

**New South Wales**

**The University of Newcastle**

**DP0878858** Dr SD Brown; A/Prof M Steyvers

**Approved Project Title** **A new kind of dynamics for psychology**

**2008 :** \$ 146,000  
**2009 :** \$ 126,000  
**2010 :** \$ 145,000  
**2011 :** \$ 120,000  
**2012 :** \$ 120,000

**Primary RFCD** 3801 PSYCHOLOGY

QEII Dr SD Brown

**Administering Organisation** The University of Newcastle

**Project Summary**

In order to remain efficient in real-world decisions, people must dynamically monitor and adjust their cognitive processes. This project aims to develop innovative methods and analyses for dynamics in experimental psychology, using standard paradigms in which task parameters are dynamically manipulated. The development of models of dynamic behaviour will advance the science of psychology and serve as a practical measurement tool for individuals.

**DP0881244** Dr SD Brown; A/Prof AJ Heathcote

**Approved Project Title** **Absolute identification and beyond: A comprehensive, integrated architecture for speeded choice**

**2008 :** \$ 42,000  
**2009 :** \$ 38,000  
**2010 :** \$ 40,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** The University of Newcastle

**Project Summary**

Absolute identification (AI) is an important field of study for both theoretical and practical reasons. Theoretically, advances in AI study shed light on fundamental memory and attentional limitations of human cognition. Practically, AI models a task that is useful and necessary in everyday life and the extensions we propose are similarly useful (e.g., a model of the confidence with which judgments are made). Apart from the epistemological benefits, the proposal will rebuild the role that Australian researchers have previously played in mathematical approaches to basic cognitive problems (including decision making and AI).

**DP0878724** Dr Z Chen

**Approved Project Title** **Biological pattern generator for control and optimization of locomotion systems**

**2008 :** \$ 80,000  
**2009 :** \$ 70,000  
**2010 :** \$ 70,000

**Primary RFCD** 2909 ELECTRICAL AND ELECTRONIC ENGINEERING

**Administering Organisation** The University of Newcastle

**Project Summary**

This proposal exploits the interdisciplinary nature of systems and control area and incorporates biology science. It is expected to generate a synergy between biology science and control engineering and to advance scientific understanding in both fields. The proposed research will have impact on new innovations in a variety of fields. This will bring economic benefits for Australia. It will help to develop engineers for industry who have team-oriented problem-solving skills in a multidisciplinary working environment. It will also stimulate students' intellectual curiosity into engineering and science through a series of innovative interdisciplinary research/educational activities.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878089** Prof LH Connor; A/Prof GA Albrecht; A/Prof NH Higginbotham

**Approved Project Title** **Climate change, place and community: An ethnographic study of the Hunter Valley, New South Wales**

**2008 :** \$ 135,000  
**2009 :** \$ 117,000  
**2010 :** \$ 90,000  
**2011 :** \$ 80,000

**Primary RFCD** 3703 ANTHROPOLOGY

**Administering Organisation** The University of Newcastle

### Project Summary

The project contributes to the National Research Priority of "An Environmentally Sustainable Australia" and the Priority Goal of "Responding to Climate Change and Variability." The interdisciplinary approach will advance social research on climate change in Australia, enhancing Australia's international profile in this crucial field. The research will contribute to public debates on policy initiatives relevant to global warming and climate change. The regional and community focus of the study has the potential to contribute valuable knowledge about adaptive practices at the local level that can be applied to other locations in Australia and overseas.

**DP0880351** Prof H Craig

**Approved Project Title** **Linguistic individuation in the plays of Shakespeare and his peers, 1576-1599**

**2008 :** \$ 64,000  
**2009 :** \$ 52,500  
**2010 :** \$ 56,486

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** The University of Newcastle

### Project Summary

The question of how differently each speaker or writer uses language is important in everything from plagiarism to the definition of artistic genius. The project makes Shakespearean drama before 1600 a definitive test case of this wider problem of individuality in language. Australians are inheritors of the Western tradition of individual self-determination and self-expression; the project will help clarify one of the main assumptions behind this tradition. Australia is also an inheritor of the English-language culture of which Shakespeare is a key element, and the project will enrich the understanding of this culture through new light on his beginnings.

**DP0881308** A/Prof PC Dastoor; Dr W Allison

**Approved Project Title** **Imaging with Neutral Atomic Beams: A Completely New Tool for Nanotechnology**

**2008 :** \$ 110,000  
**2009 :** \$ 99,000  
**2010 :** \$ 89,000

**Primary RFCD** 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

**Administering Organisation** The University of Newcastle

### Project Summary

The tantalising possibility of building an optical instrument that uses neutral atom beams to image surfaces, rather than light or electrons, has long been a goal of physical scientists across the world. This project aims to realise this goal using an elegantly simple design based on the concept of a pin hole camera. The successful development of this world-first instrument would represent a significant advance in helium atom microscopy and would significantly enhance the reputation of Australian science. Moreover, this project maintains the position of Australian researchers and students at the core of this emerging technology.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881419** Dr JA De Dona; Dr MM Seron  
**Approved Project Title** **Fault tolerant multisensor feedback control**  
**2008 :** \$ 50,000  
**2009 :** \$ 45,000  
**2010 :** \$ 40,000  
**Primary RFCD** 2301 MATHEMATICS  
**Administering Organisation** The University of Newcastle

### Project Summary

This project will advance knowledge by deepening the theoretical understanding of the interplay between multisensory data and feedback control mechanisms. It will also expand the tool sets of control engineering with innovative multisensory control designs. We see major benefits for Australia arising from this project both by enhancing its scientific reputation and by promoting technological advances in its industries and services. The project has potential to contribute to the National Research Priority area: Frontier Technologies for Building and Transforming Australian Industries, since it has direct impact on the relevant areas of biotechnology, information, communication technology, nanotechnology and sensor technology.

**DP0877633** Dr E Doran; Prof D Henry; Mr RN Moynihan  
**Approved Project Title** **Pharmaceutical Promotion: Productive or Problematic?**  
**2008 :** \$ 55,000  
**2009 :** \$ 95,000  
**Primary RFCD** 3212 PUBLIC HEALTH AND HEALTH SERVICES  
**Administering Organisation** The University of Newcastle

### Project Summary

Pharmaceutical promotion is an issue of importance for all Australians. Pharmaceuticals are central to maintaining the health of Australians and with factors such as an ageing population and technological advances the centrality of pharmaceuticals is likely to be consolidated. A major future challenge will be how to provide pharmaceuticals efficiently, equitably and sustainably. Problematic pharmaceutical promotion such as 'disease-mongering' potentially compromises PBS efficiency and threatens sustainability. The proposed project represents a significant empirical contribution to understanding the impact of pharmaceutical promotion on the PBS and will make a significant contribution towards making the PBS sustainable

**DP0878093** Dr PG Dwyer  
**Approved Project Title** **Veteran Culture and the Military Memoirs of the Revolutionary and Napoleonic Wars**  
**2008 :** \$ 40,000  
**2009 :** \$ 40,000  
**2010 :** \$ 11,098  
**Primary RFCD** 4301 HISTORICAL STUDIES  
**Administering Organisation** The University of Newcastle

### Project Summary

This project contributes to an understanding not only of veteran culture in early nineteenth-century France and Europe, but also of the ways in which veterans across western cultures assimilate, process and reconstruct memories of war. This necessarily will lead to a better understanding of role story-telling in the construction of national histories. In addition to offering new insights that will inform scholarship and teaching in the field history, it will also redress a significant gap in the international literature. The findings of this study thus assist in establishing Australian historical scholarship at the forefront of international research initiatives in memory, auto-biography and memoir writing.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881195** Prof GM Evans; Dr E Doroodchi

**Approved Project Title** **Force Interactions in Packed and Fluidised Beds at Micro-Scale Operation**

**2008 :** \$ 150,000

**2009 :** \$ 130,000

**2010 :** \$ 100,000

**Primary RFCD** 2918 INTERDISCIPLINARY ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Industrial processing in the 20th century was about increasing size to gain benefit from economies of scale. This century, the focus is on micro devices like lab-on-a-chip and high speed computer processors that deliver their product directly to the consumer. There are significant obstacles facing this new technology. Mixing is reduced due to laminar flow, and a large amount of energy is needed to move the fluid through such small devices. Particles are often added to improve mixing and heat transfer, but their presence adds to the energy requirements. This study will help us overcome these challenges.

**DP0881689** Prof M Fu

**Approved Project Title** **Design of Quantized Feedback for Robust Control Systems**

**2008 :** \$ 130,000

**2009 :** \$ 125,000

**2010 :** \$ 120,000

**Primary RFCD** 2903 MANUFACTURING ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Most modern machineries and industrial processes are manipulated using advanced control technologies. With the recent advances in information technology, more and more control systems operate over communications networks. However, the technologies used in these control systems are seriously lagging behind because they make little assumptions about problems in digital communications. These problems include sampling errors, quantization errors, transmission errors and transmission delays. The proposed research will develop a new control theory to address this issue. Our work will help Australia maintain a leading role in the area of control and give the Australian industry advantages in applying modern technologies in control and automation.

**DP0879594** Prof KP Galvin; Dr P Stevenson

**Approved Project Title** **Use of Parallel Inclined Channels to Enhance Foam Drainage in Ion Flotation**

**2008 :** \$ 120,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

This study is concerned with increasing the rates of foam drainage in flotation processes. The findings will have direct benefit in the field of ion flotation, and will be highly relevant to the flotation of high value minerals worth tens of billions of dollars annually. The Reflux Classifier, a device that employs the Boycott Effect to achieve a significant increase in the effective area of the vessel, will be used. This device has already attracted three national awards in the area of gravity concentration in mineral processing. The study is ideal for training new researchers, especially at the PhD level, given the importance of the field to Australia.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0881523** Dr P Geigenberger

**Approved Project Title** **Investigations of signals involved in redox-regulation of carbon storage**

**2008 :** \$ 136,000

**2009 :** \$ 127,000

**2010 :** \$ 113,000

**Primary RFCD** 2704 BOTANY

**Administering Organisation** The University of Newcastle

### Project Summary

This project seeks molecular understanding of signals optimising storage processes in plants in response to nutrient supply and environmental stress. Discovering regulatory signals that control carbon storage and yield will maintain Australia's international reputation in this field of research and may provide technical opportunities to improve crops in healthy or stressful environments. This is an issue of increasing importance especially in the context of global warming.

**DP0880092** A/Prof AP Holbrook; Prof SF Bourke

**Approved Project Title** **Modelling and validating an approach to maximise consistency in research thesis examination**

**2008 :** \$ 60,000

**2009 :** \$ 60,000

**2010 :** \$ 55,000

**Primary RFCD** 3301 EDUCATION STUDIES

**Administering Organisation** The University of Newcastle

### Project Summary

Australia seeks to be a world leader in research activity including research education and training. This is evident in the establishment of National Research Priorities, the Research Quality Framework and \$577m currently invested annually in research training. Thesis quality is a critical indicator of success, but universities globally have been grappling with ways to discriminate fairly and effectively between different levels and types of research theses. This study rises to the challenge and will lead in building, refining and testing a framework for reporting thesis quality that will enhance our own system of research training and model best practice internationally.

**DP0880994** Prof GJ Jameson

**Approved Project Title** **New process for mineral flotation**

**2008 :** \$ 300,000

**2009 :** \$ 250,000

**2010 :** \$ 250,000

**Primary RFCD** 2907 RESOURCES ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Flotation is an important process in the minerals industry, which underpins Australia's prosperity. Ore is first finely ground and suspended in water. Finer grinds need more energy. The energy used in grinding in Australia is 14 percent of the national electricity consumption. This project will lead to a flotation technology that can successfully process much coarser particles than current devices, with large savings in grinding energy, greenhouse gas emissions and water consumption. A case study of a large mine shows that, by increasing the initial grinding size from 100  $\mu\text{m}$  to 500  $\mu\text{m}$ , the new technology could cut grinding energy by 45 percent, the carbon dioxide emissions by the same amount, and the water consumption by a factor of five.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878430** Dr R Jeffrey

**Approved Project Title** **Quantification of the influence of bacteria and elevated nutrient levels on the corrosion of structural steels in seawaters**

**2008 :** \$ 30,000  
**2009 :** \$ 30,000  
**2010 :** \$ 30,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Much of Australia's steel infrastructure is along the coastline and prone to high levels of corrosion. Recent evidence suggests that marine corrosion is greater under the influence of bacteria and nutrients contained in water pollution. This is examined in detail in the project. It is of economic and environmental significance since a wide range of physical infrastructure may be involved, including tanks, pipelines, offshore platforms, ships, coastal structures, bridges and hazardous material containers. These structures are required to have long lifetimes and hence improved understanding of the deterioration mechanisms is essential for developing better corrosion protection, management and paint coatings.

**DP0877258** Dr SJ Johnson; Dr CM Kellett

**Approved Project Title** **Iterative coding for next generation networks**

**2008 :** \$ 130,000  
**2009 :** \$ 105,000  
**2010 :** \$ 100,000

**Primary RFCD** 2805 DATA FORMAT

**Administering Organisation** The University of Newcastle

### Project Summary

The demands on next generation telecommunication networks can be extrapolated from the increasing use of Voice Over IP (e.g., Skype), real-time streaming media (e.g., live sporting events), and downloaded movies (e.g., the iTunes Music Store). In this data-rich environment, it is necessary to utilise the network itself intelligently. This project draws together ideas from error correction and network coding to provide the technologies that will underpin next generation communication networks. With a focus on implementable technologies, this project presents significant potential for project outcomes to impact the Australian information economy, spawning new businesses, transforming established industries, and creating new jobs.

**DP0878873** Prof EM Kennedy; Prof BZ Dlugogorski; Prof JC Mackie; Prof AA Adesina; Dr H Yu

**Approved Project Title** **Process for treatment of fluorine-containing synthetic greenhouse gases**

**2008 :** \$ 300,000  
**2009 :** \$ 250,000  
**2010 :** \$ 250,000  
**2011 :** \$ 250,000  
**2012 :** \$ 175,000

**Primary RFCD** 2906 CHEMICAL ENGINEERING

APD Dr H Yu

**Administering Organisation** The University of Newcastle

### Project Summary

It is generally agreed that increasing levels of greenhouse gases in the atmosphere are leading to higher average atmospheric temperatures. This research pursues the development of an energy-efficient, non-destructive process for transforming fluorine-containing greenhouse gases (GHGs) into valuable and environmentally benign products. The application of research will lead to the development of a new non-destructive process and will benefit Australia, socially by reducing emission of GHGs and thus protecting the environment, and economically through licensing of the technology for treatment of the growing stockpiles of synthetic GHGs.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879039** Dr A Lattas

**Approved Project Title** **Government, Religion and the Problem of Moral Order in Contemporary Papua New Guinea**

**2008 :** \$ 71,944

**2009 :** \$ 59,432

**2010 :** \$ 71,432

**Primary RFCD** 3703 ANTHROPOLOGY

**Administering Organisation** The University of Newcastle

### Project Summary

Successful Australian international relations depend on understanding the popular culture within which neighbouring people formulate grievances and desires for change. PNG is physically close to Australia; it was an administered colony and today as a regional ally it receives much Australian aid. Many Australian organizations, companies and citizens reside in PNG. This project will provide accurate knowledge of how popular religious movements can provide a political language for voicing everyday expectations and grievances. Social and cultural changes can produce new perceptions of injustice that are voiced as a moral critique of present day government, where the future kingdom of God or of the dead is used as a point of ethical contrast.

**DP0880450** Dr K Mahata

**Approved Project Title** **Spectral analysis with selective harmonic emphasis**

**2008 :** \$ 65,000

**2009 :** \$ 60,000

**2010 :** \$ 55,000

**Primary RFCD** 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

**Administering Organisation** The University of Newcastle

### Project Summary

This project lies under ARC research priority area "Frontier Technologies for Building and Transforming Australian Industries". The signal processing algorithms to be developed in this project will be useful in many important practical applications, which include various bio-medical imaging modalities, beamforming, radar, sonar and target tracking using sensor arrays. The idea is to use the prior knowledge to enhance certain desired properties of the algorithms via intelligent processing. In this light the project also lies within the ARC research priority area of "Smart Information use".

**DP0878355** Dr EA McLaughlin; Dr DL Russell; Dr RL Robker

**Approved Project Title** **Cellular signals controlling oocyte activation**

**2008 :** \$ 90,000

**2009 :** \$ 90,000

**2010 :** \$ 90,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** The University of Newcastle

### Project Summary

This research will significantly advance our understanding of the basic biological processes that underpin the fertility rate of all mammals and are key to the immediate and future health and well-being of Australian landscape and society. Understanding the processes that maintain healthy quiescent oocytes over many years before activation and subsequent growth will enable development of methods of increasing productivity in domestic animals and enhancing fertility in endangered species. Knowledge of these cellular mechanisms will underpin biotechnology platforms necessary for novel methods of feral animal population control thus contributing at multiple levels to an economically sustainable Australia.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0880695** Prof WF Mitchell; A/Prof MJ Watts

**Approved Project Title** **Advancing spatial research by reconstructing Australia's economic geography**

**2008 :** \$ 55,000

**2009 :** \$ 45,000

**2010 :** \$ 50,000

**Primary RFCD** 3704 HUMAN GEOGRAPHY

**Administering Organisation** The University of Newcastle

### Project Summary

Significant National Benefits will arise: (a) Innovative and demanded spatial data based on the new economic geographies created will value-add to a current ARC LIEF project; (b) A newly created socio-economic atlas will enhance our understandings of regional Australia; (c) An understanding of the 'new regional geography of winners and losers' through new analyses of new spatial data; (d) Facilitating the development of spatially informed policies to enhance the capacity of citizens to participate in the socio-economic life of their communities; (e) Capacity building through skill transfers within the social science research community focused on spatial research and policy.

**DP0878706** Dr T Morrison

**Approved Project Title** **Isaac Newton's Temple of Solomon and his analysis of sacred architecture: An interpretation and discussion of Babson Manuscript 0434**

**2008 :** \$ 81,500

**2009 :** \$ 82,428

**2010 :** \$ 78,648

**Primary RFCD** 3101 ARCHITECTURE AND URBAN ENVIRONMENT

APD Dr T Morrison

**Administering Organisation** The University of Newcastle

### Project Summary

Babson Manuscript is an important Newtonian manuscript that contains significant cross disciplinary ideas. It requires a multi-disciplinary understanding and skills for its detailed evaluation. Interpretation and analysis of this significant Newtonian manuscript will advance Newtonian scholarship and will be a valuable resource for researchers of architectural history. This project has both academic and public outcomes. Recently there has been an increased interest in what is commonly perceived as 'ancient wisdom.' Solomon's Temple is one of the most revered ancient symbols. This project will make the history and ideas of this symbol more accessible to the public

**DP0881154** Em/Prof AW Roberts; Dr CA Wheeler; Dr W McBride

**Approved Project Title** **Passive Control of Dust Emissions from Belt Conveyor Systems**

**2008 :** \$ 100,000

**2009 :** \$ 100,000

**2010 :** \$ 80,000

**Primary RFCD** 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Belt conveyor systems are employed extensively to transport bulk materials in a great many industries, particularly those associated with mining and mineral processing. Belt conveyor installations are becoming longer and belt speeds significantly faster, resulting in increased dust emissions. An estimated 16 billion litres of water per annum is used by the Australian Black Coal Industry alone on dust suppression. This project will develop passive dust control technology, requiring no external energy or suppressants. This will be achieved through the development of numerical methods verified by rigorous experimental work. This will lead to significant cost savings, improved employee health and safety and reduced environmental impact.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878623** A/Prof D Sheng; Prof JP Carter

**Approved Project Title** **Unsaturated soil mechanics and risk assessment for mine waste management**

**2008 :** \$ 110,000

**2009 :** \$ 110,000

**2010 :** \$ 110,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Acid mine drainage from mine wastes has caused detrimental environmental impacts in Australia and is recognised as one of the largest environmental liabilities facing the mining industry. Mining companies have to lodge hundreds of million dollars in bonds for perpetual treatment of potential environmental impacts. Federal and state regulations require mine wastes being managed in accordance with the 'current best practicable technology', which generally requires the placement of a soil cover over a waste deposit. The outcome of this project can assist the design of cost-effective site rehabilitation plans, which are crucial for sustainable development of the Australian mining industry.

**DP0878636** A/Prof D Sheng; Prof SW Sloan

**Approved Project Title** **Pile and penetrometer analysis using computational contact mechanics**

**2008 :** \$ 170,000

**2009 :** \$ 160,000

**2010 :** \$ 140,000

**2011 :** \$ 130,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

The project will enable the fundamental aspects of pile and penetrometer behaviour to be addressed by modelling the entire installation/penetration process. Pile foundations are commonly used to support structures on soft soils and seabeds. Penetration tests are the main site characterisation tool used in geotechnical engineering. The numerical methods developed will result in more cost-effective design of displacement piles and more reliable interpretation of in-situ tests. The research outcomes will also benefit other engineering applications, such as the impact of projectiles on concrete structures.

**DP0881238** Prof SW Sloan

**Approved Project Title** **Stability of Underground Openings**

**2008 :** \$ 170,000

**2009 :** \$ 190,000

**2010 :** \$ 180,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Excavated openings such as tunnels and galleries play a key role in mining and civil infrastructure. This project will develop new solutions for predicting the stability of these openings in soil and rock, and will include the effects of anisotropy, fissuring, and inhomogeneity in both two and three dimensions. It will also study the interaction effects between adjacent openings, as well as the influence of different types of loading and boundary conditions. Where possible, the solutions will be presented in the form of dimensionless design charts for use by practising engineers. The outcomes of the project will lead to safer and more cost-effective designs for a wide variety of underground infrastructure

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0878979** Dr P Stevenson; Prof GM Evans

**Approved Project Title** **Transport phenomena in foam fractionation**

**2008 :** \$ 150,000

**2009 :** \$ 158,723

**2010 :** \$ 166,974

**Primary RFCD** 2901 INDUSTRIAL BIOTECHNOLOGY AND FOOD SCIENCES

**Administering Organisation** The University of Newcastle

### Project Summary

Foam fractionation has a number of immediate applications in mineral and food processing but its most exciting potential is as low cost alternative for recovering and purifying high value biosurfactants. These are materials used to stabilise interfaces in living systems, and can be used as antibiotics and antiviral agents. The affinity for biosurfactants to collect at an interface suggests that foam fractionation is an ideal process to concentrate valuable products. Clearly, a cost-effective and reliable method of enriching streams of biosurfactants will make their use even more attractive and will engender the development of more novel biomaterials, such as pepfactants.

**DP0878347** Prof MG Stewart

**Approved Project Title** **Stochastic Modelling of Structural Facade Damage and Occupant Safety Risks Due to Explosive Blast Loading**

**2008 :** \$ 120,000

**2009 :** \$ 100,000

**2010 :** \$ 100,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

The cost of providing blast protective measures to built infrastructure is immense and providing protective measures to potentially hundreds or thousands of existing buildings is immense and beyond the resources of government and society. The risk-based decision-making framework proposed herein allows damage and casualty risks to be quantified and compared in a rational and consistent manner, thus ensuring that risk mitigation is maximised given expenditure of limited resources. Clearly, maximising risk mitigation across a range of high risk buildings will minimise building damage, loss of life, business disruption and other economic and social impacts in the event of a severe bomb blast.

**DP0881247** Dr GJ Suaning; Dr SL Cloherty

**Approved Project Title** **Novel Neural Interfaces and Instrumentation for Stimulation and Monitoring of Retinal Activation in an Epiretinal Vision Prosthesis**

**2008 :** \$ 110,000

**2009 :** \$ 100,000

**2010 :** \$ 90,000

**Primary RFCD** 2915 BIOMEDICAL ENGINEERING

**Administering Organisation** The University of Newcastle

### Project Summary

Australia's reputation in medical neuroprostheses is second to none with the most notable example being the 'bionic ear' for the deaf. This research compliments that reputation by advancing science and engineering knowledge towards achieving a truly beneficial prosthesis for the blind, a 'bionic eye'. This research will also advance our capacity to address other areas of therapeutic medical implants including those for limb movement to the paralysed. Benefits to the community include the very real possibility of restoring some visual capacity to the blind thus improving their quality of life through improved mobility, social interaction, and mental health.

## Summary of Discovery Projects Proposals for Funding to Commence in 2008

**DP0879178** Dr J Zhao

**Approved Project Title** Micro-macro modelling of collapse problems in geomaterials by strain gradient plasticity

**2008 :** \$ 40,000

**2009 :** \$ 40,000

**2010 :** \$ 40,000

**Primary RFCD** 2908 CIVIL ENGINEERING

**Administering Organisation** The University of Newcastle

### **Project Summary**

The proposed research aims to improve our fundamental understanding of the collapse of geomaterials, which is directly related to the failure of offshore structures, mining operations, tunnels, cuttings and foundations. The advanced mathematical model developed will be capable of accurately predicting the collapse of geomaterials and will be founded on measurable microscopic information. The fruits of the research will be implemented in an advanced nonlinear finite element program, and will lead to safer and more cost-effective designs for a wide range of geostructures.