

Victoria

Monash University

FT0991840 Dr SR Batten

Approved Project Title **Building Advanced Materials from the Bottom Up**

2009 : \$ 111,375
2010 : \$ 222,150
2011 : \$ 220,300
2012 : \$ 220,900
2013 : \$ 111,375

Primary RFCD 2502 INORGANIC CHEMISTRY

Administering Organisation Monash University

Project Summary

This proposal will result in new advanced materials with a range of useful properties, such as storage or trapping of gases such as hydrogen (for use in environmentally friendly transportation), methane and carbon dioxide (for pollution control), magnetic switching (with potential applications such as molecular sensors or data storage), new bulk and discrete nanometer sized magnets, and new liquids with novel solvent properties. These will be constructed from carefully designed polymeric materials and unusual nanometer sized molecules. This proposal will also enable the applicant to develop and enhance overseas collaborations, particularly with a number of research groups in the emerging economy of China.

FT0991199 Dr JS Broad

Approved Project Title **Mary Astell (1666-1731): An Historical-Intellectual Role Model for Women in Philosophy**

2009 : \$ 68,100
2010 : \$ 138,900
2011 : \$ 136,600
2012 : \$ 131,600
2013 : \$ 65,800

Primary RFCD 4401 PHILOSOPHY

Administering Organisation Monash University

Project Summary

Mary Astell was an early modern English philosopher of exceptional eloquence and skill. This project will produce the first overview of her philosophical thought, the first authoritative critical edition of her magnum opus, and the first assessment of her philosophical relevance today. These outputs have the potential to encourage women's participation in philosophy and in intellectual life more generally, outcomes that would be of tremendous benefit to Australia's social and economic fabric. The project will also enhance Australia's already outstanding scholarly reputation for early modern studies and the history of women's ideas.

FT0991598 Dr DK Galloway

Approved Project Title **High-energy probes of dense matter and distorted spacetime**

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

Primary RFCD 2401 ASTRONOMICAL SCIENCES

Administering Organisation Monash University

Project Summary

This is an ambitious but achievable program with the potential for results which will be highly significant to physicists worldwide. The expected outcomes have the potential to alter our understanding of fundamental physics, and will demonstrate that Australia's high-energy research ability is on par with the world's best. The techniques of X-ray astronomy are increasingly a standard part of the professional astronomer's toolkit, although Australia has a limited track record in recent years. The international collaborations that this project will build and maintain will help to improve access to, and utilisation of, multi-million dollar international satellite observatories by local observers.

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

FT0991036 Dr CR Hutchinson

Approved Project Title **Dynamically responding metals: a new generation of engineering alloys**

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

Primary RFC 2913 METALLURGY

Administering Organisation Monash University

Project Summary

The manufacture of engineering metals is a major Australian industry and the worldwide metal manufacturing sector is estimated to be worth \$1 trillion USD per annum. Advanced materials and, particularly the light metals, are both designated national research priority areas. The availability of new classes of metals with greatly improved combinations of properties will profoundly affect not only metal use by existing industry, through the introduction of new, stronger and safer metal grades, but also allows for new engineering designs which will lead, for example, to lighter and more efficient automobiles and more sustainable construction.

FT0991045 A/Prof GM Martin

Approved Project Title **A Bayesian State Space Methodology for Forecasting Stock Market Volatility and Associated Time-varying Risk Premia**

2009 : \$ 102,400
2010 : \$ 204,800
2011 : \$ 212,300
2012 : \$ 212,300
2013 : \$ 102,400

Primary RFC 3404 ECONOMETRICS

Administering Organisation Monash University

Project Summary

Accurate prediction of stock market volatility is critical for effective financial risk management. Along with information on volatility embedded in historical stock market returns, the prices of options written on the underlying stocks also reflect the option market's assessment of future volatility. This project will exploit this dual data source in a completely new way, using it to produce forecasts of both volatility itself and the premia factored into asset prices as a result of traders' perceptions of volatility risk. State-of-the-art statistical methods will be used to produce up-dates of the probability of extreme volatility and/or extreme risk aversion, as new market data becomes available each trading day.

FT0991248 Dr A Mazumdar

Approved Project Title **Origins of our Universe**

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

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

Administering Organisation Monash University

Project Summary

The present proposal will study the origins of our Universe, which is one of the grand challenges of 21st century physics. As such it will utilise insights and discoveries in many areas of physics, ranging from string theory and particle physics at the highest energies, to x-ray, optical and radio astronomy. The research program will add to our understanding of a fundamental branch of science - extending it in new directions - thereby considerably boosting the quality of cosmology and theoretical physics research in Australia. In concert with our international collaborations, work arising from this fellowship will enhance the Australian presence on the international cosmology, astro-particle, and theoretical physics scene.

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

FT0990681 Dr PG Ranjith

Approved Project Title **An assessment of carbon dioxide storage capacity of water bearing sedimentary basins**

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

Primary RFCD 2907 RESOURCES ENGINEERING

Administering Organisation Monash University

Project Summary

Dealing with the problems caused by climate change and global warming is among the greatest challenges facing Australia today. One of the approaches being considered to minimise anthropogenic influence over climate is the geo-sequestration of carbon dioxide (CO₂). The proposed project will lead to greater understanding of storage capacity of sedimentary basins and identification of optimum injection conditions for geo-sequestration in such aquifers, and any potential mechanisms that could lead to migration of CO₂ from the source rock back to the atmosphere. This will contribute to national efforts to reduce global warming, safeguard the Australian economy, and allow continued electricity generation from coal-fired plants.

FT0990986 Dr JT Smith

Approved Project Title **Masterminding Reproduction: Kisspeptin and RFamide-Related Peptide**

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

Primary RFCD 3207 NEUROSCIENCES

Administering Organisation Monash University

Project Summary

There are a number of concerning trends in reproductive health. Women are reporting difficulty conceiving and maintaining pregnancies; while sperm count and quality are declining in men. More concerning is the increase in reproductive cancers. Gonadotropin-releasing hormone (GnRH) antagonist and agonist have been used for decades to treat reproductive cancers (such as breast cancer and prostate cancer), infertility and precocious puberty. Kisspeptin and RF-related peptide may offer more physiological alternatives to GnRH, without detrimental side effects. We will fully explore these two newly defined and major players in reproduction and provide a physiological framework for their progression to clinical use.

FT0991356 Dr B Winther-Jensen

Approved Project Title **Electro-Catalytic Conjugated Polymers**

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

Primary RFCD 2501 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Administering Organisation Monash University

Project Summary

The Future Fellowship will tackle some of the challenging issues regarding the conversion of our society into a post-petroleum era through: Development and understanding of a new class of catalysts for efficient conversion and storage of energy. Developing cheap and effective electrodes structures for next generation transport and storage technologies i.e. fuel-cells for cars and flexible solar-cells for electricity production. Collaborating at an international level with leading groups in the sustainable energy field. These outcome will contribute to National Research Priorities 2; Frontier Technologies for building and transforming Australian Industries and 1; An Environmentally Sustainable Australia

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

FT0990695 Dr J Zhang

Approved Project Title **Three Dimensional Anti-biofouling Conducting Polymer Hydrogel Electrodes for Biosensor and Biofuel cell Applications**

2009 : \$ 85,800

2010 : \$ 171,600

2011 : \$ 171,600

2012 : \$ 171,600

2013 : \$ 85,800

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Administering Organisation Monash University

Project Summary

Exploitation of advances in nanotechnology, electrochemical technology, biosensor, biofuel cell and material science are important to Australia's prosperity from a societal industrial perspective. Currently, research in this field is being actively conducted around the world due to their huge potential for commercial applications. Therefore, through the development of new principles and concepts, and the synthesis of newly designed materials, this project will bring significant benefits in improving the efficiency of these devices and to promote Australian leadership in the field of medical devices and alternative energy generation.

FT0991010 Dr L Zhang

Approved Project Title **Generation of Ultra-Clean Fuel from Victorian Brown Coal and Its Oxygen-Enriched Combustion Characteristics**

2009 : \$ 85,800

2010 : \$ 171,600

2011 : \$ 171,600

2012 : \$ 171,600

2013 : \$ 85,800

Primary RFCD 2999 OTHER ENGINEERING AND TECHNOLOGY

Administering Organisation Monash University

Project Summary

Completion of this project can significantly contribute to the national priority of developing alternative energy technologies and ecologically sustainable power generation systems, as well as provide solutions to reduce and capture greenhouse gas emissions during Victorian brown coal firing. Improvements in the quality of Victorian brown coal and its value in national/international trade markets can be achieved through the generation of ultra-clean fuel from coal. Substitution of ultra-clean fuel for Victorian brown coal in energy industries would greatly improve the competitiveness of the Victorian economy in a carbon-constrained future, and ensure power generation near-zero emissions.