

Summary of Linkage Infrastructure, Equipment and Facilities Proposals by State and Organisation

New South Wales

The University of Sydney

LE100100164 Prof Jonathan Bland-Hawthorn, Prof Matthew Colless, Prof Warrick J Couch, Prof Kenneth C Freeman, Prof Karl Glazebrook, Prof Brian P Schmidt, Prof Christopher G Tinney, Dr Jonathan S Lawrence, Dr John W O'Byrne, Dr Simon C Ellis

Approved Project Title **GNOSIS: a new window on the early universe using revolutionary photonic technology**

2010 \$500,000.00

Primary FoR 0201 ASTRONOMICAL AND SPACE SCIENCES

Partner/Collaborating Organisation(s)

Anglo Australian Observatory

Macquarie University, Swinburne University of Technology, The Australian National University, The University of New South Wales

Administering Organisation The University of Sydney

Project Summary

Australian astronomers have a long history in innovative instrumentation and are some of the early pioneers in infrared astronomy. The GNOSIS project brings together leading Australian astronomers to build on past success. This facility instrument makes use of recent technological advances in photonics—a key strength of Australian research and industry—to provide a dramatic improvement in observational sensitivity at these wavelengths. This will allow Australian astronomers to carry out new science programmes that have not been possible to date. These programmes include unprecedented observations of very cool low mass stars, the first chemical information on dust-embedded star clusters, and accurate ages for distant galaxies.

LE100100010 A/Prof Filip C Braet, Dr Lilian Soon, Prof Robyn L Overall, Prof David A Day, Prof Peter M Waterhouse, Dr Jan Marc, Prof Arthur D Conigrave, Prof Anthony S Weiss, Dr Timothy P Newsome, Prof Steven R Meikle, Prof Jürgen Götz, Dr Claire S Goldsbury, Prof Trevor W Hambley, Prof Iqbal M Ramzan, Dr Paul M Young, Dr Daniela Traini, Dr Thomas Grewal, Prof Simon C Fleming, Prof Christopher R Murphy, Prof Georges E Grau, Prof Wolfgang Weninger, Prof Cristobal G Dos Remedios, Dr Sabine Wimmer-Kleikamp, Prof Paul R Munroe, A/Prof Marion A Stevens-Kalceff, A/Prof Leslie J Foster, Prof Hazel Mitchell

Approved Project Title **A 5-D Correlative Imaging Platform: Combining the strengths of light and electron microscopy**

2010 \$720,000.00

Primary FoR 0601 BIOCHEMISTRY AND CELL BIOLOGY

Partner/Collaborating Organisation(s)

The University of New South Wales

Administering Organisation The University of Sydney

Project Summary

This will be Australia's first dedicated five-dimensional multiphoton-microscopy platform, allowing observation of dynamic structures across different length and time scales under controlled temperatures, followed by high-resolution electron microscopy studies on the same samples. This platform will provide a unique characterisation tool to Australia's top-flight investigators, and so contribute to the nation's research priorities. It will enable: fundamental studies of cancer, neural diseases and immune disorders; the development of frontier technologies, such as smart nanomaterials, biosensors and targeted drug delivery; and applied research to help plants and soils adapt to climate variability, and to increase sustainable use of water.

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LE100100030 Dr Julie M Cairney, Prof Paul R Munroe, Prof Simon P Ringer, Prof Michael Ferry, Prof Yiu-Wing Mai, Dr Xiaozhou Liao, Prof David R McKenzie, Prof Stuart R Wenham, Prof Andrew S Dzurak, A/Prof Marion A Stevens-Kalceff, Prof Geoffrey M Spinks, Prof Shi Xue Dou, Dr Nagarajan Valanoor, Dr Zongwen Liu, Dr Gwénaëlle Proust, Prof David J Young, A/Prof Filip C Braet, Prof Tailoi Chan-Ling, Prof Dr Thomas Maschmeyer, Prof Hak-Kim Chan, Dr Daniela Traini, Prof Michael V Swain, A/Prof Andrew T Harris, Prof John W Crawford, Prof Daniel T Potts

Approved Project Title **Advanced focused ion beam (FIB) / scanning electron microscopes (SEM) for nanometre scale characterisation and fabrication**

2010 \$1,200,000.00

Primary FoR 0912 MATERIALS ENGINEERING

Partner/Collaborating Organisation(s)

The University of New South Wales, University of Wollongong

Administering Organisation The University of Sydney

Project Summary

These instruments are designed to provide fundamental insights into physical and biological systems through characterisation and fabrication of structures at nanometre length scales. These versatile platforms will support a wide range of projects covering three national research priority areas. These range from the characterisation of light alloys for improving and building Australia's Aluminium, Magnesium and Titanium alloy industries, to the study of aerosol particles for improved pulmonary drug delivery for asthma patients, the development of advanced solar cells and the study of the integrated behaviour of the soil-microbe system for sustainable agriculture.

LE100100118 Prof Katrina A Jolliffe, Prof Trevor W Hambley, A/Prof Louis M Rendina, Dr Richard J Payne, Dr Joel P Mackay, Prof Philip W Kuchel, Prof Barbara A Messerle, Dr Graham E Ball, Prof William S S Price, Prof Maxwell J Crossley

Approved Project Title **Nuclear magnetic resonance spectroscopy facilities for the Sydney region**

2010 \$600,000.00

Primary FoR 0306 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Partner/Collaborating Organisation(s)

The University of New South Wales, University of Western Sydney

Administering Organisation The University of Sydney

Project Summary

The determination of molecular structure is crucial in the chemical and biomolecular sciences, leading to the development of new drugs and other types of molecules and providing an understanding of how molecules interact with each other. The requested equipment will provide the ability for researchers in the Sydney region to advance our knowledge at this fundamental level by expanding the number and types of experiments that can be performed.

LE100100236 Dr Brendan J Kennedy, Dr Chris D Ling, Prof Donald McNaughton, A/Prof Joel Brugger, Dr Qinfen Gu, Dr Andrew G Christy, Prof Roland De Marco, Dr Mark J Tobin, Dr John A Stride

Approved Project Title **Facilities for spectroscopy and diffraction at high pressures**

2010 \$180,000.00

Primary FoR 0302 INORGANIC CHEMISTRY

Partner/Collaborating Organisation(s)

Australian Synchrotron Company Ltd

Curtin University of Technology, Monash University, The Australian National University, The University of Adelaide, The University of New South Wales

Administering Organisation The University of Sydney

Project Summary

The provision of infrastructure for the study of novel materials under high pressures will enhance Australia's capability in creating new materials and in creating new devices that meet needs in communication, environment and medicine applications. The new facility will enable researchers to understand the response of structures to extreme pressures and will exploit the unique capabilities of the synchrotron light.

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LE100100135 Prof Cameron J Kepert, Prof Jules M Guss, Dr Robyn L Malby, Dr Mika Jormakka, Dr Marcus L Cole, Prof Nicholas E Dixon, Prof Gordon Kearley

Approved Project Title Federated single crystal X-ray structural analysis facility

2010 \$700,000.00

Primary FoR 0306 PHYSICAL CHEMISTRY (INCL. STRUCTURAL)

Partner/Collaborating Organisation(s)

Australian Nuclear Science and Technology Organisation
The University of Newcastle, The University of New South Wales, University of Wollongong

Administering Organisation The University of Sydney

Project Summary

X-ray crystallography is the most widely applied method for the determination of three-dimensional molecular structures. These structures range in size from small systems such as materials and pharmaceuticals through to large biological structures such as proteins. This application will provide a multidisciplinary facility covering the structural characterisation needs of chemistry, pharmacy, biology, and medicine. This will position local universities for key scientific breakthroughs that benefit the Australian community by providing improved healthcare technologies, and processes. Furthermore, access to this world-class facility will provide state-of-the-art training for undergraduate, postgraduate and postdoctoral researchers.

LE100100045 Dr Luming Shen, Prof Mark J Hoffman, A/Prof Itai Einav, Dr Gianluca Ranzi, Dr Xiaozhou Liao, Prof Yiu-Wing Mai, Prof Mark A Bradford, Prof Raymond I Gilbert, Prof Stephen J Foster, Dr Zhe Liu

Approved Project Title Split Hopkinson bar facility for high strain rate testing of materials

2010 \$260,000.00

Primary FoR 0913 MECHANICAL ENGINEERING

Partner/Collaborating Organisation(s)

Monash University, The University of New South Wales

Administering Organisation The University of Sydney

Project Summary

The design of both civil structures that can survive explosions or earthquakes and automobiles that can minimize casualties during crash requires optimum understanding of material response and failure under dynamic loading. As the most commonly used technique for determining material properties under high strain rates, the proposed split Hopkinson bar facility will greatly promote the development of alloys, polymer composites, metal foams and other new advanced materials for important applications, such as in blast-resistant design and vehicle crashworthiness, and in aerospace industry.

Summary of Linkage Infrastructure, Equipment and Facilities Proposals by State and Organisation

LE100100125 Prof Roland Stocker, Prof Nicholas H Hunt, Prof Rebecca S Mason, Dr Paul K Witting, Prof Basil D Roufogalis, Prof Peter A Lay, Prof Michael J Davies, Prof Ian W Dawes, Dr Grant R Drummond, Prof Carolyn L Geczy, Prof Levon M Khachigian, Prof Philip J Hogg, A/Prof Martin Lackmann, A/Prof Tony Tiganis, Dr Shane R Thomas, Prof Kevin D Croft, Prof Nicholas J King, Prof Leann Tilley, Prof David E James

Approved Project Title Oxidative stress bioanalytical facility

2010 \$330,000.00

Primary FoR 0601 BIOCHEMISTRY AND CELL BIOLOGY

Partner/Collaborating Organisation(s)

Agilent Technologies

La Trobe University, Monash University, The University of New South Wales, The University of Western Australia

Administering Organisation The University of Sydney

Project Summary

The primary national benefit of this application is that it will provide a currently unavailable, state-of-the-art facility for Australian scientists to define precisely how changes in cellular redox state contribute to biological processes relevant to health and diseases. The facility will uniquely complement, and in many cases integrate with existing facilities in this area of research in Australia. It will act as a platform for major national and international research collaborations, develop cutting-edge technology and unique local skills, and contribute to Australia maintaining a leading position in redox-related research in biology and medicine. In doing so, the facility will increase the likelihood of gaining future, value-adding funding.

LE100100130 Prof Ronald J Trent, Prof Peter M Waterhouse, Prof Ian W Dawes, Prof Ian T Paulsen, Prof Robert J Henry, Prof Merlin Crossley, Em/Prof Peter L Bergquist, Dr Michal Janitz, Dr Jonathan W Arthur, Prof Juergen K Reichardt, Prof Nicolle H Packer, Dr Bing Yu, Prof Rodney J Scott, Prof Claire M Wade

Approved Project Title Systems biology: New generation DNA sequencing to functional analysis

2010 \$850,000.00

Primary FoR 0604 GENETICS

Partner/Collaborating Organisation(s)

Macquarie University, Southern Cross University, The University of Newcastle, The University of New South Wales

Administering Organisation The University of Sydney

Project Summary

The technique of DNA sequencing (or 'reading' the lines of the four repeating letters that make up the genetic code) illustrates how technological developments have become the main drivers in exploring the roles of genetic factors across a spectrum of research activities. Funding provided through this ARC grant will allow the purchase of the latest DNA sequencing platform, the Illumina Solexa, as well as equipment that will be used to understand the biological function of the DNA sequencing results that are obtained. The equipment will allow Australian researchers to compete on an equal footing with the international leaders in understanding the roles played by genes in plants, microorganisms, animals and humans.