

**Number of Successful Proposals for Super Science Fellowships to Commence in 2011  
by FoR Division**

<b>020000</b>	<b>Physical Sciences</b>	
0201	ASTRONOMICAL AND SPACE SCIENCES	7
0205	OPTICAL PHYSICS	1
<b>020000</b>	<b>Physical Sciences</b>	<b>8</b>
<b>040000</b>	<b>Earth Sciences</b>	
0404	GEOPHYSICS	1
0405	OCEANOGRAPHY	1
<b>040000</b>	<b>Earth Sciences</b>	<b>2</b>
<b>050000</b>	<b>Environmental Sciences</b>	
0501	ECOLOGICAL APPLICATIONS	3
0502	ENVIRONMENTAL SCIENCE AND MANAGEMENT	1
<b>050000</b>	<b>Environmental Sciences</b>	<b>4</b>
<b>060000</b>	<b>Biological Sciences</b>	
0601	BIOCHEMISTRY AND CELL BIOLOGY	1
0602	ECOLOGY	1
0605	MICROBIOLOGY	1
<b>060000</b>	<b>Biological Sciences</b>	<b>3</b>
<b>100000</b>	<b>Technology</b>	
1007	NANOTECHNOLOGY	4
<b>100000</b>	<b>Technology</b>	<b>4</b>
<b>Total Number of Grants</b>		<b>21</b>

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 0201 ASTRONOMICAL AND SPACE SCIENCES

### Anglo Australian Observatory

**FS110200023** A/Prof Andrew M Hopkins, Prof Matthew Colless, Prof Simon P Driver, Dr Christopher E Lidman, A/Prof Scott M Croom

**Approved Project Title** **The Galaxy Genome Project 2**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Space Science And Astronomy

SSF 3

**Administering Organisation** Anglo Australian Observatory

#### Project Summary

The Galaxy Genome Project builds on the Anglo-Australian Observatory's (AAO) major investments and world-leading strengths in wide-field survey astronomy and multi-object spectrographs. Combining the AAO's ongoing and planned survey programs with data from other new Australian facilities, such as SkyMapper and Australian Square Kilometre Array Pathfinder, will increase the scientific productivity and impact of all of these major Australian investments and leverage access for Australian researchers in other leading international astronomical surveys and facilities. The project will also increase the international profile of Australian astronomy and enhance the prospects of Australian scientific and technical involvement in next-generation astronomical facilities such as Square Kilometre Array and Giant Magellan Telescope.

### Curtin University of Technology

**FS110200003** Prof Steven J Tingay, Prof Bryan M Gaensler, Prof Lister G Staveley-Smith, Prof Franklin H Briggs, Prof Iver H Cairns

**Approved Project Title** **Supporting early science from the Murchison Widefield Array - a Square Kilometre Array (SKA) pathfinder telescope**

2011	\$46,400.00
2012	\$92,800.00
2013	\$92,800.00
2014	\$46,400.00

Targeted Area Space Science And Astronomy

SSF 1

**Administering Organisation** Curtin University of Technology

#### Project Summary

The Murchison Widefield Array (MWA) is likely to be the first operational pathfinder for the \$2.5 billion Square Kilometre Array (SKA) on one of the two candidate SKA sites - the Murchison Radioastronomy Observatory (MRO) in Western Australia. The MWA will therefore generate large volumes of scientific data before 2012, the expected date of the international decision that will determine whether Australia or South Africa is to host the SKA. The early science results from the MWA will showcase the excellence of the Australian site for radio astronomy and play a significant strategic role in Australia's bid to attract the SKA, as an international mega-science project to Australia, with its benefits to Australian science, industry and society.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## Macquarie University

**FS110200035** Dr Daniel B Zucker, Prof Kenneth C Freeman, Prof Jonathan Bland-Hawthorn, Prof John C Lattanzio, Dr Samuel C Barden

**Approved Project Title** **Space Science and Astronomy: Dissecting the Galaxy with High Resolution Multi-Object Echelle Spectrograph (HERMES) II: Decisive Observations**

2011 \$139,200.00

2012 \$278,400.00

2013 \$278,400.00

2014 \$139,200.00

Targeted Area Space Science And Astronomy

SSF 3

**Administering Organisation** Macquarie University

### Project Summary

Australia has long been a world leader in wide-field astronomical surveys, and the new High Resolution Multi-Object Echelle Spectrograph (HERMES) being built for the Anglo-Australian Telescope (AAT) will enhance that leadership position. Through a combination of Australian technological and scientific advances, the surveys we conduct with HERMES will allow us to study galaxy formation and stellar astrophysics in unprecedented detail. There are powerful synergies between HERMES and Skymapper, another Australian astronomical survey, as well as with Gaia, the billion-dollar European space mission for studying the Galaxy; HERMES will thus promote both national and international research collaboration. In this proposal we lay the observational groundwork for maximising the scientific return from HERMES.

## Monash University

**FS110200047** Dr Michael J Brown, Dr Kevin A Pimblet, A/Prof Andrew M Hopkins, Prof Raymond P Norris

**Approved Project Title** **Australia Surveys the Galaxies: The Central Role of Environment**

2011 \$46,400.00

2012 \$92,800.00

2013 \$92,800.00

2014 \$46,400.00

Targeted Area Space Science And Astronomy

SSF 1

**Administering Organisation** Monash University

### Project Summary

The success of Australia's premier astronomical facilities is critical to the development of Australian astronomy in the 21st century. Understanding how galaxies grow and evolve (including our Milky Way) is one of the principal goals of these facilities. This program aims to understand galaxy evolution, by exploring the connection between galaxies and their environments. The Super Science Fellows will gain new insights into the longstanding problem of galaxy evolution, and build upon Australia's investment in 21st century astrophysics.

## Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

### Swinburne University of Technology

**FS110200007** Prof Karl Glazebrook, Dr Michael T Murphy, Dr Emma V Ryan-Weber, Dr Christopher A Blake, Dr Virginia A Kilborn

**Approved Project Title** **Mass Assembly of Galaxies In the Cosmos: the roles of stars, gas, and metals**

2011 \$92,800.00

2012 \$185,600.00

2013 \$185,600.00

2014 \$92,800.00

Targeted Area Space Science And Astronomy

SSF 2

**Administering Organisation** Swinburne University of Technology

#### Project Summary

Swinburne's Centre for Astrophysics and Supercomputing is uniquely placed to tackle the outstanding 'super questions' of modern astronomy. We will utilise Australia's investment in current and future telescopes to unlock the process of galaxy assembly across cosmic time. New computing and instrumentation technologies will be developed. A further benefit is the training of young scientists to the highest level. The outcomes of this research will further enhance Australia's international profile in astronomy.

### The Australian National University

**FS110200016** Prof Gary S Da Costa, Prof John E Norris, Dr Helmut Jerjen, Dr Chiaki Kobayashi

**Approved Project Title** **Exploiting the discovery of ultra-faint dwarf galaxies in the southern hemisphere sky**

2011 \$92,800.00

2012 \$185,600.00

2013 \$185,600.00

2014 \$92,800.00

Targeted Area Space Science And Astronomy

SSF 2

**Administering Organisation** The Australian National University

#### Project Summary

The scientific exploitation of newly discovered southern hemisphere ultra-faint Milky Way satellite galaxies will make Australia a leader in this rapidly developing research field. It will be enabled by access to national and international telescope facilities such as the Anglo- Australian Telescope (AAT), Gemini and Magellan, and by access to national computing resources for theoretical simulations. National benefit will also flow from collaborations between the team and its Super Science Fellows and researchers at overseas institutions. Results from the project will motivate research programs for the coming era of extremely large telescopes and will position the Fellows as potential future leaders in the exploiting the scientific potential of those facilities.

## Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

### The University of Sydney

**FS110200013** Prof Jonathan Bland-Hawthorn, A/Prof Scott M Croom, Prof Geraint F Lewis, Prof Matthew Colless, Prof Joseph Silk

**Approved Project Title** **Accretion and Feedback in Galaxies with Cosmic Time**

2011 \$92,800.00

2012 \$185,600.00

2013 \$185,600.00

2014 \$92,800.00

Targeted Area Space Science And Astronomy

SSF 2

**Administering Organisation** The University of Sydney

#### **Project Summary**

Australia is a world leader in both astronomy and photonics. This proposal seeks to exploit a revolutionary device that is the first developed from the new cross-over field of astrophotonics. The Gemini Near-infrared OH Suppression IFU System (GNOSIS) instrument will showcase Australian industry development in optical fibres and will keep Australian astronomers at the forefront of international research. This will lead to major advantages when developing future instrumentation for next generation telescopes such as the Giant Magellan Telescope, enabling Australia to continue to lead astronomy and astronomical instrumentation into the next decade and beyond.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 0205 OPTICAL PHYSICS

### The University of Adelaide

**FS110200009** Prof Tanya M Monro, Prof Alan Cooper, Prof Lois A Salamonsen, Prof Robert J Norman, Adj/Prof Nigel A Spooner

**Approved Project Title** Transformational diagnostics

2011 \$139,200.00

2012 \$278,400.00

2013 \$278,400.00

2014 \$139,200.00

**Targeted Area** Future Industries Research  
Biotechnology And Nanotechnology

SSF 3

**Administering Organisation** The University of Adelaide

### Project Summary

Australia has established world-leading capabilities in optical fibres and surface science that, when brought together, have the potential to transform applications that require non-invasive, real-time and/or portable biological detection tools. We propose a novel and ambitious suite of projects that bring together these capabilities with experts in reproductive health, forensics and explosives to solve pressing problems in each of these areas that have the promise to develop into new industries for Australia as well as to explore rich science opportunities at the boundaries of these disciplines.



**Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group**

**0405 OCEANOGRAPHY**

**The University of Western Australia**

**FS110200021** Prof Malcolm T McCulloch, Prof Gregory N Ivey, Asst Prof Ryan J Lowe, Asst Prof James Falter, Dr Ross J Jones

**Approved Project Title** **Indian Ocean Climate Change: Ningaloo Reef, a litmus test for the survival of coral reefs**

2011	\$92,800.00
2012	\$185,600.00
2013	\$185,600.00
2014	\$92,800.00

Targeted Area Marine And Climate Science

SSF 2

**Administering Organisation** The University of Western Australia

**Project Summary**

Coral reefs are at the frontline from the effects of rapidly rising levels of carbon dioxide that is causing both global warming and oceans to become more acid-like. Our research program will determine how the survival of one of the World's most pristine and best preserved coral reefs, Ningaloo Reef, is linked to the response of Australia's Indian Ocean to climate change. For the first time, we will simulate realistic 'future' conditions and see how actual coral reef systems respond. This will provide a 'yardstick' against which the best-case survival potential of the world's coral reefs can be assessed, critical for underpinning the urgently needed action to reduce greenhouse gas emissions if we are to ensure the survival of coral reefs.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 0501 ECOLOGICAL APPLICATIONS

### James Cook University

**FS110200046** Prof Terence P Hughes, Prof Bette L Willis, Prof David J Miller, Dr Philip L Munday, Prof Robert L Pressey

**Approved Project Title** **Resilience of Coral Reef Ecosystems to Climate Change**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Marine And Climate Science

SSF 3

**Administering Organisation** James Cook University

#### Project Summary

Science-based management of coral reefs provides enormous environmental, social and economic benefit to Australia and other tropical maritime nations. The proposed research will provide scientific knowledge and research training that underpins the management and long-term sustainability of Australian reef resources. Climate change research is vital for supporting the sustainable use of the ecosystem goods and services provided by reef ecosystems (e.g. to tourism and fishing industries, recreational users and indigenous Australians). This research will place Australia in the forefront of understanding and responding to the regional-scale impacts of climate change on tropical societies and economies.

### The University of Adelaide

**FS110200051** Prof Andrew J Lowe, Prof Corey J Bradshaw, Prof Anton J van den Hengel, Prof Barry W Brook, Prof Alan Cooper

**Approved Project Title** **Multi-model predictions of ecosystem flux under climate change based on novel genetic and image analysis methods**

2011	\$92,800.00
2012	\$185,600.00
2013	\$185,600.00
2014	\$92,800.00

Targeted Area Marine And Climate Science

SSF 2

**Administering Organisation** The University of Adelaide

#### Project Summary

Improving the forecasts of ecosystem shifts must be a key focus of future ecological research if we are to preserve our unique Australian landscapes. Our proposal is of clear benefit to Australia because of the urgent need for integrated methods to predict the cumulative impact of shifts in climate and land use. We will also contribute innovative tools involving genetic and image analysis, and state-of-the-art modelling. The damage modern human societies are inflicting on global environments has led to a great demand for logistically feasible and cost-effective ways to prevent biodiversity loss.

## Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

### University of Tasmania

**FS110200029** Prof Craig R Johnson, A/Prof Neil J Holbrook, Dr Neville Barrett, Prof Peter D Steinberg

**Approved Project Title** **Effects of climate change on temperate benthic assemblages on the continental shelf in eastern Australia**

2011 \$92,800.00

2012 \$185,600.00

2013 \$185,600.00

2014 \$92,800.00

Targeted Area Marine And Climate Science

SSF 2

**Administering Organisation** University of Tasmania

#### **Project Summary**

Benthic habitats on the continental shelf in southeast Australia support some of Australia's most productive fisheries and manifest high levels of biodiversity and endemism. However, the region is experiencing rates of ocean warming 3.8 times the global average and nutrient depletion because of increased influence of the East Australian Current. This work will, for the first time, provide a clear indication of the relationship between the physical environment on the shelf and the distribution of benthic assemblages, predict future changes in temperature and nutrients in the area, and predict the effects of these changes on the associated benthic biota. These predictions are critical to an informed adaptation response to climate change.

**Summary of Successful Super Science Fellowships Proposals for Funding to  
Commence in 2011 by FoR group**

**0502 ENVIRONMENTAL SCIENCE AND MANAGEMENT**

**The University of Queensland**

**FS110200005** Prof Hugh P Possingham, Prof Andrew B Griffiths, Prof John C Quiggin, Prof Sarah C Derrington, Dr Tiffany H Morrison

**Approved Project Title** **Defend or retreat? Adapting to the impacts of sea level rise as a result of rapid climate change.**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Marine And Climate Science

SSF 3

**Administering Organisation** The University of Queensland

**Project Summary**

Rapid sea level rise has been identified as a major threat to coastal Australia, where most of the Australian population lives. Our understanding and ability to respond to this threat is extremely limited at this point. This project will directly benefit Australian communities and businesses, specifically those in southeast Queensland by bringing together a team of distinguished, multidisciplinary researchers and Super Science Fellows to explore the threats and challenges posed by rapidly rising sea levels. By building capacity and answering many urgent and difficult questions related to the legal, environmental and planning ramifications of sea level rise, this project will prepare communities and policymakers for the difficult times ahead.



# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 0602 ECOLOGY

### Australian Antarctic Division (AAD)

**FS110200057** Dr Stephen Nicol, Prof Mark A Hindell, Dr Nicholas J Gales, Prof Robert G Harcourt

**Approved Project Title** Pelagic ecosystem linkages in a changing Southern Ocean.

2011	\$92,800.00
2012	\$185,600.00
2013	\$185,600.00
2014	\$92,800.00

Targeted Area Marine And Climate Science

SSF 2

**Administering Organisation** Australian Antarctic Division (AAD)

### Project Summary

Our study, which aims to better describe and understand the ecology of the vast Ocean to the south of Australia, will provide the information that will assist in managing this region in an era of change. Many species are of significant conservation concern, others are recovering from previous harvesting, some are being harvested and all will be affected by a changing climate. Understanding the ecosystem linkages and the way in which the physical environment affects the distribution and abundance of key ecosystem components will allow us to better manage the system and to predict the effects of future climate change.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 0605 MICROBIOLOGY

### Australian Institute of Marine Science

**FS110200034** Prof Linda L Blackall, Dr Madeleine J van Oppen, Dr Katharina E Fabricius, Dr Curtis Suttle, Dr David G Bourne

**Approved Project Title** **A Changing Climate on the Great Barrier Reef: Present and Future Implications**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Marine And Climate Science

SSF 3

**Administering Organisation** Australian Institute of Marine Science

#### **Project Summary**

The Great Barrier Reef is fundamental to the economy of Australia. This national and international icon needs to be preserved in the face of a changing world to ensure on-going sustainability of our marine resources. Ocean acidification, warming water temperatures, increased freshwater disrupt the sensitive symbiotic association of corals the major structure building organisms of reefs. Understanding how these environmental stressors result in the decrease in coral health is fundamental to prevent loss of our coral reefs and an important step towards preserving them for future generations.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## 1007 NANOTECHNOLOGY

### Monash University

**FS110200015** Prof Trevor J Lithgow, Prof Jamie Rossjohn, Prof Rodney J Devenish, A/Prof Lisandra L Martin, Prof Richard A Strugnell

**Approved Project Title** **Design and Fabrication of Molecular Machines: the Nanomachines of the Future**

2011 \$139,200.00

2012 \$278,400.00

2013 \$278,400.00

2014 \$139,200.00

**Targeted Area** Future Industries Research  
Biotechnology And Nanotechnology

SSF 3

**Administering Organisation** Monash University

#### Project Summary

Nanotechnology that incorporates the use of nanomachines and molecular machines is an exciting new area of translational research, with broad potential in biomedical technology and industrial applications. We are developing new molecular machines and optimising their assembly. Recent innovation in the world of nanotechnology concerns the design and manufacture of synthetic and hybrid machines, based on existing biological molecular machines but incorporating synthetic parts. Australia has an opportunity to be at the forefront of these new developments in nanotechnology, with a new generation of Australian scientists being trained across the foundation disciplines of chemistry, physics and molecular biology.

### The Australian National University

**FS110200033** Prof Chennupati Jagadish, Prof Yuri S Kivshar

**Approved Project Title** **Nanofabrication of Metamaterials for Next Generation Optical Devices**

2011 \$139,200.00

2012 \$278,400.00

2013 \$278,400.00

2014 \$139,200.00

**Targeted Area** Future Industries Research  
Biotechnology And Nanotechnology

SSF 3

**Administering Organisation** The Australian National University

#### Project Summary

The dream of invisibility cloaks dates back to ancient times but recent advances in nanotechnology have made this a reality through the use of metamaterials. Metamaterials are artificially-made materials that have optical properties not found in nature. This field is still in its infancy and significant challenges remain and need to be solved before practical applications can be realised. This project builds on Australia's strategic investment in nanofabrication capabilities to fabricate functional metamaterials and uncover the underlying physical phenomena. It will revolutionise the field of nanophotonics for a variety of novel applications ranging from defence, renewable energy, imaging, sensing to optical communications.

# Summary of Successful Super Science Fellowships Proposals for Funding to Commence in 2011 by FoR group

## The University of Melbourne

**FS110200025** Prof Frank Caruso, Prof Geoff W Stevens, Prof Greg G Qiao, A/Prof Sandra E Kentish  
**Approved Project Title** **Nanoengineered Polymeric Materials for Environmental and Biological Applications**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Future Industries Research  
Biotechnology And Nanotechnology

SSF 3

**Administering Organisation** The University of Melbourne

### Project Summary

The development of advanced materials with nanoengineered properties promises to revolutionise future industries, including the energy and healthcare sectors. This research program will involve the design, synthesis and assembly of tailored polymers to prepare next-generation, engineered materials. The research will deliver advanced polymeric membranes, tissue engineering scaffolds and vaccine delivery systems. These materials are expected to provide benefits for Australian citizens in the energy and health sectors and contribute to the development of a robust Australian nanotechnology industry. The projects will also provide opportunities for the development of outstanding young scientists and will foster multidisciplinary collaborations.

## The University of Western Australia

**FS110200022** Prof Lorenzo Faraone, Prof John M Dell, Prof Martin Saunders, Prof Chennupati Jagadish, Prof Sanjay Krishna  
**Approved Project Title** **A fundamental study of electronic transport in advanced semiconductor nanostructures**

2011	\$139,200.00
2012	\$278,400.00
2013	\$278,400.00
2014	\$139,200.00

Targeted Area Future Industries Research  
Biotechnology And Nanotechnology

SSF 3

**Administering Organisation** The University of Western Australia

### Project Summary

The principal aim of this project is to attract and retain very high calibre early career researchers by providing them with the best-available infrastructure and research environment, combined with world-class supervision and mentoring. The project brings together an outstanding team of international collaborators, who will work with the early career researchers to ensure that they are trained and mentored at an international level. The new science, novel characterisation methods, and theoretical models that are outcomes of this project will provide new opportunities and expertise to advance the strategic defence and national security interests of Australia, and the emerging Australian semiconductor device and solar cell industry.