

# Summary of Discovery Projects Proposals for Funding to Commence in 2010

## Victoria

### La Trobe University

**DP1092668** Prof EL Bavin; Dr C Dissanayake; Dr EJ Kidd; Prof M Prior

**Approved Project Title** **Language processing in children with high functioning autism: Evidence from eye tracking**

**2010 :** \$ 85,000

**2011 :** \$ 35,000

**2012 :** \$ 30,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** La Trobe University

#### Project Summary

The language abilities in people with autism predict their response to intervention and their cognitive outcome. Young children with autism with poor language abilities are severely disadvantaged. Yet we understand little about what impedes their language development and their interpretation of what others say. The research findings will make a significant contribution by enriching our understanding of why and how comprehension may go astray, as well as helping us to identify subgroups within the autism population.

**DP1096783** Prof JM Brett

**Approved Project Title** **The Enigmatic Mr Deakin**

**2010 :** \$ 46,000

**2011 :** \$ 22,000

**2012 :** \$ 38,000

**Primary RFCD** 4301 HISTORICAL STUDIES

**Administering Organisation** La Trobe University

#### Project Summary

A new single volume biography of Alfred Deakin will make this most intriguing and influential of Australia's early Prime Ministers available to contemporary readers (including politicians, policy makers, journalists, teachers, broadcasters, and the politically engaged public). It will re-enliven his place in Australians' political memory and imagination so that knowledge of his achievements and limitations will inform the choices facing contemporary Australia and enlarge their understanding of the possibilities of politics. It will also provide the basis for further exploration of his life and influence in other media, such as film, television and radio.

**DP1094578** Dr MG Jackson; Prof BA Davey; Prof RN McKenzie; Dr TM Niven; A/Prof C Szabo; Prof Dr MV Volkov

**Approved Project Title** **Complexity in Algebra and Algebra in Complexity: the role of finite semigroups and general algebra**

**2010 :** \$ 85,000

**2011 :** \$ 85,000

**2012 :** \$ 85,000

**Primary RFCD** 2804 COMPUTATION THEORY AND MATHEMATICS

APD Dr TM Niven

**Administering Organisation** La Trobe University

#### Project Summary

Algebra and logic form the mathematical framework for expressing and analysing algorithms and their difficulty. We can then scientifically analyse what makes some tasks more difficult than others. This project unifies parallel areas of algebra to focus on two key topics at this interface between algebra and computational complexity. As a flow on, our work can uncover new algorithms for solving constraint problems and for the study of formal languages.

With a team of top international researchers developing new interactions between mathematics and the study of algorithms, the project will foster a culture of innovation and bring Australia into the play in this internationally competitive area.

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**DP1093518** Dr AG Maier; Dr M McKenzie; A/Prof PA Buffet

**Approved Project Title** **Biogenesis of red blood cell membrane modifications by the malaria parasite Plasmodium falciparum**

**2010 :** \$ 121,000

**2011 :** \$ 105,000

**2012 :** \$ 105,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** La Trobe University

### Project Summary

Malaria is not only a major global health problem, but also affects countries neighbouring Australia like Indonesia, reducing the region's stability and prosperity. Environmental changes and increased mobility of people (aid and military personnel) make Australia itself more prone to malaria. The project will translate recent genomic data into functional insights using frontier technology to identify new intervention targets for Plasmodium falciparum infection. Developing novel targets is mandated by humanity, but also to safeguard Australia's region against the social and economic implications of this disease. An Australian developed intervention would increase the global visibility of its science, leading to increased investments.

**DP1093811** Dr SK Martin

**Approved Project Title** **Cities of Words: Women's cultures of reading and writing in colonial Melbourne and beyond.**

**2010 :** \$ 100,000

**2011 :** \$ 80,000

**2012 :** \$ 86,000

**Primary RFCD** 4202 LITERATURE STUDIES

**Administering Organisation** La Trobe University

### Project Summary

This project will promote community awareness of the honour bestowed upon Melbourne and Australia by the United Nations, by uncovering the foundations of Melbourne's literary cultures and situating them nationally and internationally. By showing that Melbourne has ever been a city of words it will provide impetus for present and future literary activity, and enhance the understanding of the cultural life of the city and the country. It takes part in an international conversation about the transcultural importance of books, reading and writing, staking a claim for Melbourne, and Australia, in the global exchange of ideas.

**DP1093001** Prof TA Murray; Asst Prof SE Lawrence; A/Prof AJ May; Dr SC Hayes; Dr LE Young

**Approved Project Title** **Suburban archaeology: approaching an archaeology of the middle class in 19th century Melbourne**

**2010 :** \$ 220,000

**2011 :** \$ 205,000

**2012 :** \$ 206,000

**Primary RFCD** 4302 ARCHAEOLOGY AND PREHISTORY

APD Dr SC Hayes

**Administering Organisation** La Trobe University

### Project Summary

This project has three main benefits. First, it will help Australians understand more about the richness and diversity of urban experience in the country, thereby enhancing the heritage value of Museum collections drawn from urban archaeological sites. Second, by focusing on the historical archaeology of the emergent middle class in Australia we will improve our understanding of the history of Australian society during a crucial period. Last, it will enrich the social and cultural histories of Australia through a deeper and closer integration of archaeological and written historical information.

## Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1093909** Prof RS Norton; Dr BJ Smith; Prof GK Chandy; Dr MW Pennington

**Approved Project Title** **Evolution of a protein fold from toxin to physiological regulator: an endogenous potassium channel blocker in humans**

**2010 :** \$ 120,000

**2011 :** \$ 110,000

**2012 :** \$ 110,000

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**Administering Organisation** La Trobe University

### Project Summary

A potassium channel blocking peptide employed by sea anemones as a toxic component of their venom is also found in proteins from a number of higher organisms, including man. In most of these proteins the function of this toxin domain is unknown. This project aims to define the structure and function of this domain in a human protein, matrix metalloprotease 23, which has possible roles in prostate and other cancers. Our results will not only be of interest in tracing the structural and functional evolution of this toxin domain but will also provide valuable clues to its role in both the normal physiological function of matrix metalloprotease 23, as well as its potential pathological role in cancer.

**DP1094212** Prof RS Norton; Dr JB Baell; Asst Prof G Bulaj; Prof BM Olivera

**Approved Project Title** **New analgesics based on  $\mu$ -conotoxins: structure-based design of helical mimetics**

**2010 :** \$ 120,000

**2011 :** \$ 110,000

**2012 :** \$ 120,000

**Primary RFCD** 3203 MEDICAL BIOCHEMISTRY AND CLINICAL CHEMISTRY

**Administering Organisation** La Trobe University

### Project Summary

Diseases in which voltage-gated sodium channels are implicated are contributors to morbidity and mortality in the Australian population, and this project promises to provide new leads for the future development of drugs to treat such diseases, in particular analgesics for the treatment of chronic pain. The generation of these leads will entail the development of new approaches to mimicking key regions of peptides and proteins in drug-like molecules. This is a highly interdisciplinary project, spanning structural biology, molecular design, medicinal chemistry, molecular biology and electrophysiology, and the training of PhD graduates with such broad experience represents another national benefit of the project.

**DP1095656** Prof SJ Paxton; A/Prof JM Mond; Prof PJ Hay; Prof B Rodgers

**Approved Project Title** **Paving the way for effective public health interventions for bulimic eating disorders: Understanding stigma and mental health literacy**

**2010 :** \$ 74,000

**2011 :** \$ 70,000

**2012 :** \$ 70,000

**Primary RFCD** 3801 PSYCHOLOGY

**Administering Organisation** La Trobe University

### Project Summary

This research contributes to promoting and maintaining good health. The burden of bulimic eating disorders in the community is high, frequently ignored and increasing. Our research will pave the way for improved understanding of eating disorders and a reduction of stigma in relation to these problems. In so doing, it will lead to reduced shame and suffering for people with eating disorders and enhance appropriate treatment seeking and the quality of advice received from family, friends and health professionals. A public health intervention based on our findings will contribute to a more tolerant and understanding community.

## Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1096960** Dr SV Petelina  
**Approved Project Title** **The coldest region on Earth gets even colder**  
**2010 :** \$ 40,000  
**2011 :** \$ 30,000  
**2012 :** \$ 25,000  
**Primary RFCD** 2606 ATMOSPHERIC SCIENCES  
**Administering Organisation** La Trobe University

### Project Summary

Studying the observable atmospheric indicators of climate change is of national interest and importance. It strengthens the Australia's participation and further recognition in this research area. This project adds to the Australia's contribution to fundamental atmospheric physics and complements work carried out by other Australian researchers. Australian science further benefits from satellite data access and analyses skills. Development of international collaborations in this research area and involvement in several international satellite projects is important for future national atmospheric and space programs. Postgraduate training in this area provides expertise needed at many Australian organisations.

**DP1095044** A/Prof GE Prince; Prof P Broadbridge  
**Approved Project Title** **New Geometric and Entropy Techniques for Differential Equations**  
**2010 :** \$ 65,000  
**2011 :** \$ 65,000  
**2012 :** \$ 65,000  
**Primary RFCD** 2301 MATHEMATICS  
**Administering Organisation** La Trobe University

### Project Summary

The three main practical outcomes of this mathematical research will be better predictability of salt movement responsible for land degradation, better predictability of surface evolution of microelectronic components in nanoscale technology and an open source computer package that harnesses new and powerful geometrical techniques to solve differential equations. The project will train the next generation of researchers in the mathematical modelling of critical physical processes and it will bring international experts to Australia to work on these vital problems.

**DP1096931** Prof DG Stephenson  
**Approved Project Title** **Cross-bridge cycling-dependent activation of force production in the absence of Ca<sup>2+</sup> in fast- and slow-twitch skeletal muscle fibre types**  
**2010 :** \$ 100,000  
**2011 :** \$ 100,000  
**2012 :** \$ 100,000  
**Primary RFCD** 2706 PHYSIOLOGY  
**Administering Organisation** La Trobe University

### Project Summary

The project will contribute new knowledge about how skeletal muscle works, which will be published in top international journals in biological sciences. This will increase the reputation of Australian science in muscle research and will have the potential to benefit Australian people and Australian athletes. The project will also provide several Australian research students the opportunity to develop sophisticated laboratory and reasoning skills.

## Summary of Discovery Projects Proposals for Funding to Commence in 2010

**DP1092966** Dr N Stern; Dr KE Fitzsimmons; Prof CV Murray-Wallace

**Approved Project Title** **Human responses to long term landscape and climate change in the Willandra Lakes World Heritage Area**

**2010 :** \$ 220,000

**2011 :** \$ 214,000

**2012 :** \$ 218,000

**Primary RFCD** 2601 GEOLOGY

**APD** Dr KE Fitzsimmons

**Administering Organisation** La Trobe University

### Project Summary

A multi-disciplinary research endeavour that includes the Traditional Tribal Groups from the Willandra Lakes World Heritage Area will investigate the impact of past global climate change on a fragile, semi-arid ecosystem in the continent's southeast. It will document the strategies that Indigenous Australians employed to accommodate large-scale changes in landscape and environment. This work will result in the first integrated account of human and landscape history for an area that has attracted international attention since it was inscribed on the World Heritage register in 1981.

**DP1094973** Dr D Stojanovski; Dr MT Ryan; Prof N Pfanner

**Approved Project Title** **Transporting proteins to and within mitochondria**

**2010 :** \$ 114,182

**2011 :** \$ 107,083

**2012 :** \$ 107,083

**Primary RFCD** 2701 BIOCHEMISTRY AND CELL BIOLOGY

**APD** Dr D Stojanovski

**Administering Organisation** La Trobe University

### Project Summary

Mitochondria are found in all of our cells and are essential for life. They act like a nuclear power plant, providing the bulk of energy - but they can also kill the cell if the mitochondrial wall (membrane) is opened. Mitochondria contain about 1000 different proteins to function properly but almost all of them are made outside the compartment and must squeeze in through narrow membrane channels. This project will provide new insights into how proteins get into mitochondria and what factors help in this process. Besides providing new information about a process that is essential for life, the project will train students in molecular cellular biology techniques and will help foster strong international collaborations.

**DP1092501** Prof DL Vaux

**Approved Project Title** **Creation of a non-venomous honey bee**

**2010 :** \$ 65,000

**2011 :** \$ 90,000

**2012 :** \$ 65,000

**Primary RFCD** 2708 BIOTECHNOLOGY

**Administering Organisation** La Trobe University

### Project Summary

On average, two Australians die from bee stings each year. Our goal is produce honey bees that do not have a dangerous sting.