



Australian Government
Australian Research Council

ARC
Facts

Super Science Fellowships

Fellowships commencing in 2010

Disruptive approaches to biological sensing (FS100100039)

Optical fibre-based biosensors have the potential to transform our ability to monitor our environment, protect our nation's assets and safeguard our citizens, and to offer improved clinical diagnostics and food quality control by creating tools that can detect biomolecules in real-time within complex samples. To fulfil this mission, we propose to develop new fibre-based sensing architectures for sensing biomolecules that have the potential to be sensitive, selective, fast and compact. These new platform technologies will enable the future development of new high tech diagnostics and sensing industries.

Funding: \$835,200 over three-years

Administering organisation: The University of Adelaide

Targeted research area: Future Industries Research—Biotechnology and Nanotechnology

Media contact: Professor Tanya Monro—0400 649 369 (int +61 400 649 369)

Large-scale maps of the universe: Enabling wide-field science with the Australian Square Kilometre Array Pathfinder and the Square Kilometre Array (FS100100038)

Observational capabilities in astronomy continue to make great advances across the electromagnetic spectrum. The first truly global facility for radio astronomy will be the Square Kilometre Array (SKA), an international \$2.5 billion project scheduled for deployment between 2015 and 2020, for which the proposed Australian site has been short-listed. The Australian SKA Pathfinder (ASKAP) is a next generation radio telescope that is on the strategic pathway towards the staged development and deployment of the SKA. By refining the ASKAP technology and enabling its scientific success we address the national strategic goal of ensuring Australia's technological and scientific readiness for the SKA.

Funding: \$835,200 over three-years

Administering organisation: Commonwealth Scientific and Industrial Research Organisation

Targeted research area: Space Science and Astronomy

Media contact: Dr Robert Braun—0448 418 701 (int +61 448 418 701)

Precipitation-groundwater interactions over eastern Australia: climate change impacts at multiple scales (FS100100054)

Most surface water in the Murray-Darling Basin is used for agricultural activity, and groundwater extraction is accelerating. We cannot yet predict how these water resources will be affected by climate change, partly because Australian climate models do not represent key interactions between small and large scale rainfall changes, and interactions between ground water, the land surface and the atmosphere. This project will produce the first climate simulations that explicitly include these interactions. This will allow a better understanding of future changes to groundwater resources. This understanding will help us plan ahead, and enable new research to help Australia maintain food security in an uncertain future.

Funding: \$835,200 over three-years

Administering organisation: The University of New South Wales

Targeted research area: Marine and Climate Science

Media contact: Professor Matthew England—0425 264 485 (int +61 425 264 485)

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Nanofabrication of Metamaterials for Next Generation Optical Devices (FS110200033)

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.

Funding: \$835,200 over three-years

Administering organisation: The Australian National University

Targeted research area: Future Industries Research—Biotechnology and Nanotechnology

Media contact: Professor Yuri Kivshar—0411 159 639 (int +61 411 159 639)

The Galaxy Genome Project (FS110200023)

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.

Funding: \$835,200 over three-years

Administering organisation: Anglo–Australian Observatory

Targeted research area: Space Science and Astronomy

Media contact: Dr Andrew Hopkins—0432 855 049 (int +61 432 855 049)

Resilience of Coral Reef Ecosystems to Climate Change (FS110200046)

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.

Funding: \$835,200 over three-years

Administering organisation: James Cook University

Targeted research area: Marine and Climate Science

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