

Summary of Discovery Projects Proposals for Funding to Commence in 2009

Tasmania

University of Tasmania

DP0984745 Dr MC Breadmore

Approved Project Title **Integrated microfluidic device for the direct analysis of drugs and metabolites in biological fluids**

2009 : \$ 160,000

2010 : \$ 135,000

2011 : \$ 130,000

2012 : \$ 140,000

2013 : \$ 140,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

QEII Dr MC Breadmore

Administering Organisation University of Tasmania

Project Summary

Due to the way in which multiple processes are integrated in a micro Total Analysis System (μ TAS), they offer substantial advantages over current technology, in terms of speed, cost of analysis, portability and operator simplicity and safety. This has considerable potential benefit for Australia, specifically for the remote and rural analysis of drugs and metabolites in biological fluids such as blood, serum, urine and saliva. These devices will have application for point-of-care testing in therapeutic drug monitoring, which will improve medical treatment and the patient's quality of life, as well as for on-site analysis in forensics for the rapid determination of illicit drugs and performance enhancing substances in our elite athletes.

DP0984673 Dr R Chung; A/Prof M Chuah; Prof J Vickers; A/Prof AK West

Approved Project Title **Redefining the metallothionein's role in the injured brain: extracellular metallothioneins play an important role in astrocyte-neuron responses to injury**

2009 : \$ 144,000

2010 : \$ 110,000

2011 : \$ 110,000

2012 : \$ 98,570

2013 : \$ 98,570

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

ARF Dr R Chung

Administering Organisation University of Tasmania

Project Summary

This project is being performed by an Australian team of researchers who are leaders in this field of research, and has significant national benefits in supporting this team reveal fundamental information on the cellular interactions that occur between astrocytes and neurons within the injured brain. In national terms, it will contribute to the concerted effort by Australian scientists to understand how and why neurons die following brain injury or neurodegenerative disease. Furthermore, this research contributes directly to the Designated National Research Priorities by identifying some of the earliest biochemical and cellular processes associated with aging or disease of the brain.

DP0984994 Dr MH Dungey; A/Prof OT Henry; Prof MD McKenzie

Approved Project Title **Understanding the Behaviour and Impact of Bond Markets.**

2009 : \$ 100,000

2010 : \$ 65,000

2011 : \$ 65,000

Primary RFCD 3503 BANKING, FINANCE AND INVESTMENT

Administering Organisation University of Tasmania

Project Summary

An improved understanding of the way in which the timing of transactions on financial markets interact enables better choices to be made in terms of designing market systems and conventions. The US Treasury market is arguably the most important market in the world, and uses an expandable limit order book. Better understanding of this market will help in choices about new system design, and in how news transmitted through this market may impact on other markets. In particular this project will consider the role of the microstructure of the US Treasury market in the 2007-2008 financial crisis.

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DP0987318 Prof PR Haddad; Dr EF Hilder; Dr RA Shalliker

Approved Project Title **Synthesis, characterisation and evaluation of novel ion-exchange polymer monolithic stationary phases for separation science**

2009 : \$ 150,000

2010 : \$ 135,000

2011 : \$ 135,000

2012 : \$ 140,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Administering Organisation University of Tasmania

Project Summary

This project will provide highly significant, fundamental advances in separation science by accelerating the design and development of new stationary phases and separation technologies suitable for the analysis of very complex samples. The project will lead to very significant new intellectual property having extremely high commercial potential worldwide, and therefore the project has potential for considerable direct financial returns to Australia. The new technologies will be applied in a wide range of areas of national importance including pre-and post-blast identification of explosives in counter-terrorism applications; environmental, clinical, and forensic analysis; energy generation and foods.

DP0984779 Dr MJ Hovenden; Dr PC Newton; Dr E Pendall; Prof Dr M Rillig; Dr PM Mele; Dr M Loeffering

Approved Project Title **How does warming prevent soil nitrogen availability from declining in response to elevated CO2?**

2009 : \$ 90,000

2010 : \$ 80,000

2011 : \$ 80,000

2012 : \$ 110,000

2013 : \$ 90,000

Primary RFCD 3001 SOIL AND WATER SCIENCES

Administering Organisation University of Tasmania

Project Summary

The sustainable use of the terrestrial environment depends upon maintaining ecosystem productivity which in turn depends upon nutrient availability within the soil. Increasing levels of CO₂ in the atmosphere are known to decrease nutrient availability while warming prevents this from happening. The aims of this project are to determine how warming is able to prevent elevated CO₂ concentrations from reducing soil N availability and hence productivity in a native grassland ecosystems. This is important, as it will allow likely problems caused by global climate change to be predicted by increasing the understanding of the underlying mechanisms as well as improving the management of grasslands in an environmentally sustainable way.

DP0987099 Prof JB Kirkpatrick; Dr AG Davison

Approved Project Title **Australia's changing urban tree estate: a socio-ecological study of patterns, causes and consequences**

2009 : \$ 70,000

2010 : \$ 30,000

2011 : \$ 30,000

Primary RFCD 3704 HUMAN GEOGRAPHY

Administering Organisation University of Tasmania

Project Summary

The project will significantly advance social and environmental understanding of the patterns, causes and consequences of changes in the Australian urban tree estate, therefore having immediate relevance to the home-environment of the majority of Australians. This knowledge will be of direct benefit to researchers, planners, land managers and residents in improving the sustainability of Australian cities. In particular, better informed decisions about the urban tree estate will help to maintain Australia's biodiversity, mitigate local and global climate change effects, manage fire risk, contribute to water conservation, improve air quality, enhance environmental amenity, reduce tree-related social conflict and enhance sense of place.

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DP0985361 Dr D Lannuzel

Approved Project Title **Iron in the Antarctic sea ice zone and its role in the past and future climate**

2009 : \$ 125,000
2010 : \$ 85,000
2011 : \$ 90,000

Primary RFCD 2604 OCEANOGRAPHY

APD Dr D Lannuzel

Administering Organisation University of Tasmania

Project Summary

The Antarctic sea ice environment has remained poorly investigated for decades as it is difficult to access. Recent scientific advances have revealed that melting sea ice may provide a significant amount of the plant micro-nutrient iron to the Southern Ocean. Given that polar waters are iron-deficient and seasonal sea ice affects ~14 million square kilometres of ocean, the importance of iron fertilisation from decaying sea ice and its effect on global climate urgently need to be evaluated. This proposal aims at improving our understanding of Earth's complex system, and will inform future climate change policy in Australia.

DP0985077 A/Prof D Nicol; Dr J Nielsen; Dr CR Critchley; Prof R Aoki

Approved Project Title **The innovation pool in Australian biotechnology: assessing strategies for fostering innovation through patenting and patent pooling**

2009 : \$ 100,000
2010 : \$ 125,000
2011 : \$ 139,000
2012 : \$ 48,000

Primary RFCD 3901 LAW

Administering Organisation University of Tasmania

Project Summary

The current patent system was designed for a very different research environment than that in which the global biotechnology industry operates. Rather than facilitating innovation there is evidence that the system can unduly restrict R&D. Patent pooling is being promoted internationally as a way to facilitate innovation. However, potential pitfalls are also recognised, and work is underway to develop appropriate regulation. Australia cannot afford to be left behind: urgent consideration must be given to the desirability of patent pooling and the regulatory changes that are required to allow it to function in the national interest. The proposed research will provide the data necessary to make informed decisions on this critical issue.

DP0986491 Prof BM Potts

Approved Project Title **Genetic architecture of species divergence and hybridisation in eucalypts**

2009 : \$ 130,000
2010 : \$ 130,000
2011 : \$ 130,000
2012 : \$ 100,000

Primary RFCD 2702 GENETICS

Administering Organisation University of Tasmania

Project Summary

Eucalypts are an icon of Australia and are of great economic and ecological significance to the nation. They are the most widely planted hardwood trees in the world, but Australia is the centre of origin of most species and the custodian of this important native bioresource. Understanding the evolutionary processes that shape diversity in this internationally significant genus is important for its long-term management and conservation. This project links to large international initiatives currently underway for high-density mapping and sequencing of the eucalypt genome, to enhance the flow of information gained back to Australia for scientific, economic and environmental benefit.

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DP0984449 Dr M Rolls; Dr A Johnston

Approved Project Title **Travelling Home: A Study of Walkabout, Australia's Geographic Magazine (1934-74).**

2009 : \$ 42,000

2010 : \$ 27,000

2011 : \$ 40,000

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation University of Tasmania

Project Summary

Walkabout was one of mid-twentieth century's most popular magazines with a focus on inland Australia, as well as the Pacific region. It graced suburban lounge rooms, doctors' and dentists' surgeries, railway waiting rooms, ministerial offices, and school libraries. Walkabout's mixture of entertainment and education ensured its influence across a spectrum of readers: across age, class, and educational boundaries. This project explores the role of Walkabout in the development of a modern national identity. Walkabout deliberately cultivated one of Australia's key modern economic foundations-the travel industry-and did so whilst also influencing knowledge formation and circulation.

DP0987402 A/Prof S Shabala; Dr RM Guijt

Approved Project Title **Novel approach to study mechanisms of Na⁺ transport in plants using Lab on a Chip technology**

2009 : \$ 40,000

2010 : \$ 90,000

2011 : \$ 90,000

Primary RFCD 2704 BOTANY

Administering Organisation University of Tasmania

Project Summary

A Lab on a Chip for sodium ion measurements in plants is proposed, offering a long overdue solution to the lack of appropriate techniques to study the mechanisms of sodium ion uptake, transport and compartmentation. Sodium ion transport is a key determinant of salt tolerance, but a good understanding of its transport mechanisms is lacking since no appropriate measurement tools are available. Using the system proposed here, sodium ion is separated from interfering ions, allowing fast and selective measurements. A series of ground breaking studies towards sodium ion uptake, transport and compartmentation in plants will be conducted using this Lab on a Chip.