

Summary of Linkage Projects Proposals for Funding to Commence in 2008

New South Wales

The University of New South Wales

LP0882720 Prof R Amal; Prof PJ Russell; Prof JJ Gooding; Dr BJ Walsh

Approved Project Title **Numerical Modelling and Experimental Studies to Design and Engineer Nanoparticulate Systems for Bioapplications**

2008 : \$ 121,253

2009 : \$ 124,442

2010 : \$ 125,625

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Collaborating/Partner Organisation(s)

Minomic Pty Ltd

Administering Organisation The University of New South Wales

Project Summary

Project outcomes will enhance Australia's reputation for scientific innovation in the field of bio-nanotechnology. The project will expand the knowledge base in this area and increase Australia's international profile in research on nanomaterials for bio-related applications. The project partners UNSW and Australian company (Minomic), integrating their skills, expertise and facilities to address current limitations in understanding the stability of magnetic nanoparticles in biological fluids. The Australian partners will play a leading role in commercializing new applications for functionalized magnetic nanoparticles. The project will provide an excellent multidisciplinary research environment and training for early career researchers.

LP0882929 Prof MA Bradford; Prof B Uy; Dr G Ranzi; Mr A Filonov

Approved Project Title **Time-Dependent Response and Deformations of Composite Beams with Innovative Deep Trapezoidal Decks**

2008 : \$ 87,141

2009 : \$ 83,893

2010 : \$ 85,154

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

BlueScope Lysaght

Administering Organisation The University of New South Wales

Project Summary

The construction industry in Australia is introducing efficient and economical long-span trapezoidal profiled steel sheeting for composite flooring systems. Australia is a world leader in the research of composite structures. Composite beams undergo deformations because the concrete creeps and shrinks, and because the slab slips relative to the steel joist. Surprisingly little research has addressed these issues collectively; they are of paramount significance with trapezoidal decks and research is much-needed. This research will investigate the interaction of creep, shrinkage and partial interaction in these composite beams, producing valuable design guidance to keep Australian research and practice at the forefront internationally.

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LP0882024 Dr JP Craig

Approved Project Title Trends in Time: Work, Family and Social Policy in Australia 1992-2006

2008 : \$ 109,576

2009 : \$ 113,743

2010 : \$ 119,101

Primary RFCD 3705 DEMOGRAPHY

Collaborating/Partner Organisation(s)

Human Rights and Equal Opportunity Commission
Department of Families, Community Services and Indigenous Affairs
Australian Bureau of Statistics

Administering Organisation The University of New South Wales

Project Summary

This project will contribute to the national priority goal of 'strengthening Australia's social and economic fabric to help families and individuals live healthy, productive, and fulfilling lives', within the National Research Priority of 'promoting good health and well being for all Australians'. It will provide sound new evidence for effective strategies fostering the policy goals of reducing stress on families, maintaining fertility and encouraging women into paid work. Identifying measures that most support men and women to balance work-family commitments, to spend adequate time with their children and social networks, and most facilitate female workforce participation, will promote national wellbeing.

LP0882191 A/Prof AG Dempster; Prof DA Gray; Mr A Tabatabaei Balaei

Approved Project Title Locating Interference to GPS: Protecting the World's Aircraft Landing Systems

2008 : \$ 176,426

2009 : \$ 161,930

2010 : \$ 172,130

Primary RFCD 2910 GEOMATIC ENGINEERING

APA(I) Award(s): 2

APDI Mr A Tabatabaei Balaei

Collaborating/Partner Organisation(s)

AirServices Australia

Administering Organisation The University of New South Wales

Project Summary

GRAS is an enormous initiative that is expected to generate billions of dollars in exports for Australia. The equipment developed in this project will protect the system from radio frequency interference. It thus protects these exports, and creates a new exportable product. By protecting this system, it makes air travel safer both in Australia and in the countries that buy this Australian technology.

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LP0882860 A/Prof KM Dunn; Dr A Pedersen; A/Prof J Forrest; Dr YC Paradies; A/Prof DF Ip; Prof H Babacan

Approved Project Title **Constructing regionally appropriate anti-racism strategies for Australia**

2008 : \$ 62,750

2009 : \$ 88,291

2010 : \$ 37,639

Primary RFCD 3701 SOCIOLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Human Rights and Equal Opportunity Commission
Equal Opportunity Commission of South Australia
Victorian Equal Opportunity & Human Rights Commission

Administering Organisation The University of New South Wales

Project Summary

Racism is an international social scourge, and Australia is not immune from its injurious effects. The experience of racism degrades senses of belonging and generates disaffection, leads to ill-health and restrictions of mobility, as well as other social and individual pathologies. Reducing racism will strengthen Australia's social fabric. This project tests the utility of anti-racism templates and does so in rural as well as urban Australia. The templates will be usable by local authorities and NGOs in framing their anti-racism efforts.

LP0882595 Dr L Ge; Dr S Gherardi; Dr A Edirisinghe; Dr AL Mitchell; Dr B Scheuchl

Approved Project Title **Measurement of paddock scale pasture biomass using synthetic aperture radar remote sensing**

2008 : \$ 83,648

2009 : \$ 83,648

2010 : \$ 83,648

Primary RFCD 2910 GEOMATIC ENGINEERING

APDI Dr B Scheuchl

Collaborating/Partner Organisation(s)

Department of Agriculture and Food Western Australia

Administering Organisation The University of New South Wales

Project Summary

To maintain the long-term viability of livestock production, producers and land managers need access to regular, timely and accurate estimates of pasture biomass. Radar remote sensing has the capacity to consistently provide this information at the paddock, farm and catchment scale in a timely manner to assist in tactical and strategic decision making for sustainable pasture and livestock management. Economic analyses undertaken at the farm level have revealed the potential to double farm profit by increasing the utilization of pasture grown. In addition to the socio-economic benefits, the environmental benefits of sustainable land management are paramount in light of the current drought in Australia and the global climate change.

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LP0882474 Dr AR Green; Dr IC Piper; Dr A Mahidadia
Approved Project Title **Development of a Multi Threat Risk Assessment Model for Critical Infrastructure Using Scripted Agent Computer Technology**

2008 : \$ 51,254

2009 : \$ 51,254

2010 : \$ 51,254

Primary RFCD 2399 OTHER MATHEMATICAL SCIENCES

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Arup, Risk and Security

Administering Organisation The University of New South Wales

Project Summary

The project will develop a distributed risk network capable of real time assessment of multiple threats to critical infrastructure, which will guide decision making on the appropriate response as the nature of the threat changes. This will assist all stakeholders and allow an integrated response across industry and government agencies. The developed technology will find ready application in other areas where integration of science and technology is required to solve complex problems. For example, risk network technology has application to natural hazards, waste disposal and financial markets while the scripted agent has application to communication technologies and sensor networks.

LP0882002 Dr CC Harb; Dr EH Huntington; Dr GN Milford; Dr SB O'Byrne; Prof BJ Orr; Dr T Spence

Approved Project Title **Molecular Fingerprinting: Forensic Spectroscopy of Trace Gases**

2008 : \$ 85,000

2009 : \$ 25,000

2010 : \$ 45,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Collaborating/Partner Organisation(s)

Australian Federal Police

Administering Organisation The University of New South Wales

Project Summary

Safeguarding Australia from terrorism, crime and invasive diseases is essential to securing our national infrastructure. This project will develop national capabilities in anticipating and responding to critical threats to society. The scientific instrumentation developed from this effort will enhance Australia's potential aid for early detection of explosive and chemical weaponry and also in the analysis of crime scenes. This research will significantly improve our abilities to maintain the operational advantage of Australia's security agencies through superior capabilities in threat detection.

LP0882630 Prof RE McMurtrie; Prof BA Neilan; Dr DJ Eldridge

Approved Project Title **Is reintroduction of soil foraging animals critical for the restoration of degraded semi-arid woodlands?**

2008 : \$ 65,354

2009 : \$ 74,454

2010 : \$ 56,654

Primary RFCD 2707 ECOLOGY AND EVOLUTION

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Australian Wildlife Conservancy

NSW Department of Natural Resources

Administering Organisation The University of New South Wales

Project Summary

Locally-extinct animals are important, not only for their intrinsic value, but because they are thought to be essential for maintaining and restoring healthy ecosystems. This project will give us valuable insights into how ecosystems may have functioned prior to the loss of native animals, and how ecosystems can be restored when the animals are reintroduced. Our research will provide Australian Wildlife Conservancy with the knowledge they need to continue their reintroductions, and information that encourages land managers to adopt strategies to ensure the survival of reintroduced animals outside of formal reserves.

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LP0882620 Prof RB Randall; Dr N Feng; Prof MJ Hoffman; Dr D Ashmore; Prof SD Garvey

Approved Project Title **Diagnostics and Prognostics of Turbine Engine Bearings**

2008 : \$ 90,000

2009 : \$ 90,000

2010 : \$ 90,000

Primary RFCD 2902 AEROSPACE ENGINEERING

Collaborating/Partner Organisation(s)

Rolls-Royce plc

Administering Organisation The University of New South Wales

Project Summary

Rolls Royce are a leading supplier of engines world-wide, but in particular (with respect to this application) to airlines operating in and from Australia, including Qantas, as well as to the Australian armed forces. The methods to be developed will give greater security to the flying public, and to the Defence Forces, allowing them to carry out their role more reliably. Collaboration with Rolls Royce will add prestige to this Australian developed technology, and increase the likelihood of it (and related technology) being used in the Joint Strike Fighter.

LP0882592 Prof V Sahajwalla; Dr R Khanna

Approved Project Title **Recycling waste plastics in aluminium processing: Fundamental investigations of carbon/gas reactions**

2008 : \$ 85,000

2009 : \$ 90,000

2010 : \$ 90,000

Primary RFCD 2913 METALLURGY

Collaborating/Partner Organisation(s)

Rio Tinto Aluminium Ltd.

Administering Organisation The University of New South Wales

Project Summary

This project will be a major step towards tackling the global problem of disposing waste plastics in an environmentally sustainable way, and will improve the efficiency of industrial operations, lowering costs and resource consumption. Our advances will deliver the fundamental science that will enable the aluminium industry to consume substantial amounts of plastic waste, including plastics that are currently unsuitable for recycling. This technology is likely to make significant contributions towards the development of a sustainable recycling oriented society, to curb global warming, enhancing the international competitiveness of Australian aluminium manufacturing.

Summary of Linkage Projects Proposals for Funding to Commence in 2008

LP0882352 Prof PG Saunders; Prof B Cass; Mr GM Redmond; Dr T Ridge; Dr JR Stanley; Ms AC Hampshire

Approved Project Title **Making a Difference: Building on Children's Perspectives on Economic Adversity**

2008 : \$ 103,000

2009 : \$ 131,000

2010 : \$ 128,000

Primary RFCD 3702 SOCIAL WORK

Collaborating/Partner Organisation(s)

Mission Australia

The Smith Family

Office for Children

The Brotherhood of St Laurence

Association of Child Welfare Agencies

Social Inclusion Unit, Department of the Premier and Cabinet, Government of South Australia

Department of Education and Children's Services

Department of Families, Community Services and Indigenous Affairs

Administering Organisation The University of New South Wales

Project Summary

Governments allocate a large volume of resources to address the needs of children. Investigating children's perspectives on the nature and impacts of economic adversity in the family, at school and in the community will provide a better understanding of how policy can make a difference to children's lives. The direct involvement of major government and non-government agencies in the research will strengthen its relevance and impact. The resulting improvements in service design and delivery will generate substantial economic and social benefits in areas that align with the designated national research priorities.

LP0882693 Prof MY Simmons; Dr JN Randall

Approved Project Title **Exploring the Fundamentals of Atomically Precise Manufacturing with Scanning Probe Microscopes**

2008 : \$ 65,666

2009 : \$ 65,666

2010 : \$ 43,486

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Zyvex Corporation

Administering Organisation The University of New South Wales

Project Summary

Over the past five years, Australian researchers have pioneered the development of a new method for fabricating electrical devices in silicon with atomic precision. By partnering with the world leader in nanotechnology manufacturing, these same researchers now have an opportunity to extend Australia's early lead in this area. The proposed research will lead to new capabilities for Australia within the growing field of electro-mechanical devices. It will strengthen and broaden Australia's leadership in atomic-scale device fabrication in silicon. It will assist world-leading Australian researchers to evaluate and prioritise the commercial potential of their technologies.

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LP0882447 Dr M Stenzel; Dr SK Jones

Approved Project Title Degradable hollow microspheres for liver cancer treatment

2008 : \$ 108,090

2009 : \$ 100,000

2010 : \$ 100,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

Collaborating/Partner Organisation(s)

Sirtex Technology Pty Ltd

Administering Organisation The University of New South Wales

Project Summary

The expected outcome of this multidisciplinary approach is a controlled drug delivery system for the treatment of liver cancer. We aim to increase the understanding of drug release using polymeric microspheres and the influence of the polymer properties on the release kinetics resulting in the tailored drug release for liver cancer treatment. An in-depth knowledge in drug delivery can lead to optimised release kinetics leading to an increased patient convenience and life prolonging treatments.

LP0881993 Dr I Takken; A/Prof JC Croke; Dr PN Lane; Dr GJ Sheridan; Dr AA Webb

Approved Project Title Developing a decision support system for the management of road runoff for water quality protection

2008 : \$ 110,000

2009 : \$ 100,000

2010 : \$ 80,000

Primary RFCD 2605 HYDROLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Forests NSW

Parks, Conservation & Lands Branch, Dept. of Territory and Municipal Services

Department of Sustainability and Environment

Department of Environment and Conservation

Southern Rivers Catchment Management Authority

Eurobodalla Shire Council

Administering Organisation The University of New South Wales

Project Summary

Multiple stakeholders share a vested and often significant financial commitment to ensure water quality standards. These industries, in turn, are vital to the social and economic sustainability of many rural communities in Australia. Recent climatic trends of increasing drought episodes and related natural disasters such as bushfires are expected to increase the delivery of sediments and associated pollutants to streams. The proposed DSS will allow testing of various management scenarios with respect to road position and layout, thereby providing a planning and management tool, and a method to educate the practitioners involved in environmental management in Australia.

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LP0882150 Dr H Timmers; Dr LG Gladkis; Dr JM Scarvell; A/Prof PN Smith

Approved Project Title **Rare isotopes as tracers of prosthesis debris**

2008 : \$ 108,000

2009 : \$ 108,000

2010 : \$ 108,000

Primary RFCD 2499 OTHER PHYSICAL SCIENCES

APDI Dr LG Gladkis

Collaborating/Partner Organisation(s)

Trauma and Orthopaedic Research Unit

Administering Organisation The University of New South Wales

Project Summary

The incidence of knee replacement surgery in Australia is 30,000 per year. Limited by wear debris, the lifespan of knee implants is only 10-15 years and can be much shorter. Due to increasing life expectancy, many patients need several surgical procedures. As a multi-disciplinary team of materials-, isotope-tracing- and medical-experts, we aim to understand and monitor wear debris in prostheses. Knee replacement surgery alone imposes a high burden of annually half a billion dollars on the Australian health budget. Controlling and reducing wear debris in prosthesis joints would reduce these costs and improve patients' quality of life.

LP0882961 A/Prof R van der Meyden

Approved Project Title **Model Checking Knowledge and Probability in Pursuit-Evasion Games**

2008 : \$ 130,000

2009 : \$ 125,000

2010 : \$ 120,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Collaborating/Partner Organisation(s)

Defence R&D Canada - Valcartier (DRDC Valcartier)

Administering Organisation The University of New South Wales

Project Summary

The research will produce software enabling modellers to better understand their models in applications including planning under uncertainty, information flow security and systems fault diagnosis. The application studied in this project is military search and rescue mission planning, resulting in greater confidence in mission success. The research is also relevant to emergency response and collision avoidance. The project will support retention of Australian intellectual property with potential for future commercialisation. It will foster linkages between Australian researchers and an international defence alliance partner. Outcomes will be available to Australian Defence through existing Defence research sharing arrangements.

LP0882468 Dr J Wang; Prof FD Foster; Dr L Yang; Dr M Yang; Mr I Geninson

Approved Project Title **Information Content of Order Flows in the Foreign Exchange and Commodities Markets**

2008 : \$ 40,000

2009 : \$ 35,000

2010 : \$ 35,000

Primary RFCD 3402 APPLIED ECONOMICS

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Commonwealth Bank of Australia

Administering Organisation The University of New South Wales

Project Summary

The Australian economy depends heavily on resources and commodities markets. The Australian dollar is the sixth most actively traded currency in the world and is more volatile than all other major currencies except the Japanese yen. The proposed study seeks to improve volatility forecasts and hedging effectiveness for foreign exchange and commodity risks, which will create significant benefits for the Australian economy, corporations, and investors. In addition, the project will enhance investment performance and risk management practice of financial institutions, improving the overall safety of our financial system. It will also foster research culture and increase research capacity of Australian financial institutions.