

Western Australia

Curtin University of Technology

DP0879330 Dr CF Clark

Approved Project Title **Crustal-Scale Fluid Flow in Deep Intracontinental Settings: Conditions, Sources and Deformational Responses**

2008 : \$ 64,889

2009 : \$ 75,136

2010 : \$ 67,586

Primary RFCD 2603 GEOCHEMISTRY

Administering Organisation Curtin University of Technology

Project Summary

Fluids are important agents of heat and mass transport in the Earth's crust. They play a key role in the mobilisation of metals and as such play a crucial role in the generation of ore deposits. The outcomes of this project will result in a greater understanding of the mechanisms and sources of fluid generation and mobilisation in deep-crustal settings. These outcomes can be related directly to the understanding of the controls on the transport and deposition of metals and hence the formation of mineral resources which are vital to maintaining a strong Australian economy.

DP0877655 A/Prof TP Dolin; Prof R Jones

Approved Project Title **An interdisciplinary investigation of literary tourism and literary subjectivity**

2008 : \$ 42,972

2009 : \$ 47,972

2010 : \$ 32,972

Primary RFCD 4202 LITERATURE STUDIES

Administering Organisation Curtin University of Technology

Project Summary

Literary tourism is an under-exploited cultural resource in Australia, despite well-organised tourism industries, an established literary canon, identifiable literary landscapes and locales, and strong links between literature and popular culture. Australia has much to learn from British literary tourism, with its established systems and advanced image marketing; and from a deeper understanding of reader-tourist motivations and behaviours. This research lays the methodological foundations for essential and genuinely interdisciplinary research into Australian literary tourism, and establishes a partnership that promises to deliver palpable national benefits in this and future projects, advancing understanding of our region and the world.

DP0879032 Prof JD Gale; Prof KV Wright; Dr S Piana; Dr A Laio

Approved Project Title **A virtual exploration of iron-sulphur-world in search of the precursors to life on earth**

2008 : \$ 91,233

2009 : \$ 96,678

2010 : \$ 80,000

Primary RFCD 2506 THEORETICAL AND COMPUTATIONAL CHEMISTRY

Administering Organisation Curtin University of Technology

Project Summary

The greenhouse gas, carbon dioxide, that currently presents a threat to the continued existence of humanity, ironically represents the starting point from which life on Earth probably originated. This research will probe the chemistry of how this gas, dissolved in ancient oceans, came to be converted to molecules that form the basis of living organisms through interaction with minerals, such as iron sulphide. Aside from answering a fundamental question, it will offer insights into processes that convert a pollutant into a useful chemical, as well as what might happen if carbon dioxide is placed in mineral deposits for long-term storage.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0877167 Prof K Grice; Prof RE Summons; Dr RJ Twitchett

Approved Project Title **Characteristics of organic matter formed in toxic, sulfide-rich modern and ancient environments**

2008 : \$ 140,000

2009 : \$ 190,000

2010 : \$ 170,000

2011 : \$ 85,000

2012 : \$ 75,000

Primary RFCD 2603 GEOCHEMISTRY

QEII Prof K Grice

Administering Organisation Curtin University of Technology

Project Summary

This project will help scientists understand past climate changes and understand the mechanisms of global warming. This in turn will improve our ability to forecast future climate change, and help Australia manage current threats to its biodiversity. Furthermore, this research involving Australia's major petroleum rocks will increase the ability to identify crude oil sources, to the benefit of petroleum exploration in Australia and world-wide. Importantly, this project will enable students and young professionals to be trained in state-of-the-art technologies, leading to quality scientists ready for employment in geoscience industries, and raising the profile of science careers in Australia.

DP0877404 Prof RK Lowe; Dr MM Keehner

Approved Project Title **Touching scenes: intelligent haptic guidance for supporting learning with complex graphic displays**

2008 : \$ 110,000

2009 : \$ 90,000

2010 : \$ 80,000

Primary RFCD 3301 EDUCATION STUDIES

Administering Organisation Curtin University of Technology

Project Summary

Complex visual information is a defining feature of 21st Century life because advances in graphics display technology permeate all aspects of our society. For Australian citizens to prosper in a world reliant on rich informational graphics, they must be able to use these depictions effectively and efficiently. Touch-based approaches, using a haptic tablet, could facilitate processing of key visual information in challenging circumstances where displays are complex or vision is limited. Improving visually-based performance and learning will benefit education and training, increase productivity and safety across the industrial, professional and service sectors, enhance security monitoring, and broaden community information access.

DP0880483 Prof MO Tadé; Prof R Datta

Approved Project Title **Multiscale Integrated Modelling and Control of an Ethanol-Fuelled Tubular Solid Oxide Fuel Cell**

2008 : \$ 100,000

2009 : \$ 100,000

2010 : \$ 100,000

Primary RFCD 2906 CHEMICAL ENGINEERING

Administering Organisation Curtin University of Technology

Project Summary

The results from this project will allow use of alternative sources for energy through a better understanding of the functioning, design, operability and control of SOFCs. Fuel Cells (FCs) with biomass ethanol feed will not only act as reliable power source but also reduce greenhouse gas emissions. A successful R&D effort to develop FCs will improve the national energy security by reducing the growing dependency on foreign energy sources, improve the environment by reducing carbon and other harmful emissions, and improve the economic growth by expanding the portfolio of highly efficient energy and useful spill over technologies.

Summary of Discovery Projects Proposals for Funding to Commence in 2008

DP0881040 Prof KL Teo; Prof Y Lim

Approved Project Title **A Computational Study of Nonconvex and Nonlinear Semi-infinite Optimisation Problems in Signal Processing**

2008 : \$ 80,000
2009 : \$ 80,000
2010 : \$ 75,000

Primary RFCD 2301 MATHEMATICS

Administering Organisation Curtin University of Technology

Project Summary

The operation of filtering is an important part of most modern communication engineering systems. Many important problems, which arise naturally from communications engineering applications, can be formulated as nonconvex optimization problems and nonlinear semi-infinite and/or semi-definite optimization problems. New optimization theory, in combination with novel computationally efficient solution methods, and efficient hardware implementation will be developed. The outcomes will enhance Australia's reputation in this cutting edge research and facilitate opportunity for international collaboration as well as commercial opportunity. The project will also provide an excellent environment for the training of junior researchers in the area.

DP0878453 Prof KV Wright; A/Prof SM Reddy; Dr JF Kirby

Approved Project Title **Defects and Deformation in Olivine: From Molecules to Mantle**

2008 : \$ 100,000
2009 : \$ 119,000
2010 : \$ 89,000

Primary RFCD 2601 GEOLOGY

Administering Organisation Curtin University of Technology

Project Summary

This project establishes the role of hydrogen in controlling olivine deformation, plate tectonics and mantle geodynamics. The unique application of innovative nanoscale simulation, microscale observation and geophysical characterisation ensures that results will have far-reaching impact in the Australian and International Earth Science community. In particular, our results will enable greater understanding of water migration in the mantle, the formation of deep Earth mineral resources and lead to significant improvements in the interpretation of geophysical variations in Earth's lithosphere.

DP0877513 Prof SR Zubrick; Prof S Silburn; Adj/Prof DJ Trewin; A/Prof AV Sanson; Prof WR Loudon; Dr DM Lawrence

Approved Project Title **Measuring and modelling the childhood determinants of human capital formation and human capability expansion**

2008 : \$ 181,777
2009 : \$ 276,000
2010 : \$ 130,482
2011 : \$ 100,000

Primary RFCD 3801 PSYCHOLOGY

Administering Organisation Curtin University of Technology

Project Summary

This project aims to address significant gaps in the data infrastructure needed to advance Australian's current human capital reform agenda. It will draw on existing population and longitudinal datasets and collect specific community and family data to analyse how the social, economic and ecological contexts of child development enable life-course outcomes in health and human capability. Existing human capital measures will be refined to develop data standards to support the monitoring of the reform agenda. New modelling techniques to predict patterns of economic, civic and social participation in individuals and populations will also be developed and tested.