

Queensland

The University of Queensland

LP0990169 Dr UR Abeyratne; Mr B Mersky; Dr C Hukins

Approved Project Title **Tooth-mic Devices for Monitoring the Efficacy of Home-based Continuous Positive Airway Pressure (CPAP) Technology**

2009 : \$ 37,500

2010 : \$ 75,000

2011 : \$ 72,500

2012 : \$ 35,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Audiodontics

Princess Alexandra Hospital

Administering Organisation The University of Queensland

Project Summary

Over 800,000 Australians suffer from Obstructive Sleep Apnea (OSA). OSA patients use twice the health resources compared to healthy people. They are 7 times more likely to cause traffic accidents; in NSW up to 43000

accidents/year are due to OSA. OSA is treatable & consequences such as strokes, diabetes & heart attacks are preventable. The standard OSA treatment is home-based Continuous Positive Airway Pressure Therapy.

Unfortunately, no effective technique exists to measure the efficacy of the treatment. We propose enabling solutions to this problem via developing technology centered on breathing sound analysis. The project proposes joint work with a US-company facilitating access to advanced technology highly beneficial to Australia.

LP0990522 Prof A Atrens; A/Prof EM Gray

Approved Project Title **Influence of hydrogen on metallic components for clean energy**

2009 : \$ 45,000

2010 : \$ 71,140

2011 : \$ 52,280

2012 : \$ 26,140

Primary RFCD 2913 METALLURGY

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Alstom Power Systems

Administering Organisation The University of Queensland

Project Summary

Hydrogen (H) energy technology for a future H economy, and much of the world's current electricity generation by H-cooled turbogenerators, rely on the availability of affordable materials that are resistant to hydrogen embrittlement (HE), sudden mechanical failure owing to absorption of H atoms. This project will lead to better understanding of the HE resistance of commercial medium-strength steels for use in H pipelines and pressure vessels, and of the specific steels used in turbogenerator components. More efficient, cheaper and safer clean energy will be the result.

LP0990280 Prof BM Degnan; A/Prof DJ Jackson

Approved Project Title **Using genomic information to understand and improve the quality of the Australian South Sea Pearl**

2009 : \$ 35,500

2010 : \$ 71,000

2011 : \$ 70,500

2012 : \$ 70,000

2013 : \$ 85,000

2014 : \$ 50,000

Primary RFCD 3007 FISHERIES SCIENCES

Collaborating/Partner Organisation(s)

Summary of Linkage Projects Proposals for Funding to Commence in 2009

Autore Pearling Pty Ltd
Pearl Oyster Propagators
Administering Organisation The University of Queensland

Project Summary

Recently, mass-produced freshwater pearls from Asia have markedly increased in quality and begun to compromise our prestigious South Sea Pearl market. This presents Australian pearl growers with a challenge to maintain market identity by improving their pearl quality and consistency. By adding genomics to the existing Australian pearl industry armoury we will help not only to maintain the premier position of the Australian South Sea Pearl in the market, but also to move it further ahead. Knowledge of the genetics of pearl formation will advance a range of hatchery and farm practices, such as selective breeding and pearl grafting, which in turn can enhance farm-based operations and the remote communities that support them.

LP0992220 Prof CE Franklin

Approved Project Title **Predicting the Impact of Damming on the Endangered Mary River Turtle**

2009 : \$ 10,000

2010 : \$ 20,000

2011 : \$ 20,000

2012 : \$ 10,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Collaborating/Partner Organisation(s)

Tiaro & District Landcare Inc.

Administering Organisation The University of Queensland

Project Summary

Little is known about the effects of inland river alteration on the ecology of freshwater turtles, where river damming results in dramatic changes in river physical, chemical and biological characteristics. In Australia there are 446 large dams, necessary for hydro-electric power, navigation, flood control, irrigation and drinking water. Many of these rivers are inhabited by freshwater turtles, endemic to Australia, and this project will assess the impact of changes in habitat quality on the endangered Mary River Turtle (*Elusor macrurus*). The study comes at a timely opportunity, as proposed river damming will substantially alter the turtles' habitat, and its survival potential remains unknown.

LP0990769 Prof RG Gilbert

Approved Project Title **Next-generation technology for determining fitness-for-use of starches in cereal grains**

2009 : \$ 35,237

2010 : \$ 74,426

2011 : \$ 78,629

2012 : \$ 39,439

Primary RFCD 2901 INDUSTRIAL BIOTECHNOLOGY AND FOOD SCIENCES

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

PSS Polymer Standards Service GmbH

Postnova Analytics GmbH

Administering Organisation The University of Queensland

Project Summary

The project will deliver a new methodology to characterize starch-containing materials such as grains. This will provide the first tools to readily measure the full size distribution of starch in industry laboratories, giving far more information than is currently accessible. The data will be extremely sensitive to structural characteristics associated

with desirable end-use properties. The new process will enable conventional instrumentation methodology to be re-engineered to better select starch-containing materials. This will enable superior targeting and processing of materials for improved products in human nutrition, animal feed and manufactured goods such as biodegradable plastics.

LP0990626 A/Prof ID Godwin; Dr ES Mace; Dr DR Jordan

Approved Project Title **NextGen Sorghum: Genomic approaches to novel renewable bioproducts**

Summary of Linkage Projects Proposals for Funding to Commence in 2009

Project Title

2009 : \$ 39,000

2010 : \$ 78,000

2011 : \$ 78,000

2012 : \$ 39,000

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Collaborating/Partner Organisation(s)

Department of Primary Industries and Fisheries

Administering Organisation The University of Queensland

Project Summary

Next Gen Sorghums will have enhanced nutritional and processing qualities for humans and animals, and be ideal feedstocks for the bio-economy for the delivery of novel products. Our approaches in reverse genetics to identify gene networks which control sorghum seed development, cell size, cell wall thickness and the way in which starch and protein are packaged within the grain will generate knowledge to underpin the future utilisation of this important

grain. This will help to drive the future of Australian cereals industries, with health benefits to consumers, the enhanced delivery of specialised feedstocks for novel and renewable bio-products, and financial benefits to farmers.

LP0990917 Dr PA Lant; Dr S Pratt; Dr AG Werker; A/Prof PJ Halley

Approved Project Title Next generation bioplastics: Production of polyhydroxyalkanoate (PHA) bioplastics from organic waste

2009 : \$ 87,500

2010 : \$ 175,000

2011 : \$ 175,000

2012 : \$ 87,500

Primary RFCD 2908 CIVIL ENGINEERING

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

AnoxKaldnes AB

Veolia Water Solutions & Technologies Australia

Administering Organisation The University of Queensland

Project Summary

Production of next generation bioplastics by using waste as a resource supports an environmentally sustainable Australia and provides wide-ranging commercial opportunities for Australian businesses. Fundamental research in this field will provide a platform for creation of an Australian Centre of Excellence in PHA bioplastics, which will play

an integral role in progressing research on sustainable materials development. The project will provide training and PhD education in environmental biotechnology, and direct commercial benefits to Australia by the development

of significant Intellectual Property and linkage between an Australian University and leading players in environment technology commercialisation.

LP0991958 Prof GM Lu; Prof V Rudolph; Dr R Ding; Dr GX Wang

Approved Project Title Nano- and micro-scale engineering of MoS₂-based catalyst for conversion of syngas to ethanol

2009 : \$ 100,000

2010 : \$ 195,000

2011 : \$ 187,500

2012 : \$ 92,500

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Collaborating/Partner Organisation(s)

Envirovolve Pty Ltd

Administering Organisation The University of Queensland

Project Summary

Domestic production of ethanol to provide a 10% blend in petrol (E10) can be achieved from waste methane gas that Australia currently vents or flares to atmosphere. This project aims to develop a conversion process for

Summary of Linkage Projects Proposals for Funding to Commence in 2009

making ethanol from syngas (the product of coal or methane gasification). Small scale, modularised plants would make ethanol locally to the methane emission source. The benefits of local E10 production would be a reduction in the oil trade deficit of \$1 billion per year, \$500 million per year in lower carbon imposts to industry and government, 25 million tonnes per year of reduced CO₂e release to atmosphere and significantly improved urban air through reduced emissions from car transport, with attendant human health benefits.

LP0990184 Dr KM Makar; Dr SL Dole; Prof RM Gillies

Approved Project Title **Inquiry Teaching in Mathematics: Accelerating the process of change**

2009 : \$ 35,076

2010 : \$ 69,965

2011 : \$ 69,782

2012 : \$ 34,893

Primary RFCD 3302 CURRICULUM STUDIES

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Education Queensland

Administering Organisation The University of Queensland

Project Summary

Inquiry-based learning in mathematics immerses students in solving authentic, complex problems. As a nation, Australia spends too much time on repetitive, isolated procedural problems which inhibit creativity and higher-order thinking and contribute to the sharp decline in student interest in studying mathematics. Research has shown that teachers require support over time to become proficient in engaging students in inquiry of real-life problems. This study expands successful longitudinal research on teachers' adoption of inquiry methods in mathematics and works to study ways to accelerate the process of developing teachers' confidence and expertise in teaching mathematics with inquiry.

LP0990992 Dr GJ Marston; Prof HJ Karger; Prof C McDonald; A/Prof RA Russell

Approved Project Title **The high cost of financial insecurity: exploring the role of the 'fringe economy' in the lives of low-income Australians**

2009 : \$ 21,244

2010 : \$ 42,488

2011 : \$ 21,244

Primary RFCD 3701 SOCIOLOGY

Collaborating/Partner Organisation(s)

National Australia Bank

Good Shepherd Youth and Family Services

Administering Organisation The University of Queensland

Project Summary

The national benefit from this research has a number of dimensions. The first is to draw the community's attention to the high costs and charges associated with fringe lenders in Australia and the economic and social consequences of accessing these services. The second benefit relates to establishing what sorts of financial products and regulatory measures would offer low-income Australians a better outcome. A number of states in Australia have recently introduced legislation to limit the interest rates charged by pay-day lenders. The study is very timely in that it offers an opportunity to monitor the impact of these new regulatory measures and consider opportunities for further reform.

LP0990178 Dr JR Rhodes; Dr J Worthington Wilmer; Dr CA McAlpine; Dr A Peterson; Prof FN Carrick

Approved Project Title **Conserving species in human-modified landscapes: incorporating spatial population processes**

2009 : \$ 56,000

2010 : \$ 111,000

2011 : \$ 120,000

2012 : \$ 65,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Collaborating/Partner Organisation(s)

Summary of Linkage Projects Proposals for Funding to Commence in 2009

Queensland Museum
Moreton Bay Regional Council
Redland City Council
Logan City Council
Gold Coast City Council
Queensland Environmental Protection Agency
Administering Organisation The University of Queensland

Project Summary

Many regions of Australia are experiencing rapid population growth and urban expansion and these are predominantly located in areas that are rich in biodiversity. Therefore, conserving biodiversity in these regions is critical for the conservation of Australia's unique flora and fauna. This project will make a major national contribution to this by developing new conservation planning tools to conserve biodiversity in areas where people live and work. This will have substantial benefits for achieving environmentally sustainable development in Australia, maintaining quality of life in urban areas, and sustaining Australia's important nature-based tourism industry.

LP0990558 Dr PM Schenk; A/Prof BD Hankamer; Prof Dr CH Posten

Approved Project Title **Clean fuels for the future: Scale up and optimisation of microalgal oil production and biodiesel synthesis**

2009 : \$ 57,500

2010 : \$ 112,500

2011 : \$ 115,000

2012 : \$ 60,000

Primary RFCD 2708 BIOTECHNOLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

North Queensland & Pacific Biodiesel

Administering Organisation The University of Queensland

Project Summary

The development of renewable carbon-neutral fuels is an urgent challenge facing our society. This project aims to develop an innovative system for biodiesel production from local Australian algae species. If cultivated under the right conditions, microalgae are very efficient near-continuous producers of biodiesel and are likely the only renewable source of fuel that could match our current and future demand without competing for arable land and food production. Such systems couple the national/community benefits of energy generation, carbon-capture, biodiesel production and the clean-up of wastewater. Successful outcomes from this project will bring this innovative technology closer to commercial reality.

LP0990817 Prof MT Smith; Prof AK Whittaker; A/Prof RJ Lewis; Dr BD Wyse; Dr KJ Thurecht; Dr PF Schmidt

Approved Project Title **Novel polymeric microparticles for slow-release intrathecal delivery of analgesics**

2009 : \$ 50,000

2010 : \$ 100,000

2011 : \$ 100,000

2012 : \$ 50,000

Primary RFCD 2505 MACROMOLECULAR CHEMISTRY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Xenome Ltd

Administering Organisation The University of Queensland

Project Summary

Unrelieved chronic pain is a large area of unmet medical need, adversely affecting the lives of millions of people worldwide. This project seeks to develop innovative methods for delivering a novel pain-relieving medication into the spinal fluid in close proximity to the cells that transmit pain messages to the brain. The goal is to develop a new treatment to produce prolonged periods of pain relief in those patients who do not obtain benefit from existing pain medications. The technology that will be developed has the potential to be applied to a broad range of analgesic drug treatments.

Summary of Linkage Projects Proposals for Funding to Commence in 2009

LP0991765 Prof Z Yuan; Dr KA Third; Dr PA Lant

Approved Project Title **Understanding and mitigating nitrous oxide emission from wastewater treatment plants**

2009 : \$ 69,000

2010 : \$ 124,000

2011 : \$ 112,500

2012 : \$ 57,500

Primary RFCD 2911 ENVIRONMENTAL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Water Corporation

Administering Organisation The University of Queensland

Project Summary

Climate change caused by greenhouse gas emissions is one of the most serious challenges that mankind is facing. Substantial reduction in emissions must be achieved, with responsibility to be shared by all industrial sectors. Wastewater systems contribute to greenhouse gas emissions through not only energy consumptions but also direct emissions of fugitive greenhouse gases such as nitrous oxide. This project aims to provide knowledge and technology support to the Australian wastewater industry to minimize the emission of nitrous oxide during biological nitrogen removal from wastewater. This is critically important for this industry to achieve greenhouse gas neutral wastewater management.