

Summary of Linkage Infrastructure, Equipment and Facilities Proposals

Victoria

Monash University

LE0775544 A/Prof AY Nikulin; Prof BC Muddle; Dr AG Peele

Approved Project Title **X-Ray Facility for 3-D High Resolution Diffraction Imaging of Nanostructures**

2007 : \$ 350,000

Primary RFCD 2402 THEORETICAL AND CONDENSED MATTER PHYSICS

Partner Organisations & Collaborating Organisations

La Trobe University

Administering Organisation Monash University

Project Summary

Australian advances in quantitative x-ray imaging are at the leading edge of international efforts to permit 3D characterisation of the structure of materials and dynamic studies of structural changes. They have proven to be sensitive to local arrangement of materials at the nanometre scale, and they are emerging as critical tools in the development of advanced materials, which is a national research priority. This facility will allow the non-destructive 3D imaging of nanostructured materials to be performed as continual experimental development - something that is very difficult to achieve at synchrotron sources where access can be sporadic. The newly developed techniques will be applied to critical problems in emerging nanotechnologies.

LE0775616 Dr RG Pathegama; Prof DW Smith; Dr JK Kodikara; A/Prof DW Airey; Dr A Bouazza; Dr A Haque

Approved Project Title **Advanced Testing Facility for Geological Sequestration of Greenhouse Gases**

2007 : \$ 350,000

Primary RFCD 2907 RESOURCES ENGINEERING

Partner Organisations & Collaborating Organisations

The University of Melbourne

The University of Sydney

Administering Organisation Monash University

Project Summary

Predicted climate changes can cause disastrous impacts on nation's human health, agriculture, infrastructure and natural ecosystems. The reduction of greenhouse emissions as required by Kyoto Protocol while protecting Australian industries and jobs is a massive challenge. The long-term sequestration of CO₂ in deep geological formations is considered to be the most viable solution. This technology, however, is at its infancy and a concerted national research effort is urgently required. The multi-user Facility will enable closer collaboration with researchers in academia and industry, and will be integral in training the next generation of Australian scientists in the geological sequestration and wealth from the earth and the ocean.

LE0775725 Dr AJ Robinson; Dr LL Martin; A/Prof SJ Langford; A/Prof PC Junk; Prof WR Jackson; Dr KL Tuck; Prof M Augustin; Prof PJ Marriott; A/Prof HM Hügel; Dr CG Li; Dr EC Pang; Prof IA Smith; Prof DR MacFarlane

Approved Project Title **Molecular separation and characterisation - A facility for advanced mass spectroscopy and chromatography**

2007 : \$ 465,000

Primary RFCD 2504 ANALYTICAL CHEMISTRY

Partner Organisations & Collaborating Organisations

RMIT University

Administering Organisation Monash University

Project Summary

Characterising molecular composition is a basic need for the progress of many sciences. It is used to examine traditional and modern medicinal chemistry, bio-active peptides, molecular modulation of chemical properties, markers of disease and system status, and can also be used to elucidate molecular mechanisms and interactions in a system. This can only be achieved through precise measurement using the frontier technologies described in this grant. This proposal ensures international competitiveness on a broad front, and supports highest level research training and bio/chemical/medical research in several priority research areas.

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LE0775673 Prof J Rossjohn; A/Prof MC Wilce; Dr JC Whisstock; Dr SP Bottomley; Prof IA Smith; Prof J McCluskey; Dr AW Purcell; Dr A Brooks

Approved Project Title **A high throughput protein crystallization & imaging facility**

2007 : \$1,200,000

Primary RFCD 2701 BIOCHEMISTRY AND CELL BIOLOGY

Partner Organisations & Collaborating Organisations

The University of Melbourne

Administering Organisation Monash University

Project Summary

Protein crystallography is an important field of research that enables us to understand the precise shape of proteins. The precise shape of a protein determines the function of a protein. This information is essential in understanding the physiological role of a protein and may be used for the development of therapeutics, where appropriate. We aim to develop a high-throughput robotics system that will enable us to determine the shape of many proteins more rapidly, thereby greatly accelerating the pace of biomedical research.

LE0775660 Prof H Schmidt; Dr S Selemidis; Dr K Wingler; Prof BP McGrath; A/Prof HC Parkington; A/Prof MJ Morgan; Prof KS Murray; Prof AM Bond; Dr KL Tuck; Prof L Spiccia; A/Prof SJ Langford; A/Prof MC Thompson; A/Prof CG Young; Dr SP Best; Prof AG Wedd; Prof F Separovic; Dr PS Donnelly; Dr C Boskovic; Prof CL Masters; Dr KJ Barnham; Prof GR Hanson; Prof B Martinac; A/Prof LR Gahan; Dr G Schenk; A/Prof MJ Riley

Approved Project Title **A National Biomedical Electron Paramagnetic Resonance and Molecular Imaging Centre**

2007 : \$ 500,000

Primary RFCD 2499 OTHER PHYSICAL SCIENCES

Partner Organisations & Collaborating Organisations

The University of Melbourne

The University of Queensland

Administering Organisation Monash University

Project Summary

Multifrequency continuous wave and pulsed electron paramagnetic resonance spectroscopy and molecular imaging instrumentation will provide forefront technologies in identifying, characterising, quantifying, visualising and manipulating fundamental chemical and biologically relevant processes involving free radicals, metalloproteins and metal ions. This technology is crucial in validating these functional processes at the cellular and tissue level and for providing invaluable and unique biomedical information under physiological conditions. This synergistic and highly integrative approach will make available new techniques for identifying major disease mechanisms such as cardiovascular disease with a potential to improve and maintain health.

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LE0775747 Prof HW Schmidt; Dr RJ Beare; Prof WF Appelbe; Dr S Petrou; Prof JY Tu
Approved Project Title **Distributed Medical Image Analysis and Visualisation Engine (MedVis)**
2007 : \$ 160,000
Primary RFCD 3207 NEUROSCIENCES

Partner Organisations & Collaborating Organisations

VPAC
Howard Florey Institute
RMIT University
Administering Organisation Monash University

Project Summary

Improved understanding of neurological processes is crucial to improving clinical outcomes for patients. MedVis will contribute in three ways: support development of new methods of interpretation and analysis of complex neurological studies, allowing current methods to be applied more efficiently, and enabling distributed simulations and visualisations in real-time from remote sites.

The leading-edge, grid-based, software and computational techniques developed for the project will enable visualization, analysis and modelling of massive volumes of image and other visualisation data. This capability is important in medical research where large visualisation data volumes are being created and studied by experts remote from each other.

LE0775692 A/Prof B Shirinzadeh; Prof S Nahavandi; Prof JA Smith; Prof J Soria; A/Prof M Aguilar; A/Prof Y Chen; Dr RJ Pranker; Dr DR Honnery; Dr HM Trinh; Dr DN Oetomo; Dr Y Zhong; Dr VH Mak; Dr PN Pathirana; Dr D Creighton
Approved Project Title **Micro/nano optomechatronics sensing, measurement, and control research facility**
2007 : \$ 430,000
Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Partner Organisations & Collaborating Organisations

Deakin University
Administering Organisation Monash University

Project Summary

This project aims to establish a facility that enhances the capabilities for sensing, positioning, and manipulating of micro/nano scale objects and environment, and as such constitutes the building block for many frontier technologies such as nanotechnology, bio/nano medicine, microsurgery and neurosurgery, biotechnology, microbiology, microfluidics, and micro/nano manufacturing, all of which are still in their infancy and promise to be the challenging areas of research for the next two decades. The outcomes will strengthen Australia's position in world-class innovative scientific research. It also strengthens collaboration between major engineering institutions and medical experts for innovative research and training of researchers.

Summary of Linkage Infrastructure, Equipment and Facilities Proposals

LE0775582 Prof A Tsoi; Prof BA Pailthorpe; Prof BP Schmidt; Prof ST Hyde; Prof RA Lewis; Prof MA Ragan; Prof S Crozier; Prof DA Abramson; Prof PA Lindsay; Prof MA Knackstedt; A/Prof MJ Drinkwater; Prof PD Drummond; Dr P McConvell; Prof AK Whittaker; Dr B Evans; A/Prof SR Phinn; Dr A Khan

Approved Project Title **Data Grid -- Access Layer**

2007 : \$ 530,000

Primary RFCD 2916 COMPUTER HARDWARE

Partner Organisations & Collaborating Organisations

The University of Queensland
The Australian National University
QPSF Ltd

Administering Organisation Monash University

Project Summary

Vast increases in computing power and the arrival of new scientific instruments are contributing to the so-called data deluge of the 21st century. Accessing and archiving these data is essential to research. While the underlying computing and network requirements are well resourced, data access has been relatively neglected in Australia. A continuing problem in Australian research communities is the absence of coordinated access to digital storage resources. In many cases computational and experimental data are stored on ad-hoc resources, such as local university servers, PC disc drives, and are not generally accessible. The central goal of this proposal is to provide access to an integrated scientific data storage capacity for Australia.

LE0775550 Dr PA Webley; A/Prof AL Chaffee; Dr K Suzuki; Dr SE Kentish; Dr RA Caruso; Prof GW Stevens; Dr GG Qiao

Approved Project Title **Characterisation Equipment for Advanced Gas Separation Applications**

2007 : \$ 345,000

Primary RFCD 2906 CHEMICAL ENGINEERING

Partner Organisations & Collaborating Organisations

The University of Melbourne
Administering Organisation Monash University

Project Summary

The proposed research will lead to the synthesis of new advanced materials capable of performing new and existing separations more efficiently than previous methods. We therefore expect the new materials to directly benefit the community through improved removal and recovery of a wide range of pollutants which would otherwise enter the environment. This research is directly aligned to the National Research Priority of Frontier Technologies for Building and Transforming Australian Industries: Advanced Materials.