South Australia

University of South Australia

DP0987148 A/Prof JW Boland; Prof JA Filar

Approved Project Title **Strategic integration of renewable energy systems into the electricity grid**

2009 : $ 95,000
2010 : $ 95,000
2011 : $ 50,000

Primary RFCD 2302 STATISTICS

Administering Organisation University of South Australia

Project Summary

The Intergovernmental Panel on Climate Change states that 'warming of the climate system is unequivocal' and there is high probability it is anthropogenic. In response to the growing awareness of climate change, there is an expansion in Australia in the use of renewable energy resources in electricity generation, albeit from a low base. The various renewable energy systems have differing patterns of availability and volatility, and it is difficult to determine the right mixture to best match the demand. It is imperative that future growth be structured so that both maximum grid penetration, and required greenhouse gas reductions be attained.

DP0986449 Prof BM Comber; A/Prof PA Cormack; A/Prof B Doecke; Dr A Kostogriz; Dr RJ Kerin; Dr DE Smith; Dr AI Griffith

Approved Project Title **Mandated literacy assessment and the reorganisation of teachers' work**

2009 : $ 62,000
2010 : $ 71,000
2011 : $ 40,000

Primary RFCD 3302 CURRICULUM STUDIES

Administering Organisation University of South Australia

Project Summary

The study will inform practitioners, teacher educators and educational policy-makers about the ways that teachers' work is being changed by the introduction of mandated standardised assessment and reporting processes. The research will provide insights into the ways in which teachers need to adapt standardised processes and policies to account for the varied student and community populations they serve. This is significant for educational policy as recent international studies of students' literacy performance suggest Australia is lagging in terms of equity for low SES students.

DP0987648 A/Prof PA Cormack; Prof WC Green; Prof AJ Patterson

Approved Project Title **Teaching reading in Australia: An historical investigation of early reading pedagogy, the figure of the teacher and literacy education**

2009 : $ 50,000
2010 : $ 30,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation University of South Australia

Project Summary

This project will make a distinctive national and international contribution to reading pedagogy and literacy research by reconceptualising debates about the teacher of reading and establishing an historical foundation for the study of reading pedagogy in teacher education and professional development practices. Teacher education, already a site of national concern, will be reinvigorated by new insights and frameworks for training through access by teacher educators to the corpus of data on a website and through publications and conference presentations that will provide a new vision of the complex processes involved in teaching reading.

DP0984470 Dr VV Ejov; Prof S Friedland; Dr N Litvak; Mr P Zograf

Approved Project Title **Graph isomorphism and quantisation of longest cycles by means of determinants and spectra**

2009 : $ 85,000
2010 : $ 87,000
2011 : $ 90,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation University of South Australia

Project Summary

A characterisation of the difficulty of the Hamiltonian cycle problem and the graphs isomorphism problem will be a significant conceptual advancement with repercussions in a number of fields including combinatorial optimisation and theoretical computer science, in particular, the Google PageRank. Applications of tensor networks technique will lead to a design of a quantum computer that enumerates all Hamiltonian cycles in a graph. Analysis of the determinant objective function in terms of the eigenvalues may lead to new spectral properties of stochastic matrices. Algorithmic advances exploiting such a characterisation will significantly contribute to existing technologies for solving problems in a wide range of applications.

DP0985005 A/Prof S Franzway; A/Prof JE Mills; Prof R Sharp; A/Prof J Gill

Approved Project Title **Epistemologies of workplace change: transforming gender relations in engineering**

2009 : $ 73,000
2010 : $ 73,000
2011 : $ 69,000

Primary RFCD 3799 OTHER STUDIES IN HUMAN SOCIETY

Administering Organisation University of South Australia

Project Summary

The severe shortage of engineers threatens sustainable development in rich and poor countries alike. The situation is exacerbated in Australia by global warming and the mining boom, ultimately constraining the national capacity for future economic development and long-term prosperity. Women are potentially an important source of future engineers, but they are currently neither attracted to nor retained within the profession in significant numbers. This project, involving international collaboration, will generate a new conceptual model designed to re-dress this problem. A key outcome will be more efficient and effective gender equity policies in engineering and related industries.

DP0986696 Prof V Gaitsgory

Approved Project Title **Duality, singular perturbations and numerical analysis in infinite dimensional linear programming problems related to problems of control of nonlinear dynamical systems**

2009 : $ 50,000
2010 : $ 50,000
2011 : $ 50,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation University of South Australia

Project Summary

Problems of control of nonlinear dynamical systems attract continued interest of eminent researchers motivated by important applications and by the fact that analytical and/or numerical analysis of a general nonlinear control problem presents a challenging task. The outcomes of the project will be both fundamental theoretical results and readily applicable (linear programming based) algorithms that will equip researchers and engineers with new tools for analysis and numerical solution of nonlinear control problems (including problems that have been intractable so far). The project will further enhance Australia's international reputation in Control Theory and its Applications.

DP0986371 Prof RG Horn; Prof SJ Miklavcic

Approved Project Title **Anomalous interfacial air-bubble dynamics: the importance of electrokinetic effects in thin film drainage**

2009 : $ 100,000
2010 : $ 60,000
2011 : $ 60,000

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation University of South Australia

Project Summary

Air bubbles play important roles in numerous systems including plastics and paper recycling, water treatment and mineral separation processes, foodstuffs, beverages, cosmetics, cleaning products, fire retardants, and natural systems such as rivers, oceans and biological fluids. The properties and behaviour of these systems and processes depend on how air bubbles in water interact with each other, and/or with other materials. Currently our understanding of the bubble interactions is incomplete. The improved understanding gained from this research project will lead to better ability to control the properties of systems and processes such as those listed above.

DP0987825 Dr JD Pisaniello; Prof RL Burritt

Approved Project Title **How to manage on-farm surface water storage for sustainable and safe catchments.**

2009 : $ 40,000
2010 : $ 70,000
2011 : $ 35,000

Primary RFCD 3602 POLICY AND ADMINISTRATION

Administering Organisation University of South Australia

Project Summary

Unsafe on-farm storage of runoff is a potential but silent problem ready to strike downstream communities. Unfair storage already occurs at the expense of farmers, communities and environment. Stakeholders will gain understanding of these two inter-related problems and the factors that drive them. The national benefit will be empirical evidence and policy guidance about the drivers of on-farm dam storage which ensures fairness and safety in surface water sharing systems by (1)providing certainty of water entitlements and encouraging farming investment in safe dams, (2)minimising hardship to farmers and communities not benefiting from their full entitlement and to those that suffer from dam failures, and (3)maximising environment's share.

DP0986089 Prof LK Rasmussen; Dr IR Land; Prof J Huber

Approved Project Title **Efficient Transmission Strategies for Cooperative Wireless Ad Hoc Networks**

2009 : $ 120,000
2010 : $ 90,000
2011 : $ 90,000

Primary RFCD 2805 DATA FORMAT

Administering Organisation University of South Australia

Project Summary

The contribution of information and communications technologies to the national economy has been widely recognized. It enables wealth creation, employment and exports, underpinning many innovation processes. Immediate project benefits will be: contribution to the knowledge base and fundamental capabilities in wireless communication; education of future Australian academic and industrial innovators; raising the international profile of Australian research in the area of information technology. The proposed research is in areas of great commercial interest, addressing new directions and technologies for future wireless networks. Applied development of the outcomes will lead to valuable intellectual property for commercial exploitation.

DP0988420 Dr GD Roach; Dr SA Ferguson; A/Prof DJ Kennaway

Approved Project Title **The relative impacts of sleep, wake and the internal body clock on human performance.**

2009 : $ 160,000
2010 : $ 140,000
2011 : $ 116,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation University of South Australia

Project Summary

The 24h society presents a number of challenges to the shiftworker. First, shiftworkers have to maintain a balance between the competing needs of work, family, leisure and social life. Second, shiftwork has been identified as a risk factor for obesity, diabetes and heart disease. Third, shiftworkers have an increased risk of injury and death at work. This project will use an innovative research protocol to provide critical information about the independent and combined effects of sleep loss and body clock disruption on human performance. Work schedules designed on the basis of a better understanding of sleep loss and circadian disruption will result in healthier employees, safer workplaces, and reduced costs to the community.

DP0987821 Prof RD Short; Dr KA Vasilev; Prof JW Bradley

Approved Project Title **Unravelling mechanisms in plasma growth of polymers**

2009 : $ 73,000
2010 : $ 49,000
2011 : $ 50,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation University of South Australia

Project Summary

Surface engineering broadens the breadth of applications for many materials, and enhances the performance and value of current and emerging technologies. Surface engineering is particularly important to maintaining the competitiveness of manufacturing in developed economies such as Australia, that can not compete on a cost basis with emerging economies. Plasma coating replaces (alternative) environmentally-questionable surface treatments. This project enhances Australian competitiveness; it cuts across industrial sectors and will deliver the new knowledge required to enhance material/technology functionality/performance. A PhD student will receive a multi-disciplinary training in a frontier technology and advanced analytical tools.

DP0988961 Prof M Stumptner; Dr WE Mayer; Prof M Schrefl

Approved Project Title **Dynamic Semantic Interoperability for Business Processes**

2009 : $ 100,000
2010 : $ 80,000
2011 : $ 100,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation University of South Australia

Project Summary

The integration of independently developed applications constitutes one of the major bottlenecks in modern software development in business, industry, and defense, in particular for a nation such as Australia that is highly reliant on overseas trade. Technologies that facilitate the smooth application integration promise significant savings in software development. By offering automated support task, this project offers the potential of significant cost savings, highly beneficial to any industry with a major ICT component. Lessons learned from the demonstration prototype can be directly carried over into commercial tool development. The project strengthens links to high quality European research laboratories.