

Summary of Discovery Projects Applications for Funding to Commence in 2006

Tasmania

University of Tasmania

DP0663416 Prof AJ Canty; Dr RM Guijt; Dr T Rodemann

Approved Project Title **Microreactors for Organic Synthesis**

2006 : \$100,000

2007 : \$90,000

2008 : \$90,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Institution University of Tasmania

Project Summary

Since the electronic revolution, miniaturisation has been the trend for devices from consumer electronics to scientific instruments. In this time very little has changed in the manner, or scale, that synthetic organic chemistry has been carried out even though advances in instrumentation mean that less compound is required for identification and analysis. This project aims to bridge the gap by developing recyclable miniaturised reaction vessels for the formation of organic compounds on a scale thousands of times smaller than it is currently done. These devices will have applications in drug discovery programmes due to higher throughput and increased efficiency while minimising waste.

DP0666733 Prof R Coleman

Approved Project Title **Active Ice-Shelf Rift Systems on the Amery Ice Shelf, East Antarctica**

2006 : \$110,000

2007 : \$90,000

2008 : \$90,000

Primary RFCD 2601 GEOLOGY

Administering Institution University of Tasmania

Project Summary

Our work will inform the public on how the Antarctic might contribute to global sea level rise, e.g., are current iceberg production rates accelerating and causing inland ice to flow into the sea more rapidly? Furthermore, a greater understanding of the important Earth systems, including the ocean-ice-atmosphere system, is important to a society contemplating the responsibilities of stewardship of the planet as we move into the era of potentially profound effects from global climate change.

DP0666062 Prof AJ Crawford

Approved Project Title **Marine Geological Investigation of the Naturaliste Plateau and Diamantina Zone - the tectono-magmatic development of a non-volcanic passive margin**

2006 : \$70,000

2007 : \$40,000

Primary RFCD 2601 GEOLOGY

Administering Institution University of Tasmania

Project Summary

Australia's continental margins impact enormously on our major industries including tourism, hydrocarbon production and fisheries, and are particularly significant with respect to biodiversity and hazard planning (both long and short term), yet knowledge of the seafloor of our margins is desperately poor. To contribute to alleviating this problem, we will use the R/V Southern Surveyor research vessel to produce swath mapping imagery and dredge samples from the seafloor of a geologically fascinating part of the southern section of the Western Australian margin dominated by the Naturaliste Plateau and Diamantina Zone.

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DP0663781 Prof PR Haddad; Dr RA Shellie

Approved Project Title **Enhanced peak capacity in ion chromatography through gradient elution and multidimensional separations**

2006 : \$298,879

2007 : \$251,517

2008 : \$179,765

2009 : \$186,404

Primary RFCD 2504 ANALYTICAL CHEMISTRY

APD Dr RA Shellie

Administering Institution University of Tasmania

Project Summary

Current methodology in ion chromatography (IC) is limited in that very complex samples cannot be analysed because the peak capacity of conventional IC systems is insufficient. The proposed research will provide a huge increase in peak capacity so that samples of extreme complexity can be analysed. Samples of this type occur in many fields, including environmental, clinical, forensic, energy generation and foods. The ability to directly address such samples will therefore provide benefit to a wide range of sciences of great importance to Australia. Moreover, the proposed research will lead to significant new intellectual property which can be commercialised, thereby providing further direct national benefit.

DP0666271 A/Prof B He; Prof GM Stokes

Approved Project Title **Deliberative Democracy and Citizenship: A Study of Deliberative Polling and Participatory Budgeting in China**

2006 : \$40,000

2007 : \$20,000

2008 : \$20,000

Primary RFCD 3601 POLITICAL SCIENCE

Administering Institution University of Tasmania

Project Summary

The result of this research will enhance Australian democracy-promotion activities overseas, foster Chinese learning from Australian deliberative democratic experiences, as well as benefiting Australian governmental agencies such as AusAID and Australian NGOs working in this field. The project will also strengthen cooperation between Australian researchers and their counterparts in China. The lessons learned from this Chinese experiment can be used to improve the quality of citizen participation and to develop more effective means of public participation and consultation in Australia. The project will contribute to the Australian government's dialogue approach to human rights issues in China since 1989.

DP0666121 Dr EF Hilder; Dr MC Breadmore

Approved Project Title **Bioanalytical Microchips Based on Integrated, Application Tailored Monolithic Modules**

2006 : \$80,000

2007 : \$40,000

2008 : \$60,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Administering Institution University of Tasmania

Project Summary

Microfluidic devices offer substantial advantages over current technology, in terms of speed, cost of analysis, portability, operator simplicity and safety. Integrating multiple analytical processes within a simple and reliable portable device will lead to application in a range of areas, from pharmacology to therapeutic drug monitoring, proteomic and metabolomic screening for disease diagnosis and drug development, and also for performing clinical diagnostics in a rural area. This will significantly impact on the quality of life of the Nation as a whole, not only due to expedient diagnosis and treatment which has obvious health benefits, but also in the considerable financial benefits that result from early and efficient treatment.

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DP0666431 Dr MA Kashem

Approved Project Title **Optimising Control of Hydroelectric Turbines Subject to Basslink Instability**

2006 : \$41,064

2007 : \$25,000

2008 : \$25,000

Primary RFCD 2909 ELECTRICAL AND ELECTRONIC ENGINEERING

Administering Institution University of Tasmania

Project Summary

With the introduction of Basslink, an underwater DC power cable across the Bass Strait, Tasmania will be connected to the national Electricity Market. Basslink will also provide an opportunity to utilise the significant water energy potential found throughout Tasmania. This project will examine the impact and disturbances due to the connection of Basslink with Tasmanian hydro power systems and develop control strategies for effective operation and control of hydro turbines with Basslink. Particular attention will be paid to the quality and reliability of electricity supply in Tasmania.

DP0665083 Prof JB Kirkpatrick

Approved Project Title **Grazing-fire interactions and vegetation dynamics**

2006 : \$110,000

2007 : \$83,000

2008 : \$83,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Institution University of Tasmania

Project Summary

Grazing and fire are the two major cost-effective tools that can be used to manipulate the vegetation of reserves and rangelands. This project will result in information and models that will enable a more effective use of grazing than at present in natural vegetation management for both nature conservation and production. An understanding of the ways in which vertebrate grazing animals influence the incidence and intensity of fire is also highly important in planning to prevent the occasional vegetation fire that causes substantial losses of life, property and conservation values, especially in the context of predicted climatic change.

DP0662838 Dr M Macka

Approved Project Title **Towards Microfluidic-Based Advanced Remote Analysis**

2006 : \$75,000

2007 : \$75,000

2008 : \$75,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Administering Institution University of Tasmania

Project Summary

The research under this project will establish and systematically develop Advanced Remote Analysis as a new inter-disciplinary area and establish a leadership role for Australia. By addressing pressing needs such as monitoring the environment, remote medical diagnostics, advancing Australian science and technology, or monitoring for traces of explosives, this project falls directly into all four of the National Research Priorities with applications addressing corresponding Priority Goals. Other areas benefiting from the outcomes of this project will be remote monitoring of agricultural production including living species, and a number of other industries such as biotechnology, mineral processing, power generation etc.

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DP0665058 Dr D McGuinness

Approved Project Title **The development of homogeneous catalytic processes for the manufacture of new chemical products derivable from Australia's resources**

2006 : \$150,000
2007 : \$120,000
2008 : \$140,000
2009 : \$120,000
2010 : \$120,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)
QEII Dr D McGuinness

Administering Institution University of Tasmania

Project Summary

The research proposed is deliberately aimed at exploiting opportunities that will arise as a result of changes that are taking place in the global petrochemical industry. It is almost certain that Australia will take part in these changes through the utilisation of its gas and coal reserves and abundant biomass. Early advances in the processes that are presented above will allow Australian industries to benefit from these changes, and will allow significant value-adding to Australia's resources.

DP0664923 Dr GE McKinnon; A/Prof BM Potts

Approved Project Title **Contribution of hybridisation to genetic diversity and adaptation in Eucalyptus**

2006 : \$100,000
2007 : \$85,000
2008 : \$85,000

Primary RFCD 2702 GENETICS

Administering Institution University of Tasmania

Project Summary

The eucalypt gene pool is an outstandingly important bioresource for Australia. Its effective future management will be based on understanding the extent, causes and significance of genetic variation in eucalypt species. This project investigates a currently overlooked, but potentially important, source of genetic diversity and adaptation in Eucalyptus. The knowledge gained will contribute substantially to our understanding of eucalypt biology, and will inform decision-making for conservation, revegetation, and sustainable use of seed resources. Through addressing fundamental questions, the project will also provide a uniquely Australian contribution to world research in forest molecular genetics.

DP0662856 Prof CJ Pybus; Dr A Johnston; Dr AR Page; Prof PD Hulme; Prof M Rediker

Approved Project Title **The Construction of Race and Racial Identity at the Antipodes of Empire, 1788-1840**

2006 : \$102,000
2007 : \$40,000
2008 : \$81,000

Primary RFCD 4301 HISTORICAL STUDIES

Administering Institution University of Tasmania

Project Summary

The view that Australia was always a racially based society, pursuing racial policies to the detriment of indigenous Australians and our Asian neighbours, is subject to rancorous national debate. Polemical assertion by high profile journalists that race was never a driving force in Australian history is not conducive to understanding complex history, nor are derogatory attacks on historians helpful in explaining the past to our neighbours. Whether colonial Australia was a race-based society remains to be established. With indigenous uncertainty over the demise of ATSIC and rising antagonism among our Islamic neighbours, there is need, as never before, for dispassionate scholarship to provide a complex interpretation of Australia's past.

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DP0663758 Prof JB Reid; Dr JJ Ross

Approved Project Title **Genetic and Hormonal Regulation of Plant Growth**

2006 : \$110,000

2007 : \$93,000

2008 : \$93,000

Primary RFCD 2704 BOTANY

Administering Institution University of Tasmania

Project Summary

Leguminous plants make a substantial contribution to the Australian economy. To ensure future growth, we need to know more about how legume development is regulated. Genetic mutants, typically affecting the growth-promoting gibberellin plant hormones, played a key role in the green revolution, which transformed agriculture world-wide. Recent results show that gibberellin acts in concert with another hormone, auxin. We will generate new auxin-related mutants that will help us to understand how auxin and auxin-mediated interactions affect crop architecture and performance. Further benefit will accrue from training of students in state-of-the-art techniques, and the generation of new germplasm for use by other researchers and plant breeders.

DP0662868 Dr M Sussex; A/Prof P Shearman; Prof M Cox; Prof R Sakwa; Prof RE Kanet

Approved Project Title **Globalization and New Wars: The War in Chechnya**

2006 : \$47,000

2007 : \$26,489

2008 : \$35,000

Primary RFCD 3601 POLITICAL SCIENCE

Administering Institution University of Tasmania

Project Summary

Identifying the causes of conflict has practical applications for Australian security policy formulation, since an area of instability exists within our region. A finding that causes of war arise either from complex domestic political struggles, or processes of globalization, has implications for which strategic posture Australia should adopt in responding to crises. The project falls within Research Priority 4: 'Safeguarding Australia'. By addressing the need to better understand causes of war, it assists Australian policymakers to better understand and manage potential threats. Greater knowledge of war likewise assists defence policy planners to maintain an operational advantage for Australia's defence forces.

DP0663741 Prof FM Vanclay; Dr AW Russell; Dr HJ Aslin

Approved Project Title **Managing innovation with a policy-relevant framework to assess the social consequences of technological developments**

2006 : \$56,000

2007 : \$52,000

2008 : \$40,000

Primary RFCD 3701 SOCIOLOGY

Administering Institution University of Tasmania

Project Summary

A framework to assess the social consequences of new technologies will enable their benefits to be maximised and impacts lessened. By considering impacts during development and before release, design criteria can be broadened, appropriate management and mitigation measures implemented and appropriate regulatory conditions established. Interested parties can participate in discussions about technology directions at an early stage, allowing technological development that is more democratic and less obstructed by conflict. Society benefits by having socially-appropriate and socially-acceptable technologies. Industry benefits from clearer technology development paths and a better understanding of potential social impacts of new technology.

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DP0664792 A/Prof BF Yates; Prof T Rovis

Approved Project Title Nucleophilic carbenes as organocatalysts for asymmetric synthesis

2006 : \$90,000

2007 : \$75,000

2008 : \$75,000

Primary RFCD 2503 ORGANIC CHEMISTRY

Administering Institution University of Tasmania

Project Summary

Chemical compounds which come in two chiral mirror images (enantiomers) can have very different biological function. Often one form can have beneficial effects while the other can cause great harm (such as birth defects in the case of thalidomide). It is therefore very important for the drug industry to have asymmetric chemical reactions that lead specifically to only one enantiomer. The asymmetric reactions in this project have been used previously to synthesise the anti-cancer metabolite roseophilin. The results of this project will ensure that there are many more similar success stories in the pharmaceutical and biotechnology industries.