

Summary of Successful Linkage International applications - Round 10 Awards to Commence in 2005 by State/University

New South Wales

Macquarie University

LX0664998 Dr TJ Bayne; Dr J Fernandez; Dr A Egan; Prof MK Davies; Dr AM Aimola Davies; A/Prof PC Menzies; Dr J Sutton; Dr P Jacob; Dr J Proust; Dr F De Vignemont; Dr F Recanati; Dr E Pacherie; Dr P Engel; Dr J Dokic

Title: A philosophical and empirical approach to the nature of perception and belief

2005 : \$11,000

2006 : \$5,500

Category: 3803 - COGNITIVE SCIENCE

Collaborating Countries

France

Administering Institution: Macquarie University

Summary:

Delusions - bizarrely false but tenaciously maintained beliefs - are troubling for patients and their families and puzzling for theorists in philosophy and psychology. The aims of this project are to employ recent work in philosophy to understand the nature and causes of delusions, and to use empirical models of delusions to resolve debates in philosophy about the nature of perception, rationality and belief. The project is significant for inter-disciplinary and international research and practice. In addition to improved empirical models of delusions and philosophical theories of experience and reason, the outcomes will include prospects for new approaches to therapy and family support.

LX0664977 Dr AK McIver; Dr CC Morgan; Prof M Kwiatkowska; Dr J Hurd

Title: Increasing the effectiveness of quantitative verification

2005 : \$5,000

2006 : \$2,500

Category: 2302 - STATISTICS

Administering Institution: Macquarie University

Summary:

Quantitative verification provides detailed information on performance of many complex protocols including those for the internet. But analysis is often impeded by intricate, and unexpected interactions between the random and arbitrary concurrent events inherent in the operating conditions. The major approaches to quantitative analysis include algorithmic styles (model checking) and proof-based styles (theorem proving). These deal with the difficulties in distinctly different ways. The two approaches have not been combined before for quantitative analysis. By developing rigorous techniques to put them together we aim to provide a means to scale up what can currently be achieved with either method separately.

The University of New South Wales

LX0667387 Dr S Bandyopadhyay; A/Prof S Seal

Title: UCF-UNSW Development of Sol gel Derived Non-agglomerated Cerium Oxide Nanoparticles

2005 : \$12,000

2006 : \$6,000

Category: 2918 - INTERDISCIPLINARY ENGINEERING

Collaborating Countries

USA

Administering Institution: The University of New South Wales

Summary:

Sol gel Synthesis of Nano-ceria will be carried out at the UCF Nanomaterials Synthesis and Characterisation Facility with an aim to produce non-agglomerated ceria nanoparticles 20 - 30 nm size range. The microemulsion system will use water, toluene and surfactant AOT (sodium bis(2-ethylhexyl) sulfosuccinate). Different sols will be synthesized by varying one parameter at a time in the process while keeping the other chemical conditions constant. Subsequently, the sols will be separated and calcined at 600°C to evaporate toluene and burn off the surfactant to provide nanoparticles of cerium oxide in powder form.

LX0665810 A/Prof MH England; Mrs AM Treguier; Dr RA Morrow; Dr SR Rintoul

Title: Eddy mixing and water mass formation in the Southern Ocean in a global 1/4 degree model

2005 : \$7,000

2006 : \$3,000

Category: 2604 - OCEANOGRAPHY

Collaborating Countries

France

Administering Institution: The University of New South Wales

Summary:

The dynamics of the Southern Ocean and its interaction with the atmosphere depend strongly on mesoscale eddies (ocean motions with typical scales of 100 km). These eddies are still poorly represented by idealized parameterisations in most climate forecast models. The present project relies on a European global ocean-ice model with a 1/4° grid allowing eddy formation, as well as expert

knowledge of the Southern ocean provided by the Australian partners. Model results will be critically assessed in reference with observations. We will quantify eddy contributions to the dynamics of the Southern Ocean, and compare them with parameterizations used in coarse resolution climate models.

LX0667478 A/Prof V Jeyakumar; Prof G Lee

Title: Continuous Optimization with Linear Matrix Inequality Constraints

2005 : \$11,000

2006 : \$5,250

Category: 2301 - MATHEMATICS

Collaborating Countries

Korea

Administering Institution: The University of New South Wales

Summary:

How to use continuous optimization methodologies to improve system design and control has become a critical question in Engineering and Mathematics world-wide. This proposal will investigate a relatively new methodology, epi-conjugate-sum technique, that has potential to provide the basis for enhancing analysis and applications of optimization with linear matrix inequalities (LMIs). This project will determine the major principles, methods and critical characteristics of optimization problems involving LMIs.

University of Technology, Sydney

LX0667312 Dr SI Belli; A/Prof NC Smith; Prof BT Chait

Title: Identification of structural proteins in the tissue cyst wall of *Toxoplasma gondii*

2005 : \$6,000

Category: 3204 - MEDICAL MICROBIOLOGY

Collaborating Countries

USA

Administering Institution: University of Technology, Sydney

Summary:

Toxoplasma gondii is a protozoan parasite that is well recognised as a cause of miscarriage or birth defects in otherwise healthy people, but it can also cause severe neurological disorders in immunocompromised people. Once inside the body, it hides from the immune system by encapsulating itself within a cyst wall where it remains dormant for years; infected people are at constant risk of reinfection. We will identify the structural proteins within the cyst wall, using sensitive, revolutionary mass spectrometers, and identify the mechanisms involved in cyst wall formation. These proteins and mechanisms will be the targets for new strategies to control infection.

Victoria

RMIT University

LX0666659 Dr K Ghorbani; Dr K Kalantar-zadeh; Dr A Mitchell; Prof A Safari; Dr AS Holland

Title: Barium Strontium Titanate Thin Films for Tunable Microwave Applications

2005 : \$4,500

Category: 2917 - COMMUNICATIONS TECHNOLOGIES

Collaborating Countries

USA

Administering Institution: RMIT University

Summary:

This project will investigate the application of a novel ceramic material for the development of radio frequency and wireless devices. The material, barium strontium titanate (BST), has a dielectric constant that can be controlled by an electronic signal. Importantly, BST-based devices can be adjusted or calibrated electronically, rather than by more traditional mechanical methods. The project will involve the collaborative development of a reliable fabrication process for BST thin film devices. These will be designed, fabricated and tested at the Microelectronics and Materials Technology Centre (MMTC) at RMIT University. Thin-film deposition and microcharacterisation will be conducted at Rutgers University, USA.

Swinburne University of Technology

LX0560113 A/Prof DA Forbes; Prof JP Brodie

Title: Globular Clusters: Shedding Light on Dark Halos

2005 : \$10,000

2006 : \$15,000

2007 : \$5,000

Category: 2401 - ASTRONOMICAL SCIENCES

Collaborating Countries

Canada

Germany

USA

Administering Institution: Swinburne University of Technology

Summary:

Our overall aim is to use globular clusters as a probe of galaxy formation and their dark matter halos. We will apply new techniques to probe galaxy halos in their outer parts. Outcomes include an observational database for the community, new simulations and a better understanding of the role of dark matter in galaxy formation and evolution.

The University of Melbourne

LX0559610 A/Prof D Nestic; Dr L Zaccarian

Title: Analysis and design of control systems with saturation and time-delay

2005 : \$2,500

2006 : \$5,000

2007 : \$2,500

Category: 2301 - MATHEMATICS

Collaborating Countries

Italy

Administering Institution: The University of Melbourne

Summary:

Control engineering is an enabling technology without which most modern engineering systems, such as aircrafts or Internet, can not operate properly. Actuator saturation and time-delays are undesirable phenomena that often arise in control systems leading to poor performance and sometimes instability. For example, both of these phenomena arise in control of modern telecommunication systems, such as Active Queue Management in TCP networks. The project aims at tackling these phenomena by using recently developed techniques in antiwindup for saturating actuators and by revisiting some classical methods for Smith predictor design for time-delayed systems.

Queensland

The University of Queensland

LX0667145 A/Prof SP Riek; A/Prof WD Byblow; Dr CM Stinear

Title: How does Motor Cortex Excitability Influence Internal Model Retention

2005 : \$5,396

2006 : \$2,698

Category: 3214 - HUMAN MOVEMENT AND SPORTS SCIENCE

Collaborating Countries

NZ

Administering Institution: The University of Queensland

Summary:

The ability to learn and recall the appropriate motor commands is a fundamentally important quality of the motor control system. Considerable evidence exists to suggest that in programming the motor output to muscles, the central nervous system uses an internal model to predict the dynamics of the task. Adequate retention of internal models assists us maintaining acquired movement patterns needed for tools use or recovery from movement impairments, for example, following stroke. We seek to understand how the level of excitability of the primary motor cortex impacts upon retention of recently learned motor outputs.

South Australia

The University of Adelaide

LX0561447 Dr BS Cazzolato; Prof N Tanaka

Title: Noise control in aircraft and motor vehicles

2005 : \$9,700

2006 : \$19,700

2007 : \$10,000

Category: 2905 - MECHANICAL AND INDUSTRIAL ENGINEERING

Collaborating Countries

Japan

Administering Institution: The University of Adelaide

Summary:

The principal aim of this collaborative program between Australian and Japanese research teams is to tackle the complex issue of using active noise control systems focussing "zones of quiet" at passengers in aircraft and motor vehicles. The work has important implications for increased comfort of air travel and a safer environment for drivers of heavy vehicles. The outcomes will be the development of "smart skins" for application to aircraft and vehicle cabin interiors to actively control of interior noise. This will be achieved by combining the Japanese team's "structural wavenumber sensors" and the Adelaide team's "virtual microphones".

Western Australia

The University of Western Australia

LX0561250 Prof S Lewandowsky; Prof GD Brown; Dr S Farrell

Title: The role of time and similarity in short-term memory

2005 : \$4,000

2006 : \$7,500

2007 : \$3,500

Category: 3801 - PSYCHOLOGY

Collaborating Countries

UK

Administering Institution: The University of Western Australia

Summary:

The project examines the role of time and similarity in memory for serial order, with the long-term goal to construct a new computational model of short-term memory. The investigators are internationally known for their models, and the collaboration will enable them to combine their complementary perspectives into a unifying theory. Theory construction will be guided by two sets of studies: The first will delineate the circumstances, if any, under which temporal separation at encoding affects memory. So far, we have shown that temporal distinctiveness has no effect on memory, unless people use temporal gaps to 'chunk' the list. The second set of studies will examine whether phonological similarity determines the strength of encoding.

LX0665384 A/Prof AN Luiten; Dr JJ McFerran; Dr FA Benabid

Title: **Micro-engineered Optical Fibre Clocks**

2005 : \$11,000

2006 : \$5,000

Category: 2917 - COMMUNICATIONS TECHNOLOGIES

Collaborating Countries

UK

Administering Institution: The University of Western Australia

Summary:

Clocks are crucial components in all communication, navigation and computing technologies; as such, they lie at the heart of the modern technological revolution. There is presently a critical need to develop high performance clocks that are also compact and robust. This project will bring together the expertise of the UWA group in clock construction, with the expertise of the optical fibre designers at the University of Bath. Together they will develop a new type of clock that will fulfil this need.

LX0664864 Prof MF Randolph; Dr C Gaudin; Dr J Garnier; Dr DJ White

Title: **Physical modelling of on-bottom pipelines and offshore anchoring systems**

2005 : \$9,500

2006 : \$4,500

Category: 2908 - CIVIL ENGINEERING

Collaborating Countries

France

UK

Administering Institution: The University of Western Australia

Summary:

Offshore hydrocarbon developments are extending into water depths in excess of 2000 m. In deep water, a floating facility is held in place by flexible mooring lines anchored at the seabed and the risers for transmitting oil often take the form of steel catenaries draped down to the seabed. The development of these floating facilities requires novel types of installation, which present geotechnical challenges involving softening seabed soils and extreme environmental loading. The collaborative research programme comprises physical modelling of anchoring systems and pipeline sections under these conditions, with the aim of providing high quality data under realistic conditions to validate analysis tools and design methods.

Australian Capital Territory

The Australian National University

LX0667213 Dr R Kennedy; Prof LS Bell; Dr JV Emberley

Title: **Testimonial narratives in the post-colonial era**

2005 : \$11,500

2006 : \$4,000

Category: 4203 - CULTURAL STUDIES

Collaborating Countries

Canada

Administering Institution: The Australian National University

Summary:

In both Australia and Canada, testimony has been used extensively in coming to terms with the histories, legacies and effects of settler colonialism. This project aims to develop an innovative transnational framework for analysing testimonial narratives produced and circulated in post-colonial contexts. Drawing on the expertise of Australian and Canadian researchers, this project will analyse Australian and Canadian materials in relation both to national contexts, and to transnational concepts such as reconciliation, human rights, and genocide. By highlighting the significance of Australian and Canadian materials, it will ensure these countries a place in the emerging international field of testimony, trauma and cultural memory studies.

LX0667315 Prof PF McDonald; Prof TK LeGrand; Dr HA Evans; Dr S Khoo

Title: **Transitions to adulthood among young people in migrant families in Australia and Canada: A comparative study**

2005 : \$6,250

Category: 3705 - DEMOGRAPHY

Collaborating Countries

Canada

Administering Institution: The Australian National University

Summary:

Social and economic integration of the children of immigrants is one of the most important objectives of a successful migration programme. Research conducted in Australia has indicated very high levels of integration for the second generation of immigrants in terms of education, employment and family formation. The proposed project will extend this research to Canada and to immigrants who arrived in Australia as children using a common research framework. In relation to migration, Australia and Canada share very similar histories and very similar policy approaches and, as such, they are ideally suited for comparative migration research.

LX0667518 Dr JP Sullivan; Prof SJ Buckman; Dr MJ Brunger; Prof CM Surko; A/Prof Y Nagai; Dr TN Rescigno; Prof CW McCurdy

Title: Positron processes - From Basic to Applied Science

2005 : \$13,000

2006 : \$6,500

Category: 2403 - ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS; PLASMA PHYSICS

Collaborating Countries

Japan

USA

Administering Institution: The Australian National University

Summary:

We aim to increase Australian expertise in the field of positron studies, as well as to establish research links with outstanding international research groups. Positrons are emerging as a vital tool for studying novel materials, as well as being important in our understanding of the quantum physics of basic scattering processes. The Australian researchers in this proposal are all involved in a new program which is building a state-of-the-art positron beamline for experimental studies in materials and atomic and molecular physics. This project will allow the researchers to establish productive links with research groups in other countries, providing an important cross fertilisation of ideas and new insight into research directions.

LX0560800 Dr S Zhang; Prof MV Srinivasan; Prof Dr WA Ribic

Title: Learning and memory in the honeybee: Task-dependent brain development

2005 : \$3,500

2006 : \$3,500

Category: 3207 - NEUROSCIENCES

Collaborating Countries

Liechtenstein

Administering Institution: The Australian National University

Summary:

We wish to explore whether the development of specific brain regions in young bees depends upon the nature of the learning task in which they are engaged. We will examine tasks that involve two sensory modalities: olfaction and vision, both of which are important to successful foraging. The relative ease with which bees can be trained, and their nervous systems accessed, make them a very attractive subject in which to study fundamental principles of learning and memory that may span a variety of organisms.