

Summary of Linkage Projects Proposals for Funding to Commence in 2009

New South Wales

The University of New South Wales

LP0990840 Prof R Amal; Dr JA Scott; Prof Dr DY Pui

Approved Project Title **Volatile Organic Compound removal from indoor air environments by an integrated photocatalytic/filtration system**

2009 : \$ 45,000

2010 : \$ 82,500

2011 : \$ 37,500

Primary RFCD 2906 CHEMICAL ENGINEERING

Collaborating/Partner Organisation(s)

The Boeing Company

Administering Organisation The University of New South Wales

Project Summary

This project promotes the development of technology for providing improved air quality in indoor environments. Mentoring by internationally renowned experts of young Australian researchers on this issue of high importance will be undertaken by the Chief and Partner Investigators. Success from this project will place Australia as a leader in the global community for developing technology in air pollution quality control.

LP0991495 Prof MA Bradford; Prof RI Gilbert; Prof SJ Foster; Mr A Filonov; Mr R Ratcliffe

Approved Project Title **Strength of two-way steel fibre reinforced composite flooring systems**

2009 : \$ 30,000

2010 : \$ 60,000

2011 : \$ 30,000

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

BlueScope Lysaght

BOSFA

Administering Organisation The University of New South Wales

Project Summary

The construction industry in Australia is introducing efficient and economical long-span profiled steel sheeting for composite flooring systems, and Steel Fibre Reinforced Concrete (SFRC) applications are becoming widespread. Australia is a recognised world leader in the research of both composite structures and SFRC. Using SFRC in composite decks to eliminate conventional reinforcement is very efficient and cost-effective, but surprisingly little relevant research aimed at the Australian industry has been reported. Comprehensive design guidance is much needed to advance this technology. This project will give designers confidence and expertise to advance these technologies, while maintaining Australian research and practice in composite structures at the forefront.

LP0990696 Prof RA Bryant; Mr R Weston; Ms N Whyman; Mr J Files; Prof D Silove; Dr RT Brooks; Mr Z Steel; Dr KA Senior; Prof LK Newman

Approved Project Title **Enhancing Mental Health in Aboriginal Children**

2009 : \$ 120,035

2010 : \$ 246,570

2011 : \$ 253,035

2012 : \$ 264,000

2013 : \$ 137,500

Primary RFCD 3210 CLINICAL SCIENCES

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Maari Ma Health Aboriginal Corporation

Greater Western Area Health Service

Administering Organisation The University of New South Wales

Project Summary

The poor health, academic, and mental health functioning of Aboriginal children is one of Australia's major public health problems. This project will identify the specific factors that lead to these problems and empirically evaluate

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management programs aimed at leading to reduced violence and better mental health. This program aims to interrupt the intergenerational cycle of violence and mental health problems in Australian Aborigines.

LP0990670 Prof RO Day; Dr CM Kirkpatrick; A/Prof KM Williams; Dr J Greenfield; Prof K Giacomini

Approved Project Title **Development of computer-based decision support tools using population pharmacokinetic/pharmacodynamic models**

2009 : \$ 73,461

2010 : \$ 121,068

2011 : \$ 85,873

2012 : \$ 38,266

Primary RFCD 3205 PHARMACOLOGY AND PHARMACEUTICAL SCIENCES

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

St Vincent's Hospital

Alphapharm

Merck Sharp & Dohme (Australia) Pty Ltd

University of California San Francisco

Administering Organisation The University of New South Wales

Project Summary

Diabetes is an epidemic that presents an enormous burden to health systems of both developed and developing nations. Australia spends an estimated \$35 billion on the condition annually, with costs set to rise with increasing diagnosis rates. Additionally, the burden of diabetes is more prominent in indigenous Australians. We intend to improve management of this disease in non-indigenous and indigenous Australians by development of a user-friendly computer-based decision support tool for doctors. Once established, this tool will have applications in other fields of health care where support is needed to make informed dosing decisions for critical medications and have the potential to reduce financial and social impacts of chronic disease.

LP0991701 Prof RI Gilbert; Prof MA Bradford; Mrs R Zeuner; Mr GR Brock

Approved Project Title **Time-dependent in-service behaviour of composite concrete slabs with profiled steel decking**

2009 : \$ 45,000

2010 : \$ 89,000

2011 : \$ 82,500

2012 : \$ 38,500

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Fielders Australia Pty Ltd

Prestressed Concrete Design Consultants Pty Ltd

Administering Organisation The University of New South Wales

Project Summary

At present, the in-service behaviour of composite floor slabs is incompletely understood, and structural designers have no reliable means to assess the effects on structural behaviour of shrinkage warping, time-dependent cracking, temperature gradients and the influence of prestress on bond-slip at the concrete-deck interface. This project will, through laboratory testing and theoretical analysis, provide the necessary data to develop and calibrate models to simulate structural behaviour and provide rational guidance for design engineers. The project will result in more serviceable and more economical composite floor slabs in Australian buildings, thereby reducing the costs of construction, maintenance and repair.

LP0991589 Prof Dr RJ Goodwin; Mr R Lowe

Approved Project Title **Real-time Porosity: Using computer gaming technology to map and analyse pedestrian movement in public and private space.**

2009 : \$ 70,000

2010 : \$ 135,000

2011 : \$ 138,000

2012 : \$ 73,000

Primary RFCD 4102 VISUAL ARTS AND CRAFTS

APA(I) Award(s): 2

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Collaborating/Partner Organisation(s)

Department of Lands

Administering Organisation The University of New South Wales

Project Summary

This project will make a major, and ongoing, contribution to our understanding of urban space in a major Australian city. The Porosity Lenses will enable a more complete understanding of pedestrian movement that the Emergency Information Coordination Unit (EICU) believes will directly contribute to protecting Australia from terrorism and crime. In the case of terrorism the socio/economic benefits of even the smallest success can be immeasurable. The need to anticipate and mitigate the impact of catastrophic events on the city will be balanced, in this study, by a concern to maintain freedom of circulation and promote civic opportunities within previously under-utilised zones.

LP0990427 Dr M Groth; Dr AM Johnson; Ms H Hong; Dr AA Grandey; Prof LJ White; Prof J Crisp

Approved Project Title **The Heart of Health Care: Advancing Emotional Well-being, Engagement and Performance in Hospitals**

2009 : \$ 72,841

2010 : \$ 146,105

2011 : \$ 148,107

2012 : \$ 74,843

Primary RFCD 3801 PSYCHOLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Sydney Children's Hospital

Prince of Wales Hospital

Royal Children's Hospital

Royal Hospital for Women

Sydney Hospital Sydney Eye Hospital

Administering Organisation The University of New South Wales

Project Summary

This research will improve our understanding of the drivers of effective health care delivery and will identify practical ways to improve the well-being, performance, retention and engagement of health care professionals and improve patient care, satisfaction and safety. In light of significant staffing shortages of health care professionals, the knowledge created will have substantial benefits in developing more effective models of quality care. In addition this research will enable health care professionals to build holistic, adaptable and multidisciplinary approaches to patient care in order to ensure a sustainable health care system for the future.

LP0990189 Dr RK Henderson; A/Prof RM Stuetz; Dr V Bulmus; Dr WL Peirson; Dr G Newcombe; Dr B Jefferson

Approved Project Title **Optimising dissolved air flotation (DAF) for algae removal by bubble modification in drinking water and advanced wastewater systems**

2009 : \$ 75,000

2010 : \$ 140,000

2011 : \$ 120,000

2012 : \$ 55,000

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 1

APDI Dr RK Henderson

Collaborating/Partner Organisation(s)

United Water International

Melbourne Water Corporation

South Australia Water Corporation

SEQWater

Administering Organisation The University of New South Wales

Project Summary

Algal blooms in potable water reservoirs and advanced wastewater treatment lagoons can impact the performance and economic viability of water treatment processes resulting in taste and odour episodes and the risk of algal toxins as well as causing further limitation to already stressed water resources in Australia. This project aims to develop an adaptation of the dissolved air flotation process that is already used for algae treatment that will provide a more robust, economic and sustainable barrier to algal cells in accordance with the Australian Drinking and Recycled Water Guidelines.

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LP0992098 Prof GD Housley

Approved Project Title **Gene therapy to enhance auditory prosthesis performance for cochlear implants**

2009 : \$ 57,500

2010 : \$ 107,500

2011 : \$ 119,500

2012 : \$ 69,500

Primary RFCD 3210 CLINICAL SCIENCES

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Cochlear Ltd

Administering Organisation The University of New South Wales

Project Summary

The cochlear implant is the most effective neural prosthesis, restoring hearing to the deaf. The research aims to develop a new type of implant compatible with delivery of therapeutic genes to the cells lining the cochlea. Gene therapy DNA constructs will be developed that will enhance neural survival and growth, improving cochlear implant performance. The research will provide advances in understanding how to transfer genes into cochlear tissue, as well as development of gene cassettes for effective neural repair. The work will advance the field of bionics, an area where Australia is establishing international preeminence.

LP0990640 Dr EL Johnston; Dr BP Kelaher; Dr MA Coleman

Approved Project Title **Assessing and understanding ecological changes in highly disturbed estuaries: addressing the complexity of multiple stressors**

2009 : \$ 82,500

2010 : \$ 165,000

2011 : \$ 167,500

2012 : \$ 182,500

2013 : \$ 97,500

Primary RFCD 2707 ECOLOGY AND EVOLUTION

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Bluescope Steel Limited

Batemans Marine Park, NSW DECC

Administering Organisation The University of New South Wales

Project Summary

The conservation of estuarine ecosystems is necessary due to the intrinsic value of their biodiversity and the ecosystem services they provide to humans (food, tourism, recreation). This project will identify anthropogenic stressors that pose ecological threats to estuaries. We will identify indicator species and biomarkers that are cost-effective signs of ecological change, useful to any manager of Australian estuaries. The simultaneous assessment of multiple stressors is a great advance in the ecological assessment of estuarine health. We will develop a manual of methods and indicators for measuring the success of environmental management programs.

LP0990137 Prof RT Kingsford; Dr D Ramp; Dr A Sharma; Dr DA Keith

Approved Project Title **An innovative approach to maximising catchment water yield in a changing climate**

2009 : \$ 40,000

2010 : \$ 80,000

2011 : \$ 80,000

2012 : \$ 40,000

Primary RFCD 3008 ENVIRONMENTAL SCIENCES

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Sydney Catchment Authority

Department of Environment and Climate Change

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Administering Organisation The University of New South Wales

Project Summary

Australia is facing a crisis in water availability and management within many of the continent's major cities and the Murray-Darling and Sydney Basins. Risk to water resources will also be exacerbated by climate change. Past solutions of increasing water supply by building dams are no longer easily implemented because of the significant environmental consequences. To maximise yield, better management of current resources is required, dependent on understanding what factors affect water yield and how they may be better manipulated. This project innovatively integrates ecological and hydrological processes by modelling the expression of water use by vegetation and its management and water availability at fine resolutions.

LP0991781 A/Prof F Ladouceur; Prof S Prawer; Dr P Atanackovic; Dr SG Duvall

Approved Project Title **Diamond-based Ultra Violet (UV)-emitting devices**

2009 : \$ 100,000

2010 : \$ 197,500

2011 : \$ 175,000

2012 : \$ 77,500

Primary RFCD 2404 OPTICAL PHYSICS

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Saphicon Semiconductor Pty Ltd

Administering Organisation The University of New South Wales

Project Summary

The development of UV-emitting solid state devices will enable new applications and drive rapid growth of new industries in particular in health care (sterilisation), microelectronics (lithography) and high-density data storage. With its deep expertise in photonics, Australia is well positioned to become a significant player in these industries. This collaborative project, involving academic and industrial partners, seeks to leverage Australian scientific expertise to create new hybrid diamond/nitride structures potentially capable of emitting UV-radiation with high-efficiency and power. The outcomes will help seed new industry and economic growth in Australia.

LP0990749 Prof CR MacIntyre; Prof DE Dwyer; A/Prof PT Nga; Prof NM Ferguson; A/Prof M McLaws; Prof L Maher; Dr H Seale; Dr JG Wood; Dr AT Newall

Approved Project Title **Economic, social and cross cultural issues in non-pharmaceutical protection of front line responders to pandemic influenza and emerging infections.**

2009 : \$ 37,500

2010 : \$ 67,500

2011 : \$ 55,000

2012 : \$ 25,000

Primary RFCD 3210 CLINICAL SCIENCES

Collaborating/Partner Organisation(s)

3M Australia. Pty.Ltd

Administering Organisation The University of New South Wales

Project Summary

The protection of front line responders in a pandemic is essential to underpin an effective response. This research is the only work internationally which will address a key gap in evidence. This research has major implications for the national stockpile and for management of front line responders in a pandemic. These data are urgently needed, not just in Australia, but globally to inform pandemic planning and disease control policy around emerging infections and bioterrorism.

LP0991263 Prof CR MacIntyre; A/Prof PK Ray; A/Prof S Goldstein; Prof P Barach; Mr RL Itzwerth; Dr JG Wood

Approved Project Title **Pandemic Influenza, Human Resources and Critical Infrastructure Dependencies: Mitigating The Impact on Hospitals**

2009 : \$ 35,000

2010 : \$ 70,000

2011 : \$ 70,000

2012 : \$ 35,000

Primary RFCD 3210 CLINICAL SCIENCES

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Collaborating/Partner Organisation(s)

Australian Centre for Health Research

Administering Organisation The University of New South Wales

Project Summary

Pandemic planning is conducted from a health-centric model which only considers subsystems within health. This study will determine the impact of a pandemic on the hospital system by failures of human resources and external systems (such as power, finance and telecommunications) which comprise critical infrastructure of society. The results will enable identification of key weak points, strengthening of health systems and resilience in the event of a pandemic or other disruption.

LP0991017 Dr G Peters; Dr S Lundie

Approved Project Title **Sustainability of water and wastewater treatment chemicals**

2009 : \$ 13,070

2010 : \$ 26,140

2011 : \$ 26,140

2012 : \$ 13,070

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Sydney Water

Melbourne Water

Yarra Valley Water

Water Corporation

Gold Coast Water

SA Water

Administering Organisation The University of New South Wales

Project Summary

In recent years, the environmental design and management of water and wastewater treatment facilities has broadened from consideration of water quality outcomes to include the environmental consequences of energy and material inputs. This has produced nationally agreed approaches to estimating greenhouse gas emissions from power consumption, but for important chemical additives analysts are forced to work with low-quality estimated data. In a time when society wants to account for the 'carbon-footprint' of decisions and more broadly consider the resources used and emissions produced by industry, this research will make this quantitatively possible for chemicals used in water and wastewater treatment.

LP0991295 Prof A Sowmya; Prof PJ Compton; Dr DH Yates; A/Prof PS Thomas; Dr A Johnson; Dr LJ Silverstone; Dr A Sandrini; A/Prof DH Bryant

Approved Project Title **Feature Detection and Computer-aided Diagnosis with Longitudinal Tracking of Benign Asbestos-Related Pleural Disease in CT images**

2009 : \$ 47,500

2010 : \$ 95,000

2011 : \$ 92,500

2012 : \$ 45,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Collaborating/Partner Organisation(s)

St Vincent's Hospital Sydney

Liverpool Hospital

Administering Organisation The University of New South Wales

Project Summary

This project seeks to develop smart and novel feature extraction and knowledge acquisition techniques to assist radiologists in automated diagnosis and assessment of lung diseases. These outcomes will lead to improved delivery of health services in Australia, including in rural regions. They will lead to more accurate assessment of asbestos related pleural diseases for compensation and treatment and better followup, leading to earlier treatment and better quality of life for patients suffering from lung diseases. The project will also save costs due to automated assessment as well as the potential for fewer patient scans.

LP0991794 Dr N Valanoor; Prof PR Munroe; Prof MJ Hoffman; Prof CC Sorrell; Dr PJ Bryant; Dr V

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Kurusingal
Approved Project Title **New Generation Lead-free Piezoelectric Ceramics for Acoustic Sensor Technologies**
2009 : \$ 30,000
2010 : \$ 60,000
2011 : \$ 60,000
2012 : \$ 30,000
Primary RFCD 2914 MATERIALS ENGINEERING
APA(I) Award(s): 2
Collaborating/Partner Organisation(s)
Thales Australia
Administering Organisation The University of New South Wales

Project Summary

Cooperative research between University of NSW and Thales Australia to design new Lead-free piezoceramics is of critical importance to Australia's strategic leadership in underwater acoustic technology. This area has been identified by the Department of Defence to be a critical defence capability and essential to Australia's exploration of oil, gas, and minerals. Improved and new transducer components will provide significant economic benefit to Australia through increased export of sonar technology, particularly to Europe and all Restriction of Hazardous Substances (RoHS) compliant countries. The project will produce highly skilled graduates ensuring an on-going basis for Australia's future innovation in this area.

LP0991274 Mr JS Ward; Dr H Worth; Prof A Smith; Ms D Thiele; Prof J Kaldor; Dr J Bryant; Prof MK Pitts

Approved Project Title **Sexual health and relationships in young Indigenous people.**

2009 : \$ 105,000
2010 : \$ 200,000
2011 : \$ 195,000
2012 : \$ 177,500
2013 : \$ 77,500
Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES

Collaborating/Partner Organisation(s)

NSW Department of Health
Department of Human Services Victoria
Department of Health and Human Services Tasmania
Department of Health SA
Queensland Health
ACT Health
Department of Health WA
Northern Territory Department of Health and Families
Victorian Aboriginal Community Controlled Health Organisation
Aboriginal Health and Medical Research Council of NSW
Queensland Aboriginal and Islander Health Council
The Aboriginal Health Council of South Australia
Aboriginal Health Council of Western Australia
Tasmanian Aboriginal Centre
Aboriginal Medical Services Alliance Northern Territory
Winnunga Nimmityjah Aboriginal Service Health Clinic
National Aboriginal Community Controlled Health Organisation

Administering Organisation The University of New South Wales

Project Summary

Despite higher notified rates of sexually transmissible infections and blood borne viruses and often negative depictions of young indigenous people, very little is known of the health and well being of young Indigenous people. This project will for the first time provide a national profile of risk behaviours, levels of knowledge and the types of health services young Indigenous people access for sexual health and blood borne viruses. The findings of this research will set the foundations for a longer term strategy to ensure trends and behaviours can be identified among the population and where necessary interventions can be implemented

LP0991229 Prof AB Yu; Dr RP Zou; Dr BY Guo; Dr PR Austin; Dr SJ Chew; Dr DJ Pinson

Approved Project Title **Model studies of multiphase flow in fluid bed reactors**

2009 : \$ 26,140

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2010 : \$ 52,280

2011 : \$ 52,280

2012 : \$ 26,140

Primary RFCD 2913 METALLURGY

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

BlueScope Steel Research Labs

Administering Organisation The University of New South Wales

Project Summary

Multiphase flow is widely encountered in mineral, metallurgical and chemical industries which are important components of Australia's economy. Understanding and modelling multiphase flow plays a significant role in the design, control and optimization of multiphase reactors in these industries. The success of this project will enhance computational multiphase flow capability and help build fluid bed reactors with high efficiency, low energy consumption and low emissions. The research outcomes will not only greatly benefit Australia's economy but also significantly help environmental protection beneficial to Australia's community.

LP0991678 Dr RP Zou; Dr RY Yang; Dr KJ Dong; Mr D Hu

Approved Project Title **Experimental and numerical studies of the packing and piling of coal**

2009 : \$ 39,295

2010 : \$ 78,591

2011 : \$ 78,591

2012 : \$ 39,295

Primary RFCD 2913 METALLURGY

APDI Dr KJ Dong

Collaborating/Partner Organisation(s)

BAOSHAN IRON & STEEL CO.LTD

Administering Organisation The University of New South Wales

Project Summary

This project is oriented to the coal and steel industries, which are important to Australia. In fact, the coal industry creates a significant employment and produces 80% of electricity in Australia. Australia is also the world's biggest coal exporter. This project will develop methods to control the packing and piling processes of coal, which are of fundamental importance to many granular processes. The benefits from the project include improvements in productivity, coke quality and fuel efficiency, which will lead reduced energy consumption and pollution emission and thereby improve the competitiveness of Australia's coal and steel industries.