Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Australian Capital Territory						
The Australian National University						
DE220100042	**Self-determination for Indigenous Australia: histories, visions and voice**	77,476.00	153,814.00	140,519.50	64,181.50	435,991.00
Rademaker, Dr Laura M	This project aims to provide a historical exploration of the experiences of self-determination in Aboriginal communities in the Northern Territory. Working in partnership with Indigenous collaborators, it expects to generate new knowledge of the challenges and opportunities which arose from the process of self-determination. Expected outcomes include a new history of the Northern Territory as shaped by self-determination, together with innovative methods for community-based collaborative research which give voice to historical Indigenous experiences. This should provide significant benefits for policymakers engaging with Indigenous communities and generate deeper cultural understanding of an important era in Australia's Indigenous history.					
	National Interest Test Statement					
	Remote Aboriginal communities continue to endure inequities in health, education and economic outcomes. The Commonwealth Government introduced a policy of self-determination in 1973, which included the transformation of remote missions in the Northern Territory into these communities. Yet the Uluru Statement shows that many Indigenous leaders do not consider self-determination to have been realised. Truth-telling about this period is therefore vital. This collaborative project will investigate what self-determination meant for communities and what Indigenous people, governments and churches attempted in its name. The research will generate opportunities and outputs for Indigenous communities to promote and revitalise their stories for the benefit of the rising generation and broader Australian public. The benefit this project will contribute to Australian culture includes increased awareness of past policy successes and failures (as a precursor to improved policy delivery) and an historically-informed evidence-base for national debate about Indigenous sovereignties.					
DE220100144	**Linking changes in plant-pollinator networks to plant reproduction**	72,803.50	145,309.50	150,470.50	77,964.50	446,548.00
Bennett, Dr Joanne M	The project aims to investigate how human actions in agricultural landscapes affect the activity of pollinating insects and the consequence for the plants that rely on them for reproduction. The project seeks to reveal how the structure of plant-pollinator networks is related to the reproductive success of plants through the novel application of networks that describe patterns in species interactions. The knowledge gained from this study will enhance our ability to forecast the effects of insect declines for plant seed production in Australia and the world. The intended benefit is an improved capacity to identify vulnerable plant species and maintain pollination services in managed landscape for both wild and cultivated plant populations.					
	National Interest Test Statement					
	Pollinators may be particularly vulnerable to environmental disturbance. This is very concerning because most wild and cultivated plants rely on pollinators to reproduce, including plants that are important for Australian livelihoods such as fruit, berry, vegetable, and nut crops, medicines, and materials. The project will investigate how environmental change affects the relationship between plant-pollinator interactions and plant reproductive success. The outcomes of this project will enhance our capacity to sustainably manage agricultural landscapes for the promotion of pollination services for both native plants and food production. It will also inform us about the current state of pollinator services in Australia, which are currently largely unknown.					
DE220100163	**Harnessing dynamic materials to produce better heterogeneous catalysts**	68,500.00	137,000.00	137,000.00	68,500.00	411,000.00
Evans, Dr Jack D	This project aims to investigate an emerging class of catalysts featuring dynamic reaction sites using innovative computational chemistry methods. The capability of traditional materials has reached a performance status quo for many catalytic reactions. Dynamic materials may unlock a new dimension in catalyst design; however, their influence on reactivity is unclear, and the combination of materials and dynamics represents an immense parameter space. This project expects to provide a comprehensive framework for understanding dynamic catalytic processes. Expected outcomes of this project include the identification of specific materials and dynamics that achieve extraordinary efficiency for the benefit of sustainable chemical production.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The global market growth for chemical processes is driven by the development of new materials and there are increasing requirements of purity and efficiency in the chemical industries. This innovative project lies at the cutting-edge of contemporary international research into stimuli-responsive materials and new heterogeneous catalysts. It will assess the ability of new materials to perform a variety of industrial transformations with improved efficiency. The enhanced performance of these materials will strengthen the economic viability of Australian chemical production and the development of this emerging technology could underpin the growth of Australia's advanced manufacturing capability. New catalytic processes, investigated in this project, expand Australia's research capacity and are vital to transition the economy towards value-add industries, securing jobs for Australians into the future. The science described in the proposed work builds upon a solid foundation of preliminary results and expands the application of fascinating materials to new exciting directions.					
DE220100595 Haines, Dr Thomas E	**Efficient privacy-preserving proofs for secure e-government and e-voting** Electronic systems are becoming increasingly widespread and crucial to social and economic wellbeing. This project aims to ensure that e-government, e-health, e-commerce and e-voting are secure and trustworthy by inventing new ways to verify these systems without infringing privacy. This project expects to use innovative techniques from cryptography to support development of trustworthy systems. Expected outcomes of this project include better support for organisations to build trustworthy systems that will maximise benefit to Australian business and society. This should provide significant commercial, reputational, and societal benefits by avoiding disruptions to the organisations and their clients if and when they are attacked.	69,400.00	138,800.00	138,800.00	69,400.00	416,400.00
	National Interest Test Statement Cybercrime costs the global economy trillions of dollars annually in addition to profound societal costs. The project aims to develop innovative techniques in cryptography to provide trustworthy and robust systems with potential applications to e-commerce, e-government, e-health and e-voting. Securing systems has a direct economic and commercial benefit to organisations through avoiding disruptions if and when these systems are attacked. Not only are robust systems vital to prevent direct, indirect, and reputational costs to the organisation, they also benefit organisation's end users or clientele who are no longer burdened with the costs of successful cyber-attacks. In addition to the commercial benefits, are the social benefits; the trustworthiness of e-government and e-voting are crucial to health of democracies including Australia.					
DE220100663 Desborough, Dr Jane L	**The Real Price of Health: Experiences of Out-of-Pocket Costs in Australia** This project aims to investigate the experiences and preferences of Australian families and individuals on low, middle, and high incomes in managing the out-of-pocket costs of chronic disease. This project aspires to ensure outcomes that are relevant to the public and patients through involving people living with chronic disease in the research team. The project expects to generate a discrete choice model that describes people with chronic diseases' preferences, and the trade-offs that they are faced with when deciding how to manage out-of-pocket health costs. The evidence arising from this innovative study will be used to directly inform Australian health policy, leading to wide-ranging health and economic benefits for the whole community.	72,513.50	147,661.50	147,911.50	72,763.50	440,850.00
	National Interest Test Statement Medicare was established to ensure equity of access to healthcare for all Australians; however, 17% of healthcare costs are funded through out of pocket (OOP) costs by individuals. For people on lower incomes, this can constitute a large proportion of their income. For the 47% of Australians with one or more chronic diseases, effective treatment is essential to maintain optimum health and productivity; however, OOP costs can present a substantial challenge to achieving this for some. This project aims to investigate the experiences and preferences of Australian families and individuals on low, middle, and high incomes in managing the OOP costs of chronic disease. The intended outcomes of this project are to describe the experiences and preferences of people with chronic disease, and the trade-offs they make when deciding how to manage OOP health costs. This study will provide new and important information to inform Australian healthcare financing policy, enhancing the progressivity and equity of Australia's health system. This will result in economic, health and social benefits for Australians.					
DE220100691 Lee, Dr Conrad C	**The influence of conscious state on cortical processing and perception** This project aims to understand the brain circuits that link consciousness with sensory perception. By using state-of-the-art imaging and electrical recording techniques, I will determine how different types of cells in the brain interact to transform sensory information into perception, measured under different states of conscious awareness. The project will apply the rigorous approaches of neuroscience to solving the puzzle of consciousness. The findings will have major implications for our future ability to treat brain disorders and build artificially intelligent machines.	72,437.00	139,641.50	131,544.00	64,339.50	407,962.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project will enhance Australia's research capacity and technological innovation by investigating how changes in consciousness affect the way the brain processes sensory information. The outcomes from this research will substantially shift our current understanding about how the brain produces perception, with impacts across a broad range of sciences. First, this project will improve our understanding of the neural circuitry that is linked to a number of development disorders, such as Autism Spectrum Disorder and Attention Deficit Disorder. Second, this project uses advance computational modelling which will enhance artificial intelligence and neuromorphic engineering. It will provide new biologically inspired framework by mimicking the physical architecture and design principles of brain circuits revealed by this project.					
DE220100712 Estrecho, Dr Eliezer	**Mixing light and matter with complex gauge fields** Quantum fluids of light and electronic matter provide a practical route towards technological applications of collective quantum effects that were previously only possible at extreme conditions. However, progress in harnessing these effects, such as the flow of synchronised particles without resistance, is hindered by the weak interaction of the hybrid light-matter particles with electromagnetic fields. This project aims to engineer artificial fields that can easily control these hybrid particles and their flow in semiconductors at ambient conditions. The outcome of this research will benefit the design of low-energy devices and new quantum technologies based on hybrid light-matter quantum fluids.	69,342.00	141,561.50	144,439.00	72,219.50	427,562.00
	National Interest Test Statement Quantum physics has revolutionised the way we live, work, and communicate since the birth of computers and the internet. New quantum technologies that rely on controlling, isolating, and sensing individual quantum particles have matured for applications in health, mining, space, and defence. This has opened a new opportunity for Australia that can potentially unlock a four billion-dollar industry. The proposed project opens a new avenue for utilising quantum effects arising, not from single particles, but from an ensemble of synchronised particles. These synchronised particles can flow without resistance or friction and can find applications in low-energy electronics, computing, and communication. By studying the fundamental properties of these particles, this proposed project will benefit the development of new quantum technologies. The proposed research direction is completely new and its outcome can enhance the competitiveness of Australian research and foster international collaborations contributing towards Australia's growing quantum technology industry.					
DE220100739 Jack, Dr Bradley N	**Measuring the sound of inner speech with advanced brain signal analyses** The overarching aim of this project is to develop an objective, electrophysiological marker capable of identifying the auditory properties of a person's inner speech, which is defined as the silent production of words in one's mind. This will be accomplished by combining novel experimental paradigms with advanced brain signal analyses. This marker would represent a historically significant event, placing Australia at the forefront of cognitive science. It would provide deep insight into the fundamental nature of inner speech, such as whether it is a "special form" of overt speech, and would inform the ongoing development of brain-computer interfaces aimed at deciphering inner speech for people who are unable to produce overt speech.	69,886.00	140,146.50	128,374.50	58,114.00	396,521.00
	National Interest Test Statement This project addresses several issues of critical importance to Australia. For psychology, this project will advance scientific knowledge by providing an empirical foundation for testing the hypothesis that inner speech is a "special form" of overt speech. This would provide deep insight into whether the brain makes a distinction between the concepts of "thought" and "action". For health, inner speech abnormalities are thought to underlie a wide-range of mental health conditions, including schizophrenia, autism-spectrum disorders, depression, and anxiety. This project is a precursor for the development of desperately needed treatments. For education, this project provides a means for the early identification of reading and speech difficulties, such as dyslexia and stuttering. For technology, this project will inform the ongoing development of brain-computer interface technologies. For industry, the ability to decipher a person's inner speech might provide a powerful method to detect deception, which would have massive implications in the fields of forensic science and legal studies.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100766	**Stars and Galaxies: The chemical abundance breakthrough**	75,000.00	148,500.00	148,500.00	75,000.00	447,000.00
Grasha, Dr Kathryn A	Measuring the chemical history of galaxies is critical to understand how galaxies form and evolve. This program aims to address shortcomings in current methods used to measure elements in a novel approach that combines observations and state-of-the-art modelling. Expected outcomes include a model for the history of the elements as the theoretical basis to derive new, robust galaxy diagnostics. There are tremendous benefits as this research topic is a major science driver for the next generation of telescopes, such as the James Webb Space Telescope and the 25m Giant Magellan Telescope. Through this project, young Australians will be trained in the science and technology required to lead the ground-breaking astronomy research of the future.					
	National Interest Test Statement					
	Understanding how the Universe works is critical to our ability to predict the future of Earth and its support of human life. While Australia's astronomy industry is a current world leader in driving this global understanding, our methods increasingly lack sufficient measurement capability. This puts our industry at risk of declining competitiveness into the future. Leveraging Australia's $114M investment in major astronomical facilities, this program will solve these shortcomings in diagnostic and forecasting ability through a novel approach that combines galaxy chemical observations and state-of-the-art modelling. The program will make transformational new discoveries about galaxy evolution that Australia can lay claim to, as well as produce the fundamental science on which Australia's future commercialisation opportunities and leadership status in the global market will rest. These outcomes will contribute to longer-term commercial, economic, and reputational benefits for Australia's astronomy industry.					
DE220100785	**Addressing the challenge of communicating uncertainty in diagnosis**	77,477.00	153,619.50	149,362.50	73,220.00	453,679.00
Dahm, Dr Maria R	This project aims to examine the critical role and impact of communication on the diagnostic process in health settings. Uncertainty in communication is pervasive in healthcare. Little is known about how health policy and practice affect linguistic expressions of uncertainty. This research expects to generate new knowledge of the influence of communication on the delivery of health services. Expected outcomes include practical communication strategies, advanced research methods in misdiagnosis, and enhanced research capacity in the health community. This should provide significant social, health and economic benefits by informing policy changes, and improving diagnostic communication and health services efficiency.					
	National Interest Test Statement					
	Every year, up to 4000 Australians die from an error in a medical diagnosis given to them by their doctor. These diagnostic errors are associated with significant patient harms and costs. This project analyses how diagnoses and uncertainty are communicated and managed in real life patient-doctor interactions. It will identify evidence-based communicative strategies that can reduce diagnostic error, and, over the course of the project, work in partnership with the Australian medical community and healthcare patients to implement the research findings in practice. By building both the evidence base for what works, and capacity among health consumer interest groups and key policy experts to implement that evidence, this project will contribute to policy change in national healthcare quality standards, including communicating for diagnostic excellence. These outcomes have the potential to deliver the longer term benefit of improved patient safety regarding medical diagnoses, fewer associated deaths, and more efficient and cost-effective health service delivery in Australia.					
DE220100907	**Tracking groundwater variations via 4-dimensional seismic imaging**	71,973.50	145,038.50	145,080.00	72,015.00	434,107.00
Jiang, Dr Chengxin	This project aims to develop an advanced seismic framework to sense subtle subsurface changes related to groundwater variations beneath the Great Artesian Basin. Groundwater storage is subject to climatic and anthropogenic forcing, but modern monitoring tools are not sufficient to capture its detailed response in both time and space. Using novel techniques and extensive seismic recordings, this project expects to generate time-lapse images across the basin in unprecedented resolution to reveal the system's dynamic evolution and a static basin model to aid the interpretation. Potential benefits include improved geophysical techniques for groundwater tracking and enhanced scientific understandings to underpin future groundwater management.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Tracking groundwater variation is a top research priority in Australia. This project will deliver an advanced and cost-effective groundwater monitoring framework that can eliminate a sampling gap in the existing methods. It will generate both time-lapse and static seismic images in unprecedented resolution and detail to help improve the fundamental understanding of Australia's largest groundwater system as well as its dynamic evolution. Seismic monitoring at permanent and long-term seismic stations offer a unique perspective to understand how the groundwater system respond to the climate change. This project will expand Australia's international reputation for modern environmental research, and will also initiate significant co-operation and data sharing between Geoscience Australia, the Geological Survey of Queensland, the Geological survey of New South Wales and local groups to promote outcomes, maximising its benefits.					
DE220101073 Kavesh, Dr Muhammad A	**Donkey Politics: How China’s Belt & Road shapes everyday life in Pakistan** This project will develop a socio-cultural understanding of the China-Pakistan Economic Corridor, the flagship project of China’s Belt and Road Initiative (BRI), through an ethnographic examination of the donkey trade with China. The research will produce fine-grained data on the impacts of the massive export of donkeys on the work, livelihoods, and health-seeking behaviour of marginalised populations in Pakistan. Expected outcomes include enhanced understanding of Chinese mega projects on host countries. It will benefit Australian and international policymakers seeking to develop a grounded understanding of BRI and its broader implications for the Indo-Pacific region, including the risk of zoonotic diseases associated with animal trade.	75,324.00	148,918.00	149,683.50	76,089.50	450,015.00
	National Interest Test Statement For over 100 years, feral donkeys have caused major environmental damage and competed for pasture with livestock and native animals in Australia. Forty years of aerial culling, Australia’s standard and costly solution to the problem, has missed a market opportunity in the livestock industry and failed to engage with Indigenous people and their knowledge of sustainable co-existence with donkeys. Drawing on highly relevant comparative experience in Pakistan, this project will provide timely recommendations for Australian agribusiness, enabling livestock farmers and indigenous managers to sustainably and ethically profit from Australia’s finest breed donkey population. It will also offer an evidence base to enable improved policy and industry assessment to mitigate the threat of animal-borne viruses to Australia’s $18.5b live animal and meat export industry. These outcomes will boost prospects for an emerging, potentially profitable and sustainably-managed donkey farming industry in regional Australia, while promoting Indigenous development, ecological benefits and the industry’s future economic prosperity.					
DE220101519 Hoggard, Dr Mark J	**Sedimentary basins: Windows into the dynamics of Australian lithosphere** This project aims to investigate the structure and stability of the Australian continent. It will focus on improving predictive models of sedimentary basin development on the edge of thick lithosphere, which host large quantities of metal, hydrocarbons, and freshwater. Understanding their formation will enhance the ability to locate resources in frontier areas. The research combines state-of-the-art geodynamical modelling with the burgeoning quantity of geophysical and geological data collected by the government and research community. The project would build Australian research capability and stimulate novel approaches to critical problems, highlighting opportunities at the interface between academic and industry geoscience.	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
	National Interest Test Statement Long-term evolution of the continental lithosphere plays a crucial role in the development of natural resources, including critical minerals, hydrocarbons, and groundwater. Building on my collaboration with Geoscience Australia's 'Exploring for the Future' (EFTF) program, the hunt is on to refine predictive tools to uncover the location and extent of buried resources. By linking the unprecedented diversity and volume of data collected by the EFTF program with investigations of continental dynamics, this project will ensure effective communication between academic and operational communities and improve our understanding of the formation and preservation of sedimentary basins that host precious natural resources. Expected deliverables include improved forecasting of resources considered key to sustaining economic activities and recovery from COVID-19, and enhancing the future development of Australian society. Thus, this work directly addresses the 'Resources' National Research Priority, and will provide an HDR student with a powerful basin-analysis skillset that is regularly sought after but seldom taught.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101520	**A New Era of Galactic Archaeology with Large Surveys and Machine Learning**	73,450.00	146,650.00	146,400.00	73,200.00	439,700.00
Ting, Dr Yuan-Sen	The project aims to advance the symbiotic relation between astronomy and machine learning to unravel the origin and the evolutionary history of the Milky Way. The proposed study will base heavily on the data from the Australian-led spectroscopic survey and, as a result, contribute to realising the full potential of this multi-million dollar endeavour. The goal of the study is to walk ourselves back in cosmic time, using the most advanced technologies of our time to reveal the Milky Ways oldest story. The investigation aims to consolidate Australia's position in big data astronomy and give Australia a unique competitive advantage in data analytics. Such an endeavour is essential for Australia to maintain its leadership in astronomy.					
	National Interest Test Statement Big data is transforming how astronomers make discoveries. To realise a competitive advantage, Australia’s astronomy and space industry needs cutting-edge algorithms that will power big data analytics. It also needs the highly specialised and skilled workforce that will propel the country forward. This project addresses both these needs. To build national capability for future economic gain, this project combines novel methods from astronomy, statistics and machine learning to study big data: that of the last 14 billion years of the Milky Way's evolution. The project will provide a world-class training ground for the next generation of big data scientists and astronomers. It will reveal the physical processes that engender the Milky Way's evolution, which Australia can claim as a key scientific discovery. Moreover, it will contribute the algorithmic innovations needed for broader commercial exploitation by industry, delivering economic and reputational benefits.					
	The Australian National University	1,020,582.50	2,036,660.50	2,008,085.00	992,007.00	6,057,335.00
	Australian Capital Territory	1,020,582.50	2,036,660.50	2,008,085.00	992,007.00	6,057,335.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
New South Wales						
Australian Catholic University						
DE220100854 LaValle Norman, Dr Dawn T	**The Female Voice in Ancient Philosophical Dialogues** This project aims to conceptualise and communicate how a major innovation was accepted in the ancient world, when women for the first time began to serve as intellectual role-models for both men and women. This project will create a ground-breaking narrative of female intellectuals over 800 years of history. The expected outcome is a new history of the role women played in the intellectual life in the ancient world, and a new understanding of how their voices were used as authorities on certain issues in philosophy and the good life. In addition, reflection on how this innovation was accepted historically will help modern attempts to advance the social cohesion of men and women, especially in the intellectual life. **National Interest Test Statement** This project on the role of women in ancient philosophy aims to expand Australia's knowledge base and research capability in strategic areas of humanities excellence, especially Classics and early Christianity, reception studies, and emotions history. It will do so through scholarly publications, conferences, collaboration, and the commissioning of new one-act plays that reflect on the issues of gender, conversation, and philosophy. By advancing our knowledge about why there is a lack of the female voice engaging in philosophy, especially in Australia, this project will create pathways of change inspired by historical reflection. The project is intended to help Australians understand the European past and its philosophies, and to aid reflection on current issues surrounding gender and the silencing of certain voices in the intellectual life.	63,102.00	126,602.00	127,000.00	63,500.00	380,204.00
DE220101054 Crabbe, Dr Kylie L	**Inside Others: Early Christian Protagonists and their Impairments** This project aims to uncover how disability functions in the portraits of key early Christian figures and their receptions over time. Its innovative approach combines disability studies, emotions studies, literary criticism, social history, and reception studies. It expects to generate new knowledge by intervening in disability readings of late antique literature, introducing a new category of impaired protagonists and constructing the first reception history of disability in early Christianity. It intends to enhance Australia's capacity in interdisciplinary studies of antiquity and contribute to critical reflection on the nature of impairment in light of urgent questions arising from the Disability Royal Commission and Covid-19 measures. **National Interest Test Statement** Understanding disability is critical to Australian society. The dynamics of disability play a significant role in the challenges faced by contemporary Australia. Recent advances through the NDIS and Disability Royal Commission highlight government commitment to these concerns, while the sacrifices of millions of ordinary Australians through Covid-19 restrictions demonstrate both a keen interest in protecting the vulnerable and the timeliness of a study that considers shared contexts of impairment through illness, ageing, and human limitation over time. This study aims to uncover how disability functions for key figures in early Christian sources and for later readers, with a view to illuminating critical reflection on how context affects disability in our contemporary setting. The study expects not only to strengthen Australia's international contribution to scholarship on health and disability in the ancient world, but also to contribute significant resources to this wider cultural conversation, through a Public Policy Lab, an interactive website, popular writing, scholarly publications and collaborations.	58,732.00	127,637.50	133,779.50	64,874.00	385,023.00
	Australian Catholic University	121,834.00	254,239.50	260,779.50	128,374.00	765,227.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Charles Sturt University						
DE220100295	**Public libraries in the lives of people experiencing homelessness**	67,922.00	135,214.00	137,339.50	70,047.50	410,523.00
Garner, Dr Jane M	The number of Australians living without secure housing grows every year. Increasingly this community is reaching out to our public libraries for shelter, connection to others and access to resources and services. Despite this relationship, there are no public policies to guide libraries in supporting this community or in partnering with housing agencies. Using a process of particpatory design with the homeless community, public library staff and users, and housing agencies, the research builds theoretical frameworks and public policy foundations to support the design of public library services, resources and environments that will meet the needs of the Australian homeless community in our urban, regional and remote contexts.					
	National Interest Test Statement					
	This research has a social benefit for Australia. Homelessness is a growing social issue that is visible in our cities, towns and regional areas. As one of the only places where everyone is welcome without a requirement to pay, the homeless community are increasingly accessing public libraries to find shelter, comfort, company, and connection to resources. Consequently, public library staff are being called on to work at the frontlines of support for these users with very little known of their needs, of the barriers to providing optimum support for this group, or of ways in which public libraries can partner with housing agencies to support each other's work. This research investigates each of these areas and provides theoretical frameworks and policy foundations that will allow public libraries to respond to the needs of the homeless community in a rapid and informed way. The research will facilitate the development of models of service provision tartgetted to this community that can be implemented across Australian public libraries to support the needs of people experiencing homelessness.					
	Charles Sturt University	67,922.00	135,214.00	137,339.50	70,047.50	410,523.00
Macquarie University						
DE220100087	**Sally disagrees with you! A unified theory for human sociality**	76,500.00	151,090.00	149,642.50	75,052.50	452,285.00
Deschrijver, Dr Eliane E	As fundamentally social beings, we usually keep company with the people that think like ourselves: Our friends and loved ones. This project aims to deliver a unifying theory of human sociality that can account for why the human brain may want to avoid conflict between own and others' ways of thinking. This will be achieved via online behavioural experiments, a highly innovative functional magnetic resonance imaging (fMRI) design, and philosophical approaches. The project expects to generate knowledge on the social neuroscience of political/religious group behaviour, shedding light on the brain mechanisms that underlie social cognition. It will benefit our approach to social problems like discrimination, fundamentalism and extremism.					
	National Interest Test Statement					
	This project addresses an important gap in knowledge regarding the neuroscience of social behaviour, namely the brain areas involved in the processing of others thinking differently from oneself. Using a groundbreaking new experimental technique by applying brain imaging to establish this key aspect of social behaviour, the project will provide insights into the neural mechanisms underlying the processing of others having a different ideological belief system than oneself. The project will result in a better understanding of how distinct groups in society, like political and religious opponents, come to being, with the outcomes having specific benefit in the understanding and resolution of social and cultural issues such as discrimination, religious and political fundamentalism, radicalisation and extremism, and criminal accountability in Australia and the wider world. The findings will also allow the evaluation of ethical conundrums related to intergroup processes, which will underpin the development of tools on how to counteract religious and political radicalisation in societies and online spaces.					
DE220100096	**Understanding the relationship between the social environment and cognition**	71,539.50	144,751.50	146,476.50	73,264.50	436,032.00
Ashton, Dr Benjamin	The predominant theory for the evolution of intelligence, the social intelligence hypothesis (SIH), posits that within-group social interactions drive cognitive evolution. But the SIH overlooks a major component of social life: interactions with outsiders of the same species. Using a unique combination of meta-analytical and experimental approaches, the DECRA project will test the predictions of an expanded SIH, incorporating the “Napoleonic” cognitive challenges posed by outsiders. The expected outcome is to gain a new understanding of which factors govern cognitive evolution – one of the longest-running debates in evolutionary biology.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The predominant theory for the evolution of intelligence, suggests that the cognitive demands of living in complex social environments are the main drivers of cognitive evolution. However, this theory overlooks a major component of social life: interactions with outsiders of the same species. This project will test the cognitive challenges posed by outsiders and will deliver a new understanding of the factors that govern cognitive evolution. The project will show how social living influences intelligence and will reveal new insights into the evolution of human intelligence and its relationship with the emergence of different societies, from hunter-gatherers to complex multi-level social groups. This will be of profound importance to understanding our place in evolution, and will be of cultural benefit to the Australian and international community by revealing the origins of our own intelligence. The project will provide insights into the social dynamics of human populations and deliver a new understanding of the capacity for cognitive development.					
DE220100323 Hameau, Dr Solene S	**I can't find the word! Reading to maintain communication skills in ageing.** This project aims to investigate why, as we age, we have trouble retrieving words when we speak but not when we read aloud. It takes the novel approach of systematically testing both reading and speaking in the same older adults. Through its innovative use of both behavioural research and computational modelling, it will generate new knowledge in spoken word production and reading, areas in which the project team have acknowledged expertise. This project will advance theories, achieving understanding of how ageing affects the cognitive systems involved in saying words and reading them aloud. By also investigating whether reading aloud can support word retrieval, it has potential future benefit for improved communication in older adults.	74,561.00	145,587.00	134,191.50	63,165.50	417,505.00
	National Interest Test Statement This project will result in the production of new knowledge, contributing to Australia's profile as a producer of high-quality research with translational importance. It will improve our understanding of how and why word retrieval ability declines in ageing, resulting in better theories of speaking and reading and of the effects of ageing on cognition. The innovative word recall training part of the project, pending larger scale implementation and demonstration of lasting benefits, has the potential to delay the onset of cognitive decline in older adults, allowing increased participation and longer engagement in the workforce, saving associated economic costs. The research will also result in a new database of reading and picture naming in older Australians which, as an added bonus, can serve as normative data to facilitate early detection of cognitive decline or dementia, potentially enabling earlier targeted intervention to maintain independence. Thus, the project has the potential to contribute, in the future, to building healthy and more resilient communities for the 15% of Australians that are over 65.					
DE220100339 Graham, Dr Marnie L	**Re/connecting People, Nature and Sustainable Futures via Indigenous tourism** This project aims to identify how Australians might appropriately learn from and act on Indigenous knowledges for more sustainable futures. In the face of global ecological crises, Indigenous custodians are increasingly recognised as sustainable land managers from who much can be learned, yet it is not clearly understood how different individuals might be influenced by Indigenous sustainability thinking. In collaboration with NSW-based Indigenous tour operators, this project aims to discover the potential of Indigenous custodians as change agents towards sustainability thinking and action, communicated widely through research publications, reports to policy-makers. and documentary film.	77,347.00	154,694.00	149,405.50	72,058.50	453,505.00
	National Interest Test Statement This project contributes to National Science Priority 8: Environmental Change by enhancing Australia’s capacity and options for responding to the impacts of environmental change through developing new insights on how individuals might incorporate Indigenous knowledges, worldviews, sustainability thinking and ideas into different sectors of Australian society and in their everyday lives. The project will benefit participating Indigenous tour operators, and the NSW and Australian Indigenous tourism sector by providing new information on what kinds of Indigenous tourism activities and encounters most successfully influence tourists’ sustainability learning, thinking and doing. It will deliver policy-relevant materials through research synthesis reports on the types of sustainability learning activities that might be better supported and promoted within the Indigenous tourism sector.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100379	**Missing link in the chain: Gateway to the Satellite-Internet Constellations**	70,097.00	140,194.00	140,194.00	70,097.00	420,582.00
Hashmi, Dr Raheel M	This project aims to develop affordable and compact, reconfigurable antenna systems for satellite-terminals. With unprecedented performance, the wide bandwidth of operation, and low cost of production, the resulting antenna systems will act as the 'enabling' chip in providing internet connectivity to millions of people, who are unconnected or poorly connected at present. High-speed internet is not a reality outside densely populated areas, even today. The outcomes will close the digital divide, increase Australia's economic and intellectual standing internationally, generate socio-economic benefits by empowering regional populations, increase the economic viability and remote-jobs outside metropolitan cities, and develop tourism.					
	National Interest Test Statement					
	The proposed technology aims to pave a way to significantly improve internet services in suburban and regional Australia. It will affordably connect billions of people to the internet worldwide, who do not have regular internet access so far. The project will create new opportunities for the Australian industry in emerging telecommunication and defense markets, by enabling remote jobs in the Australian economy. As COVID-19 disrupted the world's economy, the socioeconomic strengths of e-commerce, internet connectivity and remote workplaces has been recognized globally. The proposed project is a timely attempt to develop affordable and effective technology, critical in enabling remote global populations to develop skills and contribute towards national economies. Aligned with the goals of the Australian Space Agency in the next decade, the project will realize affordable and reliable connectivity, enabling remote education, distant healthcare, and remote workforce augmentation.					
DE220101085	**3D metafibre optics for advanced imaging**	75,000.00	146,000.00	142,000.00	71,000.00	434,000.00
Ren, Dr Haoran	The aim is to design and interface multi-functional metasurfaces with optical fibres by using 3D laser printing technology. The anticipated goal is to develop innovative metafibres interfaced with achromatic meta-lenses, polarisation-selective metasurfaces, and Fourier-space imaging metasurfaces for all-on-fibre achromatic, full-Stokes polarimetric, and Fourier endoscopic imaging, respectively. Expected outcomes include new knowledge in fibre meta-optics and a novel metafibre manufacturing platform in a critical sector of the 21st-century economy. The novel ultracompact, flexible, and versatile metafibre technology is expected to have a profound impact on fibre-optic imaging in photonic, biological, and telecommunications applications.					
	National Interest Test Statement					
	Fibre-optic endoscopes are widely used clinical tools, providing images of unprecedented resolution in real time. But miniaturisation and alignment of the optics for precise control of the fibre beam with minimal optical perturbation remains a challenge. By designing and 3D printing metasurfaces – nano-structured ultrathin surface devices – on fibre tips, I will create novel metafibres, offering superior imaging capabilities, as well as stability and flexibility. The metafibres will enable improved performance in fibre microscopy and fibre-optic endoscopes, and will offer social benefits for patients experiencing rapid, accurate disease diagnosis. This project will create economic benefits to Australia through translating a new metafibre manufacturing platform to local photonics companies, to create fibre-based products anticipated to have a global market. The higher degree research students trained in the areas of nanophotonics and nanotechnology will be well-prepared to do further research in this field, or to enter industry in a sector that will need a skilled Australian workforce.					
DE220101189	**Fast-track Asylum Procedures: Balancing Fairness and Efficiency**	73,336.50	148,573.00	149,089.00	73,852.50	444,851.00
Ghezelbash, A/Prof Daniel	Governments around the world are implementing measures to fast-track the processing of asylum claims. This project aims to identify if this can be done in a way that is both fair and efficient. It will use an innovative interdisciplinary approach, which combines doctrinal and empirical methods, to compare and evaluate current laws in Australia, the United States, the United Kingdom and Switzerland. Project outcomes will include evidence-based law reform and policy recommendations to improve the efficiency and quality of Australia's asylum process. A fair and more efficient asylum process will secure the integrity of Australia's borders and save the government money while ensuring refugees can access protection promptly.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The project will benefit Australia by providing an evidence base for designing fairer and more efficient asylum processes. A faster process will result in significant economic benefits for the government, reducing the time decision-makers spend carrying out asylum determinations and lowering the costs associated with supporting asylum seekers during the asylum process. More efficient decision-making will reduce the incentive for unmeritorious asylum claims, saving costs and enhancing the integrity of asylum system. Reducing the time asylum seekers spend in limbo will have social benefits for Australia through improving the mental and physical well-being of asylum seekers and enhancing their ability to integrate into Australian society. This will have flow on economic benefits in the form of better employment outcomes for refugees. The focus on fairness and legality will ensure that asylum claims are properly examined and that refugees are not returned to situations where they face persecution or death, in violation of Australia's obligations under international law.					
DE220101270 Wright, Dr Claire E	**Above the glass ceiling: Australian women in corporate leadership 1910–2020** This project aims to expand our understanding of business history by undertaking the first comprehensive history of women in corporate leadership in Australia across the twentieth and early twenty-first centuries. An interdisciplinary approach and multi-method design aims to expand national and international knowledge on the ways women have accessed, operated in and influenced corporations since Federation. Expected outcomes include deeper knowledge about women's participation in corporate leadership in Australia, their pathways to leadership positions, and their long-term impact on corporation strategy and decision-making. This will help design more effective strategies to improve the success of women in leadership now and in the future.	73,097.00	126,194.00	106,194.00	53,097.00	358,582.00
	National Interest Test Statement This will be the first history of women in corporate leadership in Australia. Despite national efforts to improve women in leadership, women make up only 10 percent of CEOs, 25 percent of executives, and less than 30 percent of all board members. Improving the success of women in leadership requires deeper knowledge on the diverse ways women have accessed positions of leadership in Australia, changes in their pathways into leadership roles, and their long-term influence on strategy and decision-making. This project's interdisciplinary approach and multi-method design will produce significant knowledge that addresses these important questions with depth, nuance and context. Advancing knowledge in these areas can help governments and corporations develop better policies to improve women's access to, and success in, senior leadership roles in Australia. Improving the success of women in leadership can lead to economic benefits such as innovation and better decision-making, with women's empowerment generally contributing to societal benefits such as more comprehensive health, education and social protection.					
DE220101536 McConnell, Dr Douglas W	**Rewriting moral character and professional virtue** This project aims to solve the philosophical problems of whether moral character motivates action and how it does so by developing an innovative account of moral character that draws on two overlooked bodies of research: the psychology of 'moral identity' and the philosophy of narrative self-constitution. The resulting narrative account of moral character claims that moral identities motivate moral action and, therefore, underpin moral character. The project then applies this knowledge to professional ethics, empirically testing the extent to which professional moral identities influence action and creating novel, self-narrative focused strategies to foster professional virtue.	59,097.00	118,789.00	112,789.00	53,097.00	343,772.00
	National Interest Test Statement Morality is essential for social collaboration and people who lack sufficient morality act in self-interested, socially damaging ways. This project will help Australian communities foster morality more effectively by establishing that moral character is largely underpinned by people's moral identities and revealing new approaches to moral education that aim to shape moral identity. More specifically, this project aims to recommend ways to improve professional moral character by developing professional moral identity. Immoral professionals harm vulnerable service users and erode public trust in the professions. Professionals with stronger moral characters work more diligently to generate their profession's goods, such as good healthcare, and improve public trust in the professions. These social benefits have associated economic benefits for Australia. Society is more productive when it benefits from the goods provided by the professions and the more the public trust the professions the more likely they are to seek those goods.					
	Macquarie University	650,575.00	1,275,872.50	1,229,982.00	604,684.50	3,761,114.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
The University of New England						
DE220100795	**Message sticks: Long-distance communication in Indigenous Australia**	73,026.00	139,723.50	133,277.00	66,579.50	412,606.00
Kelly, Dr Piers	Message sticks are marked wooden objects that were once used throughout Indigenous Australia to convey important information between communities. The intended outcome of this project is to answer a central question: What role did message sticks play in Indigenous long-distance communication? Drawing on archival evidence and original fieldwork in the Top End, the project aims to be the first empirically grounded study of message sticks as a practice. The project expects to define message sticks as a class of material culture, explain their communicative dynamics, generate new cross-cultural insights, and strengthen collaborations between research institutions, museums and Indigenous cultural organisations.					
	National Interest Test Statement					
	Message sticks are an ancient form of Indigenous information technology. Once diffused all across Australia, the system was supported by kin-based networks of mobile messengers. In the period of early contact, settlers were impressed by the efficiency of the practice, but struggled to understand its principles or reconcile it with writing-based communication. Today, knowledge about message sticks is severely endangered. On the basis of Indigenous-managed fieldwork and the analysis of historical archives, the project will establish what message sticks really are, how they conveyed meaning, and how they have adapted to historical change. The resulting study will be an invaluable contribution to Australian cultural heritage. It will document and preserve a critically endangered knowledge-system, strengthen research networks involving Indigenous cultural institutions and establish the global importance of a uniquely Indigenous mode of literacy.					
DE220101558	**Exploring the nexus between global palaeogeography and the rise of animals**	77,210.00	135,538.50	116,171.00	57,842.50	386,762.00
Betts, Dr Marissa B	The Ediacaran–Cambrian periods (635–485 million years ago) capture one of the most critical events in the history of life, but are rarely the focus of global-scale palaeogeographic modelling. By employing a holistic, multi-proxy approach that synthesises vast fossil and geological datasets, this project aims to reconstruct continental positions to determine how shifting landmasses influenced the evolution of the first complex animals. Expected outcomes and benefits include a new, animated global model of continental evolution that can be used across a broad range of fields, particularly for studies investigating the development of Earth System processes and the biosphere in deep time, with potential applications in resource exploration.					
	National Interest Test Statement					
	Important outputs from this project include an interactive, animated global model of continental plate motion to be made freely available online, providing a valuable digital resource to be used in the research, STEM education, and industry sectors. This project will also utilise existing State and Territory government resources to enhance knowledge of the Australian crust, particularly sedimentary basins with economic potential. Through the production and implementation of vast fossil datasets, this project will also highlight Australia's world-class palaeontological heritage. The new geoscientific information generated during this project will strongly support the South Australian Government's nomination of the Flinders Ranges as a UNESCO World Heritage Serial Site. Achieving such prestige for the Flinders Ranges will enhance tourism and boost the economy in this region, whilst ensuring the protection of a culturally significant place for Indigenous Australians and a key part of Australia's natural heritage.					
	The University of New England	150,236.00	275,262.00	249,448.00	124,422.00	799,368.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
The University of New South Wales						
DE220100044	**Data-driven Wide-area System Strength Monitoring under Weak Grid Conditions**	68,824.00	137,648.00	137,648.00	68,824.00	412,944.00
Zhang, Dr Yuchen	This project aims to investigate and evolve the system strength assessment framework to suit weak electricity grids with substantial renewable sources. It expects to develop a digitalized approach where comprehensive metric indices are estimated by an innovative data-driven system to realize real-time wide-area system strength assessment under weak grid conditions. Advanced methods will also be developed to bridge the gap between data science and energy system applications. The new suite of next-gen metrics and data-driven techniques will offer the world's most innovative renewable energy products with desired grid support capability and low system strength operability, that would smooth the transition towards low-carbon electricity future.					
	National Interest Test Statement					
	As a strategic plan to mitigate climate threat, the Australian electricity grid undergoes a tremendous transition towards a system dominated by renewable energy. In this transition, weak system strength has been identified as a significant and urgent issue that could cause catastrophic cascading failure or rolling blackout in the Australian grid. Addressing the weak grid issue requires the evolvement of system strength assessment framework. The development of data-driven techniques in this project serves as an immediate solution committing to elevate the low system strength operability of the Australian grid in the short run. The outcome of the applied research will help appeal secure renewable energy integration, improve the reliability of electricity supply, provide low-cost energy to the public, and create more environmental values in the path towards low-carbon future.					
DE220100279	**Did ocean circulation changes build the Antarctic ice sheet?**	76,000.00	152,000.00	150,500.00	74,500.00	453,000.00
Hutchinson, Dr David K	The evolution of the Antarctic ice sheet, from its beginning 34 million years ago (Ma) until today, is critical to our understanding of future climate change. This project aims to improve climate and ocean model simulations of the early Oligocene (30 Ma) and middle Miocene (15 Ma), using higher resolution and more accurate paleogeography than has previously been done. Expected outcomes include improvements to paleoclimate reconstructions, better constraints on future climate change, and a better understanding of the impact of ocean eddies on Antarctic climate. These outcomes should strengthen Australia's long-term program of climate modelling, and enable more effective climate adaptation, mitigation and risk management.					
	National Interest Test Statement					
	The Oligocene (34 to 23 million years ago) and Miocene (23 to 5 million years ago) were geological periods with warm polar environments that represent excellent analogues for future climate change. The world's CO2 concentration in 2019 was already similar to levels during the Miocene, while future projections indicate CO2 levels not seen since the Oligocene. Geological records of these periods can inform us of the long-term history of the Antarctic ice sheet, which is at risk of melting due to climate change. This project aims to improve ocean and climate model simulations of the Oligocene and Miocene. The outcomes are expected to enhance Australia's climate modelling capacity, by implementing the first ever deep time paleoclimate simulations using the Australian community earth system model ACCESS-ESM1.5. This will contribute to efforts of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), by improving constraints on their future climate change modelling. This in turn will benefit Australian policymakers who are planning for climate change adaptation, mitigation and risk management.					
DE220100308	**Effects of artificial light at night on coastal ecosystems**	72,017.00	146,379.00	145,857.00	71,495.00	435,748.00
Mayer Pinto, Dr Mariana	This project aims to determine the ecological effects of artificial light at night on coastal marine ecosystems. Artificial light at night is a pervasive stressor that disrupts a fundamental driver of ecological and evolutionary processes: natural light cycles. Using a holistic approach that combines field experiments and microbial ecology, this project will assess impacts of artificial light at multiple levels of biological and ecological organisation. Expected outcomes include new knowledge on how species interactions mediate functional changes in response to an emergent, global stressor. This should provide significant benefits, including enhanced management of coastal systems and the critical services and social benefits they provide.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement While artificial light is central to the functioning of modern society, light is also an environmental pollutant that causes global ecological consequences, poses public health risks and wastes energy and money. Temperate Australian coastlines contribute to AUD$10 billion/year just in tourism, recreational and commercial fisheries. In Australia, >80% of the population live near the coast, with many beaches and coastlines around the country experiencing light pollution. Impacts from light pollution can therefore have significant social, economic and ecological impacts to coastlines in Australia and worldwide, threatening the benefits humans derived from these habitats. Outcomes of this project will inform strategies to solve the challenges posed by artificial light at night that will improve coastal environmental health, and may play an important role in shifting towards a more sustainable society. A clear benefit of this project is that light pollution impacts can be immediately mitigated at local and large scales by combining novel technologies with scientific evidence, which this project aims to deliver.					
DE220100350 Dose, Dr Wesley M	**Sodium inventory for sodium-ion batteries** This project aims to increase the energy density and cycle life of sodium-ion batteries by investigating practical ways to increase the amount of cycleable sodium ions. This project expects to generate new knowledge in the field of energy storage using an innovative approach to address the key issues facing sodium-ion batteries. Expected outcomes of this project include the development of a novel high-energy sodium-ion battery, achieved by practical sodium inventory solutions and fundamental understanding of internal battery processes. This should provide significant benefits including lowering the cost of energy storage, decreasing the reliance on lithium, and facilitating society’s shift towards renewable and sustainable energy sources.	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
	National Interest Test Statement In Australia there is currently a steady uptake in battery storage for residential, commercial, and grid-scale applications, and in electric vehicles. Lithium-ion batteries dominate these markets, however, the rising cost, geographical concentration, and environmental concerns around sourcing raw materials are driving research towards lower cost, sustainable alternatives. Breakthroughs in sodium-ion batteries, and other low cost alternatives, are vital to facilitate a smooth transition towards sustainable energy practices. With a unique focus on increasing sodium inventory, this project will accelerate the development of sodium-ion batteries and create fundamental research knowledge. Prioritising sodium-ion battery research is also an investment in developing future supply chains for Australia’s natural resources and mining industry, which extracts many of the materials needed in the battery supply chain. This research is aligned with the Science and Research Priority topic “Energy” and addresses the Practical Research Challenge of energy storage technologies that are efficient, cost-effective and reliable.					
DE220100362 Vansteenkiste, Dr Cara	**Disaster Relief Philanthropy: Can Corporate Giving Increase Firm Value?** This project aims to investigate the stock price effects of corporate philanthropy by applying event study methods to the setting of natural disasters in a global dataset of corporate disaster-relief giving. Expected outcomes include the ability to identify the institutional and governance-related determinants of corporate giving and their effects on firm value and stock prices. This should provide significant benefits by contributing to a framework of corporate giving that can increase firms' incentives to provide disaster-relief giving and that can ensure donations are aligned with the needs of affected communities.	63,124.00	122,586.00	120,209.00	60,747.00	366,666.00
	National Interest Test Statement Australia is increasingly coping with large natural disasters that have a devastating impact on urban and rural communities. The recent Australian bushfire crisis in the summer of 2019 attracted over $500 million in corporate disaster-relief donations, but there has been significant public criticism with regards to how donations are allocated to affected communities. Given the increase in frequency and severity of natural disasters, understanding firms' incentives to donate is of great importance, especially in the context of disaster-relief. This project will identify the regulatory factors and donation-specific variables that affect firms' incentives to donate by analyzing the stock price effects of disaster-relief giving on a global scale. The anticipated benefits are to increase disaster-relief donations by Australian corporations following natural disasters and to better align donations with the needs of affected communities.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100558	**Biomimetic catalysis for sustainable polymer syntheses**	70,000.00	140,000.00	140,000.00	70,000.00	420,000.00
Rizzuto, Dr Felix J	New classes of sustainable polymers are required to produce biodegradable materials for nanotechnology applications. This project aims to address this demand by developing versatile polymerisation catalysis protocols inspired by enzymatic systems. This new method of polymer synthesis expects to generate a diverse set of nanomaterials using chemical networks that modulate reaction conditions on-demand, providing facile control over polymer form and resulting function. The expected outcomes of this project will advance our understanding of polymer structure-property relationships and stimuli-responsive systems, and should provide significant benefits for the deployment of biorenewable polymers as next-generation soft materials.					
	National Interest Test Statement					
	Of the 9.3 billion tonnes of plastic produced in Australia in the last 70 years, over 70% has accumulated in our environment as permanent waste. Biodegradable materials hold great promise as timely replacements for modern non-sustainable plastics, but their implementation will require new synthetic strategies that are dynamic, long-term and applicable to broad sets of inputs. This project will develop methods that enable the rapid formation of biodegradable polymers using an adaptable catalysis protocol. This process will make sustainable, high-value materials that offer potential advantages as recyclable elastomers, shape-memory plastics for soft robotics and delivery agents for biomolecule therapies. Moreover, the technologies developed in this proposal will be capable of selectively producing polymer sequences with predictable functions, facilitating the autonomous production of useful products on-demand. These technologies have the potential for broad commercial and environmental impact across Australia's biomedical, manufacturing and engineering industries.					
DE220100798	**Novel multinary intermetallic compounds for water electrolysis**	72,500.00	145,000.00	144,000.00	71,500.00	433,000.00
Jia, Dr Zhe	This project aims to make breakthrough developments in producing high performance water splitting electrocatalysts based on high-entropy intermetallic compounds (HEIMCs) by understanding their processing-structure-catalysis relationships. The project will generate new knowledge on how to enhance that performance by the combined effect of nanoscale atomic ordering and lattice distortion via alloying. Expected outcomes will be an enhanced capacity to develop and commercialise HEIMCs with functional properties superior to current hydrogen production catalysts. Anticipated benefits will be reduced consumption of fossil fuels, development of renewable clean energy, and stimulation of economic development to Australian mining industries.					
	National Interest Test Statement					
	This project will develop high performance water splitting electrocatalysts for hydrogen production that will help Australia develop its future hydrogen economy and will provide great economic, commercial, environmental, and social benefits to the nation. With respect to environmental and social benefits, the project will help enable a renewable hydrogen energy society that will reduce fossil fuel usage and carbon emissions and thus reduce air pollution that causes human health problems. The raw materials used for fabricating the alloy electrocatalysts developed in this project are readily sourced from the Australian mining industry, creating a new commercial application for their products that will stimulate economic activity for the mining sector in Australia. Benefits will also be felt by Australian companies in the advanced manufacturing and high-tech energy conversion sectors that will potentially produce and use the developed electrocatalysts. Overall, this project will position Australia for a leading global position in the strategic technological shift to renewable energy and net zero emissions.					
DE220100812	**Is degradation of photovoltaic modules predictable and preventable?**	73,097.00	143,597.00	139,847.00	69,347.00	425,888.00
Ciesla, Dr Alison M	This project aims to determine the fundamental properties of the hydrogen related defect causing degradation of commercial solar modules and develop models to predict its impact. The defect causes up to 16% power loss and is likely to affect all photovoltaics due to the universal behaviour of hydrogen in semiconductors. Through new techniques combining deuterium (heavy hydrogen) and machine learning, the key project outcomes are new knowledge of hydrogen behaviour, mitigation of degradation and predictive models to test and forecast the future output of affected modules. This is critical for system design and reliability, manufacturer warranty terms, investor returns, consumer confidence, and ultimately mitigating the climate crisis.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement A hydrogen related defect is causing up to 16% power loss in solar panels. This degradation affects all existing technologies and is likely to affect future technologies if not solved. Since its identification in 2012, over 16GW of solar has been installed in Australia and growing each year. At a cost of ~$1 per Watt, the power already lost is worth billions of dollars. This project aims to determine the fundamental properties of the hydrogen related defect to enable mitigation, testing and prediction. Models for forecasting future power output of affected modules installed in Australian conditions will be made freely available online. The impact of this research will flow through to system designers sizing systems; to energy retailers, investors and lenders seeking return on investment; to manufacturers seeking to mitigate the degradation and warranty claims; and to confidence in the solar industry. Ultimately, this will enable continued rapid solar uptake and reduced reliance on carbon emitting fossil fuels in line with the Paris agreement and to mitigate the climate crisis for a more stable environment.					
DE220100816 Tang, Dr Jianbo	**Liquid Metal Nano Metallurgy by Controlled Phase Transition Thermodynamics** The phase transformation thermodynamics of post-transition metals, which form low-melting-point alloys, remain largely unknown. This project aims to explore low-energy metallurgy pathways enabled by liquid metals to discover such dynamics. The strategy is to harvest structured/crystalline materials by incorporating target metal species into liquid metal solvents and stimulating autonomous phase separation and pattern formation during phase transition. Contemporary instruments and technologies will be employed to achieve active control of these fundamental processes at different scales. The expected outcomes will reveal new insights in traditional metallurgy as well as extend metallurgical concepts to electronics, optics, and catalysis.	73,500.00	144,500.00	141,500.00	70,500.00	430,000.00
	National Interest Test Statement Being able to understand and control fundamental behaviours of metals and alloys is without doubt of tremendous value for various technology-important fields. In this regard, the emerging liquid metals offer great opportunities that have not been previously accessible. This project explores the fundamentals of liquid metal phase transition and pattern formation for nanotechnology-based applications. The findings will advance the current knowledge in the fields of metallurgy and advanced materials. In addition, the discoveries will lead to active control over complex yet dynamic surface phase transition processes that govern the science of liquid metals. High-value metallic patterns and structures will be produced at low energy cost and high efficiency. These outcomes will realise the liquid metals' unprecedented potentials for synthesis of functional materials through autonomous thermodynamic pathways. Therefore, this project will diversify the application spectrum of metal resources that are mined and refined in Australia, which will be of great interest to Australian mineral and metallurgy communities.					
DE220100859 Kerr, Dr Bryce D	**New techniques for exponential sums over low degree polynomials** This project aims to obtain new quantitative estimates for Weyl sums over low degree polynomials. Such estimates are fundamental to several areas of number theory. By interfacing techniques from diverse areas of mathematics, including algebraic geometry, analytic number theory, the geometry of numbers and harmonic analysis, this project will provide the first progress on estimating Weyl sums over low degree polynomials in over a century. The expected outcomes include a deeper understanding of Weyl sums and enhanced international collaborations. Such progress will place Australia at the forefront of this important branch of number theory.	60,000.00	117,000.00	117,000.00	60,000.00	354,000.00
	National Interest Test Statement This important research will make progress on longstanding problems which are fundamental to several areas of number theory. It will enhance the reputation of Australian science in a cost-effective way. It will attract the attention and direct involvement of many world leaders in this area and will allow them to undertake research in Australia and share their expertise with other researchers, enhancing international collaboration and networking in mathematics in Australia. This will place Australia as a major contributor to this fundamental area of mathematics. Due to the strong connection with cyber security, number theory research in Australia has recently seen a rapid expansion. This research will strengthen the number theory community in Australia and will provide social and economic benefits through the training of HDR students with strong skills in the mathematical foundations of encryption and cyber security.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101040	**Ultrastable perovskite nanocrystals for high quality optoelectronic devices**	71,000.00	142,000.00	141,000.00	70,000.00	424,000.00
Huang, Dr He	This project aims to investigate novel highly efficient luminescent nanomaterials; by utilising perovskite nanocrystals with enhanced stability by coating or mesoporous materials. This project expects to generate new knowledge in the area of energy conversion using interdisciplinary approaches of chemistry, physics, engineering and machine learning. Expected outcomes of this project include higher efficiency display and lighting, better performance of energy harvesting. The cross disciplinary collaborations pave the way to achieve the objectives of this project. This should provide significant benefits, such as better ways to convert energy from renewable sources and more efficient ways to use electrical power for lighting and display.					
	National Interest Test Statement					
	With the rapid development of society, the requirement for energy is increasing. These would require better ways to convert energy from renewable source and more efficient ways of lighting. This project is aiming the most challenging issues such as stability in the perovskite research field, provide the possible candidate for next generation of lighting and energy harvesting simultaneously. Developing such a novel and high-performance materials are essential and meet the concept in the Science and Research Priority of “advanced manufacturing” and “energy” by the Australia government. By carrying this project with the next generation of scientists, they can receive professional training with multi-disciplinary skills and broad knowledge in chemistry, physics, and engineering. The expected groundbreaking results could not only publish high impact papers but also emerging perovskite nanocrystals to the best potential forefront candidate in the rapidly growing PV and LED industry. The result of the project will further improve Australia's global position as a leader in energy research.					
DE220101103	**Giant piezo responses in rare-earth doped eco-friendly relaxor perovskites**	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
Zhang, Dr Le	This project aims to design and fabricate superior eco-friendly substitutions for lead-based perovskites widely used in piezoelectric devices, to address the long-standing toxic concern of lead for human beings and the environment in the community. It is expected to surmount the fundamental limit of current approaches to reach giant room-temperature piezoelectric responses in lead-free perovskites through using a pioneering route named rare-earth doped relaxor/morphotropic phase boundary crossover. Success of this project will not only meet the Australia’s ecological sustainability goals, but also provide commercial opportunities for Australia in the large market of piezoelectric devices (> 25 Billion USD annually).					
	National Interest Test Statement					
	Electromechanical devices such as sensors, actuators, and transducers commonly used in consumer, aerospace, defence, and healthcare applications have been based for many years on lead-containing piezoelectric ceramic materials. Lead poses significant environmental and health risks and there is strong impetus world-wide to replace these materials with lead-free alternatives while maintaining, preferably improving, their properties. The project uses a novel methodology to produce lead-free piezoelectric materials that are safe and environmentally friendly and have high electromechanical properties suitable for commercial devices. The project addresses the “Advanced Manufacturing” National Science and Research Priority, and successful outcomes will provide new opportunities for Australian manufacturing industry in the global piezoelectric market currently worth AUD$33Bn p.a. and projected to increase 3.7% p.a. in the next few years. Intellectual property generated in the project will enable strategic partnering with leading Australian companies to develop high performance devices of major societal benefit.					
DE220101185	**Engineering ferroelectric topologies in freestanding membranes**	71,150.00	145,800.00	147,550.00	72,900.00	437,400.00
DAS, Dr SUJIT	This DECRA proposal is focused on the exploiting controlled motion, annihilation and creation of real space topological defects (polar skyrmions, vortices and merons) in free-standing ferroelectric superlattices. Topological states in ferroic materials arise from spin/dipolar textures (the spins/dipoles can be considered as quasiparticles) which condense to form topological defects. The imposition of precisely controlled elastic boundary conditions through an applied bending stress, temperature profiles and electric fields to the membranes enables tailored functional responses without any interference from substrate clamping effect. This yields multifunctional materials with enhanced operational speed, sensitivity and energy-efficiencies.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The aim of this project is to design and produce new and unique electronic materials for potential use in advanced electronic manufactured products including random access memories, ferroelectric racetrack memories, thin-film capacitors, transistors, and actuators. The project addresses the National Science and Research Priority of “Advanced Manufacturing” and successful outcomes will contribute to Australia’s emerging capability in advanced manufacturing technologies especially those based on quantum and low-energy devices. Intellectual property generated in the project will contribute to Australia’s well-established world-leading development of electronic and quantum technologies and will enable strategic partnering with leading Australian and overseas companies to develop new electronic devices of major national and societal benefit. A combination of advanced materials synthesis techniques and sophisticated analysis tools employed in the project will provide state-of-the-art research training skillsets to Australian researchers to further develop national capability in advanced materials.					
DE220101210 Alinejad Rokny, Dr Hamid	**Deciphering molecular genetic mechanisms underlying chromatin interactions** This project aims to generate the high confidence map of enhancer-promoter links in 61 tissues and cells through robust integration of novel machine learning tools with genomic and epigenomic datasets. Understanding which key elements in the genome may be important to fine-tune gene expression is essential for understanding biological pathways. The expected outcomes include i) New tools to robustly identify true chromatin pairs; ii) Comperehensive maps of regulatory interactomes in 61 tissues & cells, which will provide a roadmap for interpreting & prioritising noncoding variants. This should provide significant benefit to Australia's capacity for cutting-edge genomics research through fundamental understanding of gene regulation mechanism.	75,483.50	150,588.50	150,333.50	75,228.50	451,634.00
	National Interest Test Statement This project will make a major contribution in developing novel methodologies to study chromatin structure of human and mammalian genomes, providing research leadership in this area. The research outcomes will be communicated to relevant stakeholders, local and national government and other related businesses, by creating novel toolsets and high confidence maps of tissue-specific regulatory interactome. This will provide a roadmap for interpreting and prioritising tissue-specific regulatory elements and will contribute to our understanding of gene expression regulation. The impact of these program goes way beyond molecular biology. The ability to identifying regulatory regions is a key requirement for many other disciplines, such as genomic medicine including treatment of a human disease through suppression or enhancement of the levels of key disease-related genes. A long-term outcome of this research will be advancing the Australian capacity for health data analytics, personalised medicine, and genomics research.					
DE220101257 Tye, Dr Michelle H	**Understanding how community characteristics shape suicidal behaviour** This project aims to fill a critical knowledge gap in our understanding of the social determinants that give rise to suicide in Australian communities. Using an innovative, theory-driven approach, this project is expected to establish new insights into what, and how, social and economic inequalities create variation in suicide risk, and illuminate new opportunities for intervention and monitoring. Expected outcomes include evidence-based policy recommendations for the actions that are likely to be most effective in reducing suicide risk at the population-level. This new knowledge should provide significant benefits in shaping the development of national suicide prevention responses to reduce social and economic disadvantage into the future.	67,150.00	142,588.50	149,136.50	73,698.00	432,573.00
	National Interest Test Statement Inequality in the social and economic conditions in which we live can shape our risk of suicide. Recent environmental and health threats have contributed to growing inequality across Australian communities, which could have long term impacts on suicide. A limited understanding of the social determinants of suicide means that Australian governments do not have the data they need to plan targeted, effective and equitable solutions for the future. This project will collect and analyse rich spatial data on trends and patterns in the impacts of social determinants on suicide in Australia, and develop expert consensus on the actions that need to be undertaken to prevent suicide in the population. The systematic and innovative methods will improve how social determinants of suicide are identified into the future, providing policymakers with clear recommendations on the highest-priority conditions to target for intervention. The findings from this research are expected to directly contribute to improved planning to reduce inequality in a range of policies, which will ultimately help to save lives of Australians.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101277	**Temporal-Spatial Data Analytics for Stochastic Power System Stability**	69,500.00	141,650.00	144,300.00	72,150.00	427,600.00
Zhang, Dr Rui	The modern power system is evolving towards a renewable-energy dominated, digitalized "data-intensive" system, where enormous data are measured in multiple timescales, different locations, and in diverse structures. This project will develop a novel data-driven framework for power system stability analysis. This project will deliver new knowledge about instability phenomena and mechanism of power systems with high-level renewable energies, faster-than-real-time system instability risk detection, and rule-based stability control. These research outcomes will form the basis of an innovative theoretical foundation to guide new technologies for power utilities for stability assessment and enhancement in the digitalized era.					
	National Interest Test Statement					
	This project falls within the Science and Research Priority “Energy” and aims to address the research challenge “Australian electricity grids that can readily integrate and more efficiently transmit energy from all sources including low- and zero-carbon sources.” This project aims to develop a novel data-analytics framework for enhancing the stability of Australia's power grids in the context of large-scale renewable power integration. The outcomes of this project can be potentially applied by power utilities to reduce the risk of power grid blackouts such as the Sep 2016 South Australia blackout and help Australia to effectively and safely achieve the Renewable Energy Target. This research will provide a foundation to ensure the stability and secure the economic efficiency of the energy systems currently experiencing an accelerated transition into a renewable energy-dominated and digitalized system, in Australia and internationally.					
DE220101424	**Molecular basis of Prestin’s electromotility and sound discrimination**	77,597.00	142,494.00	139,544.00	74,647.00	434,282.00
Bavi, Dr Navid	Sonar animals like whales can hear at exceptionally high frequencies allowing them to echolocate. Humans, though, can hear at much higher frequencies than reptiles and birds. Frequency sensing mainly depends on a protein in the ear called Prestin. Currently, the structure and working mechanism of Prestin is unknown. This project aims to characterize how Prestin responds to high frequencies by probing the electro-mechanical force generated using mechanically gated channels as a reporter. Single particle cryo-electron microscopy will also be used to visualize Prestin’s 3D structure. Together, this DECRA project will elucidate the molecular basis of hearing differences across species and reshapes our understanding of the evolution of hearing.					
	National Interest Test Statement					
	We rely on our hearing and sound discrimination for survival and communication. Approximately, one in six Australians suffer from hearing loss. Annually, this costs the nation $12 billion. Studies have shown that a lack or dysfunction of a protein in the inner ear, called Prestin, causes disabling hearing loss. However, the molecular architecture of Prestin is completely unknown and it is unclear how Prestin governs frequency tuning in the mammalian cochlea. This project is aimed at generating fundamental knowledge to address these huge knowledge gaps in the field. This includes bringing state-of-the-art techniques into the hearing field in Australia, such as cryo-electron microscopy to solve the high-resolution 3D architecture of Prestin, and novel single-molecule methods to dissect its function. In addition, our research aims to understand the differences in frequency sensation between humans and sonar animals such as whales, dolphins, and bats. Ultimately, outcomes of this research will provide invaluable insights to combat hearing loss.					
	The University of New South Wales	1,210,942.50	2,413,831.00	2,408,425.00	1,205,536.50	7,238,735.00
The University of Newcastle						
DE220100006	**Determining the regulation of ovary development with single cell sequencing**	64,040.50	127,915.00	127,895.50	64,021.00	383,872.00
Sutherland, Dr Jessie M	This project will greatly advance our understanding of ovary development and mammalian reproduction. I will investigate the process of ovarian primordial follicle activation including its genetic regulation, the importance of supportive granulosa cells and the biological significance of regulatory factors. This will be achieved through the comprehensive investigation of a single cell transcriptomic dataset of ovarian development (Aim 1) in conjunction with functional studies (Aim 2). The outcomes of which will hold significant benefit to animal reproduction through new strategies to improve livestock productivity and control invasive pest species. These outcomes are of economic and environmental and benefit nationally.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Regulation of fertility of agricultural, feral, and domesticated species remains a crucial component of the economic success of Australia's agribusiness, conservation, and environmental sustainability. Australia's agricultural industry is currently worth $61 billion per year with targets to grow this to $100 billion by 2030, with farmed livestock generating more than $30 billion annually. Pest animals cause over $600 million a year in lost agricultural productivity and represent a major pressure on Australia's threatened species. Optimal animal production drives the financial benefit of agricultural animals and the pervasiveness of pest species. Both of which are ultimately dictated by the reproductive fitness of the species. This project will investigate the regulation of mammalian oocyte (egg) production using novel single cell and transcriptomic technologies to understand and reversibly target the process of ovarian development and ultimately harness our control of animal reproduction.					
DE220100032 Lord, Dr Tessa	**Banking on spermatogonial stem cells to safeguard Australian native fauna** Spermatogonial stem cells in the testis are an untapped resource for species conservation. This project aims to characterise metabolic pathways that control spermatogonial stem cell function, and define the conserved nature of these pathways between model species (mouse) and vulnerable Australian native fauna. Expected outcomes of this project include an enhanced capacity to culture koala spermatogonia in vitro, which will be a first step towards using spermatogonial biobanking as a tool to maintain genetic diversity in this species. Outcomes from this study should provide significant benefits in safeguarding our unique Australian native species, which is of particular importance following the catastrophic 2019/20 bushfire season.	64,044.00	128,088.00	125,588.00	61,544.00	379,264.00
	National Interest Test Statement This project directly contributes to Australia's national interest through the fortification of conservation strategies that can be applied to our vulnerable Australian native faunae. This research will uncover novel molecular mechanisms that control spermatogonial stem cell function in the testis, in both the mouse (model species) and the koala. Knowledge produced in this proposal will inform pioneering attempts to culture koala spermatogonia in vitro: a first step towards developing spermatogonial stem cell biobanking as a conservation technique. Beyond this, the ability to maintain primary cultures of undifferentiated spermatogonia would provide a seminal experimental resource for future studies into potential threats to koala reproduction, such as chlamydia infection and heat stress (i.e. climate change). Moreover, this project will consolidate the standing of Australian researchers in the field of Reproductive Biology, and will provide outstanding training opportunities for PhD candidates.					
DE220100071 Cook, Dr Julia A	**Understanding intergenerational financial assistance with home ownership** Rates of intergenerational financial support with first home ownership have skyrocketed over the last decade. This project aims to understand how this support is negotiated within families. It will use innovative qualitative methods to identify how this form of financial assistance impacts upon families over time, and from the perspectives of multiple family members. Expected outcomes include a new, systematic framework to recognise how families shape young adults' pathways into home ownership and to develop evidence-based financial policy. This should provide significant benefits including greater protection for both donors and recipients of financial assistance when purchasing property.	65,000.00	125,500.00	119,000.00	58,500.00	368,000.00
	National Interest Test Statement This project will generate crucial evidence to better understand the changing role of families in young adults' pathways into home ownership in Australia. Over the last 10 years parents have increasingly stepped in to financially assist their adult children with buying their first home, collectively representing the country's fifth largest home loan lender in 2020. However, little is known about what happens to both parties after the money changes hands. This project provides an in-depth account of how the provision and receipt of financial assistance with home ownership impacts upon both donors and recipients following the transfer. It will benefit the nation by identifying key vulnerabilities and risk factors and will aid in developing evidence-based policy to safeguard the financial wellbeing of the growing number of families involved in this practice.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100084	**Creative ageing through transformative engagement with music**	73,176.00	151,087.00	150,398.00	72,487.00	447,148.00
English, Dr Helen J	This project aims to evaluate how participation in music activities can foster personal growth, self-efficacy and purpose amongst older adults. Using a novel hybrid theoretical framework, it will generate new knowledge about what elements in music activities deliver such transformative effects and how to widen access. Expected outcomes include a blueprint for transformative music activities, and resources to design them, as well as guidelines and an online, interactive map to make them more widely accessible to our ageing population. Benefits will be improved wellbeing and quality of life for older adults and carers, guidance for music groups, and resources and recommendations for aged-care providers to implement music activities.					
	National Interest Test Statement					
	This research will advance Australia's national interest by contributing knowledge specific to Australia's older populations and their access to opportunities for a positive ageing experience through creativity linked to learning. The project will document information on music activities nationally and identify what constitutes best practice. Through an extensive survey, it will produce a digital map, using innovative time/location software, to disseminate information on the availability of music activities nationally, a valuable resource for older adults and care providers. In addition, the research will identify elements and practices in music learning that are transformative for participants, promoting positive change. It aligns with the Australian Government's research priority 9 'Health' for preventative strategies to improve physical and mental well-being for older adults through discovering how engagement with music promotes positive changes and recommending strategies to widen accessibility for demographics including low socioeconomic status communities, ethnic groups and frailer adults.					
DE220100121	**Effects of environmental heat stress on male fertility in livestock species**	76,296.00	151,092.00	150,116.00	75,320.00	452,824.00
Swegen, Dr Aleona	This project aims to address the role of ambient heat stress in animal fertility by examining its mechanisms and developing treatments to alleviate its effects. Using an interdisciplinary approach that brings together veterinary sciences, reproductive biology, biochemistry and bioinformatics, the project expects to improve our understanding of how high environmental temperatures lead to reduced fertility, pregnancy loss and compromised inheritance in large animals, and to develop effective interventions. The resulting benefits include enhanced productivity and resilience of Australia's livestock industries in the face of a changing climate.					
	National Interest Test Statement					
	Australia's cattle and horse industries collectively contribute an estimated $17.5 billion to the economy per year, with cattle and beef representing the single largest contributor to the annual value of Australian agricultural production. The ability of bulls and stallions to produce healthy offspring is a cornerstone in both these industries, while rising ambient temperatures pose an imminent threat to male fertility and therefore to the industries' productivity and long term viability. This project seeks to address the problem of heat-induced subfertility in conditions relevant to Australia's livestock industries and develop practical ways to diagnose and prevent fertility losses, thus directly benefiting the livestock industries and the Australian economy by enhancing productivity and resilience in some of Australia's most important agricultural sectors.					
	The University of Newcastle	342,556.50	683,682.00	672,997.50	331,872.00	2,031,108.00
The University of Sydney						
DE220100025	**Human-kangaroo relations: Reconciling perceptions, knowledges and practices**	77,847.00	144,028.00	140,278.00	74,097.00	436,250.00
Chao, Dr Sophie M	This research aims to reveal the diverse perceptions, knowledges and practices shaping human-kangaroo relations in Australia. Using inter-disciplinary and multi-sited methods, the project expects to generate innovative empirical and conceptual insights into the contested status of the kangaroo as native species and pest, food resource and political symbol. Planned outcomes of the project include the development of participatory and applied approaches to reconciling environmental conservation with ethical food production and multispecies justice. Anticipated benefits include fast-tracking a multi-stakeholder dialogue to ensure an ecologically viable, ethically just and economically sustainable future for Australian wildlife.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This research investigates the various perceptions, knowledges and practices surrounding human-kangaroo relations among multiple Australian actors and institutions. These include government agencies, conservation scientists, animal welfare organisations and commercial and non-commercial kangaroo harvesters. The project will offer a comprehensive social analysis of the opportunities and challenges in reconciling the ecological and ethical dimensions of kangaroo management with its economic importance for agriculturalists and the kangaroo meat industry. Importantly, this research will bridge the existing gap between scientific knowledge, legal frameworks and public perceptions surrounding kangaroo conservation, culling and consumption. It will lay the groundwork for critically needed inter-disciplinary and multi-stakeholder dialogue towards the creation of sustainable and just human-kangaroo futures. The knowledge generated by this research will enable the development of innovative and inclusive processes for harmonising the economic, environmental and ethical facets of human-wildlife relations in Australia.					
DE220100188 Kummerfeld, Dr Jonathan K	**Generating Plots with Dialogue Based Executable Semantic Parsing** This project aims to address the limited abilities of dialogue systems by developing new models and data collection techniques. The project expects to address a major gap in Natural Language Processing using a model that generates computer code and updates it in response to user requests. Expected outcomes of this project include a system that interacts with a user in plain English to analyse data, and efficient methods of training the system with minimal expert input. This should provide significant benefits to research and business by broadening the accessibility and efficiency of data analysis, enabling faster and wiser decisions.	73,097.00	146,194.00	146,194.00	73,097.00	438,582.00
	National Interest Test Statement This project will create a new way to analyse data that is faster and does not require specialist training. The fundamental ideas developed will have broader value in other artificial intelligence systems that interpret text. These innovations will address a growing gap between the volume of data and our need to analyse it. The Australian government, businesses, and individuals are all collecting information at a progressively faster rate with new smart devices. This data has been described as the new oil of the economy, and like oil it is only useful once refined through analysis. Today that analysis is limited by the tools available and the small number of people with the training necessary to use those tools effectively. This project will expand the capacity of Australian businesses, researchers, and individuals to extract valuable insight from their data, providing economic and commercial benefits to Australia.					
DE220100284 GOYAL, Dr ASHISH	**Multiscale mathematical modelling to gain insights into hepatitis viruses** This project aims to use mathematical modelling to study hepatitis viruses at multiple levels. The project expects to develop complex yet analysable mathematical models to comprehend the fundamental biology of hepatitis viruses by elucidating longitudinal patterns in viral and immune markers at intracellular and cellular levels, and advance a new subfield in mathematical biology, i.e., modelling codependent human viruses. Expected outcomes of the project include new generalized mathematical tools, biological insights that may aid research beyond the scope of this project, and strong interdisciplinary collaborations. Expected benefits include an increased capacity of the research community in Australia to use mathematical models in virology.	74,000.00	148,000.00	148,000.00	74,000.00	444,000.00
	National Interest Test Statement By developing novel mathematical models, my research will provide new insights into the fundamental biology of hepatitis viruses that may ultimately inform medical researchers conducting future research beyond the scope of this project. This work is impactful as it will contribute to current knowledge of hepatitis viruses, which affect almost 400,000 people in Australia. This could attract future funding from the pharmaceutical industry and other overseas agencies, contributing to the growth of the Australian economy. Because hepatitis viruses raise global health concerns, outputs from this project will attract the attention of the international research community, promote interdisciplinary collaborations and boost Australia's international image as the major contributor to the field. This project will also provide significant benefits to the research community in Australia with an increased capacity to use mathematical models in virology. Furthermore, my project will train young researchers in an emerging field of the mathematical modelling of coinfections, promoting Australia's leadership in this area.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100317	**Chinese Business: economic and social survival in white Australia,1870-1940**	69,218.50	144,415.50	148,229.00	73,032.00	434,895.00
Loy-Wilson, Dr Sophie D	This project aims to uncover the social and cultural significance of Chinese economic activity in Australia. Documenting enterprises that Chinese migrants pursued, under conditions that restricted non-white immigration and labour, it seeks to offer the first national account of the strategies these migrants used to pursue collective economic interests. Large datasets are needed to reveal this. Court archives will be used to investigate Chinese agricultural and remittance economies, re-centering Chinese Australians in the nation's history. Benefits include the digitisation of these records, expected to form a major online archive accessible to descendants and future researchers, whose economic activity buttressed Australian prosperity.					
	National Interest Test Statement					
	This project will reveal the full extent of the social and cultural significance of Chinese economic activity in Australia. As an additional benefit, it will underline to the 1.2 million Australians of Chinese origin that their past, present and future contributions to Australian society are acknowledged and valued. It will benefit social cohesion by helping redress the perception of some Chinese Australians, members of a community that now numbers 1.2 million, that negative sentiment towards them has recently increased (as registered by the Lowy Institute annual opinion survey). Drawing on perspectives from the past, it will highlight the collective strategies used by migrants to successfully build communities and secure economic prosperity, particularly in regional Australia.					
DE220100387	**Life without Birth: The Ethics, Politics, and Law of Artificial Wombs**	55,500.00	117,000.00	120,500.00	59,000.00	352,000.00
Ferracioli, Dr Luara L	This project aims to assess the morality of ectogenesis, the process of gestating a foetus in an artificial womb. Recent technological advances in non-human ectogenesis raise the question of whether it is desirable to pursue research in human ectogenesis. This project expects to generate new knowledge in social philosophy by inquiring into the value of natural gestation, the foundations of parenthood, and the interests of foetuses during gestation. Expected outcomes of this project include an improved understanding of the costs, risks, and benefits of ectogenesis. This should provide significant benefits, such as resources for ethical decision-making in light of technologies aimed at radically reshaping the process of human creation.					
	National Interest Test Statement					
	This DECRA project contributes to Australia's national interest through its potential to have social benefits to the Australian community. The project will derive a number of philosophical principles that can be action-guiding for policy-makers considering legislation, policy and programmes that can promote and protect the interests of prospective parents, foetuses and the children they become. Indeed, the project will produce and defend philosophical principles, theoretical innovations and moral narratives that can inform governments' responses in the areas of abortion, IVF, artificial wombs, neonatal incubation, custody disputes, and medical interventions in the lives of foetuses, whether they continue to be gestated in natural wombs, or start to be gestated in artificial wombs.					
DE220100462	**Searching for New CP Violating Phenomena at the Intensity Frontier**	60,500.00	121,000.00	121,500.00	61,000.00	364,000.00
Hsu, Dr Chia-Ling	This project aims to search for new sources of matter-antimatter asymmetry in B-meson decays at the intensity frontier, using data from the Belle and Belle II experiments at Japan's KEK collider facility. It aims to do this by optimally utilising an innovative analysis approach based on advanced machine learning techniques and fitting methods. It could resolve long-standing puzzles such as the origin of the matter-antimatter asymmetry in the universe. Expected outcomes include broader knowledge in the field of particle physics and enhancement of international collaboration. This should provide significant benefits for Australia's international scientific reputation, leading to increased export opportunities for Australian education.					
	National Interest Test Statement					
	This project will contribute to both social and cultural benefits to the Australian community. It will seek a deeper understanding of fundamental questions. Why is there much more matter than antimatter in the Universe? How much do we understand the basic laws of Nature? The addressing of basic questions such as these has always represented a high quest enriching human culture. The topics are topics of keen interest to the general public and to a world-wide research community. The project seeks to make an identifiable Australian contribution to a large international scientific effort. The results will stand by themselves, and provide a mark of the maturity of our scientific work. The project will also increase Australia’s engagement with the international scientific community, in particular at the premiere particle physics laboratory in the Asia-Pacific region, KEK in Japan.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100466	**Mito-nuclear coevolution as an engine of biodiversity**	76,822.00	154,911.50	154,501.50	76,412.00	462,647.00
Gloag, Dr Rosalyn S	This project aims to advance understanding of the processes that drive speciation and generate biodiversity. It will use Australia's native social bees to test whether genetic diversity in mitochondrial genomes drives biodiversity at the population level, combining molecular and field studies in this uniquely tractable natural system. The expected outcome is a significant advance in knowledge of how coevolution between the two genomes of eukaryotic cells - mitochondrial and nuclear - affect the observable diversity of the natural world. The project is also expected to benefit the management and conservation of Australian native bees, which are vital pollinators in our natural and agro-ecosystems.					
	National Interest Test Statement					
	All animal cells contain two genomes (mitochondrial and nuclear) that must co-operate to ensure proper cell function. The interactions of a cell's genomes have important implications for human health, but how they affect large-scale ecological processes remain poorly understood. This project will use the unique properties of Australia's native social bees to investigate whether interactions between mitochondrial and nuclear genes drive populations to diverge genetically and form new species. Understanding the mechanism by which new species originate will provide a better knowledge base by which to recognise and conserve the world's biodiversity. The new information generated by this project will also benefit the conservation and management of Australian native bees, which play a vital role in our agriculture, food security and ecosystem health by pollinating crops and native plants.					
DE220100509	**Going Fourth: ruling light with pure-quartic solitons**	73,347.00	147,819.00	144,894.00	70,422.00	436,482.00
Runge, Dr Antoine	This project aims to develop a novel integrated high-energy light source through the combination of nanoscience and optics. The core research of this project addresses the energy limitation inherent to the current technology which has hindered its use in real applications. Expected outcomes include new knowledge, with publication in world-class scientific journals, and disruptive technological capabilities in miniaturized photonics. The expected benefit is to generate high-energy pulses from a battery powered micro-chip that could enhance spectroscopy sensing devices for real-world applications, outside laboratories. This project will strengthen Australian capabilities and expertise in cutting-edge nanotechnology and photonics.					
	National Interest Test Statement					
	This project aims to advance Australian scientific and technological capabilities by developing a novel integrated high-energy light source by combining cutting-edge physics and nanoscience. The project will generate new knowledge in the science and engineering of integrated, micro-sized nonlinear photonic devices, ranging from modelling and fabrication, to comprehensive experimental verification. The expected benefit is a battery-powered microchip emitting strong optical pulses, that can be taken out of the lab and into the field. These could be used for real-world applications that thus far were impractical, such as spectroscopy and environmental sensing. The research contained in this proposal has the potential to result in a core-technology patent in a global photonic industry, which is estimated to be worth ~590 billion USD/year and growing. This project will strengthen Australia's native capabilities and expertise in world-leading nanotechnology and photonics.					
DE220100527	**Novel high-performance copper-based materials via additive manufacturing**	70,000.00	140,000.00	140,000.00	70,000.00	420,000.00
Nomoto, Dr Keita	This project aims to develop novel high-performance copper-based materials produced by additive manufacturing for the electrification revolution, which will provide significantly higher mechanical performance, superior electrical and thermal properties and enable flexible complex shape options. Atomic-scale microstructural analysis using advanced microscopy techniques will reveal profound new insights into the process-structure-property relationship. Expected outcomes include new understandings of the fundamental physics of new functional materials, eco-friendly products, and an ability to facilitate the increasingly widespread use of the copper-based materials for renewable electricity towards a more sustainable society and economy.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement As identified in the National Science and Research Priorities, advanced manufacturing is a key area of immediate and critical importance to Australia and its place in the world. This project will develop advanced copper-based materials via additive manufacturing. In the next decade, these new functional materials will become integral to numerous applications across the energy, resources and transport sectors. In elucidating the fundamental physical properties of high-performance copper-based materials and giving them life through additive manufacturing, this project offers breakthroughs in scientific understanding, underpins Australia's world-leading manufacturing of metal products, addresses the global challenges of developing specialised materials and alloys, and contributes to a strong economy, a healthy environment and connected and well-functioning society.					
DE220100552 Huang, Dr Yuhan	**Improving pollutants dispersion in street canyons for better urban living** Urban street canyons formed by tall buildings restrict dispersion of vehicle emissions. This poses severe health risks to the public by aggravating roadside air pollution, but is often overlooked in city planning. This project aims to uncover the mechanisms controlling vehicle emissions dispersion processes in urban street canyons by combining novel field experiments and numerical simulations. Expected outcomes include a validated tool for predicting roadside air quality, control measures for reducing air pollution and guidelines for better future urban planning. This project expects to critically assist policy makers and urban planners to effectively manage city development projects and safeguard a high air quality standard in our cities.	71,862.50	144,462.50	142,150.00	69,550.00	428,025.00
	National Interest Test Statement Urban air pollution causes approximately 3,000 premature deaths and $11-24 billion health costs every year in Australia. Meanwhile, the Australian Bureau of Statistics predicts that Australia's population will continue to increase rapidly in the coming decades. Many Australian cities are relaxing the building height limits to accommodate the growing population, leading to taller and denser buildings and deeper street canyons which restrict air ventilation and pollutants removal and pose severe health risks to the public by aggravating roadside air pollution. This project will advance our understanding of vehicle emissions dispersion in urban street canyons and develop control measures to mitigate its impact on public health. Such knowledge will be crucial for policy makers and urban planners to safeguard a high air quality standard in our cities during the rapid urbanisation and construction boom. Such decision-making capability is expected to benefit millions of Australian city inhabitants by reducing their exposure to roadside air pollution and the associated health and economic costs.					
DE220100555 Foo, Dr Shawna	**Identifying factors that counter negative impacts of ocean climate change** This project aims to identify factors that counter the negative impacts of climate change on coral reefs. This project expects to address key research gaps to ensure the persistence of these ecosystems. Expected outcomes of this project include identification of coral reefs that are buffered by adjacent systems, such as mangroves and seagrass, and characterisation of conditions (e.g. increased food availability) that allow coral reefs and associated organisms to persist under stress. Outcomes of this project should provide significant benefits such as adding to the interventions toolbox in alleviating the impacts of global change on coral reefs and identifying conservation strategies to help prevent the loss of these valuable ecosystems.	76,376.50	153,213.50	153,059.50	76,222.50	458,872.00
	National Interest Test Statement Coral reefs are endangered due to unprecedented global change. By combining spatial modelling, special sensor technologies, field and laboratory experimentation, this project will determine if factors, such as proximity to adjacent ecosystems like mangroves and seagrass, and increased food availability often associated with these systems, can counteract the negative impacts that climate change is having on our coral reefs. This information is crucial in order to effectively manage Australian coral reefs to ensure they continue to survive as functioning ecosystems and continue to provide services such as supporting a wealth of jobs, tourism, fishing and recreational activities. Increasing the resilience of Australian coral reefs will greatly benefit economic activity and jobs in Australia, where coral reefs contribute $6.4 billion to the economy annually and have an asset value over $56 billion.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100583	**Engineering of biocatalysis in metal-organic frameworks for CO2 conversion**	77,500.00	150,000.00	145,000.00	72,500.00	445,000.00
Liang, Dr Weibin	Transforming the greenhouse gas carbon dioxide (CO2) into valuable fuels would be beneficial for relieving energy shortage and improving global sustainability. This project aims to architect a biocascade system in metal-organic frameworks (MOFs) for artificial CO2 conversion. Learned from the living organisms, a whole biocatalysis unit including enzymes and cofactors will be encased and protected in an artificial porous polymeric MOF coating. This approach is expected to deliver robust biocatalysts with high reaction-activity and chemo-selectivity in converting CO2 into methanol under the industrial operating condition, involving thermal, pH, and chemical stressors. This advancement will contribute to a carbon-neutral industry and society.					
	National Interest Test Statement					
	This project advances the prospect of design and synthesis of enzyme/MOF biocatalysts and provides an environment-friendly approach to CO2 conversion. The successful execution of the project will provide significant benefits to Australia's chemical manufacturing industry in the energy and environmental sectors and deliver a two-fold benefit to Australia's national interest. Firstly, this project will not only recycle CO2 to contribute to solving climate change but also convert CO2 from an unwanted byproduct into a valuable commodity. Secondly, this project will deliver new insights into the enzyme-MOF interactions which are particularly important to the design of robust biocatalyst for industrial applications. This advancement will support future biocatalytic technologies by bridging the gap between biocatalysis and industrial application. The fulfillment of the DECRA project will provide a pathway towards the groundbreaking technologies that would be of benefit in a carbon-neutral energy cycle, whilst also maximizing Australia’s competitiveness in sustainable manufacturing.					
DE220100625	**Topological phases of matter for quantum computation**	60,000.00	120,000.00	120,000.00	60,000.00	360,000.00
Williamson, Dr Dominic J	A global effort is underway to build quantum computers at scale. There are promising approaches based on quantum phases of matter with exotic topological properties that are harnessed to protect fragile quantum information. This project aims to take advantage of recent breakthroughs in three dimensional topological phases to discover new materials and design better components for quantum computers. This addresses the significant question of what the analogue of a transistor will be in a full scale quantum computer. Benefits include classification of three dimensional topological phases and the discovery of better routes to scalable quantum computing, potentially causing a fundamental shift in the direction of this global research effort.					
	National Interest Test Statement					
	This project aims to discover the ideal components on which to base scalable quantum computers. Scaling up is necessary to reap the benefits of the extraordinary power promised by quantum computers for solving important problems in science, industry and cryptography. The nascent quantum technology industry is receiving substantial investments from international government agencies and private industry to fund efforts in the competition to attain this powerful new technology. Australia has had an enormous impact in the field of quantum computation to date and as such is positioned as a leading player in this technological development. This project would develop valuable expertise in Australia that would provide long term benefits to the development of Australia’s own quantum technology industry. The particular focus on new designs for quantum computing components could provide the Australian quantum computing effort with a competitive edge. Such contributions, at this relatively early stage, have the potential to generate significant economic benefits through the growing Australian quantum technology sector.					
DE220100676	**Realising highly selective catalysts for continuous chlorine production**	73,097.00	145,194.00	142,194.00	70,097.00	430,582.00
Zhao, Dr Shenlong	The aim is to directly electrocatalytic low concentration NaCl solution under mild conditions, to form chlorine gas for the polymers and pharmaceuticals production, enabled by the low dimensional metal-organic framework based catalysts. The project will also gain an atomic-level understanding of the mechanism of CER, based on in-situ spectroscopies e.g., X-ray absorption and Raman. Unlike electrocatalytic chlorine evolution using membrane cell with one membrane only, the project will design a novel integrated reactor system to alleviate the naturally sluggish chlorine evolution reaction, CER, significantly improving the yield and selectivity.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The combination of two fuel cells operating synergistically to drive the generation of chlorine gas from seawater-like solution, and electrical power, will be a paradigm shift and form a foundation for significant economic, environmental and social benefits. The anticipated scientific breakthroughs in catalyst design and preparation, coupled to the technical implementation of these advanced materials in our novel chlorine generator, will lead to a new and exciting low-temperature, low-pressure, and (if using renewable energy) zero-carbon synthesis route for producing chlorine gas. The in-depth, fundamental study of the reaction mechanism will generate the knowledge base for applied success. The project will help to position Australia at the leading edge of research into chlorine production that can be used as inputs for key Australian industries such as construction (polymer production), pharmacy (sodium hypochlorite production) and energy (hydrogen transport vector).					
DE220100829 Tran, Dr Dominic M	**Stop it: Learning response inhibition** Behavioural inhibition is an essential part of daily life. However, some behaviours are hard to inhibit, such as refraining from eating junk foods. This project aims to determine how learning from past experiences and individual differences account for our capacity to inhibit actions. The project combines novel behavioural paradigms with an associative learning framework, cutting-edge neurophysiological techniques, and advanced statistical analyses. Expected outcomes include new knowledge of the psychological, cognitive, and neural mechanisms involved when behaviours are successfully inhibited. This project should provide benefits to understanding why inhibiting actions is prone to failure in addiction and psychological disorders.	72,647.00	148,310.00	150,872.00	75,209.00	447,038.00
	National Interest Test Statement Inhibiting inappropriate actions is necessary for healthy function. We often stop ourselves from eating high fat high sugar foods, jaywalking across a busy road, or touching our face during a global pandemic. The ability to withhold or cancel actions is also linked to addictions such as overeating and gambling, as well as psychopathologies such as attention deficit hyperactivity disorder and obsessive-compulsive disorder, which are all major health and social issues affecting Australia. For example, Australia has one of the highest prevalence rates of obesity in the world and it is estimated to cost the economy $8.6 billion per year. This project will help to understand why action inhibition succeeds under some circumstances but fails in others. This knowledge has societal and economic benefits for improving clinical interventions targeted at retraining maladaptive behaviours linked with obesity, such as the inability to refrain from eating junk foods while dieting, but also other behavioural disorders, such as the inability to suppress the urge to repetitively perform irrational actions.					
DE220100904 Mestrom, Dr Sanné	**ART, PLAY, RISK: An interdisciplinary approach to child-friendly cities.** ART, PLAY, RISK will provide new creative and scholarly research into how artworks contribute amenity to public spaces, with a specific focus on questions of risk-in-play in both legal and cultural paradigms. A key methodology is to develop a public child-led playable sculpture project, designed to test creative assumptions about the sorts of art children actually want in their dense urban landscapes, enabling analysis of their play-behaviours, including: self-imposed boundaries of risk, creativity, challenge and comfort. Understanding the playability of public art from a child's perspective will generate solutions addressing the future of child-friendly cities in Australia, as defined by UNICEF's Child-Friendly-Cities policy.	66,183.50	128,221.50	127,089.00	65,051.00	386,545.00
	National Interest Test Statement Australia's high-density urban communities offer decreasing opportunities for children to develop the vital skills of risk-perception and risk management. A lack of understanding about risk can have adverse affects on their development threatening their physical health, psychosocial wellbeing, mental health, and cognitive and communication skills. Pursuant to Australia's National Science and Research Priorities, there is an urgent need to identify, prevent and manage these emerging threats to children's health. Aiming to ensure the future of child-friendly cities, as defined by the UN Convention UNICEF's Child-Friendly- Cities policy, this project supports the provision for children to experience risk and challenge and develop resilience and self-reliance through play in their local urban communities. The method proposed by this project is the transformative power of participatory art in public spaces. To achieve the successful implementation of playable public artworks, involves the complex alignment of interdisciplinary urban agents: artist, landscape architect, urban planner and social scientist.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100964	**Statistical approaches for spatial genomics at single cell resolution**	74,212.00	149,454.00	147,722.50	72,480.50	443,869.00
Ghazanfar, Dr Shila	Cells cooperate to form complex, dynamic and varied tissue structures. This project aims to develop statistical and computational approaches to analyse spatial genomics data, a novel technology that retains vital spatial information at single cell resolution while detecting RNA molecules for hundreds of genes. Observing the molecular activity of cells in their spatial context is critical for tackling key biological questions, such as how tumour cells behave during malignancy or how stem cells determine their fate. Expected outcomes also include techniques to fully harmonise spatial and non-spatial genomics datasets, and methods toward understanding the complex relationships among cells in their environment, revealing novel cell biology.					
	National Interest Test Statement					
	This project will provide an enabling statistical and computational framework that will directly benefit all Australian researchers who use highly multiplexed, spatial gene expression technologies to study biological systems and complex diseases at the cellular level. The novel statistical, bioinformatics and spatial analysis methods combining multiple technologies and existing data will contribute to methodological research in statistical sciences. The methods for discovery of novel cell-types and examining complex cellular interactions in situ will benefit researchers from fields as diverse as biology, ecology, medicine, and agriculture who seek to understand complex biological systems and diseases. This will ultimately lead to a better understanding of disease that will benefit the health of Australians.					
DE220101008	**Cyber Repression and Political Protests in Thailand**	65,629.00	127,786.00	123,985.50	61,828.50	379,229.00
Sinpeng, Dr Aim	This project investigates the impact of digital repressive technologies on activism in autocracies through a case study of online opposition movements in Thailand. The project advances a new conceptual framework for the analysis of networked counterpublics, which outlines the conditions under which social media aids or contains digital dissidents. Expected outcomes include a comprehensive study of interactions between the Thai State and Free Youth Movement and a series of conceptual tools to assess strategies for collective action in digitally repressive environments. It will also provide a roadmap to assist civil society and policymakers in building resilience against cyber repression and reclaiming online spaces for progressive change.					
	National Interest Test Statement					
	The Australian government has a direct interest in addressing cyber repression in Thailand. The Department of Foreign Affairs and Trade (DFAT) has invested $48 million through its International Cyber Engagement Strategy to advance open, free and secure cyberspace. One of the six pillars of the Strategy is ‘human rights and democracy online’, which includes supporting civil society organisations that defend human rights online. This project's examination of how civil society groups in Thailand respond to and manage cyber repression will provide greater understanding of the key drivers of online human rights abuses and strategies to combat them. The project will provide a strong and robust evidence base for how DFAT could better support civil society organisations to defend human rights and democracy.					
DE220101147	**First-principles design of atomic defects for quantum technologies**	67,150.00	134,300.00	136,650.00	69,500.00	407,600.00
Verdi, Dr Carla	This project aims to address the issue of designing and engineering better single-photon sources based on atomic defects in solids, a crucial building block for many quantum technologies. Using advanced first-principles quantum mechanical theories and calculations, the project expects to produce fundamental knowledge of key mechanisms and properties, and to use this to inform the design of new atomic defects for tailored applications as quantum emitters. The expected outcomes, including novel methodologies, will contribute to different research areas, from condensed matter and materials physics to quantum science and technology. This project should provide significant benefits in accelerating quantum technology innovation in Australia.					
	National Interest Test Statement					
	This project seeks to create new knowledge in the prominent field of theoretical condensed matter and materials science, with the potential of making an impact on the new wave of quantum technology applications. In particular, the project’s goal is to drive the design of atomic defects systems that are ideal platforms for realising many quantum technologies, such as secure communications systems and precision sensors and metrology devices. The theoretical and computational tools produced in this project will support Australia’s emerging quantum technology industry, which is projected to become a billion-dollar industry over the next two decades, not only creating new jobs but also contributing to the transformation of society. Moreover, this research project will also drive capacity building by training students and young researchers, which is instrumental to forming a high quality workforce. The project is further expected to strengthen Australia’s links with overseas institutions through a network of collaborations across three different countries.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101316	**Protecting prey from predators using sensory tactics**	62,573.00	123,205.00	121,514.00	60,882.00	368,174.00
Price, Dr Catherine J	This project aims to develop new approaches to prevent the extinction of threatened native species from invasive predators, such as rats, pigs, cats and foxes. Many native species are hard to see but vulnerable to being found by predators with powerful senses of smell and hearing. By harnessing the sensory cues of prey that predators use when hunting, this project expects to discover olfactory and auditory techniques that prevent predators finding threatened species. In doing so, the project intends to provide new perspectives on how animals find food using multiple senses, and lead the recovery of threatened species in areas where predators remain within Australia and globally.					
	National Interest Test Statement					
	Since 2009, invasive predators, such as foxes, cats, rats and pigs, have been responsible for two thirds of extinctions in Australia. It is not feasible to eradicate these predators, and reducing their numbers does not necessarily prevent extinctions. This project offers a new approach to protecting endangered species that does not require predators to be removed or fences built; instead it seeks to stop predators finding prey in the first place by disrupting the sound and smell cues used when hunting. Many native species are hard to see but exposed to predators by their smell or sounds. This project aims to use the sensory tactics of predators against them and develop practical techniques for hiding prey when predators remain. This project will provide new understanding of the role of sensory information to animals seeking food, and enable more effective biodiversity conservation and benefits to agricultural industries in Australia and around the world.					
DE220101498	**Kids, bugs and drugs: Human-microbial relations in everyday family life**	77,009.00	151,678.00	151,265.50	76,596.50	456,549.00
Kenny, Dr Katherine E	This project aims to investigate human-microbial relations in everyday family life within the context of escalating Antimicrobial Resistance (AMR). While AMR is widely recognised as a potentially catastrophic global health threat, antimicrobials still feature prominently in families' daily attempts to care for their health. Using innovative qualitative methods, this project expects to generate better understandings of how human-(anti)microbial relations are understood and negotiated in community settings in daily life. Expected outcomes include new knowledge in the field of health sociology and a crucial evidence base that will yield significant benefit by informing and enabling community-centred responses to the growing AMR threat.					
	National Interest Test Statement					
	Antimicrobial Resistance (AMR) is a major concern for societies, healthcare systems and governments in Australia and worldwide. If left unchecked, AMR is anticipated to have extremely negative effects on human health and national economies causing up to 10 million deaths and USD$6.3 trillion in direct costs each year by 2050. The findings of this project will aid the Australian response to the global challenge of AMR by advancing community-focused perspectives on how antimicrobial drugs are understood and used as part of families' everyday practices of health, illness and care. It will contribute interdisciplinary, multi-sectoral perspectives that will enable novel practice guidelines and health and educational policies that advance a community-centred approach to AMR. In so doing, it will help ensure that responses to antimicrobial resistance are firmly embedded within the social and cultural fabric of Australia's communities.					
DE220101505	**The Aristotelian Soul in Late Ming China**	60,597.00	123,694.00	121,194.00	58,097.00	363,582.00
Canaris, Dr Daniel P	This project aims to uncover a seminal moment during the first stage of Sino-Western intellectual encounters when the Jesuit Francesco Sambiasi (1582-1649) collaborated with the mandarin Xu Guangqi (1562-1633) on the Lingyan lishao (1624), a Chinese translation of Aristotle's On the Soul. Since Ming Chinese lacked direct analogues for the Aristotelian soul, this work provides significant insights into how conceptual translation is conducted between disparate cultures. The intended outcome of this project is to reveal the semantic transformations between the European and Chinese contexts. Benefits include the opening up of pioneering yet understudied texts and insights into why certain ideas fail to resonate in their new target culture.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project will generate new knowledge about Europe's first intellectual and cultural exchanges with China in the early seventeenth century. It will provide valuable insights into the linguistic and cultural challenges faced by attempts to exchange ideas across different intellectual contexts. By analysing the reception of European thought among the Chinese, this research will yield a new understanding of the conditions under which such exchanges succeed or fail. This will greatly benefit our understanding of how cross-cultural dialogues can be successfully conducted, and the results of the research will be able to inform contemporary efforts to foster dialogue between countries with a mostly European heritage (like Australia) and China. This project will forge new research partnerships between Australian academics and overseas scholars and build up Australia's capacity for future cutting-edge research in cross-cultural exchange.					
	The University of Sydney	1,535,168.00	3,062,886.50	3,046,792.50	1,519,074.00	9,163,921.00
University of Technology Sydney						
DE220100311 Arppe-Tabbara, Dr Riikka M	**Shining nanoparticles for single microRNA detection in microfluidics** This project aims to extensively study the interface between nanoparticles and nucleic acids. It sets out to produce a novel ultrasensitive high-performance biosensing platform that will combine luminescent nanoparticles with microfluidics in a digital assay. This portable platform will detect biological fingerprints, or microRNAs, at a single-molecule level, delivering unprecedented levels of sensitivity and specificity. The multiplexed platform has the potential to benefit the biomedical research of microRNAs and opens up a genuine commercialisation potential for portable biosensing of nucleic acids.	60,597.00	126,294.00	131,394.00	65,697.00	383,982.00
	National Interest Test Statement The COVID-19 pandemic showed the importance of rapid and sensitive pathological tests that are easy to perform. In 2019 these point-of-care tests held a global market value of USD 18.8 billion, the COVID-19 pandemic increased this to an estimated USD 27.8 billion in 2020, and it is only expected to grow. This project will develop a novel biosensing platform for nucleic acids optimal for future use in a point-of-care setting. Every part of the project lifecycle involves high or moderate job growth areas of very high skill in diverse fields and lives up to the National Innovation and Science Agenda calling for greater research-industrial collaboration and commercial spin-offs. Point-of-care tests will allow faster and self-directed identification of health threats, can be deployed in remote communities and will alleviate the burden on centralised testing. Developing cutting edge technologies supports Australia's economic and commercial position as a leading innovation hub in nanotechnology.					
DE220100487 Tran, Dr Trong Toan	**Thermal hotspots detection in nanoscale two-dimensional electronics** The emergence of flexible nanoelectronics holds the promise to impact the way we live—from smart wearables to foldable smartphones. However, heat dissipation in the atomically-thin materials used for their conception has remained poorly understood due to their planar structures. This project aims at the detection and mapping of nanoscale thermal hotspots in flexible nanoelectronics devices using a two-dimensional-based optical thermometer. The expected outcome of this project is the development of a non-invasive thermometric technology that enables locating these critical nanoscale hotspots with nanoscale precision. This will lead to better design and manufacturing strategies for heat dissipation in these devices.	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
	National Interest Test Statement Flexible nanoelectronics are predicted to play a major role in transforming our lifestyle and connectivity in the era of Internet of Things. The development of these devices requires a comprehensive understanding of their thermal dissipation at the nanoscale, which is critical to their optimal operation as well as failure. This project will create a uniquely suitable thermometric toolset to help engineers tackle these heat transfer issues, and hence pushing the boundaries of device performance. The project aligns well with the set of Autralia's Science and Research Priorities—"Enabling the development of a new and advanced manufacturing sector". It will significantly boost Australia's research capabilities in the emerging field of flexible nanoelectronics, propelling the nation towards its leading position in designing and manufacturing wearables and bendable gadgets. The knowledge formed in the proposed project will allow Australian companies to access or define new markets and supply chains, globally, as well as provide training opportunities for highly-skilled engineers and scientists in the country.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100530	**Directly Transforming Sewage Sludge into High-value Liquid Bioenergy**	77,375.00	153,275.00	152,300.00	76,400.00	459,350.00
Wei, Dr Wei	This project aims to develop an innovative technology and the underpinning science to gain renewable liquid bioenergy from sewage sludge and realise sludge reduction on an economical and safe platform, by directly transforming sewage sludge into high-value medium chain fatty acids, allowing for easy collection, storage and transportation. Wastewater treatment is generating an increasing quantity of carbon-rich sewage sludge, which typically represents a substantial, but largely untapped, renewable resource. The intended outcome of the project will transform sewage sludge from a troublesome waste stream to a valuable resource that can be applied in existing sludge treatment infrastructure for addressing Australia's increasing energy demand.					
	National Interest Test Statement					
	Australia's energy consumption is growing at about 2% per year. As natural resources currently used to supply this energy demand (e.g., petroleum and coal) are finite, alternative and renewable energy sources are urgently required. Large quantities of waste sewage sludge generated from wastewater treatment in Australia are posing an ever increasing threat to our societies and economies. The sludge is one of the main issues derived from wastewater sanitation but also represents a substantial renewable energy resource. This project aims to mitigate the global threat presented by increasing volumes of sewage sludge through creating a novel sustainable process that provides treatment while also delivering valuable liquid bioenergy. The project will provide strong support to the on-going paradigm shift in the view of waste sludge streams - from sludge as pollutant to sludge as renewable resource. Such attitude change is expected to fundamentally alter the economics and sustainability of sewage sludge management and bring strong economic, social and environmental benefits to Australia.					
DE220100763	**Multiscale modelling of fluid–particle transport in porous media**	67,500.00	134,500.00	134,150.00	67,150.00	403,300.00
He, Dr Xuzhen	The aim is to use a multiscale approach to rigorously model fluid–particle transport in porous media – a fundamental process in many engineering problems. With advanced parallel-computing tools, a microscale model is developed to incorporate interacting grains, water, and particles. The model and innovative upscaling methods will transform our understanding of mechanisms, and allow development of predictive models for particle transport in both steady and unsteady porous flows. The fundamental knowledge and new-generation numerical models will support technological advances to directly benefit rail and road construction and their maintenance, fuel and renewable-energy extraction, coastal soil and water protection, and bushfire control.					
	National Interest Test Statement					
	Fluid–particle transport in porous media is found in many areas of nature, industry, and construction. My advances will directly lead to technological advances that increase production of energy and resilience of infrastructure, soil, and water – benefiting the Australian economy in three ways: (1) Our rail and road infrastructure is a critical asset. Mud pumping (upward transport of fine particles from subsoil contaminating top layers) is a major threat to these assets. Accurate modelling of mud pumping will save huge initial and ongoing costs. (2) Extraction of fluid fuel and geothermal energy depends on fluid flow within the earth's crust under artificial control, often accompanied by particle transport and clogging, resulting in significant decrease of production. Modelling these phenomena will lead to major efficiencies. (3) More than 80% of Australians live in the coastal zone, where increased consumption of freshwater has caused a continuous drop of aquifer waterhead, promoting seawater intrusion (transport of dissolved salts from ocean) and thus freshwater degradation and coastal soil salinity.					
DE220100846	**Ordering photon energy carriers for efficient upconversion**	68,000.00	138,597.00	141,194.00	70,597.00	418,388.00
WEN, Dr SHIHUI	This project aims to tackle the major challenge of upconversion nanosystems – their brightness. It will centre on building a donor/acceptor-ordered nanosystem to improve the energy transfer efficiency in hybrid nanomaterials. This ordered system will significantly improve the brightness of hybrid nanoparticles at low irradiance. Expected outcomes include a fundamental understanding of energy transfer mechanisms at sub-nm scales and a new strategy to brighten the upconversion nanomaterials. This project should push upconversion nanoscience to a new generation and provide significant benefits in ultra-sensitive biomolecular assays and in vivo bioimaging.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project is expected to deliver an innovative approach for engineering a new breed of hybrid materials that are highly sensitive, and able to be deployed in diverse optical and biomedical applications. As such, the project outcomes promise to deliver broad economic and social benefits to Australia. Leveraging the strong demand by Australian diagnostics companies for higher-quality, higher-volume analysis of diagnostic samples, commercialisation of the anticipated breakthrough technology holds a key to the creation of next-generation tools and techniques at the nanoscale, leading to significant health benefits for Australians through more sensitive and earlier detection of diseases, and time and cost savings for health services. It would stimulate growth and demand in Australia's advanced manufacturing and health sectors, new jobs in related and emergent sectors, and reinforce the high international standing of Australian researchers in nanomaterials, nanophotonics and optical physics.					
DE220101075 Zuo, Dr Hua	**Fuzzy transfer learning for real-time decision making under uncertainty** This project's objective is to build new tools for the next generation of real-time decision making. As the datasphere grows more complex, meaningful decision support already requires a strong capacity for knowledge transfer, substantial robustness to uncertainty, and real-time analytics. Today's methods are struggling to meet these challenges. The new schema to be devised combines fuzzy logic, transfer learning, reinforcement learning and deep neural networks. These integrations will lay the foundations for real-time decision-making solutions over the next decade and will advance machine learning under uncertainty. Immediate applications include structural health monitoring, climate prediction and telecommunications maintenance.	70,030.00	138,970.00	137,880.00	68,940.00	415,820.00
	National Interest Test Statement This project will provide the techniques needed to build intelligent systems that can still provide effective data analytics and decision support even when data quality is poor, data is lacking, or the data is being streamed in real time. The outcomes will drastically widen the scope of decision intelligence across advanced manufacturing, security, telecommunications and beyond. Benefited from the capabilities of this project in handling real-time data analytics for decision support, immediate possibilities for applications include: sensor-based condition monitoring for major infrastructure, real-time face recognition for security, and timely maintenance for telecom systems. These end products have the potential to significantly impact Australia's economy and society with safer environs and higher productivity. The integrations developed will establish a new and promising base of knowledge in real-time decision making for the international research community. Academically and commercially, the outcomes of this project will help to position Australia as a leader in the field of decision intelligence.					
DE220101093 Zhou, Dr Dong	**Non-flammable quasi-solid electrolytes for lithium batteries** This project aims to develop non-flammable and sustainable quasi-solid electrolytes for lithium batteries with high energy density, excellent safety and long cycling life. The deployment of high-energy lithium batteries has been greatly impeded by the poor electrode|electrolyte compatibility, and safety concerns originating from flammable liquid electrolytes. This research will tackle these challenges by in-situ fabricating non-flammable quasi-solid electrolytes, and stabilising the electrode|electrolyte interfaces. The project is expected to facilitate the commercialisation of high-performance quasi-solid lithium batteries, and leap forward the progress of clean energy storage technologies that are efficient, durable, safe and reliable.	73,500.00	147,000.00	147,000.00	73,500.00	441,000.00
	National Interest Test Statement Advanced rechargeable batteries play critical roles in modern society with applications in portable electronic devices, electric vehicles and renewable energy storage. The proposed research is expected to significantly boost the performance of quasi-solid lithium batteries including safety, energy density, and cycle life. In particular, the highly-safe quasi-solid lithium batteries have great potential to support smart electricity grids and electric vehicles, which will improve the reliability of electricity supply to Australian communities and enable eco-friendly transport modes. Therefore, this project will help the government to meet its renewable energy target, facilitate utilities to improve power quality and reliability, open new industry opportunities, and enable Australia to maintain its high standing in energy research.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101379	**Towards Transferable Visual Understanding in the Real World**	69,500.00	139,000.00	139,000.00	69,500.00	417,000.00
Kang, Dr Guoliang	This project aims to investigate how to improve the transferability of visual understanding algorithm and system in the real-world applications. This project expects to innovate and advance knowledge in the fields of visual transfer learning and generalizable visual representation learning. Expected outcomes of this project include techniques and algorithms to make the visual understanding system robust to diverse real-world scenarios. This project should provide significant benefits, such as improving the robustness and safety of autonomous vehicles in transportation area, and reducing the cost of destructive data collection for intelligent fault detection in advanced manufacturing area.					
	National Interest Test Statement					
	AI-powered visual understanding systems are transforming business and our society. However, deploying systems that are transferable across diverse real-world scenarios remains challenging. This project aims to deliver technical and algorithmic advances that will overcome some of the key barriers limiting transferability, by defining clearer and more essential principles that build the system's ability to depict underlying variations in the real world. These advances are expected to result in visual understanding systems that are more robust and cost-effective in real-world scenarios. Enhanced transferability in these systems will deliver significant economic and commercial benefits for industry and government sectors in Australia, and social benefits for Australian end users. These include safer, more robust autonomous transport solutions, and more accurate, timely and lower-cost solutions for medical diagnostics, advanced manufacturing and other knowledge-based sectors.					
DE220101390	**Towards Human-like Machine Perception for Embodied AI**	67,150.00	134,300.00	134,300.00	67,150.00	402,900.00
Wang, Dr Wenguan	This project aims to investigate human-like visual perception, whereby AI machines can see and interpret the world like a human. The expected outputs will empower AI machines with the abilities of human-centered visual recognition and annotation-efficient learning through a set of deep learning techniques, and the ability to actively gather visual information through a reinforcement learning methodology (for decision support). This research is fundamental to the creation of embodied AI machines, which are expected to provide assistance to humans in industry, education and health. It thus will indicate immediate applications embracing autonomous vehicles and domestic robotics, providing scientific, social and economic benefits for Australia.					
	National Interest Test Statement					
	The key outcome of this project will be development of human-like machine perception that can interpret the visual world from a human-centred view, and actively learn, adapt and make data-driven decisions in various scenarios under limited supervision. The breakthroughs this research is expected to enable will unlock significantly enhanced robotics capabilities for autonomous transport, house service robots, and various potential applications across manufacturing, defence, agriculture and medical diagnostics sectors. The potential benefits of this research for Australia are broad, given the enormous potential robotics offer for economic development and societal improvement in Australia. With trends suggesting that the global stock of intelligent robots will multiply rapidly in the next 10 years, reaching as many as 20 million by 2030, this project will contribute to generating new jobs in the Australian intelligent technologies sector and existing sectors that benefit from these technologies, positioning Australia as a leader in the field.					
	University of Technology Sydney	628,652.00	1,261,936.00	1,267,218.00	633,934.00	3,791,740.00
University of Wollongong						
DE220100656	**Aqueous-based potassium ion batteries for scalable energy storage**	65,457.00	134,414.00	137,914.00	68,957.00	406,742.00
Zhang, Dr Wenchao	The aim of this project is to develop aqueous-based potassium ion batteries for new energy storage applications that currently have barely been studied. This project will design novel cathode/anode materials and electrolytes to significantly advance knowledge in this new technology. The expected outcomes include high-performance aqueous-based potassium ion batteries, while new fundamental knowledge of the reaction mechanisms will enhance our research capabilities to position Australia as a leader in potassium ion storage.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The success of this project will pave the way for future potential applications of aqueous-based potassium ion batteries and expand both fundamental knowledge in materials engineering and innovative technologies for new sustainable energy storage system. The outcomes are expected to lead to a safe energy storage devices with long life. This project will develop new capabilities in materials science and advanced manufacturing to lead research and development that will position Australia as a leader in the renewable energy sector. This project will also help Australian researchers to initiate a new research direction, have a positive impact on the environment, and accelerate Australia's progress in solving the problems of efficient large-scale energy storage.					
DE220101102 Jiang, Dr Zhen	**Bioinspired hierarchically Intelligent Hydrogels for Soft Machines** This project aims to develop new bioinspired hydrogels capable of performing life-like functions. It expects to generate new knowledge in the area of advanced polymers for soft robotics using an interdisciplinary approach, combining chemical design, micro-nano fabrication and additive manufacturing. Expected outcomes of this project include new macromolecular design concepts to achieve intelligent hydrogels with sophisticated functions enabling the integration of high-performance artificial muscles and soft robotics. This should provide significant benefits in strengthening Australia's competitiveness in manufacturing soft machines with much safer human-machine interactions and being able to be operated in diverse dynamic environments.	75,737.00	149,637.00	147,800.00	73,900.00	447,074.00
	National Interest Test Statement Currently, most of the existing smart hydrogels developed in laboratories have focused heavily on the proof of concept. The proposed macromolecular engineering concepts in this project have the potential to surpass the proof-of-concept stage of smart hydrogels and move ahead to practical use in real applications. This soft actuation technology will have the broad impact on a number of advanced manufacturing areas. For example, the developed hydrogels could be manufactured by 3D printing into soft robotic prosthetic hands with compliance similar to that of human tissue, which could assist Australian individuals with hand loss to grasp various delicate objects. Moreover, these fabricated robust soft machines could perform the complex tasks for human beings such as exploring underwater environments, examining explosive devices or conducting remote surgery. This project, if funded, would put Australia at the forefront of the efficient manufacturing of soft robotic devices and lead to an explosion of growth in the consumer robot industry.					
DE220101113 Lai, Dr Weihong	**Optimal reaction pathways towards advanced energy technology** This project aims to develop a novel lithium-ion battery (LIB) system that delivers high energy-density, a long cycle life, low-cost, and high safety based on conversion-type lithium oxide cathodes. Expected outcomes of this project will address the preliminary challenges for the practical use of lithium-oxide, which requires innovative designs of reaction pathways to lithium oxide cathode and lithium metal anode architectures as well as a fundamental in-depth understanding of the electrochemical and growing mechanisms. This project will establish a manufacturing road-map for a novel lithium-ion battery system in Australia with practical reliability by integrating active lithium oxide cathode, optimized electrolyte, and lithium metal anode.	71,000.00	142,500.00	143,000.00	71,500.00	428,000.00
	National Interest Test Statement This project targets zero-emission high-energy technologies, closely aligned with Australia's new road-map on energy technology, which aims to reduce the emission by the development of affordable, clean and reliable energy. Outcomes of this project will strengthen Australia's research capability and bring large-scale energy storage technologies to Australia, as well as power Australia's sustainable economy. This project will keep Australia as a global forerunner in building new renewable energy and demonstrating to the world its rapid transition towards low-carbon, renewable power generation from a fossil-fuel-dominated electricity system. This project will also yield new academic knowledge and research outcomes to strength high-quality education in Australia.					
	University of Wollongong	212,194.00	426,551.00	428,714.00	214,357.00	1,281,816.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Western Sydney University						
DE220100569	**Mapping fertility control among migrant and refugee women in Australia**	74,394.00	148,619.00	144,693.50	70,468.50	438,175.00
Hawkey, Dr Alexandra J	This project aims to increase understanding of fertility control among migrant and refugee women living in Australia. This vulnerable group of women report low rates of contraception use and high rates of unintended pregnancy, with significant negative health implications. This project will examine women's negotiation of fertility control, within the context of broader sexual and reproductive embodiment. It will provide novel insight into women's negotiation of contraception choice and sides effects, abortion and reproductive coercion, recognising women's agency, across a range of cultural contexts and backgrounds. These findings will provide recommendations for culturally meaningful health promotion activities and healthcare provision.					
	National Interest Test Statement					
	Migrant and refugee women from non-English speaking backgrounds are a growing population in Australia, who experience inequitable reproductive health outcomes, including lower rates of contraception use and higher rates of unintended pregnancy. This has negative implications for the quality of life, physical health and psychological wellbeing of women and their families, whilst putting pressure on Australia's economy and health infrastructures. Addressing the fertility control needs of migrant and refugee women is an urgent priority, documented in the Australian National Women's Health Strategy 2020-2030. This project uses community led research methods to explore women's lived experiences of fertility control, in the context of their broader reproductive embodiment, including women from recent and established migrant groups. The results will inform culturally tailored health promotion activities and healthcare provision, with the aim of educating and empowering migrant and refugee women to control their fertility and reduce unwanted pregnancy.					
DE220100783	**Music and speech as a window into the predictive brain**	66,500.00	137,956.00	138,390.50	66,934.50	409,781.00
Fiveash, Dr Anna R	Prediction is fundamental to daily life, and yet we know little about how this central process works in the brain. This research program aims to provide in-depth insight into predictive processing by investigating the precise, culturally relevant, and communicative domains of music and speech. The research expects to reveal cognitive and neural correlates of "what" will occur and "when" it will occur, while exploiting the musician brain as a model for plasticity. Expected outcomes include a multi-dimensional model of prediction and its neural markers that will lay the foundation to investigate impaired predictive processing. This should substantially benefit health and education by providing perspectives for training and rehabilitation.					
	National Interest Test Statement					
	The ability to predict is vital for everyday life. We use prediction when we cross a busy street, talk with a co-worker, or move with music. However, little is known about how the brain predicts, or how prediction impairment can be assessed and treated. This research has the potential to benefit health and education for the Australian community by providing a foundational evidence base for prediction, which could inform the development of cost-effective and socially rewarding music-based interventions and techniques for teaching and learning. Through this research, it will be possible to discover underlying impairments in developmental disorders such as Dyslexia, Developmental Language Disorder, and Autism Spectrum Disorder, with the goal to improve outcomes for these groups and to reduce disparities with typically developing children. By using music and speech as a window into the predictive brain, this research will place Australia at the forefront of this exciting and emerging field, with potential avenues to improve economic and social productivity through clinical interventions, education, and training.					
DE220100961	**The Musical Escape: Investigating Music and Imagination**	76,000.00	152,000.00	152,000.00	76,000.00	456,000.00
Herff, Dr Steffen A	Imagination plays a pivotal role in creativity as well as self-regulation. Yet, despite its important role throughout cognition, imagination is still ill-understood as it is notoriously difficult to systematically induce and measure. This project aims to deepen our understanding of imagination by using an innovative approach that combines quantitative, qualitative, and neuroscientific methodologies. It leverages the facts that music can reliably induce imagination and that imagined orientation in time and space can be measured. Expected outcomes include free algorithmic tools capable of generating music that induce user-specified imagination to the benefit of informing the foundations of creativity and the phenomenology of imagination.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Imagination remains one of the least explored frontiers of human cognition. Insight into the mechanisms underlying imagination is of great cultural benefit. This project addresses the need for a systematic phenomenology of music-evoked imagination and contributes to ongoing discussion about the semantic and pragmatic nature of musical meaning. The recent COVID-19 global pandemic highlighted the importance of music as a social tool for 'escapism'. Novel insights into imagination may contribute to the Australian society by informing coping mechanisms and strategies, as well as therapies that rely on imagination, such as CBT and Exposure Therapy. Informing such types of therapy will also have a direct beneficial impact on the economy, as it addresses the mental long-term consequences caused by the pandemic. The algorithmic tool that will be developed has great commercial potential for the Australian music industry, in particular for film soundtracks and video games.					
	Western Sydney University	216,894.00	438,575.00	435,084.00	213,403.00	1,303,956.00
	New South Wales	5,136,974.00	10,228,049.50	10,136,780.00	5,045,704.50	30,547,508.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Northern Territory						
Charles Darwin University						
DE220100852	**Breathing streams: integrating aquatic emissions into carbon budgets**	77,813.50	152,883.00	150,069.50	75,000.00	455,766.00
Duvert, Dr Clement	This project aims to determine the amount of greenhouse gases emitted by small streams across the Australian tropics, a potential hotspot for emissions of carbon dioxide and methane. The project expects to investigate the controls on gaseous emissions from stream to regional scales using a novel combination of gas tracer experiments, remote sensing techniques and machine learning algorithms. Expected outcomes include the development of a predictive model of gas exchange and the first estimate of gaseous emissions from the Australian tropics. This should provide significant benefits such as reducing uncertainties on the national carbon budget and avoiding misalignment of greenhouse gas abatement policies.					
	National Interest Test Statement The global carbon budget is presently unbalanced: there is a mismatch between current estimates of carbon sources (from fossil fuel burning and land use change) and carbon sinks (from storage in terrestrial ecosystems and oceans). This is because ecosystems tend to leak some of the stored carbon into streams and rivers thereby returning it to the atmosphere. This means that initiatives like the Emissions Reduction Fund, which supports projects based on their potential to store atmospheric carbon dioxide in biomass and soils, are likely to overestimate offsets. By quantifying the amount of carbon that leaks out of soils and is emitted by tropical streams, this project will improve estimates of carbon storage on land, which will ensure that publicly funded greenhouse gas offset projects provide maximal return on investment.					
	Charles Darwin University	77,813.50	152,883.00	150,069.50	75,000.00	455,766.00
	Northern Territory	77,813.50	152,883.00	150,069.50	75,000.00	455,766.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Queensland						
Griffith University						
DE220100079	**Redefining success in marine ecosystem restoration**	72,097.00	144,194.00	139,694.00	67,597.00	423,582.00
Sievers, Dr Michael	This project aims to improve evaluations of marine ecosystem restoration through the measurement of key animal health metrics, and automated monitoring using artificial intelligence. This project expects to generate unique knowledge about why ecosystem restoration succeeds or fails, and improve our understanding of how animal data can better inform future restoration projects. The expected outcomes will enhance our capacity to use new and efficient techniques to monitor and evaluate ecosystem restoration in a more ecologically valid way. Benefits include more effective ecosystem restoration, wildlife conservation, and the enhancement of ecosystem services including sustainable fishing and eco-tourism.					
	National Interest Test Statement					
	Restoration of degraded ecosystems is essential for a thriving planet. Commonwealth and state governments in Australia invest significant funding into the restoration of ecosystems, including the $100 million Environment Restoration Fund. However, restoration often fails, wasting valuable resources and missing prime opportunities to enhance biodiversity. This project can inform best practice to achieve the intended benefits of ecosystem restoration, contributing to the conservation of Australia's unique wildlife, and supporting industries that rely on healthy, productive ecosystems such as fisheries and eco-tourism. This project will contribute to the Science and Research Priorities of Environmental Change and Soil and Water, and the National Marine Science Plan's critical challenge of Biodiversity Conservation, by improving our capacity to respond and adapt to the impacts of environmental change, and developing solutions to maximise benefits from restoration efforts. Ultimately, the project will benefit Australia's environment, economy, and our society.					
DE220100202	**Colour change: Artistic/ritual responses to climate flux in Australasia**	78,034.50	156,069.00	155,979.00	77,944.50	468,027.00
Huntley, Dr Jillian A	Art and ritual connect people socially and help them manage stress. Throughout human history, evidence for this is preserved by the collection and use of ochres (coloured earth minerals). Characterising ancient ochre records across Sunda, Wallacea and Sahul, this project aims to understand people's use of art and ritual in the most climatically dynamic region on Earth. Furthering Australia's reputation for innovative archaeological science, expected outcomes will include the first large-scale interdisciplinary investigations into how art and ritual were used to help mediate climate flux, generating significant new narratives of past cultural resilience to benefit people currently grappling with climate vulnerabilities.					
	National Interest Test Statement					
	People living today have complex behaviours and social interactions that are evolutionarily unique. Understanding what drove these developments, and how they enabled us to migrate, settle and prosper in almost every part of the globe, are central questions in archaeological research. This project will expand our knowledge of the cultural resilience that has seen people thrive in the most climatically dynamic region on Earth: the Australasian monsoon domain. It will produce new insights into how populations, from the first human colonists to the recent cultural groups, used art and ritual to mitigate environmental stress. It will strengthen collaborations between researchers and indigenous stakeholders across the Asian Pacific region, empowering contemporary Aboriginal artists to deliver narratives of past cultural resilience that will be of timely benefit to people currently grappling with climate vulnerabilities.					
DE220100205	**Engineering micropatterned surfaces for cell mechanics and mechanobiology**	72,500.00	144,500.00	144,000.00	72,000.00	433,000.00
Kashaninejad, Dr Navid	This project aims to engineer a highly versatile micropatterned surface that can be used to culture and study cells. This project expects to generate a unique microtechnology, as well as new knowledge in surface science and cell mechanics by elucidating the relationship between controlled surface wettability and cell behaviour. The expected outcomes of this project include a low-cost and highly engineered tissue culture tool that controls cellular functions, revolutionising practices in stem cell engineering. The platform technology has a great potential for commercialisation and enhancing Australian research capacity through international and interdisciplinary collaborations and will directly benefit the Australian biotech industry.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement We need to study cells in a 3D environment to understand the cell mechanics, which are central to tissue function, wound healing, embryonic development, and the formation and metastasis of cancer. While technologies for this exist, they often fail to grow cells and little is understood about their interaction with tissues at a cellular level. The proposed research will improve the cell culture platforms that are indispensable in biomedical industry by fabricating a highly versatile micropatterned surface. The project aims to generate knowledge of the microphysical properties of a silicon-carbide surface and its interaction with cells. The platform will be fabricated through an advanced manufacturing process using the latest advances in microtechnology. This aligns well with the advanced manufacturing research priority, and if successfully commercialised, has the potential to be used throughout the multi-billion-dollar biotech sector. The research enabled by this proposed platform could lead to significant advances in mechanobiology, leading to significant health benefits for the Australian community.					
DE220100394 Barry, Dr Kaya	**Momentarily immobile: the futures of backpacking and seasonal farm workers** This project aims to examine the experiences of backpackers and seasonal migrants who live in communal hostel accommodation while doing farm work in regional Queensland. This project expects to generate new knowledge using ethnographic and arts-based methods on how backpackers navigate periods of being affixed to the one place while completing required farm work, and their contribution to the socio-cultural life of regional communities. Expected outcomes include greater understanding on the contributions of seasonal migrant labour, a public forum, recommendations for industry and governments, and an exhibition. This should provide significant benefits to encouraging post-pandemic growth back into regional communities and farming labour.	75,446.50	148,490.50	146,827.50	73,783.50	444,548.00
	National Interest Test Statement Australia continues to be a destination of choice for a ‘working holiday’ among young people, with backpackers making up the bulk of labour in Australia’s agricultural sector. However, there is little understanding of how young working holidaymakers and those temporary and seasonal migrants who toil alongside them survive their time in the intensive, and sometimes exploitative, conditions of farm work. There is a need to better understand what motivates working backpackers and other seasonal migrants to participate and remain in farm work. This project aims to deliver timely information on the experiences of working backpackers and how industries of accommodation and agriculture can better support them. This project seeks to build valuable knowledge that all stakeholders can use to grow and support a key player in Australia’s agricultural and tourism industries.					
DE220100521 Batmunkh, Dr Munkhbayar	**Engineering semitransparent perovskite solar cells for smart solar windows** This project aims to develop highly efficient and stable semitransparent perovskite solar cells for innovative smart solar windows. The key concept is to explore novel functionalisation strategies on emerging carbon and two-dimensional materials to fabricate semitransparent perovskite solar cells for self-powered smart photovoltaic windows. Expected outcomes of this project include not only placing Australia at the forefront of research in the fields of materials science and renewable energy, but also creating commercial opportunities in Australia. This project expects to have various benefits for Australians – through the development of a cutting-edge sustainable energy device and the establishment of strong international collaborations.	67,500.00	137,500.00	140,000.00	70,000.00	415,000.00
	National Interest Test Statement Australia receives much more solar radiation than any other continent on Earth, making it well-suited region for solar power. Developing advanced technologies to utilise Australia’s abundant resources is vital to a sustainable future of Australia. This project aims to develop high efficiency semitransparent perovskite solar cells for building-integrated smart photovoltaic windows. This new-generation window is expected to dynamically control the amount of sunlight and heat that can come inside our house whilst producing power, saving on energy cost and improving Australian’s life style. This project will generate new advanced knowledge in the fields of materials science, nanoscience and technology, and energy, enhancing Australia’s international profile in these fields. The commercial opportunities of the smart solar windows created from this project will lead to significant socioeconomic benefits for photovoltaic and building industries in Australia. The success of this project will have direct positive impact on the environmental issues by developing high efficiency renewable solar energy technologies.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101249	**Fusing wearables and advanced computational models for real world analysis**	78,097.00	156,194.00	156,194.00	78,097.00	468,582.00
Saxby, Dr David J	This project aims to solve a major technological problem: our inability to study human skeletal, muscular, and neural function in the real world. This project expects to, for the first time globally, integrate wearable sensors with neuromusculoskeletal computational models and artificial intelligence, and validate this technology. Expected project outcomes include an integrated system for future commercialisation and new understanding of how whole-body behavioural choices affect tissue mechanics during daily and sporting activities. Project outcomes should provide significant benefits, such as the ability to escape the laboratory to understand human performance for defence, sport, industrial, and health settings.					
	National Interest Test Statement					
	This project aims to generate rich novel scientific data and inaugurate a new era of human movement study by enabling modelling of human neuromusculoskeletal function in the real world. This project will benefit those who value mechanistic understanding of human motor function. As this project involves a step-change in wearable sensor technology, it will be of interest to many industry sectors including: defence, who plan, monitor, and evaluate training and missions; biomedical device companies, who evaluate human-device function in real world settings to optimise design; sporting clubs, where coaches monitor athlete work load to improve performance and reduce injury risk; and labour industries, who monitor how occupational activities stress human tissues to manage injury risk. The project technology will enable an individual to gain novel, powerful, and immediate understanding of neuromusculoskeletal dynamics of a specific individual during motor tasks with need to access a specialized laboratory. Further, the project outcomes will have excellent potential for future commercialization.					
	Griffith University	443,675.00	886,947.50	882,694.50	439,422.00	2,652,739.00
Queensland University of Technology						
DE220100757	**Engineering Tissue Organisation Using Intelligent Additive Biomanufacturing**	77,357.00	151,192.00	146,470.00	72,635.00	447,654.00
Allenby, Dr Mark C	This project aims to organize and shape the formation of lab-grown tissue by 3D printing structures which control the behaviour of cells. This cell behaviour control will be accomplished through an interdisciplinary and multiscale pipeline of additive micromanufacturing, bioreactor engineering, cell culture, single-cell imaging, and computational modelling. In contrast with current empirical approaches, this quantitative and predictive understanding of how to control biological processes within 3D printed environments will design and engineer more robust, customisable, scalable, and economical cell culture platforms able to optimally manufacture bespoke and complex 3D tissues for future agricultural, pharmaceutical, or medical products.					
	National Interest Test Statement					
	Australia’s world-leading bioeconomy depends on cell culture processes for industries such as beer fermentation, vaccine production, and other biologics. However, industrial cell cultures remain inefficient and are becoming replaced by high-density tissue culture bioreactors. This project combines Australian biomanufacturing interests with new additive fabrication technologies to understand how the formation of lab-grown tissue can be better controlled and optimised within 3D printed bioreactor environments. The project produces substantial economic, commercial, and agricultural benefits by developing more robust, customisable, efficient, and scalable tissue culture manufacturing processes for current Australian bioindustries while also targeting next-generation tissue products such as lab-grown animal meat, agricultural produce, or more realistic drug testing platforms. This project’s fundamental understanding of biological process control will extend Australia’s research priorities in advanced manufacturing and has future industry applications to medical technologies, pharmaceuticals, and the bioeconomy.					
DE220100909	**Innovative Soft-computing for Condition Assessment of Large Infrastructure**	60,100.00	117,700.00	114,900.00	57,300.00	350,000.00
Nguyen, Dr Khac Duy	Health conditions of large infrastructure, such as bridges, have been difficult to determine due to their large scales, associated incomplete data and high uncertainties in measurement and system identification. This project will develop an innovative condition assessment method based on the advancements in structural dynamics analysis, multi-objective topology and soft-computing techniques, for reliably evaluating the health conditions of large infrastructure. The outcomes will enhance the current practices in infrastructure asset management to deliver timely retrofitting and extended life cycle. The development will provide benefits to Australia by enhancing operational efficiency and preventing catastrophic failure of infrastructure.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project will enhance the safety of Australian infrastructure by assisting infrastructure asset owners with more informed maintenance plans. This will also increase productivity for freight transport-dependent industries, who rely on the condition of road and bridge systems. Safety of other infrastructure such as buildings and energy plants will also allow effective operations, towards contributing to higher productivity. Commercial benefits of the project can include soft-computing tools for structural condition assessment, which bring excellent export opportunities for Australian infrastructure management industry. In addition, research outcomes will enable engineers to transform the routine-based maintenance practice to a condition-based maintenance framework through condition assessment results of infrastructure. This transition will help reduce hazardous waste generated from maintenance, prevent carbon emissions due to structural collapse and reconstruction, increase public safety and extend life cycle of aging infrastructure, including national iconic buildings and bridges.					
DE220101354 Ye, Dr Jiaye	**Novel Ion Exchange Membrane for High Performance Vanadium Flow battery** This project aims to design and synthesis novel ion exchange membrane with tailored ion selectivity and high proton conductivity for vanadium redox flow battery (VRFB). VRFB is a promising energy storage technology for large scale storing renewable energy due to its advantage of decoupled capacity and power, long lifetime. Currently, VRFB suffers from fast capacity decay and cyclic instability because of severe vanadium ion permeability of commercial membrane. The expected research outcomes in this project include stable, high ion selectivity membranes made of cost-effective aromatic polymer and robust nanofillers, enabling high performance VRFB. This will place Australia in the forefront of clean energy storage technologies.	73,597.00	151,507.00	150,487.50	72,577.50	448,169.00
	National Interest Test Statement Vanadium redox flow batteries (VRFB) is an important energy storage technology that is suitable for large scale storing renewable energy. The technology of VRFB is currently restricted by the unsatisfactory membranes. The novel hybrid ion exchange membrane developed in this project will significantly enhance the performance of vanadium redox flow batteries, enhancing the capability of utilization of abundant renewable energy, improve energy diversity and security and reducing green-house emission in Australia. The research aims and objectives aligns with the national Science and Research priority of Energy, addressing the practical research challenge of “New clean energy sources and storage technologies that are efficient, cost-effective and reliable”. The research outcomes in this project will improve the global leading position of Australia in this field. Furthermore, intellectual properties in the form of publications and patents will foster collaboration with industry, and enhance the competitiveness of Australia in the area of energy storage materials and technologies in the worldwide.					
DE220101435 Graham, Dr Timothy J	**Combatting Coordinated Inauthentic Behaviour on Social Media** Online disinformation is a global problem that threatens national security and is harmful to society. However, current methods are not suited to detect coordinated disinformation operations that conceal their activity by co-opting and cultivating regular users, groups and social movements. This project develops cutting-edge methods and workflows to accurately distinguish genuine activity from coordinated inauthentic behaviour, and to trace and evaluate the adoption of material spread by malicious actors across multiple platforms.	75,000.00	150,000.00	151,000.00	76,000.00	452,000.00
	National Interest Test Statement This project provides a major contribution to Australia’s national interest by providing early detection approaches for coordinated disinformation campaigns orchestrated by foreign and domestic actors, and practical recommendations on how to counter them. It is closely aligned with the National Science and Research Priorities, and in particular the priority on Cyber-Security. By providing cutting-edge methods, tools and knowledge to fight coordinated inauthentic behaviour on social media, this project addresses Practical Research Challenge 3, by developing frameworks for the discovery and understanding of vulnerabilities, threats and their impacts, and enabling improved risk-based decision making, resilience and effective responses to the critical challenge of coordinated inauthentic behaviour; and Practical Research Challenge 4, by using these frameworks to conduct an assessment of the scale of the cyber security challenge for Australia, with particular emphasis on the social factors informing individuals, organisations, and national attitudes as they encounter coordinated disinformation campaigns.					
	Queensland University of Technology	286,054.00	570,399.00	562,857.50	278,512.50	1,697,823.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
The University of Queensland						
DE220100003	**Understanding diversity: chemical and kinematic tracers of galaxy evolution**	74,000.00	148,000.00	151,337.50	77,337.50	450,675.00
Sweet, Dr Sarah M	Understanding how galaxies form and evolve throughout the Universe is one of the biggest outstanding challenges in astrophysics. The project aims to develop an innovative method for understanding the fundamental properties of angular momentum and chemical content of all kinds of galaxies. This project expects to generate new knowledge in the field of galaxy evolution, for the first time enabling astronomers to robustly compare distant, long-ago galaxies with those in the nearby, present-day Universe. Expected outcomes include a novel framework for determining galaxy morphology, based on fundamental physics. The framework will be highly beneficial to understanding the evolution of diverse types of galaxies, including our own Milky Way.					
	National Interest Test Statement					
	This project will enhance Australia's outstanding reputation and world-leading influence at the cutting edge of astronomical research, revealing how galaxies like our Milky Way come to be out of the distant progenitor galaxies which we observe to be vastly different in shape, rotational properties, and chemical composition. Australia's significant investment in optical astronomical facilities including the Anglo-Australian Telescope and the European Southern Observatory will be leveraged to lead strong international collaborations. The project will dramatically improve our understanding of fundamental physical properties, underpinning future developments in engineering, aviation and climate knowledge. New discoveries will provide the social benefit of a deeper understanding of the Universe and our place within it. The project will inspire young people to work in STEM fields, and train new workforce in quantitative problem solving and data analysis, skills which are transferable to a plethora of industries including engineering, finance, medicine, manufacturing, resource management and space science.					
DE220100100	**The Role of Emotions in Marketing Cultured Meat**	71,554.00	145,108.00	148,708.00	75,154.00	440,524.00
Septianto, Dr Felix	Traditional agriculture has a strong environmental impact. One solution to reduce this impact is cultured meat, which is meat created via a cell culture, rather than from a slaughtered animal. This project aims to examine the role of emotions in promoting consumer acceptance, which is the greatest barrier facing the commercialisation of cultured meat. The expected outcome is insight into factors influencing the acceptance of cultured meat, allowing development of effective marketing communication strategies. This should provide benefits including reduced environmental and ethical impact of conventional meat and improvement to Australian agribusiness. Similar strategies could also potentially be applied to other emerging food technologies.					
	National Interest Test Statement					
	Emerging food technologies are on the rise in Australia because of climate change and the need to reduce environmental impact of agriculture. One emerging innovation in this area has been cultured meat, which is meat produced via a cell culture, rather than coming from an animal raised for slaughter. The successful commercialisation of cultured meat in the Australian market would potentially help address multiple environmental issues (78 - 96% lower emissions, 99% lower land use, 82 -96% lower water use) and ethical issues (treatment of animals) related to conventional meat production. However, consumer acceptance of cultured meat has been noted as the biggest barrier to the marketing and commercialisation of cultured meat. The project aims to examine the role of emotions in promoting consumer acceptance of cultured meat. The resulting knowledge should benefit Australian agribusiness and associated food technology companies investing in cultured meat and associated production technologies through providing assurance that such technologies will be successfully marketed to and adopted by consumers.					
DE220100329	**No place like home? A phenomenology of racialised non-belonging.**	67,000.00	133,500.00	141,000.00	74,500.00	416,000.00
Ngo, Dr Helen	Racism is a persistent problem in Australian society, yet its existential effects remain inadequately understood. This project aims to develop a new understanding of racism's deep impact on one's sense of self, and sense of place. The project seeks to use the emerging framework of critical phenomenology to illuminate different experiences of racialised non-belonging. Expected outcomes include an improved understanding of the ontological significance of feeling not at home in one's environs, or in one's own body. This expanded understanding will provide significant benefits by helping to motivate and guide more robust models of anti-racism in public life, leading to a more racially just society.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Racism is an issue of national importance, costing the Australian economy $38 billion each year, and a problem that governments at all levels have committed to combatting. My research will contribute a better understanding of racism's deep effects on one's sense of self and belonging, in order to more clearly identify racism's harms and the underlying issues that anti-racist efforts need to address. This project will investigate the significance of non-belonging as experienced by racialised, Indigenous, and immigrant communities in Australia, through a philosophical examination of 'home'. By investigating the foundational significance of the home to who we are, this project will develop an account of the different and provisional ways racialised communities in Australia make 'homeplaces' in the face of persistent racism. Identifying the conditions that would lead to a more racially just society, this project will assist Australian government agencies and organisations to address the continuing problem of racism, providing social and cultural benefits to the Australian community as a whole.					
DE220100544 Badia, Dr Guillermo	**Fuzzy logics for graded reasoning in applied contexts** Many things we care about, such as friendship or safety, come in degrees, but our current systems for tracking information are not built to handle this. This project aims to enhance many-valued logic as a tool to manage graded information. It expects to generate new knowledge in the area of logical languages for fuzzy databases and finite domains using an interdisciplinary approach between philosophers, mathematicians and computer scientists. Expected outcomes include new logical methods and modelling techniques for many-valued logics. This will provide significant benefits, such as the enhancement of fuzzy logic as a tool in artificial intelligence to handle reasoning with imprecise concepts, giving meaning to complex real-life data.	59,500.00	119,000.00	118,500.00	59,000.00	356,000.00
	National Interest Test Statement Fuzzy logic is a highly useful modelling tool listed as one of Australia's future technologies in the government's Australian Infrastructure Audit 2019. It can be used in diverse applications, from unmanned helicopters to household appliances. This project will produce distinctive theoretical expertise in Australia in an emergent area of mathematical fuzzy logic, studying, for instance, databases describing the degree of favourability that certain groups assign to ideas or products. This will be useful for Australian government bodies interested in advertising a given policy or infrastructure project to a receptive target market. The project will also facilitate future developments in artificial intelligence applications which analyse human languages, for example, in sentiment analysis or question answering. Moreover, through high quality publications, conference presentations, and the organisation of two international workshops, this project will increase Australia's ability to attract top students and researchers to continue Australian excellence in fuzzy logic and artificial intelligence.					
DE220100561 Grainger, Dr Sarah A	**Applying ecologically valid approaches to social cognitive ageing** Social functioning is a critical predictor of wellbeing, particularly in older age. This project aims to investigate how important social cognitive capacities, that lay the foundation for effective social functioning, are impacted by normal adult ageing. This project will use cutting edge experimental techniques to investigate, for the first time, how ageing alters our capacity to visually attend and understand emotional information in others during real time social interactions, both in and out of the laboratory. Expected outcomes include new knowledge of how older adults navigate social interactions, with potential to lay a foundation for improving social wellbeing in older Australians.	75,344.50	153,243.00	155,875.50	77,977.00	462,440.00
	National Interest Test Statement We are currently faced with an ageing population, with older adults projected to make up a higher proportion of the Australian population than children by the year 2066. These fundamental changes to our ageing demographic now makes it critical to understand the factors that promote successful ageing, not only for humanitarian, but also for financial reasons. At all stages of the lifespan, loneliness and social isolation are key predictors of poorer wellbeing and these relationships appear to be strongest in late adulthood. This project will provide novel insights into a potentially modifiable risk factor for social isolation and loneliness by conducting the most complete and nuanced understanding of how core social cognitive skills – that are known to be linked to loneliness and social isolation – are affected by normal adult ageing. In doing so, this project will lay the foundation for improving social wellbeing in older Australians, with long-term social and economic benefits in our ageing population.					
DE220100823 Emming, Dr Stefan	**Elucidating ATPase function during NLRP3 inflammasome assembly** Humans and animals are constantly exposed to microbes, which inhabit their external environment as well as body surfaces such as the skin and gut. We are, however, able to co-exist with these microbes, because our immune system protects us from these everyday encounters. This proposal will reveal how an important immune protein called NLRP3 senses microbes and other physiological processes. When NLRP3 senses such factors and is activated, it induces the release of messenger substances to alert other immune cells. This research will deliver fundamental knowledge of how animals normally co-exist with microbes.	72,347.00	144,694.00	148,894.00	76,547.00	442,482.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Humans and animals are constantly exposed to all kinds of microbes, which inhabit their external environment as well as body surfaces such as the skin and gut. We are, however, able to co-exist with these microbes, because our immune system constantly samples the environment and protects us from these everyday encounters. This proposal will reveal how an important immune process senses and responds to microbes. By delivering fundamental knowledge of how animals normally co-exist with microbes, this project will deliver new immunological paradigms. Expected outcomes and benefits of this proposal include high-impact publications, international collaboration, world-class training for young scientists and new knowledge for future commercialisation.					
DE220100903 Chapman, Dr Cassandra M	**Charitable triad: How donors, beneficiaries, & fundraisers influence giving** This project aims to test a new model of charitable giving to examine how donors, beneficiaries, and fundraisers together influence donor decisions. Until now, no holistic model has existed to explain donor behaviour: past research has focused on donors but neglected beneficiaries and fundraisers. This project is expected to provide evidence for a new bedrock theory of philanthropy. Findings can also inform practitioner toolkits, offering advice to nonprofits on how to raise money effectively by understanding how the particular organisation and its beneficiaries can influence donor decisions. By helping ensure the survival of charities, this research will contribute to the delivery of essential social services that benefit many Australians.	74,455.50	149,437.00	151,487.00	76,505.50	451,885.00
	National Interest Test Statement Most of Australia's 57,000 charities depend on public donations to fund their important work. During this COVID-induced economic crisis it is especially important that charities fundraise effectively. This project will provide empirical evidence showing how relationships between donors, beneficiaries, and fundraisers can influence charitable outcomes. Results can be used by nonprofits to target campaigns to appropriate donors, frame campaigns in effective ways, select motivating beneficiaries to highlight in campaigns, and ultimately maximise campaign return-on-investment. By helping to ensure the survival of Australian nonprofits, this research will contribute to the delivery of essential social services that benefit many Australians, including services like homeless shelters, cancer research, environmental protection, and child welfare programs. In addition, by ensuring fundraising appeals are targeted appropriately, this research can reduce donor fatigue by ensuring that Australians get approached by fewer charities overall but more causes that are personally relevant to them.					
DE220100919 Buttsworth, Dr Timothy J	**Distinguished Geometric Structures with Symmetry in Four Dimensions** The Ricci flow is a geometric evolution equation having significant applications in geometry, topology, as well as in physics, biology and image processing. This project aims to provide a complete description and classification of highly symmetric, self-similar solutions to the Ricci Flow in four dimensions. Such a classification is essential to understanding the behaviour of the flow, but has so far evaded discovery. This project intends to combine techniques from pure mathematics with computational techniques to complete this classification. Such an outcome would greatly improve the understanding of the geometry of four-dimensional manifolds, potentially leading to applications in several areas of science as well as image processing.	57,500.00	115,000.00	115,000.00	57,500.00	345,000.00
	National Interest Test Statement Society relies crucially on a firm understanding of the geometries of various objects that arise across many areas, ranging from architecture and engineering to the natural sciences. A deep understanding of geometry is also essential in fields such as medical imaging, artificial intelligence and mining engineering, where it becomes important to have machines recognise objects (e.g. tumours, animals, roads, minerals, or even people) from their geometry. This project lies in the area of geometric analysis, a currently-trending topic in mathematics, which seeks to produce the analytical tools required to accurately and rigorously understand these objects. One of the most important of these tools is the Ricci flow; this project seeks to produce exciting new techniques in the use of the Ricci flow, and will help reinforce Australia's reputation as a global leader in the important field of geometric analysis.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100936	**Brideprice, Conflict, and Violence Against Women in Asia**	77,525.00	148,092.00	148,651.50	78,084.50	452,353.00
Johnston, Dr Melissa F	This study aims to investigate where, how and why brideprice facilitates armed conflict and violence against women. Emerging evidence shows paying high brideprice incentivises men to join armed groups, and global modelling correlates brideprice and armed conflict. However, despite the exorbitant sums exchanged as brideprice in many societies, the socio-economic mechanisms connecting brideprice and conflict are not well understood. Expected project outcomes are (1) data on volumes and prevalence of brideprice (2) understanding links to armed conflict and violence against women in Southeast Asia. This project's findings will support more effective Australian gender equality and peacebuilding programs that take account of brideprice.					
	National Interest Test Statement					
	The proposed project will help the Australian government improve our aid effectiveness in the Asia Pacific by addressing the urgent problem of brideprice's negative effects on conflict and violence against women. It aims to develop a systematic understanding of the role brideprice plays in increasing socio-economic inequality and links to conflict and violence against women. Reports from women's organisations and the Australian government recognise brideprice as a factor facilitating violence against women in the Pacific and urge further research. In the current pandemic, understanding brideprice and its relationship to conflict, violence against women (including human trafficking) will improve aid responsiveness impacts of COVID-19 in the Asia-Pacific. The project will help ensure Australian public money spent on peace and gender equality in the Asia Pacific, such as through the Pacific Step-up program, can be effective. Better protections of human rights and stability in the region benefits Australian peace and security.					
DE220101000	**Polymeric materials of tailor-made macrocycles for selective anion capture**	73,000.00	143,500.00	136,000.00	65,500.00	418,000.00
Wu, Dr Xin	This project aims to develop an innovative class of adsorbent materials comprised of macrocycles (large cyclic molecules) tailored to specifically bind toxic anions in water. The project expects to address the key issue of poor selectivity in existing adsorbent materials and generate knowledge in materials chemistry by producing ring-shape anion binding molecules, advancing low-cost synthesis of materials, and providing fundamental insights into anion binding in polymeric materials. Expected outcomes include sensors and adsorbents targeting toxic anions for water quality monitoring and purification. This should provide significant benefits, such as improving water quality and tackling environmental challenges globally and in Australia.					
	National Interest Test Statement					
	The project is expected to generate a new class of solid-state "sponges" that capture a targeted anion from a mixture of ions in water with unprecedented selectivity, to address the need for more robust water quality monitoring and water purification techniques globally and in Australia. Examples of expected outcomes are adsorbents that remove carcinogenic contaminants (e.g. bromate) from drinking water, optical sensors that monitor bicarbonate concentrations in seawater, and materials that assist nuclear waste treatment. Building upon the unique strategies of embedding cyclic units to enhance the performance and reduce the cost of anion adsorbing materials to meet the demands of industrial applications, the project aligns with the national research priority to manage Australia's soil and water, by providing new solutions to monitor and remediate damages to fresh water and marine systems. The originality of the developed synthetic anion binding systems that mimic protein function, as well as new knowledge generated will strengthen Australia's international standings in chemistry and materials science.					
DE220101019	**Understanding how neural oscillatory phase affects perception and attention**	75,572.50	150,266.50	150,099.00	75,405.00	451,343.00
Harris, Dr Anthony M	The project examines rhythmic 'waves' in human brain activity, with the aims of determining the mechanisms behind their involvement in attention and visual perception, and of differentiating the types of rhythmic activity involved in different aspects of attention. The project will generate new knowledge, and benefit cognitive neuroscience in Australia, by characterising the fundamental rhythmic nature of visual perception. In addition to resolving existing scientific controversies, the outcomes of this project include the creation of a large, public repository of behavioural and neural data, and the generation of new knowledge to guide development of cognitive enhancement strategies for attentionally demanding, real-world scenarios.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project will benefit cognitive neuroscience in Australia by identifying some of the key brain processes involved in regulating visual perception and its modulation by attention. The project's combination of electroencephalography, computational modelling, and non-invasive brain stimulation will contribute to making Australia a world leader in this burgeoning area of research. The findings will illuminate the neural mechanisms underlying conscious perception of the visual environment, and could help inform the design of devices to track and enhance human perceptual performance in attention-demanding scenarios (e.g., radar operators, baggage screeners). Knowledge gained through the project will benefit the rapidly developing area of human-autonomous vehicle interaction, which requires precise estimates of human attention to guide the behaviour of vehicles such as self-driving cars. Beyond the scope of the project, the findings from this research also have the potential to impact future efforts to understand abnormal attention regulation in various neurological conditions.					
DE220101129 Lebre, Dr Eleonore	**Assessing the risks of extracting metals for the global energy transition** This project aims to produce the first of its kind online atlas that systematically documents the social, environmental and economic impacts in mining locations around the world. Analysing impacts at the source of metal supply chains is crucial to comprehend the implications of transitioning to metal-intensive low-carbon energy technologies. The project would deliver insights on available pathways to achieve a 'just' energy transition, meaning a transition that successfully tackles climate change without placing unacceptable burden on mining communities and environments. The goal of the research is to generate evidence-based recommendations so that future metal supply can be both reliable and responsible.	73,215.50	151,286.50	146,024.00	67,953.00	438,479.00
	National Interest Test Statement Australia is committed to accelerating the deployment of low-emission energy technologies. These technologies have high metal requirements, and the Australian mining sector will play an essential role in supplying the metals needed for the energy transition, in Australia and worldwide. This research project is concerned with the risks that will be embedded in this supply, and particularly, how certain risk dynamics may both impact mining communities and constrain metal supply, which would in turn affect the global energy transition. The project will collect data across a selected sample of 1,000 mine sites, producing a global inventory that will be analysed in order to determine the direction and scale of these risks. Expected benefits from the research include the identification of climate change mitigation pathways that ensure the protection of mining communities' well-being and the environment. The research will also have considerable economic benefits by addressing the root causes of mining production constraints. Results from this project will inform the development of legislative responses nationally.					
DE220101190 Lyu, Dr Miaoqiang	**Designing low-toxicity and stable perovskites for solar energy conversion** Efficient solar energy conversion systems can significantly promote sustainable and low carbon-emission economy. This project aims to rationally design low-toxic and stable metal halide perovskites for efficient solar hydrogen conversion. The key concept is to design stable lead-free metal halide perovskite semiconductors with superior photophysical properties for solar-driven valuable chemical production. Expected outcomes include new generation advanced materials and proof-of-concept technologies for efficient solar hydrogen generation. The successful completion of this project will benefit Australia by positioning the nation at the frontier of advanced functional materials and renewable energy supply technologies.	66,257.00	137,414.00	142,889.00	71,732.00	418,292.00
	National Interest Test Statement Solar energy provides a viable solution to address Australia`s energy security and environmental concerns. Low-toxicity and stable semiconductors with excellent optoelectronic properties are the core component of an efficient solar energy conversion system. This project will take up this challenge by designing new metal halide perovskite semiconductors with low-toxicity and high stability for solar hydrogen generation, which is well-aligned with two of the Science and Research Priorities of Australian Government: Advanced Manufacturing and Energy by addressing 1) Specialised, high value-add areas such as high-performance materials, composites, alloys and polymers and 2) New clean energy sources and storage technologies that are efficient, cost-effective and reliable. The success of this project will promote the important advancement of technology that will lead to a significant economic and environmental benefit to Australia. The expected impacts are advancing Australia's academic knowledge and the enhancement of R&D capability in both next-generation functional materials and clean energy conversion sectors.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101221	**Revealing bat antibody recognition mechanism against bat-borne viruses**	76,094.00	150,545.00	150,713.00	76,262.00	453,614.00
Modhiran, Dr Naphak	Bats act as asymptomic reservoir hosts for numerous zoonotic viruses that are lethal in humans, indicating that the bat immune system can control these viruses. However, little is known about bat immunity including how bat antibodies recognise bat-borne viruses. This project aims to study bat anti-viral antibodies by utilising innovative protein engineering, cutting-edge cryo-EM technology and single-cell isolation and sequencing. The project seeks to uncover bat-borne zoonotic virus glycoprotein architecture and reveal how bat antibodies function to inhibit viral infection. Expected outcomes will be new insight and tools to combat emerging and yet to emerge pathogens, enabling pandemic preparedness and increasing global biosecurity.					
	National Interest Test Statement					
	Cross-species transmission of pathogens is a major threat to both human and animal health worldwide. Bats are known to act as reservoirs for many zoonotic viruses without having significant diseases. However, the mechanisms that govern bat immunity and viral tolerance are currently poorly understood. The project aims to decipher the role of bat humoral immunity to these zoonotic viruses. The project will utilise an established innovative approach and cutting-edge technologies, including single-cell sequencing and advanced cryo electron microscope to provide the first functional and structural characterisation of bat antiviral immune responses. Outcomes should include publications in top tier journals, strengthening of emerging local and international research collaborations, and enhance multidisciplinary research. Potential impacts beyond the benefit of gain in fundamental knowledge are raising public's awareness of bats and ecosystem through media engagement.					
DE220101226	**Testing Effects of Environmental Exposures on Subsequent Human Generations**	74,000.00	144,000.00	137,500.00	67,500.00	423,000.00
Moen, Dr Gunn-Helen	This project aims to develop new statistical models to determine how environmental exposures in pregnancy, such as smoking, alcohol consumption and diet, can impact the first and second generations of children. The project will fill a void in unbiased tools to disentangle genetic and environmental components in the inheritance of complex traits, and will be the first to determine objectively if and how effects from environmental exposures can be inherited. Through international collaborations and advanced interdisciplinary approaches, this project will generate new knowledge in the emerging field of multigenerational inheritance to drive the future design of interventions and influence positive behaviours during pregnancy.					
	National Interest Test Statement					
	This project aims to develop advanced statistical models for use in Australia to investigate how birthweight is affected by environmental exposures of the grandparental generation using genetics. The project will investigate lifestyle factors such as grandparental smoking, alcohol consumption and diet on grandchildren’s birthweight. This cutting edge, highly innovative project will give Australia an opportunity to utilise Norwegian genotyped cohorts with extensive birth registry information. The modelling technology developed in this project has the potential to be applied to a wide range of genetic analyses at the population level in Australia, including monitoring intergenerational effects on normal genetic traits as well as disease, although the latter is outside the scope of this study. These applications will have economic and social benefits for Australia by providing extremely valuable tools for monitoring populations and enabling long-term planning and policymaking, taking into account lifestyle factors of previous, current and future generations.					
DE220101310	**A unique and overlooked microbial process scavenging two greenhouse gases**	72,597.00	144,694.00	144,694.00	72,597.00	434,582.00
Liu, Dr Tao	This project aims to perform the first-ever systematic investigation of a novel microbial process, in which two potent gases (methane and nitric oxide) responsible for the climate change are metabolized simultaneously. This process is suggested to be universal in early and modern Earth's aquatic systems, which is a potential but overlooked microbial sink for methane and nitric oxide. By identifying the responsible organisms and their metabolic pathway, this project represents a critical step towards a full understanding of their roles in affecting the greenhouse gas emission. This understanding will also enable us to more reliably predict the global climate change, which is one of the most significant challenges in the 21st Century.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project contributes to Australia's national interest through its significant environmental benefits to Australia, directly aligning with the National Science and Research Priority: 'Environmental Change (the carbon cycling)'. Climate change is one of the most serious challenges of the 21st century, especially for countries like Australia with its long coastal lines. Identifying and understanding the mechanisms of a unique microbial process for removing potent greenhouse gases (e.g. methane and nitric oxide) in this project will enable us to predict global climate change more accurately, and facilitate a strong foundation for the development of new biotechnologies to mitigate their emissions. This project will benefit Australian water industries seeking to reduce their carbon footprints, and will enhance the international competitiveness of Australian research through national and international collaborations.					
DE220101320 Yildirimoglu, Dr Mehmet	**Rethinking traffic modelling for next generation city-scale networks** This project aims to develop an efficient traffic simulation model that enables data-informed traffic monitoring and automated model development, streamlining the fundamental transformation that next-generation cities will undergo in the coming decades. The project expects to generate new knowledge in traffic modelling by developing an innovative approach to inferring traffic conditions and traveller behaviour from diverse data feeds, and automating model calibration through an optimisation formulation. Expected outcomes address the eventual transition to smart cities and connected and autonomous vehicle technologies, providing significant social, economic and environmental benefits through optimal planning and effective operation schemes.	73,731.50	139,053.50	139,253.50	73,931.50	425,970.00
	National Interest Test Statement This project will provide a major scientific breakthrough in the modelling of city-scale traffic networks; it will develop an integrated theoretical framework consolidating efficient traffic modelling, data-informed traffic monitoring and automated model development, which collectively provide a comprehensive and systematic modelling platform. This research has a significant impact on how the next-generation traffic networks will be designed and operated to exploit the full potential of smart cities initiatives and connected and autonomous vehicle (CAV) technologies. Findings from this forward-thinking project will enable state and federal transport agencies to plan for optimal integration of CAVs in the transport systems and identify effective transport management strategies maximising the efficiency of existing infrastructure, thereby helping Australian cities achieve sustainability and efficiency goals. The project outcomes will significantly contribute to smart cities initiatives, resulting in mobility benefits by reducing congestion, and environmental benefits by reducing greenhouse gas emissions.					
DE220101339 Benham, Dr Claudia F	**Ecological grief, wellbeing and resilience in the Great Barrier Reef** Adaptation to environmental change is a critical societal challenge that increasingly involves psycho-social factors such as ecological grief – the distress caused by loss of important environments. This project aims to understand how social factors such as place attachment and environmental values interact with broader environmental and institutional changes to shape community resilience to ecological grief in the Great Barrier Reef region. This will be the first comprehensive, interdisciplinary study to understand how ecological grief influences community wellbeing and identify local adaptation responses. The project will provide a basis for policy making that seeks to foster strong and resilient communities in Australia and globally.	76,411.50	153,168.00	150,573.00	73,816.50	453,969.00
	National Interest Test Statement Adaptation to environmental change within Australian regional communities is recognised as an issue of national importance due to the rapid acceleration of environmental threats such as climate change and biodiversity loss, and the significant negative effects of these threats on community wellbeing and mental health. Communities in the Great Barrier Reef are at the forefront of environmental change, and are experiencing significant ecological grief and loss as a result. This project aims to analyse the environmental, social, institutional and economic conditions that combine to make regional communities more vulnerable to environmental change and will also examine how communities are building local resilience. The project directly responds to the Australian Government's Science and Research Priority 8 – Environmental Change. Knowledge from this project can be used to develop targeted Australian policy responses to improve community wellbeing in response to environmental change.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101548	**Calming the Superfluid Storm: Taming Turbulence in Superfluid Devices**	65,000.00	135,000.00	142,500.00	72,500.00	415,000.00
Reeves, Dr Matthew T	Turbulence, the chaotic flow of fluids, occurs in the vast majority of fluid flows in nature. This project aims to develop a new understanding of turbulence in superfluids, a class of quantum fluids which can flow without friction. The significance is that aspects of turbulence are universal, so that discoveries in superfluid turbulence will provide fundamental insights into all forms of turbulence. The expected outcomes are solutions to two outstanding questions – what are the universal laws of turbulent flow for superfluids, and what new forms of quantum vortex matter are possible? New insights into turbulence will benefit all applications which rely on its understanding, for example in medicine, aviation, and climate modelling.					
	National Interest Test Statement					
	This project aims to develop innovations in the control of turbulence in superfluids. Recently, applications leveraging the frictionless flow of superfluidity have been proposed, including ultra-low energy switching devices for computation, and high precision quantum sensors. However, turbulence caused by quantum vortices marks the breakdown of superflow and the onset of dissipation, and has been shown to limit performance in these devices. The outcomes of this project have the potential to enhance the critical currents in such devices by controlling quantum vortices in the fluid. Computing infrastructure uses an increasing fraction of the international energy budget, and is a major contribution to carbon emissions. Technology leading from this project could enable ultra-low energy computing, benefiting Australia both environmentally and economically. Furthermore, this work will strengthen Australia's world-leading effort in quantum technologies, which has the potential to provide new jobs, technology exports, and economic diversification.					
DE220101577	**Two-Dimensional Covalent Organic Framework for Next-Generation Batteries**	75,575.50	149,222.50	147,744.00	74,097.00	446,639.00
Wang, Dr Jie	This project aims to develop advanced two-dimensional (2D) covalent organic framework (COF) materials for sodium and potassium-ion batteries. It expects to generate a new family of few-layered 2D COF materials and their 2D-2D heterostructured composites with improved electrochemical properties, and develop processing technologies and fundamental understanding of COF-based electrodes for flexible sodium and potassium-ion batteries. Expected outcomes include novel materials, technologies, and energy-storage options for Australia. Significant economic and environmental benefits are expected from developing advanced sodium and potassium-ion batteries with low cost, high energy density, and improved safety for renewable energy storage.					
	National Interest Test Statement					
	New materials are critical to next-generation energy-storage devices, which will reduce power bills and help to protect the environment in Australia. The outcomes of this project will be new classes of functional materials for next-generation energy storage systems such as sodium-ion and potassium-ion batteries. The expected impacts are the expansion of Australia's knowledge base and research and development capability in functional materials and clean energy technologies. The project outcomes will underpin significant advances in sodium and potassium-ion batteries technologies that have future applications in flexible and wearable devices. Significant economic, energy and environmental benefits are expected from the development of sustainable and clean energy-storage devices.					
DE220101597	**Empowering Users to Protect their Personal Privacy on Social Media**	63,817.00	124,844.50	116,315.00	55,287.50	360,264.00
Risius, Dr Marten M	This Information Systems project aims to take a bold approach to finally overcome the paradoxical inertia of people who care about their privacy but do not protect it. This project integrates different psychological theories proposing a paradigm shift expecting to generate new knowledge in privacy research, which can currently neither explain nor provide means to overcome the vexing issue. Expected outcomes of the project include a privacy behaviour model (PIM), privacy training program and system design solutions. This should offer substantial benefits as it integrates privacy research and guides behavioural models beyond Information Systems, provide means to solve the paradox, guide legislation and the privacy consent mechanism design.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement According to the Consumer Policy Research Centre, 94% of Australians frequently make careless privacy decisions. This is paradoxical behaviour as 49% of Australians also report annually growing concerns about their personal online data. Insufficient privacy protection is a major cybersecurity issue with personal, economical and societal implications. Privacy related breaches cause personal damages including identity theft, financial and medical fraud, stalking, and bullying. Their employees' poor privacy behaviour is also a major cybersecurity threat for companies who invest $190 billion AUD in cybersecurity, while suffering multi-million-dollar losses per year due to privacy breaches. Poor privacy protection also exposes the Australian society, for example, to the distortion of public discourse and election manipulation as witnessed by other countries. Empowering users to actually protect their privacy will safeguard the Australian citizens against personal threats, preserve the society from unwanted external interference, and help companies to achieve effective privacy protection through their investments.					
	The University of Queensland	1,494,497.50	2,979,068.50	2,983,758.00	1,499,187.00	8,956,511.00
University of Southern Queensland						
DE220100479 Frew, Dr Adam	**Delivering defences: using fungi to enhance plant resistance to herbivory** This project will identify how the diversity of beneficial fungi in the soil is affected by agricultural management, and will reveal how these fungi govern the ability of plants to defend themselves from insect herbivores. Through innovative field surveys and experimentation, this project will generate new knowledge in the key areas of soil ecology and plant defence. This will allow us to exploit these soil fungi to enhance crop protection while simultaneously conserving soil ecosystems. Effectively boosting plant defence in this way will reduce reliance on ecologically damaging pesticides, promote soil biodiversity, and ensure the sustainability of crop production into the future.	75,597.00	151,194.00	151,194.00	75,597.00	453,582.00
	National Interest Test Statement Reducing damage to agricultural crops by insect herbivores will allow us to meet the challenge of feeding a growing population. Microbes in the soil have the capacity to boost the natural defences of plants. This project delivers major socio-environmental and economic benefits by unlocking our ability to utilise these microbes in sustainable agriculture. Doing so will reduce our reliance on expensive and ecologically damaging pesticides while promoting soil biodiversity. These benefits will be relevant to (i) farmers as they look to manage their soils sustainably, conserve their local environment, and maintain crop pest-resistance; (ii) bioinoculant industries who will benefit from accurate information on effective microbial formulations for pest resistance; (iii) Australian agricultural export industries subject to stringent organic and sustainability guidelines of trading partners.					
	University of Southern Queensland	75,597.00	151,194.00	151,194.00	75,597.00	453,582.00
	Queensland	2,299,823.50	4,587,609.00	4,580,504.00	2,292,718.50	13,760,655.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
South Australia						
Flinders University						
DE220100403	**Defining how gut bacteria regulate metabolism: a role for gut serotonin**	78,097.00	156,194.00	156,194.00	78,097.00	468,582.00
Martin, Dr Alyce M	This project aims to understand how serotonin-producing cells in the gut interact with gut bacteria (the microbiome), using a combination of cells in culture and live germ-free and genetically modified mice. This project expects to generate new knowledge regarding cellular interactions that underlie important physiological pathways, such as the control of blood glucose and fat storage. The intended outcomes of this project are to identify how gut bacteria communicate with serotonin-producing cells to regulate metabolism, and whether diet acts via a gut microbiome-serotonin axis to impact physiology. The expected benefit of this project will be to provide a new understanding of highly complex physiological systems that regulate our health.					
	National Interest Test Statement					
	This project aims to benefit the health and wellbeing of Australians. In Australia, 67% of Australian adults (12.5 million people) and almost 25% of children are overweight or obese. These statistics provide a concerning projection for the likely rise in obesity-related metabolic diseases such as type 2 diabetes, and continued reliance on schemes such as the National Diabetes Services Scheme (NDSS). Currently, 170 people a day are registered with the NDSS, at an increasing cost to the economy, with an estimated $14.6 billion spent in 2010 on direct diabetes-related costs. The outcomes of this project aim to provide new approaches to regulating blood glucose control for metabolic disorders such as diabetes, to improve the quality of life for Australians and reduce the economic burden for Australia.					
DE220100550	**Prospecting for Australia's Submerged Landscapes through Machine Learning**	77,900.00	150,339.50	143,904.00	71,464.50	443,608.00
McCarthy, Dr John K	This project aims to apply machine learning to image-based seabed surveys to prospect for submerged Aboriginal archaeological sites, beginning with both of Australia's only known sites. This will be the first attempt globally to develop a technique to pinpoint potential archaeological material within large area surveys, tagging features which can then be tested through scientific diving. Expected outcomes are workflows that pair machine learning algorithms, marine robotics and scientific diving to greatly enhance prospecting efficiency. This will enhance knowledge and benefit management of these resources on Australia's continental shelf and beyond, reducing the impacts of offshore industry on cultural heritage.					
	National Interest Test Statement					
	This project will develop tools to locate submerged archaeological sites across the Australian continental shelf in a much more efficient and cost-effective manner than previously possible. Australia has long recognised the importance of Indigenous archaeological sites, but global research has increasingly highlighted that sea levels were lower by up to 130 metres for most of the 65,000 year occupation of this continent. Discovery of submerged archaeological sites in Western Australia in 2019 confirms that such sites can survive the process of inundation. As Australia recognises the existence of Aboriginal lands offshore and moves towards ratification of the UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001) there is an urgent need to locate, understand and protect these sites from natural and human impacts. This project combines established techniques from other disciplines to offer new and innovative solutions to enhance archaeological prospecting techniques through machine learning, which will support heritage management and sustainable marine industry at a large scale.					
DE220101409	**Quantifying trophic niches to measure the resilience of marine predators**	75,657.00	146,314.00	140,566.50	69,909.50	432,447.00
Meyer, Dr Lauren	This project aims to pair global movement with feeding ecology datasets to characterise relationships between space use and diet breadth, and tests the effects of marine industries on functional roles of marine predators. This expects to generate knowledge about population and individual specalisation using innovative biochemical approaches and shark's unique dental anatomy. Expected outcomes include a biochemical database facilitating global collaborations, and a vulnerability scale to rank resilience to impacts based on relative specalisation. This should benefit managers by accounting for previously unknown effects of marine industries on specialists at elevated extinction risk, with limited resilience to local impacts and global change.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Australia's growing marine-based economy, estimated to be worth ~$100 billion/year by 2025, must balance recreational and industry use with maintenance of a functional marine ecosystem and animal conservation. Wildlife with specialised diets and small home ranges are at heightened risk of extinction, potentially unable to adapt to impacts from disruptive industries. This project will identify biochemistry to better define the food sources and distributions of sharks and rays, and then test, through advanced tracking approaches, the impact of different marine-based economies on one of the world's most threatened group of species. The effects of industrial developments, wildlife tourism, waste disposal, and aquaculture facilities on sharks and rays will be tested through case studies in five sites throughout Australia. This project is of national interest because it directly addresses the need to understand and manage the health of our unique and extraordinary marine ecosystems in which many endangered sharks and rays continue to decline.					
	Flinders University	231,654.00	452,847.50	440,664.50	219,471.00	1,344,637.00
The University of Adelaide						
DE220100230 Amare, Dr Azmeraw A	**Investigating the Genetic Basis of Human Intrinsic Capacity** Intrinsic capacity is a new concept introduced by experts at the World Health Organisation to promote healthy ageing. It is defined as the composite of an individual's physical and mental capacities, based on measures of five criteria; cognitive, sensory, locomotor, vitality and psychological. It is a genetically predetermined trait, but is influenced by a range of environmental stimuli. Applying a cutting-edge genetic methodology on big biobank datasets, this project aims to examine the role of genetics and the environment to explain the variability of intrinsic capacity between individuals. Understanding the biological basis of intrinsic capacity has major implications for scientific research in healthy ageing and mental wellbeing.	62,500.00	122,500.00	120,000.00	60,000.00	365,000.00
	National Interest Test Statement Intrinsic capacity is a holistic measure of an individual's physical and mental functioning, whose follow up over time is useful to monitor healthy ageing and wellbeing. This project will produce a comprehensive knowledge and framework of how human intrinsic capacity is shaped by genes, the environment and the interaction of them. Results will clarify the biological mechanisms through which the interaction of genetic and environmental factors impacts intrinsic capacity and natural vitality, which can be used in future research to find better ways of promoting healthy ageing. This project will contribute to Australia's national interest in a number of ways. First, the project aligns with the Australian Government's aim of promoting innovation. Second, the project will implement cutting-edge genomic research methods and enable the formation of an international team of researchers that will signify Australia's position as a leader in the research area. Research outcomes will have benefits in the future to maximise the health of Australians and to advance science in healthy ageing and mental wellbeing.					
DE220101074 Tian, Dr Wenjie	**Conversion of biowastes to porous carbon materials for green catalysis** This project aims to develop a family of biowaste-derived porous carbon and single-atom-anchored porous carbon catalysts for the degradation of emerging microcontaminants in water. Innovations are expected in systematically developing affordable, facile, productive, and sustainable approaches. Via reaction-oriented structure design, new concept will be defined at the atomic level using calculations and in situ characterisations in material engineering and advanced purification technology. The anticipated outcomes will provide fundamental knowledge in green nanotechnologies for water remediation. Success will secure a sustainable future for Australia with clean water and strategies for advanced manufacturing in relevant areas.	74,500.00	143,500.00	137,750.00	68,750.00	424,500.00
	National Interest Test Statement This project is closely related to the Science and Research Priorities in Australia, i.e., Advanced Manufacturing, Soil and Water. Australia has abundant biowaste feedstocks (e.g. bagasse) and this project prioritises the utilisation of biowastes for the preparation of cost-effective, and value-added, porous carbon-based catalysts for removing the emerging micropollutants in Australia's soil and water systems. The outcomes will bring breakthroughs in the practical viability of affordable green technology, and promote Australia's leading role not only in advanced manufacturing of biowaste-derived carbon catalysts but also in advanced nanotechnology for environmental sustainability and water security. This project will lead to potential commercialisation in manufacturing industries and water or wastewater treatment industries in Australia, bringing long-term economic, social, and environmental benefits to the community.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101365	**Multiscale Design of Electrocatalysts for On-Demand H2O2 Production**	72,597.00	146,694.00	143,944.00	69,847.00	433,082.00
Tang, Dr Cheng	The aim of this project is to design advanced single-atom catalysts at multiscale for efficient and selective electrocatalytic reduction of oxygen to hydrogen peroxides as clean chemicals and fuels. It is expected to generate new knowledge in materials science and electrochemistry, using interdisciplinary approaches of multiscale material engineering, in situ characterisation and theoretical calculations. Expected outcomes include generalised design principles, innovative synthesis strategies, refined reaction mechanism understanding, and commercially relevant electrolysis technologies. Benefits include a sustainable future for Australia with advanced manufacturing, decreased emissions and resilient chemicals supply.					
	National Interest Test Statement					
	This project will lead to new, fundamental and technical breakthroughs in the rational development of nanomaterials, in-depth understanding of reaction mechanisms, and eco-friendly production technologies of hydrogen peroxides. The new technology will significantly reduce the carbon footprint and avoid the production of organic by-product wastes in the chemical industry. It will enable the resilient, local and self-sufficient manufacturing and supply of essential chemicals. The project is expected to provide promising materials and technology to store renewable electricity into value-added fuels and chemicals, which can be widely applied in large-scale industrial processes and smaller on-site activities, thus expanding Australia's economy and employment with new opportunities in energy markets and supply chains. The outcomes will significantly enhance Australia's research capacity and advance its world-leading roles in developing advanced nanomaterials, promoting green chemistry and addressing climate change.					
DE220101449	**How mammalian males indirectly control transmission of paternal traits.**	77,281.00	154,540.00	154,418.50	77,159.50	463,399.00
McPherson, Dr Nicole O	This project aims to address how environmental insults in males prior to conception are able to modify phenotype of subsequent offspring. This project expects to generate fundamental knowledge in a key biological pathway on how non-genetic factors delivered by sperm at conception are able to program the growth of the developing embryo.The knowledge generated from this project will provide understanding and biological options for responding to, and potentially mitigating the impacts of environmental change on the mammalian reproductive system.					
	National Interest Test Statement					
	Humans have changed natural ecosystems for over 100 years with substantial gains in human economic benefit. However, not all species have benefited from this, with approximately 60% of ecosystems resources - in particular air and water quality and food availability - degrading or becoming unsustainable. The associated effects from this are not restricted to the individual at the time of exposure, with consequences been passed to multiple generations through the male reproductive line. This project looks to understand how environmental exposures in mammalian males prior to conception, transmit paternal traits to subsequent offspring, through non-genetic pathways delivered by sperm at fertilisation. Outcomes from this project should help reduce the overall economic burden from loss of biodiversity due to changes to natural resources and the impact of environmental insults on male non-genetic inheritance.					
DE220101526	**How Republics Die: Rome's democratic breakdown in the first century BCE**	58,781.50	120,293.00	123,498.50	61,987.00	364,560.00
Rafferty, Dr David M	This project aims to use recent political science scholarship on democratic breakdown and the threat of a competitive authoritarian regime in Trump's US to analyse the breakdown of the Roman Republic in the 50s BCE under Caesar and Pompey. Expected outcomes include a better understanding of how and why constitutional government collapsed in Rome, using language and concepts directly transferable to our own fragile democracy. This should benefit the study of Roman history at all levels and provide historians and political scientists with a unique dataset for analysing how a centuries-old democracy fell into authoritarian rule.					
	National Interest Test Statement					
	This project is in the national interest because it will improve our understanding of the risks to democracies in an international environment where democratic government looks increasingly fragile. Australia has a longstanding and deeply felt commitment to preserving and improving democracy at home (through such programs as Democracy 2025) and abroad (where promoting stronger democratic institutions is one of the five pillars in our membership of the UN Human Rights Council). The Roman Republic was, like Australia, a constitutional polity of long standing, whose citizens could not imagine a better form of government, yet which succumbed to authoritarian rule. Improving our understanding of the political processes by which this happened puts us in a better position to defend our own democracy against similar threats.					
	The University of Adelaide	345,659.50	687,527.00	679,611.00	337,743.50	2,050,541.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
University of South Australia						
DE220100381	**Facilitating detection of new psychoactive substances in wastewater**	73,500.00	147,500.00	148,500.00	74,500.00	444,000.00
Bade, Dr Richard	This project aims to develop and apply novel analytical methods for detecting new psychoactive substances (NPS) in wastewater. NPS are a dynamic, complex addition to the illicit drug market, and a persistent analytical challenge for wastewater analysis. This project expects to fill the current knowledge gap in detection and identification of these substances in wastewater. This will provide substantial benefits both to Australia and internationally by aiding development of early warning drug monitoring systems, providing the rapid deployment of interventions to reduce drug-related harm in the local community, while facilitating law and government agencies to better direct resources.					
	National Interest Test Statement					
	Illicit drug and new psychoactive substance (NPS) use contribute to a myriad of economic, social and environmental issues. Novel, Australia-first methods including the elucidation of specific markers of NPS combined with targeted national and international wastewater sampling regimes will make this project the most comprehensive study of these substances worldwide. End-users such as the Australian Criminal Intelligence Commission, South Australia Health and Forensics SA have already endorsed this approach and acknowledged the nature of the analytical results derived from this work, which will serve to offset a number of the acknowledged shortcomings inherent in traditional drug data sources including seizure information and user self-reporting. Close collaborations with these partners will ensure the data obtained from this project will be translated to reduce the economic and adverse social issues associated with the use of new psychoactive substances in Australia and internationally.					
DE220100406	**Next generation Floating Structures with High-Performance Composites**	73,500.00	147,350.00	141,000.00	67,150.00	429,000.00
Zeng, Dr Jun-Jie	Floating structures are facing severe deterioration problem due to steel corrosion. This project proposes to address the deterioration problem by developing prefabricated high-performance fibre-reinforced polymer (FRP)-ultra-high performance cementitious (UHPC) composite elements for future floating structures. FRP-UHPC composite elements have excellent strength-to-weight ratio and improved durability. Basic mechanical properties and durability of FRP-UHPC composites will be investigated. Also, reliable connection device for FRP-UHPC structural units will be proposed and verified. The project is expected to provide durable floating structures with low maintenance cost, leading to a revolution of the current floating structures.					
	National Interest Test Statement					
	Australia has a coastline of 2,576,000 km and most cities in Australia are coastal cities. Offshore floating structures, generally made of steel or steel reinforce concrete (RC), face a major challenge: deterioration resulted from steel corrosion. In Australia, corrosion costs over $32 billion a year -- about 2.1% of GDP in the country. Utilisating advanded noncorrosive high-performance FRP-UHPC composite structural elements allows usage of in-site materials (e.g. fly ash, sea-sand, seawater), and offer more sustainable floating structures through improved durability and the reduced need for maintenance, thereby contributing the structural longevity. Floating structures based on prefabricated FRP-UHPC structural units have additional benefits such as fast construction, moveable and reduced environmental impact to the sea bed. This new technology would create commercial and military benefits, and would also require additional skilled labour and trained professionals thus producing many new job opportunities for Australia and throughout the world.					
	University of South Australia	147,000.00	294,850.00	289,500.00	141,650.00	873,000.00
	South Australia	724,313.50	1,435,224.50	1,409,775.50	698,864.50	4,268,178.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Tasmania						
University of Tasmania						
DE220100264	**A Socio-Legal History of Australia's Environmental Lawyers**	74,093.00	152,170.50	151,762.50	73,685.00	451,711.00
Bartie, Dr Susan M	This historical study of 50 years of Australian environmental lawyering (1970-2020) aims to develop and preserve an unprecedented data set of environmental lawyers over multiple generations. It will create important new knowledge, challenging the common and limited treatment of lawyers as mere instruments of social causes and revealing a novel, and previously unexplored, layer of environmental governance. This new knowledge can be used by environmentalists, researchers and policy makers to better understand and engage with this important class of social reformers. It can inform environmental advocacy, governance and environmental protection. Other benefits include building capacity in Australian socio-legal historical research.					
	National Interest Test Statement This research will contribute to Australia's national interest through its potential to provide environmental, social and cultural benefits to the Australian community. It will create new knowledge about the way that a significant class of actors - environmental lawyers - have responded to the impacts of environmental change. This new knowledge will provide a strong foundation for reforming environmental governance and environmental protection with Australia. It therefore can assist Australia to meet international obligations, responding to the United Nations Sustainable Development Goal 16. The project will preserve significant documents and oral histories of an important group of environmental defenders, creating a new national, cultural and scholarly resource for the benefit of the environment and community. It will also connect Australian research agendas with a vibrant and growing field of international research interrogating the lives and broader context of lawyers to gain better understandings of politics and society. It therefore has the potential to build significant new research collaborations.					
DE220100265	**A closed-loop human–agent learning framework to enhance decision making**	69,500.00	139,000.00	139,000.00	69,500.00	417,000.00
Cao, Dr Zehong	This project aims to design a foundational human–agent learning framework to augment the decision making process, using reinforcement and closed-loop mechanisms to enable symbiosis between a human and an artificial-intelligence agent. It envisages significant new technologies to promote controllability and efficient and safe exploration of an environment for decision actions – drastically boosting learning effectiveness and interpretability in decision making. Expected outcomes will benefit national cybersecurity by improving our understanding of vulnerabilities and threats involving decision actions, and by ensuring that human feedback and evaluations can help prevent catastrophic events in explorations of dynamic and complex environments.					
	National Interest Test Statement This project will conduct seminal cross-disciplinary research to build a foundational closed-loop human–agent learning framework to enhance decision making. By tackling challenges in the design of the artificial-intelligence agent, and developing human–agent networks with closed-loop mechanisms, it aims to deliver theoretical foundations and frontier technical solutions to the computational intelligence and human–computer interaction communities, enhancing Australia’s research competitiveness. Supporting excellent research training for PhDs, the project is expected to attract national and international talent to contribute to Australia’s skill base. Because human–agent learning is an essential aspect of most ecosystems – such as defence, social networks, finance, supply chains, agriculture, the environment – success in this project should yield a vastly improved decision-making infrastructure, toward a trustworthy environment for the enormous volumes of cyber internet and physical-sensor data that are indispensable to information and communication technologies in Australia and internationally.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101017	**Assessing the vulnerability of East Antarctica to future warming**	76,000.00	152,000.00	152,000.00	76,000.00	456,000.00
Noble, Dr Taryn L	This DECRA aims to address major gaps in our understanding of how the Antarctic Ice Sheet will respond to climate change, by enabling critical insights on its sensitivity to past climate warming. The project will apply a suite of geochemical approaches to determine – for East Antarctica's most vulnerable basin – the extent of ice-sheet loss during past warming, and the impact of glacial meltwater on biological productivity and Southern Ocean circulation. New knowledge of how the ice sheet and ocean respond to climate warming, will lead to more reliable projections of future sea-level rise and climate. The DECRA will benefit Australia by providing a strong evidence base for policy decision-making to manage the impact of sea-level rise.					
	National Interest Test Statement The sea-level rise impacts (e.g., coastal inundation, flooding, salinisation of groundwater and agricultural land) associated with human-driven melting of the Antarctic Ice Sheet will affect the well-being of Australians and hundreds of millions of people around the world, with exposure and vulnerability for multiple generations to come. This DECRA will contribute to our understanding of the sensitivity of the East Antarctic Ice Sheet to global climate warming, and the impact the associated meltwater will have on the Southern Ocean circulation and global climate. There are currently deep uncertainties associated with projections for the Antarctic contribution to sea level rise to 2100, and even large uncertainties beyond this time. By investigating the ice sheet's behaviour during times of past climate warming when sea level was 6-11 m higher than today, this project will improve our understanding of where and how much East Antarctica is likely to melt in the future.					
	University of Tasmania	219,593.00	443,170.50	442,762.50	219,185.00	1,324,711.00
	Tasmania	219,593.00	443,170.50	442,762.50	219,185.00	1,324,711.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Victoria						
Deakin University						
DE220100103	**Striking voices: Australian school-aged students' climate justice activism**	77,097.00	151,694.00	150,194.00	75,597.00	454,582.00
Mayes, Dr Eve E	Mass student-led climate justice activism emerged as a transnational phenomenon in 2018.This project aims to foster understanding of this phenomenon, through exploring how Australian young people are taking action on climate change, the supports for their activism, and educational conditions of and responses to their climate concerns, using ethnographic and participatory methods. Expected outcomes include online student-curated accounts of social movement participation, and a co-produced teaching and learning framework for schools. Anticipated benefits include a greater understanding of emerging patterns of political engagement, and the development of educational capacity to engage young people and face urgent environmental challenges.					
	National Interest Test Statement					
	This project will foster a timely understanding of school student climate activism in Australia, by identifying conditions for young people's engagement with climate issues, exploring patterns of young people's political participation, and analysing schools' responses to their climate concerns. By involving young people and adults across formal and informal spaces of education this project will contribute to intergenerational discussion of civic-social approaches to the climate crisis. Outcomes, including a student-curated website and a teaching and learning framework developed with educational stakeholders, will advance knowledge of how young Australians contribute to climate action, how they learn and teach others, and how schools can develop educational capacity, together with young people, to meet contemporary environmental challenges. This project will benefit Australia by documenting how young people innovate to create strategies and solutions for environmental urgencies – ultimately contributing to strengthening Australia's collective social, cultural and environmental futures.					
DE220100203	**Shadow Continent: Submerged Histories from Sahul**	56,956.00	116,294.00	116,367.00	57,029.00	346,646.00
Griffiths, Dr Billy	This project aims to investigate the cultural and environmental histories of Australia's drowned coastlines and what they reveal about past and future sea-level rise in the Australian region. Drawing on scientific understandings of the ancient continent of Sahul, it expects to generate new knowledge about environmental change and people-sea relationships. Expected outcomes of this project include enhanced capacity to build disciplinary collaborations in the fields of history, heritage and archaeology and establishing the first historical overview of Sahul. Benefits include recommendations to protect and manage Australia's underwater cultural heritage and a narrative framework to advance public knowledge of Australia's deep human history.					
	National Interest Test Statement					
	The history of environmental change informs how Australians respond to future challenges. This interdisciplinary project develops four case studies in order to examine historic and scientific understandings of past and present sea-level change in the Australian region. It will foster greater appreciation of the variety and complexities of people-sea relationships, contributing to a better understanding of Australia's coastal heritage. It will address the National Science and Research Priority 'Environmental Change', providing insight into local and regional histories of sea-level rise. Expected benefits include policy recommendations to more effectively protect and manage Australia's underwater cultural heritage and the creation of opportunities for the wider Australian community to learn about Australia's ancient and enduring heritage.					
DE220100206	**After the Return: Understanding Re-engagements with Aboriginal Collections**	72,259.50	146,930.50	145,043.00	70,372.00	434,605.00
Gibson, Dr Jason M	This project aims to investigate the dynamic ways in which repatriated cultural collections are re-integrated back into the lives of Aboriginal individuals and communities in central Australia. As the first systematic study of the mid-to long-term consequences of repatriation, the project intends to discover how repatriation policies and practices might be better developed, implemented and resourced. The project is designed to provide significant benefits to Aboriginal communities and wider Australia through the elevation of Indigenous perspectives and the production of community resources. It should also benefit the museum sector by developing insights into the effects of repatriation and enable the design of new policy frameworks.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The return of Indigenous cultural heritage is one of the most important developments in Australia's recent cross-cultural history. Through engaged, collaborative research with Aboriginal people across Central Australia and the Western Desert, this DECRA project will develop important new research into the effects of museum repatriation practices. Case studies involving some of the nation's most important ethnographic collections - including those that led to public understandings and translations of key Aboriginal concepts such as 'Songlines', 'Dreaming', and 'Country' - will reveal important Aboriginal responses and critiques to these nationally significant cultural collections. Innovative digital interactives will be developed in collaboration with Aboriginal communities, that show how museum object/s are linked to Dreaming stories, places and to people. New policy frameworks will also be developed to ensure the practices of Australia's collecting sector align with the cultural heritage experiences and aspirations of contemporary Aboriginal communities.					
DE220100515 McKnight, Dr Lucinda J	**Teaching digital writing in secondary English** In a digital world the nature of writing is changing. This project investigates how secondary English teachers are conceptualising and teaching digital writing, and how they perceive this work can be enhanced to create more engaged and empowered students, workers and citizens. The study contextualises contemporary digital writing pedagogy in the history of English teaching and provides insights into how teachers respond to demands for 21st century literacies. The project, of both national and international significance, will contribute to policy, professional learning and teacher education, and shape capacity for the education of adept writers for digital futures.	70,163.50	142,546.00	141,662.50	69,280.00	423,652.00
	National Interest Test Statement This project is of high national relevance. English, in various forms, is compulsory in Australian schools and the study aims to expand conceptions of the fundamental skill of writing along with the capacity of a significant teacher workforce. Australian needs a better understanding of ways teachers can balance requirements of high stakes testing with the need to produce writers confident in a diverse repertoire of digital purposes, forms and audiences. The project seeks to provide strategic knowledge around how teachers can design within and beyond constraints and to identify their perceptions of how this capacity can be further enhanced. The project's digital focus offers innovative strategies for schooling beyond face-to-face contact, important for resilient education systems in volatile times. By prioritising writing, the project develops writers for future workplaces including the creative and cultural industries. 21st century literacies are vital for an economically sound, culturally rich, socially engaged and globally competitive post-COVID democracy.					
DE220100622 Conduit, Dr Dara T	**Digital authoritarian practices and the 21st century autocrat** This project aims to examine the emerging digital practices of authoritarian regimes, generating new knowledge on authoritarianism through qualitative methods that are underused in cybersecurity research. It proposes to determine whether such 'digital authoritarianism' is a new and distinct phenomenon, or rather the transposition of offline authoritarian practices into the online space. Expected outcomes include enhanced understanding of technology's impacts on autocratic agendas and generating data that supports effective national security policy. This should create benefits such as (1) furthering knowledge on authoritarianism and (2) supporting evidence-based policies to respond to the authoritarian cyber threat.	58,808.50	126,861.50	126,861.50	58,808.50	371,340.00
	National Interest Test Statement Cyber security is a top national priority for Australia, with our 2020 Cyber Security Strategy warning that a successful attack on critical infrastructure 'could have significant ramifications for the broader economy and Australian way of life.' To date, government agencies, businesses and universities in Australia have been targeted in costly attacks linked to authoritarian regimes. This project is of significant national interest. By examining how autocrats are weaponising technology against domestic and foreign targets—a phenomenon known as digital authoritarianism—the project will support Australia's cyber security strategy. It will create a comprehensive database of worldwide authoritarian cyber tactics and undertake detailed regime case studies. The project will benefit Australia by facilitating greater understanding of digital authoritarianism, and provide an evidence base to support Australian policy responses to authoritarian cyber threats.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100752	**Reducing greenhouse gas emissions from Australian farm dams**	75,597.00	151,194.00	151,194.00	75,597.00	453,582.00
Malerba, Dr Martino E	There is an untapped potential to reduce greenhouse gas emissions from millions of Australian farm dams. This project aims to quantify the nation-wide carbon footprint of farm dams and develop low-cost strategies for “greener” practices. Contributing to Australia’s commitment to tackle climate change, this project aspires to empower farmers to significantly reduce the carbon footprint of their farm dams. It will also inform on the economic viability of alternative management strategies for mitigating farm dam emissions and provide recommendations for financial incentives. This project should enhance the capacity of Australia to meet its carbon reduction targets and mitigate anthropogenic climate change.					
	National Interest Test Statement					
	Farm dams are among the highest greenhouse gas emitters of all freshwater ecosystems, in Victoria alone releasing the equivalent of around 385,000 cars each day. Yet, government programs (e.g., Water Observation from Space) lack the capacity to detect and monitor farm dams due to their small sizes, and hence tackle their carbon footprints. This project will use innovative satellite tools to detect farm dams across Australia, calculate their greenhouse gas emissions, and quantify their contribution to climate change. Then, I will develop, test, and verify the use of floating wetlands as a natural, low-cost solution to reduce greenhouse fluxes from farm dams – while also increasing biodiversity, and lowering water temperature and turbidity. This project will upgrade Australia’s Greenhouse Gas Inventory, deliver policy recommendations for “greener” farm dam practices, and reduce the carbon footprint of Australia’s agricultural sector.					
DE220100847	**RECONNECT ME: REgaining CONtrol of childreN’s EleCTronic MEdia**	66,734.00	129,825.50	130,700.00	67,608.50	394,868.00
Arundell, Dr Lauren	This project aims to understand the impact that screen behaviours have on children’s quality of life, social skills and family functioning, and co-design feasible, acceptable and effective behavioural and digital strategies to mitigate this impact. Parents are concerned and are seeking urgent help in the persistent and evolving technology climate, where previous strategies are no longer relevant. Expected outcomes include new knowledge of the impact of screen time, and the co-design of innovative and user-friendly strategies developed with families, for families, to manage this. The benefits will include informing future effective and scalable screen time strategies for improved quality of life, social skills, family functioning outcomes.					
	National Interest Test Statement					
	Children’s quality of life, social skills, and family functioning are established in childhood, yet excessive screen time may be deleterious to these outcomes. The majority of Australian children fail to adhere to national behaviour recommendations and this is exacerbated by the rapid expansion of the technology environment. Parents are concerned and urgently seeking effective technology-related strategies for the current technology climate. This research will explore the impact of children’s screen time on quality of life, social skills, and family functioning and the potential determinants of these behaviours. It will purposefully collaborate with families, stakeholders and Deakin University's Applied Artificial Intelligence Institute (A^2I^2) to co-design theoretically-based, innovative and user-friendly behavioural and digital strategies to help parents manage screen time. This research will generate new knowledge of the impact of screen time on children's quality of life, social skills, and family functioning, and develop feasible, effective and scalable screen time strategies to improve these outcomes.					
DE220101105	**Developing Sustainable and Reliable Anode-free Lithium Metal Batteries**	72,500.00	142,500.00	140,000.00	70,000.00	425,000.00
Kang, Dr Minkyung	This project aims to investigate and optimise the functional properties of anode-free lithium metal battery electrodes. The project expects to develop a novel, high-throughput electrochemistry platform that can rapidly screen new materials and chemistries across length scales, from single atoms to entire battery cells. Understanding battery performance in such detail is expected to enhance our capability to design and manufacture smart battery materials that are higher performing, safer and longer lasting than current technologies. This should provide significant socio-economic and environmental benefits, through the development of commercially-feasible next-generation devices, used by households or businesses to store renewable energy.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The commercialisation of “post lithium ion batteries” is hindered by a general lack of understanding on the elementary processes that limit the performance, cycle life and safety of alkali metal anodes. This project aims to overcome this shortcoming, and in doing so directly addresses the “Energy” research priority, specifically the research challenge “New clean energy sources and storage technologies that are efficient, cost-effective and reliable”. Indeed, the development of commercially-feasible anode-free materials/chemistries would have significant environmental and socio-economic benefit, supporting Australian government initiatives on climate change mitigation (for example, the Mandatory Renewable Energy Target “MERT” program), as well as providing a means for safe, clean, secure and sustainable energy production/storage. Beyond this, the project will provide fundamental knowledge, training and intellectual property to support emerging energy storage industries in Australia and further ensure that Australian researchers remain in the driving seat of this globally-important and rapidly growing market.					
DE220101253 Kerr, Dr Emily M	**Redox-mediated electrochemiluminescence enhancement for novel biosensors** This project aims to understand and apply a novel approach to the enhancement of diagnostic tests for agricultural biosecurity applications. Government and Industry require simple, rapid tests to monitor and detect threats to Australia’s agricultural biosecurity. This interdisciplinary project intends to enhance collaboration, generate fundamental advances in the field of analytical chemistry and bolster Australia’s research capabilities through new analytical techniques and technologies. The breadth of applications of this technology should also provide significant benefits to the Australian biotechnology industry, improve existing instrumentation and impact diverse research fields from biosecurity to health monitoring.	70,000.00	140,000.00	140,000.00	70,000.00	420,000.00
	National Interest Test Statement This project will optimise and develop novel sensor technologies, with wide-reaching and important applications in a diverse range of fields. Viral outbreaks such as Foot and Mouth Disease and Avian Influenza have highlighted the need for cheap, quick and accurate diagnostic tools to monitor viral diseases in livestock. The versatile technology developed as part of this project could greatly benefit Australia’s ability to monitor biosecurity threats which pose significant risks to the Australian livestock industry. Better diagnostic platforms will provide opportunities to expand the Australian biotechnology industry. This project aims to bring new analytical instrumentation and techniques to Australia, that will build local skills and knowledge, and complement existing capabilities in the domestic sensor industry. Other benefits to this project include increasing national and international collaboration, providing research training opportunities and enhancing Australia’s research profile through publication in prestigious journals.					
	Deakin University	620,115.50	1,247,845.50	1,242,022.00	614,292.00	3,724,275.00
La Trobe University						
DE220100028 Farrugia, Dr Adrian	**Addressing gender and sexuality in drug education** This project aims to generate new knowledge on the relationship between young people’s concerns about drugs and the priorities informing drug education. Alcohol and illicit drug use costs Australia almost $40 billion per year and is a leading contributor to total burden of disease for young Australians. Drug education is a key strategy used to reduce youth alcohol and illicit drug-related harm, yet it has been the subject of sustained criticism for its inability to address youth effectively, including the gendered and sexual dimensions of harm. Outcomes expected from this project include more effective and equitable drug education materials. Overall, the project seeks to reduce alcohol and illicit drug-related harm among young Australians.	72,224.50	145,193.00	143,790.00	70,821.50	432,029.00
	National Interest Test Statement Alcohol and illicit drug-related issues constitute an estimated 16.5% of Australia’s national disease burden and cost the nation almost $40 billion annually. In 2019, 22% of Australians aged 14–19 reported lifetime use of illicit drugs. In response, Australia’s National Drug Strategy identifies school drug education as a central means of addressing youth alcohol and illicit drug-related harm. While alcohol and illicit drug use is known to be shaped by gender and sexuality, drug education is ill-equipped to address these aspects. Consequently, many drug education initiatives are not only ineffective but can be counterproductive. This project will explore how gender and sexuality shape young people’s experiences of, and responses to, drug education. This project will also analyse how drug education stakeholders perceive young people’s needs and how these understandings relate to their priorities. The findings will be used to develop new, practice-ready drug education resources that respond to young people’s needs and reduce alcohol and illicit drug-related harm among young Australians.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100064	**Socio-Legal Implications of Virtual Autopsies in Coronial Investigations**	74,126.50	146,959.50	150,333.00	77,500.00	448,919.00
Trabsky, Dr Marc	This project aims to assess how forensic imaging technology impacts coronial investigations in Australia. It expects to generate new knowledge on the implementation of post-mortem computed tomography in coronial investigations using a socio-legal approach. Expected outcomes include a framework for understanding how the technology has been developed in coronial investigations, and the social and legal effects of using virtual autopsies as a supplement or replacement of post-mortem dissections. This should provide significant benefits for stakeholders of the coronial process, through deeper understanding of how new technologies can be best implemented to improve the efficiency, accuracy and cost-effectiveness of coronial investigations.					
	National Interest Test Statement This project will be the first in Australia to study how forensic imaging technology impacts coronial investigations. Virtual autopsies allow for efficient, economical and accurate coronial investigations that minimise the use of invasive autopsies, which enables coroners to meet increased demands from families of the deceased who oppose post-mortem dissections due to religious or cultural beliefs. While Victoria is an early adopter of conducting whole-body post-mortem computed tomography for all deaths reported to the coroner, this practice has not been replicated across every state and territory of Australia. Through a report for the State Coroners of each state and territory in Australia, this project will provide a framework for understanding the social and legal effects of implementing pmCT in coronial investigations. The report will provide guidance on how Australian coroners can use pmCT to fulfil their statutory responsibilities under coronial law, make recommendations for reducing the occurrence of preventable deaths and carry out the administration of coronial justice.					
	La Trobe University	146,351.00	292,152.50	294,123.00	148,321.50	880,948.00
Monash University						
DE220100154	**Engineering twisted two-dimensional materials for mid-infrared detectors**	71,000.00	142,000.00	142,000.00	71,000.00	426,000.00
Ou, Dr Qingdong	This project aims to engineer twisted two-dimensional materials and develop efficient room-temperature mid-infrared detectors that sense both the intensity and polarisation of light. This project expects to generate a cost-effective, ultra-compact, and multifunctional mid-infrared optical platform with high energy conversion efficiency towards advanced sensing and imaging systems. The anticipated goal of this project is to deliver high value-added devices with reduced energy consumption for the electronics and photonics industries. This should provide significant economic and environmental benefits by realising technological innovations, savings in materials and energy costs, and reduced environmental impact in advanced manufacturing.					
	National Interest Test Statement The outcome of the project is the development of highly energy-efficient mid-infrared photodetectors with multifunctionality and ultra-compact integration that are operational at room temperature. The new prototype devices can lead to reduced costs in resources and energy consumption and decreased environmental impact, and become competitive alternatives to commercial bulky mid-infrared detectors operational under cryogenic cooling condition. By adopting the proposed technologies in this project, the Australian materials and photonics industries will be able to manufacture and export high-value products for next-generation integrated sensing and imaging systems that have huge potential to revolutionise healthcare, defence, and communications sectors in Industry 4.0. This project will expand fundamental knowledge of material science and engineering, enable technological innovations in advanced manufacturing, and enhance Australia's research capacity by promoting high quality research opportunities for early career researchers in advanced nanotechnology.					
DE220100417	**Everyday Insurtech: Impacts of Emerging Technology for Insurance**	71,750.00	145,500.00	138,850.00	65,100.00	421,200.00
Sadowski, Dr Jathan	This project aims to investigate the emerging insurance technology (insurtech) sector, better understanding how it uses digital innovations to disrupt the insurance industry. This project expects to conduct the first major empirical study of insurtech's implementation and impacts in Australia, with a focus on automotive, health, and property coverage. Expected outcomes include essential knowledge on the politics of insurtech that can inform interventions into industry practice and regulatory policy. Benefits resulting from this project include ensuring risks of insurtech are avoided (e.g. unfair discrimination and targeted surveillance), while realising positive benefits of more effective and efficient insurance services for Australians.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement According to market analysis, global revenue for the insurance technology sector is projected to be US$10.14 billion by 2025, with some foreign start-ups founded only a few years ago already valued in the billions of dollars. Many companies including banks, peak bodies and government agencies are working to grow the nascent domestic sector and capture the economic benefits of this innovation. However, there are serious concerns about the insurance technology being developed for the purpose of monitoring, managing, and modifying people's behaviours to optimise profits in the insurance industry. These emerging technologies can therefore lead to new forms of exclusion and discrimination in insurance, which pose real risks of social and economic harm to Australians. By investigating the development and impacts of the insurance technology sector in Australia, this project is expected to generate knowledge essential for understanding and regulation in this area, thus helping realise its benefits and avoid its risks.					
DE220100427 Li, Dr Xingya	**Engineered multifunctional membranes for aqueous organic redox flow battery** This project aims to develop multifunctional membranes with high ion conductivity and selectivity and high energy density to address the key challenges in the development of aqueous organic redox flow battery for renewable energy storage. The project will develop novel methodologies for precisely tuning and functionalising microporous materials to achieve cost-effective and scalable fabrication of membranes with multi-functions, thus improving the energy efficiency and retaining the cycling capacity of redox flow batteries. The advancement of multifunctional membranes will enhance the efficiency of storage of intermittent and fluctuating renewable resources, thereby contributing to the reduction of carbon footprint in Australia.	73,500.00	148,000.00	149,500.00	75,000.00	446,000.00
	National Interest Test Statement This project will contribute to the development of an economically viable electricity storage technology to address the key issue with intermittent renewable resources such as solar and wind energy. The large-scale and cost-effective storage of renewable electricity will create more opportunities for clean power generation in Australia. Advanced flow batteries are one of the most promising energy storage technologies currently being developed, but the lack of high-performance membranes (core component of batteries) is a key hurdle for widespread technology implementation. Multifunctional membranes will be developed in this project to achieve desirable properties and lower the manufacturing costs of advanced flow batteries. The project expects to lead to new intellectual property for further research and development towards full commercialisation of advanced flow battery technology in Australia. The successful completion of the project will help Australia to become a world leader in the field of renewable energy.					
DE220100429 Zeng, Dr Xiangkang	**Bioinspired Photocatalysts for Solar-Driven Hydrogen Peroxide Production** This project aims to develop advanced photocatalysts that can efficiently produce hydrogen peroxide from just water, air, and sunlight. By mimicking the structure and function of the natural photosynthetic apparatus, the key innovations are expected in the design of reaction-oriented conjugated polymer-based photocatalysts at the atomic and molecular nanostructure levels. It expects to generate new knowledge in artificial photosynthesis and rational design of functional materials, and sustainable technology for hydrogen peroxide production. This cross-disciplinary research will benefit Australia by the development of biomimetic catalysts for advancing solar energy conversion and enabling sustainable manufacturing of commodity chemicals.	63,107.00	131,269.00	139,981.50	71,819.50	406,177.00
	National Interest Test Statement Hydrogen peroxide is a valuable inorganic chemical applied in many industries, e.g. mining, paper and pulp, and wastewater treatment, which have significant contributions to the Australian economy; it also works as a disinfectant to prevent the spread of infectious disease among the people in the community. Nevertheless, its current industrial production process is not environmentally friendly. By mimicking the structure and function of the photosynthetic apparatus, this project aims to create a novel class of advanced catalysts that can efficiently produce hydrogen peroxide from just water, air, and sunlight. The project expects to generate new scientific basics for artificial photosynthesis and functional nanomaterials. The anticipated outcomes of this project will also generate sustainable technology for hydrogen peroxide production. It will stimulate the use of renewable solar energy for the manufacturing of commodity chemicals. This will consequently reduce the carbon footprint in chemical manufacturing, and lead to new knowledge of Australia's comparative advantages on sustainable manufacturing.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100456	**The interaction between injury compensation and social security systems**	72,514.00	128,954.00	115,130.00	58,690.00	375,288.00
Gray, Dr Shannon E	With the ultimate goal of reducing the road traffic crash burden in Australia, on individuals, their families, and on the nation's social support systems, the project will determine the impact of pre-claim social factors on compensation system outcomes including claim duration, benefits and costs, and the impact of compensation system design on claim and social outcomes of road traffic crash survivors. Addressing an unmet need, this project will determine the impact of macro-level compensation system design on social and claim outcomes and allows identification of groups at higher risk for poor post-crash outcomes, in whom earlier identification and intervention can improve these, and potentially save the Australian economy $300m annually.					
	National Interest Test Statement					
	The end goal of this project is to reduce the burden of road traffic crash in Australia, on individuals, their families and on the nation’s social support systems. This project will do so by addressing an area of unmet need in Australia - determining the impact of macro-level compensation system design on social and claim outcomes. By identifying social factors that influence the severity, duration and features of road traffic crash compensation claims, a critically important concurrent challenge that this project addresses is identifying groups in society at higher risk for poor post-crash outcomes, in whom earlier identification and intervention will improve outcomes. The proposed benefits of this project are substantial. A reduction of 1% in the burden arising from road traffic will result in $300m/year in savings to the Australian economy (based on the latest road traffic crash economic study). Further, given this project is unique internationally, it has the potential to impact policy in other countries with similar policy architecture and social structures such as Canada, the UK, and New Zealand.					
DE220100538	**Evolution of mitochondrial diversity regulation**	77,307.00	155,128.00	149,810.00	71,989.00	454,234.00
Radzvilavicius, Dr Arunas	Mitochondria power cellular metabolism. Research suggests that genetic variation in mitochondrial genes can be detrimental and impair energy production, but it can also be advantageous and help organisms adapt to environmental change. How organisms and populations balance these conflicting demands is not known. This project will create and use innovative mathematical methods to provide the general theory of how bioenergetic genes of mitochondria evolve to adapt to shifting environments, while removing mutations that compromise bioenergetics. Expected benefits include informing future applications and new evolutionary understanding of the ongoing effects of climate change in conservation management, agricultural and health industries.					
	National Interest Test Statement					
	Mitochondria are known as the energy producers of our cells, but they do much more than this. They contain their own mitochondrial DNA regulating energy production, and genetic variation in this DNA creates “mitochondrial diversity” in organisms and populations. This diversity has recently been linked to the capacity of organisms to adapt and cope with environmental stress, but it can also be detrimental and cause metabolic disease. This project will develop innovative mathematical methods to understand how organisms meet the dual demands of removing mutations that compromise energetic function while maximizing capacity to adapt to environmental change through adaptive mutations. The findings will provide new insights into how plants and animals adapt to cope with rapidly changing environments. These insights may ultimately assist the agricultural industry manage the ongoing effects of environmental change on production of crops and livestock, inform future applications in conservation management, and offer evolutionary insights into why mitochondrial mutations cause disease in some carriers but not others.					
DE220100748	**Mechanofluorescent Surfaces for Understanding Complex Cell Traction Forces**	67,500.00	137,500.00	142,500.00	72,500.00	420,000.00
Besford, Dr Quinn A	This project aims to develop pressure-sensing surfaces that directly quantify surface forces, focused towards measuring complex cell traction forces. Understanding cell traction forces is a crucial challenge towards developing new materials for regenerative medicine. The surfaces, consisting of fluorescent polymer brushes, are expected to provide direct information on singular and clustered cell forces, which can reveal new insight into how cells interact together. This may provide currently missing information on how cell-surface interaction forces modulate cell growth, differentiation and tissue formation. This insight is crucial to providing the underpinning science that can position Australia at the forefront of regenerative medicine.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement With global health centre-stage in current times, developing new ways to understand interactions of cellular life is a high priority. In this project, new, cutting-edge, pressure-sensing surfaces will be developed that can advance our understanding of cellular interactions so as to explain and predict cell behaviour in a meaningful way. The ability to harness the power of cellular forces and growth unlocks huge potential towards new treatments for many of our most pressing health challenges, including in cardiovascular disease and neurodegenerative disorders. This fundamental research will enhance the competitive standing of Australian science and bring Australia to the forefront in quantifying the forces exerted by cellular life, towards the rational design of materials as artificial tissues. This will empower the tissue regeneration industry, which has the capacity to boost the Australian economy and help numerous people affected by disease.					
DE220100965 Rossetto Marcelino, Dr Vanessa	**Understanding nutritional interactions for targeted microbiome manipulation** This project aims to identify how microbial communities, known as microbiomes, can be effectively manipulated to the benefit of their host. Microbiome manipulation has been in the spotlight as a potential solution to maintain or improve the health of several hosts, from threatened coral species to livestock and humans, but the development of industry-scale strategies has been slow. This project proposes to chart the nutritional interactions among microorganisms and to identify cascade effects of microbiome manipulation. This will generate fundamental knowledge on the biological processes underlying community stability and malleability, which will ultimately help engineering optimised microbiomes.	74,097.00	148,194.00	148,194.00	74,097.00	444,582.00
	National Interest Test Statement The rich community of microorganisms associated with animals provide untapped resources that can benefit human health, the productivity of food animals, and the resilience of Australia's unique biodiversity. This project will generate fundamental knowledge to inform the design of microbiome manipulation strategies while strengthening Australia's international position in microbiome research. By mapping and modelling microbial food-webs, it will be possible to forecast cascade effects of microbiome manipulation and therefore design more effective microbiome optimisation strategies. The potential to engineer microbial communities to better cope with our quickly changing environment and lifestyle is expected to have significant economic and environmental benefits.					
DE220101087 Wolkow, Dr Alexander P	**Impact of shift work on emergency performance, decision making and stress** Sleep and circadian disruptions due to shift work are common for emergency personnel, but their impact on team performance and decision making is poorly understood. Using an ecologically relevant simulated work environment, this project aims to examine how shift work influences work performance and team decision making and identify potential stress-related mechanisms that may underpin impairments in these outcomes. By understanding the role poor sleep and circadian misalignment due to shift work play on work performance, this project will inform industry practices and training approaches designed to optimise workplace safety and emergency performance. This project will benefit emergency personnel and the people who depend on these services.	75,597.00	151,194.00	151,193.00	75,596.00	453,580.00
	National Interest Test Statement Emergency personnel, such as paramedics, experience a 7-fold greater risk of injury compared to other occupations in Australia. Furthermore, up to a third of these workers report having made a serious error at work. Sleep loss and circadian misalignment due to shift work are major contributors to workplace accidents and errors, which are estimated to cost the Australian economy over $400 million annually. By ascertaining the influence of shift work on work performance and team decision making in emergency personnel, this research has potential to optimise scheduling and occupational training, which would help promote safe workplaces for personnel and an effective and efficient emergency sector for the public. Beyond emergency services, findings from this project will be relevant to a wide range of shift working industries in Australia, which collectively account for 16% of all employees nationally. Therefore, findings from this research have the potential to enhance Australia's emergency response capability and – through their broader applicability – benefit a significant proportion of Australia's workforce.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101296	**Diving into deep-time: macroevolutionary patterns of aquatic tetrapods**	76,633.00	141,772.00	122,321.00	57,182.00	397,908.00
Park, Dr Travis	This project aims to compare and contrast the broad-scale evolutionary patterns of the disparate lineages of aquatic tetrapod (e.g. whales, penguins, plesiosaurs). This project expects to generate new knowledge by utilising cutting-edge methods from several fields, e.g. three-dimensional scans, phylogenetic comparative methods and functional morphology. Expected outcomes include multiple high-quality publications and the development of new local and international collaborations. This will provide significant benefits, including revealing aquatic tetrapod evolution on an unprecedented scale and a better understanding of how some of Australia's most iconic animals respond to global change, helping inform eco-tourism and conservation policies.					
	National Interest Test Statement					
	This groundbreaking project seeks to generate fundamental new knowledge about how some of the most charismatic and iconic Australian animals have adapted to life in water. These Aussie wildlife symbols include the little penguins on Phillip Island, baleen whales migrating along the eastern seaboard, and the saltwater crocodiles in zoos and the tropical north. These animals are major drivers of Australia's ecotourism industry, drawing overseas visitors to our shores. They also inspire the general public to engage in science and conservation. By combining cutting-edge technologies and methods from several fields, this project will show how these very different groups have evolved over time, revealing deep-time patterns of evolution. This interdisciplinary project will also generate lasting links between local and international organisations, cementing Australia's place as a world-leader in the fields of zoology, evolution, and palaeontology.					
DE220101325	**Minding the gaps in our maps of the stars**	64,152.00	122,874.00	117,894.00	59,172.00	364,092.00
Boubert, Dr Douglas	This Project seeks to understand the formation of our Galaxy by studying the brightest billion stars. This Project will develop novel methods to account for the unseen hundreds of billions of fainter stars, and for the complexities of space telescopes. Anticipated outcomes include fundamental tests of stellar evolution theory; the discovery of stars flung from our Galaxy by massive black holes; a timeline of our Galaxy's evolution; and a 3D map of its stars and interstellar dust. This is expected to drive a generational advancement in astrophysics, provide social benefits by engaging the public with discovering the cosmos, and generate economic benefits from a general method for hypothesis testing with biased and incomplete datasets.					
	National Interest Test Statement					
	The arc of our Galaxy across the night sky is central to Australia's stories, from the dust clouds that form the Emu in the Sky to the Southern Cross on the flag. This Project seeks to uncover the continuing story of our Galaxy and its stars using humanity's largest star catalogue. This Project will investigate the key processes that drive the evolution of the Milky Way and advance our understanding of the physical laws of the Universe, by i) studying how stars evolve from birth to death, ii) discovering stars escaping our Galaxy, iii) creating a timeline of our Galaxy's formation, and iv) mapping its stars and dust in 3D. This Project will drive cultural benefit by exciting the public in the mapping of our Galaxy, and thus inspiring them to further engage with science and technology. This Project will develop novel statistical methods that can handle biased or incomplete data, which will create economic benefit in other applications.					
DE220101402	**Multi-scale, multi-modal X-ray imaging using speckle**	65,000.00	135,000.00	142,500.00	72,500.00	415,000.00
Zdora, Dr Marie-Christine A	This project aims to develop new X-ray imaging methods that capture multiple next-generation image modalities at an unprecedented range of length and time scales. While conventional X-ray imaging is routinely used in medicine and industry, it can only visualise high-density materials like bone. To reveal low-density objects like biological soft tissue and microstructure like tiny cracks, the project plans to extract two complementary image modalities using a robust setup that does not rely on large-scale facilities. Significant benefits from the developed methods are expected for leading-edge research in fields including biomedicine, materials science and palaeontology, and industries such as security, medical diagnostics and manufacturing.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project aims to develop cutting-edge X-ray imaging methods that will benefit research and industry for a broad range of applications. The new methods will visualise low-density features and the microarchitecture of objects, which are invisible with conventional X-ray scanners. This project will bring Australia to the forefront of global imaging capabilities, equipping the Australian Synchrotron with world-leading imaging technologies and making the innovative methods also accessible to a wider user community via translation to compact X-ray systems. This will enable novel research in areas like biomedicine, materials science, palaeontology and geology and will benefit the economy, healthcare and society when applied in industry, for example, for quality control in manufacturing and agriculture, soil analysis, food safety inspection, mineral and structural analysis in mining, security screening and clinical diagnostic imaging. Moreover, the project will advance knowledge in optical and imaging physics by developing a better understanding of the processes contributing to the multi-modal signal formation.					
DE220101484 Suryanto, Dr Bryan H	**Towards Electrochemical Fertiliser Production Powered by Renewable Energy** The electrochemical manufacturing system is a sustainable alternative to traditional fertiliser manufacturing plants. The system can be assembled inexpensively and readily integrated into the renewable electricity grid, solving the greenhouse gas emission issues of the fertiliser plants. This project will identify ground-breaking electrochemical pathways for urea fertiliser and other value-added C-N containing chemicals synthesis. Gaseous CO2 and N2 will be electrochemically reacted to produce the C-N bonds. Therefore, a suite of new materials and electrochemical systems for sustainable fertiliser manufacturing will be developed. It is anticipated that the technology will revolutionise Australian fertiliser manufacturing and agriculture.	76,500.00	150,500.00	148,000.00	74,000.00	449,000.00
	National Interest Test Statement This project will contribute to several of Australia's national interest, including: (i) Environmental: An environmentally benign and renewable energy powered fertiliser manufacturing device will be developed, helping Australia in reducing its annual greenhouse gas emissions. (ii) Commercial: The electrochemical device will significantly alter the fertiliser supply chain. In contrast to the current centralised fertiliser manufacturing practice in large chemical plants, the electrochemical device will be suitable to be implemented at a smaller scale and distributed level (i.e. hydroponic grower, greenhouses). A new manufacturing industry for device production will emerge. (iii) Economic: Australia has great potential to become a major global exporter of renewable energy. Innovation in a renewable energy powered electrochemical process for fertiliser/chemical manufacturing improves Australia ability to grow its manufacturing industry inexpensively and rapidly. Hence, expanding Australian 'sustainable commodity' exports portfolio considerably, which will significantly contribute to the Australian economy.					
DE220101491 Awad, Dr Wael	**A molecular investigation into metabolite-mediated T cell immunity** This project aims to undertake discovery research to investigate the roles of metabolites in T cell immunity. This project expects to generate new knowledge in the areas of cellular biology and immunology by using cutting-edge molecular and immunological approaches. This will provide fundamental insights into the mechanisms that govern microbial metabolite-based T cell immunity, which may advise future research into vaccines or therapeutics. In addition to knowledge gains, expected outcomes of this project include the development of innovative methodology and building international collaborations to enhance national research capabilities. This will place Australia at the forefront of conceptually innovative discovery in the life sciences.	73,052.00	147,104.00	148,604.00	74,552.00	443,312.00
	National Interest Test Statement The immune system fights off invading pathogens by sensing foreign fragments “antigens” on the surface of the infected host cells. Using multidisciplinary approaches, this DECRA aims to provide fundamental knowledge on the roles of the poorly understood classes of antigens “small molecule metabolites” in T cell immunity. This project is expected to improve our understanding of an important biological process that will pave the way for the establishment of inter-disciplinary technology platform pipelines for the development of novel T cell-based therapies: either as a drug or vaccine adjuvant, with the alignment to the biotechnology industry. This, in turn, contributes to improving Australian health services and with the potential to lead to both health and economic benefits.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101517	**Through the Lens of Sufism: Global Dissemination of Knowledge in Islam**	57,489.50	113,586.50	110,694.00	54,597.00	336,367.00
Kars, Dr Aydogan	This project aims to investigate the intellectual legacy of Sufism on Islamic thought. Using an interdisciplinary approach it expects to generate new knowledge about the influence of Sufism since the thirteenth century, through a detailed analysis of newly-identified medieval texts and their transmission and dissemination throughout knowledge systems. Expected outcomes of the project include a challenge to conventional understandings about the chronology and structures of Islamic thought, and the first global mapping of Islamic intellectual networks. The project should provide significant benefits including an improved appreciation of the influences on, and complexities of, Islamic thought in the modern world.					
	National Interest Test Statement Australia is an increasingly diverse country that has successfully integrated people from many countries, cultures, and religions. However, there remain misunderstandings in and around religions such as Islam, including within Muslims and non-Muslims. In particular the important influence of Sufism within Islam has largely been ignored and at times marginalised. The present project utilises unstudied archival resources and aims to detail and map the intellectual contribution and reach of Sufi mysticism, philosophy, and teaching within Islam and globally. The project has the potential to benefit Australia through improved social and cultural relations within Islam in Australia, and by providing a more informed view of Islam broadly through the study of Sufism in shaping Islam.					
	Monash University	1,059,198.50	2,098,575.50	2,067,171.50	1,027,794.50	6,252,740.00
RMIT University						
DE220100052	**Impacts of the apartment boom on public transport in Australian cities**	67,760.00	143,995.00	150,750.00	74,515.00	437,020.00
De Gruyter, Dr Chris L	This project aims to investigate the impacts of high density housing on public transport use and service provision to directly inform policy and practice. Recent growth in high density housing along public transport corridors is associated with overcrowded public transport services in Australian cities, yet this complex and interconnected relationship is not well understood. This project expects to generate new knowledge in the field of transport and land use integration and produce much needed cross-sectional and longitudinal evidence of the impacts of the apartment boom on public transport. Anticipated benefits include reduced overcrowding on public transport, improved travel choices and enhanced liveability in Australian cities.					
	National Interest Test Statement This project will significantly increase our understanding of the effect that high density housing has on the use and provision of public transport. This research is critical given the rapid growth in high density housing in Australia coupled with overcrowded and unreliable public transport services. The project will help to improve policy and practice for better integrating transport and land use planning. Public transport operators will also benefit as the research findings will help to facilitate improved management and efficiency of public transport services, through reduced passenger overcrowding. Greater alignment between high density housing and public transport will contribute to enhanced liveability in our cities through reduced traffic congestion and overcrowding on public transport, greater travel choices and improved accessibility.					
DE220100303	**Energy Poverty and Policy Responses in Australia**	53,097.00	110,870.00	114,170.00	56,397.00	334,534.00
Awaworyi Churchill, A/Prof Sefa	This project aims to understand the factors influencing energy poverty in Australia. Using econometric methods, this project will examine: 1) the impact of life shocks and weather shocks on energy poverty, and 2) the impact of existing government programs and policies on energy poverty. This project expects to generate new knowledge on the pathways through which shocks and policies influence energy poverty. The outcomes include knowledge generation and dissemination of findings to key stakeholders. This project will provide significant benefits, including better understandings of energy poverty that can influence policy directly shaping the health and wellbeing of Australians and others vulnerable to energy poverty.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Household energy is a basic daily need that is vital to our overall health and wellbeing. Indeed, research has shown that energy poverty, defined as the inability of households to comfortably meet domestic energy needs, can lead to poor health and wellbeing, mental stress and mortality. In Australia, however, energy poverty rates are as high as 14%, suggesting that over 3.5 million Australians are energy poor. This research will develop energy poverty related wellbeing metrics that can help monitor progress and provide insights on the factors that influence energy poverty. This will equip policymakers to effectively address energy poverty. If state and federal policymakers are better equipped to tackle energy poverty successfully, millions of people living in energy poverty will benefit. Productivity lost to poor health and wellbeing could be minimised, thus ensuring Australia's ongoing prosperity. For the research community, the success of this project builds a solid and innovative foundation that will guide future studies.					
DE220100356 Couzens, Dr Vicki L	**Mother Tongue: Language revitalisation through immersive practice** This project aims to expand and enhance Gunditjmara language ecology. It will examine Gunditjmara language acquisition and learning through practical methodologies in everyday settings and across the spectrum of cultural revitalisation praxis. Expected outcomes include new knowledge about the value and efficacy of traditional Aboriginal pedagogical and methodological approaches in language acquisition and intergenerational knowledge transmission. A cultural model of immersion practice, toolkit and digital resources will support cultural continuity, survival and thriving of First Languages into the future. Benefits include increased Aboriginal language use and improved transmission to safeguard and revitalise enduring Aboriginal traditions.	70,264.00	140,908.50	143,050.00	72,405.50	426,628.00
	National Interest Test Statement This project will significantly contribute to and extend the body of knowledge in Indigenous language revitalisation in Australia. The focus on cultural revitalisation has relevance to communities across urban, rural and remote centres through the development of a cultural Practice Model in revitalisation applications. Outcomes will include a more nuanced history of Indigenous Australia, a significant body of resources on the Gunditjmara language (dictionary, videos, language beta-app, audio speaking Mother Tongue), and the development of a national framework for involving communities in cultural revitalisation practices. Anticipated benefits include the empowerment associated with Aboriginal communities reclaiming their language and cultural practices, as an enduring living history of continuing ancestral knowledge traditions.					
DE220100435 Hou, Dr Jue	**Photonic Crystal Sensors for Intelligent Packaging** This project aims to synthesize and investigate the properties of optical sensors composed of oriented assembled, high-flexible metal-organic-framework-based photonic crystals. This project is expected to generate new knowledge in the area of oriented self-assembly and elucidate the relationship between the optical properties of photonic crystal optical sensors and the orientation, flexibility and functionalisation of metal-organic frameworks. Expected outcomes of this project include novel oriented assembly methods and a series of optical sensing devices for various detection scenarios. This research will provide significant benefits on environmental protection, sustainable development, food safety and human health.	63,997.00	127,994.00	127,994.00	63,997.00	383,982.00
	National Interest Test Statement This project will develop a new technology and new materials for the development of optical sensing devices for a wide range of applications in intelligent packaging. The sensors resulting from this technology will be highly sensitive, highly specific for what is being analysed and fast responding, and find use in a range of Australian industries critical for the national economy and health. They will improve the measurement of spoilage of agricultural products, reducing waste, protecting consumers from foodborne illness and increasing consumer confidence in the quality of local food products. They will improve the monitoring of pharmaceuticals to ensure they remain effective. Production of these materials by the Australian materials and sensors manufacturing industries will improve their international competitiveness and lead to new job creation.					
DE220100511 Elbourne, Dr Aaron J	**Molecular-Scale Interaction of Nanomaterials with Biomembranes** This project aims to develop a holistic understanding of how nanoparticles, and nanomaterials in general, interact with cellular materials, via the cell membrane on a molecular level. To date, the precise mechanism by which nanomaterials, such as particles, colloids, and sheets, interact with cellular material is poorly understood. This project expects to generate new, fundamental knowledge in the field, and establish a platform for high-resolution, in situ, molecular-scale imaging of nanoscale events at the biomembrane. This will develop a fundamental understanding of the dynamics of nanomaterial-cell interactions, and provide benefit in the development of next-generation nanomaterial-based therapeutics and diagnostic technologies.	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Nanomaterials are materials with nanometer-sized features. These features give them unique and useful properties, especially in biological applications. This project will improve our fundamental understanding of nanomaterial-biomembrane interactions. This will, in-turn, facilitate the development of nanomaterials as biologically useful tools. This fundamental scientific knowledge will enhance their potential as therapeutic and diagnostic materials in, for example, cellular imaging, cellular probes, nanomedicines, nano-diagnostic technologies, and antimicrobials. However, further research into their behavior in biological systems is necessary to design nanomaterials specifically for diagnostic and therapeutic technologies. The results will provide design parameters for advanced biomedical materials and facilitate their wide-spread uptake as next-generation nano-medicines. It will also drive innovation in both medicinal and advanced manufacturing sectors, which will have significant commercial benefits as well as establish Australia as a world-leader in these fields.					
DE220101471 Yang, Dr Yi	**Controlling uranium species to its long-term stability in bioremediation** This project aims to reveal the mechanisms of uranium transformation and immobilisation in both aerobic and anaerobic conditions of bioremediation with the emphasis on elucidating stable uranium immobilised under different pathways and conditions. This project expects to generate new knowledge regarding the relationship between uranium speciation and stability with the matrix mineral, microbiota, and environmental conditions. Expected outcomes from this project include new strategies for preferential immobilisation of uranium to stable species that are resistant to air and acid. The anticipated benefits of this project include mitigating uranium contamination and promoting the sustainable development of the uranium industry in Australia.	70,650.00	147,050.00	149,900.00	73,500.00	441,100.00
	National Interest Test Statement Australia possesses more than 30% of the world's uranium resources and is a major export earner for the country, with a export of uranium ore concentrate valued at AUD$734 million (FY 18-19). However, uranium mining also brings environmental threat to the soil and water system. This project will help to underpin effective bioremediation strategies that aim to maintain the long-term stability of uranium. It will help to design new uranium remediation practices that will mitigate uranium contamination and restrain its proliferation, which is an essential part of the effort to address environmental issues in Australia and globally. In addition, the outcome of this project will assist the successful rehabilitation of current Australian uranium mines, which has a very important impact on the decision-making of opening-up new uranium mine sites, and promotes the sustainable development of the uranium industry of Australia.					
	RMIT University	400,768.00	820,817.50	835,864.00	415,814.50	2,473,264.00
Swinburne University of Technology						
DE220100147 Papalia, Dr Nina L	**Child victims: Providing protection from re-victimisation and offending** This project aims to improve understanding of the impact of child abuse, neglect and exposure to domestic violence on young people’s future experiences of re-victimisation and offending. It expects to generate new evidence about the maltreatment experiences that increase risk of youth re-victimisation and offending, potential causal mechanisms and factors that might aggravate or buffer children from these harmful effects. Expected outcomes include increased knowledge to inform effective policy and interventions aimed at identifying at-risk children and meeting young people’s needs related to adverse legal outcomes. This should help improve public safety, reduce the economic impact of maltreatment and support vulnerable children to thrive.	78,097.00	156,194.00	150,432.00	72,335.00	457,058.00
	National Interest Test Statement Too many Australian children endure abuse, neglect and domestic violence. The costs of maltreatment in Australia are in the billions of dollars annually with a substantial portion due to victims' increased likelihood of re-victimisation and offending. Through greater understanding of the causal processes linking maltreatment to youth re-victimisation and offending, the factors signalling which children are most vulnerable and the conditions that are protective, findings can inform improved policy and practice responses to help break intergenerational cycles of violence and offending. Effective interventions to reduce re-victimisation and offending in at-risk children would result in less human suffering and increased public safety and wellbeing through fewer victims and offenders. This would benefit Australian society by limiting the economic burden on criminal justice and related systems. Findings can ultimately contribute to improved life-courses for Australian children who endure maltreatment: through reduced future justice system contacts and related benefits to social and economic potential.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101094	**Energy absorption and impact mechanics of origami structures and materials**	73,150.00	145,300.00	142,800.00	70,650.00	431,900.00
Zhang, Dr Jianjun	This project aims to understand the dynamic behaviour of origami structures and metamaterials by utilising interdisciplinary approaches. This project expects to generate new knowledge in the areas of origami engineering and structural mechanics. The success of this project will form a foundation for studying energy absorption and impact mechanics of origami family; the fundamental physics and mechanics will be applied to characterise microstructures and design novel metamaterials and offer a way of exploring new materials with superior and tuneable performance. This should provide significant benefits to improvement of their safety, stability and reliability performance in applications such as vehicles, warships and offshore engineering.					
	National Interest Test Statement					
	This project studies the properties of origami to inform the development of structures and materials that can safely absorb kinetic energy from impacts. These energy-absorbing materials will have significant benefits for Australian industry, allowing the development of safer and more reliable equipment for use in mining, construction, manufacturing and many other local sectors. They will also provide opportunities for Australian industries to take a global lead in the design and manufacture of protective structures and advanced materials, providing benefits for the Australian economy and creating more highly skilled job opportunities here. These materials will also have social benefits thanks to their use in creating safer vehicles, from cars to ships, that provide greater protection for passengers during crashes and impacts.					
	Swinburne University of Technology	151,247.00	301,494.00	293,232.00	142,985.00	888,958.00
The University of Melbourne						
DE220100027	**Making a life with less: youth underemployment over the life course**	77,683.00	155,780.00	156,194.00	78,097.00	467,754.00
Churchill, Dr Brendan L	This project aims to investigate the experiences and impacts of underemployment on young people. Using high-quality longitudinal data and qualitative interviews, this project expects to generate new, foundational knowledge about the employment pathways young people take following underemployment and the strategies they use to mitigate its effects. In doing so, this project aims to reveal the impacts underemployment has on young people's lives within and outside work, including their relationships, family formation and well-being. This much-needed research aims to provide significant benefits for policymakers and service providers that improve the lives of young people.					
	National Interest Test Statement					
	This project contributes to new knowledge that can help better understand the impact of underemployment on young people and their futures. In taking a multi-dimensional view of youth underemployment that views it beyond just working less but also earning less and using less one own skills, education and experience in their currently employment, this project addresses issues that are critical to employment and economic policies. Mapping young people's pathways in the labour market following underemployment will provide better insights into how best policymakers and service providers can ensure that young people prosper. Further, identifying the strategies young people themselves take following underemployment will shed further light on creating targeted policy interventions that can succeed. This project will also examine the impact of underemployment beyond work and its effects on relationships, family formation and well-being will also tell us critical parts of the story that are often left out, but give greater insights into the experiences of underemployment and how best to address it.					
DE220100055	**Impact of seaweed polyphenols on gut health: Gut microbiome modulation**	78,096.50	152,975.00	147,611.00	72,732.50	451,415.00
Suleria, Dr Hafiz Ansar Rasul	This project aims to understand the true impact of seaweed polyphenols on the gut microbiome and develop methods to improve their bioavailability, bioaccessibility and bioactivities in the gut. The project's use of cutting-edge analytical tools helps to investigate the movement and absorption of phenolic compounds across the gut. This project expects to explore new knowledge in the area of marine-based functional foods and their health benefits using an innovative interdisciplinary approach. The success of this project will ultimately provide a new pathway for the development of functional foods that will help to improve the health status of Australians by consuming healthy food ingredients.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement The proposed research will provide very comprehensive information about the impact of seaweed polyphenols on the gut microbiome and promote the importance of Australian functional or healthy foods. Australia is well-placed to be the key global marine-derived functional foods and nutraceutical hub over the coming decades. Australian 'health and wellness' products including functional foods and supplements, along with more sustainable products such as seaweed-derived bioactive compounds and alternative plant-based proteins etc. will become an AU$25 billion market by 2030. The new knowledge generated in this proposal will undoubtedly contribute to the "Australian Functional Food and Nutraceutical Market" and assist in the development and commercialisation of marine-based functional foods. My proposed project will also increase the success rate of clinical trials, which costs Australia more than $1.1 billion annually. The outcome of the project will provide opportunities for further research avenues and contribute to the international competitiveness of Australia's research standing.					
DE220100073 Defina, Dr Rebecca	**Learning to think and talk about events in the APY lands** This project aims to investigate differences between languages in how events are described. Do these linguistic differences relate to differences in how people think? And how does the relationship between the way people think and talk about events develop throughout childhood? The project focuses on the Indigenous languages Pitjantjatjara and Yankunytjatjara with a comparison to English. It expects to significantly improve our understanding of event cognition as well as how children learn Pitjantjatjara and Yankunytjatjara. The project also intends to provide valuable materials for use in the Anangu Pitjantjatjara Yankunytjatjara (APY) lands to assist in maintaining their traditional languages while also improving access to English.	75,543.50	151,300.50	148,340.50	72,583.50	447,768.00
	National Interest Test Statement This project contributes to Australia's national interest in the areas of cultural heritage, education, and wellbeing. It will support the maintenance and use of Indigenous languages which has been connected with increased wellbeing and strong identity among Indigenous Australians, especially for young people. Research partnerships within the project will provide mentoring, training and employment for emerging researchers in the Anangu Pitjantjatjara Yankunytjatjara (APY) lands to aid them in ensuring their languages remain strong for the next generation. The project will significantly improve understandings of how Pitjantjatjara and Yankunytjatjara think and talk about events in stories, with explicit comparisons to English. Story-based learning and assessment are major components in education and resources will be developed for English, Pitjantjatjara and Yankunytjatjara. These will aid initiatives to close the gap in education outcomes, especially within the SA Department for Education's target to move towards a bilingual education model as a key focus of their 2019-2029 Aboriginal Education Strategy.					
DE220100094 Atazadeh, Dr Behnam	**A new 3D data model to integrate underground land information in Australia** This project aims to develop a novel 3D digital approach to managing subterranean ownership spaces by referencing these spaces to the physical reality of the underground environment. This project expects to generate new knowledge in the area of underground land administration using new 3D data modelling techniques. Expected outcomes of this project include a new underground 3D data model to improve management and communication of physical location and ownership extent of Australia's underground assets. This should provide significant benefits such as protecting underground assets, decreasing the risk of damaging utilities, avoiding unnecessary disruptions and delays when planning, constructing and managing underground infrastructure.	72,500.00	145,000.00	142,500.00	70,000.00	430,000.00
	National Interest Test Statement With rapid urbanisation necessitating optimal land use both above and below ground, Australia, and particularly Victoria, has invested in significant development of underground urban spaces, with projects such as West Gate Tunnel, the Victorian Desalination Project, and M4-M5 Link Tunnels. An integrated 3D digital environment that can curate and communicate the physical location and legal ownership of underground assets will provide significant benefits by reducing legal disputes (e.g. registration; boundary disputes), economic damages (e.g. project delay; utility relocation) and social issues (e.g. ownership rights) when planning, constructing and managing underground assets. This project's proposed 3D underground data model presents a significant shift from current fragmented 2D representations and the opportunity to modernise land administration in Australia.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100110	**Technology, sustainability, and social equity through Science Fiction**	57,177.00	124,677.00	124,500.00	57,000.00	363,354.00
Truman, Dr Sarah E	This project aims to investigate how youth create science fictions in order to think critically and innovatively about issues related to sustainability, technology, and social equity. The project expects to foster youth voice in mining communities and metropolitan communities in three commonwealth countries (Australia, Canada, and Wales) in collaboration with teachers and experts in the fields of English, arts, and STEM. Expected outcomes include promoting youth wellbeing and creativity and pedagogical collaboration across the arts and STEM to generate co-designed creative solutions for technological, environmental, and social equity futures.					
	National Interest Test Statement					
	This project is expected to benefit Australia socially, culturally and economically. Through addressing the pressing and highly publicised issues of youth anxiety regarding sustainability, technologies, and social equity, this project will contribute to stronger social and cultural school communities in Australia in collaboration with communities in Canada and Wales through fostering youth voice and well-being through creative writing. Through foregrounding youth voice in collaboration with teachers in English, arts, and STEM as well as international experts in the field, the project will benefit pedagogical practice in schools and the wider public through generating youth co-designed creative solutions for technological, environmental, and social equity futures.					
DE220100135	**Superhydrophobic thermally rearranged membranes for low-energy separation**	74,900.00	146,550.00	144,300.00	72,650.00	438,400.00
Kim, Dr Seungju	This project aims to develop thermally rearranged membranes with superhydrophobicity using novel polymer chemistry and nanofibre morphology. Both water flowrate in membrane distillation and gas flowrate in carbon dioxide stripping from solvents will be increased by minimising the water vapor condensation between the nanofibers; resolving shortcomings in current energy-intensive filtration systems. This project will provide significant benefits to Australian communities by advancing cost-effective and energy-efficient potable water production and carbon dioxide separation processes for sustainable development. The advanced materials developed can be manufactured locally and will enhance our national capability in modern manufacturing.					
	National Interest Test Statement					
	By 2025, the value of the membrane filtration market is estimated to grow to USD 19.6 billion; Australia, like many countries, is heavily invested in developing new membrane technologies for clean water and clean energy. This project aims to develop thermally rearranged nanofibre membranes to advance emerging processes such as membrane distillation (MD) and membrane gas absorption (MGA). This will lead to significant environmental and socio-economic benefits for Australia: MD will form part of the next generation water processing portfolio that can draw clean water from sources such as seawater, domestic wastewater, or saline dairy effluent. Carbon capture by MGA technology will be a key approach to mitigate climate change and to accelerate our transition to a hydrogen economy. The project also addresses the National Science and Research Priority “Advanced Manufacturing”. The successful development of thermally rearranged nanofibre membranes and membrane modules could have significant impact on sustainable economic growth, providing potential employment growth in manufacturing jobs within Australia.					
DE220100165	**Engineering T cells to promote peripheral immunity**	74,150.00	150,050.00	151,800.00	75,900.00	451,900.00
Fonseca, Dr Raissa	Tissue-resident memory T cells (TRM) are key for immune protection against infections and cancer. This has led to much interest in understanding how these immune cells develop, although elucidation of molecules that regulate TRM are still scarce. This project aims to (i) identify genetic drivers of TRM in peripheral organs and (ii) modulate TRM generation utilising state-of-the-art genetic engineering techniques. Expected outcomes include generating new knowledge that will contribute to the development of novel therapeutics against infectious disease and cancer, together with the benefit of promoting national and international collaboration with the ultimate goal of improving health.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This research will significantly contribute to Australia's national interest by providing social and commercial benefits. This project aims to generate advances in fundamental T cell biology knowledge, informing how to regulate peripheral immunity. Findings arising from this proposal will shine new light on mechanisms involved in the establishment of tissue-resident memory T cells, crucial for protection against infections and cancer. This proposal will leverage Australia's leadership in immunology research, bringing state-of-the-art techniques to modulate the immune system for enhancing protection against diseases, which is essential to improve individual and community health. Identifying new pathways to regulate immunity will facilitate the development of new vaccines and immunotherapies, generating patents, attracting commercial partners and fostering the development of commercial pharmaceutical products. These outcomes will benefit Australian health, industries and the economy.					
DE220100185 van de Sandt, Dr Carolien E	**Decoding the evolution of killer T cell immunity across human lifetime** The immune system is a potent weapon for protection against pathogens. T cells have a central role as their receptors monitor the body for threats. The thymus (organ) educates receptors to discriminate between healthy and infected cells. Receptor diversity and T cell strength change throughout human life. This project aims to unravel how T cells gain and lose optimal receptors and strength. The aims are to understand 1) The role of thymic education in diversifying receptors 2) Whether gradual loss of thymic education affects receptor diversity 3) The molecular mechanisms underlying T cell strength. The project is essential for understanding how optimal T cell immunity is formed, critical if we wish to harness this to improve healthy aging.	76,447.00	147,929.00	142,909.00	71,427.00	438,712.00
	National Interest Test Statement This project contributes to Australia's national interest through its potential for social benefits, as this project will generate abundant fundamental knowledge on how T cell immunity changes throughout human life, which currently represents a missing link in our understanding of aging immunity. This knowledge will provide new insights into protective versus detrimental T cell functionality. Australia has a world-renowned reputation for excellence in immunology research, and we are in an unmatched position to leverage this rich history, and critical mass of expertise to shed light onto this elusive biology. It is anticipated that this project will make major headway for the internationally competitive field of T cell immunology, resulting in high impact publications. Thus, this project directly aligns with the ARC Medical Research Policy and ARC discovery objectives, as it will provide fundamental knowledge, enhance Australia's international research standing, maintain our research at an international arena, foster collaborations, all leading to economic, health and commercial benefits later down the track.					
DE220100259 Hardee, Dr Justin P	**Interrogating the adaptive potential of skeletal muscle** Disruptions to muscle oxidative capacity and growth signalling underpin atrophy and dysfunction with ageing, which impacts on an individual's quality of life. These biological processes are thought to be mutually exclusive and compete during muscle adaptation. This project aims to define how these processes regulate the extent of muscle adaptation, and how modifying these attributes influence functional capacity in the context of ageing. This project will provide fundamental new knowledge in understanding how modifying muscle attributes influence successful ageing. This knowledge will improve resilience, productivity, and wellbeing of all Australians, with implications for reducing societal and economic burden.	77,957.00	156,029.00	156,025.00	77,953.00	467,964.00
	National Interest Test Statement Skeletal muscle has a remarkable capacity to adapt to imposed demands. The adaptive potential of muscle is diminished with ageing, and disruptions to muscle oxidative capacity and growth signalling underpin age-related atrophy and dysfunction. Unfortunately, there is a knowledge gap in our basic understanding of how muscle oxidative capacity and growth processes regulate muscle adaptation, as they are thought to be mutually exclusive and competitive. This proposal will investigate how these cellular processes regulate the extent of muscle adaptation, and how modifying these attributes influence functional capacity in the context of ageing. This project will build basic knowledge of how muscle attributes can be modified to influence successful ageing. Outcomes from this research include knowledge gain, training of emerging researchers in cutting-edge research, enhancing Australia's international research standing, and providing societal and economic benefits through translation of knowledge gains into improving resilience, productivity, and wellbeing of all Australians, with implications for healthy ageing.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100302	**A long-lasting interface for communicating with the brain**	76,700.00	154,750.00	153,950.00	75,900.00	461,300.00
Tong, Dr Wei	This project aims to address the most urgent challenges in developing the next generation of implantable devices for communicating with the brain. Using a new type of carbon-based electrode, along with light therapy, this project expects to build innovative technologies that can greatly enhance the functionality and longevity of these devices. Expected outcomes include a novel tool that can be implemented to obtain detailed insights into neural circuits, advancing our understanding of neural function and pioneering feedback and closed-loop neuroscience. This project should provide significant benefits in neuroscience research and the neural interface industry, both of which have the ultimate goal to unlock the mysteries of the brain.					
	National Interest Test Statement					
	This project has the potential to benefit Australia from three aspects. First, it provides novel strategies to improve the functionality and longevity of implantable microelectrodes that directly communicate with the nervous system. Such microelectrodes are critical tools in neuroscience research for studying the function of neural circuits. Therefore, this technologies developed in this project will advance our understanding of brain function, provide a pathway to advance Australian neuroscience research and enhance the research output in Australia. Second, the successful outcomes from this research will lead to Australian Intellectual Property as the results have the strong potential for commercialisation and may attract industrial collaboration and investment. This research will strengthen Australia in the industry of neural interfacing technologies. Last, this proposed project is strategically aligned with advanced manufacturing, one of Australia's current research priorities, as it develops high-performance materials for neural interfacing.					
DE220100500	**Measuring social media speed and the acceleration of informational crisis**	67,200.00	143,726.00	145,126.00	68,600.00	424,652.00
Pond, Dr Philip	The project aims to investigate the role that time plays in the production of misinformation on social media. The speed of digital communication is frequently implicated in destabilising the reasoned discussion upon which democracy depends. However, the temporal study of the internet is hampered by a contradiction in time theory between mathematical-scientific time and intuitive-social time. This project advances a theoretical solution to this problem and aims to measure the production of time online, developing digital methods to fulfil this purpose. A better understanding of the relationship between time and communication could support strategies to counter misinformation and promote better informed and more consensual discourse.					
	National Interest Test Statement					
	The Covid-19 pandemic has exacerbated the production of misinformation, conspiracy and polarisation online, increasing the risk of dislocation, uncertainty and extremism among the Australian public. There is evidence that the speed of digital communication is a critical factor in the destabilisation of information. This project examines the role that social media software plays in constructing the conditions for informational crisis, and in particular its influence on the temporality of information production. It will deliver a digital methods infrastructure to assess and understand communication across major social media platforms in Australia. This infrastructure will help government communication specialists and policy makers to better identify and respond to informational trends that may threaten social cohesion and public debate. Additionally, the project will deliver a digital interface allowing young Australians to visualise how social media use shapes their temporal experience. The interface will be an important addition to Melbourne Science Gallery's education program.					
DE220100609	**Green Water is Good: Control and Design of Low-Carbon Water Pumping Systems**	77,081.00	151,666.50	149,172.50	74,587.00	452,507.00
Wang, Dr Ye	This project aims to develop new theoretical tools for the control and design of low-carbon water pumping systems powered by renewable energy. One expected outcome is to establish advanced control frameworks that significantly reduce operational cost for water pumping systems and meanwhile produce the least carbon emissions. The control frameworks will integrate stochastic uncertainties of solar cloud cover, electricity price and water demand. The control frameworks will be incorporated into a two-stage constrained optimisation as a codesign strategy for future low-carbon water pumping systems. This project will gain significant economic, commercial and environmental benefits to the Australian community.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Australia is a dry country in general. Total water taken for consumptive use was 15100 GL mainly from the surface water sources in 2018-2019, which was 10% lower than the previous year. The dry conditions and low water availability resulted in a 24% decrease in the volume of water allocations traded compared to 2017-2018 but a tripling of average allocation prices due to strong demand for the limited available water. Apart from the costs of water sources, the operating cost for water supply also makes up a significant portion of water prices. More energy use for water supply, especially for water pumping, may cause climate change. This project will contribute to the optimal operation and design for low-carbon water pumping systems. The developed control and design strategies can help the Australian water industry to find a good trade-off between operating cost minimisation and low carbon emissions, which will potentially gain significant economic, commercial and environmental benefits.					
DE220100680 Monazam Erfani, Dr Sarah	**Making Anomaly Detection Interpretable & Actionable in Hostile Environments** Anomaly detection plays a vital role in cyber security to identify threat patterns hidden within large volumes of data. However, current approaches experience high false alarm rates in noisy, heterogeneous and adversarial environments. This project aims to identify and interpret anomalies that can disrupt system performance by introducing the concept of actionable anomalies. It will significantly advance the effectiveness of anomaly detection by developing algorithms that distil local and global structures of data to characterise actionable anomalies and explain their outlying aspects. Project outcomes will enhance the security, trustworthiness and fault-tolerance of critical systems, contributing to international efforts in cyber security.	67,247.00	134,494.00	134,494.00	67,247.00	403,482.00
	National Interest Test Statement This project directly contributes to the Australian government's Science and Research Priority on Cyber Security by advancing the effectiveness of anomaly detection and developing distributed algorithms that can accurately identify cyber intrusions, better understand their impact, resist malicious attempts, and interpret the outcomes. The tools developed in this project will be foundational resources for responding to actionable anomalies, critical decision making and contributing to the emerging field of security analytics. The project outcomes will have broad application in network intrusion and fault detection, contributing to (inter)national efforts in cyber security. This project will also train highly skilled graduates with expertise in machine learning for cyber security who can then contribute their skills to continue to advance the field in Australia. Robust and reliable anomaly detection will also benefit a wide range of critical systems, helping to safeguard banking, health, energy, transport and urban infrastructure systems.					
DE220100694 Robertson, Dr Hannah M	**Constructing Communities on Country: Building the Olkola Knowledge Centre** This project researches new ways of building on remote Indigenous homelands that contribute to culturally, environmentally and economically sustainable livelihoods on Country. This will be done by conducting the first construction and use analysis of a 'Cultural Knowledge Centre' in partnership with the Olkola People on their Cape York homeland. Combining participatory design and appropriate technology theories, expected project outcomes include enhanced understandings of how sustainable material technologies and self-building practices can be harnessed to deliver meaningful local economic outcomes. Significant research benefits include effective and economically sustainable ways building can support Indigenous peoples to live on Country.	62,097.00	124,194.00	124,194.00	62,097.00	372,582.00
	National Interest Test Statement Due to their extreme remoteness, including limited access to markets, restrictive land tenure and high construction costs, existing building practices on Indigenous homelands provide limited support for the formation and operation of sustainable livelihoods. In collaboration with Olkola Traditional Owners, this project will define and enhance understandings of an alternative homeland building typology, a Cultural Knowledge Centre. By researching new self-building methods and building material technologies, the collaboration will support Olkola's vision to show and share their cultural artefacts, expand cultural tourism activities, improve the land management research and capacity and support Olkola people to return to living on country. In an era when building investment on homelands is in doubt, this innovative collaboration illustrates an alternative that synthesises technical, practical and traditional cultural knowledge that is beneficial for both Olkola and remote Indigenous peoples across Australia who are looking for ways to build culturally meaningful and sustainable livelihoods on their Country.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220100746	**Engineering ion specificity for water electrolysis**	73,000.00	146,000.00	143,500.00	70,500.00	433,000.00
Jiang, Dr Wenjie	This project aims to understand how foreign ions in water can be manipulated to selectively control the activity and selectivity of electrocatalytic water splitting and explore the potential if seawater or low-grade-water can be used as water feed to mitigate the economical barrier for large-scale hydrogen production through electrolysis. The new knowledge gained will be helpful for future design of more cost-effective electrolyser systems to underpin Australia's emerging hydrogen economy.					
	National Interest Test Statement					
	This project aims to leverage the effect of ion specificity at the electrode/electrolyte interface to advance the fundamental knowledge and benefit the engineering applications. This is a highly novel approach to steer the activity and selectivity of electrocatalytic reactions compared with traditional electrode-centred research. A targeted application is to help solve the incompatibility between direct seawater electrolysis and current water electrolysis technologies for economical production of clean and renewable hydrogen. The Australia Energy Council released Australia's National Hydrogen Strategy in November 2019, setting a vision for a clean, innovative, safe and competitive hydrogen industry that benefits all Australians. This project also strongly aligns with the Australia's Science and Research Priority of Energy, by contributing to low emission energy production from fossil fuels and other sources and to providing new clean energy sources and storage technologies that are efficient, cost-effective and reliable.					
DE220100830	**Elucidating the genesis of MAIT cell-mediated immunity**	77,963.00	155,713.50	154,501.00	76,750.50	464,928.00
Koay, Dr Hui-Fern	T cells develop in the thymus and proceed to survey our body probing molecules that signal if anything is abnormal. A specialised subset of T cells, mucosal associated invariant T (MAIT) cells are crucial in detecting microbial molecules and infection, yet their numbers vary widely between individuals. A key problem is that the factors controlling their development and function are poorly understood. This proposal aims to decode this critical issue in MAIT cell biology, using innovative tools to investigate the molecular basis underpinning their development in the thymus. This work will provide vital, fundamental discoveries into how MAIT cells are produced and regulated, as we ultimately wish to harness MAIT cells to improve human health.					
	National Interest Test Statement					
	Australia has a history of pioneering excellence in immunology research, built upon studies that decode missing links in our understanding of immune biology. This project will generate new knowledge towards understanding how the body generates a specialised immune cell type [MAIT] which represents a poorly understood mechanism of immunity. In better understanding this process and cell-type that is present in everyone, it will lay the foundation for further studies, internationally and nationally, and continue to build Australia's leadership in this critical area. Research findings will contribute to improved understandings of human health and immunity, bringing significant social, wellbeing and economic benefits for the Australian community. The research also has the potential for important applications and the generation of novel intellectual property. The research project is well-positioned to develop commercially viable opportunities to build cellular or molecular products, and patent applications that will foster Australian research industry's capacity and growth.					
DE220100876	**Smart Optimisation of Functionally Graded Porous Structures**	67,150.00	136,850.00	139,350.00	69,650.00	413,000.00
Chen, Dr Da	This project aims to develop a novel smart optimisation method for shaping the porosity geometries of metal foams for design requirements. Although these functionally graded porous structures have superior engineering properties, efficient examination methods to understand the mechanical behaviour of irregular graded porosities are lacking. Expected outcomes of this project include the expansion of fundamental knowledge in porous media and new technologies to build stronger and lighter multifunctional structural components. The project will provide significant benefits, including enhanced manufacturing capacities of local industries to fabricate metal foam products, new job opportunities in a growing market, and less carbon emissions.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement This project will improve Australia's research capacity in infrastructure innovations and high-performance composite materials. It will increase knowledge in metal foams and develop new technologies for the analysis and design of functionally graded porous structures. With superior light weight and unique acoustic, conductive and electrochemical properties, metal foam has broad application potential in structural, defence, aerospace, automotive, biomedical, and thermal engineering. Metal foam will improve capabilities in the fabrication of lightweight building structures with increased stiffness, protective panels and covering with enhanced impact resistance, and multifunctional aircraft components with reduced weights, as well as stiffer porous metal foams for biomedical implants. It will benefit traditional sectors in construction, defence and automotive industries, as well as emerging manufacturing industries. Thus, the project will benefit a wide range of sectors economically as well as stimulating a growing market of metal foams with new job opportunities and less carbon emissions during manufacturing.					
DE220100918 Mullane, Dr Scott	**Teichmueller dynamics and the birational geometry of moduli space** The project aims to leverage recent cutting-edge advances in the area of Teichmueller dynamics to answer longstanding open questions from algebraic geometry on the moduli space of curves, an object with deep connections to many diverse areas of science including quantum gravity and theoretical physics. The project expects to generate new theories and increased understanding in both areas through the innovation of relating these perspectives, as well as uncovering new connections between the viewpoints. Further benefits should include building international collaborations and the contribution of this diverse perspective to the growing algebraic geometry community in Australia and to mathematics and related scientific fields more generally.	71,000.00	142,000.00	142,000.00	71,000.00	426,000.00
	National Interest Test Statement Developments in pure mathematics have long been shown to have cascading benefits to all other sciences, from Riemannian geometry, crucial to the functioning of modern GPS systems, to representations of groups, central to quantum mechanics and the functioning of iPhones, computers, and all electronic devices we today take for granted. The acceleration of the benefits of pure research in recent decades only further evidences that the presence of world leading mathematics research and researchers in Australia directly benefits all scientific research inAustralia. The results will have consequences in the understanding of the moduli space of curves, an object with complex connections across many areas of science including the flow of water, quantum gravity and the origins of the universe. Further, the innovative new techniques developed will increase the future capacity to address the current problems in this area, while the perspective and results developed in the project are expected to have broader applications increasing understanding across number theory, cryptography, and mathematical physics.					
DE220101027 Vreugdenhil, Dr Catherine A	**Resolving ocean convection: new knowledge for a changing Antarctica** This project aims to improve our understanding of the role of convection on the Antarctic margins using a high-resolution, cutting-edge numerical approach. Convection is an important, but poorly understood oceanic process, which diverts heat away from the melting Antarctic ice shelves by transporting cold and salty water from the ocean surface to depth. The project outcomes will be new knowledge of the physics from novel numerical models and theory, supported by insights from observations and model parameterisations. This timely research will improve prediction of sea level rise due to a changing Antarctica and enhance our ability to adapt to future climate scenarios, providing significant environmental and health benefits to Australians.	77,953.00	152,953.00	150,000.00	75,000.00	455,906.00
	National Interest Test Statement Convection is a vital, but poorly understood, ocean process. This project seeks to understand convection on the Antarctic continental shelf because it affects the melting of the ice margins, which is strongly linked to sea level rise. The project will enhance the interpretation of ocean observations and revolutionise climate models by improving representation of these critical convective processes. International collaborations with prominent institutions will help this project build a track record for, and strategically position, Australia to continue advancing climate science. Accurate predictions of climate change and sea level rise is critical for Australia's national security and ability to adapt to future climate scenarios. By improving the prediction of sea level rise, this project is very timely. It will provide significant and cost-effective environmental and economic benefits to the Australian community, now and into the future.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101048	**First Nations community-led approaches to Australian healthcare genomics**	61,732.00	124,106.00	124,201.50	61,827.50	371,867.00
Huebner, Dr Sharon A	This project aims to develop community-led approaches that address key barriers to First Nations inclusion in Australian healthcare genomics. It will focus on working with communities to evaluate, co-design, and implement culturally appropriate engagement strategies and ethical research practices, including relationship-based consent; cultural integration of genomics; and ethical strategies for long-term management and use of biological samples and data for clinical and research purposes. Expected outcomes of this project are policy recommendations, contributions to national ethics and protocols guidelines, and the evaluation of educational materials and digital learning tools aimed at improving genomics literacy and research practices.					
	National Interest Test Statement					
	This project will collaborate with First Nations communities of Australia to evaluate the ethical, legal, and social implications relating to healthcare genomics and policy. The project will address questions using methods that regard First Nations leadership as the key priority for the development of ethical and culturally safe genomic research and data collection. The outcomes of this project will be critical to ethics and governance guidelines, protocols, as well as national policy that is aiming to improve First Nations inclusion in healthcare genomics. Engaging First Nations values, principles, and protocols is essential for leading, informing, and shaping the national agenda so that First Nations are included in, and benefit from health care genomics for current and future generations. This project will contribute to the National Health Genomics Policy Framework that states Australia has a national responsibility to overcome the challenges inherent to First Nations inclusion in healthcare genomics, including righting the wrongs of the past, and building lasting relationships based on trust and respect.					
DE220101057	**Practical Automated Software Bug Fixing via Syntactic and Semantic Analyses**	77,770.00	144,920.00	134,300.00	67,150.00	424,140.00
Le, Dr Dinh Xuan Bach	This proposal aims to advance the practical adoption of automated software bug repair, which has recently been adopted by industry, e.g., Facebook. It will produce novel methods that use mining software repositories, program analysis, and human-guided search to help automated repair to scale and be accurate. Expected outcomes include a publicly available automated bug repair framework. This project will help the software industry deliver to users high quality software with improved reliability and safety, and increase education quality for students learning to code via automated feedback generation.					
	National Interest Test Statement					
	Software bugs cause considerable economic and social disruption, with one estimate that in 2017 alone they cost 1.7 trillion US dollars and affected 3.7 billion lives. This project aims to advance research on automated software bug repair, and in doing so promote greater practical adoption of bug repair solutions. Almost every aspect of our lives nowadays is operated by software – public transportation, telephones, cars. This project aims to deliver high software quality and ensure that our environment is safe and secure. Advances in the automation of bug repair will also create opportunities for further innovation in software development. Findings from this research have the potential for wide-ranging and significant national benefits, from improved safeguarding of sensitive data to reducing current costs and delays associated with software repair. Overall, the project aims to bring Australia to the frontier of research on automated bug fixing and for it to be adopted world-wide.					
DE220101153	**Mapping resources, demands and constraints to critical metal supplies**	70,000.00	140,000.00	140,000.00	70,000.00	420,000.00
Werner, Dr Timothy T	This project aims to assess the mineral resources of five metals needed for renewable energy transitions and map the potential impacts of their mining. It uses novel geochemical proxy models to build highly detailed resource databases and demonstrates a world-first use of cloud-computing power to assess worldwide satellite data of mine areas. Expected outcomes include in-depth knowledge of geological endowments and global-scale patterns of mining emerging to meet changing metal demands, plus the discovery of geological and socio-environmental constraints to future supplies. This will enhance government and industry capacities for de-risking metal supply chains, and facilitate more sophisticated land use planning of mining regions.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
	National Interest Test Statement Australian manufacturing makes use of virtually the whole periodic table, and while Australia hosts a variety of mineral resources, it lacks domestic refining capacity for many by-products used in high-tech applications. For these metals, it relies heavily on overseas imports that are at higher risk of supply disruption. In 2019, Australia released its first Critical Minerals Strategy, in which it highlighted a vision of becoming a “world leader in the exploration, extraction, production and processing of critical minerals”. Achieving this vision and unlocking Australia's resource potential will require advanced knowledge of the enrichment of critical metals in various ore types, the potential impacts of their mining, and an understanding of how resources and production capacities distribute between nations. This project assesses these aspects in unprecedented detail, allowing Australian importers, exporters and policymakers to access targeted and comprehensive data on the environmental, social and economic risks of critical metal supply chains, and to minimise their exposure in response.					
DE220101329 Karas, Dr John A	**Advanced Chemical Protein Synthesis and Applications** This project aims to develop enhanced methods for the chemical assembly of peptides, oligonucleotides and proteins. This will lead to the creation of new knowledge in chemistry and structural biology, and underpin advances in the drug discovery process, pharmaceutical manufacture and biocatalysis. Once complete, it is expected that lower cost, greener processes for manufacturing drugs such as Enfuvirtide (for HIV) will ensue. A new generation of hyper-stable, environmentally friendly catalysts will also be developed. This could enable domestic production of fine chemicals and essential medicines, and thus create high-tech jobs in a more diversified, resilient economy. Ultimately, it could lead to improved outcomes in human health.	72,500.00	145,000.00	145,000.00	72,500.00	435,000.00
	National Interest Test Statement This project aims to develop enhanced methods for the chemical synthesis of peptides, oligonucleotides and proteins such as receptors and enzymes. The intellectual property that may be generated could underpin the establishment of several technology startups - for example, one based on the low-cost manufacture of pharmaceuticals and another on enzyme development for green chemistry. This will create high-tech jobs, generate export income and increase diversification of the Australian economy, making it much more resilient. The environmental benefits could be enormous too, with a significant reduction in toxic solvent and reagent waste generated from various industrial processes. New research tools will also be developed, which will lead to greater insights into the biological sciences and thus enhance Australia’s research capability. Finally, this technology could bolster the domestic manufacture of essential medicines. This will ensure a secure supply for all Australians, particularly during turbulent global events such as the COVID-19 pandemic, whereby international supply chains are disrupted.					
DE220101508 Feuerriegel, Dr Daniel	**A Brain-Behaviour Model of Decision-Making Under Distraction** People make thousands of decisions each day, such as judging whether it is safe to cross the street at a busy intersection. This project aims to investigate how decision-making is impacted when a person is temporarily distracted, for example when receiving a text message alert from one’s phone. By combining recordings of brain activity with cutting-edge mathematical modelling techniques, this project expects to develop a novel theoretical framework that captures the effects of distraction on brain networks that underpin human decision-making performance. This knowledge should be highly beneficial for developing informed policies that reduce effects of distraction and preserve decision-making capacity in safety critical situations.	74,500.00	149,000.00	149,000.00	74,500.00	447,000.00
	National Interest Test Statement We rely on our ability to make rapid and accurate judgements based on visual information in our environment. For example, when driving through a busy intersection we must be able to precisely judge the speeds and locations of surrounding cars to avoid collision and injury. In these situations, we often encounter distracting events (such as text message alerts from our phone) which make us slower and more error-prone in our decision-making. This project aims to provide a detailed understanding of how our decision-making is impacted by a distracting event, and how this is reflected across distributed networks in the brain. This knowledge can be used as the basis for developing better informed technologies and policies that help preserve the decision-making capacity of Australians in safety critical situations, such as when driving. Reducing distraction-related decision errors has the potential to confer health and economic benefits to Australians through improved safety and productivity.					

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
DE220101527	**Real-time control with safety guarantees: theory and applications**	70,000.00	140,000.00	140,000.00	70,000.00	420,000.00
Pu, Dr Ye	Modern network control systems, such as transport systems with self-driving cars, are becoming bigger, more complex and human-involved. The systems are usually equipped with intelligent devices, such as numerous sensing, fast processors and communication components. To adapt to this change and to benefit from these new intelligent devices, efficient algorithms for control and management need to be developed. This project aims to develop novel optimisation-based control techniques, as well as efficient optimisation algorithms, for future control systems with an emphasis on distributed implementations, taking safety and real-time constraints such as limited computation and communication resources into consideration.					
	National Interest Test Statement This project will benefit both academia and industry. On the one hand, the project is expected to deliver novel theory in safe control subject to real-time constraints, e.g., limited computational time and communication resources. On the other hand, this project aims to develop practical optimisation algorithms for real-time control and prediction, with an emphasis on efficient distributed implementations. Future control systems, such as transport systems with self-driving cars and power grids with renewables, will bring new opportunities, but also face challenges such as scalability and safety. This project will provide a fundamental tool for advanced control and management of these real-world applications. The benefits to Australia from this research cannot be overstated. Large scale control networks are already integrated into our modern world and their importance is continually growing. More active devices are joining ever-expanding networks. Thus, the benefits of developing efficient and safe control techniques in these networks are huge and will improve our finances, society, health and environment.					
	The University of Melbourne	1,808,347.00	3,615,663.50	3,582,968.50	1,775,652.00	10,782,631.00
	Victoria	4,186,027.00	8,376,548.50	8,315,381.00	4,124,859.50	25,002,816.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
Western Australia						
Edith Cowan University						
DE220101043	**Peculiar membrane structures for removing microplastics from water**	68,547.00	137,644.00	138,194.00	69,097.00	413,482.00
Zargar, Dr Masoumeh	Microplastic pollution can inflict irreparable damage to human health and the environment. This project aims to develop functional membrane structures specifically designed to remove microplastics from aquatic and wastewater treatment systems. The approach will utilise advanced techniques in material science, separation science and fluid mechanics. The expected outcomes include advanced membranes with high separation efficiency for microplastics filtration. This will have significant benefits, including the efficient removal of microplastics from water sources securing cleaner potable, irrigation and recycled water, and contributing to a safer, healthier environment for all Australians.					
	National Interest Test Statement					
	Microplastic contamination of water is a growing issue for Australia, but there is a lack of microplastic-specific filtration technology to address the issue. Australia is a country with extensive coastlines that accommodate a large portion of the population, whose lifestyles rely on access to fresh water and the ocean alike. Therefore, microplastic filtration technology is beneficial to the environment, the quality of drinking water and human health. This research will also contribute to the Australian Government's goal to control greenhouse gas emissions because microplastics disrupt the transport of carbon dioxide to the seafloor—the largest natural sink for carbon dioxide. Microplastics can also harm soil bacteria, so the agriculture sector can also suffer from microplastic contamination. Therefore, this project aims to protect the economic, health, and ecological conditions in Australia by developing advanced water filtration technology to remove microplastics from water sources. This will protect Australia's waterways, iconic coastlines and marine environments from microplastic pollution.					
	Edith Cowan University	68,547.00	137,644.00	138,194.00	69,097.00	413,482.00
Murdoch University						
DE220100833	**Resilience of forest ecosystems to multiple stressors in a changing climate**	74,824.50	137,177.00	118,529.50	56,177.00	386,708.00
Sapsford, Dr Sarah J	This project will examine the influence of multiple stressors including disease, drought and fire, on the resilience of forest ecosystems within Australia. This project expects to generate new knowledge for land managers and the international community, in management of forest health by determining how soil health and soil fungi influence forest recovery after disturbance events. Anticipated outcomes include improved risk assessment of disturbed forests to future disturbances and significant benefits will include informing climate smart management goals in the recovery of important forest ecosystems, not only for the forest tree species but the animal, plant, insect and microbe communities that depend on these systems.					
	National Interest Test Statement					
	Australian forest ecosystems are crucial to Australian wildlife, human society, culture and the economy. Forests also play a major role in climate mitigation by storing carbon. However, in recent years, drought, fire and disease have destroyed hectares of forest. Disease outbreaks after drought and fire events produce kindling and fuel that increase the risk of future drought and fire events, thereby generating harmful feedbacks. One solution to the recovery of these stressed forests lies in the soil. Beneficial soil fungi provide protection to forests against pathogens and drought, but their ability to provide protection in the face of multiple stressors has not been assessed. This project will fundamentally contribute to Australia's national research priorities by testing whether beneficial soil fungi can be manipulated to enhance recovery of forests after disturbance. This project will provide management options towards biodiversity conservation in forests - not only in Australia, but around the world - and will be fundamental to Australia's sustainable development goals for climate mitigation.					
	Murdoch University	74,824.50	137,177.00	118,529.50	56,177.00	386,708.00

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)	Total ($)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	(Column 8)
The University of Western Australia						
DE220100633	**The Australian Preventive Justice Project**	73,275.00	145,425.00	149,287.50	77,137.50	445,125.00
Tulich, Dr Tamara S	This project aims to generate the first account of Australian preventive justice. Through original legal, historical and critical research, the project will create new knowledge by mapping, for the first time, the legal architecture of preventive justice in the Australian Federation since colonisation, and analysing these laws and their impacts through settler colonial and coloniality theories. Outcomes include the first legal history of preventive justice in the Australian settler colonial context, and enhanced understanding of the role of race in preventive injustice. Benefits include publications and guidelines to inform preventive policy and lawmaking, research training and increased capacity for Australian preventive justice research.					
	National Interest Test Statement					
	Preventive law and policy are central to governmental responses to a range of social harms confronting Australia, from public health to terrorism. This project will develop the first account of preventive justice in the Australian settler colonial context. It will generate new knowledge by comprehensively mapping the legal architecture of preventive justice since colonisation and analysing these laws and their impacts through settler colonial and coloniality theories. The outcomes will assist governments to identify and eliminate racism in preventive law and policy (in furtherance of the National Agreement on Closing the Gap (2019) Priority Reform 3), and contribute to law and policy reform through the development of Best Practice Guidelines to strengthen preventive justice in Australian jurisdictions. The project will increase Australia's capacity for international disciplinary collaboration, and be an exemplar for other countries facing similar challenges. The project will serve the national interest by better positioning Australia to respond to threats to our communities requiring preventive action.					
DE220101158	**Virtual Minds in the Real World: Mind-Uploading in the 21st Century**	57,000.00	116,000.00	119,000.00	60,000.00	352,000.00
Weber, Dr Clas	This project aims to investigate the potential and the consequences of mind-uploading (i.e. transitioning a person from a biological hardware to an artificial one). It will use the methods of analytical philosophy to contribute to, and integrate, three different fields: philosophy of mind, metaphysics, and artificial intelligence. Expected outcomes include a theoretical and normative framework for mind-uploading, and a much-improved understanding of its implications. This should provide significant benefits, such as fostering exchange between philosophy and computer science, providing directions for scientific research and technological development, as well as informing legal guidelines for artificial intelligence development.					
	National Interest Test Statement					
	Artificial Intelligence already has a great impact on societies and economies in Australia and around the globe. This trend will accelerate within the next decades. The rapid progress in this area may provide access to mind-uploading technology within this century. This project will generate new and improved philosophical and interdisciplinary understanding of mind-uploading and generate new knowledge on central issues in philosophy, and artificial intelligence research. It will have social and cultural benefits by helping the public to understand mind-uploading, via academic articles, media reports, public lectures, blog posts, and podcasts. Its results will contribute to an informed discussion of ethical and legal guidelines concerning artificial intelligence research.					
	The University of Western Australia	130,275.00	261,425.00	268,287.50	137,137.50	797,125.00
	Western Australia	273,646.50	536,246.00	525,011.00	262,411.50	1,597,315.00
		13,938,773.50	**27,796,391.50**	**27,568,368.50**	**13,710,750.50**	**83,014,284.00**

* Note - Indicative funding for approved projects will be made available through a funding variation under section 54 of the ARC Act