New South Wales

The University of New South Wales

DP0881037 Dr SS Ajiev

Approved Project Title **Functional and harmonic analysis of function spaces: synthesis, development and applications**

2008 : $ 78,648
2009 : $ 78,648
2010 : $ 78,648

Primary RFCD 2301 MATHEMATICS

APD Dr SS Ajiev

Administering Organisation The University of New South Wales

Project Summary

Recent advances in mathematics are on the borderlines of its branches. This interdisciplinary project develops and binds the research areas attracting growing interest of prominent mathematicians during the last 30 years because of not only its theoretical value, but also its ties with the key equations describing a multitude of physical phenomena and the theoretical foundation of numerical methods. The Euler, Helmholtz, Lamb, Navier-Stokes and acoustic equations, studied in terms of function spaces, govern incompressible viscous fluid flows and wave propagations. Contributing to both pure mathematics and, particularly, Short-Term Tsunami Prediction, the project will enhance Australia's research reputation.

DP0881442 Prof CA Alexander

Approved Project Title **The Young Writer in History**

2008 : $ 77,472
2009 : $ 40,972
2010 : $ 40,972

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation The University of New South Wales

Project Summary

The project will add significantly to the theorization and documentation of children's literary and cultural history. It will contribute to the establishment of Literary Juvenilia in the academy, making it a viable and recognized area of literary research. It will enlarge and alter the critical reception of childhood writings, particularly in the nineteenth-century. It has the potential to radically alter the boundaries of Children's Literature. Such a study will also benefit approaches to literature in schools (the study of Juvenilia can be inspiring for young writers); and will showcase Australian scholarship that is taking the lead in innovative research in international literary studies.

DP0881800 Dr BL Anderson

Approved Project Title **Image segmentation and the perception of lightness and color**

2008 : $ 160,282
2009 : $ 128,000
2010 : $ 126,009
2011 : $ 117,000
2012 : $ 129,857

Primary RFCD 3801 PSYCHOLOGY

APF Dr BL Anderson

Administering Organisation The University of New South Wales

Project Summary

Almost half of the brain is involved in interpreting visual information, which provides the most detailed and precise information about the external world for humans (and many other species). Despite the great ease with which our brains determine the structure and properties of the world from visual information, this is an extremely difficult problem. One of the most basic issues involves understanding how the brain determines the perceived color of objects, despite drastic variations in the illumination and atmospheric conditions (such as smoke or fog) in which objects are embedded. This research will provide valuable insight into how the visual system solves this important problem.

DP0878580 Prof EJ Anderson; A/Prof HR Outhred; Dr IF MacGill; Dr RA Betz

Approved Project Title **Understanding the interactions between emissions trading and wholesale electricity markets**

2008 : $ 150,000
2009 : $ 142,000
2010 : $ 136,000

Primary RFCD 2909 ELECTRICAL AND ELECTRONIC ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Australia faces some critical decisions with regard to its commitment to reducing emissions of greenhouse gases. There are a variety of emissions-related trading schemes that operate at a State level, and there are now proposals to introduce a National scheme. This research will help in the design of an emissions trading scheme through the use of sophisticated models of the behaviour of individual generation companies operating in a complex market situation. Also this project will build the skill base of Australia in an area of increasing importance where a multi-disciplinary focus is critical.

DP0881643 Prof MC Ashley; Dr DK Galloway; Prof CW Akerlof; Prof WT Vestrand

Approved Project Title **Gamma-ray burst astronomy in the Swift era and beyond**

2008 : $ 115,000
2009 : $ 114,000
2010 : $ 109,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation The University of New South Wales

Project Summary

The study of gamma-ray bursts is one of the most active and exciting fields in astrophysics, and touches on subjects that are of interest to all humans: e.g., to what extent was life on Earth shaped by cataclysmic explosions in our Galaxy? Australia's ROTSE-III telescope is the only facility in the southern hemisphere capable of rapidly (within 10 seconds) finding optical light from gamma-ray bursts. It will provide Australian astronomers with a competitive advantage in this high-profile field. The project will involve and inspire some of our best physics and engineering students.

DP0881692 Dr GE Ball; Prof AF Hill

Approved Project Title **An Integrated Synthetic and NMR Spectroscopic Study of Photochemical Organometallic Bond Activation**

2008 : $ 163,000
2009 : $ 114,000
2010 : $ 109,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation The University of New South Wales

Project Summary

Modifications of alkanes and related processes under study will occupy the heart of next generation catalysed chemical processes that may ultimately be used globally on a vast scale. A detailed knowledge of mechanism is the precursor to rational design and improvement of catalysed processes, making them more efficient and greener. This will allow better usage of Australia's natural gas and precious metal resources and benefit local chemical companies. Specialized new NMR technology that will greatly aid a wide range of local researchers will be developed to facilitate these studies. The researchers of the future will also be trained.

DP0881455 Dr P Banks; Prof EM Korpimaki

Approved Project Title **Protecting prey with chemical camouflage**

2008 : $ 104,576
2009 : $ 125,830
2010 : $ 84,350
Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation The University of New South Wales

Project Summary

We develop an entirely new solution to protect rare and endangered wildlife and to improve the survival of rehabilitated and reintroduced animals at risk from alien predation. Our cost-effective approach will improve conservation efforts in Australia and our solution can be used by both large conservation organisations as well as small community groups aiming to protect key wildlife. Our technique can also be exported to solve alien species problems elsewhere in the world. This work strengthens Australia's world renowned expertise for research into alien species and ability to develop novel solutions to alien impacts

DP0877122 Dr L Barner; Prof AH Mueller; Dr H Schmalz

Approved Project Title **Design of Polymeric Devices for Biotechnological Applications**

2008 : $ 55,000
2009 : $ 44,000
2010 : $ 49,000
Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

Administering Organisation The University of New South Wales

Project Summary

The research project focuses on the development of functional polymer particles for diagnostic applications. Advanced polymer chemistry will be used to synthesize devices for reliable and fast diagnostic systems. The outcome of this work will help promoting and maintaining good health in Australia by developing novel technologies and advanced materials based on polymer science.

DP0881553 A/Prof B Benatallah; Prof M Hassan; Prof Dr F Casati; Prof SK Das

Approved Project Title **Next Generation Ubiquitous Service Spaces**

2008 : $ 160,000
2009 : $ 155,000
2010 : $ 150,000
Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of New South Wales

Project Summary

The challenges facing the next generation ubiquitous service computing come from scale and variability in user activities, services, and network connectivity. The project will deliver innovative, useful, and usable concepts and tools to allow provisioning of services in large scale, dynamic, and heterogeneous environments. This research will have significant benefits to Australia. It will strengthen research capabilities and provide an ideal opportunity to train postgraduate research students in cutting edge technologies. It will enhance smart information use for useful information sharing among individuals, private or public organisations. It will facilitate the development of IT solutions that help citizens be self-supported.

DP0879142 Prof BH Bennett; Dr A Pender; Dr IR Henderson

Approved Project Title **Reverse Diaspora: Australian Expatriate Writers in Britain since the 1830s.**

2008 : $ 62,972
2009 : $ 30,000
2010 : $ 62,972
Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation The University of New South Wales

Project Summary

The changing relations between Australia and Britain are explored in this project through writers of literature and drama. Reverse Diaspora explores the aspirations, problems and achievements of eighty expatriate Australians who have chosen to live and work in Britain since the early nineteenth century. From one point of view they represent a 'brain drain'; from another they are exporters of Australian ideas, experience and talent. This study will increase knowledge and understanding of the lives, creative achievements and public impact of Australians abroad. It will enhance Australians' capacity to interpret their national culture in their region and the world.

DP0879391 A/Prof J Bennett

Approved Project Title **Practical Aesthetics: A Study in Understanding Real Events through Contemporary Art**

2008 : $ 49,000
2009 : $ 49,000
2010 : $ 43,000
Primary RFCD 4199 OTHER ARTS

Administering Organisation The University of New South Wales

Project Summary

This project advances the concept of practical aesthetics to demonstrate how art is of direct benefit to both the academic and wider community, furnishing concrete techniques that enable us to apprehend and understand key social and political events. It engenders an exhibition, public symposia, a workshop with student/international participation, and a book/articles, presenting Australian art in an international framework. The project extends the discipline base of art history, promoting and facilitating the use of art in other disciplines and in debates on events relating to issues of national importance (including border control, Reconciliation, and environmental disaster).

DP0877576 Prof RA Bryant

Approved Project Title **Enhancing Hypnotic Responding with Oxytocin**

2008 : $ 80,000
2009 : $ 49,000
2010 : $ 49,000
Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

Although hypnosis has been studied for over a 100 years, little is understood about the neuroscience of hypnosis. This project represents the first investigation of the neural mechanisms underpinning hypnosis. At an applied level, this project has the potential to markedly increase the capacity for Australians to benefit from medical and psychological hypnosis. Hypnosis has been shown to assist in many medical and psychological conditions, and by developing the means to increase hypnotic responding, this project can directly enhance the physical and psychological health of Australians.

DP0881431 Prof R Buckley

Approved Project Title **Debt-for-development Exchanges as a Means to Enhance the Security of Australia and the Region**

2008 : $ 54,204
2009 : $ 51,604
2010 : $ 51,604

Primary RFCD 3901 LAW

Administering Organisation The University of New South Wales

Project Summary

When Australia currently cancels debts owed to it by poor countries it has little control over how the money saved will be spent. Debt-for-development exchanges offer Australia this control while preserving the sovereignty of the recipient countries. Yet Australia has never undertaken an exchange.

Seven other nations have used this technique effectively to achieve developmental ends. We will analyse their experiences to provide a road map for Australia to use this technique to achieve security-enhancing and developmental outcomes.

DP0879202 A/Prof MG Burton; Prof GA Garay; Prof KM Menten; Prof Y Fukui; Dr S Lizano

Approved Project Title **The birth of massive stars**

2008 : $ 105,000
2009 : $ 101,000
2010 : $ 75,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation The University of New South Wales

Project Summary

Australia has an international reputation for the quality of its astronomy. This in turn stimulates public interest in science, and helps drive the development of technologies needed to pursue it. Over the past decade our nation has invested in the technology for millimetre-wave astronomy, building competitive instrumentation and the first interferometer in our hemisphere. We aim to capitalise on this investment, leveraging it to access frontline facilities in Chile being built by our international partners. In doing so, we will expose our students to the leading-edge and help nurture a vigorous radio science community, one able to actively participate in the billion-dollar international ALMA radio-telescope, due for completion in 2012.

DP0880143 Dr DS Chan

Approved Project Title **Towards Mike Artin's conjecture**

2008 : $ 45,000
2009 : $ 45,000
2010 : $ 40,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of New South Wales

Project Summary

Non-commutative algebra and algebraic geometry are both classical branches of mathematics with much depth to them. As a result, the recent study of the interactions between the two disciplines has proven to be fertile ground for many important developments in mathematics. This project ensures that Australia remains a part of these developments.

DP0880626 A/Prof V Chen; A/Prof RM Stuetz; Prof AG Fane

Approved Project Title **Optimising Fouling Control in Membrane Bioreactors**

2008 : $ 180,000
2009 : $ 110,000
2010 : $ 100,000
Primary RFCD 2906 CHEMICAL ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Membrane bioreactors (MBR) are growing in importance for wastewater treatment because they offer an alternative for producing higher effluent quality wastewater within a more compact space compared to conventional processes. However, due to the pumping and bubbling used to keep the membranes clear of foulants resulting from the biological processes in MBR's, controlling fouling incurs significant energy usage and costs. The proposal aims to reduce the costs of fouling control by understanding the optimal conditions to remove these depositions and improve the design of MBR modules, operating conditions and shear delivery in the membrane system.

DP0881174 Dr B Chi

Approved Project Title **Novel nanostructured InVO4 and related vanadates photocatalysts for water splitting under visible light irradiation**

2008 : $ 115,000
2009 : $ 106,000
2010 : $ 101,000
Primary RFCD 2914 MATERIALS ENGINEERING
APD Dr B Chi

Administering Organisation The University of New South Wales

Project Summary

This proposal is at the forefront of a number of important fields, and therefore the outcomes are expected to be of great interest to a broad spectrum of industry sectors, including sustainable energy supply, solar energy applications, and environmental purification. This novel material system could lead to highly efficient photocatalysts for application in solar energy to split water to produce hydrogen. The outcomes of this project will position Australian researchers among the pioneering groups in this area and will benefit several major technology-related fields including sustainable energy supply, environmental protection engineering, and materials manufacture technology.

DP0878564 Dr Y Cinar; Prof WV Pinczewski

Approved Project Title **Experimental Verification of the Predictive Value of Microtomography-Based Network Models for Multiphase Flow Properties of Petroleum Reservoir Rocks**

2008 : $ 105,000
2009 : $ 54,000
2010 : $ 49,000
Primary RFCD 2907 RESOURCES ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Australia's oil and gas reserves are primarily dependent on exploration and development in remote offshore deep waters where the operational costs are highest. This is precisely the area where the emerging microtomography-based network model technology will have the most economic impact. The outcome will be of immense scientific interest to the national/international community which has long been studying network models to understand multiphase flow in petroleum reservoirs. This will place Australia in the forefront of this technology. Furthermore, modelling studies of groundwater remediation and geosequestration of greenhouse gases which require a multiphase model will benefit from the project.

DP0877331 Prof C Cunneen; Prof DB Brown; Dr MM Brown; A/Prof E Baldry; Mr AD Steel

Approved Project Title **The Prison Project: Penal Culture and the Re-invention of the Prison in Australia**

2008 : $ 122,852
2009 : $ 115,662
2010 : $ 272,039

Primary RFCD 3904 LAW ENFORCEMENT

Administering Organisation The University of New South Wales

Project Summary

The Prison Project addresses the issue of increased use of imprisonment over recent decades. It is the first comprehensive Australian investigation of penal policy and practice at national and state and territory levels. The research will provide analysis of the reasons and justifications for the increased use of imprisonment, particularly in the context of perceived effects on crime and the substantial public costs incurred by correctional services. The project will document and analyse the effects of changes in sentencing law and practice, and administrative changes in penal policy.

DP0881251 Prof PM Curmi; Dr RG Hiller; A/Prof G Scholes

Approved Project Title **Ultrahigh resolution crystallography and ultrafast laser spectroscopy to uncover the evolution and mechanisms of a unique algal light harvesting system**

2008 : $ 88,000
2009 : $ 98,000
2010 : $ 98,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of New South Wales

Project Summary

The results of our research will provide the first comprehensive understanding of a biological light harvesting system at high temporal, energetic and spatial resolution. This will allow us to understand how nature has evolved highly efficient strategies for trapping light. The benefits of this work include spawning ideas as to how to improve current technologies for enhancing optoelectronic devices and solar collectors. Protein systems are by nature nanotechnology. The understanding gained through probing a natural nanosystem will enhance our understanding of how human designed nanophotonic systems will behave.

DP0877603 Dr DK Curnoe; Prof PS Tacon; Dr SD Mooney; Dr DA Penny; Mr J Xueping; Dr R Pan; Dr D Fink; Dr AI Herries

Approved Project Title **The Late Pleistocene Peopling of East Asia and Associated Climate-Environment History**

2008 : $ 150,000
2009 : $ 140,000
2010 : $ 140,000
2011 : $ 130,000
2012 : $ 105,000

Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

ARF Dr AI Herries

Administering Organisation The University of New South Wales

Project Summary

This project will contribute to an environmentally sustainable Australia through understanding the long-term history of climate change centred on the monsoon weather system and the scale and magnitude of environmental change and its long-term impacts on human inhabitants in East Asia and Australasia. It helps to safeguard Australia by enhancing our capacity to interpret and engage with our region through greater understanding of societies and cultures. It will improve understanding of the long-term history and relationships of major groups of people across our region. Many benefits will derive from scientific, educational and cultural exchange between Australia and our neighbour China.

DP0878541 Prof IW Dawes; Prof M Breitenbach; Dr HR Yang

Approved Project Title **Oxidative Damage and Cell Ageing**

2008 : $ 188,000
2009 : $ 188,000
2010 : $ 188,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of New South Wales

Project Summary

This research will benefit Australia by providing a fundamental understanding of how cells age. This will have immediate international impact at the scientific level and will inform strategies to reduce the rate of ageing and alleviation of age-related disorders. In the longer term the research may provide commercial and social outcomes by identifying antioxidant systems that will provide a genuine benefit in reducing ageing.

DP0881205 A/Prof DJ Doiron; Prof J Hall; Prof DJ Street

Approved Project Title **The training and job decisions of nurses: an integrated approach using panel surveys and dynamic discrete choice experiments.**

2008 : $ 100,000
2009 : $ 110,000
2010 : $ 110,000
2011 : $ 110,000
2012 : $ 110,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of New South Wales

Project Summary

The nursing shortage in Australia is considered to be at crisis stage. The results of this study will lead to improved recruitment and retention of students in nursing, improved retention of new nurses in the health workforce, better design of nursing roles and job structure, and testing of the acceptability of changed health service delivery models. It will also lead to better health workforce planning. The study directly contributes to filling the gaps in health labour force quantitative studies identified in a recent Productivity Commission Report, and provides a basis for the implementation of the Commission's recommendations.

DP0878065 Prof AH Dooley

Approved Project Title **Dynamical systems: theory and practice**

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

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of New South Wales

Project Summary

Mathematical science has proven a crucial platform for science and technology: it may have a long lead-time to application but its impacts are more profound than glamorous technical developments. Australia has an economic imperative to maintain investment in fundamental mathematics. Dynamical systems underpin a wide range of applications in physics, engineering, information science, finance and economics. This project will improve our capacity to model systems and to study their evolution, giving us better predictive power. It will keep Australia in the forefront of international research, providing a basis of expertise not otherwise available to Australian researchers and industry.

DP0878081 A/Prof SL Dunwoodie; Dr DB Sparrow

Approved Project Title **A role for Cited2, Transforming Growth Factor-beta and matrix metaloproteinases in trophoblast invasion and placenta formation**

2008 : $ 84,000
2009 : $ 84,000
2010 : $ 84,000
Primary RFCD 2702 GENETICS

Administering Organisation The University of New South Wales

Project Summary

The placenta is essential for the growth and development of the fetus, and if it fails to form correctly during pregnancy, it can have dramatic effects that can result death in utero, or adult onset diseases. Our research aims to understand how one protein functions in placenta formation. We will also investigate how this protein works at the molecular level in a process that enables single cells to respond to molecules sent from a distance by other cells (TGF-beta signalling). This process is also very important for a host of other biological processes relevant to human health, including cancer.

DP0881798 Prof MH England; Dr WP Sijp

Approved Project Title **Coupled ocean-carbon-atmosphere feedbacks in the global climate system**

2008 : $ 145,000
2009 : $ 135,000
2010 : $ 135,000
Primary RFCD 2604 OCEANOGRAPHY

Administering Organisation The University of New South Wales

Project Summary

The capacity of the oceans to absorb and store carbon fundamentally regulates atmospheric CO2 concentrations. Climate change is altering the flux of carbon between the ocean and atmosphere, and may reduce the capacity of the oceans to store carbon. Research into climate change and the global ocean carbon cycle is of high national significance, and will underpin efforts to protect our biodiversity and ensure Australia's environmental sustainability. We propose a major new study of the nature of coupled ocean-carbon-atmosphere feedbacks operating in the global climate system. This work will quantify how the ocean's carbon storage capacity might shift in the future, guiding policy-makers in setting future CO2 emissions targets.

DP0879616 Dr D Fabian

Approved Project Title **Artistic signatures in violin playing on sound recordings: What makes the performance of a prominent violinist recognizable and legendary?**

2008 : $ 70,000
2009 : $ 50,000
2010 : $ 35,000
Primary RFCD 4101 PERFORMING ARTS

Administering Organisation The University of New South Wales

Project Summary

The project's comprehensive account of performance styles in the age of recording will provide significant new knowledge in several respects: The examination of the relationship between the record industry and classical music practitioners will inform about cultural responsibilities, changing taste and the impact of technology on art. The systematic analyses of renowned violinists' (including two Australians') recordings will demonstrate the richness and diversity of valid artistic approaches to standard pieces. This will encourage emerging talent to explore the full gamut of expressive and technical means in creating unique and convincing interpretations to invigorate the appeal of classical music in Australia.

DP0877618 Dr J Faulkner

Approved Project Title **The Concept of Innocence and the Political Community: Australian identity and social health**

2008 : $ 82,378
2009 : $ 79,906
2010 : $ 85,301

Primary RFCD 4401 PHILOSOPHY

APD Dr J Faulkner

Administering Organisation The University of New South Wales

Project Summary

In recent years, dispute, and even violence, has erupted in Australia between cultural groups and interests. By analysing the import of 'innocence' in Western social thought, and the cultural values corresponding to it, the project promotes a rethinking of the assumptions that underpin (and often undermine) relations between different cultures that make up the Australian community. In so doing, the project addresses urgent questions posed by contemporary philosophy, and implicitly within Australian society, regarding the negotiation of differences between citizens and communities. The project thereby contributes to Australia's reputation in the field of social philosophy, particularly concerning cultural difference.

DP0879101 Prof V Flambaum; Dr M Kuchiev

Approved Project Title **Many-body problems**

2008 : $ 90,000
2009 : $ 100,000
2010 : $ 100,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of New South Wales

Project Summary

The discovery of new superheavy elements, chemical evolution of the Universe, nuclear reactions deep under the Coulomb barrier in nuclear reactors, in stars and during the Big Bang Nucleosynthesis, accuracy of precise atomic clocks, consistency of the Standard Model in strong fields are among the most vital problems of modern science. This project suggests several new ideas in these areas, which are based on knowledge accumulated in different research fields. The outcomes of the research will help Australia to build up a "critical mass" of scientific expertise, which is necessary to place and keep it among leaders in these frontier areas of physics, and to train the next generation of experts in these fields.

DP0877386 Prof JP Forgas

Approved Project Title **The cognitive and motivational consequences of affect in interpersonal behavior**

2008 : $ 80,000
2009 : $ 80,000
2010 : $ 80,000
2011 : $ 80,000
2012 : $ 80,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

Affect plays a major role in health and social adjustment and has a marked influence on many everyday behaviours, yet the mechanisms linking affect to thinking and behaviour remain poorly understood. These studies will produce a national and community benefit by contributing to our understanding of how affect influences thinking and behaviour. The project will develop a new, comprehensive theory of affective influences and the real-life consequences of affect in relationships, health, organisational, educational, marketing and clinical settings will also be explored. The project will contribute to Australia's research capability by training doctoral and postdoctoral students, and fostering international research collaboration.

DP0877944 Dr SM Fraser; Dr C Treloar; A/Prof D Moore

Approved Project Title **Under construction: The social and cultural politics of hepatitis C in Australia**

2008 : $ 35,000
2009 : $ 30,000
2010 : $ 30,000

Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES

Administering Organisation The University of New South Wales

Project Summary

The project will make a major contribution to knowledge about the social and cultural aspects of the prevention of hepatitis C, its management and treatment, and the lived experience of affected individuals. Its aim is to understand better how hepatitis C is conceptualised in Australia and how this informs the clinical encounter, the design and delivery of treatment, and the medical response to chronic symptoms. It will also shed light on how individuals understand and cope will their illness, how they view transmission prevention, and what strategies they use to manage their own health.

DP0878959 A/Prof MR Frater; Dr MR Pickering; Prof JF Arnold

Approved Project Title **Processing and Compression of Digital Video in Immersive Environments**

2008 : $ 75,000
2009 : $ 75,000
2010 : $ 75,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of New South Wales

Project Summary

This project will have significant economic and social benefits, both in terms of the technologies developed and the new applications in training and entertainment supported by them. This project supports the national research priority "Frontier Technologies for Building and Transforming Australian Industries", supporting media and creative industries and assisting organisations to collaborate across large distances. These benefits will be realised in both urban and remote areas. The collaboration between the CIs and the iCinema Centre will lead to the application of advanced technology to real-world problems.

DP0879731 Dr A Fuhrer

Approved Project Title **Towards Quantum Electromechanical Devices with Semiconductor Nanowires**

2008 : $ 195,000
2009 : $ 154,000
2010 : $ 149,000
2011 : $ 140,000
2012 : $ 140,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

QEII Dr A Fuhrer

Administering Organisation The University of New South Wales

Project Summary

More importantly, semiconductor nanowires and nanorods represent a novel nanosystem being intensely researched world wide for applications in high efficiency solar cells, ultra bright light emitting diodes, single photon emitters, fast post CMOS wrap-gate field effect transistors, high efficiency thermoelectric devices and chemical sensing. The current proposal thus helps to ensure Australias forefront involvement in this quickly evolving and highly promising research field.

DP0877158 Prof J Gascoigne

Approved Project Title **Encountering the Pacific in the Age of Enlightenment and Revolution**

2008 : $ 32,972
2009 : $ 57,998
Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of New South Wales

Project Summary

Through a study of the interaction of the peoples of Europe and of the Pacific the project will explore the character of attitudes towards other peoples and human society more generally which helped to shape European Australia in its formative phase. The strong historical imprint of such attitudes means that they still have to be reckoned with in assessing our position in the increasingly troubled region of the Pacific. Since the project draws heavily on major collections here in Australia it will help to raise the profile of such cultural institutions and to promote their usage by others including postgraduates.

DP0879557 Dr A Ghosh; Dr H Morita

Approved Project Title **Economic Analyses of Competitor Collaboration: Theory, Evidence, and Policy Implications**

2008 : $ 54,000
2009 : $ 50,000
2010 : $ 52,426
Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of New South Wales

Project Summary

Several industries in Australia (eg. airlines, banking, telecommunications) exhibit some common characteristics: few big firms, with significant market power, selling differentiated products. Given the level of market concentration in these industries, mergers are unlikely to improve welfare. However, is the same true for collaborations on value-creating activities? What decisions, if any, should any two firms be allowed to collaborate on? What are their effects on rival firms and consumers? The project will develop the first unifying framework to address these questions. Our research findings are expected to assist the competition policymakers in comprehensively assessing the welfare impacts of competitor collaborations

DP0881291 Prof BJ Gillam; Dr SA Palmisano; A/Prof R Allison

Approved Project Title **An investigation of long-range stereopsis**

2008 : $ 100,000
2009 : $ 65,000
2010 : $ 60,000
Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

Our project will be the first to examine long-range stereoscopic perceptions of depth, slant and curvature, as well as perceived changes in slant and curvature on the ground. The research is also theoretically significant and novel in exploring the scaling of stereopsis by monocular distance cues such as the ground plane, perspective and horizon. Determining the useful range of stereopsis also has many practical applications e.g. for understanding vehicle guidance (eg helicopter landing), as well as natural locomotion and route planning. The research is possible because of innovative equipment designed to allow for fast changes in remote targets.

DP0877508 Dr RA Hall; Dr MG Barlow

Approved Project Title **Discipline, Morale and Winning Wars: Understanding the Relationships Between Discipline and Combat Performance in Low-Intensity Conflict.**

2008 : $ 41,638
2009 : $ 30,841
2010 : $ 20,819

Primary RFCD 4301 HISTORICAL STUDIES

Administering Organisation The University of New South Wales

Project Summary

Discipline and morale are key elements in combat performance, particularly in Low-Intensity Conflict (LIC). This project examines the relationships between discipline, morale and combat performance using the Australian Army in Vietnam as a case study. It provides insights into better understanding and managing discipline and morale to produce and sustain combat performance. It assists the Army to avoid the negative effects of failures in discipline and morale that produced the My Lai massacre and the Abu Ghraib fiasco. It also helps position Australia internationally as a contributor to the better understanding of LIC, and fills a gap in Australian historiography of war.

DP0881440 Dr S Hand; Prof M Archer; Dr DJ Bickel; Dr ME Dettmann

Approved Project Title **Precious time-capsule: discovery of fossil-rich amber from Australia**

2008 : $ 90,000
2009 : $ 80,000
2010 : $ 75,000

Primary RFCD 2601 GEOLOGY

Administering Organisation The University of New South Wales

Project Summary

Cape York's natural attributes are already of national and global significance. Our research, which focuses on the world's most recently discovered, fossil-rich amber deposit will significantly increase this value. In addition to discovery of hundreds of stunningly-well preserved fossil organisms, analysis of trapped bubbles of ancient air will enable us to reconstruct their prehistoric environment. This should improve ability to anticipate biotic responses to future climate change. The amber industry globally contributes to national wealth. Increasing understanding about the geology and palaeontology of this amber deposit will maximise commercial and scientific benefits to the nation.

DP0879786 A/Prof G Hawkins; Dr KD Race; Dr EC Potter

Approved Project Title **From the Tap to the Bottle: an international study of the social and material life of bottled water**

2008 : $ 64,186
2009 : $ 100,000
2010 : $ 72,000

Primary RFCD 4203 CULTURAL STUDIES

Administering Organisation The University of New South Wales

Project Summary

Water is a critical resource in Australia yet little is known about water in bottles. This project will be the first comparative study of bottled water marketing, consumption and disposal. It will make a significant contribution to national and international understandings of changing practices in the consumption of drinking water. The research will produce an analysis of the rise of the bottle in relation to the tap. Specifically, how various anxieties associated with drinking tap water, in Australia and elsewhere, impact on bottled water consumption. The knowledge produced about bottled water collection, circulation and regulation will contribute to wider debates about sustainable water provision and access to safe water for all.

DP0877213 Prof SC Hetherington

Approved Project Title **Practicalism: Knowing and Agency**

2008 : $ 32,972
2009 : $ 32,972
2010 : $ 32,972

Primary RFCD 4401 PHILOSOPHY

Administering Organisation The University of New South Wales

Project Summary

Australian philosophy has a deserved reputation for excellence, especially in topics of traditional centrality for analytic philosophers. But more still needs to be done within Australian epistemology. Most of the recent related work has occurred within the philosophies of mind, of language, and of science, and to some extent within ethics. That work needs to be complemented by good work in epistemology. I hope this project will help to achieve that, thereby increasing the national and international philosophical visibility of Australian epistemology.

DP0878641 Dr X Jiang

Approved Project Title **Function-driven Synthesis and Assembly of Two-dimensional Metal Nanostructures**

2008 : $ 25,000
2009 : $ 25,000
2010 : $ 25,000

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

The project is fundamentally concerned with material science and nanotechnology, one of the cutting-edge areas in Australia's National Research Priority. Successful completion of the project will result in controlled synthesis, functional assembly and their fundamental understanding of metal nanostructures. The research findings will be useful for developments of new nanomaterials and applications to optoelectronics, molecular electronics and biochemical sensor systems. They can also greatly increase the scientific understanding of particle behaviour in relation to process control, and expand the knowledge creativity of Australia in research in these materials.

DP0877983 Mr MM Kasumovic

Approved Project Title **The importance of phenotypic plasticity in maintaining and introducing variation**

2008 : $ 102,000
2009 : $ 88,000
2010 : $ 78,648

Primary RFCD 2707 ECOLOGY AND EVOLUTION

APD Mr MM Kasumovic

Administering Organisation The University of New South Wales

Project Summary

This research is a synthesis of behaviour, natural and sexual selection, physiology, and natural and breeding ecology-important interactions that are rarely considered simultaneously in biology. It will contribute to our understanding of life-history decisions, and a long-neglected source of the variation that is the raw material for adaptation and for economically-important breeding programs . These results will have far-reaching implications for economically-important improvements to medicine, conservation, and crop and livestock production. This work will strengthen Australia's strong research profile in evolutionary genetics, physiology and ecology.

DP0877219 A/Prof GH Kingston; A/Prof HJ Bateman; Prof KW Clements; Dr LA Fisher; Dr SJ Thorp

Approved Project Title **Security in Retirement: Forecasting and Managing Macro Investment Risks**

2008 : $ 108,050
2009 : $ 110,088
2010 : $ 110,088

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of New South Wales

Project Summary

In his Boyer Lectures Ian Macfarlane, former RBA governor, observed that risks once borne by employers or governments are in the process of being transferred to households. Retirement incomes are a case in point. Not only do most households belong to accumulation funds which shift investment risks to members, but exposure to growth assets (equities and property) in the typical account is in the 60% - 70% range, even in the case of retirees. Our project will focus on the forecasting and management of economy-wide risks, as distinct from the equity risks or credit risks attached to investments in particular companies.

DP0881035 A/Prof X Lin

Approved Project Title **Effectively Computing and Maintaining Graph-based Statistics in Large Scale Applications**

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

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of New South Wales

Project Summary

The expected research outcome includes significantly technical contributions to the graph-based query processing technology development by supporting on-line data analysis. The proposed systematic, algorithm and database centric approach to investigate the novel, ubiquitous problems will lead to a greater support, from the database community, to the advanced real applications, and to creating new opportunities for the IT industry. The success of this project will not only further enhance us as an internationally leading research group in data statistics computation and provide training for high quality personnel in this important and growing area but also bring considerable economic and social benefits to Australia.

DP0878172 Prof GC Low; Prof B Henderson-Sellers; Prof AK Ghose; Dr G Beydoun

Approved Project Title **Ontology-based agent-oriented development methodologies**

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

Primary RFCD 2803 COMPUTER SOFTWARE

Administering Organisation The University of New South Wales

Project Summary

Establishing an industry strength unified agent-oriented methodology which focuses on interoperability and reusability will create stronger commitment to the new technology and stability in the commercial sector in Australia. Our methodology will create significant potential for Australian software companies, due to the added productivity and long term customer satisfaction through reusability, interoperability and pay-off of the developed systems. This not only brings profits to Australian companies through the exploitation of this frontier technology, but also enhances the standard of living through increased satisfaction of the Australian public in their increasing use of software as they interact with today's computer-controlled world.

DP0877157 Dr S Maddison

Approved Project Title **New possibilities for Indigenous representation: the opportunities and constraints of conflict among leaders**

2008 : $ 67,770
2009 : $ 40,231
2010 : $ 35,615
Primary RFCD 3601 POLITICAL SCIENCE

Administering Organisation The University of New South Wales

Project Summary

A voice in national policy debates is important for Indigenous communities around Australia. Understanding the tensions that provide opportunities and constraints for national representation will contribute to strengthening the social and economic fabric of Indigenous communities, creating new possibilities for improving health and well being outcomes. In providing evidence on dynamics of contemporary Indigenous activism and illustrating the complex challenges facing Indigenous leaders, this study will both facilitate further dialogue among Indigenous leaders and activists themselves and generate deeper, empirically-focused, understanding of this work among non-Indigenous Australians.

DP0878297 Dr E Magnani; Dr A Rammohan

Approved Project Title **Ageing in a developing country and its effects on intra-household resource allocation**

2008 : $ 57,846
2009 : $ 50,000
2010 : $ 61,941
Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation The University of New South Wales

Project Summary

Indonesia, our largest neighbour and our third largest recipient of AID, is among the fastest-growing elderly populations in Southeast Asia. Ongoing cultural and economic change means that the traditional reliance of elderly on family support is breaking down leaving the country's social fabric vulnerable. Understanding the linkages between ageing, ill-health and the labour market responses at the household level is the path to effectively intervene in the link between age and poverty and to successfully design policy that facilitates improvements in women's social status.

DP0881765 Prof RE McMurtrie

Approved Project Title **Explaining forest responses to rising carbon-dioxide concentrations at stand scale using a new, simple model of plant carbon economy**

2008 : $ 106,000
2009 : $ 106,000
2010 : $ 106,000
Primary RFCD 2799 OTHER BIOLOGICAL SCIENCES

Administering Organisation The University of New South Wales

Project Summary

Australia is undergoing large changes in [CO2] and rainfall patterns, with 20% decreases in annual rainfall across southern Australia over the past 30 years, and large increases in north-western Australia. The impacts of rising [CO2] and altered rainfall must be factored into Australia's environmental and water-catchment management strategies. The outcome of this project will be a new simplified forest model that has been validated for Australia's leading climate-change experiment on forests, the Hawkesbury Forest Experiment, which includes both CO2 and watering treatments. The model will be readily transferable to new sites and at regional scale, so it can be applied as a tool for future management of Australia's forests.

DP0877430 Dr GP McNally

Approved Project Title **Predicting danger: The nature, consequences, and neural mechanisms of predictive fear learning**

2008 : $ 110,000
2009 : $ 100,000
2010 : $ 110,000
2011 : $ 100,000
2012 : $ 110,000

Primary RFCD 3801 PSYCHOLOGY

QEII Dr GP McNally

Administering Organisation The University of New South Wales

Project Summary

This project has four major national benefits. First, it addresses a fundamental scientific issue from a novel perspective to increase knowledge. By combining innovative approaches to study how the brain predicts danger, it will shed light on the relationship between brain and behaviour. Second, the project will contribute significantly to Australia's international competitiveness and reputation in experimental psychology. Third, the knowledge generated by this project has the potential to improve the welfare of Australians by addressing an increasingly important health problem - anxiety. Finally, the project provides outstanding, internationally competitive, training opportunities for Australian students in Psychology.

DP0880854 Dr GP McNally; Prof R Richardson

Approved Project Title **Are there common mechanisms for the inhibition of fear?**

2008 : $ 92,000
2009 : $ 95,000
2010 : $ 95,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

Disorders of fear and anxiety affect up to 28% of Australians across their lives. This project studies how the brain inhibits fear and anxiety. It has four National Benefits. First, the knowledge generated by this project will contribute to coherent theoretical accounts of fear inhibition. Second, it will increase Australia's competitiveness and reputation in experimental psychology and behavioural neuroscience. Third, it will provide novel insights into ways of reducing anxiety and fear among sufferers of clinical anxiety disorders. Finally, it will provide internationally competitive training opportunities for Australian students.

DP0880815 Dr BI McNeil

Approved Project Title **An Investigation into Oceanic CO2 Variability and its Influence on Atmospheric CO2 Concentrations**

2008 : $ 129,806
2009 : $ 123,806
2010 : $ 123,806
2011 : $ 120,000
2012 : $ 120,000

Primary RFCD 2604 OCEANOGRAPHY

QEII Dr BI McNeil

Administering Organisation The University of New South Wales

Project Summary

Carbon dioxide is a powerful greenhouse gas whose observed atmospheric increase is the central cause of climate change. The associated environmental, social and economic impacts to Australia could be staggering via coral reef degradation, loss of agricultural production, coastal erosion and extreme climate events. This work aims to better our understanding of how the oceans may mediate the effects of climate change for Australia and therefore has a strong national benefit. Quantifying the importance Australia's oceanic CO2 sink will be important for Australian policy makers within international climate negotiations and also for better management practices to ensure the future prosperity of Australia's coral reef ecosystem.

DP0877208 Dr AP Micolich; Dr U Zuelicke; Prof Dr A Wieck

Approved Project Title **Nanospintronics - Spin Transport in Semiconductor Nanostructures**

2008 : $ 130,000
2009 : $ 130,000
2010 : $ 120,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of New South Wales

Project Summary

The multi-billion dollar semiconductor industry drives the explosive growth in information technology that we have witnessed over the past 25 years. This proposal will provide a significant breakthrough by developing a new class of spintronic devices that will be of benefit to Australia's ongoing efforts in semiconductor nanotechnology and quantum information science, allowing us to play a role in the future development of nanoscale and quantum electronics. This research program will provide training for Australian students in a cutting-edge semiconductor research facility, and involve linkages with leading international universities including Massey University (NZ), NTT Basic Research Labs (Japan) and the University of Bochum (Germany).

DP0879529 Dr CC Morgan; Dr AK McIver; Prof MZ Kwiatkowska; Prof MJ Butler

Approved Project Title **Hidden-state modelling for modular analysis of information flow, protection and risk evaluation**

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

Primary RFCD 2804 COMPUTATION THEORY AND MATHEMATICS

Administering Organisation The University of New South Wales

Project Summary

Automation is increasing explosively, and the cliche is no longer that there is a cpu chip in your washing machine, television or automobile. Nowadays they are potentially in our cash cards, passports and soon on every item in our shopping baskets. Australia is a leader in adopting and developing such technology.

Security and privacy, hard enough for PCs, thus concerns smaller, more numerous devices that we might not even realise we are using.

Our research aims to make it easier and more effective to describe and then successfully build-in features that enforce security without adverse impact on usability.

DP0880264 Prof BA Neilan; Dr CJ Bolch; Dr MC Moffitt

Approved Project Title **Polyketides as the conserved basis for diverse marine toxin biosyntheses**

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

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Administering Organisation The University of New South Wales

Project Summary

Over the past three decades, the frequency and global distribution of harmful marine biotoxin events appears to have increased, and human poisonings have regularly occurred. This project will develop an understanding of the genetics and physiology of toxin-producing marine microorganisms in response to pollution and climatic change that is critical for the management of these species and for the risk assessment of contaminated seafood. The direct outcomes of this work constitute an easier, more economical and ethical alternative to current toxicity testing. Further benefits of this research will also be tangible for the environmental, biosecurity, fisheries and pharmaceutical sectors of Australian community and industry.

DP0877510 Dr BR Newell; A/Prof JC Dunn; Dr ML Kalish

Approved Project Title **Uncovering the processes underlying human category learning**

2008 : $ 55,000
2009 : $ 55,000
2010 : $ 55,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

There is a pervasive belief that complex tasks can somehow be learned via a 'smart' implicit or procedural learning mechanism, which operates independently of memory and attention. This idea has important implications for our understanding of cognition. If true, there seems little point in providing explicit instruction in such tasks, and efforts to do so are, at best, wasted time and, at worst, detrimental to the learning process. This project will provide much-needed scrutiny of this idea and will help not only to re-orient our understanding of how we deal with complex information, but will also highlight issues about data interpretation that are fundamental for the research and wider communities.

DP0878224 A/Prof T Preiss; Dr TH Beilharz

Approved Project Title **Role of mRNA polyadenylation control in gene expression**

2008 : $ 137,000
2009 : $ 137,000
2010 : $ 137,000
2011 : $ 137,000
2012 : $ 137,000

Primary RFCD 2702 GENETICS

ARF Dr TH Beilharz

Administering Organisation The University of New South Wales

Project Summary

Several benefits would come from a more complete understanding of the function of the messenger RNA poly(A) tail. It is frequently targeted by mechanisms that control cellular protein synthesis. This is most evident in developmental biology, where tail length control regulates maternal mRNA expression. Our previous work suggests that it has much wider importance for cellular function than previously thought and thus its study will produce knowledge of broad relevance to modern life sciences and its applications in medicine and biotechnology. Finally, a better understanding of yeast cellular biology is of benefit to the food and biotechnology sector of industry.

DP0878266 Prof RB Randall; Dr N Feng; Prof R Parker; Dr W Wang

Approved Project Title **Dynamic Simulation of Gear and Bearing Interactions in Gearboxes for Improved Diagnostics and Prognostics of Faults.**

2008 : $ 125,000
2009 : $ 100,000
2010 : $ 90,000

Primary RFCD 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

The techniques to be developed in this project should become the international standard for diagnostic and prognostic techniques for high speed gearboxes, and improve the performance of Australian industry. Australia being a major supplier of natural resources, with many mines in remote locations, it is heavily dependent on machine condition monitoring techniques, such as those being developed in the project, to maximise output and minimise the likelihood of catastrophic failure. The techniques also give improved safety, for example of helicopters, which are suspended from the gearbox, making it a very critical component. This will be of considerable benefit to both civil and military operators of helicopters, both important to Australia.

DP0881460 A/Prof M Rutkowski

Approved Project Title **Stochastic Methods for Dynamic Risk Management**

2008 : $ 80,000
2009 : $ 80,000
2010 : $ 80,000
Primary RFCD 2302 STATISTICS

Administering Organisation The University of New South Wales

Project Summary

In today's environment of intense competitive pressures, volatile economic conditions, rising bankruptcies, and increasing levels of consumer and commercial debt, an organization's ability to effectively monitor and manage its credit risk can mean the difference between success and survival. The improvement of dynamic risk management systems is also an essential part of the new regulatory Capital Adequacy Proposal Basel II in which risk-sensitive capital requirements for credit portfolios and internal models of credit risk are advocated. The goal of the project is to develop novel stochastic methods for managing of credit risk and to bring theoretical innovations developed within the project to practical implementations.

DP0878643 Prof PG Saunders; Dr BW Bradbury; Prof JR Bradshaw; Prof TM Smeeding; Dr AK Abe

Approved Project Title **Comparing the Living Standards of Children and Older People Within and Between Nations**

2008 : $ 100,000
2009 : $ 115,000
2010 : $ 140,000
2011 : $ 40,000
Primary RFCD 3702 SOCIAL WORK

Administering Organisation The University of New South Wales

Project Summary

The research will contribute to our understanding of the factors that determine the living standards of children and older people and inform the policy response to population ageing. It will draw on the expertise of leading national and international researchers, utilise a range of existing and new data to conduct in-depth comparisons between Australia and other similar countries, and contribute to the development of an important new international database. Relevant to the national research priorities, the project will train a new generation of Australian researchers, and actively engage end-users in the research process by providing new information for policy development.

DP0880301 Prof AV Savkin

Approved Project Title **Decentralized Control Problems for Networked Systems**

2008 : $ 170,000
2009 : $ 160,000
2010 : $ 150,000
2011 : $ 100,000
Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of New South Wales

Project Summary

The conceptual advances to be made in the area decentralized control of networked systems.

New design rules for decentralized control in networked systems will be developed and published in the top international journals and major international conferences.

Also, a contribution of the project will be to produce high quality Ph.D. graduates in this area of control theory.

DP0880066 Ms M Shanahan; A/Prof A Ritter; Dr W Swift; Dr RL Pacula; A/Prof MR Teesson

Approved Project Title **Developing a model to assess the economic consequences of cannabis policy options**

2008 : $ 90,500
2009 : $ 88,190
2010 : $ 59,889
Primary RFCD 3602 POLICY AND ADMINISTRATION

Administering Organisation The University of New South Wales

Project Summary

The potential economic benefits of the project reside in the ability of governments to make cannabis policy decisions based on assumptions of reduced economic burden of one model over another through:
1.the direct comparison in economic terms of three different models for the regulation of cannabis;
2.a model for estimating economic costs associated with cannabis which can be applied to other illicit drugs;
3.improving the evidence-base for policy decision-making at all jurisdictions in Australia.

DP0879218 Dr A Sharma; Dr DJ Nott; Dr LA Marshall

Approved Project Title **An Ensemble Modelling Framework for Prediction in Ungauged Catchments**

2008 : $ 95,000
2009 : $ 90,000
2010 : $ 85,000
2011 : $ 85,000
Primary RFCD 2605 HYDROLOGY

Administering Organisation The University of New South Wales

Project Summary

An important issue facing the water sector is a rationale for modeling flows in catchments having no prior measurements. Current approaches for modeling flow in ungauged catchments assume a rigid specification which is adopted for all catchments, irrespective of differences in regions and soil types. We propose here a modeling philosophy that better characterises the variability in the flow generation mechanism, with different mechanisms being represented through different models in a probabilistic sense. We expect our approach to address the limitations of current schemes, and provide a much improved basis for estimating flows for design and management applications.

DP0878146 Dr HS Sidhu; Dr GN Mercer; A/Prof RO Weber

Approved Project Title **Analysing Instabilities in Complex Combustion Models for Different Geometrical Configurations**

2008 : $ 90,000
2009 : $ 90,000
2010 : $ 90,000
2011 : $ 31,118
Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of New South Wales

Project Summary

Anyone who has gazed into a fire will appreciate the complexity of combustion. To date only the simplest of models have been comprehensively analysed. This project, which aims to analyse more complex combustion models, will address some of the fundamental issues of combustion theory. Results from this project will lead to a better understanding of combustion processes, with the potential to prevent explosions in reactors and storage tanks. Other potential applications range from bushfires to the manufacture of exotic materials. Furthermore, the novel mathematical techniques developed in this project can be easily adapted to other types of systems such as those used in biology (eg. epidemiology and tumour growth), economics, physics etc.

DP0879054 Prof MY Simmons; Dr A Fuhrer; Prof G Klimeck

Approved Project Title **Three Dimensional Integrated Circuits**

2008 : $ 155,000
2009 : $ 151,000
2010 : $ 147,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of New South Wales

Project Summary

Pushing the boundaries of current silicon fabrication technology, this proposal will investigate the possibilities of new 3D architectures to ensure that Australia remains at the forefront of world-wide research into atomic-scale electronics. It creates an important link to the latest technologies in atomistic device modelling in the US, developed at Texas Instruments. More importantly, by anticipating the problems that electronic device manufacturers are currently facing, and will face over their long-term horizons, the proposed research also seeks to provide Australia with a chance to lift its involvement in the multi-trillion dollar global semiconductor industry.

DP0880315 Prof R Simnett; Dr EA Carson

Approved Project Title **Consistency of going concern audit report modifications over time, audit firms and countries**

2008 : $ 64,680
2009 : $ 61,136
2010 : $ 39,703

Primary RFCD 3501 ACCOUNTING, AUDITING AND ACCOUNTABILITY

Administering Organisation The University of New South Wales

Project Summary

This research has both national and international benefits. Evidence of the consistency of the going concern audit reporting decision over time and by audit firms in Australia is important to financial report users. Further, an examination of audit reporting behaviour across countries contributes to international convergence. Without consistent application, the benefits of convergence decrease and transactions costs and information risk increase. Australia has a policy of international convergence and it is important that Australian representatives have input into the standard-setting process and policy and research supporting these standards both nationally and internationally. The research team can have this input.

DP0877432 Dr SA Sisson; Dr Y Fan

Approved Project Title **Innovations in Bayesian inference with applications to climate extremes**

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

Primary RFCD 2302 STATISTICS

Administering Organisation The University of New South Wales

Project Summary

Climate extremes have immense impacts on Australia and society, affecting agriculture, water supply and management, bushfire control, utilities, power, insurance, the economy and many other sectors. This project will examine possible changes in the frequency and intensity of Australian extreme rainfall, droughts, flooding and tropical cyclones using innovative Bayesian statistical methods. The project will provide valuable training to Australian graduates in Bayesian computation and the statistical modelling of climate extremes. It will enhance Australia's reputation as a strong contributor to the development of Bayesian methodologies and climate research, and help foster collaborations between climate and mathematical scientists.

DP0880199 Dr JA Stride

Approved Project Title **Porous and Magnetic Networks: Functional materials by form and design**

2008 : $ 125,000
2009 : $ 124,000
2010 : $ 119,000
Primary RFCD 2502 INORGANIC CHEMISTRY

Administering Organisation The University of New South Wales

Project Summary

The importance of obtaining smart materials to meet the increasingly stringent demands of modern technology and society, necessitates a determined effort by the research community. Three examples of such demands are the drive towards a hydrogen-based economy, sequestration technologies and green catalysis. Specifically designed meso- or highly porous materials have a central role to play in these extremely topical societal demands. The inclusion of functionality by design into such materials is central to them fulfilling their considerable potential. By researching novel materials technologies today, we aim to deliver practical solutions to market tomorrow, to the benefit of Australian industry.

DP0881336 Prof OP Sushkov; Prof B Keimer; Prof J Haase

Approved Project Title **Magnetic ground state and dynamics in high temperature superconductors**

2008 : $ 93,260
2009 : $ 110,000
2010 : $ 105,000
Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of New South Wales

Project Summary

This project is aimed at studies of novel advanced materials. It will contribute to research at the leading edge of fundamental physics. This is an international project that incorporates collaboration with two leading German experimental groups. This raises the profile of the project internationally. This collaboration may bring some experiments of overseas scientists to ANSTO OPAL reactor and hence facilitate interactions between Australian and overseas experimental groups.

DP0880078 A/Prof IM Suthers; Dr ME Baird

Approved Project Title **Quantifying the role of salps in marine food webs and organic carbon export**

2008 : $ 87,708
2009 : $ 84,650
2010 : $ 77,426
Primary RFCD 2604 OCEANOGRAPHY

Administering Organisation The University of New South Wales

Project Summary

Australia has recently committed significant resources to the observation and forecasting of ocean temperature and circulation that will vastly improve the understanding of environmental forcing of regional scale biological processes. This project will use ocean circulation hindcasts, ship-board measurements and laboratory studies to capture the dynamics of the zooplankton community, and in particular a fast-growing class of gelatinous zooplankton, the salps, in the waters off southeast Australia. During bloom events, salps can alter the functioning of marine ecosystems. This project will quantify the impact of salp blooms on fish resources and ocean uptake of carbon in southeast Australian waters.

DP0881775 Dr NH Tran

Approved Project Title **Towards efficient development of geothermal resources in Australia: an improved simulation package for fluid flow in fractured geothermal reservoirs**

2008 : $ 115,000
2009 : $ 104,000
2010 : $ 84,000

Primary RFCD 2907 RESOURCES ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Australia possesses vast deep earth geothermal resources, which are cheap, clean, reliable, sustainable and renewable. By supporting the development of geothermal resources, the fundamental research project will greatly contribute to many Australian social and economic priorities: providing immediate mitigation of climate change and greenhouse gas emissions; reducing dependence on external sources of fuels and oil price uncertainty; meeting the country's growing energy needs; therefore, supporting an Environmentally Sustainable Australia. Moreover, the project enhances Australian research recognition in the fields of fractured and geothermal simulation. It also provides high level education for five research students.

DP0880026 Prof KT Trotman; Dr NJ Harding

Approved Project Title **Improving the 21st century audit**

2008 : $ 58,000
2009 : $ 57,000
2010 : $ 54,000

Primary RFCD 3501 ACCOUNTING, AUDITING AND ACCOUNTABILITY

Administering Organisation The University of New South Wales

Project Summary

Financial reports are a key part of an efficient capital market and a central role of auditing is to add creditability to the financial reports. The corporate failures in the recent years have shaken investor confidence. The regulators and the auditing profession have an important role to play in bringing back that trust. The auditing profession needs to continue to evolve to deliver at the high standards expected of them especially in regard to auditors' ability to uncover material fraud at a reasonable cost. This research will study techniques that will help auditors in meeting the challenges faced by them in detecting fraudulent financial statements and thus improve the audit quality.

DP0880298 Prof TD Waite; Prof GM Hallegraeff; Dr AL Rose

Approved Project Title **Impact of Metal - Reactive Oxygen Species (ROS) Interactions on Growth and Toxicity of Ichthyotoxic Algae in Australian Coastal Waters**

2008 : $ 115,000
2009 : $ 94,000
2010 : $ 89,000

Primary RFCD 2604 OCEANOGRAPHY

Administering Organisation The University of New South Wales

Project Summary

Toxic algal blooms in estuarine and coastal waters can have devastating economic and ecological impacts but remarkably little is known about the factors that control either organism growth or toxin severity. Recent studies suggest that the interplay between delivery of the nutrient trace metals iron and copper and the method via which the organism acts to assimilate these metals is critical to the generation and aggressiveness of the toxins produced. These processes will be investigated in this study and conceptual and mathematical models will be developed which will assist in assessing management options for estuarine and coastal environments.

DP0878285 Dr J Wang; Prof X Li; Dr T Nguyen

Approved Project Title **Developing a new nano-surfacing and micro-fabrication technology for complex part features using micro-abrasive jet**

2008 : $ 100,000
2009 : $ 100,000
2010 : $ 100,000
Primary RFCD 2903 MANUFACTURING ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Ultra-precision fabrication such as nano-surfacing, micro-channelling and micro-texturing is crucial for the development of high-integrity, high-density systems for engineering, communication, computing, photovoltaic, electric and optical devices and systems. This project will gain a fundamental understanding of the physics in nano-surface formation using a micro-abrasive jet, and make a significant impact to the ultra-precision engineering discipline. It will also develop a frontier technology that will increase the competitiveness of the Australian fabrication industry in developing leading edge technologies and products.

DP0880333 Dr J Wang; Prof Dr PJ Teunissen; Prof Dr GW Hein

Approved Project Title **Dynamic Receiver Autonomous Integrity Monitoring for Multi-constellation Global Navigation Satellite Systems**

2008 : $ 70,000
2009 : $ 65,000
2010 : $ 60,000
Primary RFCD 2910 GEOMATIC ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

In the next five years, four Global Navigation Satellite Systems (GNSS) will be developed to foster the wide applications of satellite navigation in our daily life. These new developments can certainly offer a variety of economic, scientific and social opportunities for Australia. This research project will develop a theoretically sound integrity monitoring procedure for the new generation GNSS receivers to check their own navigation performance. The contribution from this research, which is patentable, will bring a timely opportunity for local industry to develop new products towards a massive worldwide market and serve Australian users as well.

DP0881779 Dr W Wang

Approved Project Title **Effective and Efficient Keyword Search in Relational Databases**

2008 : $ 75,118
2009 : $ 72,118
2010 : $ 69,118
Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation The University of New South Wales

Project Summary

Effective and efficient management of information, including textual information, is at the heard of ICT objectives and requirements global wide. The project aims to be of unique value to vitually all Australian industries by providing easier and better information access to their business data. The research conducted in this project will position Australia as one of the leaders in the database and information retrieval research. The project outcomes in the form of algorithms and systems will provide powerful solutions that are applicable to many Australian and international organisations. It will will also encourage more ICT within Australia and worldwide.

DP0879572 Prof JK Webb; Dr SJ Curran; Prof R Carswell; Dr D Mortlock; Prof A Lasenby; Dr A Jaffe

Approved Project Title **The application of Markov Chain Monte Carlo methods to the search for space-time variations of fundamental constants**

2008 : $ 135,000
2009 : $ 124,000
2010 : $ 109,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation The University of New South Wales

Project Summary

This work will establish Australia as the world leader in one of the most vibrant topics in current physics research. The results obtained could reveal extra dimensions in our universe and provide the first experimental evidence for string theories. The proposed research will also fundamental new information about dark matter and dark energy, the two most pressing problems in cosmology. The solutions of these problems will revolutionise our understanding of the universe. This program involves collaborations with major international institutes and provides a superb training-ground for Australian postgraduate students.

DP0877407 Dr G Weidemann

Approved Project Title **The interaction between cognitive expectancy and conditioned responding in human eyeblink conditioning.**

2008 : $ 58,986
2009 : $ 58,986
2010 : $ 58,986
2011 : $ 58,986

Primary RFCD 3801 PSYCHOLOGY

APD Dr G Weidemann

Administering Organisation The University of New South Wales

Project Summary

The project has three major national benefits. First, it addresses a fundamental issue of human learning and memory using a novel approach, which will provide important insights into the mechanisms involved in human conditioning. Second, it will provide a model for studying how the declarative system interacts with production of conditioned responses. This is clinically important because it identifies the circumstances under which target behaviours, subject to modification by conditioning processes, will be also be subject to modification by cognitive processes. Third, this project builds Australia's capacity for innovative research in human associative learning and memory and will provide training opportunities for students.

DP0881325 Prof F Westbrook

Approved Project Title **The role of prediction error in extinction**

2008 : $ 89,000
2009 : $ 94,000
2010 : $ 93,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of New South Wales

Project Summary

The project will provide information about the mechanisms by which organisms adjust their behaviour to bring it into line with new relations between events. It will also provide information regarding the mechanisms underlying cue exposure used in the treatment of anxiety disorders. It will result in publications in peer reviewed journals, and in presentations at University colloquia and conferences in Australia and overseas that will add to the reputation for science and its applications to the clinic. It will form part of the work in my laboratory where Honours and Doctoral students receive training in behavioural neuroscience.

DP0881799 Prof IF Wilkinson; Prof RE Marks; Prof L Young

Approved Project Title **Modelling the Development and Evolution of Business Relations and Networks as Complex Adaptive Systems using Agent Based Models**

2008 : $ 41,866
2009 : $ 39,053
2010 : $ 39,053

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation The University of New South Wales

Project Summary

This research develops models that will allow managers and policy makers to play more effective roles in the development and evolution of collaborative business relations and networks that lead to greater efficiency, industry innovation, and firm competitiveness, which is a key focus of corporate management and government trade and industry policy. It will also enhance Australia's resources and expertise in understanding and modelling complex adaptive systems, help develop education resources and training programs for practitioners and researchers in this fast growing area of theory and research, strengthen links with leading researchers and centres, and produce a doctorate in the area.

DP0881141 Dr EL Wong

Approved Project Title **New Strategies for Monitoring DNA-Anticancer Drug Interactions**

2008 : $ 110,000
2009 : $ 109,000
2010 : $ 101,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

APD Dr EL Wong

Administering Organisation The University of New South Wales

Project Summary

The highly successful cisplatin works by binding to DNA and partially unwinding or bending the DNA. As a consequence of the success if cisplatin, alternative anticancer drugs are being developed with reduced side effects for patients. One of the bottom necks in the development of alternative drugs is rapid screening of the efficacy on new leads. The proposed research will develop new technologies for monitoring DNA-drug binding, DNA damage and DNA repair using novel DNA biosensors. the novelty of the biosensor technology will be to use the modulation of charge transfer through DNA as a method for determining the structural changes that occur in DNA due to these events occurring.

DP0881330 Prof J Xue

Approved Project Title **Scratchpad-based Memory Allocation Techniques for Embedded Software**

2008 : $ 100,000
2009 : $ 95,000
2010 : $ 90,000

Primary RFCD 2803 COMPUTER SOFTWARE

Administering Organisation The University of New South Wales

Project Summary

This research aims at developing automatic memory allocation algorithms to maximise the effective utilisation of scratchpad memories, which will lead to significantly improved performance and energy usage in embedded applications. The outcomes of this project will provide generic solutions to many Australia-based industries, including telecommunication, network management, sensor networks, automotive and instrumentation/measurement, where embedded systems are ubiquitously used. Therefore, this project will significantly contribute to the Priority Area (Frontier Technologies for Building and Transforming Australian Industries), hence fits into its Priority Goal: Frontier Technologies.

DP0880548 Dr C Yang

Approved Project Title **Development of high-performance Si/Ge superlattice thermoelectric materials with optimization of lattice periodic thickness**

2008 : $ 110,000
2009 : $ 110,000
2010 : $ 110,000

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

APD Dr C Yang

Administering Organisation The University of New South Wales

Project Summary

Thermoelectric generation systems convert waste heat into electrical energy irrespective of source size and without the use of moving parts or the production of environmentally deleterious wastes. This would conserve fuel and energy, and reduce environmental emissions. Success of this program will facilitate the development of thermoelectric materials, which has enormous international market, in Australia. It will open up an avenue for searching out potential thermoelectric materials for practical applications. This program will also provide an education platform to intensively train high quality postgraduates at the international level.

DP0880124 Prof DJ Young; Dr J Zhang

Approved Project Title **Controlling corrosion of steel by carbon dioxide-rich gases at high temperatures**

2008 : $ 100,000
2009 : $ 80,000
2010 : $ 80,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

A growing difficulty for Australia is the need to reduce carbon dioxide (CO2) emissions whilst maintaining the economic advantages of coal fired power stations. Technologies for capturing CO2 from these stations are being developed, but inevitably involve the need to handle hot CO2-rich gases. These are surprisingly corrosive to the materials of which power stations are constructed, in a way which is not fully understood. This project aims to achieve this understanding, and to provide the basis for future alloy design.

DP0879401 A/Prof J Yuan; Dr R Malaney

Approved Project Title **Design of Cooperative Communication Techniques for the 4th Generation Mobile Networks**

2008 : $ 97,000
2009 : $ 92,000
2010 : $ 86,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation The University of New South Wales

Project Summary

The project aims at developing novel wireless techniques that will enable breakthroughs in multi-user multimedia services in the ICT industry sector. The Australian community will benefit from the design and deployment of the next-generation wireless mobile systems we will develop. These new systems will possess greatly improved quality, high data rates and low cost of services. Other benefits generated by this research include the training of new innovators, and the generation of valuable intellectual property and patent outcomes. This work will help Australian telecommunication and information industries become leaders in wireless ICT based technologies, and contribute to the national economy.

DP0881531 Dr Q Zeng

Approved Project Title **Molecular modelling of the structure and mechanical properties of clay-based polymer nanocomposites**

2008 : $ 85,000
2009 : $ 85,000
2010 : $ 85,000

Primary RFCD 2914 MATERIALS ENGINEERING

APD Dr Q Zeng

Administering Organisation The University of New South Wales

Project Summary

Nanotechnology is one of the most rapidly growing areas in the 21st century. Its world market is expected to reach US$2.6 trillions in 2014, valued at 15% of global manufacturing output. The use of clay nanofillers as polymer reinforcement is an emerging cutting-edge research and of paramount importance in Australia in view of its heavy dependence on mineral industries. The project will tackle the core problems in this field. The research outcomes will lead to highly value-added mineral products and better process control. Furthermore, the application of polymer nanocomposites in automotive and packaging industries will significantly decrease energy consumption and CO2 emission, and increase the shelf-life for food and beverage.

DP0881739 Prof Y Zhao; Dr C Cheng; Prof Y Feng

Approved Project Title **High Performance Coated Conductors by Chemical Solution Deposition**

2008 : $ 110,000
2009 : $ 110,000
2010 : $ 110,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Strengthening Australia¡|s capability and leading position in this frontier technology;
Providing human resources for the superconductivity technology industries in Australia;
Transferring new technology gained from this research to the superconductivity technology industries in Australia;
Generating patents to enrich Australian intellectual property base;
Strengthening the collaborations between Australia and other countries, such as Japan where research is also at the forefront in this field;
Providing training for Australian research students and engineers.

DP0878970 Dr H Zhu; A/Prof Y Wu

Approved Project Title **Experimental and Numerical Investigation of Granular Flow in Hoppers**

2008 : $ 100,000
2009 : $ 100,000
2010 : $ 100,000

Primary RFCD 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

Administering Organisation The University of New South Wales

Project Summary

Handling and processing of bulk solids such as coal and metal ores perform a key function in many industries, and hoppers are the most common devices for storage and discharge of granular materials in this field. The proper design of this equipment is very important. This project provides a systematic investigation of granular flow in hoppers, which is essential in order to avoid structure failures and associated costs. It will lead to a fundamental understanding of relevant industrial processes, improvement of their efficiency, and hence improved competitiveness of Australian mining/mineral/metallurgical industries.