

New South Wales

University of Wollongong

DP0878931 A/Prof G Alici; Prof GM Spinks; Dr JM Cairney

Approved Project Title **Pushing the limits: fabricating micro and nano actuators**

2008 : \$ 150,000

2009 : \$ 130,000

2010 : \$ 125,000

Primary RFCD 2903 MANUFACTURING ENGINEERING

Administering Organisation University of Wollongong

Project Summary

This project will result in significant advances in micro/nano fabrication, that is the cornerstone of nanotechnology, and an understanding of the performance of micro/nano actuators produced from electroactive materials. The project outcomes will provide a technology platform to establish micro/nano robotic systems for vaccine and gene delivery, intelligent drug delivery systems, microfluidic systems for disease monitoring and treatment, water treatment and pollution control kits, microrobotic systems for pipeline inspection and maintenance, and minimally invasive surgery. National benefits will be in the areas of human health, sustainable environment and frontier technologies to stimulate the growth of world-class Australian industries.

DP0878604 Dr LJ Arnold; Dr RD MacPhee; Dr H Poinar

Approved Project Title **Pleistocene evolutionary dynamics and past environments of Siberia: Reconstructions using luminescence dating of ancient DNA sedimentary archives**

2008 : \$ 115,000

2009 : \$ 114,000

2010 : \$ 109,000

Primary RFCD 2601 GEOLOGY

APD Dr LJ Arnold

Administering Organisation University of Wollongong

Project Summary

This study will yield critical new insights into faunal-environment interactions in Siberia and their long-term implications for the evolution and extinction of Siberia's biota. These fundamental issues are of relevance to Australian archaeology, palaeontology and biogeography, and so our discoveries are of direct interest to Australian researchers studying these disciplines. The methodological advancements in OSL dating and DNA techniques that will accompany this research will enhance Australia's international scientific standing and create new opportunities for collaborative initiatives in both cutting-edge scientific research and consulting activities.

DP0879624 Mr AR Brumm

Approved Project Title **A reassessment of early human stone technology from a Southeast Asian perspective**

2008 : \$ 100,000

2009 : \$ 95,000

2010 : \$ 85,000

Primary RFCD 4302 ARCHAEOLOGY AND PREHISTORY

APD Mr AR Brumm

Administering Organisation University of Wollongong

Project Summary

The study of early stone technology is crucial to our understanding of human evolution worldwide, providing insight into the capabilities of our earliest ancestors. Current models focus on the evidence from Africa and Europe, potentially marginalising the importance of eastern Asia in the global development of early human stone technology. This impacts how nations and communities in our region interpret themselves to the world and reduces the impetus of innovative research on this subject. The proposal aims to establish detailed comparisons between Southeast Asian and 'Western' technologies, providing a suitable framework through which current preconceptions can be more rigorously assessed.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0879520 Prof RL Chambers
Approved Project Title **Statistical Inference for Probability-Linked Longitudinal Data**
2008 : \$ 80,000
2009 : \$ 80,000
2010 : \$ 75,000
Primary RFCD 2302 STATISTICS
Administering Organisation University of Wollongong

Project Summary

The Strategic Roadmap for the Australian Government's National Collaborative Research Infrastructure Strategy states that analysis of linked data, and particularly linked longitudinal data, has the potential to revolutionise Australian public health research. Similar benefits should flow from analysis of linked datasets in other areas, e.g. the Statistical Longitudinal Census Dataset that the Australian Bureau of Statistics intends to create by linking individual records across censuses. These benefits will be maximised by controlling the impact of linkage error when analysing these datasets. This proposal will develop the statistical theory and related methodology to solve this problem in a statistically efficient manner.

DP0877348 Dr J Chen; Dr AI Minett
Approved Project Title **Novel 3D Carbon Architectures for Fuel Cell Applications**
2008 : \$ 110,000
2009 : \$ 100,000
2010 : \$ 100,000
Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING
Administering Organisation University of Wollongong

Project Summary

The implementation of clean energy technologies has clear economic, environmental and social benefits for Australia, its industries and population. This project has the potential to make a significant impact on fuel cell research as an alternative means of energy production. We aim to remove some of the technical and economic barriers through product and process innovation at the nanoscale. Building on a strong track record in advanced materials research, this project investigates the integration of novel carbon nanostructures with extraordinary properties to produce high performance electrodes, that should lead to significant improvement in fuel cell performance.

DP0877658 Prof NE Dixon; Dr JL Beck; Dr AJ Oakley; Dr AM van Oijen
Approved Project Title **Functional Dissection of the Bacterial Replisome**
2008 : \$ 234,000
2009 : \$ 234,000
2010 : \$ 234,000
2011 : \$ 198,467
2012 : \$ 198,467
Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY
APF Prof NE Dixon
Administering Organisation University of Wollongong

Project Summary

We now have the complete sequences of genes in humans and many other organisms, but we know much less about how the protein products of the genes communicate with each other to create and grow cells. Australia has recently invested heavily in state-of-the-art instruments that can be used to tackle these problems. This project will involve close interaction of four laboratories to use new instruments to determine how a large assembly of proteins interact in a biological machine that makes DNA. This process occurs in similar ways in all organisms, and is essential for life. Understanding how DNA is made will help scientists to develop new antibacterial drugs, and learn how to make practical use of molecular machines that imitate biology.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0878338 Prof Dr S Dolnicar; Dr AC Hurlimann

Approved Project Title **Water for Australia's future - reducing fears and increasing acceptance of alternative water sources through public information**

2008 : \$ 130,000

2009 : \$ 120,000

2010 : \$ 100,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation University of Wollongong

Project Summary

Australia is in the midst of a water crisis. Available water sources are dwindling. Alternative water sources are key to Australia's sustainable water future. National and international experiences show that while alternative water treatment technologies are available, public acceptance is the most important factor to determining the successful implementation of alternative water schemes. This project will study public acceptance of a range of alternative water schemes in Australia. It will identify barriers to adoption of these alternatives and highlight preferred options by the community. The information needs of Australians will be identified and optimal communication strategies developed.

DP0878423 Prof Dr S Dolnicar; Prof Dr JR Rossiter

Approved Project Title **A cognitive model for identifying optimal measures of beliefs.**

2008 : \$ 67,000

2009 : \$ 77,000

2010 : \$ 75,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation University of Wollongong

Project Summary

Belief measures are of high practical relevance. One current national example is measurement of beliefs about recycled water, which will affect state and territory governments' water conservation policies. Another is cultural values, measures of which can form the basis for initiatives to improve social harmony in Australia. The knowledge gained, however, is only as good as the validity of the belief measure employed. We will analyse the main types of measures used at present and develop improved belief measures which, when published, will increase the quality of research in the social sciences and enhance Australia's international scientific reputation.

DP0879070 Prof SX Dou; Dr J Kim; Prof TH Johansen; Dr E Bruck

Approved Project Title **Giant Magnetocaloric Materials and Room Temperature Refrigeration**

2008 : \$ 197,000

2009 : \$ 198,000

2010 : \$ 200,000

2011 : \$ 165,000

Primary RFCD 2914 MATERIALS ENGINEERING

APD Dr J Kim

Administering Organisation University of Wollongong

Project Summary

The objectives of this project are to develop new magnetocaloric materials, study their properties and their potential as components of advanced magnetic refrigeration systems. The outcomes of this project will provide an opportunity for Australian industry to produce magnetocaloric materials and magnetic refrigeration systems with higher quality, to embark on this novel innovation technology in an effective way, and to access the international magnetic refrigeration market. In the longer term, the successful outcome of this research could lead to energy savings and an overall reduction in greenhouse gas emissions, as well as contributing to the associated economic and social goals.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0879468 Prof DW Griffith; Prof PO Wennberg; Dr PJ Rayner

Approved Project Title **The carbon cycle and climate: new approaches to atmospheric measurements and modelling**

2008 : \$ 165,000

2009 : \$ 119,000

2010 : \$ 109,000

Primary RFCD 2606 ATMOSPHERIC SCIENCES

Administering Organisation University of Wollongong

Project Summary

Earth's climate is intimately connected to the carbon cycle, which controls atmospheric CO₂ through processes such as photosynthesis, respiration and ocean uptake. A thorough understanding of the carbon cycle, and potential feedbacks with climate change, is prerequisite knowledge for informed assessments of future climate, impacts, adaptation and mitigation. This proposal improves that understanding through measurements of CO₂ and other key Kyoto-protocol greenhouse gases, links to global networks and satellite measurements, and advanced modelling. Australian science has a very important role to play in international networks due to our unique combination of southern hemisphere location and scientific standing.

DP0878611 Dr ZP Guo

Approved Project Title **Charge transfer mechanism in 3-dimensional pore-solid nanoarchitectures for electrochemical systems**

2008 : \$ 100,000

2009 : \$ 100,000

2010 : \$ 100,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation University of Wollongong

Project Summary

This project represents a significant scientific and economic advance for Australia because: 1) it is likely to create advanced energy storage and conversion devices, with excellent working efficiency and kinetics, which will induce dramatic improvements to our environment 2) the project will establish local expertise and scientific know-how on electrochemical energy storage and conversion systems, which will place Australia at the forefront of this important area of lithium ion battery and PEM fuel cells; 3) relevant Australian enterprises in electric vehicle and portable device manufacturing will reap the benefits of these discoveries.

DP0878925 A/Prof PC Heaven; Dr J Ciarrochi; A/Prof WJ Vialle; A/Prof TC Skinner

Approved Project Title **Predicting health, well-being, and educational success in emerging adults: An 8 year longitudinal study.**

2008 : \$ 70,000

2009 : \$ 70,000

2010 : \$ 96,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation University of Wollongong

Project Summary

This project will inform the community about factors that affect the psychological, physical, academic, and employment outcomes of emerging adults. It will improve our knowledge of why some young people do not reach their full potential. The project will provide a comprehensive assessment of factors associated with well-being across several domains. It will better equip and assist professionals to identify early those youth at risk of having poor psychological, health, and employment prospects post-school. The project will inform the development of intervention programs for young people and maximise their overall adjustment and well-being several years later.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0879119 A/Prof GF Hoban; Prof JJ Loughran; A/Prof B Ferry; Dr A Berry; Prof GL Erickson; A/Prof A Clarke

Approved Project Title **Generating Science Content Knowledge through Digital Animation in a Knowledge-building Community of Preservice Teachers**

2008 : \$ 100,000

2009 : \$ 60,000

2010 : \$ 80,000

Primary RFCD 3303 PROFESSIONAL DEVELOPMENT OF TEACHERS

Administering Organisation University of Wollongong

Project Summary

Sustaining Australia's growth and prosperity is dependent on continuous innovation in the teaching of science. Yet science is one of the least taught subjects in the primary curriculum because teachers lack content knowledge and confidence. This research engages preservice primary teachers in using new technologies to develop their understanding of science content knowledge through digital animation and to collaborate with other preservice teachers interstate and internationally. The products and processes of digital animation will help maintain and expand Australia's base as a knowledge economy as well as provide a social benefit of improved science teaching in schools.

DP0879261 Prof AJ Hulbert; A/Prof WA Buttemer

Approved Project Title **Of birds and bees: membrane lipids and the determination of maximum lifespan**

2008 : \$ 90,000

2009 : \$ 90,000

2010 : \$ 85,000

Primary RFCD 2706 PHYSIOLOGY

Administering Organisation University of Wollongong

Project Summary

The underlying mechanisms that determine why different animals have different maximum lifespans are unknown. Why do queen bees live for years but the genetically-identical workers bees live for only weeks? Similarly, to understand why birds live much longer than similar-sized mammals will give immense insight into the processes that cause ageing. Understanding the aging process in animals will have significant implications for human health as the biggest risk factor for most diseases is age. Such understanding will help to cope with the worldwide problems of an aging population.

DP0878122 A/Prof ZY Jiang

Approved Project Title **Advanced Shape Development in Cold Rolling of Thin Strip**

2008 : \$ 100,000

2009 : \$ 100,000

2010 : \$ 100,000

2011 : \$ 80,000

2012 : \$ 80,000

Primary RFCD 2903 MANUFACTURING ENGINEERING

ARF A/Prof ZY Jiang

Administering Organisation University of Wollongong

Project Summary

The manufacturing of thin strip with good shape, profile and flatness has a significant impact on society by providing high quality products to the electrical, instruments, and other industries. Metal manufacturing is a major Australian industry. If innovative thin strip rolling technology is developed, it will enable dramatic improvement in the strip manufacturing industry, which will bring significant economic and social benefits to Australia. The project will expand the university's R&D capability and make it a world leader in advanced metal rolling technology of thin strips. This will include the development of innovative rolling technology and new rolling theory, as well as further collaborative links with industry in Australia.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0877312 Dr MJ McLelland

Approved Project Title **Global/Local Intersections: History, Identity and Community in a Tokyo Subculture**

2008 : \$ 50,252

2009 : \$ 45,000

2010 : \$ 35,000

Primary RFCD 4203 CULTURAL STUDIES

Administering Organisation University of Wollongong

Project Summary

The human rights of minorities are gaining increased attention in Australia and the region. It is important for our understanding of the region that we are informed about the development of minority gender identities in an Asian context from both human rights and health perspectives. The project will contribute to the national research priority of understanding Australia's place in the region through building links between Australian and Asian researchers working on minority gender histories and cultures. It will also add to Australian understanding of Japan, an important social and economic partner in the region.

DP0881191 Dr K Michael

Approved Project Title **Toward the Regulation of the Location-Based Services Industry: Influencing Australian Government Telecommunications Policy**

2008 : \$ 61,950

2009 : \$ 70,000

2010 : \$ 59,962

Primary RFCD 3602 POLICY AND ADMINISTRATION

Administering Organisation University of Wollongong

Project Summary

Mobile telephone penetration in Australia is among the highest in the world. With so many Australians relying on their mobile device for secure voice and data communications, the sensitivity and magnitude of stored location information being gathered for each person is only now being realised. The collection, use and disclosure of location information by stakeholders including government agencies, private enterprise, and subscribers and their monitors needs to be regulated. This research will place Australia at the forefront of telecommunications policy, and provide legislative recommendations that can aid in overcoming the challenges to ensure subscriber privacy.

DP0881329 Prof MM Olsson; Dr E Wapstra

Approved Project Title **Molecular aggression: variation and heritability of the levels of reactive oxygen species, and their effects on the evolution of life histories in the wild**

2008 : \$ 114,000

2009 : \$ 114,000

2010 : \$ 114,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Organisation University of Wollongong

Project Summary

Three areas of biology have intrigued every generation since Aristotle (c. 300 BC)- sex, embryology, and ageing. This proposal targets all three of these areas with a special focus on aspects of ageing. In particular, we assess how 'free radicals', so often identified in our food and wine for good and bad, exert selection on living organisms and whether resistance (and defense) towards free radicals may drive evolution of ageing in the wild, its trade offs with fertility and fecundity, and how it is influenced by sexual or non-sexual reproduction. In spite of excellent work in the laboratory, this is the first attempt to do this in 'the real world' and will extend Australia's excellent reputation in evolutionary biology.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0881176 Prof W Ommundsen; A/Prof P Sharrad; Dr AE Broinowski

Approved Project Title **Globalising Australian literature: Asian-Australian writing, Asian perspectives on Australian literature**

2008 : \$ 79,563

2009 : \$ 110,000

2010 : \$ 100,000

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation University of Wollongong

Project Summary

Through the arts, and in particular through its literature, a nation defines its identity and aspirations. Literature is also a force for cultural diplomacy, leading to enhanced understanding and cooperation between nations and cultures. This study of literary interactions between Australia and Asia produces detailed knowledge of how cross-cultural influences shape the production, circulation and reception of literary texts, and develops strategies for using this knowledge for national benefit: greater understanding of the forces shaping the nation's self-image and perceptions of Australia in the Asian region, models for cultural diplomacy enhancing Australia's reputation as a sophisticated and culturally diverse nation.

DP0879933 Dr AV Pan; Dr CP Foley; Prof TH Johansen; Prof Dr H Hilgenkamp

Approved Project Title **Tailoring superconducting hybrid multilayered film systems for electric and electronic applications**

2008 : \$ 165,000

2009 : \$ 164,000

2010 : \$ 159,000

2011 : \$ 120,000

2012 : \$ 105,000

Primary RFCD 2914 MATERIALS ENGINEERING

ARF Dr AV Pan

Administering Organisation University of Wollongong

Project Summary

This project focuses on the development of new scientific and technological aspects of the fabrication, properties and operation of novel hybrid systems for revolutionizing electricity handling and electronics. It will also solve some existing problems of film structures with promising multilayer technology. Hybrid systems, often make the headlines in science and are gaining an increasingly promising outlook in materials engineering, nanotechnology and electronics, promising eventual application in a broad range of industries. This project will establish Australia's capability at the forefront in this area. The outcomes predicted will benefit existing Australian companies and may establish new companies dealing with these hybrid systems.

DP0879714 Dr G Peleckis

Approved Project Title **Development of novel high efficiency thermoelectric oxides for high temperature power generation**

2008 : \$ 35,000

2009 : \$ 35,000

2010 : \$ 35,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation University of Wollongong

Project Summary

Thermoelectric materials are considered as a key factor in clean energy production, based on the conversion of waste heat emitted by power plants and automobiles to electricity. A series of novel high performance Co-based oxide thermoelectric materials will be developed by this project using nanotechnology and advanced material processing techniques. Significant improvement of the heat-to-electricity conversion factor is expected to result from the proposed program. The novel thermoelectric oxides with high thermoelectric performance will be practically used for high temperature power generation. This will provide a long-term solution to the global warming threat through decreasing amounts of waste heat presently generated.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0879491 Prof SG Pyne; Dr AT Ung; A/Prof A Jatisatienr

Approved Project Title **Large Scale Production of Stemona Alkaloids for Agricultural Applications and New Drug Discovery**

2008 : \$ 122,000

2009 : \$ 121,000

2010 : \$ 116,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Organisation University of Wollongong

Project Summary

The Stemona alkaloids form a large group of natural products that have significant potential as agricultural and pharmaceutical drugs. Extracts of these natural products have many applications in traditional medicine and as insecticides in Asia. We propose to develop innovative methods for the large scale production and synthesis of these bioactive alkaloids. The methodology and products developed may have potential pharmaceutical and agricultural applications from which the country could benefit in the future. This project would help develop skilled people who may produce innovative outcomes in the future, especially in the developing pharmaceutical and biotechnology industries in Australia.

DP0880675 Prof RG Roberts; Prof AR Chivas; Dr MD Petraglia

Approved Project Title **Monsoons and migrations: Quaternary climates, landscapes and human prehistory of the Arabian peninsula and the Indian subcontinent**

2008 : \$ 155,000

2009 : \$ 130,000

2010 : \$ 125,000

2011 : \$ 110,000

2012 : \$ 100,000

Primary RFCD 2603 GEOCHEMISTRY

APF Prof RG Roberts

Administering Organisation University of Wollongong

Project Summary

By providing important new data on the initial dispersal of Homo sapiens from Africa to Australia via Arabia and India, this project will improve our knowledge of the time-depth of cultural connections between indigenous Australians and other societies. It will provide a long-term perspective on the impact of climate change on hunter-gatherer communities, and will contribute to NRP Safeguarding Australia by increasing our understanding of cultures in Arabia and India. Technical advances made in this study will benefit researchers worldwide, increase capacity for commercial services, and enhance Australia's international standing in the geosciences. We will also train high-quality research students and create new collaborative initiatives.

DP0877239 Dr JR Rodgers

Approved Project Title **An Investigation of Chronic and Transitory Poverty in Australia in the Twenty-First Century**

2008 : \$ 28,000

2009 : \$ 30,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation University of Wollongong

Project Summary

People in chronic poverty are unlikely to lead 'healthy, productive or fulfilling' lives. Their unrealized productive and creative potential is a loss to society as well as to the individuals themselves. The information about the intensity of chronic and transitory poverty in Australia that is generated by this project will enable government and charitable institutions to better allocate the substantial resources that they invest annually in programs to assist economically disadvantaged people. The project also has a training function: to develop the research capacity of a postgraduate student who will write a thesis on chronic poverty among children.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0877123 A/Prof W Susilo; A/Prof Y Mu; Dr J Baek

Approved Project Title **Secure and Practical Anonymous Electronic Payment and Applications**

2008 : \$ 80,000

2009 : \$ 80,000

2010 : \$ 75,000

Primary RFCD 2805 DATA FORMAT

Administering Organisation University of Wollongong

Project Summary

The expected results of this project will be frontier technologies that are essential in applications and services whose acceptance and take-up will depend on users' assurance about their security in the cyber world. The project will contribute to the economic and social advancement of Australia by allowing effective usage of advanced IT technologies. This development will also maintain Australia's leading position in the telecommunication and IT industries, which is well recognised by increasing levels of government. The resulting application will place Australia as the first country able to design and implement a provably secure and practical e-payment system.

DP0877456 Prof GG Wallace; Prof DL Officer; A/Prof RM Kapsa; Dr SE Moulton

Approved Project Title **Functionalised nanostructured polythiophenes: novel platforms for bionics**

2008 : \$ 185,000

2009 : \$ 210,000

2010 : \$ 210,000

2011 : \$ 210,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

Administering Organisation University of Wollongong

Project Summary

The nanostructured organic polymer materials targeted for production in this project will bring unique capabilities to the field of muscle regeneration. A multi-modal stimulation platform is expected to bring significant improvements in muscle cell growth. This will have profound effects on the quality of life for those suffering from neuromuscular disorders or other traumas that require muscle regeneration. This project will demonstrate the capabilities of these nanostructures in-vitro.

DP0877055 Prof M Wand

Approved Project Title **Generalised Linear Mixed Models: Theory, Methods and New Areas of Application**

2008 : \$ 85,000

2009 : \$ 85,000

2010 : \$ 80,000

Primary RFCD 2302 STATISTICS

Administering Organisation University of Wollongong

Project Summary

This project will aid the analysis of complex data sets throughout Australia. The ensuing methodology and software products will be applicable to data arising from longitudinal and geo-referenced public health and biomedical studies being conducted in Australia. It will also aid analysis of complex survey data from the Australian Bureau of Statistics and other agencies. Part of this project is geared towards smart information use in Australian industries and will help foster collaboration between mathematical scientists and members of the Australian business sector. Cancer research in Australia will also benefit from this project.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0881180 Dr K Ward
Approved Project Title **Gaze Tracking Haptic User Interface for the Blind**
2008 : \$ 70,000
2009 : \$ 65,000
2010 : \$ 60,000
Primary RFCD 2801 INFORMATION SYSTEMS
Administering Organisation University of Wollongong

Project Summary

It is estimated over 40 million people suffer from severe visual impairment in the modern world. Although blind people are able to use the computer with the aid of a screen reader and output devices like Braille displays, it remains difficult for the blind to use many applications with Graphical User Interfaces (GUIs) due to the need for hand-eye coordination when manipulating screen objects with the mouse. This project intends to overcome this difficulty by providing a means for the blind to perceive and control the GUI of typical computer applications. This potentially could provide increased computer access, job opportunities and education for the blind.

DP0879507 A/Prof TA Wysocki; Dr M Abolhasan
Approved Project Title **Novel Architecture for Next Generation Wireless Relay Networks**
2008 : \$ 100,000
2009 : \$ 100,000
2010 : \$ 95,000
Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES
Administering Organisation University of Wollongong

Project Summary

The proposed project will provide a diverse range of benefits for the nation, by providing future solutions to address a number of key telecommunication networking requirements in Australia. One such area is the provision of broadband connectivity to rural and remote regions of Australia. It is well known, that wireless relay networks could potentially provide low-cost networking infrastructure for rural and remote communities. The solutions developed in this project will enable a wider deployment of such networks, as they would increase the capacity of these networks both in terms of bandwidth and their coverage. This is of major benefit to Australia, due to our large desert land-mass and sparsely populated remote and rural communities.

DP0878661 Dr X Yu
Approved Project Title **Improvement and synthesis of advanced hydrogen storage materials for fuel cell applications**
2008 : \$ 96,148
2009 : \$ 96,148
2010 : \$ 96,148
Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS
APD Dr X Yu
Administering Organisation University of Wollongong

Project Summary

Energy systems of the future must be cleaner and much more efficient, flexible, and reliable to meet the growing global demand for energy. A hydrogen economy offers a potential solution to satisfying the global energy requirements while reducing carbon dioxide and other greenhouse gas emissions and improving energy security. The enhanced hydrogen storage materials to be investigated will have higher hydrogen storage capacity, which can have applications in a variety of areas, including the storage and transport of hydrogen, fuel cells and electric automobiles.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0879151 Prof C Zhang; Dr D Li; Prof F Liu; Prof RB Kaner; Prof Y Jiang

Approved Project Title **Novel graphene nanostructures: modelling, synthesis, fabrication and characterisation**

2008 : \$ 150,000

2009 : \$ 145,000

2010 : \$ 145,000

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation University of Wollongong

Project Summary

As a key nanomaterial for future electronics, graphene is rapidly becoming one of the most promising frontier areas of nanotechnology throughout the world. This project aims to develop a new class of graphene nanostructures that hold great potential for large-scale applications in the next generation nanoelectronic devices, sensors, solar cells and light emitting devices. This project will significantly enhance the international competitiveness of Australia in the areas of new materials and nanotechnology and will help place Australia at the forefront of nanotechnology. This project will produce high quality PhD students in nanotechnology.

DP0879843 Dr S Zhou

Approved Project Title **Fabrication of high quality MgB2 superconductor**

2008 : \$ 40,000

2009 : \$ 40,000

2010 : \$ 40,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation University of Wollongong

Project Summary

Superconductors are electrical resistance free materials. They have great potential for power applications. Nowadays, superconductors have been used in applications such as Magnetic Resonance Imaging and other R&D equipment. This project deals with newly discovered MgB2 superconductor. The process outlined in this project will produce MgB2 superconductor with better superconducting properties. The application of MgB2 superconductor will save energy, and enhance the performance of existing electrical devices such as magnet and power line.