

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

## Victoria

### Monash University

**LE100100108** A/Prof James R Friend, Dr Adam I Mechler, Dr Leslie Y Yeo

**Approved Project Title** Ultra-high frequency non-contact vibrometry equipment for biomicrofluidics metrology

2010 \$175,000.00

Primary FoR 0203 CLASSICAL PHYSICS

#### **Partner/Collaborating Organisation(s)**

La Trobe University

**Administering Organisation** Monash University

#### **Project Summary**

This equipment will enable experimental vibration measurement up to an unprecedented one billion cycles per second of motion smaller than the width of a helium atom (20 femtometres). Understanding and harnessing the phenomena unique to this regime, especially very large accelerations surpassing one billion times the acceleration of gravity, will enable the development of rapid protein crystallisation techniques and constant-temperature organic chemical reaction enhancement for rapid development of new drugs, new devices for measuring the profile of surfaces at video speeds (videoAFM), new micro- and nano-devices for fluid pumping, mixing, colloidal separation and concentration, and new autonomous nanorobots for non-invasive microsurgery.

**LE100100165** A/Prof Ian S Harper, Prof Trevor J Lithgow, Prof Christina A Mitchell, Prof Rodney J Devenish, A/Prof Martin Lackmann, Dr Georg Ramm, A/Prof Johnson Mak

**Approved Project Title** Electron microscopy cryopreparation facility for biomedical research

2010 \$250,000.00

Primary FoR 0601 BIOCHEMISTRY AND CELL BIOLOGY

#### **Partner/Collaborating Organisation(s)**

**Administering Organisation** Monash University

#### **Project Summary**

The proposed cryopreparation facility will allow cell and molecular biologists and material scientists in the region to prepare samples for ultrastructural research not currently possible due to insufficient local resources, and will thus significantly boost their research. The facility will support a wide range of world class medical and material scientists, including those visiting the Australian Synchrotron, whose research in health sciences and advanced materials characterisation facilitates the goals of promoting and maintaining good health and frontier technologies. The instrumentation will enhance training capacity in the region and provide young Australian scientists with direct experience of modern electron microscopy techniques.

**LE100100197** Prof Keith S Murray, Prof Leone Spiccia, Prof Glen B Deacon, A/Prof Stuart R Batten, Dr Colette Boskovic, A/Prof Lawrence R Gahan, Prof Graeme R Hanson, Dr Christopher J Sumby, A/Prof Gerhard Schenk, A/Prof Brendan F Abrahams

**Approved Project Title** National magnetochemical facility

2010 \$200,000.00

Primary FoR 0302 INORGANIC CHEMISTRY

#### **Partner/Collaborating Organisation(s)**

The University of Adelaide, The University of Melbourne, The University of Queensland

**Administering Organisation** Monash University

#### **Project Summary**

New magnetic materials of the molecular or biological types are quite different to traditional metal oxide magnets widely used, for example, in recording devices. They are very important from the perspective of understanding fundamental properties at low temperatures, in high magnetic fields, or when irradiated by light, but they are also showing promise in a range of applications, such as memory devices and smart cards and in the new area of spintronics and molecular computers. The magnetochemical projects described here, that require the new equipment being sought, are fundamental in nature but will provide the underpinning of future nanomagnetic materials.

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**LE100100222** Prof Julio Soria, Prof Ivan Marusic, A/Prof Damon R Honnery, Prof Brian G Falzon, A/Prof Wing K Chiu, Dr Jason P Monty, Dr Nicholas Hutchins

**Approved Project Title** **Time-resolved tomographic particle image velocimetry facility**

2010 \$440,000.00

Primary FoR 0915 INTERDISCIPLINARY ENGINEERING

**Partner/Collaborating Organisation(s)**

The University of Melbourne

**Administering Organisation** Monash University

### **Project Summary**

The experimental information gained from measurements provided by this infrastructure will lead to significant advances in understanding turbulent flows and the dynamics of solid structures, which will impact a broad range of engineering and geophysical fields. Some specific examples include the development of efficient turbulence control strategies for the reduction of skin-friction drag and improved combustion processes, resulting in not only better fuel efficiency for vehicles but also reduced CO<sub>2</sub> and pollutant emissions. Significant advances can also be made in understanding the dispersion of pollutants in the atmosphere, wind turbine design and the development of lighter and stronger intelligent materials with improved fatigue life.

**LE100100207** A/Prof Matthew C Wilce, Dr Travis C Beddoe, Prof Stephen P Bottomley, Prof Paul J Hertzog, Prof Jamie Rossjohn, Prof James C Whisstock, Prof Bryan R Williams, Dr Nathan P Cowieson, Prof Milton T Hearn, Prof Julian I Rood

**Approved Project Title** **A biomolecular small angle X-ray scattering facility**

2010 \$500,000.00

Primary FoR 0601 BIOCHEMISTRY AND CELL BIOLOGY

**Partner/Collaborating Organisation(s)**

**Administering Organisation** Monash University

### **Project Summary**

The biomolecular small-angle X-ray scattering (SAXS) facility will support a broad range of research activities that will significantly benefit basic and applied biological and biomedical research as well as the field of biomolecular engineering. Specific areas of investigation will include enzyme action, viral protein assembly, gene regulation, immunity and fertility. The instrumentation will complement the current research tools of Australian biomedical scientists, as well as stimulate new collaborative partnerships and opportunities for researchers studying biological macromolecules. In this way Australia will benefit through direct research outcomes and through training of future scientists in state-of-the-art technologies.