Victoria

RMIT University

DP0988099 Dr V Bansal

Approved Project Title **Biosynthesis of multiple-nonmetal codoped titania nanoparticles for visible light photocatalysis**

2009 : $ 75,000
2010 : $ 70,000
2011 : $ 70,000
2012 : $ 70,000

Primary RFCD 2502 INORGANIC CHEMISTRY

APD Dr V Bansal

Administering Organisation RMIT University

Project Summary

Nano-photocatalysts' are particles of very small size that can degrade organic wastes and harmful microorganisms, when exposed to light. Titania is the most commonly used photocatalyst, but the limitation with existing titania is that it is mainly active in ultraviolet (UV) light. UV-light cannot be used for indoor applications because UV is mutagenic and causes cancer. This project will use an eco-friendly approach to develop novel titania nanoparticles, which will be active in visible light. Success will lead to new options in the management of our organic wastes and wastewaters (global problems), plant disease control, clean clinical surroundings, and add value to our day-to-day products like self-cleaning windows, and textiles.

DP0985178 Prof MB Beverland; Dr FJ Farrelly; Dr J Napoli; Dr SJ Dickinson

Approved Project Title **Can commerce be authentic? Developing and testing consumer-based measures of brand authenticity**

2009 : $ 35,000

Primary RFCD 3502 BUSINESS AND MANAGEMENT

Administering Organisation RMIT University

Project Summary

Academics and practitioners identify the management of brand authenticity as a critical success factor in building brand equity. Significant opportunities exist for Australian firms to benefit from application of a brand authenticity scale in the development of brand communication strategies. In particular, small firms where reputation can be built on an authentic connection to family or regional history; tourism organisations where consumption is driven by authenticity; or exporters of local brands where perceptions of what is authentically Australian are critical. It is also significant for sports organisations where the opportunity to self-authenticate is a major motivation for consumers whether spectator or participant.

DP0985070 Prof MC Burry; Prof JH Frazer; Ms JR Burry

Approved Project Title **Challenging the inflexibility of the flexible digital model**

2009 : $ 170,000
2010 : $ 165,000
2011 : $ 233,000

Primary RFCD 3101 ARCHITECTURE AND URBAN ENVIRONMENT

Administering Organisation RMIT University

Project Summary

Shared digital Building Information Models that link diverse heterogeneous information are beginning to show promising results in reducing the enormous fiscal and environmental cost of clashes, errors and rework caused by design and communication errors in construction. Model flexibility is a crucial factor in enacting the best design decisions at every stage while maintaining current shared information. But there are, as yet, no examples of comprehensive flexible building information modelling in Australia. This research builds on an Australian concentration of world class expertise to create new knowledge to overcome the obstacles. It will directly benefit the quality and cost of the Australian built environment.

DP0985878 Dr PH Ednie-Brown; Prof MC Burry; Dr AL Burrow; Mr O Catts

Approved Project Title **Ethics and aesthetics as criteria for innovation: A design research study of biological art and digital architecture**

2009 : $ 73,000
2010 : $ 37,028
2011 : $ 70,000

Primary RFCD 4104 DESIGN STUDIES

Administering Organisation RMIT University

Project Summary

The project will contribute to the goal of promoting innovation in three areas. First, the project will amplify Australia's individual strengths in biological art and digital architecture by creating a network of artists and designers in which each discipline is stimulated by the concerns and practices of the other. Second, the project will explain innovation in such networks, by identifying activities that lead to innovation. Such an explanation will improve the nation's capacity to promote innovation in targeted fields. Third, the project will test and develop collaboration tools designed to support the activities identified as leading to innovation, as information technology is a primary enabler for operating across such networks.

DP0986998 Ms L Hjorth; Dr MV Arnold

Approved Project Title **Online@asia/pacific: A comparative study of online networks in the Asia-Pacific**

2009 : $ 95,000
2010 : $ 79,000
2011 : $ 97,000

Primary RFCD 4001 JOURNALISM, COMMUNICATION AND MEDIA

APD Ms L Hjorth

Administering Organisation RMIT University

Project Summary

In the 21st century, the role of the Internet will increasingly become part of everyday life - for individuals, communities, businesses and government agencies. Thus it is imperative that we have a robust comparative understanding of online life in Australia and across the region, and its relation to local life offline. Such an understanding is fundamental to Australia's technology and cultural sectors, thus contributing to National Research Priority 3 through one of the strongest currencies in 21st century global market, web 2.0, as well as contributing to the broader long-term project of locating Australia in the region.

DP0985838 A/Prof J Hu; Dr F Han

Approved Project Title **Developing Reliable Bio-Crypto Features for Mobile Template Protection**

2009 : $ 83,000
2010 : $ 82,000
2011 : $ 82,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

APD Dr F Han

Administering Organisation RMIT University

Project Summary

Cost of identity theft crimes were at multi-million dollars in Australia in 2007. Technically this is due to the fact that conventional personal identification number and token based security mechanisms cannot identify genuine users. Biometric fingerprint security systems emerge as a promising solution. However protection of the mobile embedded fingerprint template itself is an unresolved problem. The project aims to develop new ways designing bio-cryptosystems that provide strong security strength. The project will bring new body of knowledge into this field and place Australia in the forefront of this research, and also result in strengthened security of IT infrastructure and systems for industries.

DP0988656 Prof PJ Marriott; A/Prof HM Huegel

Approved Project Title **Simulation, Modelling, Prediction and Two-Dimensional Retention Database Development in Comprehensive Two-Dimensional Gas Chromatography (GC×GC)**

2009 : $ 80,000
2010 : $ 70,000
2011 : $ 70,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Administering Organisation RMIT University

Project Summary

Quality of life is enhanced by the application of chromatography to many aspects of living. It is an existing technology made more powerful when used as comprehensive two-dimensional gas chromatography (GC×GC), an advanced form of GC. This project will apply new interpretation strategies to GC×GC to improve precise chemical analysis in many areas including: measurement of 'good fats' in foods, sources of illicit drugs, allergens in perfumes, disease profiling through metabolite monitoring and the detection of performance enhancing drugs in sport. Based on this research, the science of chromatography will be advanced in Australia and throughout the world, using Australian technology and expertise.

DP0986713 Prof DG McCulloch; Dr NA Marks; Dr JG Partridge; Prof B Tay

Approved Project Title **Graphene based nanostructures for high performance devices**

2009 : $ 200,000
2010 : $ 150,000
2011 : $ 175,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation RMIT University

Project Summary

Graphene sheets are the building blocks of graphite and a huge variety of carbon based nanostructures. Stacked graphene sheets have the unique property of the highest known thermal conductivity. By manipulating graphene sheets into three-dimensional channels and interconnects, vastly increased heat fluxes can be extracted from sensitive nanoscale devices such as microprocessors and micro electro mechanical systems. The potential of stacks of graphene as electrical contacts and interconnects will also be explored. By combining thermal and electrical functions, graphene will allow more efficient use of the valuable space on future devices. The outcome will be more efficient nanoscale devices to meet ever increasing performance demands.

DP0984393 Prof MB Steger; Dr HO Patomaki; Dr J Goodman

Approved Project Title **Mapping Justice Globalism: Reassessing the Ideological Landscape of the Twenty-First Century**

2009 : $ 112,000
2010 : $ 67,000
2011 : $ 94,000

Primary RFCD 3701 SOCIOLOGY

Administering Organisation RMIT University

Project Summary

"Mapping Justice Globalism" offers the first comprehensive analysis of the ideological claims of the global justice movement. The project assesses problem-solving approaches and policy platforms of civil society groups within the global justice movement and implications for Australian policy development and practice. The project offers alternative strategies to anticipate and address problems of globalization, such as climate change, financial volatility, migratory pressures and cultural conflict. Key findings will be made available to Australia's policy-making sector in targeted and accessible formats. The project will enhance Australia's capacity to interpret and engage with the forces of globalization shaping our region and the world.

DP0988345 Prof Z Tari; Dr CM Ryan; Prof MP Papazoglou

Approved Project Title **Designing for Reliability and Maintainability in Service-Oriented Architectures**

2009 : $ 120,000
2010 : $ 80,000
2011 : $ 80,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation RMIT University

Project Summary

This project aims to build expertise in the design of computer software, especially enterprise systems in domains such as finance and logistics that are vast in scale and highly complex and geographically separated. By fostering and formalising techniques for improving developer productivity and the reliability and maintainability of enterprise systems, Australia can secure a place as a world leader in software methodology, with an emphasis on technology production rather than consumption. Australian computer consulting services are a $19.5b industry, whilst the wider services sector, which is increasingly reliant on automation to stay competitive, accounts for 70% of Australia's GNP.

DP0986183 Prof JY Tu; Dr MA Stoodley; Dr J Tu; Dr WW Yang; Prof M Umezu; Dr GH Yeoh

Approved Project Title **Developing a Hemodynamic Model for Improving Clinical Treatment of Vascular Diseases**

2009 : $ 89,000
2010 : $ 96,000
2011 : $ 60,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation RMIT University

Project Summary

Stroke caused by vascular diseases is the second greatest single killer, which is taking away thousands of lives and costing billions every year in Australia. Improving the existing clinical treatments of these diseases is thus of utmost urgency. This project is targeted to developing a reliable Hemodynamic model through comprehensive experimental validation approach. It will not only foster a more in-depth research of vascular diseases but also provide a virtual forecasting tool for physicians or surgeons to develop guidance on diagnosis and therapeutic planning of clinical treatment, which brings great socio-economic benefit to the health of the Australian community.

DP0988654 Prof HR Wu; Prof X Yu; Prof Z Man

Approved Project Title **Modelling and Removal of Noise and Artefacts in Surveillance and Security Video for Forensic Image Analysis and Enhancement**

2009 : $ 110,000
2010 : $ 70,000
2011 : $ 70,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation RMIT University

Project Summary

This project spearheads research in advanced digital image and video processing technology, placing Australia at the forefront of both theoretical and applied research to safeguard Australia. It tackles fundamental issues identified in our earlier research in this area and consulting work for Victoria and NSW Police Departments in forensic investigations since 2000. Although the main investigation focuses on video surveillance and security systems for public safety, policing, crime prevention and border control, the outcomes of the investigation will have other applications, including digital photography for fine-art, medical imaging, picture archiving and communication systems for telemedicine and rural healthcare systems.

DP0984565 Prof I Yarovsky; A/Prof GJ Howlett

Approved Project Title **Protein self-assembly on surfaces, interfaces and nanoparticles**

2009 : $ 120,000
2010 : $ 110,000
2011 : $ 110,000

Primary RFCD 2506 THEORETICAL AND COMPUTATIONAL CHEMISTRY

Administering Organisation RMIT University

Project Summary

Surfaces such as those presented by an air-liquid interface or air-borne nanoparticles exert significant effects on protein aggregation in biological environments. We will develop a comprehensive theoretical and experimental approach to study the effects of such surfaces on the self assembly of proteins leading to disease causing amyloid fibrils. This will provide a molecular level understanding of protein self-association and a rational basis for the design of inhibitors to stop protein aggregation. The work will also establish design principles for new nanomaterials via the controlled self assembly of proteins on surfaces.

DP0986376 Prof X Yu; Prof Q Han

Approved Project Title **Variable Structure Control Systems in Networked Environments**

2009 : $ 70,000
2010 : $ 70,000
2011 : $ 80,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation RMIT University

Project Summary

This project will be the first in the world to lay the foundation for a new theory for understanding and designing new variable structure control systems in the networked environments, which is in great need due to increasing use of shared communication networks in modern industrial systems. It will firmly place Australia at the forefront of this research by developing a cutting edge technology for improving reliability and efficiency of industrial variable structure control systems in the networked environments, hence resulting in cost-saving and improved productivity for industry. It will provide training for new leading researchers specialised in this new theory and technology.