

Summary of Discovery Projects Proposals for Funding to Commence in 2008

Victoria

Swinburne University of Technology

DP0879771 Dr CA Blake; Dr DJ Croton; Dr S Rawlings

Approved Project Title **Cosmological simulations of future radio surveys**

2008 : \$ 94,000

2009 : \$ 96,000

2010 : \$ 94,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation Swinburne University of Technology

Project Summary

Future radio telescopes such as the Square Kilometre Array will create unprecedented surveys of the Universe. This Project is designed to increase Australia's expertise in cosmological simulations and analysis, crucial for performing science with these surveys. It will enable Australia to influence the scientific design of the Square Kilometre Array and stimulate the success of its pathfinder telescopes. The Project will create several opportunities for PhD projects, producing training in a broad range of scientific, technical and computational skills. It will also produce exciting public outreach and visualizations that will inspire public and media interest in science and astronomy.

DP0880295 Prof TY Chen; Dr F Kuo

Approved Project Title **Failure-Based Testing: An In-Depth Theoretical and Experimental Study**

2008 : \$ 85,000

2009 : \$ 85,000

2010 : \$ 80,000

Primary RFCD 2803 COMPUTER SOFTWARE

Administering Organisation Swinburne University of Technology

Project Summary

Nowadays, software is pervasive and ubiquitous. It plays a significant role in the daily lives of all kinds of people. The Australian software industry has bloomed in recent years. Our research results will improve the cost-effectiveness of software development, thereby upgrading the nation's software productivity and quality. These factors are conducive to the export of software produced by Australians and helpful in raising our nation's competitive advantage towards the goal of becoming a leading nation in the software industry among Asia-Pacific countries.

DP0877642 Prof WJ Couch

Approved Project Title **Rich clusters of galaxies: probing galaxy evolution and dynamical growth under the most extreme conditions**

2008 : \$ 125,000

2009 : \$ 124,000

2010 : \$ 119,000

2011 : \$ 78,648

2012 : \$ 78,648

Primary RFCD 2401 ASTRONOMICAL SCIENCES

APF Prof WJ Couch

Administering Organisation Swinburne University of Technology

Project Summary

This project will investigate two of the most fundamental processes within the universe - galaxy evolution and the dynamical growth of structure - and the interplay between them, thereby contributing to the Priority Goal of Breakthrough Science under National Research Priority 3. It will also bring national benefit through the international collaborations it will involve with prestigious US institutions. These collaborations will lead to new research capacity being built within Australia, through knowledge and expertise being vested in young postgraduate and postdoctoral researchers.

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DP0878812 Dr DL Foley

Approved Project Title **Developing Aboriginal Social Capital for participants not spectators in the Australian economy**

2008 : \$ 80,000
2009 : \$ 75,000

Primary RFCD 3999 OTHER LAW, JUSTICE AND LAW ENFORCEMENT

Administering Organisation Swinburne University of Technology

Project Summary

If a sector of Indigenous Australians can be taught to understand financial management, resource budgeting and financial planning (personal attributes that Western society values, yet often takes for granted); it is anticipated that they will in turn seek to improve their social position and look at wealth creation to reduce their dependence in a welfare culture. These people can be educated and encouraged to be active participants within the wider Australian economy, the national and community benefit will be the development of independent citizens and the creation of social capital that is financial knowledge.

DP0879698 Prof M Gu; Dr A Boussioutas; Dr H Xie

Approved Project Title **Functional nonlinear optical endoscopy - the third-generation optical endoscopy technology toward early cancer detection at a cellular level**

2008 : \$ 260,000
2009 : \$ 200,000
2010 : \$ 180,000

Primary RFCD 2404 OPTICAL PHYSICS

Administering Organisation Swinburne University of Technology

Project Summary

The third-generation optical endoscopy technology can be used for a better understanding of nonlinear optical interaction with organ sites and thus for early cancer detection. Such a novel device will enable biomedical scientists to gain the fundamental knowledge needed to enable Australians to develop better medical strategies for health and productive lives. Since 1 in 3 Australians will feel the effects of cancers, development of portable nonlinear optical endoscopes is of national importance, in particular for rural Australia, and therefore improves the healthcare of human beings. The potential spin-off activity will lead to economic benefits from new R&D development.

DP0879137 A/Prof DT Liley

Approved Project Title **Neurobiological computation using self organization**

2008 : \$ 75,000
2009 : \$ 75,000
2010 : \$ 70,000

Primary RFCD 2399 OTHER MATHEMATICAL SCIENCES

Administering Organisation Swinburne University of Technology

Project Summary

Despite their phenomenal power and speed there are many simple things that computers still cannot do, that humans, and indeed many animals, are able to perform effortlessly. The research outlined in this proposal aims to develop new, biologically inspired, computational approaches that attempt to bridge this gap. This research will help place Australia, despite its relatively small size, as a leading research community in the development of the next wave of computing devices. The development of new and "more natural" approaches to computing will deliver large dividends to a range of social, economic and environmental problems.

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DP0878405 A/Prof C Liu; Dr J Liu; A/Prof JX Yu

Approved Project Title XML Views of Relational Databases: Semantics and Update Problems

2008 : \$ 90,000

2009 : \$ 85,000

2010 : \$ 80,000

Primary RFCD 2805 DATA FORMAT

Administering Organisation Swinburne University of Technology

Project Summary

XML is the standard for representing, publishing and exchanging data over the Internet and relational database is the dominant technology for data management. Updating XML views over relational data is fundamental to bring these two technologies together to serve Internet-based applications. Australia has been a leading country in both developing and applying internet technologies. The theoretic outcomes of this project will contribute to the advance in database and web research communities and establish us as an internationally leading group in this research area. The technological outcomes will help organisations in Australia effectively and efficiently conduct e-Business on the Internet.

DP0877998 Dr MT Murphy

Approved Project Title Galaxy formation and femtosecond frequency combs

2008 : \$ 150,000

2009 : \$ 140,000

2010 : \$ 140,000

2011 : \$ 140,000

2012 : \$ 122,000

Primary RFCD 2401 ASTRONOMICAL SCIENCES

QEII Dr MT Murphy

Administering Organisation Swinburne University of Technology

Project Summary

I bring galaxy observations from already-scheduled European time on major international telescopes and I will add significant value to large US datasets. The scientific return will accrue to Australian researchers. I bring strong collaborations with the UK, USA, Europe and Canada, providing galaxy data which Australia cannot otherwise access. I will establish a new knowledge-base in Australia by applying femtosecond frequency comb technology to astronomy. This will cement Australian involvement in future telescopes. New technology for Australian telescopes, commercial and industry links are also possible. Student training is a main focus, providing a future for Australian research and skills transferable to industry.

DP0877630 Prof K Neumann; Dr CL Healy; Dr MM Tumarkin; Dr L Apel; Prof Dr S Schüler-Springorum; Prof Dr H Welzer

Approved Project Title Social Memory and Historical Justice: How Democratic Societies Remember and Forget the Victimisation of Minorities in the Past

2008 : \$ 160,000

2009 : \$ 140,000

2010 : \$ 130,000

2011 : \$ 40,000

Primary RFCD 4203 CULTURAL STUDIES

APD Dr MM Tumarkin

Administering Organisation Swinburne University of Technology

Project Summary

We will analyse how the victimisation of minorities is publicly and collectively remembered in a range of countries, including Australia, New Zealand, Spain, the Ukraine, Austria, Germany, Peru, Chile and the USA. We will identify key factors that enable democratic societies to work towards historical justice. By exploring how memories are contested and how communities actively negotiate the legacies of the past, we will address issues of crucial contemporary concern. The project will provide research training and international experience for a postdoctoral fellow and three doctoral students in an area at the cutting edge of the humanities and social sciences.

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DP0878231 Prof Dr PW Newton; Dr MG Wulff; Prof TW Burke; Dr DH Meyer

Approved Project Title **Consuming the Urban Environment . A Study of the Factors that Influence Resource Use in Australian Cities**

2008 : \$ 80,000

2009 : \$ 130,000

Primary RFCD 3705 DEMOGRAPHY

Administering Organisation Swinburne University of Technology

Project Summary

This project is the first study which aims to quantify how much of Australia's accelerating total consumption is designed into our cities and housing and how much is related to a household's discretionary behaviour and the sets of attitudes and values that drive it. The resulting knowledge will provide an evidence-based platform - that is currently lacking - for policy and program development by all tiers of government and industry to target areas where resource consumption can be effectively and equitably wound back. Key groups for influence include: individual consumers and households, housing designers (in relation to density, materials, appliances planners of urban communities(eg. public transport,level of land use mix).

DP0880772 Dr E Rennie

Approved Project Title **The reinvention of Indigenous media: Innovation, expansion and social development**

2008 : \$ 100,000

2009 : \$ 95,000

2010 : \$ 90,000

Primary RFCD 4001 JOURNALISM, COMMUNICATION AND MEDIA

APD Dr E Rennie

Administering Organisation Swinburne University of Technology

Project Summary

Detailed examination of Remote Indigenous Media Organisations will provide much-needed evidence of the role that community media organisations play in communications uptake and use in remote communities. The success of RIMOs further suggests that investigation at the organisational level may yield lessons for social development more broadly. Content analysis will identify gaps and achievements in Indigenous media production, providing a deeper understanding of how local media interacts with and informs national textual systems. The project will also analyse communications innovations occurring in remote communities and assess the possibilities for Indigenous industry development.

DP0879926 Dr CC Ticknor

Approved Project Title **Understanding Collisions of Cold Polar Molecules**

2008 : \$ 78,648

2009 : \$ 78,648

2010 : \$ 78,648

Primary RFCD 2403 ATOMIC AND MOLECULAR PHYSICS; NUCLEAR AND PARTICLE PHYSICS; PLASMA PHYSICS

APD Dr CC Ticknor

Administering Organisation Swinburne University of Technology

Project Summary

This project is in a high impact research field and therefore has several immediate and substantial national benefits. First, this project will directly raise the quality of Australian science in ultracold atomic physics, cold polar molecules physics, and quantum chemistry. Second, it will constitute high impact research from an Australian institute which will raise the recognition of the high quality Australian science. Third, it will further develop capabilities of the ARC Centre of Excellence for Quantum-Atom Optics (ACQAO). Fourth, this work will start high calibre international collaborations, most notably with a world renowned experimental group at Yale University among others.