

Summary of Discovery Projects Proposals for Funding to Commence in 2010

New South Wales

University of Western Sydney

DP1093227 Prof SB Banerjee; Prof DL Levy; Dr BB Wittneben; Dr C Okereke

Approved Project Title **Corporate and institutional strategies for climate change: An international comparative study**

2010 : \$ 90,000

2011 : \$ 95,000

2012 : \$ 110,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation University of Western Sydney

Project Summary

Drawing on 'best practice' from US and European countries, the project will improve corporate Australia's capacity for sustainability by developing a framework that integrates climate change issues into corporate strategy. By integrating perspectives from market, state and civil society actors, the research's multi-stakeholder approach also addresses community concerns about climate change. The findings will help enhance our understanding of the challenges and opportunities resulting from the introduction of Australia's first national emissions scheme in 2010.

DP1093833 Prof JW Cairney; A/Prof IC Anderson

Approved Project Title **Plant : fungal symbioses in Australian forests - new perspectives using laser microdissection**

2010 : \$ 110,000

2011 : \$ 90,000

2012 : \$ 100,000

Primary RFCD 2703 MICROBIOLOGY

Administering Organisation University of Western Sydney

Project Summary

Ericaceae are important components of the Australian flora in many habitats, including forests and fragile alpine regions that are significant to Australia's cultural and natural heritage, and several species are considered threatened. This project addresses the fundamental question of whether networks of symbiotic fungal mycelia act as below-ground bridges between Ericaceae plants and tree roots. If demonstrated, this would alter current views of carbon and nutrient cycling in Australian forests and provide the basis for better informed decisions for the sustainable management of Australian forest resources. This is particularly important in the context of carbon sequestration and future climate change.

DP1095699 Prof CW Davis; Dr S Kouider

Approved Project Title **Unconscious processing: To what extent, how flexible and how smart?**

2010 : \$ 80,000

2011 : \$ 50,000

2012 : \$ 70,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation University of Western Sydney

Project Summary

We are unaware of the sophisticated pattern analyses conducted by our perceptual systems that enable us to operate in a complex environment. Less clear is whether unconsciously presented information itself can influence our behaviour or indeed whether unconscious cognition occurs. The proposed studies provide the foundation and structure for a pioneering examination of the extent, flexibility and computational power of unconscious processing at the level of neural response and behaviour. The impact and benefits of the project will be in its contribution to theory with outcomes revealing the boundary conditions governing unconscious cognition and providing a first benchmark for how such conditions might vary across the lifespan.

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DP1094072 Dr V Gebhardt; Prof P Dehornoy; Dr J González-Meneses
Approved Project Title **Algorithmic approaches to braids and their generalisations**
2010 : \$ 50,000
2011 : \$ 50,000
2012 : \$ 50,000
Primary RFCD 2301 MATHEMATICS
Administering Organisation University of Western Sydney

Project Summary

This project combines theoretical methods from pure mathematics with computational experiments in order to gain new knowledge. The objects of interest, so-called braid groups and generalisations, are important for many fields of mathematics, but also have applications for data security. Both the theoretical outcomes of this project and the algorithms developed will strengthen Australia as a centre of cutting-edge research in computational algebra. Moreover, the results can lead to new technologies for protecting confidential data, which are more efficient and hence cheaper to implement than existing alternatives. Secure identification of legitimate users in the context of online banking is one possible field of application.

DP1096179 Prof KC Kwok; Prof V Macefield; Dr PA Hitchcock; Dr DK Walton
Approved Project Title **Occupant comfort, cognitive performance and task performance in wind-excited tall buildings**
2010 : \$ 166,000
2011 : \$ 191,000
2012 : \$ 187,000
2013 : \$ 61,621
Primary RFCD 3199 OTHER ARCHITECTURE, URBAN ENVIRONMENT AND BUILDING
Administering Organisation University of Western Sydney

Project Summary

Strong winds are sensitive to climate change and highly unpredictable, critically affecting the design of tall buildings and our built environment. The outcomes of this research will revolutionise current design approach for occupant comfort in wind-excited tall buildings and deliver a new generation of tall buildings that provides a comfortable living and working environment without a degradation of work performance due to wind-induced vibration. The transfer of this knowledge from research to practice will enhance the international competitiveness of our architecture, engineering and construction professionals, boosting our involvement in major tall building projects worldwide and bringing long-term economical benefits to Australia.

DP1094309 Dr S Liyanapathirana; A/Prof CJ Leo
Approved Project Title **Application of expanded polystyrene (EPS) geofoam and deep cement mixed columns for protection of existing foundations during urban construction**
2010 : \$ 65,000
2011 : \$ 57,000
2012 : \$ 61,000
Primary RFCD 2908 CIVIL ENGINEERING
Administering Organisation University of Western Sydney

Project Summary

Urban construction activities are increasing in the capital cities of Australia, and the occurrence of new construction activities near existing structures is increasing. The main outcome of this project will provide economic engineering strategies for the protection of buildings during urban construction activities, hence minimising construction related damage, litigation and delays as witnessed recently during Sydney's Lane Cove tunnel collapse. Proposed novel solutions using EPS geofoam and deep cement mixing will significantly increase the international competitiveness and export potential of the Australian construction industry, and improve community confidence in developers and the Engineering profession.

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DP1096324 Prof PM O'Neill

Approved Project Title **Developing criteria to help solve Australia's urban infrastructure crisis**

2010 : \$ 58,000

2011 : \$ 56,000

2012 : \$ 50,000

Primary RFCD 3402 APPLIED ECONOMICS

Administering Organisation University of Western Sydney

Project Summary

The key items of infrastructure in our cities are seen to be in crisis. Yet despite a growing willingness to fund new infrastructure, governments at all levels struggle to devise, rank and deliver infrastructure projects. The project will recover and rebuild a language for understanding the role of infrastructure in Australian cities and then devise criteria for better enactment of the infrastructure procurement and provisioning processes. The project's prime outcomes will intersect with a growing need for better ways to build and operate large economic infrastructure and thus contribute to building cities that perform better economically, are more liveable, and contribute to long term environmental sustainability goals.

DP1094174 Dr C Reid; Prof C Halse

Approved Project Title **A sociological analysis of ethnicity and compulsory schooling in NSW**

2010 : \$ 40,000

2011 : \$ 40,000

2012 : \$ 30,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation University of Western Sydney

Project Summary

Building social cohesion is a national priority. We directly address this priority through our focus on young people of low SES, ethnically diverse backgrounds in a region with a public reputation for inter-ethnic tensions and low school retention. We aim to generate insights that will shape a suite of policies and practices that teachers report effective in meeting the needs of schools and ethnically diverse students in the context of the collapse of the youth labour market.

DP1095972 Dr M Riegler; Prof DS Ellsworth

Approved Project Title **Insect herbivore and plant responses in eucalypt forests under climate change at physiological, species and community scales**

2010 : \$ 102,500

2011 : \$ 102,500

2012 : \$ 100,000

Primary RFCD 3006 FORESTRY SCIENCES

Administering Organisation University of Western Sydney

Project Summary

Understanding the drivers for insect populations and vulnerabilities to climate change are the first steps to predicting adaptation and mitigation strategies to minimise impacts of climate change on forest biodiversity. Our research will quantify the outcome of climate change on the still neglected but important insect community associated with eucalypts in Australian forests. These insect communities are widespread, diverse and quintessential for the Australian economy and ecology. Apparent climate change is expected to cause biodiversity shifts, leading to outbreaks and extinctions of insects in eucalypt forests. Negative outcomes of impacts could also include the accumulation of leaf litter, increasing bush fire activity in the future.