Project Summary

A grand challenge for modern society is the sheer complexity of vast networks arising from organizations and infrastructures. Unexpected, sometimes catastrophic, behaviour often emerges from interactions within such systems. As a result, the Internet, financial markets, power grids and other vital infrastructures are susceptible to costly problems such as cascading failures, inefficiency, and unpredictability. High-tech industries, such as biotechnology and information networking, face problems in coordinating networks of interacting agents. This project will expand the horizon of complex systems by deriving the design principles underpinning stable and resilient network structures and validate these principles on real world networks.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985304 Dr KA Green
Approved Project Title **A History of Women's Political Thought in Europe 1700-1800**
2009 : \$ 103,000
2010 : \$ 116,000
2011 : \$ 129,000
Primary RFCD 4401 PHILOSOPHY
Administering Organisation Monash University

Project Summary

This research will contribute to Australia's reputation for innovative scholarship on women and feminism and foster the development of models of active female citizenship and political participation by deepening our knowledge and understanding of the contribution that women made to political philosophy in the pre-revolutionary period.

DP0985470 Dr PA Hasking; Prof G Martin
Approved Project Title **A prospective investigation of self-injury, suicidal ideation and psychological distress in Australian secondary school students**
2009 : \$ 190,000
2010 : \$ 100,000
2011 : \$ 100,000
2012 : \$ 20,000
Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES
Administering Organisation Monash University

Project Summary

Suicide prevention has been a national priority for the past 10 years. Self-injury is a predictor of suicide, results in considerable distress for family and friends and is associated with significant health care expenditure. In addition the known correlates of self-injury, such as depression and substance use, also pose significant burden to society and are themselves predictors of suicide. Understanding the nature and extent of self-injury in Australian adolescents, and the causal relationships between self-injury, suicidal ideation and psychological distress, will improve the care given to those who self-injure, improve their well-being, decrease their chances of further self-injury, and decrease the chance they will die by suicide.

DP0984572 Dr J Hohwy; Dr TJ Bayne
Approved Project Title **Conscious states in conscious creatures: A philosophical framework for the science of consciousness**
2009 : \$ 78,000
2010 : \$ 79,000
2011 : \$ 90,000
Primary RFCD 4401 PHILOSOPHY
Administering Organisation Monash University

Project Summary

Consciousness is a major research focus world-wide. Though Australia is well represented in the field, comparatively few Australian researchers have ventured into the philosophy of consciousness science. This project will consolidate Australian research scholarship in this foundational area of philosophy, and will also contribute to the emergence of an experimental science of consciousness. An understanding of consciousness is important for understanding a number of national health concerns such as schizophrenia, coma and epilepsy. This is a project in the philosophical foundations of consciousness science, but it has some potential to inform new research and therapeutic strategies in these areas.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985559 Dr S Homan; Dr M Cloonan; A/Prof R Shuker

Approved Project Title **Policy Notes: Local Popular Music in Global Creative Economies**

2009 : \$ 85,000

2010 : \$ 70,000

2011 : \$ 70,000

Primary RFCD 4101 PERFORMING ARTS

Administering Organisation Monash University

Project Summary

In providing the first comprehensive analysis of how music policy is created, the project assesses the viability of local music industries in a time of rapid, global technological change. It forges new ways of planning the different needs of producers, audiences and government in cultural production; and contribute to the economic and cultural health of Australian popular music industries. The project fills a major gap in Australian and international cultural policy studies in relation to the effectiveness of popular music policy and practice, particularly for industries situated outside the predominant centres of music production in Europe, the U.S. and Asia.

DP0984487 Mr L Humberstone

Approved Project Title **Rules in Logic**

2009 : \$ 32,972

2010 : \$ 32,492

2011 : \$ 68,000

2012 : \$ 28,000

2013 : \$ 32,972

Primary RFCD 4401 PHILOSOPHY

Administering Organisation Monash University

Project Summary

Logic is a foundational discipline which supports work in philosophy and other intellectual fields. Communities and nations are enriched by research in logic even if there are no direct economic benefits. But, in Australia, which has been a world-leader in philosophical logic for the past thirty years, there are also more direct benefits. Continued foundational research in logic attracts international students to Australia, and enhances the international reputation of Australian universities. This research will contribute significantly to Australia's reputation for fundamental logical research.

DP0987678 Prof FH In; Prof R Gencay

Approved Project Title **Modelling the Optimal Hedge Fund Portfolio Using a Multiscaling Method**

2009 : \$ 40,000

2010 : \$ 25,000

2011 : \$ 25,000

Primary RFCD 3503 BANKING, FINANCE AND INVESTMENT

Administering Organisation Monash University

Project Summary

Asset allocation theory sits at the heart of modern finance, yet remains something of a conundrum. By developing the a longer-horizon framework to asset allocation involving hedge funds, this project provides a significant insight onto sources of risk-horizon effects on asset allocation and allow us to understand how the exposure of hedge funds to the market risk varies across investment horizons. This allows academics to address a wide range of problems in optimal asset allocation and performance measurement. In addition, the outcomes can be applied to risk management by practitioners for their international and Australian domestic investors.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987643 Prof SP Jackson; Dr WS Nesbitt; Mr A Fouras

Approved Project Title **Development of Model Systems to Investigate Blood Hydrodynamic Parameters Affecting Blood Cell Function: An Interdisciplinary Approach**

2009 : \$ 140,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation Monash University

Project Summary

National benefit will come through this research contributing to a better understanding of blood flow biology and pathology, both of which are of particular relevance to the aging Australian population. This benefit is well aligned with the 2008 National research priority 2: Promoting and Maintaining Good Health; Priority Goal 3. Preventative Health. The synthesis of both extensive expertise in platelet/cardiovascular research and bioengineering/rheology should provide a substantial platform from which fundamental new discoveries in this niche area can be made. The development of novel platelet analysis tools arising from this work may also ultimately lead to new intellectual property and attract industry based funding.

DP0985665 Prof C Jakob; Prof MJ Reeder

Approved Project Title **Rainfall over the Maritime Continent and Northern Australia**

2009 : \$ 150,000

2010 : \$ 110,000

2011 : \$ 110,000

Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation Monash University

Project Summary

Australia's proximity to the tropics results in major influences, both direct and indirect, of tropical weather and climate on society as a whole. Tropical convection is key to all those influences. The prediction of the many natural hazards related to convection as well as a projection of the influence and strength of these hazards under climate change is a matter of high national priority. Through an improved understanding of convection over tropical Australia and in its vicinity, the proposed research will improve our predictive tools and capabilities, thereby making a major contribution to decision-making in an environmentally sustainable Australia.

DP0985088 Prof DE Jesson; A/Prof MJ Morgan

Approved Project Title **Imaging surface topography using Lloyd's Mirror in photo-emission electron microscopy**

2009 : \$ 100,000

2010 : \$ 60,000

2011 : \$ 60,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation Monash University

Project Summary

The wide-ranging and innovative nature of the proposal will significantly raise Australia's international profile in condensed matter physics through high impact publications and invited presentations at major international conferences. Researchers will be trained in cutting-edge electron microscopy and synchrotron science. A spin-off company will be formed to commercialise software for reconstructing surface topography and generating movies of dynamic events. The development of new synchrotron based electron microscopy techniques will establish the expertise for the future creation of a dedicated nanotechnology beamline equipped with photo-emission electron microscopy which will have far reaching national benefit in the physical sciences.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985290 Prof DE Jesson

Approved Project Title **Quantum Dot Self-Assembly via Langmuir Decomposition**

2009 : \$ 120,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation Monash University

Project Summary

We will develop a new capability to precisely position quantum structures on surfaces in large-scale patterns, solving a key problem in nanotechnology. We expect to generate patents governing key lithographic technology which will underpin the fabrication of the next generation of devices and we anticipate the generation of spin-off companies in this area. The ability to integrate new quantum structures into optoelectronics will impact everyday life from communications and lighting to environmental sensing and medical care. The project will generate key expertise and high level training for post-doctoral fellows and post-graduate students in materials physics and nanotechnology.

DP0986291 Prof R Jones; Dr BR Hinton

Approved Project Title **Supersonic Particle Deposition Of Metal Matrix Composite/Aluminium Alloy For Ensuring The Continued Airworthiness Of Damaged Structures**

2009 : \$ 50,000

2010 : \$ 50,000

2011 : \$ 50,000

Primary RFCD 2902 AEROSPACE ENGINEERING

Administering Organisation Monash University

Project Summary

The June 2007 Report to Congress by the US Under Secretary of the Department of Defence (Acquisition, Technology and Logistics) estimated the cost of corrosion associated with US DoD systems to be between \$10 billion and \$20 billion annually. It further stated that the US DoD has focused its life-cycle corrosion research and development efforts on four primary areas one of which is repair processes that restore corroded materials to an acceptable level of structural integrity and functionality. This project specifically addresses that topic and as such will have a significant impact on Australia's Defence infrastructure.

DP0984775 Prof PC Junk; Prof GB Deacon

Approved Project Title **Rare Earth Metal-Organic Compounds - A Source of Continuing Excitement**

2009 : \$ 200,000

2010 : \$ 140,000

2011 : \$ 140,000

Primary RFCD 2502 INORGANIC CHEMISTRY

Administering Organisation Monash University

Project Summary

Australia has the world's second largest rare earth resources which are at best exported unprocessed leading to an 80-fold mark up on import of separated products. This project builds the expertise and knowledge needed to underpin Australian rare earth processing and develops the breakthrough science needed for new applications or rare earths.

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DP0988483 Prof FC Klebaner; Dr K Hamza; Dr B Buchmann

Approved Project Title **New Stochastic Processes with Applications in Finance**

2009 : \$ 80,000

2010 : \$ 80,000

2011 : \$ 80,000

Primary RFGD 2302 STATISTICS

Administering Organisation Monash University

Project Summary

This project investigates the properties and the use of two new families of models with applications in Finance, and beyond. It will contribute to the development of fundamental research in mathematics and its applications. The project will produce more realistic financial models that will benefit researchers in this field. This will in turn have a flow on effect to benefit the wider community. The project will provide for postgraduate training and international scientific exchange. Overall, the project will strengthen Australia's standing at the forefront of fundamental and applied research.

DP0984404 Prof SY Kneebone

Approved Project Title **Law, Governance and Regulation of Intra-regional Labour Migration in South East Asia: An Agenda for Protection and Development**

2009 : \$ 30,000

2010 : \$ 90,000

2011 : \$ 50,000

Primary RFGD 3903 JUSTICE AND LEGAL STUDIES

Administering Organisation Monash University

Project Summary

Safe and effective labour migration in the South East Asian region contributes to the prosperity, security and stability of the region and of Australia's trading partners. This project will contribute to safeguarding Australia by improving our legal and policy responses to people movement and by tackling the problem of transnational crime associated with irregular migration (smuggling) and trafficking. The project will enhance Australia's reputation, leadership and influence in the South East Asian region and will lead to economic and social benefits for Australia through strengthening co-operative relationships and improved prosperity in the region.

DP0986052 Prof G Lu; A/Prof K Ting; Dr D Zhang

Approved Project Title **Automatic music feature extraction, classification and annotation**

2009 : \$ 100,000

2010 : \$ 70,000

2011 : \$ 80,000

Primary RFGD 2899 OTHER INFORMATION, COMPUTING AND COMMUNICATION SCIENCES

Administering Organisation Monash University

Project Summary

Music is a huge industry currently undergoing a major revolution. The industry is shifting from music-making to music retrieval and its incorporation into a range of products from TV, and film, to music streaming into locations and events, as well as MP3 players and all kinds of electronic devices. This research will support immediate retrieval of music that meets the current industry need, based not just on titles, composers and/or performers, but on the actual properties of the music itself. The knowledge and music processing techniques developed will give Australian music industry an advantage over other countries.

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DP0984170 Prof RC Mac Nally; Dr E Fleishman

Approved Project Title **Change ecology - gaining broad-scale, timely biodiversity knowledge in a time of uncertainty**

2009 : \$ 160,000

2010 : \$ 140,000

2011 : \$ 140,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation Monash University

Project Summary

Australians are confronted daily with the consequences of changes wrought by human over-exploitation of natural resources. Our capacity to track and respond to change is very limited and slow. Thus, rapid deterioration of ecologically important aspects is detected late and is not reflective of the general state because knowledge is derived from small-scale measurements that are difficult to generalize. We will build a capacity for providing large-scale knowledge of vegetation condition and flow-on effects on biodiversity, which also will allow us to make informed assessments of the ecological consequences of some existing (climate change, drying) and imminent (biofuel plantings) drivers of change.

DP0984811 Prof JB Madsen; A/Prof PE Robertson

Approved Project Title **Growth, Trade, and Economic Development in Asia**

2009 : \$ 100,000

2010 : \$ 52,000

2011 : \$ 52,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation Monash University

Project Summary

Future growth in Asia has strong implications for growth, relative wages, skill levels, human capital accumulation and trade in Australia. This project seeks to gain insight into whether the high economic growth rates experienced in Asia will continue into the future and whether low income Asian countries will take off in the future. This information will be used to simulate future demand for skills, relative wages, trade and the incentives to invest in Australia and give insight into the effects of various policies in Australia on educational decision, skill composition, relative wages, trade and growth.

DP0987168 Prof KG Marriott; Prof PJ Stuckey; Dr B Bos

Approved Project Title **Supporting adaptive, interactive documents**

2009 : \$ 175,000

2010 : \$ 170,000

2011 : \$ 170,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation Monash University

Project Summary

The project will improve comprehensibility of technical material, reduce paper usage, encourage collaborative science, improve the reliability of published science (by allowing post-publication annotation and correction), and improve the accessibility of technical material for readers who are blind or have poor vision. The project also holds considerable potential for supporting Australian companies in the publishing and document processing industries.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0988037 A/Prof A Marsh
Approved Project Title **Remediation: Performance Art and Video Performance**
2009 : \$ 45,000
2010 : \$ 51,000
2011 : \$ 53,000
Primary RFCD 4199 OTHER ARTS
Administering Organisation Monash University

Project Summary

This project addresses National Research Priority 4: Safeguarding Australia, priority goal 'understanding our region and the world'. Its benefits will be felt within the cultural community in Australia and across the world. It will encourage overseas curators to include Australian works in their exhibitions; in turn this will generate international scholarship on works from Australia. This will set up a healthy critical dialogue and contribute to knowledge transfer and exchange between Australia and the rest of the world.

DP0985234 A/Prof GM Martin; Dr CS Forbes; Prof MJ Silvapulle; Prof B McCabe
Approved Project Title **Non-parametric estimation of forecast distributions in non-Gaussian state space models**
2009 : \$ 70,000
2010 : \$ 70,000
2011 : \$ 70,000
Primary RFCD 3404 ECONOMETRICS
Administering Organisation Monash University

Project Summary

The production of accurate forecasts is arguably one of the most challenging tasks in economics, business and finance, where data often assume strictly positive, integer or binary values, or are characterized by many extreme values far from the average. This project will produce new, state-of-the-art statistical methods for generating accurate estimates of the probabilities attached to different possible future values of such variables. Although far-ranging in scope, the techniques advocated will have particular impact in the financial sphere, where the concept of future risk is inextricably linked to the probability of occurrence of extreme values and, hence, to the future probability distribution of the financial variable.

DP0985481 Dr M Massi; Dr F Biscarini
Approved Project Title **Design and synthesis of novel lanthanoid complexes for the fabrication of light emitting devices**
2009 : \$ 65,000
2010 : \$ 65,000
2011 : \$ 65,000
2012 : \$ 65,000
Primary RFCD 2502 INORGANIC CHEMISTRY
APD Dr M Massi
Administering Organisation Monash University

Project Summary

There is a huge and still growing economy centred around the design and fabrication of low-cost Light Emitting Devices (LEDs), as demonstrated by the excess of US\$1.3 billion invested in this field between 2000 and 2007. Nations focused on the production of new and more efficient materials will be at the forefront of these emerging technologies. The major thrust of this proposal, the design and preparation of luminescent rare earths complexes, and their use for the fabrication of LEDs, represent a good opportunity for Australia to access this growing market.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984496 Prof EN Meeusen; Prof R O'Hehir
Approved Project Title **Molecular determinants of an allergic response**
2009 : \$ 150,000
2010 : \$ 110,000
2011 : \$ 110,000
Primary RFCD 3202 IMMUNOLOGY
Administering Organisation Monash University

Project Summary

Some humans develop allergies after exposure to environmental allergens while others do not. At present, the reason for this individual variation is not known. By comparing the processes activated in allergic versus non-allergic individuals, this study will identify critical molecules involved in making individuals susceptible to allergies, which will be used to develop safer and more effective allergy vaccines.

DP0987650 Dr P Miao
Approved Project Title **Geometry of manifolds of non-negative scalar curvature**
2009 : \$ 105,000
2010 : \$ 95,000
2011 : \$ 115,000
Primary RFCD 2301 MATHEMATICS
Administering Organisation Monash University

Project Summary

This proposal will benefit Australia in several ways: Its outcomes will make Australia a world leader in research on scalar curvature, and consequently help Australia secure its position among world leaders in research on differential geometry and differential equations; Overseas world-class experts will be attracted to Australia by the impact of this research to develop further collaboration; More and more talented Australian students will be motivated to pursue science-based and mathematics based studies, thereby improving the mathematical skills of the Australian workforce.

DP0988685 Dr B Miller
Approved Project Title **Control of Markov jumping processes with constraints**
2009 : \$ 85,000
2010 : \$ 70,000
2011 : \$ 70,000
Primary RFCD 2301 MATHEMATICS
Administering Organisation Monash University

Project Summary

The project outcomes will constitute the set of tools for modelling and optimisation of complex stochastic systems and will lead to new and more precise characterisations of optimal behaviour of complex controllable systems arising in Resource Management, Engineering and Telecommunications. Therefore, the project fits to the research priority areas Breakthrough Science and Frontier Technologies in the topic of mathematical modelling and optimisation of Complex Systems.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984648 A/Prof V Morabito; Dr BJ Sweeney

Approved Project Title **Evaluating Federal class actions through empirical and comparative perspectives**

2009 : \$ 141,000

2010 : \$ 50,000

2011 : \$ 45,000

Primary RFCD 3904 LAW ENFORCEMENT

Administering Organisation Monash University

Project Summary

Sixteen years after the introduction of a Federal class action regime (Part IVA), it is time for an accurate assessment (through an empirical and comparative study) of whether the concerns expressed by numerous commentators - that Part IVA has failed to enhance access to justice and judicial economy and has frequently been abused by the legal representatives of Part IVA parties and litigation funders - are justified. This study will finally provide Australian lawmakers with a detailed reform agenda to ensure that Part IVA will provide the benefits that it was intended to secure whilst operating in a fair and just manner. It will thus benefit similarly situated claimants, respondents, the Federal Court and the broader community.

DP0985326 Dr J Nie; Prof BC Muddle; Prof JM Howe; Prof Y Wang

Approved Project Title **A Predictive Approach to the Formation of Plate-Shaped Strengthening and Toughening Constituents in Advanced Metallic and Ceramic Materials**

2009 : \$ 170,000

2010 : \$ 120,000

2011 : \$ 150,000

Primary RFCD 2913 METALLURGY

Administering Organisation Monash University

Project Summary

Development of stronger and tougher materials has been largely empirical and the properties obtained so far are only a small fraction of the theoretical values. One of the key steps to develop stronger and tougher materials is to understand the mechanisms responsible for the formation and distribution of key strengthening and/or toughening components in the materials. This project seeks to make this step. The findings will provide guidance to the development of stronger and tougher materials for the aerospace, aircraft and automotive industries. This project provides opportunities to strengthen the collaboration with USA experts and to train early career researchers.

DP0984468 Prof GR Oppy; Dr T Handfield; Prof B Loewer; Dr JN Butterfield; Prof AJ Bird

Approved Project Title **Neglected Problems of Time: Metaphysical and topological issues arising from the physics of time**

2009 : \$ 100,000

2010 : \$ 78,014

2011 : \$ 136,486

Primary RFCD 4401 PHILOSOPHY

Administering Organisation Monash University

Project Summary

Foundational philosophical research contributes to the global stock of understanding. Further, it secures and enhances Australia's international standing as a site of foundational research. Given the global nature of higher education, this enhancement of reputation serves to make Australia a more desirable destination for students (and, in this indirect way, makes a contribution to one of Australia's largest markets). More directly, foundational research enhances any community in which it takes place--the thirst for understanding is one of the distinctive characteristics of human beings, and support for the quest for understanding is an essential part of any well-functioning society.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987500 A/Prof CJ Porter; Dr MJ Scanlon; Dr T Mantamadiotis

Approved Project Title **Guiding ligands to nuclear receptors: The role of fatty acid binding proteins.**

2009 : \$ 120,000

2010 : \$ 120,000

2011 : \$ 120,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

Administering Organisation Monash University

Project Summary

Considerable recent effort has been directed towards the development of Australia as a focal point for biotechnology and drug discovery. The principal operational focus of this effort has been the identification of potent and active new chemical entities. In order for these new molecules to be most useful in the community, however, they must be active after oral administration. This project will examine the fundamental mechanisms by which drugs are absorbed across the cells lining the intestine and will provide insight critical to the design and development of new drugs that are both potent and orally active.

DP0985348 Em/Prof M Quartly; Prof DM Cuthbert; Prof SL Swain

Approved Project Title **The search for family: A history of adoption in Australia**

2009 : \$ 102,000

2010 : \$ 82,000

2011 : \$ 71,000

2012 : \$ 70,000

Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation Monash University

Project Summary

How has Australia cared for its children? This study will fill a significant gap in the nation's self-understanding by explaining the historical factors driving the changing place, meaning and significance of adoption. Whilst participants and practitioners debate its social worth, the policy pendulum is swinging back to an acceptance of adoption. Australian society is in urgent need of an open hearing of the contesting voices, and a balanced account of the historical impact of adoption. Our project promises both, thus 'understanding and strengthening (a) key element of Australia's social fabric' - the family.

DP0986712 Dr MJ Reid; Prof FT Mavondo; Prof A Worsley

Approved Project Title **A Model and Segmentation of Household Obesogenicity in Australia**

2009 : \$ 38,000

2010 : \$ 28,000

2011 : \$ 27,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation Monash University

Project Summary

Critical to reducing obesity is reduced consumption of energy dense foods and increasing physical activity. This project provides greater insight into relationships between environment, household obesogenicity and consumer behaviour, and an improved basis for policy development regarding obesity prevention. National benefits are; Less obesity and other nutritionally related diseases and therefore reduced treatment costs in the health sector; Reduced demand for unhealthy foods and greater demand for higher quality products boosting product innovation and supporting Australia's competitiveness in the global markets; Greater health benefits among the low SES parts of the population contributing to creation of equity in Australian health.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0987059 Prof GP Risbridger; Dr RA Taylor

Approved Project Title **Keeping stem cells on track: maintaining organ and tissue homeostasis**

2009 : \$ 117,000

2010 : \$ 95,000

2011 : \$ 95,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation Monash University

Project Summary

The novel findings from this study are of fundamental importance of understanding how stem cells maintain their characteristic features as they renew themselves over a lifetime. This work will inform the National Research Priority of "Promoting and maintaining good health" because stem cell renewal is required during tissue turnover and these results will show how cells communicate with each other to achieve this.

This work is based on a unique combination of expertise in stem cell and reproductive biology and showcases Australian science.

DP0984748 Dr AF Ross; Prof K Ziarek; Prof AE Benjamin

Approved Project Title **Persuasive Force: The Role of Aesthetic Experience in Moral Persuasion**

2009 : \$ 67,000

2010 : \$ 55,000

2011 : \$ 52,000

Primary RFCD 4401 PHILOSOPHY

Administering Organisation Monash University

Project Summary

This project will make a significant contribution to the pressing contemporary topic of moral motivation. Because of its innovative approach to the problem of moral motivation this proposal will have an international impact on debates over moral conduct and raise the international profile of Australia in this field. In addition to its academic benefits for research training and our national research reputation, this proposal has implications for the way social policy is devised. In particular, the reconsideration of the sources of moral action proposed here has important implications for understanding the dynamics involved in religious fundamentalism and political violence.

DP0986413 Prof TL Seddon; Dr C Joseph; Dr A Devos; Dr LL Henriksson; Dr B Niemeyer

Approved Project Title **The Teaching Occupation in Learning Societies: A global ethnography of occupational boundary work**

2009 : \$ 75,000

2010 : \$ 75,000

2011 : \$ 85,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation Monash University

Project Summary

Education is a key instrument for governments and communities managing economic and social development. Yet the historical model of closed centralised national school and training systems cannot meet current government policy or community expectations in open global economies. This global ethnography contributes to knowledge about changes in teaching as an occupation; provides evidence about re-ordered relationships, cross-border demands and boundary work in teaching; suggests policy solutions to address occupational renewal and teacher workforce development; develops innovative global research methodologies and strategies; and consolidates expert global networks in education and human service work as a resource for Australian research.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985210 Prof PM Sexton; Prof R Abagyan

Approved Project Title **Understanding and predicting small molecule binding to G protein-coupled receptors (GPCRs)**

2009 : \$ 130,000

2010 : \$ 100,000

2011 : \$ 100,000

Primary RFCD 2506 THEORETICAL AND COMPUTATIONAL CHEMISTRY

Administering Organisation Monash University

Project Summary

The discovery of new treatments for serious diseases is a time consuming and expensive process. Our work involves developing and testing new computational modelling approaches with experimental validation for the understanding and prediction of how current and new drugs interact with their targets, and these methods can be extended for improved understanding of how other proteins work. Our approaches have the potential to increase the speed, reduce the cost and lead to the discovery of new treatments for serious crippling diseases such as anxiety, depression, diabetes, and obesity.

DP0986814 A/Prof B Shirinzadeh; Prof JA Smith; Dr Y Zhong

Approved Project Title **High-Fidelity Modelling for Robotic-Assisted Minimally Invasive Needle Insertion**

2009 : \$ 50,000

2010 : \$ 50,000

2011 : \$ 50,000

Primary RFCD 2903 MANUFACTURING ENGINEERING

Administering Organisation Monash University

Project Summary

This project will develop robotic-assisted needle insertion and greatly improve minimally invasive surgery. It will also enhance the establishment of intellectual property for Australian medicine and produce important benefits to the healthcare sector. The proposed symbiotic integration of the systems will advance modelling technologies, and further create new capabilities for a wide range of science and engineering applications. The established methodologies and systems will also provide great potential benefits in many other areas, including microbiology, life sciences and bio/nano-technology. The project's outcomes will further consolidate Australia's position in innovative technologies and international research and development.

DP0987687 Dr D Taniar; Prof B Srinivasan

Approved Project Title **Mobile Query Processing: An Integrated Approach**

2009 : \$ 60,000

2010 : \$ 50,000

2011 : \$ 70,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation Monash University

Project Summary

Mobile communication is a frontier technology, and providing efficient mobile query services to the general public is critical in placing Australia as a leading country in mobile information services. The benefit to Australia nationally is beyond the telecommunication industry. The project will transform other Australian industries which rely on mobile information services, including emergency response services (eg. ambulance, police), mobile workforce and mobile commerce, transportation/traffic controller, bureau of meteorology, defence/army forces, financial market, as well as tourism and news. With the enormous growing of investment in these industries, this project will become a major contribution to national productivity and growth.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0985730 A/Prof AJ Tilbrook; Prof IJ Clarke; Prof PH Hemsworth

Approved Project Title **Dissecting the impact of stress on reproduction: Novel peptide mediates inhibitory effects of stress on female reproduction**

2009 : \$ 150,000

2010 : \$ 120,000

2011 : \$ 120,000

Primary RFCD 2706 PHYSIOLOGY

Administering Organisation Monash University

Project Summary

This research proposal offers a pioneering opportunity to develop treatments that overcome the negative impact of stress on reproduction. Specifically, knowledge generated in this project will be vital in the development of strategic defences against the impact of stress on reproduction. This project fundamentally addresses Research Priority 2: Promoting and maintaining good health. Given that suppression of reproduction by stress occurs in all mammalian species including humans, domestic animals and wildlife, being able to prevent or overcome stress-induced reproductive dysfunction will generate significant health, social, economic and ecological benefits.

DP0986590 Dr LT Tran

Approved Project Title **International Students in the Australian Vocational Education and Training (VET) Sector: Study Purposes, Learning Practices and Institutional Responses**

2009 : \$ 62,063

2010 : \$ 77,923

2011 : \$ 74,403

2012 : \$ 61,443

Primary RFCD 3301 EDUCATION STUDIES

APD Dr LT Tran

Administering Organisation Monash University

Project Summary

This research melds with the fundamental objectives of the Australian National Strategy for VET 2004-2010 which aims to increase vocational education and training exports and ensure Australian VET standards are more harmonized with international standards. The project will assist the development of policies and strategies that can address the complex needs of the international student population and the capacity of the VET sector to internationalise the curriculum. The project will also identify qualities and factors that are important for optimizing the competition of the VET sector in the global education industry which has become Australia's leading services export sector.

DP0986984 Dr L Veracini

Approved Project Title **Settler colonialism: a global history**

2009 : \$ 117,220

2010 : \$ 117,220

2011 : \$ 117,220

2012 : \$ 117,220

2013 : \$ 117,220

Primary RFCD 4301 HISTORICAL STUDIES

QEII Dr L Veracini

Administering Organisation Monash University

Project Summary

Australia is usually defined as a 'settler society', but this term, while often being politically charged, is vaguely defined. This project seeks to place the Australian experience in its international context. In doing this, it will offer new insights into the past and future development of Australian political institutions and traditions. It will promote an appreciation of how Australian history fits within global developments and how a comparative and global perspective generates new possibilities and insights for the writing, reading and teaching of Australian history. It will also stress Australia's important role in the development of this globally significant phenomenon.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0984466 A/Prof DW Walker; Dr H Dickinson

Approved Project Title **Who determines gestation length - mother or fetus?**

2009 : \$ 140,000

2010 : \$ 100,000

2011 : \$ 100,000

2012 : \$ 60,000

Primary RFCD 3210 CLINICAL SCIENCES

APD Dr H Dickinson

Administering Organisation Monash University

Project Summary

This project will extend our knowledge of a key biological process - pregnancy. Variation of gestation length by 10% is generally deleterious to the offspring, and smaller babies have been shown to be more susceptible to later life diseases. Therefore, extension of the information gained from this project will likely impact researchers in species conservation, pest control, and the livestock industries, as well as human, obstetric care and practice. Specifically, knowledge gained from this project may lead to means of limiting (pest control) as well as enhancing (endangered species) species survival.

DP0987614 Dr HM Watt; Dr PW Richardson

Approved Project Title **Early career teachers' personal wellbeing and professional commitment**

2009 : \$ 100,000

2010 : \$ 80,000

2011 : \$ 80,000

2012 : \$ 60,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation Monash University

Project Summary

Australia is facing retention difficulties in the teaching profession which will increase staffing and financial burdens on the educational and wider community. This project will document the experiences of early career teachers with a view to establishing levels of personal wellbeing and professional engagement and commitment. It is expected that the study will show that low levels of wellbeing and school climate factors are major contributors to the loss of early career teachers. This evidence will be invaluable to government and educational policymakers keen to sustain early career teachers' wellbeing and best support them to reduce attrition from the profession.

DP0986389 A/Prof MJ Watt; Prof BE Kemp

Approved Project Title **Regulation of lipolysis: new players, new paradigms**

2009 : \$ 125,000

2010 : \$ 115,000

2011 : \$ 115,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation Monash University

Project Summary

The way in which fat is broken down is poorly understood. This research will determine how important proteins in fat breakdown are turned on and off. By understanding this relationship, effective pharmaceutical treatments will be developed that will enhance the capacity to burn fat and ultimately reduce the incidence of type 2 diabetes and cardiovascular disease, and ease the associated financial burden on the community and healthcare system. Understanding fat breakdown is also important for developing new processing technologies in the food industry.

Summary of Discovery Projects Proposals for Funding to Commence in 2009

DP0986811 Prof JC Whisstock; Dr MA Dunstone

Approved Project Title **Structural and Functional studies on Membrane Attack Complex / Perforin-like proteins**

2009 : \$ 310,000

2010 : \$ 273,000

2011 : \$ 300,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation Monash University

Project Summary

Membrane Attack Complex Perforin (MACPF) proteins play crucial roles in immunity and development. Together, these molecules comprise the largest family of pore forming proteins in eukaryotes. This proposal will result in a major advancement of knowledge in our understanding of the MACPF mechanism of pore formation. These data will provide fundamental insight into how proteins can change shape and adopt both water-soluble and membrane bound states. Our work will also eventually be important in developing approaches to control unwanted MACPF function, for example in diabetes or transplant rejection. Finally, a detailed understanding of how MACPF proteins assemble into rings and punch holes in membranes will facilitate the development of these proteins as technological tools.

DP0987761 Dr JA Wilce; Prof DN Krag

Approved Project Title **Optimisation of peptidic non-phosphorylated inhibitors of the Grb7 SH2 domain**

2009 : \$ 150,000

2010 : \$ 135,000

2011 : \$ 135,000

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 inhibitor development 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 developments in the pharmaceutical industry.

DP0985253 Dr LY Yeo

Approved Project Title **Electrohydrodynamically-Driven Microcentrifugation for Microfluidic Applications**

2009 : \$ 150,000

2010 : \$ 130,000

2011 : \$ 130,000

2012 : \$ 110,000

2013 : \$ 130,000

Primary RFCD 2405 CLASSICAL PHYSICS

ARF Dr LY Yeo

Administering Organisation Monash University

Project Summary

Microfluidics has the potential to revolutionise the way we live. Imagine portable pocket sized devices for cheap and rapid medical diagnostics and drug delivery. Or miniaturised chemical/biological sensors as early warning detection systems against terrorist threats. The research is thus intended to not only commercially benefit various industries, but also to improve the quality of life as a whole by making medical diagnosis or chemical/biological detection more readily accessible, portable and more efficient. Moreover, the fundamental studies, aimed at generating an understanding of the complex physics involved, has generic benefits to researchers in applied physics as well as providing practical protocols for microdevice development.