WESTERN SYDNEY
UNIVERSITY

Australian Research Council Grants for 2017

Australian Research Council Grants for 2017

Western Sydney University has been successful in winning $5,104,500 in Australian Research Council (ARC) grants for 2017.

Our researchers will lead ten new Discovery Projects, and collaborate on a number of other Discovery Projects, and Linkage Infrastructure, Equipment and Facilities projects with research partners in other institutions.

The University has also been awarded one Discovery Early Career Researcher Award to the value of $369,000 and one Future Fellowships grant with funding totalling $895,000.

Congratulations to the following researchers who have been awarded ARC grants for 2017.

Professor Donald McNeill, project: 'Volumetric Urbanism'

Discovery Projects

HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

LEAD RESEARCHER: DR SCOTT JOHNSON
RESEARCH TEAM: PROFESSOR SUE HARTLEY; PROFESSOR DAVID TISSUE (WESTERN)
FUNDING AMOUNT: $338,000

DOWN TO EARTH DEFENCE: UNLOCKING SILICON DEFENCES FOR PLANT PROTECTION

This project aims to study how silicon uptake in grasses affects plant susceptibility aboveground. Grasses contain more silicon than nearly any other plant, which they acquire entirely from the soil. Silicon increases plant resistance to herbivores, disease and drought, but up to 25 per cent of grass productivity is lost to root herbivores, a situation compounded by water stress. Silicon uptake is poorly understood, but root herbivory and changing rainfall patterns can either impair uptake or induce the plant to take up more silicon. The goal of this project is to optimise silicon-based resistance in grasses and exploit this for plant protection from invasive pests and drought.

LEAD RESEARCHER: PROFESSOR ELISE PENDALL
RESEARCH TEAM: PROFESSOR STEFAN ARNDT; PROFESSOR MARK TJOELKER (WESTERN); DR EVA VAN GORSEL; PROFESSOR ERIC DAVIDSON; DR VANESSA HAVERD
FUNDING AMOUNT: $405,500

TEMPERATURE SENSITIVITY OF SOIL RESPIRATION AND ITS COMPONENTS

This project aims to demonstrate how temperate evergreen forests could buffer against climate change. Soil respiration returns around half the carbon taken up by forests to the atmosphere. The project will characterise and quantify how microbes and roots in soils depend on temperature and substrate supply, and so predict how rising temperatures and drought will affect forests as natural carbon sequestration sinks. This project will resolve the roles of environmental drivers of soil respiration across forests; integrate mechanistic understanding of differing plant and microbial responses to temperature within a common modelling framework; and evaluate the implications of this knowledge in predictions of climatic impacts on terrestrial carbon cycling.

LEAD RESEARCHER: PROFESSOR BRAJESH SINGH
RESEARCH TEAM: PROFESSOR PETER REICH (WESTERN)
FUNDING AMOUNT: $396,000

DO MICROBIAL AND PLANT DIVERSITY INTERACT TO REGULATE MULTIFUNCTIONALITY?

This project aims to quantify the relative contribution of plant and microbial communities and their interactions on the rate, stability and resilience of ecosystem functions. Plant and soil microbial communities contribute to the functioning of terrestrial ecosystems, driving key processes such as carbon and nutrient cycling. This project will adapt established theories which indicate that greater plant diversity improves ecosystem functions, stability and recovery. The expected outcome is a unifying framework for determining variation in functions across different ecosystem types and environmental disturbance such as rapid climate change. The insight gained into vulnerable ecosystems will help stakeholders (government, conservation, land management) to prioritise the focus on conservation and reduce risks to ecosystem services.

LEAD RESEARCHER: DR JUSTIN WELBERGEN
RESEARCH TEAM: DR CHRISTOPHER TURBILL (WESTERN); DR DAVID WESTCOTT
FUNDING AMOUNT: $389,500

MOVEMENT ECOLOGY OF FLYING-FOXES

This project aims to understand flying-fox movement ecology from individual navigation through to population redistribution. Understanding movement across spatiotemporal scales is a goal of movement research. Grey-headed flying-foxes are mobile, and advances in tracking technology make them ideal for studying movement across scales. The project will determine how flying foxes navigate, and integrate this with drivers of their movement to understand their movement ecology by using methods that integrate experimental manipulation with telemetry, Doppler radar and analytical techniques. This is expected to develop much-needed management strategies that incorporate an understanding of movement.

INSTITUTE FOR CULTURE AND SOCIETY

LEAD RESEARCHER: PROFESSOR TONY BENNETT
RESEARCH TEAM: PROFESSOR GAY HAWKINS (WESTERN); PROFESSOR GREGORY NOBLE (WESTERN); PROFESSOR NIKOLAS ROSE
FUNDING AMOUNT: $360,500

ASSEMBLING AND GOVERNING HABITS

This project aims to examine how modern Western disciplines conceived of habits, and how these conceptions informed the techniques of mundane governance which managed habits. As cities face increasing pressures, the challenges of governing everyday habits prompt urgent questions about how habits are understood and managed. This project will study the governance of 'city habits' from the late 19th century to the present. The project will apply and deepen its description of habit through case studies focused on contemporary Sydney. Its findings are expected to benefit city planners and policy makers by informing the organisation and regulation of habits.

LEAD RESEARCHER: DR DENIS BYRNE
RESEARCH TEAM: PROFESSOR IEN ANG (WESTERN)
FUNDING AMOUNT: $298,500

THE CHINA-AUSTRALIA HERITAGE CORRIDOR

This project aims to show how buildings and places created by Chinese migrants in Australia and home places in China testify, beyond the narrative of arrival and settlement, to Australian connections with China and the Chinese diaspora. Using the 'heritage corridor' concept, it aims to develop a transnational approach to migration heritage and will provide tools and concepts for broadly documenting, analysing and interpreting Australia's migration heritage. The project aims to help a more cosmopolitan 21st century Australia capitalise on its legacy of regional linkages through Chinese migration.

LEAD RESEARCHER: PROFESSOR DONALD MCNEILL
RESEARCH TEAM: PROFESSOR DR SIMON MARVIN
FUNDING AMOUNT: $403,500

VOLUMETRIC URBANISM

This project aims to explain how global built environment and development firms 'push the envelope' of urban space. In cities worldwide, governments are faced with the problem and possibilities of 'volume': stacking and moving people within booming central business districts, especially around mass public transport nodes. The project will examine the prototypes, calculative devices and mediating technologies that are used to redefine cities and maximise development values. It will analyse the justifications for high volume urban development projects, and assess how transnational business and design models shape city redevelopment. This project expects to provide insights into interpreting complex urban megaprojects in Australia and internationally.

THE MARCS INSTITUTE

LEAD RESEARCHER: DR MANUEL VARLET
RESEARCH TEAM: PROFESSOR PETER KELLER (WESTERN); DR SYLVIE NOZARADAN (WESTERN); PROFESSOR LAUREL TRAINOR; PROFESSOR RICHARD SCHMIDT
FUNDING AMOUNT: $341,500

EFFECTS OF AUDIO-VISUAL RHYTHMIC STIMULATION ON MOTOR FUNCTIONING

This project aims to determine how the human capacity for entrainment contributes to the development and modification of motor functions through passive perception. Human movements are spontaneously attracted to auditory and visual environmental rhythms. The intended outcome is knowledge about short and long-term effects of entrainment on spontaneous cerebral, muscular and behavioural motor activity, and how auditory rhythms combined with visual depictions of human movement modulate these effects. This research should advance the understanding of perception and action links, ultimately opening pathways for training patients with reduced movement capacities and developing health technologies.

SCHOOL OF HUMANITIES AND COMMUNICATION ARTS

LEAD RESEARCHER: PROFESSOR ANTHONY UHLMANN
RESEARCH TEAM: MS ALEXIS WRIGHT (WESTERN); DR BEN ETHERINGTON (WESTERN); PROFESSOR JOHN COETZEE; PROFESSOR NICHOLAS JOSE (WESTERN); PROFESSOR GAIL JONES (WESTERN)
FUNDING AMOUNT: $572,000

OTHER WORLDS: FORMS OF WORLD LITERATURE

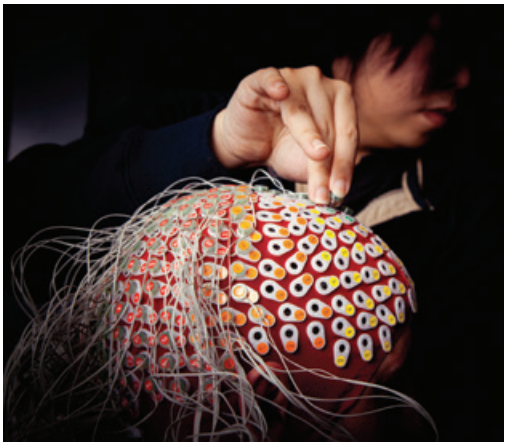
This project aims to explore a new vision of 'world literature'. Creative writing is a way of thinking, and theoretical possibilities arise from the exchange between literary criticism and literary practice. The project will bring the formal and thematic interests of four eminent Australian writers – Alexis Wright, Nicholas Jose, Gail Jones and J.M. Coetzee – into dialogue with each other and a team of critical respondents. Critical and creative dialogues between Indigenous and non-Indigenous Australia, Argentina, China, and England provide an opportunity to think about how contemporary Australian writing might meaningfully be considered in the terms of world literature.

SCHOOL OF SOCIAL SCIENCES AND PSYCHOLOGY

LEAD RESEARCHER: DR TAMARA WATSON
RESEARCH TEAM: ASSOCIATE PROFESSOR BRANKA SPEHAR; DR DAMIEN MANNION
FUNDING AMOUNT: $335,500

FLOWER POWER: NATURAL FORM, AESTHETICS AND THE HUMAN BRAIN

This project aims to study how the brain represents the emotion of aesthetic experience. The project will establish the characteristics of flowers and floral design that govern their appeal using large scale web based data collection, and identify the neural representation of floral beauty using integrative data analysis. Outcomes of the project are expected to help flower growers and designers with product planning, supporting industry sustainability. The project will also establish how the brain generates positive experience in response to our visual environment, promoting well-being by enabling informed visual design decisions.



Discovery Early Career Researcher Awards (DECRAs)

THE MARCS INSTITUTE

LEAD RESEARCHER: DR ANDREW MILNE
FUNDING AMOUNT: $369,000

UNCOVERING UNIVERSAL MECHANISMS FOR THE COMMUNICATION OF MUSICAL EMOTION

This project aims to understand the universal perceptual and cognitive mechanisms underlying musical communication. Music is a language of the emotions with a remarkable capacity to communicate across personal and cultural boundaries. The project will develop and refine a computational toolbox of perceptual models in light of behavioural experiments using musical and non-musical sonic stimuli. These models will also be used to develop software to compose perceptually grounded music. The intended outcomes are increased knowledge of perception, composition and computational modelling of music, which will stimulate investigations into music's societal benefits and therapeutic applications.

Science Building, Parramatta campus. Opened 2016

Future Fellowships

THE MARCS INSTITUTE

LEAD RESEARCHER: ASSOCIATE PROFESSOR PAOLA ESCUDERO
FUNDING AMOUNT: $895,000

ENHANCING LANGUAGE LEARNING VIA AUDITORY TRAINING AND INTERACTION

This project aims to improve adult language learning. Most adults struggle to pronounce foreign speech, because their native processing skills cannot process foreign sounds. During infancy, native sound perception is tuned through listening to variants of speech sounds while interacting with care-givers. This project aims to show that adults can reprogram their processing skills if placed in the rich environment available to infants. Rigorous testing will show whether auditory training improves processing of foreign speech sounds in adults and children and leads to successful understanding and pronunciation of foreign words. This project could benefit many Australian monolingual families who have not fully engaged with neighbouring cultures due to a language barrier.

Discovery Projects administered by other institutions

CENTRE FOR INFRASTRUCTURE ENGINEERING

RESEARCHERS: PROFESSOR BRIAN UY; DR EHAB HAMED; PROFESSOR ZHONG TAO (WESTERN); DR WON HEE KANG (WESTERN)
ADMINISTERING INSTITUTION: THE UNIVERSITY OF NEW SOUTH WALES
FUNDING AMOUNT: $435,500

COUPLED SERVICE AND ULTIMATE BEHAVIOUR OF HIGH STRENGTH COMPOSITE COLUMNS

This project aims to improve the coupled service and strength load behaviour of high strength composite columns used in building and bridge infrastructure. Taller and longer buildings and bridges need efficient and safe material. Australian Standards for concrete and steel now allow higher strength materials of 100 and 690 MPa. The project will consider coupled service and strength load issues incorporating time-dependent effects and ductility, and extend the range of concrete and steel strengths to 150 and 960 MPa for world-class heavy infrastructure. This project is expected to improve the safety and economy of tall buildings, bridges and large infrastructure.

HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

RESEARCHERS: ASSOCIATE PROFESSOR TIMOTHY BRODRIBB; DR BRENDAN CHOAT (WESTERN); DR HERVE COCHARD; DR PHILIPPE MARMOTTANT; DR SYLVAIN DELZON
ADMINISTERING INSTITUTION: UNIVERSITY OF TASMANIA
FUNDING AMOUNT: $375,500

FINDING THE FAILURE-THRESHOLD OF LEAVES IN DROUGHT

This project aims to reveal how specific water-stress thresholds damage the leaves of Australian crop and forest species during drought. Water stress affects agricultural productivity and plant survival in drought-prone regions such as Australia. Using optical and X-ray techniques, this project seeks to visualise and quantify the dynamic processes of damage and repair in leaves under stress. Anticipated outputs include a practical basis to predict drought-induced canopy death; identification of threats to ecologically sensitive plants; and selection and screening tools to improve the drought resilience of agriculturally important crop species.

INSTITUTE FOR CULTURE AND SOCIETY

RESEARCHERS: PROFESSOR ANITA HARRIS; ASSOCIATE PROFESSOR LORETTA BALDASSAR; DR SHANTHI ROBERTSON (WESTERN)
ADMINISTERING INSTITUTION: DEAKIN UNIVERSITY
FUNDING AMOUNT: $613,000

UNDERSTANDING THE EFFECTS OF TRANSNATIONAL MOBILITY ON YOUTH TRANSITIONS

This project aims to examine transnational mobility amongst young people and to understand its effects on their economic opportunities, social and familial ties, capacity for citizenship and transitions to adulthood. Young people increasingly migrate abroad for work and education, and Australia is a significant hub for sending and receiving. Migration and education policies encourage this mobility, which is expected to provide youth with enhanced competitive skills. Outcomes of this project include a significant dataset and online research database on how youth from various cultural backgrounds manage mobility and develop economic, social and civic benefits for themselves and the broader community.

WRITING AND SOCIETY RESEARCH CENTRE, SCHOOL OF HUMANITIES AND COMMUNICATION ARTS

RESEARCHERS: PROFESSOR MOIRA GATENS; PROFESSOR ANTHONY UHLMANN (WESTERN)
ADMINISTERING INSTITUTION: THE UNIVERSITY OF SYDNEY
FUNDING AMOUNT: $280,000

SPINOZA AND LITERATURE FOR LIFE: A PRACTICAL THEORY OF ART

This project aims to construct a Spinozistic theory of art that shows how the enjoyment of art promotes the art of living well. Many artists have celebrated the inspirational force of Spinoza's philosophy on their works, but philosophers have denied or neglected the relevance of his philosophy to art. By working across literary and philosophical resources, this project will show how Romantic, Victorian, and Modernist writers drew on his thought. This project expects to contribute to Spinoza studies, philosophy and literature and ethics, and show how and why artistic enjoyment is essential for human health and wellbeing.

Linkage Infrastructure, Equipment and Facilities Projects administered by other institutions

CENTRE FOR INFRASTRUCTURE ENGINEERING; HAWKESBURY INSTITUTE FOR THE ENVIRONMENT

RESEARCHERS: PROFESSOR EVATT HAWKES; PROFESSOR MARC WILKINS; PROFESSOR MICHAEL FERRY; PROFESSOR GERAINT LEWIS; EMINENT PROFESSOR LEO RADOM; PROFESSOR DIETMAR MULLER; ASSOCIATE PROFESSOR MICHAEL FORD; PROFESSOR ERIC KENNEDY; ASSOCIATE PROFESSOR MURRAY CAIRNS; PROFESSOR BIJAN SAMALI (WESTERN); PROFESSOR IAN ANDERSON (WESTERN); DR SANG HONG LEE; DR PETER UNMACK; PROFESSOR GRAHAM KING; PROFESSOR BRIAN SMITH
ADMINISTERING INSTITUTION: THE UNIVERSITY OF NEW SOUTH WALES
FUNDING AMOUNT: $900,000

MAINTAINING INTERSECT MEMBER ACCESS TO THE NCI PEAK SUPERCOMPUTING FACILITY

This project aims to continue the access of Intersect's computational researchers to the National Computational Infrastructure (NCI) peak supercomputing facility. The peak supercomputing facility at NCI is critical collaborative infrastructure on a globally competitive scale. Transformative advances in science and technology increasingly rely on high performance computing capabilities across a wide range of research disciplines. Ongoing access to this facility will allow researchers to tackle major problems in national priority areas including energy, health, and environmental change.

CENTRE FOR INFRASTRUCTURE ENGINEERING; SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS

RESEARCHERS: PROFESSOR JAY SANJAYAN; PROFESSOR STEPHEN FOSTER; PROFESSOR BRIAN UY; PROFESSOR PRIYAN MENDIS; PROFESSOR YI-MIN (MIKE) XIE; ASSOCIATE PROFESSOR WENHUI DUAN; DR ASGHAR HABIBNEGAD KORAYEM; DR VINH DAO; PROFESSOR ZHONG TAO (WESTERN); DR MAURICE GUERRIERI; PROFESSOR SYED MASOOD; PROFESSOR EMAD GAD; PROFESSOR JOHN WILSON; PROFESSOR SUJEEVA SETUNGE; ASSOCIATE PROFESSOR RICHARD YANG (WESTERN)
ADMINISTERING INSTITUTION: SWINBURNE UNIVERSITY OF TECHNOLOGY
FUNDING AMOUNT: $458,000

3D PRINTING FACILITY USING CONCRETE FOR CONSTRUCTION AUTOMATION RESEARCH

This project aims to develop concrete types of construction materials and structural forms. Three-dimensional concrete printing is a process for construction automation, and adapting recent advances in Additive Manufacturing technologies makes rapid progress possible. However, unsuitable concrete and structural designs and a lack of underpinning material and structural research hamper development. The project will test material properties, fabrication technologies and structural design concepts; and build and test freeform concrete structures. Achieving construction automation is expected to reduce injury rates by eliminating dangerous jobs, create high-end technology-based jobs, and make concrete construction cheaper by eliminating formwork.

SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICS

RESEARCHERS: ASSOCIATE PROFESSOR GAVIN ROWELL; DR NIGEL MAXTED; PROFESSOR MICHAEL BURTON; PROFESSOR HIROYASU TAJIMA; ASSOCIATE PROFESSOR PETER VEITCH; ASSOCIATE PROFESSOR CSABA BALAZS; PROFESSOR MIROSLAV FILIPOVIC (WESTERN); PROFESSOR GEOFFREY BICKNELL; DR MARTIN WHITE; PROFESSOR ANNE GREEN; DR DAVID BERGE; PROFESSOR BRUCE DAWSON; PROFESSOR TIMOTHY GREENSHAW; DR ROLAND CROCKER; PROFESSOR JIM HINTON
ADMINISTERING INSTITUTION: THE UNIVERSITY OF ADELAIDE
FUNDING AMOUNT: $1,390,000

THE CHERENKOV TELESCOPE ARRAY – PRODUCTION PHASE

This project aims to ensure Australia's contribution to the five-year production phase of the Cherenkov Telescope Array (CTA), a very high energy gamma-ray astronomy instrument that is expected to transform both high energy astrophysics and astro-particle physics. Gamma-ray astronomy probes extreme processes in the Universe such as exploding stars, black holes, and mysterious dark matter. The project will maintain Australian access to all data and key science programmes of the CTA. Australian astronomers will be able to directly influence the major astrophysics goals of CTA, and link in with Australia's flagship astronomical infrastructure. This is expected to benefit astrophysics, big data processing, electronics, atmospheric physics and optics.

Western Sydney University
Locked Bag 1797
Penrith NSW 2751 Australia

WESTERNSYDNEY.EDU.AU