

**Summary of Linkage International Fellowships Proposals by Primary
Class Code**

2404 OPTICAL PHYSICS

The University of Queensland

LX0775983 Prof AG White; Dr TD Jennewein

Approved Project Title **Detectors and sources for photonic quantum engineering**

2007 : \$ 64,747

Collaborating Countries

Austria

Administering Organisation The University of Queensland

Project Summary

This collaboration brings together two of the leading groups in quantum information and will speed the development of breakthrough technologies. Dr Jennewein is a senior member of one of the leading quantum optics groups in the world, with strong scientific credentials; Prof. White is an expert in making, applying, and detecting photons for quantum information. Dr Jennewein's experience will enhance research training of Australian students; using the unique facilities available in Australia, his research will be the first in the world to combine bright photon sources and efficient photon detectors, enabling new quantum technologies such as quantum communication, metrology, and computation.

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2503 ORGANIC CHEMISTRY

Griffith University

LX0776001 Prof M von Itzstein; Prof KY Jung

Approved **Investigation of novel sialic acid mimetics to target the spread of cancer**
Project Title

2007 : \$ 119,693

Collaborating Countries

Korea

Administering Organisation Griffith University

Project Summary

The mortality rates for many cancers afflicting the world's population are extremely high and these rates are consistent with the Australian experience. It is generally accepted that colon cancer, and cancers as a whole, are a significant healthcare issue and have immense socioeconomic impact. Alternative treatments preventing the spread of cancers would be of very significant benefit. This fellowship will provide the opportunity for the discovery and development of such treatments that are based on the processes that utilise carbohydrates to facilitate the spread of tumours.

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2599 OTHER CHEMICAL SCIENCES

The Australian National University

LX0775845 Prof MG Humphrey; Dr MJ Samoc; Dr RL Roberts; Dr PJ Low; Prof TB Marder

Approved Project Title **Syntheses and non-linear optical properties of B- and N-cored metal alkynyl dendrimers**

2007 : \$ 80,130

Collaborating Countries

Belgium

UK

Administering Organisation The Australian National University

Project Summary

This project will (i) advance fundamental science, (ii) establish and consolidate links between groups in the UK and Australia with interests in electronic and optical properties of metal alkynyl compounds, (iii) improve technology transfer between the two groups by the mobility of the ARC International Fellow, and (iv) may identify new materials with sufficient non-linear optical and materials processing performance for commercial development.

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2606 ATMOSPHERIC SCIENCES

University of Wollongong

LX0776040 Dr CS Turney; Dr MS McGlone

Approved Project Title **Australasian climate reconstruction for the past two millennia**

2007 : \$ 64,297

Collaborating Countries

NZ

Sweden

USA

Administering Organisation University of Wollongong

Project Summary

The results generated during this Fellowship will provide a greater understanding of the sensitivity of the Australasian region to the natural range of climatic variability (far beyond that recorded by historical datasets). Focussing on the past two millennia, the applicant will help investigate the timing, rate and magnitude of change, allowing a robust test of whether past changes were in phase with the Northern Hemisphere. The results will provide a considerably improved context for understanding present and future climate change in the Australasian region.

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2702 GENETICS

The University of Melbourne

LX0775848 A/Prof RB Gasser; Dr A Jex; Dr DT Littlewood

Approved Project Title A high-through-put method for unlocking the mitochondrial genomes of significant pathogens

2007 : \$ 84,530

Collaborating Countries

UK

Administering Organisation The University of Melbourne

Project Summary

The national/community benefits of this research 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; and (5) to substantially increase global visibility through quality research, leading to an increased investment in Australian science.

The University of Queensland

LX0775962 Prof BM Degnan; Prof Dr G Worheide; Dr DJ Jackson

Approved Project Title Evolution of the biofabrication of mineralized structures in animals

2007 : \$ 77,530

Collaborating Countries

Germany

Administering Organisation The University of Queensland

Project Summary

Shells and skeletons are produced by a wide range of animals. These highly-order crystalline structures are genetically-encoded and produce high-performance composite materials that exceed present capabilities in human engineering. This international collaboration will elucidate the molecular mechanisms controlling the fabrication of these architectures. This knowledge will contribute significantly to the development of materials for advanced electronics and energy transducers, human bone therapeutics and marine-based products such as pearls and cements, through the identification of genes underlying biofabrication networks and the development of in vitro bioproduction systems.

The University of Western Australia

LX0776042 Prof ID Small; Prof JM Whelan; Dr J Gualberto

Approved Project Title Developmental regulation of plant mitochondrial genome structure and copy number

2007 : \$ 59,608

Collaborating Countries

France

Administering Organisation The University of Western Australia

Project Summary

Recombination is a major driving force behind mitochondrial DNA evolution and is responsible for the occurrence of cytoplasmic male sterile plants that are used by plant breeders to obtain high yield hybrids. A better understanding of the mechanisms that underlie mitochondrial and chloroplast genome maintenance and segregation will be a major fundamental scientific advance that will permit an integrated picture of the interactions between the three plant genomes (nuclear, mitochondrial and chloroplastic). It is also a pre-requisite for the future manipulation of the cytoplasmic genomes leading to new ways to develop varieties with modified cytoplasm.

**Summary of Linkage International Fellowships Proposals by Primary
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2707 ECOLOGY AND EVOLUTION

The University of Adelaide

LX0775967 Dr BP Kear; Dr P Barrett

Approved Project Title **Global implications of Australian Cretaceous faunas: biogeography, evolution and effects of climate change**

2007 : \$ 40,306

Collaborating Countries

UK

Administering Organisation The University of Adelaide

Project Summary

Climate change is a critical issue with poorly known long-term effects. This collaboration will provide information on how marine and terrestrial faunas have responded to environmental alteration in the past. Mesozoic vertebrates make spectacular fossils that capture public attention. This collaboration will enhance public museum displays by collection and preparation of important new specimens; many found by the investigators are already centerpieces in major museums (e.g. SA Museum). This project will also promote awareness and sustainable use of the environment through media promotion and 'earthwatch-style' ecotourism field trips; these highlight finite fossil resources as lucrative sources of tourism revenue to regional communities.

The University of Queensland

LX0775855 Dr JM Pandolfi; Dr W Renema

Approved Project Title **Long-term natural ecological consequences of disturbance on coral reefs: the benthic foraminifera perspective**

2007 : \$ 41,165

Collaborating Countries

Netherlands

PNG

Administering Organisation The University of Queensland

Project Summary

The tropical coastline of Australia encompasses world-renowned coral reefs (Great Barrier Reef and Ningaloo Marine Park). Even these reefs are not pristine and are increasingly susceptible to disturbance from human impact. The long-term ecological effects of disturbance on reef communities cannot be experimentally determined; but natural experiments from the fossil record provide mechanisms to ensure that managers of Australia's reefs have critical information on how past disturbance frequency and intensity has affected coral reef communities. This information will help ensure the continuation of ecosystem goods and services from Australia's high diversity coral reefs.

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2903 MANUFACTURING ENGINEERING

University of Wollongong

LX0775992 Dr ZY Jiang; Prof KA Tieu; Prof XH Liu

Approved **An investigation into the development of super steel**
Project Title

2007 : \$ 78,527

Collaborating Countries

China

Germany

Japan

Administering Organisation University of Wollongong

Project Summary

The proposed fellow demonstrates outstanding achievements in the development of both new materials and numerical modelling for steel rolling. This research project will further enhance collaboration between the State Key Laboratory of Rolling and Automation in China and the Faculty of Engineering at UoW, and will provide an opportunity for postgraduates and postdoctoral fellows in the Faculty to work with an expert of high international standing. The project will significantly benefit Australian manufacturing industry and generate a number of joint journal and conference publications which will improve Australia's reputation in, and knowledge of, the area of super steel strip development.

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2906 CHEMICAL ENGINEERING

The University of Queensland

LX0775930 Dr JC Diniz da Costa; Prof JY Lin; Dr MC Duke

Approved Project Title **University of Queensland/Arizona State University partnership to design industrially suitable zeolite membranes for desalination**

2007 : \$ 41,515

Collaborating Countries

USA

Administering Organisation The University of Queensland

Project Summary

For desalination, the highest costs are organic-based membrane replacement (lasting ~1 year) and energy requirement. Functionalised zeolitic membranes are low-cost, high performing, chemically tolerant and thermally stable. New zeolite membranes in principle could perform the separation outlasting their organic counterparts, while at the same time offering major energy reductions from higher fluxes. Current zeolite membrane research for desalination however is lacking. The proposed team offers experience in bringing highly significant lab scale technologies to industrial scales. The outcomes will address mutual priorities between Australia and USA for reliable low cost supply of fresh water.

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2910 GEOMATIC ENGINEERING

Curtin University of Technology

LX0775935 Prof Dr WE Featherstone; Prof Dr PJ Teunissen; Prof C Rizos

Approved **Next generation global navigation satellite systems ambiguity resolution**
Project Title

2007 : \$ 159,061

Collaborating Countries

Netherlands

Administering Organisation Curtin University of Technology

Project Summary

In the next five years, four new satellite-based navigation and positioning systems, called Global Navigation Satellite Systems (GNSS), will come to challenge/complement the well-known US global positioning system (GPS). In order to get the highest accuracy and most reliable results from these GNSSs, a procedure known as ambiguity resolution (AR) is essential. This collaborative project will bring Professor Peter Teunissen, the inventor of the famous LAMBDA method that is currently used in all GPS AR software, to Australia to work on AR for a combined new GNSS AR solution that is also optimised for Australian users.

**Summary of Linkage International Fellowships Proposals by Primary
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2915 BIOMEDICAL ENGINEERING

The University of Western Australia

LX0775892 Prof DD Sampson; Mr A Patil

Approved Project Title **Techniques for probing biological media with holographic angular scattering spectroscopy**

2007 : \$ 84,530

Collaborating Countries

Switzerland

Administering Organisation The University of Western Australia

Project Summary

Huge effort in the biological and medical sciences is spent in using simple software to laboriously mark, count and measure cells and structures in microscope images of samples. We could replace this incredibly inefficient process in many instances with single-shot size-map images of unstained samples. If depth selectivity can be added, we could perform non-invasive measurements on animals, making a huge reduction in their usage. We could assess thick tissues enabling early noninvasive diagnosis of malignancy in tumours in situ or muscle characterization for meat quality or muscular dystrophy. These benefits impact on research, animal ethics, and on health, and have commercial potential in life and medical sciences, and the meat industry.

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2918 INTERDISCIPLINARY ENGINEERING

The University of Melbourne

LX0775866 Prof F Caruso; Dr F Cavalieri

Approved Project Title **Biodegradable polymeric microparticles for targeted delivery**

2007 : \$ 85,530

Collaborating Countries

Italy

Administering Organisation The University of Melbourne

Project Summary

The use of microparticles with tuneable physicochemical properties and loading characteristics is of interest in the fields of biomaterials, drug delivery and imaging. Such engineered particles are likely to address problems associated with conventional drugs and drug carriers, including poor disease site selectivity, polymer toxicity, non-biodegradability and free diffusion of drugs throughout the body. These microparticles may provide direct advantages to society, including minimally invasive and fast in-vivo diagnostics, localised delivery of drugs and therapeutic agents with increased bioavailability, patient acceptability and reduced healthcare costs.

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3008 ENVIRONMENTAL SCIENCES

The University of Queensland

LX0775993 Prof HP Possingham; Dr S Kark

Approved Project Title **Determining global and regional conservation priorities for biodiversity hotspots**

2007 : \$ 123,343

Collaborating Countries

Israel

Administering Organisation The University of Queensland

Project Summary

The economic wealth of both Australia and Israel is underpinned by biological diversity - for example the remarkable biological diversity of both countries fuels multimillion-dollar tourism industries. We will devise methods to make better decisions about where to invest conservation dollars amongst the biodiversity 'hotspots' of the Mediterranean ecosystems of the world. We will create and test new theory and tools for incorporating into decision making the effect of processes such as climate change and invasion by alien species, which will help reduce the huge detrimental impacts on social, economic, health and human-well being. We will share the results of our work with decision makers and with the public.

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3205 PHARMACOLOGY AND PHARMACEUTICAL SCIENCES

Monash University

LX0775899 A/Prof WC Hodgson; Dr V Herzig; A/Prof GM Nicholson; Dr P ESCOUBAS; Prof GF King

Approved Project Title **Pharmacological and biochemical characterisation of Australian mygalomorph spider venoms**

2007 : \$ 137,771

Collaborating Countries

France

Germany

Administering Organisation Monash University

Project Summary

This project will increase our limited knowledge of Australian mygalomorph venoms by isolation, identification and characterisation of novel toxins in theraphosid and Northern mouse-spider venoms. Thereby, the scientific basis for the treatment of mygalomorph spider bites might be improved. Secondly, new insights into pharmacology and the potential development of novel therapeutics and molecular probes of target molecules might be expected.

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3209 OPTOMETRY

Queensland University of Technology

LX0775988 Dr DR Iskander; Prof HT Kasprzak

Approved **The kinematics of the anterior eye deformation**
Project Title

2007 : \$ 42,215

Collaborating Countries

Poland

Administering Organisation Queensland University of Technology

Project Summary

This project has a potential to benefit Australia from a number of perspectives. The outcomes will provide ophthalmologists and optometrists with currently unavailable knowledge on dynamic behaviour of eye. In particular the research will identify aspects of corneal deformation that in turn will help improve the accuracy of refractive surgeries and aid in the management of glaucoma. Also, the knowledge generated through this project will be of value to engineers designing advanced clinical instrument for measuring eye parameters.

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3212 PUBLIC HEALTH AND HEALTH SERVICES

The University of New South Wales

LX0775883 Dr J Hatfield; Dr I Van Kamp

Approved Project Title **Environmental quality and health in the elderly; The Australian situation and international comparison**

2007 : \$ 90,911

Collaborating Countries

Netherlands

Sweden

Administering Organisation The University of New South Wales

Project Summary

The elderly are a vulnerable population group that should receive particular attention in health policy. They are a group of considerable and growing size that contributes disproportionately to total health burden. Although residential environment is likely to influence health and well-being among the elderly, the evidence-base for appropriate policy and practice is lacking. Improved understanding of the role of relevant environmental factors could lead to substantially reduced morbidity and mortality (and associated costs) for the key outcomes: falls, and cardiovascular and respiratory disease. Results will contribute to the international evidence-base in this increasingly critical area of research, policy, and practice.

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3501 ACCOUNTING, AUDITING AND ACCOUNTABILITY

The University of New South Wales

LX0775933 Prof CC Evans; A/Prof B Tran-Nam; Prof RM Bird

Approved **Personal income tax reform in Australia - development of a model**
Project Title

2007 : \$ 17,438

Collaborating Countries

Canada

Administering Organisation The University of New South Wales

Project Summary

This project will produce a personal income tax model that can sustain the high revenue and other expectations imposed upon it, and yet deliver enhanced equity, efficiency and simplicity. The main benefits of developing such a model include the increased legitimacy of the income tax system, with enhanced compliance outcomes and a reduction in tax avoidance and evasion. Further benefits include reduced tax administrative and compliance costs, increased work effort and a positive ongoing contribution to GDP.

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3799 OTHER STUDIES IN HUMAN SOCIETY

The Australian National University

LX0775919 Dr A Kipnis; Prof S Li

Approved Project Title Education reform and social transformation in rural China

2007 : \$ 136,416

Collaborating Countries

China

Administering Organisation The Australian National University

Project Summary

This project will increase Australian understanding of China's transformation from a rural, agricultural nation into an urban industrialized one. It will also build a collaboration between the Australian National University and the Shandong Academy of Social Sciences, which will facilitate the ability of Australian postgraduate students to undertake field research in China.

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4201 LANGUAGE STUDIES

La Trobe University

LX0775847 Prof AY Aikhenvald; Prof RM Dixon; Prof Y Matras

Approved Project Title **Development of mechanisms for understanding language contact and cross-cultural communication**

2007 : \$ 81,931

Collaborating Countries

UK

Administering Organisation La Trobe University

Project Summary

The project will make a significant contribution to the cross-linguistic study of how languages affect each other, and change as a result of contact. The perspectives revealed will have application to the multicultural and multilingual immigrant situation in Australia, and contribute to overcoming potential miscommunications due to different language backgrounds, advancing our understanding of our region and the world (a goal of the National Priority 'Safeguarding Australia'). The project offers technological advances for recording and managing data on language relationships, and will enhance the study of previously unknown endangered languages, thus contributing to the preservation of cultural and linguistic diversity.

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4302 ARCHAEOLOGY AND PREHISTORY

The Australian National University

LX0775997 Dr JA Cameron; Prof GW Barker

Approved **The Niah Cave project: archaeological textile analysis**
Project Title

2007 : \$ 53,387

Collaborating Countries

Malaysia

UK

Administering Organisation The Australian National University

Project Summary

This project on archaeological textiles from excavations at Niah Cave in Sarawak involves collaborative links between researchers from many different disciplines from the Australian National University, the National University of Singapore, the University of Cambridge and the University of Leicester as well as researchers from the Sarawak Museum in Malaysia. The project is an integrated program of archaeological excavation and environmental science by an inter-disciplinary team from universities in Great Britain, Australia, Sarawak and the USA and will lead to further international collaboration.