

# Summary of Linkage International Awards Proposals

## New South Wales

### The University of New South Wales

**LX0882654** Prof R Amal; Dr JA Scott; Prof Dr DY Pui; A/Prof G Peng

**Approved Project Title** **Optical fibre photoreactor for removing airborne molecular contaminants and volatile organic carbons for semiconductor fabrication and fuel cell applications**

**2008 :** \$ 18,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

#### Collaborating Countries

USA

**Administering Organisation** The University of New South Wales

#### Project Summary

The collaboration integrates concepts from photocatalysis, optical fibre technology and filtration, to solve important issues in the semiconductor fabrication and fuel cell industries. The project will place Australia amongst the world-leaders in novel integrated photocatalytic/filtration techniques and provide significant opportunities for penetration, in particular, into the US filtration market. The collaboration will afford young Australian-based researchers the opportunity to access technology, expertise and knowledge developed in the US, which is currently unavailable in Australia. It will strengthen ties between UNSW and UMN and provide opportunities for further collaboration.

**LX0882710** Dr MR Cunningham; A/Prof MG Burton; Prof Y Fukui

**Approved Project Title** **Collaboration with The NANTEN2 International Star Formation Consortium**

**2008 :** \$ 18,000

**2009 :** \$ 16,500

**2010 :** \$ 15,900

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

#### Collaborating Countries

Chile

Germany

Japan

Korea

Switzerland

**Administering Organisation** The University of New South Wales

#### Project Summary

Through this collaboration Australia, for a very modest sum, will gain its first direct access to the astronomical facilities of the Atacama plateau, one of the best sites for investigating star formation on the Earth. The project fosters international collaboration, and raises the profile of Australian science and facilities by bringing together astronomers from Australia, Japan, Germany, Korea, Chile and Switzerland. The collaborations formed during this project will enable Australian scientists future access to new front-line telescopes such as the Atacama Large Millimeter Array (ALMA), due to commence operations in 2010.

## Summary of Linkage International Awards Proposals

**LX0882222** A/Prof AR Hamilton; Dr AP Micolich; Prof R Newbury; Dr T Martin; Prof M Pepper; Prof Dr A Wieck; Dr M Governale; Prof RP Taylor; Dr U Zuelicke

**Approved Project Title** **Nanoscale electronic devices: bringing sample design, fabrication, test and theory together**

**2008 :** \$ 25,800

**2009 :** \$ 28,600

**2010 :** \$ 25,900

**Primary RFCD** 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

### **Collaborating Countries**

Germany

NZ

UK

USA

**Administering Organisation** The University of New South Wales

### **Project Summary**

The multi-trillion dollar semiconductor industry drives the explosive growth in information technology that we have witnessed over the past 25 years. This proposal will support Australia's ongoing efforts in semiconductor nanotechnology and quantum information science, allowing us to play a role in the future development of nanoscale and quantum electronics. This research program will bring together Australian researchers and students to work with leading international universities in the UK, Germany, the USA and New Zealand, allowing access to experimental facilities that simply do not exist in Australia.

## Summary of Linkage International Awards Proposals

### The University of Newcastle

**LX0882515** Prof BJ Fraser; Dr CC Chaston; Dr HJ Singer

**Approved Project Title** **Ring Current and Radiation Belt Dynamics**

**2008 :** \$ 5,400

**2009 :** \$ 5,400

**Primary RFCD** 2606 ATMOSPHERIC SCIENCES

#### **Collaborating Countries**

USA

**Administering Organisation** The University of Newcastle

#### **Project Summary**

Outbursts of energy from the Sun manifest themselves as geomagnetic storms in the Earth's magnetosphere. These storms can severely disrupt and damage advanced technological systems operating on the ground and in space. Operational spacecraft may experience anomalies, pipelines in the long term may corrode and the performance of GPS navigational systems, HF (High Frequency) communications systems, mobile/cell telephone networks and defence surveillance radars may be degraded. It is important to understand the magnetospheric conditions contributing to these problems. This research identifies relevant mechanisms. It also enhances Australia's international space research profile, contributes to Australia's future and supports excellent postgraduate training.

## Summary of Linkage International Awards Proposals

### The University of Sydney

**LX0882504** Prof RW Hunstead; Prof EM Sadler; Prof R Subrahmanyam; Dr L Saripalli

**Approved Project Title** **Cosmic evolution of radio galaxies**

**2008 :** \$ 6,900

**2009 :** \$ 6,000

**2010 :** \$ 15,200

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

#### Collaborating Countries

India

**Administering Organisation** The University of Sydney

#### Project Summary

The proposed research will use the telescopes in Australia in novel configurations to address a key astrophysical problem in modern day cosmology: the role of the central black hole in regulating galaxy growth and evolution. This research project will be a showcase of Australian technical innovation and scientific know-how. At the same time it provides an excellent opportunity to promote and strengthen research links between Australia and India in the field of radio astronomy. The exchange of researchers in this field has important strategic value in strengthening Australia's bid to host the next generation international radio telescope, known as the Square Kilometre Array.

**LX0881902** A/Prof DS Jeng; Prof AH Chan; Prof BR Seymour; Prof B Teng; Dr F Gao; Dr FJ Lu

**Approved Project Title** **Energy from Offshore Wind: Stability of Offshore Monopiles in Shallow Water**

**2008 :** \$ 12,490

**2009 :** \$ 26,540

**2010 :** \$ 20,798

**Primary RFCD** 2912 MARITIME ENGINEERING

#### Collaborating Countries

Canada

China

UK

**Administering Organisation** The University of Sydney

#### Project Summary

Development of renewable energy such as offshore wind energy is one of Australia's national priorities. Design of offshore wind farms such as monopiles has demanded more accurate and reliable methods to evaluate the stability of structures and their foundations, stability of these offshore monopiles being the key issue. The proposed study will not only enhance the understanding of the fluid-seabed-structure interaction, vital for the design of offshore monopiles, but also contribute to national development and competitiveness in ocean exploration, reduce the risk of potential environmental damage caused by failure of wind farms and produce high quality research students.

## Summary of Linkage International Awards Proposals

### University of Technology, Sydney

**LX0881891** Dr BP Kelaher; Dr MJ Bishop; Prof CH Peterson; Prof JS Levinton

**Approved Project Title** **Impacts of changing detrital source biodiversity on estuarine ecosystems**

**2008 :** \$ 14,692

**2009 :** \$ 13,892

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

#### **Collaborating Countries**

USA

**Administering Organisation** University of Technology, Sydney

#### **Project Summary**

Coastal development, invasive pests, and climate change are impacting abundances of estuarine aquatic plants. This in turn is affecting the composition and magnitude of detrital enrichment, threatening biodiversity, fisheries production and endangered birds. Our pioneering research will forecast the impacts of changing detrital-source biodiversity on soft-sediment communities and the food webs they support in Australia and the USA. Ecological generalities obtained can be used to support policy development that ensures sustainable management of estuaries. This work will also facilitate training of early career researchers and focus research efforts of leading US researchers towards issues crucial for Australian estuarine management.

## Summary of Linkage International Awards Proposals

### University of Western Sydney

**LX0881973** Prof JW Cairney; Prof Z Xu; Dr CD Campbell; Dr IC Anderson

**Approved Project Title** **Future climate change: consequences for decomposition and pathways of carbon flow through rhizosphere fungal communities**

**2008 :** \$ 16,500

**2009 :** \$ 28,100

**2010 :** \$ 25,100

**Primary RFCD** 2799 OTHER BIOLOGICAL SCIENCES

#### **Collaborating Countries**

UK

**Administering Organisation** University of Western Sydney

#### **Project Summary**

The proposed collaboration will provide novel insights into likely consequences of global climate change on decomposition and pathways of carbon flow through forest soils. This will refine predictive models of future climate change and its impacts on the sustainability of Australia's forests. It will also enhance the protection of our valued habitats and their important soil biodiversity. The knowledge gained will help land managers to adapt current practices to meet the demands of future climate change. This will maximize the opportunities for sequestering carbon in Australia's forests and so contribute to meeting Australia's global responsibility for mitigation of climate change.

## Summary of Linkage International Awards Proposals

### University of Wollongong

**LX0882706** Dr JL Beck; Prof NE Dixon; Prof C Robinson

**Approved Project Title** **Mass Spectrometric Investigations of Conformation and Dynamics of Biological Complexes**

**2008 :** \$ 11,000

**2009 :** \$ 13,000

**2010 :** \$ 13,000

**Primary RFCD** 2799 OTHER BIOLOGICAL SCIENCES

#### Collaborating Countries

UK

**Administering Organisation** University of Wollongong

#### Project Summary

The new collaboration between the leading mass spectrometry groups at University Wollongong and Cambridge University will benefit both partners. Researchers at Wollongong will have access to an ion mobility mass spectrometry technology not currently available in Australia that will contribute to our understanding of complicated cellular processes such as chromosome replication. The researchers' experience with this technology will pave the way for introduction of the technology to Australia and benefit the wider scientific community in wide-ranging projects such as development of new antibiotics and vaccines. Students from both institutions will benefit from experiencing science from an international perspective.

**LX0881890** Prof Dr S Dolnicar; Prof Dr F Leisch

**Approved Project Title** **Response style heterogeneity in empirical marketing research**

**2008 :** \$ 9,658

**2009 :** \$ 10,573

**2010 :** \$ 20,173

**Primary RFCD** 3502 BUSINESS AND MANAGEMENT

#### Collaborating Countries

Austria

Germany

**Administering Organisation** University of Wollongong

#### Project Summary

This study aims to improve the validity of empirical studies by accounting for different ways in which respondents answer questionnaires (response styles) while analysing the data. Response styles have been shown to depend on the cultural background of respondents. This work therefore is of particular importance in Australia given the large number of cultural backgrounds residents come from. The proposed method will be empirically tested in the context of surveys investigating sustainable tourism, public acceptance of alternative water sources and volunteering, three areas which are central to maintaining Australia's environmental sustainability and providing social and environmental services which are not covered by the commercial sector.

**LX0881969** Prof SX Dou; Dr Y Zhao; Prof X Xi; Prof Dr G Ramanath; Prof QJ Li; Dr G Peleckis

**Approved Project Title** **Development of nano-structured thermoelectric materials for power generation from heat**

**2008 :** \$ 18,200

**2009 :** \$ 20,200

**2010 :** \$ 20,200

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

#### Collaborating Countries

USA

**Administering Organisation** University of Wollongong

#### Project Summary

To make thermoelectric technology attractive for practical power generation purposes, new high efficiency materials have to be developed. Our fabricated nanostructured thermoelectric materials will have improved performance due to the peculiarities in electrical and thermal transport. The novel thermoelectric materials and constructed prototype devices with high thermoelectric performance will be practically used for various power generation purposes. This offers a long-term solution to the global warming threat through decreasing amounts of waste heat presently generated. It will also strengthen Australia's position in world-wide research on thermoelectricity.

## Summary of Linkage International Awards Proposals

**LX0882106** Dr M Hagenbuchner; Prof A Tsoi; Prof M Gori; Prof F Scarselli; Prof A Sperduti

**Approved Project Title** **Investigations into machine learning applications in link analysis.**

**2008 :** \$ 3,100

**2009 :** \$ 12,000

**2010 :** \$ 7,900

**Primary RFCD** 3803 COGNITIVE SCIENCE

### **Collaborating Countries**

Hong Kong

Italy

**Administering Organisation** University of Wollongong

### **Project Summary**

Link analysis is an emerging tool for the detection of patterns in structured data. The detection of pattern in such data can lead to the detection of fraud occurrence, security breaches in computer systems, and patterns of social interactions with a community. It is also popularly applied to applications such as Web search engine designs and marketing analysis. This project aims to advance the area of link analysis by allowing the incorporation of contextual information which accounts for relationships among actors properly. Advances in link detection will allow improvements in security and Web services on which a wide field of national bodies rely. This project can help to place Australia at the forefront of this research area.

**LX0882882** A/Prof LT Lyons; Dr MT Ford; Prof H Cunningham; Prof J Heyman; Prof TM Wilson

**Approved Project Title** **Comparative Border Studies**

**2008 :** \$ 6,100

**2009 :** \$ 2,400

**2010 :** \$ 7,100

**Primary RFCD** 3601 POLITICAL SCIENCE

### **Collaborating Countries**

Canada

USA

**Administering Organisation** University of Wollongong

### **Project Summary**

While borders are of increasing interest to Australian scholars and policy-makers, much existing research in Australia is focused on issues of border security or border integrity. There is an urgent need to supplement this work with theoretical and empirical insights drawn from the field of border studies. North America is a key site for international research in this field. Collaboration with North American scholars is thus an important step in developing and expanding Australian expertise in border studies. This project will provide the intellectual environment and collaborative networks necessary to establish the first dedicated Centre for Border Studies in Australia.

## Summary of Linkage International Awards Proposals

**LX0882225** A/Prof X Wang; Prof S Lee

**Approved Project Title** **Mechanism and enhancement of supercurrent carrying ability in magnesium diboride superconductor**

**2008 :** \$ 12,900

**2009 :** \$ 18,350

**2010 :** \$ 18,350

**Primary RFCD** 2914 MATERIALS ENGINEERING

### **Collaborating Countries**

Korea

**Administering Organisation** University of Wollongong

### **Project Summary**

The newly discovered MgB<sub>2</sub> superconductor has great potential to replace the existing conventional superconductors for uses in various medical and industrial applications. This project brings together two world leading groups with complementary expertise to develop a fundamental understanding of the factors controlling MgB<sub>2</sub> performance and to find effective ways to significantly improve its supercurrent carrying capabilities for practical applications. The outcome of this project will be of benefit to both countries and will lead to many practical applications such as transformers, rotors, and transmission cables, as well as magnetic resonance imaging without using liquid helium, reducing greenhouse gas emissions and global warming.

# Summary of Linkage International Awards Proposals

## Victoria

### Swinburne University of Technology

**LX0882703** Dr D Day; Prof K Sasaki

**Approved Project Title** **Nanometric optical sensing for characterisation of microbioreactors**

**2008 :** \$ 8,300

**2009 :** \$ 8,300

**2010 :** \$ 9,200

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

#### Collaborating Countries

Japan

**Administering Organisation** Swinburne University of Technology

#### Project Summary

Microfabrication of microfluidic based microbioreactors is a novel technology that is creating advanced tools in the fields of biology and medicine. A critically important step in the development of a microbioreactor is the ability to characterise fluid shear stress of the microenvironment without impacting on the biological system. The development of a microbioreactor in which individual or multiple cells can be cultured and manipulated will have a significant impact on study of biological systems in cancer research and stem cell research.

**LX0881913** Prof M Gu; Dr G Zhou; Prof T Wilson; Dr MJ Booth

**Approved Project Title** **Adaptive aberration compensation in high refractive index materials for next-generation active microphotonic devices**

**2008 :** \$ 14,600

**2009 :** \$ 11,400

**2010 :** \$ 14,900

**Primary RFCD** 2404 OPTICAL PHYSICS

#### Collaborating Countries

UK

**Administering Organisation** Swinburne University of Technology

#### Project Summary

The method proposed in this project is a very promising and versatile method to compensate the strong aberration in a high refractive index material. The successful compensation of such aberration will allow people to fabricate microdevices directly inside high refractive index materials. This project will greatly advance optical fabrication techniques and expand the national knowledge in the area of nonlinear PhCs (photonic crystals) and related applications. It is expected that the project will provide many chances for postgraduate students to be involved. In future, nonlinear PhCs and related devices may be widely used in daily life and this project may provide some opportunities for industry.

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### The University of Melbourne

**LX0881979** Prof DJ Clarke; Prof Dr CM Keitel-Kreidt; A/Prof Y Shimizu; Prof F Marton; Dr J Emanuelsson; A/Prof F Sahlström; Prof F Leung; A/Prof R Huang; Prof Z Huan; Prof J Novotna; Dr B Kaur; A/Prof K Park; Dr F Gallos

**Approved Project Title** **The International Classroom Research Collaboration**

**2008 :** \$ 24,200

**2009 :** \$ 27,200

**2010 :** \$ 28,200

**Primary RFCD** 3302 CURRICULUM STUDIES

#### Collaborating Countries

China

Czech Rep.

Germany

Japan

Singapore

Sweden

**Administering Organisation** The University of Melbourne

#### Project Summary

The International Centre for Classroom Research at the University of Melbourne is the hub of an international network of classroom researchers. Australian coordination of this major international research network ensures that the priorities and initiatives, characteristic of contemporary Australian education (eg problem-based learning, authentic assessment, and working mathematically) can be anticipated and accommodated in the research agenda of the International Classroom Research Collaboration. Connections with state departments of education, state and national professional associations, and Australian schools and school systems, ensure that the findings of this international collaboration will be communicated efficiently to schools and classroom practitioners in Australia.

**LX0882874** Dr J DeGier; Prof AJ Guttman; Prof VI Rittenberg

**Approved Project Title** **Hecke algebras and hidden symmetries in quantum spin chains**

**2008 :** \$ 4,500

**2009 :** \$ 10,000

**Primary RFCD** 2399 OTHER MATHEMATICAL SCIENCES

#### Collaborating Countries

Germany

**Administering Organisation** The University of Melbourne

#### Project Summary

This project further strengthens collaborative ties with Prof. Rittenberg who is a leading figure in statistical mechanics. Rittenberg is Scientific Director of one of the best journals, and has been instrumental in advocating and advancing Australia's influence in the field. All this on top of his original scientific input which we have become used to in the past years.

## Summary of Linkage International Awards Proposals

**LX0882711** A/Prof GF Egan; Prof S Usui; Prof Z Cho; Dr LA Johnston

**Approved Project Title** eResearch in the Neurosciences: Building collaborations in Asia

**2008 :** \$ 10,000

**2009 :** \$ 12,000

**2010 :** \$ 12,000

**Primary RFCD** 2801 INFORMATION SYSTEMS

### Collaborating Countries

Japan

Korea

**Administering Organisation** The University of Melbourne

### Project Summary

The proposed Australasian collaboration on eResearch in Neuroscience will promote and maintain the good health of Australians by 'improving critical mass through collaboration and information sharing' through increased access to advanced imaging technology in Korea and analysis techniques in Japan. The collaboration will also promote frontier technologies for building and transforming Australian industries by developing a creative and innovative research environment and enhancing Australian scientists' participation in breakthrough science. Great national benefit can be derived from international research collaboration, due to the contribution frontier technology can make to science and health.

**LX0882269** Prof JB Furness; Dr R Chiochetti

**Approved Project Title** The routes of infection with sheep scrapie and agents that cause related prion diseases

**2008 :** \$ 8,800

**2009 :** \$ 11,000

**2010 :** \$ 8,600

**Primary RFCD** 3004 ANIMAL PRODUCTION

### Collaborating Countries

Italy

**Administering Organisation** The University of Melbourne

### Project Summary

We will define the routes by which the infective agents for scrapie, a debilitating disease of sheep, reach the nervous system after being consumed with food. Scrapie is from the same disease group (prion diseases) as mad cow disease. There would be a large economic cost were prion diseases to infect agricultural animals in Australia, through bioterrorism or accident. An outbreak in sheep could ruin the industry, as our export markets would be immediately blocked, and thousands of animals would be killed to stop disease spread. The benefit of clearly understanding how the infective agents reach the nervous system is that this may lead to strategies to intervene, and thus limit the spread and seriousness of infection.

**LX0882215** Dr A Jex; A/Prof RB Gasser; Dr DT Littlewood

**Approved Project Title** MitoGenomics of Key Pathogens - An International Research Co-operative

**2008 :** \$ 8,900

**2009 :** \$ 8,900

**2010 :** \$ 8,900

**Primary RFCD** 2702 GENETICS

### Collaborating Countries

UK

**Administering Organisation** The University of Melbourne

### Project Summary

The national/community benefits are: (1) to develop a long-term, high quality scientific and technological program contributing to national objectives, including the maintenance of a strong capability in basic research, the development of new scientific concepts and the enhancement of international collaborative links; (2) to strengthen the links between basic and applied research; (3) to develop excellence in research by promoting collaborative research, resulting in a more efficient use of resources in a national and international context; (4) to enhance the skills-base in biology and biotechnology; (5) to substantially increase global visibility through quality research, leading to an increased investment in Australian science.

## Summary of Linkage International Awards Proposals

**LX0882103** Dr AN Kealy; Dr S Winter; Dr GW Roberts; A/Prof G Retscher

**Approved Project Title** **Smart Location Sensors for Emergency Responders**

**2008 :** \$ 22,200

**2009 :** \$ 20,700

**2010 :** \$ 28,700

**Primary RFCD** 2910 GEOMATIC ENGINEERING

### Collaborating Countries

Austria

UK

**Administering Organisation** The University of Melbourne

### Project Summary

1. It underpins the 2006 e-Government strategy with regards to spatially enabling Australian Government. This research will generate outputs to support this strategy. 2. It contributes to Australian national strategies for emergency management with regards to 'assuring the safety of emergency responders'. 3. It addresses fundamental constraints of positioning systems like GPS and provides the theoretical and practical models to take GPS into 'harsher' environments. The outcomes will expand the uses of GPS and facilitate growth across many Australian industries. 4. It will enhance the expertise and international profile of Australian researchers by offering an innovative solution to an internationally significant problem.

**LX0881960** Prof KA Nugent; A/Prof AG Peele; A/Prof LJ Allen; Dr KS Liang; Prof F Chen

**Approved Project Title** **Diffraction Imaging using Soft X-rays and Electrons**

**2008 :** \$ 14,052

**2009 :** \$ 8,646

**2010 :** \$ 11,528

**Primary RFCD** 2499 OTHER PHYSICAL SCIENCES

### Collaborating Countries

Taiwan

**Administering Organisation** The University of Melbourne

### Project Summary

Optical, electron and x-ray microscopy has yielded enormous biological insights and medical benefits to society. Optical microscopy is able to image live tissue, but at relatively low resolution. Electron microscopy can yield high resolution images, but only of highly prepared material. X-ray microscopy yields images of live tissue with a resolution that is intermediate between optical and electron microscopy. This project will provide Australian scientists with their first access to x-ray microscopy at its optimum wavelength; and secondly it will provide a superb testbed for x-ray microscopy to be enhanced using unique methods being developed in Australia.

**LX0881932** Dr S Wyithe; Prof A Loeb; Dr M Dijkstra

**Approved Project Title** **The First Galaxies and the End of the Dark Ages of the Universe**

**2008 :** \$ 8,400

**2009 :** \$ 11,200

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

### Collaborating Countries

USA

**Administering Organisation** The University of Melbourne

### Project Summary

There is one large gap in our understanding of the early evolution of the universe, namely, when did the first sources of light appear? Resolution of this puzzle requires new theoretical and observational strategies. Several international initiatives are now beginning to tackle the problem, including a major new radio telescope in Western Australia. This Linkage award will facilitate the continuation of a very successful international collaboration, and will provide a significant Australian contribution at the forefront of modern cosmology.

## Summary of Linkage International Awards Proposals

### Queensland

#### Griffith University

**LX0882502** Dr CA Wells; Dr AM Chalk; A/Prof GD Mellick; Prof J Tegner; Dr M Nikkola; Prof Y Hayashizaki

**Approved Project Title** **Bioinformatics network for the interrogation of adult stem cells**

**Project Title**

**2008 :** \$ 21,639

**2009 :** \$ 29,860

**2010 :** \$ 24,015

**Primary RFGD** 2799 OTHER BIOLOGICAL SCIENCES

#### Collaborating Countries

Japan

Sweden

**Administering Organisation** Griffith University

#### Project Summary

This project addresses the National Research Priority 'Frontier Technologies for Building and Transforming Australian Industries'. The use of state of the art DNA sequencing results in huge amounts of data that is hard to interpret without the use of computers. This project builds Australia's capacity to deal with huge biological datasets by creating software and expertise in handling these datasets. The application of this software and expertise to our stem cell population in Parkinson's disease patients will enable new insight into the difference between patients and controls.

## Summary of Linkage International Awards Proposals

### Queensland University of Technology

**LX0882226** Prof AS Hurn; Dr AE Clements; Prof DF Hendry; Dr KA Lindsay; Dr R Becker

**Approved Project Title** **Novel econometric techniques for modelling and forecasting electricity prices and price volatility in Australia.**

**2008 :** \$ 12,850

**2009 :** \$ 9,650

**2010 :** \$ 10,200

**Primary RFCD** 3404 ECONOMETRICS

#### Collaborating Countries

UK

**Administering Organisation** Queensland University of Technology

#### Project Summary

Price volatility, particularly price spikes, are of special importance to electricity retailers who, because of retail price regulation, cannot pass them onto final customers and end up bearing the price risk. While state governments may enter into compensation deals with retailers, it is of great interest to both parties to understand why and when these price surges occur and, once they have occurred, how long they will last. A better understanding of the electricity price process will enable more sophisticated plans and strategies to be put in place to hedge against unfavourable, unexpected or extreme price events.

**LX0882876** Prof KL Mengersen; Dr RS McVinish; Prof CP Robert

**Approved Project Title** **International Networks in Applied Bayesian Statistics: improving Australia's knowledge through intelligent data analysis and modelling**

**2008 :** \$ 28,000

**2009 :** \$ 24,800

**2010 :** \$ 11,300

**Primary RFCD** 2302 STATISTICS

#### Collaborating Countries

Botswana

France

South Africa

USA

**Administering Organisation** Queensland University of Technology

#### Project Summary

National benefits of this project are fourfold: (i) new international networks between Australia, Southern Africa, France and USA in the priority area of mathematical sciences; (ii) state-of-the-art Bayesian statistical methods for integrating and analyzing non-standard data and diverse information sources, including expert opinion, in order to solve complex problems in environment, industry, health, defence; (iii) direct contribution to solution of global environmental problems, specifically water quality, threatened species and environmental risk; (iv) superior training of the next generation of the global community of researchers in applied statistics.

## Summary of Linkage International Awards Proposals

### The University of Queensland

**LX0881951** A/Prof MJ Drinkwater; Prof WJ Couch; Dr CA Blake; Prof HK Yee; Dr DC Martin; Dr T Small; Dr S Bridle

**Approved Project Title** **The formation and structure of distant galaxies**

**2008 :** \$ 11,700

**2009 :** \$ 12,980

**2010 :** \$ 12,400

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

#### Collaborating Countries

Canada

UK

USA

**Administering Organisation** The University of Queensland

#### Project Summary

(i) The proposed galaxy evolution science involves the study of one of the most fundamental processes within the universe, thereby contributing to the Priority Goal of 'Breakthrough Science' under National Research Priority 3. (ii) It will bring national benefit through international collaborations with prestigious US, UK, and Canadian institutions. (iii) These collaborations will lead to new research capacity being built within Australia, with considerable knowledge and expertise being vested in young postgraduate and postdoctoral researchers.

**LX0882184** Prof AE Mark; Prof S Marrink; Prof WF van Gunsteren; Dr T Huber

**Approved Project Title** **Increasing the Efficiency of Biomolecular Simulations**

**2008 :** \$ 9,375

**2009 :** \$ 10,500

**2010 :** \$ 11,800

**Primary RFCD** 2499 OTHER PHYSICAL SCIENCES

#### Collaborating Countries

Netherlands

Switzerland

**Administering Organisation** The University of Queensland

#### Project Summary

This program will extend the range of biomolecular systems that can be modelled with near atomistic precision. It will provide a better understanding of the structure and function of proteins involved in the regulation of membrane fusion and fission as well as shedding light on the assembly of large-scale protein-protein and protein-membrane complexes in general. The work will help place Australia at the forefront of developing simulation techniques in biomolecular systems, which are widely used within the chemical and pharmaceutical industries. It will also provide opportunities for the training and development of young Australian researchers with top European laboratories.

**LX0882366** A/Prof SR Phinn; Dr AG Dekker; Dr VE Brando; Dr ZP Lee; Dr WP Bissett; Dr CD Mobley; Dr J Hedley; Prof PJ Mumby; A/Prof MJ Lynch; Mr CM Roelfsema

**Approved Project Title** **International Evaluation of Algorithms for Mapping in Optically Shallow Waters**

**2008 :** \$ 23,445

**Primary RFCD** 2910 GEOMATIC ENGINEERING

#### Collaborating Countries

UK

USA

**Administering Organisation** The University of Queensland

#### Project Summary

This work provides a means for Australian science and management agencies to apply a method for accurately mapping shallow coastal environments. The work will build Australian research capability by developing new collaborations among experienced researchers; as well as allowing the Australian teams to benchmark their proposed methods internationally. Nationally, the work will strengthen international research experience and generate opportunities for postgraduate and postdoctoral researchers to link into leading-edge international research networks. This work will also allow us to build strong ongoing collaborations between research teams in Australia and their counterparts overseas (specifically USA, Canada, UK and Germany).

# Summary of Linkage International Awards Proposals

## South Australia

### The University of Adelaide

**LX0881949** Prof AD Abell; Prof R Grubbs; Dr AT Neffe; Dr S Zaman

**Approved Project Title** **New clean and green aqueous metathesis**

**2008 :** \$ 11,800

**2009 :** \$ 15,051

**2010 :** \$ 11,551

**Primary RFCD** 2503 ORGANIC CHEMISTRY

#### Collaborating Countries

Germany

NZ

USA

**Administering Organisation** The University of Adelaide

#### Project Summary

The technique of olefin metathesis has already yielded new pharmaceuticals and materials for use in consumer products and ballistic protection. This project will help move metathesis into the realms of nature's aqueous environment, a key advance if metathesis is to reveal its full potential in biological, polymeric, and pharmaceutical applications. We specifically aim to target treatments for cataract (and other conditions associated with an aging population) and also important new biopolymers for use in health technologies of the future.

**LX0882558** Dr SJ Cooper; Prof RK Butlin

**Approved Project Title** **Development of Australian model systems for speciation research**

**2008 :** \$ 9,250

**2009 :** \$ 3,356

**Primary RFCD** 2707 ECOLOGY AND EVOLUTION

#### Collaborating Countries

UK

**Administering Organisation** The University of Adelaide

#### Project Summary

Our project will contribute to an understanding of the process of speciation, a fundamental biological problem, for which there are few well-developed model systems in the world. We will further our understanding of how Australia's extraordinary diversity of animal species have evolved, knowledge which is valuable for understanding the future impact of climatic and environmental changes on species. Our research will generate further knowledge of the diversity and biological significance of subterranean fauna in the arid zone of Australia, providing important background data for assessing the impacts of mining activities on groundwater-dependent-ecosystems and improved strategies for their sustainable management.

## Summary of Linkage International Awards Proposals

### University of South Australia

**LX0881972** Prof V Gaitsgory; Dr VV Ejov; Prof JA Filar; Prof PG Howlett; Prof CE Pearce; Em/Prof J Aubin; Dr KE Avrachenkov; Prof VS Borkar; Prof F Colonius; Prof P Dupuis; Dr H Frankowska; Dr HJ Kushner; Prof M Quincampoix

**Approved Project Title** **Linear programming approach to nonlinear deterministic and stochastic control problems: perturbations methods and numerical analysis**

**2008 :** \$ 14,200

**2009 :** \$ 15,200

**2010 :** \$ 16,600

**Primary RFCD** 2301 MATHEMATICS

#### Collaborating Countries

France  
Germany  
India  
USA

**Administering Organisation** University of South Australia

#### Project Summary

The proposed research will significantly advance knowledge by creating new analytical and numerical methods for tackling complex nonlinear control problems arising in many applications. The study's outputs will lead to a deeper understanding of fundamental issues in mathematical modelling. Collaboration with renowned researchers will further improve Australia's standing in the international research community. Also their visits may further promote research both within and outside the host institution. In particular, lectures and seminars that they will deliver will be transmitted to Australian universities participating in the Access Grid Room Project.

## Summary of Linkage International Awards Proposals

### Western Australia

#### Curtin University of Technology

**LX0882384** Prof K Grice; Prof P Ward

**Approved Project Title** **Chemostat experiments to mimic toxic environments associated with mass extinction events**

**2008 :** \$ 10,000

**2009 :** \$ 8,450

**Primary RFCD** 2603 GEOCHEMISTRY

#### Collaborating Countries

USA

**Administering Organisation** Curtin University of Technology

#### Project Summary

This project will help scientists understand past climate changes and understand the mechanisms of global warming. This in turn will improve our ability to forecast future climate change, and help Australia manage current threats to its biodiversity. Importantly, this project will enable students and young professionals to be trained in state-of-the-art technologies, leading to quality scientists ready for employment in geoscience industries, and raising the profile of science careers in Australia.

## Summary of Linkage International Awards Proposals

### The University of Western Australia

**LX0882026** Prof S Lewandowsky; Prof GD Brown; Prof Dr K Oberauer; Dr S Farrell

**Approved** **Time and Updating of Memory**

**Project Title**

**2008 :** \$ 6,400

**2009 :** \$ 6,400

**2010 :** \$ 8,200

**Primary RFCD** 3801 PSYCHOLOGY

**Collaborating Countries**

UK

**Administering Organisation** The University of Western Australia

#### **Project Summary**

What could be simpler than reading a few items, such as the digits in a phone number, and recalling them in the right order a short while later? Notwithstanding its apparent simplicity, this short-term serial recall task underlies sophisticated language abilities such as vocabulary acquisition and utterance production. Similarly, serial retention can be a critical element in mental arithmetic. A better understanding of short-term memory for serial order therefore has wide implications across many areas of education, in particular in primary school settings. The community benefit of this project arises from the improved teaching methods that can be developed on the basis of these results.

# Summary of Linkage International Awards Proposals

## Australian Capital Territory

### The Australian National University

**LX0881952** Prof S Broer; Prof Dr JW Deitmer

**Approved Project Title** **Conductance states of a brain glutamine transporter**

**2008 :** \$ 7,800

**2009 :** \$ 9,800

**2010 :** \$ 7,400

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

#### Collaborating Countries

Germany

**Administering Organisation** The Australian National University

#### Project Summary

Brain transporters are the target for many neuroactive drugs that are used to treat anxiety, depression and other psychotic disorders. Transport processes are also targeted to deliver neurotransmitter precursors to the brain to treat disorders such as Parkinson's disease. In this project we will study a transport process crucial for the function of neurons that release glutamate and GABA (gamma-aminobutyric acid) as neurotransmitters. The study of this transport process will be important for understanding disorders like epilepsy and other disorders affecting neuronal excitability.

**LX0882491** Prof WZ Krolikowski; Dr O Bang

**Approved Project Title** **Nonlocal nonlinear waves**

**2008 :** \$ 8,100

**2009 :** \$ 8,400

**2010 :** \$ 13,100

**Primary RFCD** 2404 OPTICAL PHYSICS

#### Collaborating Countries

China

Denmark

Norway

USA

**Administering Organisation** The Australian National University

#### Project Summary

This project will help to maintain the status of the Laser Physics Centre as the leading group in Australia and on the international arena in the field of nonlinear optics. Innovative and original ideas of fundamental importance emanating from this project would significantly strengthen this reputation. This project will expand the existing collaboration with our Danish partners. It will have an impact on the understanding of the soliton phenomena in many diverse fields providing knowledge which may be subsequently transferred to practical technologies. The research will provide training and experience for post-doctorate researchers as well as graduate and undergraduate students.

## Summary of Linkage International Awards Proposals

**LX0882438** Prof BR Lewis; Dr FP Mills; Prof YL Yung; Prof Dr W Ubachs; Prof ED Young; Prof DE Shemansky

**Approved Project Title** **Understanding the chemistry and evolution of planets and their atmospheres: Integrating experiments, observations, and quantum mechanical models**

**2008 :** \$ 14,249  
**2009 :** \$ 21,650  
**2010 :** \$ 13,900

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

**Collaborating Countries**  
Netherlands  
USA

**Administering Organisation** The Australian National University

### Project Summary

Ongoing changes in the Earth's atmosphere, demonstrate the need to understand photochemical processes and their role in atmospheric evolution. The proposed research will increase our understanding of the evolution of planetary atmospheres, with concomitant insight into the Earth's evolution. This proposal will greatly enhance the visibility of Australian research, through formal, direct connections to NASA and ESA (European Space Agency) planetary exploration missions, along with publications in Nature, Science, and/or PNAS (Proceedings of the National Academy of Sciences) that will likely result from the high-profile problems to be studied. Furthermore, as a result of this collaboration, Australian students and postdoctoral researchers will benefit from interactions with top international scientists.

**LX0882593** Prof JE Norris; Prof M Asplund; Dr D Yong; Prof TC Beers; Dr N Christlieb; Prof MS Bessell

**Approved Project Title** **The Early Epochs of the Milky Way Galaxy**

**2008 :** \$ 13,500  
**2009 :** \$ 6,000  
**2010 :** \$ 9,000

**Primary RFCD** 2401 ASTRONOMICAL SCIENCES

**Collaborating Countries**  
Sweden  
USA

**Administering Organisation** The Australian National University

### Project Summary

By determining the chemical compositions and space velocities of the oldest stars in our Milky Way Galaxy, our program seeks to understand the first objects in the Universe and the manner in which the Galaxy formed. Our team will utilize a program that is observing 250,000 Milky Way stars and seek access to the world's largest telescopes to a monetary value of several million dollars - stimulating interest in the natural sciences among the general public and the nation's youth. It will train young researchers in cutting-edge science, enhancing skills in data analysis, problem solving, project management, and effective communications.

**LX0882485** Prof JS Williams; Dr S Ruffell; Dr AP Knights

**Approved Project Title** **Ion implantation engineered photonic devices for use in highly integrated silicon optoelectronic circuits**

**2008 :** \$ 6,000

**Primary RFCD** 2917 COMMUNICATIONS TECHNOLOGIES

**Collaborating Countries**  
Canada

**Administering Organisation** The Australian National University

### Project Summary

This project establishes a collaboration with Canada's leading integrated silicon photonics research group thus tapping into years of valuable experience transferable to Australian-based researchers. The involvement of students as well as early career researchers ensures a new generation of Australian experts in this field. The importance of silicon photonics means that Australia must establish a strong research program in the area to maintain its current position as being at the forefront of leading-edge research. This is only possible through collaborations such as that proposed here.