

Summary of Discovery Projects Applications for Funding to Commence in 2006

New South Wales

University of Technology, Sydney

DP0664013 Dr SI Belli; A/Prof NC Smith

Approved Project Title **The biosynthesis of structural proteins in parasites**

2006 : \$80,000

2007 : \$70,000

2008 : \$70,000

Primary RFCD 3005 VETERINARY SCIENCES

Administering Institution University of Technology, Sydney

Project Summary

The socio-economic impact of parasitic diseases, in Australia and throughout the world, is enormous- they kill 2-3 million people per year and cost livestock industries billions of dollars per annum. Some are serious food and waterborne threats, such as the coccidia, because they are transmitted from person-to-person via the faecal-oral route, or via ingestion of contaminated water or food, or through the ingestion of cysts in raw or undercooked meat. They cause diarrhoea, which in some cases, can be life-threatening. We will understand how the coccidia protect themselves as they move from host to host and, through that understanding, develop new ways to control them and eliminate the suffering caused by parasitic diseases.

DP0666786 Prof SK Blay; A/Prof PD Keyzer; Ms JM Burn

Approved Project Title **The Admission and Exclusion of Asylum Seekers: The Search for Legitimate Parameters**

2006 : \$70,000

2007 : \$30,000

Primary RFCD 3901 LAW

Administering Institution University of Technology, Sydney

Project Summary

The admission of asylum seekers into Australia is a burning political, legal and human rights issue. While Australia has dramatically reduced the inflow of asylum seekers through the Pacific Solution and other administrative and legal mechanisms, there are serious national and international concerns as to whether the strategies are consistent with international standards and principles of social justice. This project investigates Australia's exclusionary policies towards asylum-seekers and establishes a definitive framework for developing Australian asylum law consistent with international standards.

DP0666815 Prof DJ Boud; A/Prof CH Rhodes; A/Prof N Solomon; A/Prof C Chappell; Dr HB Scheeres

Approved Project Title **Beyond training and learning: integrated development practices in organisations**

2006 : \$100,000

2007 : \$70,000

2008 : \$85,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Institution University of Technology, Sydney

Project Summary

It is necessary for Australian businesses to maintain and enhance their productivity in the competitive global marketplace. As enterprises anticipate and face the challenges of the contemporary economy, a central concern is ensuring that employees learn what is needed to engage successfully with these challenges. Rapid growth in unstructured training in organisations demonstrates the importance of focusing on learning that is integrated into work processes. The outcomes of this project will help organisations exploit the productive potential of these different forms of learning. It will do this by identifying the links between organisational imperatives and the development of personnel.

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DP0666689 Prof MB Cortie; A/Prof MJ Ford; Dr S Valenzuela; Dr M Zareie; Mr X Xu; Prof GB Smith

Approved Project Title **Self-assembled surface arrays of mesoscale plasmonic devices for switchable control of coloured surfaces**

2006 : \$129,000
2007 : \$110,000
2008 : \$110,000

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Institution University of Technology, Sydney

Project Summary

This project has a well-defined outcome with potentially significant commercial interest. The proposed device is novel and the development of it will enhance the science and technology infrastructure within Australia, taking it into original and exciting directions. A successful demonstration of it will enhance Australia's competitive position in the field of nanotechnology and could conceivably lead to a manufacturing activity either located in Australia or in which Australian entities have an interest. Envisaged applications include optical circuitry, 'smart' windows and display surfaces on consumer devices.

DP0663575 Prof GK Cowlshaw

Approved Project Title **Social Relations Among Urban Aborigines in Sydney's Western Suburbs.**

2006 : \$138,631
2007 : \$136,633
2008 : \$132,925
2009 : \$129,352
2010 : \$128,520

Primary RFCD 3701 SOCIOLOGY

APF Prof GK Cowlshaw

Administering Institution University of Technology, Sydney

Project Summary

The forces that generate the horrific health and welfare problems in Indigenous communities will be elucidated and tools will be offered to enhance the work of policy makers and improve communications between Aborigines and providers of services. My research will rely on Indigenous people to expose the normalised and internalised forms of racial inequality they experience and to offer strategies to combat them. Intellectual outcomes will include new directions for social science's engagement with Indigenous issues, a more innovative contemporary anthropology and better informed practices in organisations. It will contribute to capacity building by enhancing the skills and experience of participants and improving self-esteem.

DP0666128 Prof JP Dalton; Dr DL Gardiner; Dr KR Trenholme; Dr J Grembecka

Approved Project Title **Aminopeptidases involved in regulating the amino acid pool in malaria parasites**

2006 : \$88,000
2007 : \$88,000
2008 : \$88,000

Primary RFCD 3204 MEDICAL MICROBIOLOGY

Administering Institution University of Technology, Sydney

Project Summary

Aminopeptidases are pivotal to the normal functions of all cells. Abnormalities in their function and/or structure results in tissue damage in many pathological processes in humans such as cancer, neuronal diseases and hormonal action. They are also critical to viral, bacterial and parasitic infections as they are employed to remove amino acids from the host for use in building their own proteins. This project brings national and international expertise together to define the structure and biological properties of these essential enzymes so that in the future we can employ rational approaches to develop new drugs that can combat these diseases and ailments.

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DP0664081 Prof TS Dillon; Prof E Chang; A/Prof L Feng

Approved Project Title **A Commercially Viable, Innovative XML - Enabled Association Rule Framework**

2006 : \$100,000

2007 : \$90,000

2008 : \$92,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Institution University of Technology, Sydney

Project Summary

The pervasive nature of the Web has raised two important issues, namely (1) how to exchange data between isolated information systems within two different companies with their own data formats and (2) how to store information particularly documents, so that they can be accessed through the internet based on their meaning. The Extended Markup Language XML has emerged as the favoured means of addressing these issues and this is leading to an explosive growth in the information stored in this way. This project addresses the issue of determination of patterns and knowledge in information stored in XML through datamining.

DP0665537 Prof SJ Donald; Dr Y Zheng

Approved Project Title **The Cultivation of Middle-Class Taste: Reading, Tourism and Education Choices in Urban China**

2006 : \$125,000

2007 : \$135,000

2008 : \$130,000

Primary RFCD 4203 CULTURAL STUDIES

Administering Institution University of Technology, Sydney

Project Summary

In urban China, high-income professionals and consumers have enormous influence on the development of elite education, travel, and cultural pursuits, but also on the stability of the Party-State. Their choices will materially affect Australian economic strategy, and will impact the socio-political character of the entire region. This project works to support Australian understanding of the tastes, aspirations and national priorities of this new formation: the Chinese middle class. The approach and outcomes of the research will enhance Australia's global position in innovative, relevant Asian scholarship, support good economic strategy, and provide an accurate socio-cultural lens through which to engage with Chinese and regional futures.

DP0666670 Dr EJ Harry

Approved Project Title **Establishing how bacterial cells position the division site**

2006 : \$88,000

2007 : \$83,000

2008 : \$83,000

Primary RFCD 2703 MICROBIOLOGY

Administering Institution University of Technology, Sydney

Project Summary

Cell division is essential for life. It is required for bacterial infections and, if uncontrolled, causes diseases such as cancer. We will establish how bacterial cells position the division site precisely to ensure faithful production of newborn cells. We will use the latest technology in bacterial cell biology to provide novel, clear-cut information to maintain Australia at the leading edge of this important area of research. There is an alarming increase in antibiotic resistant bacteria and an imminent threat of bioterrorism. This research allows the opportunity for the development of new antibiotics to protect Australia protected from these dangerous bacteria.

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DP0665463 Dr ML Huang

Approved Project Title **Efficient and Effective Interactive Visualization of Large Graphical Information Spaces**

2006 : \$60,329

2007 : \$50,000

2008 : \$50,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Institution University of Technology, Sydney

Project Summary

The expected outcome will change ways of interacting with and thinking about information processing for all information systems. As Australian companies became larger and more global, the ability to view and analyse the growing amount of company information becomes crucial to aspects as varied as trouble shooting or new ventures and eventually to the very viability of the organization itself. The expected outcome will enhance this ability by providing an optimised global view and an effective navigation scheme of large graphical information spaces. This will attract leading international IT companies to use it for developing cutting-age tools, and will enhance significantly the capacity and international standing of Australian IT industry.

DP0666942 Prof HT Nguyen; Prof A Craig; Dr JW Middleton; Dr Y Tran

Approved Project Title **Innovative hands-free technology to give the severely disabled greater mobility control**

2006 : \$95,000

2007 : \$75,000

2008 : \$75,000

Primary RFCD 2915 BIOMEDICAL ENGINEERING

Administering Institution University of Technology, Sydney

Project Summary

Half of the serious neurological injuries in Australia result in tetraplegia. Combined with other disabilities that involve severe mobility impairments the cost to the community economically, psychologically and socially is huge. This new Australian technology will facilitate effective sharing of control between a disabled person and a computer control system, taking advantage of their unique strengths and enabling each to aid the other in areas of weakness. The social and personal benefits are potentially very large. Scope also exists to significantly reduce healthcare costs and to develop a new industry in hands-free technology.

DP0666515 A/Prof NC Smith; Prof JS Wiley

Approved Project Title **Parasite virulence: the role of activation and suppression of P2X7 receptors**

2006 : \$80,000

2007 : \$70,000

2008 : \$70,000

Primary RFCD 3005 VETERINARY SCIENCES

Administering Institution University of Technology, Sydney

Project Summary

Toxoplasmosis and leishmaniasis pose a threat to the health and well-being of the Australian human and animal populations. Around 6-8 million Australians are infected with Toxoplasma, a parasite that can cause severe problems in immunosuppressed individuals and birth defects and miscarriage in pregnant women with a primary infection. Toxoplasmosis is also the main cause of abortion and stillbirth in Australian sheep. Leishmaniasis, recently found in Australia, is a risk for overseas travellers, livestock and wildlife. This research will provide an understanding of what makes these parasites successful, paving the way for development of novel drugs to combat these chronic diseases.

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DP0666257 Prof S Vigneswaran; Dr HH Ngo; Prof HJ Kim

Approved Project Title **A New Photocatalysis Hybrid System in Wastewater Treatment for Reuse**

2006 : \$90,000

2007 : \$80,000

2008 : \$80,000

Primary RFCD 2908 CIVIL ENGINEERING

Administering Institution University of Technology, Sydney

Project Summary

This project would particularly be useful to unreticulated sewage systems and small sewage treatment plants are prevalent in the coastal areas of NSW and Queensland and the interior parts of Northern Territory with small and isolated communities. Opportunities for demonstrating the successful application of this cost effective method of waste water treatment to appropriate stakeholders through participation in workshops, seminars and events will be explored. The study can also be extended to small and medium sized industries in their wastewater treatment. The technology is of direct benefit within the Nation and also has significant export potential.

DP0667060 Prof C Zhang; Dr S Zhang

Approved Project Title **Efficient Techniques for Mining Exceptional Patterns**

2006 : \$88,000

2007 : \$78,000

2008 : \$80,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Institution University of Technology, Sydney

Project Summary

This research will develop totally new techniques for exceptional pattern discovery that are useful for deeper understanding data mining and capturing the hidden interactions (class-bridge rules and out-expectation patterns) within data. This will enable Australian data marketers to access valuable implicit information that is contained in their data, but not currently accessible. The outcomes will keep Australia in the international leading edge and preserve its competitive status in preemptively defining the information market of tomorrow. To 'Frontier Technologies for Building and Transforming Australian Industries', discovering new exceptional patterns within data will lead to increased efficiency in Australian Industries.

DP0667139 Prof JG Zhu

Approved Project Title **Characterisation and Modelling of Nanostructured Soft Magnetic Materials for Advanced Electromagnetic Applications**

2006 : \$72,000

2007 : \$73,000

2008 : \$74,000

Primary RFCD 2909 ELECTRICAL AND ELECTRONIC ENGINEERING

Administering Institution University of Technology, Sydney

Project Summary

This project bridges the gap between nanomagnetic materials and practical applications. The knowledge generated and the international collaborations with world class scientists established through this cutting-edge research project will strengthen the leading status of Australia in the field of nanoscience and nanotechnology. The research outcomes will stimulate the growth of world class Australian industries and hence the national economy through the commercial manufacturing of hi-tech nanomagnetic materials and innovative smart devices and systems. High quality PhD and honours project students will be trained.