

Summary of Successful ARC Future Fellowships Proposals for Funding to Commence in 2010 by State and Organisation

Queensland

The University of Queensland

FT100100469 Prof Dr Nicholas T Aroney

Approved Project Title **Reconceiving Australian federalism: fundamental values, comparative models and constitutional interpretation**

2010		\$110,014.00
2011		\$223,119.00
2012		\$222,806.50
2013		\$216,474.50
2014		\$106,773.00
Primary FoR	1801	LAW

FT3 Prof Dr Nicholas T Aroney

Administering Organisation The University of Queensland

Project Summary

Through systematic comparison with other federal systems, this project identifies the range of fundamental principles and values that could underlie the Australian system of government, explores their application to the interpretation of the Australian Constitution and scrutinises proposed reforms to the Australian system on the basis of that analysis.

FT100100427 Dr Thiruma V Arumugam

Approved Project Title **Novel pharmacological agents to target stroke-induced brain injury**

2010		\$88,319.00
2011		\$176,638.00
2012		\$176,638.00
2013		\$176,638.00
2014		\$88,319.00
Primary FoR	1115	PHARMACOLOGY AND PHARMACEUTICAL SCIENCES

FT1 Dr Thiruma V Arumugam

Administering Organisation The University of Queensland

Project Summary

There is a looming stroke epidemic in Australia. 72% of Australian stroke sufferers are over the age of 65 and whereas in 1997 only 12% of Australians were in that age group, by 2030 that number will have increased to 23%. There is an urgent need for novel therapies. This project will aid the development of a novel anti-stroke therapy.

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FT100100022	Dr Felicity Baker	
Approved Project Title	What's in the music? A lifespan model of emotional and musical creativity in therapeutic song writing	
2010		\$88,299.50
2011		\$172,014.50
2012		\$154,220.00
2013		\$138,698.50
2014		\$68,193.50
Primary FoR	1904	PERFORMING ARTS AND CREATIVE WRITING

FT1 Dr Felicity Baker
Administering Organisation The University of Queensland

Project Summary

Composing songs as a form of therapy is a recent innovation in music therapy practice. This study examines the health benefits of original song writing for people with varying debilitating health conditions and those adjusting to injury, trauma or pending death. The results of this study will improve health service and delivery by music therapists.

FT100100377	Dr Sureshkumar Balasubramanian	
Approved Project Title	Genomics of temperature response in plants	

2010		\$88,319.00
2011		\$175,700.50
2012		\$174,763.00
2013		\$174,763.00
2014		\$87,381.50
Primary FoR	0607	PLANT BIOLOGY

FT1 Dr Sureshkumar Balasubramanian
Administering Organisation The University of Queensland

Project Summary

Climate change is predicted to have negative impacts on Australian agriculture. This project will use genomic tools to uncover biological mechanisms for plant response to temperature that will help design crop varieties that are more tolerant to higher temperatures.

FT100100806	A/Prof Christine A Beveridge	
Approved Project Title	Strigolactone, a new plant hormone: its regulation, role and potential for plant improvement	

2010		\$87,899.00
2011		\$189,273.00
2012		\$202,873.00
2013		\$198,073.00
2014		\$96,574.00
Primary FoR	0607	PLANT BIOLOGY

FT2 A/Prof Christine A Beveridge
Administering Organisation The University of Queensland

Project Summary

This Project will investigate a new plant hormone, one of only 10 or so discovered to date in plants. This hormone regulates shoot number, water and nutrient uptake and the ability of shoots to generate roots and develop wood. The Project will produce genetic tools and describe new processes for applications in sustainable plant improvement.

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FT100100721 Dr Idriss Blakey
Approved Project Title **Smart magnetic resonance imaging (MRI) contrast agents: from early detection to assessment of drug delivery mechanisms**

2010		\$88,008.50
2011		\$176,234.00
2012		\$176,527.50
2013		\$176,599.50
2014		\$88,297.50
Primary FoR	0303	MACROMOLECULAR AND MATERIALS CHEMISTRY

FT1 Dr Idriss Blakey
Administering Organisation The University of Queensland

Project Summary

'Smart' contrast agents will be developed for enhancing the performance of magnetic resonance imaging (MRI) of diseases such as cancer by designing them to be triggered by biochemical markers for disease. This has the potential to aid in early detection which can lead to lower mortality rates and consequently a lower burden on the health system.

FT100100905 A/Prof Michael W Bromley
Approved Project Title **A study of ultracold atom interferometry and interactions through high-performance computing**

2010		\$86,319.00
2011		\$174,638.00
2012		\$174,638.00
2013		\$159,138.00
2014		\$72,819.00
Primary FoR	0206	QUANTUM PHYSICS

FT1 A/Prof Michael W Bromley
Administering Organisation The University of Queensland

Project Summary

This project involves a design and study of hyper-sensitive machines to detect changes in motion based on using clouds of atoms near absolute zero temperature. Matter at these ultracold temperatures can be harnessed to detect variations of both space and time, enabling novel quantum measurement devices to be built.

FT100100294 Dr Alexander F Broom
Approved Project Title **The changing landscapes of medical pluralism: a sociological analysis of patient experiences and decision making in Australia, India and Brazil**

2010		\$86,629.00
2011		\$155,036.00
2012		\$154,776.00
2013		\$173,188.00
2014		\$86,819.00
Primary FoR	1608	SOCIOLOGY

FT1 Dr Alexander F Broom
Administering Organisation The University of Queensland

Project Summary

This project examines the respective roles of biomedicine and traditional, complementary and alternative medicine in supporting health needs in Australia, Brazil and India. It will be the first sociological study to compare how different countries balance biomedical approaches to health with more alternative approaches.

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FT100100129 Dr Lynda A Cheshire
Approved Project Title **Transforming the outer suburbs through master planned estates: a governmental challenge**

2010	\$68,680.50
2011	\$156,496.50
2012	\$162,380.00
2013	\$141,612.50
2014	\$67,048.50
Primary FoR	1604 HUMAN GEOGRAPHY

FT1 Dr Lynda A Cheshire
Administering Organisation The University of Queensland

Project Summary

Master planned estates are becoming more common on the outer suburbs of capital cities and the developers of these estates are required to plan and manage a whole range of services. This project examines the role that private actors play in 'governing' suburban estates alongside traditional forms of government and the challenges that ensue.

FT100100476 Dr Richard J Clark
Approved Project Title **Development of effective peptide-based drugs**

2010	\$87,969.00
2011	\$176,228.00
2012	\$176,308.00
2013	\$176,308.00
2014	\$88,259.00
Primary FoR	0304 MEDICINAL AND BIOMOLECULAR CHEMISTRY

FT1 Dr Richard J Clark
Administering Organisation The University of Queensland

Project Summary

There is huge interest in the development of bioactive peptides and proteins for the treatment of a wide range of diseases. The aim of this research project is to develop potent and effective peptide-based drugs that are able to resist the body's natural degradation pathways so that they can reach their biological target and act as effective drugs.

FT100100027 Dr Brett M Collins
Approved Project Title **Defining the molecular mechanisms of intracellular protein trafficking**

2010	\$88,319.00
2011	\$168,283.00
2012	\$158,433.00
2013	\$155,233.00
2014	\$76,764.00
Primary FoR	0601 BIOCHEMISTRY AND CELL BIOLOGY

FT1 Dr Brett M Collins
Administering Organisation The University of Queensland

Project Summary

Intracellular trafficking of proteins is critical for normal cell function and defects can lead to many different human diseases. Outcomes from this project will lead to insights into how trafficking is regulated at the atomic level and will help place Australia at the forefront of international efforts to understand this essential process.

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FT100100976 A/Prof David A Copland
Approved Project Title **Optimising how the brain processes language in healthy and neurological populations**

2010		\$101,649.00
2011		\$203,298.00
2012		\$203,298.00
2013		\$203,298.00
2014		\$101,649.00
Primary FoR	1103	CLINICAL SCIENCES

FT2 A/Prof David A Copland
Administering Organisation The University of Queensland

Project Summary

This research will examine how the ability of the brain to process language can be modified by behavioural experiences, certain drugs and direct brain stimulation. The findings have the potential to reveal new ways to treat language disorders after brain injury or disease.

FT100100595 Dr Tamara M Davis
Approved Project Title **Dark matter, dark energy, and dark flow: galaxy motion reveals fundamental physics**

2010		\$75,508.00
2011		\$150,323.50
2012		\$147,107.00
2013		\$142,563.00
2014		\$70,271.50
Primary FoR	0201	ASTRONOMICAL AND SPACE SCIENCES

FT1 Dr Tamara M Davis
Administering Organisation The University of Queensland

Project Summary

The twin mysteries of dark matter and dark energy present a profound challenge to modern physics. Capitalising on new Australian technology to measure the motion of tens of thousands of galaxies, we will detect unseen matter by its gravitational influence and thus illuminate the nature of the dark components of the universe.

FT100100137 Dr Aijun Du
Approved Project Title **Electronic functionality in nanoscale materials: from discovery to design**

2010		\$77,509.00
2011		\$158,603.00
2012		\$163,603.00
2013		\$155,253.00
2014		\$72,744.00
Primary FoR	0204	CONDENSED MATTER PHYSICS

FT1 Dr Aijun Du
Administering Organisation The University of Queensland

Project Summary

This project will develop innovative multifunctional carbon/boron-nitride nanomaterials by devising new strategies to manipulate their electronic functionality. Outcomes will include technological breakthroughs leading to smart materials for energy storage, greenhouse gas emission reduction and nanoelectronics.

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FT100100113 Dr Bryan G Fry
Approved Project Title **Adaptive evolution of coleoid (cuttlefish, octopus, squid) venoms**

2010	\$99,477.00
2011	\$199,304.00
2012	\$199,654.00
2013	\$196,376.00
2014	\$96,549.00
Primary FoR	0604 GENETICS

FT2 Dr Bryan G Fry
Administering Organisation The University of Queensland

Project Summary

This project represents an opportunity for biodiscovery from the venoms of cuttlefish, octopuses and squids. The independent adaptation for venom active at the subzero Arctic and Antarctic polar waters is of particular evolutionary interest. However, their divergent, bioactive compounds are also a rich drug design resource.

FT100100165 Dr Benjamin M Hogan
Approved Project Title **Genetic analysis of lymphatic vascular development**

2010	\$87,601.50
2011	\$175,203.00
2012	\$175,203.00
2013	\$175,203.00
2014	\$87,601.50
Primary FoR	0604 GENETICS

FT1 Dr Benjamin M Hogan
Administering Organisation The University of Queensland

Project Summary

This project investigates the fundamental molecular components that regulate lymphatic vascular system development in the zebrafish embryo. Lymphatic vessels play critical roles in vascular diseases and cancer metastasis. This study will identify and examine key new molecules that will further our basic understanding of lymphatic development.

FT100100688 Dr Amanda M Keddie
Approved Project Title **Socially just schooling: a cross-cultural analysis of gender, cultural diversity and social change within Australia and the UK**

2010	\$85,701.50
2011	\$170,648.50
2012	\$171,298.50
2013	\$169,044.50
2014	\$82,693.00
Primary FoR	1699 OTHER STUDIES IN HUMAN SOCIETY

FT1 Dr Amanda M Keddie
Administering Organisation The University of Queensland

Project Summary

The study will examine issues of gender justice, cultural diversity and schooling. Through cross-cultural insight developed from analysis of schools in Australia and the UK, the study will enhance policy and practice associated with socially just schooling.

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FT100100285 Dr Karen V Kheruntsyan
Approved Project Title **Fundamental tests of quantum mechanics with ultracold atomic gases**

2010	\$100,049.00
2011	\$199,648.00
2012	\$194,848.00
2013	\$195,948.00
2014	\$100,699.00

Primary FoR 0206 QUANTUM PHYSICS

FT2 Dr Karen V Kheruntsyan
Administering Organisation The University of Queensland

Project Summary

The project seeks to make a breakthrough in our understanding of quantum 'entanglement' in large-scale systems of massive particles. Such systems can revolutionise precision measurement and lead to new quantum devices for gravitational and inertial sensing. The project will help position Australia among the world leaders in these developments.

FT100100654 Dr Dustin J Marshall
Approved Project Title **Understanding and predicting invasion in the sea: a mechanistic approach**

2010	\$87,680.50
2011	\$175,479.50
2012	\$173,396.00
2013	\$172,306.00
2014	\$86,709.00

Primary FoR 0501 ECOLOGICAL APPLICATIONS

FT1 Dr Dustin J Marshall
Administering Organisation The University of Queensland

Project Summary

Marine invasive species cost millions of dollars each year. This project aims to determine how and why invasive species outcompete native species around much of the coast of Australia. Identifying the conditions that help invasive species outcompete native species will help managers reduce the spread and impact of marine invasive species.

FT100100338 A/Prof Clive A McAlpine
Approved Project Title **Modelling the potential of large-scale revegetation to reduce the impacts of climate change in semi-arid Australia**

2010	\$101,649.00
2011	\$203,298.00
2012	\$203,298.00
2013	\$203,298.00
2014	\$101,649.00

Primary FoR 0501 ECOLOGICAL APPLICATIONS

FT2 A/Prof Clive A McAlpine
Administering Organisation The University of Queensland

Project Summary

This project will contribute to Australia's capacity to respond to climate change and to the ecologically sustainable management of our natural resources. It will provide a comprehensive understanding of the potential of large-scale revegetation to moderate climate change, and to identify limitations to adaptation.

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FT100100795 Dr Evan G Moore
Approved Project Title **Caged lanthanides for use in photo-dynamic therapy and near infra-red imaging**

2010		\$88,069.00
2011		\$173,888.00
2012		\$173,638.00
2013		\$175,888.00
2014		\$88,069.00
Primary FoR	1112	ONCOLOGY AND CARCINOGENESIS

FT1 Dr Evan G Moore
Administering Organisation The University of Queensland

Project Summary

The early detection and effective treatment of cancer are two critical factors which determine survivability. This project will provide improved drugs for photo-dynamic therapy and develop emissive probes for near infra-red imaging to allow better discrimination between healthy and diseased tissue and improve subsequent treatment.

FT100100708 Dr Celine V Nauges
Approved Project Title **Informing economic policies to enhance an efficient and sustainable use of water resources in a context of high uncertainty on future climate**

2010		\$97,029.00
2011		\$180,808.00
2012		\$173,808.00
2013		\$171,828.00
2014		\$81,799.00
Primary FoR	1402	APPLIED ECONOMICS

FT2 Dr Celine V Nauges
Administering Organisation The University of Queensland

Project Summary

The main purpose of this project is to assess how economic instruments can be used to improve water resources management in a context of uncertainty and climate change.

FT100100515 Dr Murray K Olsen
Approved Project Title **Manufacturing, controlling, manipulating and measuring continuous-variable quantum entanglement**

2010		\$72,779.00
2011		\$143,558.00
2012		\$144,198.00
2013		\$144,338.00
2014		\$70,919.00
Primary FoR	0206	QUANTUM PHYSICS

FT1 Dr Murray K Olsen
Administering Organisation The University of Queensland

Project Summary

Quantum entanglement is a feature of the quantum world which results in objects, which once interacted, remain interlinked even when separated by vast distances. We are approaching the stage where this so-called "spooky action at a distance" will be technologically useful. This project aims to place Australia at the front of quantum entanglement research.

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FT100100662 A/Prof Mark A Schembri
Approved **How bacteria cause disease in the urinary tract**
Project Title

2010		\$101,649.00
2011		\$203,298.00
2012		\$203,298.00
2013		\$203,298.00
2014		\$101,649.00
Primary FoR	1108	MEDICAL MICROBIOLOGY

FT2 A/Prof Mark A Schembri
Administering Organisation The University of Queensland

Project Summary

This project will investigate the virulence properties of uropathogenic Escherichia coli, the major causative agent of urinary tract infections (UTI) in humans. The results will help to understand how these bacterial pathogens cause disease and will impact strategies aimed at the prevention and treatment of chronic and recurrent UTI.

FT100100657 Dr Matthew J Sweet
Approved **Toll-like receptors in infectious and inflammatory diseases: the double-edged sword of innate immunity**
Project Title

2010		\$88,249.00
2011		\$176,498.00
2012		\$176,498.00
2013		\$176,498.00
2014		\$88,249.00
Primary FoR	1107	IMMUNOLOGY

FT1 Dr Matthew J Sweet
Administering Organisation The University of Queensland

Project Summary

The innate immune system is the first line of defence against invading microorganisms. This project will explore the role of specific innate immune genes in the control of infections and the development of inflammatory diseases.

FT100100725 A/Prof Bruno vanSwinderen
Approved **Perceptual suppression mechanisms in the Drosophila brain**
Project Title

2010		\$101,649.00
2011		\$203,298.00
2012		\$203,298.00
2013		\$203,298.00
2014		\$101,649.00
Primary FoR	0604	GENETICS

FT2 A/Prof Bruno vanSwinderen
Administering Organisation The University of Queensland

Project Summary

This project will investigate common processes underlying three means to losing conscious perception: selective attention, sleep and general anaesthesia. By studying these suppression mechanisms in a genetic model, the fly *Drosophila melanogaster*, fundamental processes will be highlighted that are required in the brain for maintaining perception in general.

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FT100100970	Prof Ajayan Vinu	
Approved Project Title	Design of novel nanoporous semiconductor materials for clean environment and energy	
2010		\$114,979.00
2011		\$229,958.00
2012		\$229,958.00
2013		\$229,958.00
2014		\$114,979.00
Primary FoR	0303	MACROMOLECULAR AND MATERIALS CHEMISTRY

FT3 Prof Ajayan Vinu
Administering Organisation The University of Queensland

Project Summary

This project will develop a low cost nanoporous semiconductor device for the capture and conversion of CO₂ into fuels by using water and sunlight. This novel approach will deliver a low cost technology that offers clean energy and will help to mitigate global warming.

FT100100020	A/Prof Guy M Wallis	
Approved Project Title	Mechanisms of learning at the interface between perception and action	

2010		\$100,950.50
2011		\$202,204.50
2012		\$202,373.00
2013		\$198,248.00
2014		\$97,129.00
Primary FoR	1702	COGNITIVE SCIENCE

FT2 A/Prof Guy M Wallis
Administering Organisation The University of Queensland

Project Summary

Using the latest in brain imaging and simulator technology, this project will advance understanding of how experience shapes the visual centres of our brain. It will also support partnerships with construction, mining and health services by developing real and virtual machine interfaces and tools to enhance the outcome of simulator-based training.

FT100100502	A/Prof Stephen R Williams	
Approved Project Title	Operation of nerve cell networks in the neocortex	

2010		\$101,649.00
2011		\$203,298.00
2012		\$203,298.00
2013		\$203,298.00
2014		\$101,649.00
Primary FoR	1109	NEUROSCIENCES

FT2 A/Prof Stephen R Williams
Administering Organisation The University of Queensland

Project Summary

In humans, intellectual disabilities occur when nerve cells in the neocortex, the most complicated area of the brain, fail to function correctly. The goal of this project is to understand how neocortical areas communicate and how changes in the structure of neurons disturb their function; work that will lead to a better understanding of the operation of the neocortex.

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FT100100413	Dr Kerrie A Wilson	
Approved Project Title	Prioritising habitat restoration for biodiversity and ecosystem service outcomes	
2010		\$87,916.50
2011		\$175,756.50
2012		\$175,352.50
2013		\$158,907.00
2014		\$71,394.50
Primary FoR	0502	ENVIRONMENTAL SCIENCE AND MANAGEMENT

FT1 Dr Kerrie A Wilson
Administering Organisation The University of Queensland

Project Summary

An emerging carbon market will provide funds for habitat restoration over the coming decades, but this will only be realised through careful prioritisation and planning. This research will prioritise investments in habitat restoration in order to cost-effectively achieve biodiversity conservation and ecosystem service protection goals.

FT100100879	A/Prof Xiu Song G Zhao	
Approved Project Title	Carbon-based electrode materials for electrochemical energy storage and water desalination	
2010		\$114,979.00
2011		\$229,958.00
2012		\$229,958.00
2013		\$229,958.00
2014		\$114,979.00
Primary FoR	0306	PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

FT3 A/Prof Xiu Song G Zhao
Administering Organisation The University of Queensland

Project Summary

Clean energy and water resource are two critical issues for an environmentally sustainable Australia. The research project will lead to the discovery of innovative carbon-based electrode materials with well-designed physical and chemical properties for clean energy storage and alternative water desalination technology.