

UWS Australian Research Council Grants for 2014



UWS AUSTRALIAN RESEARCH COUNCIL GRANTS FOR 2014

UWS has been successful in receiving more than \$7,784,852 million in Australian Research Council (ARC) Grants for 2014.

UWS researchers will lead 12 new Discovery Projects, supported by grants totalling \$4,555,726. A number of UWS researchers are also collaborating on ARC Discovery Projects with research partners in other institutions.

UWS received two ARC Future Fellowships for mid career researchers valued at \$1,429,325, and two Discovery Early Career Researcher Awards to the value of \$735,801. In addition, the ARC has supported the University's Linkage Infrastructure, Equipment and Facilities proposal with \$1,064,000.

Congratulations to the following UWS researchers who have been awarded ARC grants for 2014. Recipients are listed alphabetically by their University Research Institute, University Research Centre, University Research Group or School.

ARC Future Fellowships

GRANTS AWARDED TO UWS RESEARCHERS

HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

Dr Brendan Choat

Title

Limits to the resilience of Australian forests and woodlands to drought

Total \$722,214

Primary Field of Research (FoR): 0607 – PLANT BIOLOGY

Project Summary

Water availability is a primary determinant of plant growth and the distribution of plant species and communities throughout the world. In Australia, climate change is predicted to result in increasing temperatures and shifting precipitation patterns, leading to more intense droughts in some areas. This project will examine the resilience of Australian forests and woodlands to drought under both current and future climate scenarios. The results of this work will feed into the new generation of dynamic global vegetation models, allowing for robust prediction of changes in the structure and productivity of Australian vegetation communities in the face of rapid climate change.

RELIGION AND SOCIETY RESEARCH CENTRE

Dr Cristina Rocha

Title

Pentecostal Connections: Migration, Missionaries, Mobility and Media between Australia and Brazil

Total \$707,111

Primary FoR: 2204 – RELIGION AND RELIGIOUS STUDIES

Project Summary

This project investigates the rise of global Pentecostalism by exploring a Pentecostal transnational religious field between Australia and Brazil. In particular, it aims to investigate the role of Pentecostalism in the social welfare of migrants in Australia. This research contributes significant new knowledge to the ways in which religion is globalised and localised in everyday life, the role of religion in assisting migrants, and the continuing vitality and renewed public role of religion in late modernity. It will broaden the official vision of Brazil-Australia relations, encouraging policy to extend beyond the economic and political to include the cultural and social.

ARC Discovery Early Career Researcher Awards

GRANTS AWARDED TO UWS RESEARCHERS

INSTITUTE FOR CULTURE AND SOCIETY

Dr Sonja J Van Wichelen

Title

The Changing Rights to Family Life in Australia: Biomedicine and Legal Governance in Globalisation

Total \$346,449

Primary FoR: 2002 – CULTURAL STUDIES

Project Summary

This project investigates the impact of globalisation and biomedicine on the constitution of family through a cultural study of legal processes. It compares two contrasting and currently contested cases in Australia (transnational surrogacy arrangements and family reunification in immigration) to study the biomedicalisation of parenthood, the role of reproduction in border politics and legal transformations in governing 'family life'. The research will move beyond a critique of human rights, analysing justifications within legal doctrines, and exploring how the meaning of family is affected by science, capitalism and humanitarianism.

CENTRE FOR POSITIVE PSYCHOLOGY AND EDUCATION

Dr Philip D Parker

Title

Closing the Disadvantaged Gap: Self-Beliefs and Task Value as Drivers of Educational Choices During the Post High School Transition

Total \$389,352

Primary FoR: 1303 – SPECIALIST STUDIES IN EDUCATION

Project Summary

Australia's economic future requires education to close the gap between disadvantaged and advantaged students. Even successful interventions, however, typically increase the gap with advantaged students benefitting more. Whilst most efforts focus on test scores, evidence suggests that non-cognitive outcomes (such as, self-concept, task value, motivation and social context) are critical in closing the gap. This project will test these predictions for successful educational transitions by disadvantaged students, using an innovative blend of multiple large-scale primary and secondary data sources, and new, evolving statistical models. This project will provide potential actions for strengthening the economic and social future of disadvantaged youth in Australia and beyond.

ARC Discovery Projects

GRANTS AWARDED TO UWS RESEARCHERS

HAWKESBURY INSTITUTE FOR THE ENVIRONMENT (3)

Dr Scott N Johnson, Dr Benjamin D Moore

Title

Get tough, get toxic or get a bodyguard: how root herbivores shape grass defences

Total \$370,000

Primary FoR: 0602 – ECOLOGY

Project Summary

The weight of root-feeding beetles can exceed that of sheep on Australian pastures and can result in significant losses in productivity. Grasses fight back against aboveground herbivores using toughness (physical defence), toxicity (chemical defence) and bodyguards (recruitment of the herbivore's enemies). Little is known about belowground defences however, but grasses depend on roots for re-growth so good root defences seem essential. This study will apply optimal defence theory to consider these three defences against belowground herbivory across a range of grasses. The project will ask whether domestication has disarmed grass species and if defensive traits differ between photosynthetic pathways, before field-testing these patterns with root herbivore populations.

Dr Jeff R Powell, Prof Dr Matthias Rillig

Title

Getting to the root of the matter: predicting plant benefits from arbuscular mycorrhizal symbioses

Total \$320,000

Primary FoR: 0605 – MICROBIOLOGY

Project Summary

Massive efforts are underway to select beneficial root traits that enhance resource acquisition and productivity. These

efforts are usually conducted while excluding mutually beneficial mycorrhizal partnerships, which include two-thirds of higher plants. These efforts are likely to lead to artifactual outcomes unless the modifying effects of these partnerships are considered. While mycorrhization can substantially enhance plant vigour, results are often difficult to replicate due to widespread 'context-dependence'. This research will identify plant and fungal traits that predict how mycorrhizal plants benefit under a variety of contexts, which will improve varietal selection and productivity gains in marginal environments.

Prof Mark G Tjoelker, Dr Oula Ghannoum, Dr John E Drake, Prof David T Tissue, Prof Peter Reich

Title

Is physiological flexibility of forest trees constrained by home climate in a rapidly warming world?

Total \$315,000

Primary FoR: 0607 – PLANT BIOLOGY

Project Summary

The projected average Australian climate warming of 3 degrees Celsius by 2070 represents a shift in climate equivalent to moving 900km from Sydney to Brisbane. As forest trees cannot migrate fast enough to avoid these unprecedented increases in temperature, the resiliency of Australian forests to climate warming will depend on their capacity to physiologically adjust to higher temperatures. But, can forest trees successfully adjust to new climates in their current locations? This project plans to determine how thermal acclimation influences leaf and tree carbon exchange, and whether this depends upon a tree's "home" climate. These knowledge gaps limit our ability to predict the future of our forests and consequences for carbon cycling in a warmer world.

ARC Discovery Projects

INSTITUTE FOR CULTURE AND SOCIETY (2)

Prof Tony Bennett, Prof David C Rowe, Prof Gregory Noble, Dr Emma L Waterton, Prof Fred R Myers, Prof Deborah M Stevenson, Prof Modesto Gayo, Prof Timothy M Rowse, Prof Graeme Turner, Prof David J Carter

Title

Australian Cultural Fields: National and Transnational Dynamics

Total \$735,050

Primary FoR: 2002 – CULTURAL STUDIES

Project Summary

This interdisciplinary project investigates the shaping of Australian art, literary, media, sport, and heritage fields, individually and collectively, by the changing national and transnational environment since the 1994 national cultural policy Creative Nation. Like Creative Nation, its primary focus is on the relation between these fields and the nation, but also pays particular attention to the distinctive forms of cultural capital associated within and across these fields, especially ethnic cultural divisions and the distinctive presence of Indigenous culture. This project's empirical application and assessment of the concept of the 'cultural field' will contribute to the international development of cultural theory.

Dr Tim Winter, Dr Brett M Bennett, Prof Lynn Meskell

Title

The Crisis in International Heritage Conservation in an Age of Shifting Global Power

Total \$331,676

Primary FoR: 2102 – CURATORIAL AND RELATED STUDIES

Project Summary

This project responds to the current crisis in international heritage conservation at a time of shifting global power. The flagship of heritage conservation, the world heritage system, faces multiple pressures and agendas that endanger sites and politicise decision-making at all levels, from local to global. This project focuses on four iconic sites, Abu Simbel, Angkor, Bagan and Sumatran Rainforests, and the world heritage system itself, to reveal how pressures have grown and shifted since World War II, how they operate at multiple scales and what

new expertise might be introduced. It will produce a report for UNESCO and publications that include recommendations for solving challenges that threaten international heritage conservation today.

THE MARCS INSTITUTE (3)

Prof André van Schaik

Title

Hardware Acceleration for Neural Systems

Total \$430,000

Primary FoR: 0906 – ELECTRICAL AND ELECTRONIC ENGINEERING

Project Summary

To really understand how brains work, we need to simulate neural networks of a size similar to that of the human brain (100 billion neurons, 100 trillion connections). Simulating such a network on standard computers is not possible because of its sheer size. Several groups are currently building very expensive and proprietary hardware to solve this, but the output from these projects will not be accessible to other researchers. In order to make real progress in neuroscience, many more researchers need to be enabled to participate. To do this, the project will build a system from commercial hardware (FPGAs) that will cost only a few tens of thousands of dollars and it will make this design and software available for free.

Dr Gabrielle Weidemann, Prof Catherine J Stevens, Prof Christopher J Mitchell

Title

I like you and I just can't help it: Explaining automatic affective responses

Total \$293,000

Primary FoR: 1701 – PSYCHOLOGY

Project Summary

Our automatic affective responses are crucial in determining how we behave particularly in situations where there is little conscious deliberation. These automatic responses have been implicated in dysfunctional behaviours such as unhealthy food choices and racial bias. However very little research has

ARC Discovery Projects

investigated the psychological processes responsible for the formation of these automatic affective responses. The aim of this project is to investigate the role of conditioning and cognitive processes in the formation and expression of automatic affective responses. This will allow for the development of novel interventions targeting automatic responses which contribute to dysfunctional behaviour.

Prof Anne Cutler, Dr Evelina G Fedorenko

Title

Explaining the native-language listening advantage by charting neural response and perceptual adaptation across languages - but within individuals

Total \$440,000

Primary FoR: 1702 – COGNITIVE SCIENCES

Project Summary

Listening to the native language is easier than listening to a second language. This advantage is especially clear in recognising voices and in listening in noise. Identifying talkers was recently shown to involve rapid perceptual adjustment to their speech sounds, and successful listening in noise to involve adjustment of word recognition processes. This project tests the prediction that listeners more efficiently deploy each type of adjustment in the native than in a second language, by comparing native with second language phonetic and lexical processing within individuals. Further, a novel fMRI method in which target brain regions are defined functionally in each subject will identify the neural basis of the native listening advantage.

CENTRE FOR POSITIVE PSYCHOLOGY AND EDUCATION (2)

A/Prof Alexandre J Morin, Prof Rhonda G Craven, Dr Danielle K Tracey, A/Prof Christophe G Maiano

Title

Furthering Positive Futures for Children with Intellectual Disabilities: A Longitudinal Investigation

Total \$591,000

Primary FoR: 1701 – PSYCHOLOGY

Project Summary

This project will address the paucity of empirical research on drivers of psychosocial and physical well-being (PPW; for example self-concept, depression, behavioural problems, physical fitness, weight) of children with Intellectual Disabilities (ID). This proposal presents an extensive research program aimed at understanding the effects of school life and Physical Activity (PA) on PPW for Australian children with ID. This program examines: the relations between school life and PPW; the benefits, barriers and predictors of PA; moderators (personal characteristics, educational settings). The overarching objective is to advance theory and research in this area, and to inform intervention strategies furthering more positive futures for children with ID.

Prof Joseph Ciarrochi, Prof Patrick C Heaven, Prof Felicia A Huppert, Dr Todd Kashdan

Title

Identifying the biopsychosocial factors promoting healthy, productive, and fulfilling transitions from high school: A seven-year longitudinal study

Total \$324,000

Primary FoR: 1701 – PSYCHOLOGY

Project Summary

The post high-school transition represents the confluence of a number of developmental tasks. While there is considerable research on individuals after this transition, little research has examined adolescent development to identify early indicators of transition success. This project seeks to extend the multi-state, multi-year Australian Character Study (ACS), at the critical period when the ACS cohort will be transitioning out of school. Using a biopsychosocial approach, the research will explore the degree to which character strengths, contextual factors, and their interaction lead to positive transition experiences across a wide variety of domains, including social, spiritual, physical, and educational and occupational attainment.

ARC Discovery Projects

WRITING AND SOCIETY RESEARCH CENTRE

Prof Anthony J Uhlmann, Prof Bruno P Clément, Prof Nicholas Jose

Title

J.M. Coetzee and Making Sense in Literature

Total \$120,000

Primary FoR: 2005 – LITERARY STUDIES

Project Summary

Focusing on the work of Nobel Prize-winning South African-Australian novelist J. M. Coetzee, this project examines how Coetzee's fiction develops techniques that generate or produce meaning about the world and involves levels of 'translatability' that allow it to maintain relevance across cultures. A detailed analysis that focuses on how Coetzee makes us question the nature of meaning itself has not yet been undertaken, even though this is of central importance to his work.

SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS

Prof Yang Xiang, Dr Qinghua Zeng

Title

Material properties and mechanical behaviours of carbon nanotube-reinforced composite structures

Total \$286,000

Primary FoR: 0905 – CIVIL ENGINEERING

Project Summary

Polymer nanocomposites and their applications in advanced structures represent one of the most significant developments of composite materials and structures in the past decade. This project aims to quantify the equivalent material properties of effective individual carbon nanotube in polymer matrix, predict the mechanical properties of carbon nanotube reinforced polymer composites and optimise the mechanical behaviours of functionally graded carbon nanotube polymer composite structures through a multi-scale modelling and analytical approach. It will establish guidelines and strategies for design and development of high performance carbon nanotube-reinforced polymer composites and their functionally graded structures.

UWS RESEARCHERS ACHIEVING SUCCESS IN COLLABORATION WITH OTHER UNIVERSITIES

VIA THE UNIVERSITY OF NEWCASTLE SCHOOL OF HUMANITIES AND COMMUNICATION ARTS

Dr Mark D Harvey, Dr Robert S Mailhammer (UWS)

Title

Are all the languages of Australia related, deriving from a common source language: Proto-Australian

Total \$276,000

Primary FoR: 2004 – LINGUISTICS

Project Summary

This project addresses a central question about Australia's past. Are all the languages of Australia related, deriving from a common source language: Proto-Australian. The project will examine the implications of a 'yes' or a 'no' answer for analyses of Australian prehistory, and for general analyses of human prehistory. The project involves extensive documentation of an endangered language Yanyuwa, because of the significance of Yanyuwa data in deciding between a 'yes' or a 'no' answer. The project will provide a descriptive grammar of Yanyuwa, a book evaluating the Proto-Australian hypothesis, and articles discussing the significance of the success or failure of the hypothesis for theories of the general human past.

VIA DEAKIN UNIVERSITY SCHOOL OF SCIENCE AND HEALTH

Prof Neil W Barnett, A/Prof Paul S Francis, Dr Xavier A Conlan, Dr Paul G Stevenson, Prof Ross A Shalliker (UWS), Prof Stephen J Haswell, Prof Peter R; Fielden, Prof Nicholas J Goddard.

Total \$320,000

Primary FoR: 0301 – ANALYTICAL CHEMISTRY

ARC Discovery Projects

Project Summary

At present there is a need for fast and detailed chemical analysis of complex samples, such as those important to biomedical diagnostics and forensic science. Innovative technology will be developed here in order to reduce analysis time whilst maintaining the integrity of the chemical information contained within the sample. This step change in separation science will directly aid biomedical diagnostics, forensic sample determination and industrial process monitoring through decreased analysis time with an increase in the chemical information gained. By performing chemical separations on a microfluidic scale a reduction in both the cost of analysis and impact of solvent waste on the environment will be achieved.

VIA THE AUSTRALIAN NATIONAL UNIVERSITY HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

Prof William J Foley, Dr Benjamin D Moore (UWS), Prof Maria D Dearing

Title

Temperature-dependent toxicity of plant secondary compounds to mammalian herbivores

Total \$450,000

Primary FoR: 0602 – ECOLOGY

Project Summary

Changes in the toxicity of plant secondary compounds is an unexplored consequence of rises in ambient temperatures. Evidence from agricultural and laboratory studies suggests that temperature-dependent toxicity can have major effects on the intake and metabolism of plant secondary metabolites by mammals. These effects are mediated by a decrease in liver metabolism and by the effects of plant secondary metabolites on mitochondrial function which leads to greater heat production. The project will quantify the importance of temperature-dependent toxicity and measures the changes in the cost of detoxification to better model the effects of climate change on marsupial herbivores.

Discovery, Indigenous

UWS RESEARCHERS ACHIEVING SUCCESS IN COLLABORATION WITH OTHER UNIVERSITIES

VIA THE UNIVERSITY OF SYDNEY SCHOOL OF SCIENCE AND HEALTH

Dr Laura M Parker (UWS), A/Prof Ross A Coleman, A/Prof Pauline M Ross (UWS), Dr Patti Virtue

Title

Environmental change on larval energetics of molluscs on the southeast (SE) coast of Australia

Total \$593,000

Primary FoR: 0501 – ECOLOGICAL APPLICATIONS

Project Summary

This project will investigate the impact of environmental change on larval energetics of molluscs on the southeast (SE) coast of Australia. The SE coast of Australia is a climate hotspot characterised by rising ocean temperatures, fluctuations in salinity and we expect in the near future ocean acidification (OA). Mollusc larvae show extreme sensitivity to OA, but the impacts of other stressors remain unknown. It is predicted that OA will reduce the capacity of larvae to cope with temperature and salinity, particularly when food supply is low and in populations which have had no previous exposure to OA. Understanding the response of mollusc larvae to environmental change will support ecologically and economically significant mollusc populations over this century.

Linkage Infrastructure, Equipment and Facilities

GRANTS AWARDED TO UWS RESEARCHERS

SCHOOL OF SCIENCE AND HEALTH

Nanoscale

Prof William S Price, Prof Janice R Aldrich-Wright, Prof Annemarie Hennessy, A/Prof Arumugam S Sathasivan, Dr Allan M Torres, Dr Gary P Liney, Dr Lois C Holloway, Prof Geoff Delaney, Dr Bruce A Cornell, Dr Stephen G Bosi, Prof Magnus Nyden, Prof Barbara A Messerle, A/Prof Christoph H Arns, Prof Michael B Barton, Dr Jonathon E Beves, Dr Jason B Harper, Prof Steven R Meikle, Prof Maxwell R Bennett, Dr Roger M Bourne, Prof Paul J Keall, Prof Michael L Johns, Asst Prof Einar O Fridjonsson

Title

Ultra-high resolution magnetic resonance imaging (MRI) system for physical applications

Total \$1,064,000

Primary FoR: 0299 – OTHER PHYSICAL SCIENCES

Partner/Collaborating Eligible Organisation(s)

Ingham Health Research Institute, Liverpool Hospital, Surgical Diagnostics Pty Ltd, The University of New England, The University of New South Wales, University of South Australia, The University of Sydney, The University of Western Australia

Project Summary

Ultra-high resolution magnetic resonance imaging (MRI) system for physical applications: Ultra-high field magnetic resonance imaging provides unique high contrast images at previously inaccessible levels of resolution (<0.1mm). It non-invasively provides unprecedented information on chemical and biochemical processes including functional biological mechanisms. This infrastructure will be the focal point for more than 100 academics and HDR students. It will take Australia to the forefront of magnetic resonance imaging capability as well as providing unique insights into diffusion and electrophoretic problems central to designing next generation energy storage. Outcomes will range from agricultural advances, higher performing batteries, and more effective cancer treatments as well as advancing Australia's fundamental scientific capabilities.

UWS RESEARCHERS ACHIEVING SUCCESS IN COLLABORATION WITH OTHER UNIVERSITIES

VIA THE UNIVERSITY OF NEW SOUTH WALES SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS

A/Prof Evatt R Hawkes, Prof Aibing B Yu, Prof Michael Ferry, Prof Geraint F Lewis, Prof Dietmar Muller, Prof Marc R Wilkins, Prof Leo Radom, Prof Jeffrey R Reimers, A/Prof Peter B Greer, A/Prof Orsola De Marco, Prof Graham J King, A/Prof Frans A Henskens, Prof Catherine M Stampfl, Dr Graham E Ball, Dr Christopher G Poulton, Prof Bogdan Z Dlugogorski, Dr Haibo Yu, Prof Arthur Georges, A/Prof Chunhui Yang (UWS), Prof Willy Susilo, A/Prof Michael J Ford, Dr Kei-Wai K Cheung, Dr Adel Rahmani, Dr Matthew D Arnold, Dr Ming Zhao, Dr Cedric Gondro, Prof Mark E Johnson, Prof Abdulkadir S Sajeev, Prof Terry R Bossomaier

Title

Renewing Intersect's share of the National Computational Infrastructure's peak facility

Total \$1,025,000

Primary FoR: 0915 – INTERDISCIPLINARY ENGINEERING

Partner/Collaborating Eligible Organisation(s)

Charles Sturt University, University of Canberra, The University of Sydney, University of Technology, Sydney, Macquarie University, University of Wollongong, University of Western Sydney, The University of Newcastle, The University of New England, Southern Cross University

Project Summary

Renewing Intersect's share of the National Computational Infrastructure's peak facility: The rapid and continuing growth of supercomputing capabilities presents major new opportunities for scientific and engineering research. This project aims to allow world-leading computational researchers across the Intersect consortium of 11 universities to take advantage of these opportunities by renewing their partner share access to the National Computational Infrastructure facilities, notably a new petaflop-capable supercomputer and associated expert support. This access will enable the consortium's researchers to tackle grand challenge research problems in a diverse range of fields of national priority including frontier technologies, the environment, and promoting good health.

Linkage Infrastructure, Equipment and Facilities

VIA UNIVERSITY OF WOLLONGONG INSTITUTE FOR INFRASTRUCTURE ENGINEERING

Prof Buddhima N Indraratna, Prof Scott W Sloan, Prof Mark J Cassidy, Prof Daichao Sheng, Dr Cholachat Rujikiatkamjorn, Prof Kiet A Tieu, Prof John P Carter, Prof Andries B Fourie, Prof Nasser Khalili, Prof Abdelmalek Bouazza, Prof Jayantha K Kodikara, Prof Kenny C Kwok (UWS), Prof Manicka Dhanasekar, Prof Priyan Mendis, Prof David J Williams, Prof Brian Uy, A/Prof Arul Arulrajah, A/Prof Hadi Khabbaz, A/Prof Mohamed A Shahin, A/Prof Alex Remennikov, Prof J. Antonio H. Carraro, Prof John L Wilson, A/Prof Kristian Krabbenhoft, Prof Christophe Gaudin, Dr Sanjay S Nimbalkar, A/Prof Chin J Leo (UWS), Dr Adrian R Russell, A/Prof Paul A Meehan, Mr Norm Grady

Title

National Facility for Cyclic Testing of High-Speed Rail (FCTHSR)

Total \$900,000

Primary FoR: 0905 – CIVIL ENGINEERING

Partner/Collaborating Eligible Organisation(s)

Curtin University of Technology, Monash University, University of Technology, Sydney, Metro Trains Melbourne Pty Ltd, The University of Newcastle, The University of Western Australia, The University of Melbourne, University of Western Sydney, Swinburne University of Technology, Queensland University of Technology, The University of Queensland, The University of New South Wales

Project Summary

National facility for cyclic testing of high-speed rail: Frontier technologies in rail transport demand access to state-of-the-art testing facilities for track modelling. The proposed national Facility for Cyclic Testing of High-Speed Rail (FCTHSR) is internationally a first-of-its-kind and it will be designed and built in-house for examining an array of Australian ground conditions and integrated track components. This unique facility will offer a national and international hub for industry-driven research and consulting. The project outcomes will propel more Australian researchers to be among the world-leaders of rail technologies providing better solutions to challenging track environments. Prototype testing will ensure safer and cost-effective track designs.

VIA THE UNIVERSITY OF NEW SOUTH WALES HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

A/Prof Michael J Manefield, Prof Ian T Paulsen, Prof Brett A Neilan, Prof Michael R Gillings, Prof Gavin J Conibeer, Prof Peter J Ralph, Prof Ian C Anderson (UWS), Dr Federico Lauro, Dr Justin R Seymour, A/Prof Brajesh K Singh (UWS), Dr Sophie L Mazard, A/Prof Ashraf Uddin, Dr Andrew P Bissett, Dr Alan E Richardson, Dr Luke G Barrett, Dr Rosemary G White

Title

A ToF-SIMS facility for elemental and isotopic imaging of ultra-fine features for researchers in east Australia

Total \$1,000,000

Primary FoR: 0605 – MICROBIOLOGY

Partner/Collaborating Eligible Organisation(s)

Macquarie University, University of Western Sydney, University of Technology, Sydney, Commonwealth Scientific and Industrial Research Organisation

Project Summary

A time of flight secondary ion mass spectrometer facility for elemental and isotopic imaging of ultra-fine features: Microbiology has long been an area of strength in Australian science. With recent technological advances, microbiology has entered a new golden age unveiling an extraordinary level of diversity and the central role of microbes in global biogeochemistry. The 'omics' era is generating endless hypotheses regarding geochemical processes carried out by microbes and this necessitates the application of advanced technologies to generate empirical support. Time of flight secondary ion mass spectrometry has emerged as a key tool to unravel elemental cycling carried out by microorganisms in mixed species communities in contexts ranging from terrestrial to marine ecology and from groundwater bioremediation to biogas production biotechnologies.

Linkage Infrastructure, Equipment and Facilities

VIA THE AUSTRALIAN NATIONAL UNIVERSITY SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS

Prof Matthew Colless, Prof Michael J Drinkwater, A/Prof Andrew M Hopkins, Dr Jonathan S Lawrence, Prof Bryan M Gaensler, Prof Jonathan Bland-Hawthorn, Prof Elaine M Sadler, Prof Quentin A Parker, A/Prof Christopher A Blake, Prof Jeremy R Mould, Prof Lister G Staveley-Smith, Dr Baerbel S Koribalski, Dr Michael J Brown, Dr Heath Jones, Prof Raymond P Norris, Dr Kevin A Pimblet, Prof Christopher G Tinney, Dr Christopher M Springob, Dr David R Parkinson, Prof Rachel L Webster, Dr Nicholas F Tothill, A/Prof Miroslav D Filipovic (UWS), A/Prof Scott M Croom, Dr Michael J Ireland, A/Prof Andrew Sheinis

Title

TAIPAN - a spectrograph to survey the southern sky

Total \$350,000

Primary FoR: 0201 – ASTRONOMICAL AND SPACE SCIENCES

Partner/Collaborating Eligible Organisation(s)

University of Western Sydney, Australian Astronomical Observatory, Commonwealth Scientific and Industrial Research Organisation, The University of Queensland, The University of Sydney, Macquarie University, Swinburne University of Technology, The University of Western Australia, Monash University, The University of Melbourne, The University of New South Wales

Project Summary

TAIPAN - a spectrograph to survey the southern sky: The TAIPAN spectroscopic survey of the southern sky aims to quadruple the number of nearby galaxies with measured redshifts, distances and velocities. Science goals include measuring the expansion rate of the universe to 1 per cent precision, and combining optical spectroscopy and radio data for each galaxy to measure the rate at which gas is being converted into stars in the local universe. This project supports construction of the TAIPAN high-performance spectrograph that will be used to carry out the survey on the UK Schmidt Telescope (UKST). The results of the survey will be made freely available to all Australian astronomers.

VIA THE UNIVERSITY OF NEW SOUTH WALES INSTITUTE FOR INFRASTRUCTURE ENGINEERING

A/Prof Gangadhara B Prusty, A/Prof Paul Compston, Prof Liyong Tong, Prof Kenny C Kwok (UWS), A/Prof Bronwyn L Fox, Dr Youhong Tang, Dr Roberto E Ojeda Rabanal, Prof Debes Bhattacharyya, Dr Nigel A St John, Dr Andrew Beehag, Mr Mark Sterbic, Prof Brian Uy, Prof Veena Sahajwalla, Dr Garth Pearce, Prof Qing-Hua Qin, Prof Evgeny V Morozov, Prof Lin Ye, Prof Kim J Rasmussen, Dr Fidelis R Mashiri (UWS), Dr Rajarshi Das, Dr Stuart J Wildy

Title

An Australasian facility for the automated fabrication of high performance bespoke components

Total \$500,000

Primary FoR: 0912 – MATERIALS ENGINEERING

Partner/Collaborating Eligible Organisation(s)

ACS-A Pty Ltd, CST Composites, The Australian National University, The University of Sydney, University of Western Sydney, The Flinders University of South Australia, Deakin University, University of Tasmania, The University of Auckland, Defence Science and Technology Organisation

Project Summary

A facility for the automated fabrication of high performance bespoke components: The project will create a new coordinated facility for composites research including modern automated infrastructure. The facility will bring Australia in line with leading international research centres and promote fundamental and applied research into a range of fields including underwater renewable energy systems, space vehicle structures, multifunctional and smart materials and infrastructure capacity extension. The facility will position Australian research for significant international collaboration through endorsement of next-generation manufacturing technology and enable leading outcomes for Australasian science and engineering in aerospace, marine, civil, automotive, renewable energy and primary resources.

Linkage Infrastructure, Equipment and Facilities

VIA UNIVERSITY OF TECHNOLOGY, SYDNEY SCHOOL OF LAW

Prof Andrew S Mowbray, Prof Graham W Greenleaf, Prof Andrew C Byrnes, Prof Erika J Techera, Prof Donald R Rothwell, Prof Chester W Brown, A/Prof Anthony E Cassimatis, Prof Dan J Svantesson, Prof Jane McAdam, Prof Ross Buckley, Prof Dr Ana F Vrdoljak, A/Prof Julie F Debeljak, Prof Dianne L Otto, Prof Michael L Blakeney, A/Prof Timothy D Stephens, Prof Michael A Adams (UWS), Dr Hitoshi Nasu, A/Prof Kevin J Heller, A/Prof Vai Io Lo, Mr Andrew M Wells, Prof Holly Cullen, Dr Richard J Joyce

Title

The International Law Library on the World Legal Information Institute

Total \$284,000

Primary FoR: 1801 – LAW

Partner/Collaborating Eligible Organisation(s)

The University of Melbourne, The University of New South Wales, The University of Sydney, The University of Western Australia, Bond University, University of Western Sydney, The University of Queensland, The Australian National University, Monash University

Project Summary

The International Law Library on the World Legal Information Institute: new content and facilities for the leading repository and citator for international law: The International Law Library on the AustLII-operated WorldLII system already provides the most comprehensive free-access location of international law research materials, attracting over 2 million annual page accesses. This project to transform the Library will expand all its content (international case law, treaties, other key resources and commentary); improve its distribution (for example, RSS feeds for new cases); automate updating processes; add extensive metadata to improve citation histories; and provide other metrics so users can recognise significant materials. Necessary processing, storage and scanning equipment will be acquired. All international law research will be improved, as will Australian leadership in research infrastructure.