

New South Wales

The University of Sydney

FT0992302 Dr F Allon

Approved Project Title **The Wealth Effect: A cultural analysis of prosperity, financialisation and everyday life in contemporary Australia**

2009 : \$ 82,550
2010 : \$ 167,200
2011 : \$ 168,100
2012 : \$ 164,500
2013 : \$ 81,050

Primary RFGD 4203 CULTURAL STUDIES

Administering Organisation The University of Sydney

Project Summary

Financial and real estate markets are now central to Australian family life. But current government policies to individualise responsibility for saving and borrowing decisions often exceed the individual capacity to manage complex financial choices and unknown market risks. Growing levels of home and property ownership bring new benefits but they also increase exposure to economic downturn. For many households the Great Australian Dream of home ownership and prosperity has now turned into a nightmare. This project responds to the pressing need for greater understanding of these developments, and will advance our understanding of this new socio-economic terrain.

FT0992063 Dr MM Barbour

Approved Project Title **Novel laser isotopic techniques to assess the potential for water-use efficiency improvement of Australian crops**

2009 : \$ 98,600
2010 : \$ 197,200
2011 : \$ 197,200
2012 : \$ 197,200
2013 : \$ 98,600

Primary RFGD 2704 BOTANY

Administering Organisation The University of Sydney

Project Summary

This project aims to develop new methods to reduce the water used by grain crops while maintaining productivity by advancing knowledge of the regulation plant carbon gain and water loss. Novel laser-lased measurement systems developed and applied in this project will provide new mechanistic understanding of plant carbon-water dynamics for individual leaves and at the whole crop scale. Water availability is the most pressing environmental issue facing the Australian grain industry, so improvements in the efficiency with which water is used will have profound economic and environmental effects.

FT0992212 Dr K Belov

Approved Project Title **The genetics of resistance to devil facial tumour disease.**

2009 : \$ 85,800
2010 : \$ 171,600
2011 : \$ 171,600
2012 : \$ 171,600
2013 : \$ 85,800

Primary RFGD 2702 GENETICS

Administering Organisation The University of Sydney

Project Summary

Tasmanian devils are on the brink of extinction due to a new contagious cancer: Devil Facial Tumour Disease (DFTD). The aim of this project is to determine the genetic nature of DFTD resistance in order to directly contribute to the conservation management of this iconic and ecologically important species. This research will generate fundamental information about genetic diversity in Tasmanian devils and establish the feasibility of breeding resistant animals for release into the wild.

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0990730 Dr AD Corn

Approved Project Title **Indigenising the Semantic Web: Ontologies for Indigenous knowledge and heritage resources on a machine-readable Web**

2009 : \$ 85,800

2010 : \$ 171,600

2011 : \$ 171,600

2012 : \$ 171,600

2013 : \$ 85,800

Primary RFCD 4101 PERFORMING ARTS

Administering Organisation The University of Sydney

Project Summary

This project will put Australia at the forefront of international efforts to realise a functioning Semantic Web in which all data transactions are handled by machines talking to machines. It addresses the government's call for the creation of infrastructure and e-research tools that enable high-speed distributed access to Indigenous knowledge and culture resources, and its outcomes will revolutionise the way that these resources are managed, accessed and understood by users everywhere. Indigenous communities will benefit from increased protections for knowledge and heritage resources, and ability to access these in instantaneously customisable ways that promote wellbeing.

FT0992079 Dr AC Doherty

Approved Project Title **Quantum control in mesoscopic condensed matter systems**

2009 : \$ 98,600

2010 : \$ 197,200

2011 : \$ 197,200

2012 : \$ 197,200

2013 : \$ 98,600

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Administering Organisation The University of Sydney

Project Summary

Semiconductor devices are at the foundation of modern technology. Industrial nanofabrication techniques can now produce devices near the atomic scale, and state-of-the-art experiments have demonstrated the previously unimaginable ability to manipulate individual electrons. This project will develop new techniques to control such quantum circuits and couple them together to form useful devices. New experiments to test these schemes will be proposed. This project will provide a foundation for future information processing technologies such as quantum computers.

FT0992069 Dr PJ Franks

Approved Project Title **Past and future effects of climate change on the carbon-water balance of plants**

2009 : \$ 91,100

2010 : \$ 188,200

2011 : \$ 189,200

2012 : \$ 190,200

2013 : \$ 98,100

Primary RFCD 2799 OTHER BIOLOGICAL SCIENCES

Administering Organisation The University of Sydney

Project Summary

Over the coming century, climate change will profoundly impact Australian vegetation via the direct effects of elevated atmospheric carbon dioxide (CO₂) on plants and the indirect effects of CO₂-forced changes in rainfall and temperature, with major implications for agricultural production and water resources. This project will address these threats by providing new tools for measuring and predicting vegetation-climate feedbacks. It will determine the combined effects of elevated atmospheric CO₂ and drought on the productivity of natural and agricultural landscapes, and provide the biophysical framework for developing the next generation of high-yielding, drought tolerant crop varieties for the rapidly approaching greenhouse world.

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0992214 Dr G Gottwald

Approved Project Title **Stochastic Methods in Mathematical Geophysical Fluid Dynamics**

2009 : \$ 95,250
2010 : \$ 185,650
2011 : \$ 185,650
2012 : \$ 185,650
2013 : \$ 90,400

Primary RFCD 2301 MATHEMATICS

Administering Organisation The University of Sydney

Project Summary

The project will develop analytical and numerical methods for long-term weather forecasting and climate modelling. The project deals with the mathematical aspects and fundamental mechanisms underpinning numerical climate forecasting. The project will develop new methodology for accurate modelling of the important and dominant slow global processes without explicitly resolving the precise detail of the weather of each day at all scales. Using sophisticated mathematics, this project investigates how to parameterize the fast and small processes by using stochastic processes in a controllable and adaptive way.

FT0992123 Dr IM Harris

Approved Project Title **Seeing the forest and the trees: Cognitive and neural mechanisms underlying recognition of individual objects and sets**

2009 : \$ 85,800
2010 : \$ 170,775
2011 : \$ 168,250
2012 : \$ 166,550
2013 : \$ 83,275

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Sydney

Project Summary

When confronted with a set of similar objects, such as a crowd of faces or a flow of oncoming cars, human observers can rapidly and seemingly automatically extract summary statistics of these sets of objects (e.g., mean expression or location). This research will provide insights into how the human visual system executes this massive feat of computation. This represents a vital step in understanding vision in general and in eventually applying our knowledge to the development of artificial vision systems and to rehabilitation of visual disorders. The research will also investigate the effects of attentional load on perception of summary statistics of the environment, which is critical for tasks such as driving in busy traffic.

FT0990767 Dr AO Holcombe

Approved Project Title **Position perception, attention, object motion, and action**

2009 : \$ 78,320
2010 : \$ 162,748
2011 : \$ 153,598
2012 : \$ 137,000
2013 : \$ 67,830

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation The University of Sydney

Project Summary

The research will achieve a deeper understanding of the neural processing of the visual perception of position, and of the associated behavioural limits. This will provide a foundation for the development of a range of technologies to assist disabled and elderly people. The results will help reveal the link between the perception of moving objects and the capacity for visually guided movement. This link will benefit areas such as engineering of vehicles and road systems, and the design of telepresence systems. The first applications are likely to be in the rehabilitation of brain injury and the decline of mental function with age.

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0991246 Dr DJ Hunter
Approved Project Title **The early osteoarthritis (OA) phenotype**
2009 : \$ 85,800
2010 : \$ 167,850
2011 : \$ 152,350
2012 : \$ 140,600
2013 : \$ 70,300
Primary RFCD 3210 CLINICAL SCIENCES
Administering Organisation The University of Sydney

Project Summary

Australia like many other developed countries is undergoing a major demographic shift involving significant growth in the aged population. From both a patient perspective and a societal perspective, research into the underlying determinants of osteoarthritis such as those outlined in this proposal are of great importance to the aged population. Nearly one in five Australians has arthritis; indeed more Australians have arthritis than any other national health priority condition. From an individual point-of-view, the pain and disability due to osteoarthritis (OA) can lead to loss of independence and diminished in quality of life for older adults.

FT0991895 Dr BT Kuhlmeiy
Approved Project Title **Ringed photonic crystal fibres for broadband nonlinear optics**
2009 : \$ 85,800
2010 : \$ 171,600
2011 : \$ 171,600
2012 : \$ 171,600
2013 : \$ 85,800
Primary RFCD 2404 OPTICAL PHYSICS
Administering Organisation The University of Sydney

Project Summary

The technology developed from this project will enable organic molecules to be detected, identified and quantified. Because the technology is compact, easily engineered and low cost, it will lead to a dramatically increased capability for infrared spectroscopic measurement throughout biology and medicine, with specific benefits in agriculture, the food industry and defence.

FT0991861 A/Prof J Latimer
Approved Project Title **Innovative solutions to primary care management of back pain**
2009 : \$ 98,600
2010 : \$ 197,200
2011 : \$ 193,586
2012 : \$ 168,586
2013 : \$ 73,600
Primary RFCD 3212 PUBLIC HEALTH AND HEALTH SERVICES
Administering Organisation The University of Sydney

Project Summary

Each year in Australia over \$1billion is spent on low back pain treatment. Part of the reason for this massive expenditure is that back pain is extremely common. Most existing treatments involve highly skilled practitioners and considerable cost to the patient. This program of research will look at evaluating simple, low-cost care for patients with back pain. It will also consider the delivery of back pain care by community pharmacists, an approach not previously evaluated. Prevention of recurrent back pain will also be studied. Such methods of delivering care will provide enormous savings to the health system while still ensuring best practice care for the patient.

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0992081 Dr HY Liu

Approved Project Title **Fatigue Life Prediction of Nano-filler Modified Composites**

2009 : \$ 82,100
2010 : \$ 161,950
2011 : \$ 155,700
2012 : \$ 150,200
2013 : \$ 74,350

Primary RFCD 2914 MATERIALS ENGINEERING

Administering Organisation The University of Sydney

Project Summary

The proposed project aims to study the behaviour and the failure mechanisms of polymer nanocomposites under cyclic loading. The outcomes of the project will make original contributions to our knowledge base on such materials. The mechanics modelling and statistical analysis of the prediction of fatigue life will provide a sound physical basis and a useful tool for any future improvement and optimisation of the composites to achieve better reliability and integrity in their intended applications. This study will bring economic benefits to the end-users of advanced material technology including the Australian materials industries.

FT0991314 A/Prof AJ Martin

Approved Project Title **Academic Buoyancy and Academic Resilience: New Approaches to Examining and Understanding Adversity and Setback in the Academic Domain**

2009 : \$ 98,600
2010 : \$ 197,200
2011 : \$ 197,200
2012 : \$ 197,200
2013 : \$ 98,600

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation The University of Sydney

Project Summary

Although Federal & State/Territory governments inject millions of dollars into schools, multitudes of students fall short of their academic potential due to an inability to deal with academic adversity. Essentially, these students are not academically buoyant or resilient. This diminishes their personal capacity through life & ultimately Australia's capacity to compete globally. The proposed Research Program conducts a comprehensive analysis of academic buoyancy & resilience & the attributes pivotal to them. In so doing, it seeks to promote & maintain young people's good academic health. According to Australian authorities (eg. Australian Bureau of Statistics, The Ministerial Council on Education, Employment, Training and Youth Affairs), young people's academic health is vital to our nation's economic, cultural, & social success.

FT0990485 Prof Dr T Maschmeyer

Approved Project Title **Sustainable Solar Hydrogen Production from Waste Water**

2009 : \$ 111,400
2010 : \$ 222,800
2011 : \$ 222,800
2012 : \$ 222,800
2013 : \$ 111,400

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation The University of Sydney

Project Summary

The world energy demand, expected to triple by 2100, must be met from sustainable and non-polluting sources. Sunlight is the largest available carbon-neutral energy source, with enough energy striking the planet in one hour to satisfy our current requirements for about a year. With the novel catalysts designed in this project, we will use this energy to simultaneously generate hydrogen and destroy organic pollutants by oxidation. The hydrogen can then be used as a clean source of sustainable energy and the water recycled. Our climate, proximity to major economies of the future, and long commercial and research experience in solar energy make Australia an ideal location for a hydrogen production industry.

Summary of ARC Future Fellowships Proposals for Funding to Commence in 2009

FT0992291 Dr ME Thomas
Approved Project Title Expedition to Arnhem Land: Intercultural inquiry in a trans-national context
2009 : \$ 84,023
2010 : \$ 158,679
2011 : \$ 149,352
2012 : \$ 149,058
2013 : \$ 74,361
Primary RFCD 4203 CULTURAL STUDIES
Administering Organisation The University of Sydney

Project Summary

In terms of National Research Priorities, the project will encourage cultural health and cohesiveness in Arnhem Land by providing access to cultural property held until now in remote archives. It will enhance understanding of our region and the world by studying cross-cultural interactions within Australia. Furthermore, it will illuminate how Aboriginal territory and knowledge were used to shore up the Australia-US relationship at a formative historical moment.

FT0991918 Dr JY Yang
Approved Project Title New statistical methods for identifying micro-ribonucleic acid (miRNA) regulatory networks
2009 : \$ 80,800
2010 : \$ 151,600
2011 : \$ 151,600
2012 : \$ 151,600
2013 : \$ 70,800
Primary RFCD 2302 STATISTICS
Administering Organisation The University of Sydney

Project Summary

Understanding gene regulatory networks is critical in the understanding of fundamental biological systems. These networks have important implications for the discovery of fundamental mechanisms relating to the diagnosis and management of many illnesses. This research will provide new statistical methods to identify regulatory micro-ribonucleic acid modules and to understand their relationship in gene regulatory networks through multiple covariance estimation and multivariate classification techniques. My results should enable researchers to better understand the regulation underlying biological systems, leading to improved human health, medical and biological research outcomes.