Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Australian Capital Territory						
The Australian National University						
DE240100001	**Investigating public support for climate aid in Australia and abroad**	79,345.50	147,269.50	136,780.00	68,856.00	432,251.00
Stanley, Dr Samantha K	This project aims to investigate public attitudes towards policies that provide aid to those affected by climate change, including resettlement for those displaced. It aims to do so using a series of innovative approaches, including large-scale international surveys and novel experiments. Expected outcomes of this project include new knowledge about the degree of public support for these climate policies and the psychological predictors of public acceptability of climate aid and climate migration. This should provide significant benefits, such as by building Australia's capacity for effective social and policy responses to climate change, and helping Australia plan for the repercussions of environmental change on social cohesion.					
	National Interest Test Statement					
	Globally, roughly 20 million people are displaced by environmental disaster each year. This number will increase dramatically due to climate change, and cause economic and social disruption in Australia and beyond. Governments and aid agencies will seek to implement new policies to support those most affected by climate change, including through aid and resettlement opportunities. Such policies must reflect public sentiment and community needs to be effective, yet these needs and perspectives are unclear. Through large attitudinal surveys, this project will determine the current levels and predictors of support for new policies designed to support people affected by climate change. Translational outputs for policymakers will guide Governments and international bodies on new climate policies and international agreements on climate adaptation in, and migration from, vulnerable areas. By equipping Governments to better understand community needs and plan for them, the project will contribute longer-term to improved support and reduced disruption to at-risk communities and the communities they resettle into.					
DE240100032	**Chemical and structural design for high power energy storage materials**	74,274.50	151,274.00	153,999.00	76,999.50	456,547.00
Lu, Dr Teng	This project aims to develop new materials with both high power and high energy storage capabilities by exploring emerging relaxor antiferroelectric (RAFE) materials. Through investigating the internal chemical and structural factors, and their interactions at different length scales, this project will first solve the current ambiguities in RAFEs and then identify critical factors for properties to better design and develop new high-performance energy storage materials. The outcomes of this project will advance the knowledge of ferroic materials, provide new candidates for advanced electrical systems such as renewable energy, electric vehicles and pulsed power devices, and potentially revolutionise high power energy storage technologies.					
	National Interest Test Statement					
	Energy storage needs not only to hold a large amount of energy (high energy density) but also to capture/release the energy fast (high power density). Lack of a suitable material with these properties reduces the efficient use of renewable energy. For example, without a high-power energy storage buffer or high-power device protection, strong wind feeding a wind turbine might create an overflow in energy storage capability or even damage the energy storage system due to the high voltage pulse. This project aims to create a rational materials design strategy for developing new-generation energy storage materials with both high power and high energy storage capabilities. The outcomes of this project will advance materials science, complement current energy storage technologies (such as batteries and supercapacitors), and accelerate the development of novel technologies by adopting miniaturised high-power devices, e.g., electric vehicles, LIDAR systems and 5G transceivers, which will improve Australia's competitiveness in advanced manufacturing, as well as benefit the energy, defence, IoT and medical sectors.					
DE240100120	**On the wealth of First Nations: Examining the Indigenous-settler wealth gap**	74,539.50	141,967.00	127,487.00	60,059.50	404,053.00
Markham, Dr Francis	This project aims to revise understandings of First Nations economic circumstances by investigating disparities between First Nations and non-Indigenous financial wealth. It expects to generate knowledge of the size of the 'wealth gap' and identify the structures that cause its contemporary reproduction and analyse policy options to address these disparities. Expected outcomes of the project include new knowledge about the Indigenous-settler wealth gap and the development of a research literature on approaches to addressing the wealth gap in Australia. This should provide significant benefits including a clearer understanding of the nature and causes of economic					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	disparities between First Nations and non-Indigenous people in Australia. **National Interest Test Statement** Wealth inequality in Australia has been widening in recent years and is of social and political concern. Yet the gap between the wealth of First Nations and non-Indigenous Australians is less clear. In public debate, blame for economic inequalities tends to be laid on First Nations communities, yet this overlooks the role of Australia's colonial past in creating today's inequalities. Drawing on economic geographic theory and original quantitative data, this project will produce the first estimates of the value of First Nations financial assets in comparison to assets owned by non-Indigenous Australians. It will also identify the ways that the wealth gap is reproduced across generations. Through workshops and detailed reports provided to First Nations organisations and policymakers, the project will provide them with the tailored information they need to understand and address this issue, particularly through Treaty negotiations. These changes will in turn help to shift public attitudes and promote a fairer and more secure financial future for indigenous Australians.					
DE240100150 Buder, Dr Sven	**How galactic mergers and their stellar survivors shaped our Milky Way** This project aims to investigate the role of mergers with smaller galaxies in shaping the Milky Way by developing tools to identify stellar survivors of mergers. This project expects to produce an all-sky map of stellar survivors based on the largest search within Australian and international survey data and perform innovative comparisons with simulations to constrain the role of mergers. Expected outcomes are aligned with the decadal plan for Australian astronomy and can open new avenues for global astronomy and contracts for upcoming billion-dollar surveys. The project should cement Australia's role as a leader in a new era of galactic exploration and provide benefits beyond astronomy by training Australians to assess complex big data. **National Interest Test Statement** Big data analysis can revolutionise how we deal with everyday problems by finding patterns in settings such as identifying manufacturing errors or cancer cells. To take advantage of the potential of big data analysis in Australia, we need more advanced analytical tools and a skilled workforce to use them. Building on Australia's $200+ million investment in large observational and computing facilities, this project will develop innovative data analysis software that, with machine learning, can discover patterns and rare objects in large datasets. It will specifically focus on analysing the chemical compositions of millions of stars to understand how chemical elements, such as those used in modern electronics, have evolved over time and shaped the Galaxy. The research team will share these tools with Australian medical and manufacturing industries and researchers through open-access platforms and foster collaboration to support uptake. Industry's use of our software in their sector will benefit everyday Australians in areas such as less fault-prone electronics and more accurate cancer diagnosis and treatment.	76,500.00	153,000.00	153,000.00	76,500.00	459,000.00
DE240100184 Ganguly, Dr Diep R	**Pioneering alpine epigenomics to discover adaptive genetic elements** The genetic code of native plants are yet to be explored for DNA elements that promote resilience to climate change. These elements are now ripe for discovery due to recent advances in epigenomics allowing for rapid identification. This proposal aims to discover heat-associated elements in waxy bluebells, which inhabit Australia's vulnerable high country. Expected outcomes include new insights on gene regulatory mechanisms in native plants; the generation of resources for genetic conservation, and catalysing further molecular research into Australian flora. This should provide significant benefits by revealing genome regulation in native plants, thereby improving the ability to predict the impacts of climate change. **National Interest Test Statement** Australia's alpine regions are vulnerable to climate change. They contain much plant life that are critical for ecosystem health. Yet, we have little information on their DNA, which is vital to predicting their capacity for resilience. This project will identify DNA elements that promote resilience to hot weather in waxy bluebells, which grow across Australia's alpine regions. This will open a new research field discovering the genetic strategies our native plants employ to survive. Expected outcomes include new knowledge and resources that will benefit, and build capacity, for conservation genetics in Australia. Such outcomes will help improve our ability to predict how Australia's plants will respond to climate change and provide new DNA tools for crop engineering. Ultimately, this Fellowship will catalyse molecular research into native plant species thereby placing Australia at the forefront of this new field.	70,000.00	145,000.00	142,500.00	67,500.00	425,000.00
DE240100206 Sun, Dr Ling	**Probing ultralight bosons with black holes and gravitational waves** This project aims to search for gravitational waves from ultralight boson clouds around black holes and to investigate the boson properties. It expects to generate new knowledge on currently undiscovered particles by combining cutting-edge theories and innovative signal-processing	66,500.00	132,500.00	135,000.00	69,000.00	403,000.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	techniques. These particles are predicted to solve problems in particle and high-energy physics and are compelling dark matter candidates. Expected outcomes include high-profile constraints on the particle properties and potential detection of new particles, new data-analysis techniques, and significantly enhanced capacity to build international and interdisciplinary collaborations. These should bring significant benefits to fundamental physics and cosmology. **National Interest Test Statement** Australia plays a leading role in detecting invisible ripples in spacetime called gravitational waves. These waves are created by massive objects, including black holes. This project could further the search for gravitational waves emitted by clouds of undiscovered particles through cutting-edge techniques in gravitational-wave science. The new knowledge obtained in this project will shed light on the fascinating connection between black holes and particles that constitute the Universe, building the foundation for a new cosmic probe into fundamental physics. Cutting-edge technologies utilised and developed in this project, including optical interferometry, control systems, high-precision measurement, advanced signal processing techniques at low signal-to-noise-ratio regime, are highly beneficial to Australia's space industry. Novel fast signal-tracking techniques developed in this project, based on a key signal processing algorithm, could lead to new applications in defence, space technology, communication and engineering, and will bring economic value to Australia's space and communication industries.					
DE240100232 O'Donnell, Dr James M	**Demographic and life course drivers of social cohesion** The project aims to understand the individual and community-level drivers and pressures on social cohesion in Australia. It is expected to generate new knowledge on how and why individuals become more or less engaged in their communities and society over time by combining information from multiple existing data sources. Expected outcomes of the project include the creation of analytical tools for measuring the dynamics of social cohesion, helping to bridge the gap between current theories and data. This should provide significant benefits in identifying threats and opportunities, and informing community and government initiatives, to strengthen and maintain social cohesion and the collective well-being of communities and Australia. **National Interest Test Statement** In Australia, social cohesion is under considerable strain: rates of volunteerism are in decline and there is a reduced sense of collective identity and pride as a country. This poses risks to the harmony and co-operation of society. While policymakers and researchers can track these trends, the reasons for these shifts in cohesion are unclear, and therefore difficult to rectify. By adapting and developing new demographic techniques, this project will identify the driving factors that both support and weaken our connections to each other, our communities and the nation. It will translate and communicate those findings through targeted reports and a novel interactive ‘cohesion health’ tracker website. These outputs will help map social cohesion across Australia and guide the development of policy and practice responses. Sharing these tools with government and community sector partners will empower them to track changes in community cohesion and identify and prevent threats to it. In doing so, this research will contribute to stronger social cohesion in communities across Australia.	72,322.00	143,745.00	143,530.00	72,107.00	431,704.00
DE240100301 Dusenge, Dr Mirindi Eric	**Reducing uncertainty in prediction of leaf respiration in a changing world** This project aims to advance our understanding of responses of carbon dioxide (CO2) release by leaf (leaf respiration) to sustained changes in CO2 and temperature. Leaf respiration in terrestrial forests releases yearly CO2 that is two to four times higher than CO2 emitted by human activities, but its response to climate change is not well understood. The project expects to generate new knowledge on mechanisms underlying responses of leaf respiration to these climate change variables, separately and combined. Expected outcome is to deliver criteria that enable dynamic changes in leaf respiration to be predicted in climate models. Results should benefit improved forecast of feedback between Australian forests' carbon cycling and climate. **National Interest Test Statement** Plants release 60 – 80 billion tonnes of carbon dioxide (CO2) per year through a process called respiration. This is six times more than human emissions. Our limited knowledge of plant leaf respiration slows Australia’s ability to respond to climate change, meet international carbon emission obligations, and build resilient farming systems. Studying leaf respiration under rising atmospheric CO2 and temperature conditions in Australian forests will produce a more advanced framework that can enable more accurate earth system models. These models are used frequently to estimate plant-based carbon storage capacity, atmospheric CO2 levels, and future temperature and rainfall scenarios. Our framework will be shared with science agencies like CSIRO to improve Australian carbon cycle modelling and weather forecasting as well as to enable data-driven decision-making within government and industry on carbon emission reduction targets. These applications will contribute national flow-on benefits that support sustainable land-use productivity and profitability.	75,000.00	147,500.00	145,000.00	72,500.00	440,000.00
DE240100386	**Anti-racist neuroethics for epistemic justice in mental health research**	78,049.00	147,929.50	139,888.50	70,008.00	435,875.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Viana, Dr John Noel M	Racial/ethnic minorities are underrepresented in brain and mental health (BMH) research, risking inadequate healthcare for the 9.5 million minorities in Australia. With the $73 billion annual cost of BMH disorders to the country, all Australians should equally benefit from BMH research. This project aims to develop recommendations to make BMH research more diverse and inclusive. It will audit representation of minorities in Australian BMH publications and will conduct surveys, interviews, and workshops with scientists to determine institutional barriers to the inclusion of and engagement with minorities in research. This project will draw from concepts of epistemic justice and anti-racism to develop ethical frameworks for BMH racial equity. **National Interest Test Statement** Racism impacts brain and mental health (BMH), costing Australia $37.9 billion/year. Racism also manifests in research practices and ethics guidelines, limiting full participation of racial/ethnic minorities in knowledge generation. This leads to knowledge gaps and inadequate BMH care for the 29% of overseas-born Australians and 3.2% who are Aboriginal and/or Torres Strait Islander. With health and multiculturalism being national priorities, this study will determine the extent of knowledge gaps by examining Australian BMH research outputs. It will then identify systems and practices that limit minority participation by conducting interviews, surveys, and workshops with scientists. The project aims to generate recommendations for scientists, institutions, funders, and ethics committees on fostering equitable partnerships and increasing minority participation in research. BMH disorders cost the country $73 billion/year, and BMH care and promotion strategies that benefit diverse Australians are urgently needed. Anti-racist practices that ensure equal opportunities for knowledge production are thus essential.					
DE240100447 Bapat, Dr Asilata A	**The geometry of braids and triangulated categories** Triangulated categories play a central role in geometry, algebra, and topology. Their study can uncover deep structure connecting different areas of mathematics. This project aims to use novel approaches to answer fundamental questions about triangulated categories and their symmetries. These symmetries are encoded by braids, which are important objects with many applications across science. The project is expected to benefit Australia by stimulating research in mathematics and computer science. It will invite connections with leading experts and students around the world and encourage overseas collaboration. There is a potential long-term benefit to cybersecurity, towards the development of new encryption schemes based on braids. **National Interest Test Statement** Digital data theft and online crime affects Australians once every seven minutes, having increased 13% in the last year and projected to double by 2025. Last year, cyber-attacks cost Australians over $300 million, and there is an urgent need for new tools that better protect personal information. This project aims to meet this need: the complex mathematical structures studied in this project, called braids, will be used to create world-first algorithms, protocols, and tools for more efficient computation and improved data protection in Australia. The algorithms we develop will be shared via joint working groups and seminars with the Australian Signals Directorate, our established collaborative partner in the cyber sector. The project outputs will also be adapted for data protection via research collaborations with the Australian Cyber Security Centre. Through these applications, the project will contribute to strengthening the protection and privacy of Australians' online data, and to Australia's future cyber security.	73,224.50	146,449.00	146,199.00	72,974.50	438,847.00
DE240100466 Weber, Dr Millicent	**Audiobooks and digital book culture** This project aims to investigate digital technology's impact on book culture through a study of Australian audiobooks. It expects to generate new knowledge about Australian books' relationship to global culture and technology. Expected outcomes include new research infrastructure in the form of a comprehensive database of Australian audio publications and advances in the way publishers and cultural institutions consider the role and value of audiobooks. This should lead to significant benefits, including providing publishers with access to reader survey and industry publication data that will help to increase community access to audiobooks. **National Interest Test Statement** Audiobooks are an important new cultural phenomenon. They are the decade's biggest publishing growth sector and bridge a divide between books and digital culture. However, at a time of globalisation and digital and cultural disruption, we know little about Australian audiobooks, and their role in our literary landscape. Working in collaboration with key industry stakeholders including publishers, librarians and advocacy group Vision Australia, this research will examine the impact of audiobooks on the publishing sector, and reading practices of the wider community. Through a widely accessible public database, a series of public lectures, and a book, both publishers and the broader community will gain new understandings of Australian literature and our nationwide reading habits, helping to inform and guide future investment in audiobooks, improve literacy and ensure the ongoing	79,286.50	156,771.50	154,445.00	76,960.00	467,463.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	accessibility of literature to all Australians.					
DE240100530	**Neanderthal hunting ability and the extinction of archaic humans**	77,648.00	153,492.50	150,753.00	74,908.50	456,802.00
Samper Carro, Dr Sofia C	This project aims to investigate a critical factor in explaining Neanderthals extinction: their hunting abilities. The research expects to generate new knowledge of archaic humans behaviour using an innovative approach combining traditional archaeological analytical methods with ground-breaking biomolecular techniques. Expected outcomes of this project include the development of new knowledge in human evolutionary history and improved techniques to understand past human extinction events. This should provide significant benefits for Australia to become a primary power in studying human past and deep history, while enhancing capacity by becoming the first country in the Southern Hemisphere to implement ancient protein studies in archaeology.					
	National Interest Test Statement					
	Centuries ago, we co-existed with several species, including Neanderthals, a now-extinct human. Some say the reason for Neanderthal extinction was the more efficient methods for hunting wild animals developed by modern humans. Using novel bone analysis techniques from biochemical archaeology, this project will investigate Neanderthal hunting abilities to produce evidence of the importance of sustainable management of animals for modern humans' survival. We will share our discoveries via animations, media interviews, and guest podcasts with the more than 5 million Australians who watch archaeology news and documentaries, visit museums and listen to podcasts. We will also create interactive school resources, a graphic novel and curriculum recommendations for school-aged children who are future stewards of Australia's animal resources. The uptake of our creative and engaging translational outputs by these two audiences will serve to promote deeper understanding of and appreciation for how humans manage animals for our survival, past, present and future.					
DE240100573	**Genomics of extinction and isolation on Australian island arks**	79,539.50	159,079.00	145,899.00	66,359.50	450,877.00
Roycroft, Dr Emily	This project aims to measure the genetic health of key populations of threatened Australian mammals. With the highest rate of extinction in the world and over 30% of surviving species under immediate threat, Australian mammals require urgent focus to secure their future. This project focuses on island populations, which are increasingly used as sources to rewild mainland Australia. Using cutting-edge genomic tools, this project plans to determine the extent and nature of genetic variation, including harmful mutations, on islands and in declining mainland populations. The anticipated outcome is to understand how genetic factors contribute to extinction, to improve conservation strategies for threatened species.					
	National Interest Test Statement					
	Australia has the highest rate of mammal extinction in the world, with 36 species already lost and over 30% of surviving species under immediate threat. The genetic health of surviving populations – a factor which can increase extinction risk – remains largely unknown. The Australian Government's 2022-2032 Threatened Species Action Plan has a bold target of zero new extinctions. Using cutting-edge tools, this project will help achieve this goal by measuring the genetic health and resilience of threatened Australian mammals. Focusing on federally threatened species (Environment Protection and Biodiversity Conservation Act, List of Threatened Fauna) and populations of key conservation value, the project will determine whether, and which, small populations are at greater risk of extinction. By knowledge-sharing with conservation managers and policy makers, this project will improve genetic management and conservation, and equip Australia with the tools to secure the future of threatened species in the face of ongoing environmental change.					
DE240100575	**Not drowning, fighting?: UN climate governance and Pacific Island countries**	74,000.00	146,500.00	140,000.00	67,500.00	428,000.00
McDonnell, Dr Siobhan A	This project aims to significantly advance understandings of UN climate governance processes, and the spaces and strategies utilised by Pacific Island countries to influence the final decision outcomes. This project will generate important new knowledge about global climate governance using an innovative approach to collaborative event ethnography that involves a majority Pacific Islander research team and working 'internal' to formal UN climate negotiations. The project should identify key climate change outcomes for the Pacific and Australia that will help address climate security issues, and that raise the status of Pacific Indigenous knowledge systems by incorporating them centrally within understandings of climate change policy.					
	National Interest Test Statement					
	For many Pacific Island countries the impacts of climate change are urgent and real. A key foreign policy goal for Australia is a strong and united Pacific family that understands the regional challenges of climate security, but					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	to what degree are Pacific Island countries influencing outcomes of the United Nations (UN) climate governance meetings? This project will deliver new understandings of how Pacific Island nations create knowledge, negotiate and influence the decision making of the UN over key climate issues. Through participant observation and interviews with representatives from Pacific Island governments and civil society, project findings will identify the way decisions about climate are made that impact the Pacific, and how critical climate change issues for the Pacific and Australia can be addressed. This knowledge can be used to strengthen climate-based policies in Australia and the Pacific, thereby strengthening the Pacific family. Outcomes will be accessible to policymakers and the public in Australia and the Pacific through regional workshops, podcasts and articles written for free media.					
DE240100652	**Mobilising Litigation to Effect Legal, Policy and Social Change**	71,000.00	142,000.00	142,000.00	71,000.00	426,000.00
Ogg, A/Prof Kate E	This project will be the first comprehensive study of movement litigation from an Australian perspective. Using an innovative blend of socio-legal methods, the outcomes include an examination of movement litigation actors and their democratic role, a methodological framework for global scholarship on movement litigation and the first international and comparative study of refugee rights movement litigation. These outcomes will generate new knowledge for forced migration studies and have the potential to transform the discipline of law by providing tools for a broader and more contextual approach for the study of jurisprudence. Benefits include lessons for enhancing participatory democracy and promoting progressive social and legal change.					
	National Interest Test Statement					
	Australian social movements are increasingly using litigation to prompt social, legal and policy change. For example, a coalition of young Australians recently won a case in which a QLD court indicated that mining applications could be rejected on human rights and climate change grounds. Such cases can achieve new law, yet can also cause regressive law and policy change or social backlash. Using interviews, case studies and legal analysis, this project will examine the impact of such litigation and what social movement organisations seek to achieve through it. Findings will be translated for key stakeholders: the UN who will use them in international and domestic court cases and to guide members on issues such as climate change and human rights; advocacy organisations using litigation as a strategy, to leverage litigation for best effect; and Australian governments, who will be equipped with knowledge to better manage the role of defendant in future cases. Their use of the findings will increase Australian civil society's effectiveness in promoting progressive social and legal change via court systems.					
DE240101129	**Synergy between future 21-cm experiments and physical cosmology**	73,000.00	147,000.00	148,000.00	74,000.00	442,000.00
Qin, Dr Yuxiang	The nature of dark matter and formation of the first galaxies are both unsolved mysteries. During the first 500 million years, our universe was filled with hydrogen atoms illuminated by the first galaxies. The 21-cm radiation from this gas encodes properties of unseen galaxies and dark matter during this so-called cosmic dawn. This project aims to build an innovative framework to leverage future 21-cm experiments using The Square Kilometre Array to observe cosmic dawn, and to forecast the optimal constraints on dark matter physics. Additional outcomes include the largest cosmological simulation of the first galaxies powered by neural networks and improved knowledge of their properties using Bayes' theorem and The James Webb Space Telescope.					
	National Interest Test Statement					
	Australia is hosting the construction of the world's largest radio telescope, the Square Kilometre Array (SKA), which aims to address two fundamental questions in the nation's Decadal Plan for Astronomy: How did the first galaxies transform our Universe, and what is the nature of dark matter? However, the lack of theoretical capability will hinder the nation's ability to fully exploit the forthcoming SKA results, potentially losing world-first discoveries to international competitors. This project will develop a comprehensive kit of AI enhanced statistical tools that provide new insights into the formation of ancient galaxies and the nature of dark matter. It will establish the nation's long-term leadership in SKA discoveries, provide analysis software to Australia's scientific community, and yield a return on Australia's sizable investment in SKA. It will also have an immediate impact at a time when AI is profoundly shaping society, with algorithms that can prevent fraud in e-commerce, create personalised learning content for educators, and advance self-driving technology and navigation systems.					
DE240101244	**The International Political Thought of Women's Regional Networks**	75,347.00	151,361.50	150,731.50	74,717.00	452,157.00
Tanyag, Dr Maria	The political ideas of Asia Pacific women's regional networks remain under-examined and worse, misunderstood as narrowly about 'women's issues'. By combining feminist methodologies to archival research, network mapping and interviews, this project aims to generate new knowledge on how women's regional networks understand global crises and the transformative solutions to address them. Expected outcomes include an historicised understanding of the intellectual contributions of women from the most crisis-affected region in the world. It should benefit Australian policymakers and practitioners seeking to partner with these networks in collectively responding to crises on multiple fronts – from COVID-19 to conflicts and climate change.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Australia's national security is dependent on peace and security in the Asia Pacific region. In an unpredictable political environment, however, it is vital that Australia listens to all voices from the region. An important but often neglected political voice comes from women's networks situated across Asia and the Pacific. Women are routinely on the frontlines of every crisis in the Asia Pacific region from conflicts to COVID-19 outbreaks to natural disasters, and yet we know little about how they interpret and address these challenges and what solutions they can offer. This project seeks to discover how women's political ideas can transform global responses to contemporary security challenges. By combining archival research, network mapping and interviews, it will develop a model for engaging women's regional networks in Australian security and foreign-policy decision-making. This model will be shared with DFAT and relevant regional agencies such as the United Nations to more effectively promote gender equality in the context of advancing regional security.					
DE240101245 Bercher, Dr Pascal T	**Automated Modelling Assistance for the Creation of Complex Planning Models** Artificial Intelligence (AI) planning technology is used to control systems like automated factories, robots, or to solve complex optimisation problems. Creating these models is however rather complex and error-prone and requires experts to create them in the first place. This project aims at developing techniques and tools for automated modelling support. They will make the modelling process easier and guarantee desired model properties such as the desired system behaviour. The tools will thus contribute towards making the technology more easily accessible to companies that might want to deploy them, while reducing costs for doing so and increasing the quality of these models.	73,174.50	147,849.00	149,349.00	74,674.50	445,047.00
	National Interest Test Statement The future of manufacturing and even just storing goods in warehouses is automation. What large companies like Amazon or Tesla have perfected already is still beyond the reach of many mid- and even large-sized companies due to the lack of accessibility of the necessary underlying technology from the field of Artificial Intelligence. This project aims at making such automation available to even small-sized businesses by drastically reducing the need for highly specialized experts in creating the models (and maintaining them) required to control the automated parts of a process or factory. This will be achieved by developing publicly available software and online services that provide intelligent feedback to experts from the specific companies in putting together (and maintaining) these models. That is, rather than requiring experts from the academic sector, employees from companies with expert knowledge about their applications will be enabled to create the required models by themselves using the project's developed technology -- intelligent automated modelling support.					
	The Australian National University	1,342,750.50	2,660,687.50	2,604,561.00	1,286,624.00	7,894,623.00
	Australian Capital Territory	1,342,750.50	2,660,687.50	2,604,561.00	1,286,624.00	7,894,623.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
New South Wales						
Macquarie University						
DE240100410	**Child Citizens: Young People and Australian Democracy since 1945**	60,033.00	132,675.00	136,047.50	63,405.50	392,161.00
Barrett Meyering, Dr Isobelle	This project provides a new account of Australian democracy from the perspective of children and young people. It tracks changes in children's conceptions and practices of citizenship since 1945 to explain their contested status in contemporary politics. Far from simply being 'citizens in waiting', the project shows that young people have long been active participants in political and civic life and reveals how their citizenship claims have expanded across this period, alongside those of other marginalised groups. Its findings will add nuance to current debates about children's political exclusion, with its social impact enhanced through the development of an online research portal and collaboration with the Museum of Australian Democracy.					
	National Interest Test Statement					
	This project makes a unique contribution to ongoing discussions about Australian children's opportunities to participate in democratic processes. It contextualises recent debate over young people's political involvement by charting a longer history of children's civic engagement since 1945 and enhances our understanding of past attempts to include them in government decision-making. Its findings will improve the outcomes of initiatives designed to promote young people's interests, including the work of the National Children's Commissioner and state and territory equivalents, and of the newly appointed Youth Steering Committee, by allowing these entities to learn from past successes and failures. The project delivers practical benefits to the wider community through the development of an online research portal featuring free resources suitable for use by school students, teachers and community groups. In addition, collaboration with the Museum of Australian Democracy at Old Parliament House on a series of events in the final year will ensure the findings reach a wider audience.					
DE240100606	**Investigating how visual imagery influences cognition**	71,823.50	141,993.00	141,229.00	71,059.50	426,105.00
Keogh, Dr Rebecca L	This project will characterise the role visual imagery plays in other cognitive functions, namely visual working memory and attention. This will be done by studying two special populations that have extreme forms of visual imagery: aphantasia and synaesthesia. This work will develop innovative psychophysics and physiological techniques to identify different cognitive strategies used to solve visual working memory and attention tasks. Further magnetoencephalography (MEG) decoding approaches will be used to compare and contrast the neural signatures of voluntary and involuntary visual imagery, working memory, and attention. This work will help us understand why some individuals have better imaginations, memory, and attention than others.					
	National Interest Test Statement					
	Our ability to remember, pay attention and imagine impacts almost every facet of life, from our own personal memories and sense of self to academic and job performance. These cognitive functions are also impaired in many psychological and neurological disorders. This work will uncover why some people have better visual memories and attention than others, and will assess how individual differences in cognitive strategy choice may drive these differences in memory performance and attention capabilities. By understanding what limits the capacity of our memories, attention, and imagery we may be able to develop tools for boosting these cognitive functions in the future. In collaboration with educational neuroscience partners, this may be achieved through the development of cognitive training programs or targeted stimulation of specific brain regions. This could have commercial and social benefits through personal cognitive enhancement for those with impaired cognitive abilities, as well as the general population, through improving memory, attention and imagery both in the workplace and in our personal lives.					
DE240100636	**Universal Legal Identity and the Sustainable Development Goals**	70,000.00	142,500.00	144,500.00	72,000.00	429,000.00
Sperfeldt, Dr Christoph W	This project is the first comprehensive study into the risks of exclusion associated with the pursuit of the universal legal identity target enshrined in the Sustainable Development Goals. Through a systematic examination of legal identification initiatives at international and country levels, in Indonesia, Thailand and Cambodia, the project will generate new knowledge on how exclusion in legal identity regimes is produced and who it affects. Outcomes include improved understanding of these risks and practical guidance to address them. Expected benefits include more inclusive state and non-state approaches to legal identity, as well as enhanced protections and development					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	opportunities for marginalised populations in different contexts. **National Interest Test Statement** Establishing one's legal identity – increasingly in digital form – has become fundamental to modern life, with state credentials required to open a bank account, use a mobile phone or access health services. Proof of legal identity is key to unlocking access to rights, services and opportunities. Yet globally, 1 billion people do not have proof of identity, threatening global development goals. This project will provide the first comprehensive study into the risks of exclusion associated with contemporary identification systems, especially in a development context, and provide solutions to mitigate these risks. The project will reshape policy and practice globally by building awareness among decision-makers in Australia (the Digital Transformation Agency) and internationally (DFAT) by providing guidance and a toolkit to enhance the consideration of marginalised populations in legal identity initiatives. The project will benefit national efforts in the roll out of new identity solutions, and Australia's development assistance in our region by promoting more inclusive and stable societies in the Asia Pacific.					
	Macquarie University	201,856.50	417,168.00	421,776.50	206,465.00	1,247,266.00
Southern Cross University						
DE240100305 Rosentreter, Dr Judith A	**Unravelling the pathways of methane production and oxidation in mangroves** This project addresses a long-standing conundrum of why high methane emissions are sustained in saline coastal wetlands by identifying and quantifying methane production and oxidation processes in mangrove ecosystems. Using a novel combination of cutting-edge instrumentation for greenhouse gases, radiocarbon/stable isotope analysis, this project will generate a first complete picture of the mangrove methane cycle, to accurately quantify, for the first time, Australia's contribution to global coastal mangrove emissions. The outcomes will establish currently lacking fundamental understanding of wetland methane cycling, advance global biogeochemical models, and improve strategies for natural climate solutions of coastal wetlands in Australia.	79,521.00	157,021.00	137,500.00	60,000.00	434,042.00
	National Interest Test Statement Methane is a potent greenhouse gas that contributed 35% of global warming in the past decade, and is largely driven by aquatic/wetland ecosystems. Australia has joined The Global Methane Pledge to urgently reduce global methane emissions, however, we currently do not understand the processes that drive methane production (source) and consumption (sink) in coastal wetlands. By identifying and quantifying the origins and pathways of methane fluxes in mangroves using a novel combination of cutting-edge instrumentation, this project will establish a complete picture of the methane cycle in Australia's abundant coastal mangrove wetlands. This project is of national significance because it will provide the first Australian mangrove ecosystem methane emission estimate and improve Australia's national 'blue carbon' strategy to mitigate climate change. This project is of global significance because it will provide fundamental understanding of coastal methane cycling that will advance more accurate modelling to predict the effects of changing climate.					
DE240100338 Jeffrey, Dr Luke C	**Barking up the right trees – A microbial solution for our methane problem** This project aims to unveil the microbial diversity and metabolic capabilities of bark-dwelling microbial communities in Australian forests. Trees perform an important climatic function in sequestering atmospheric carbon, however the role of tree bark-associated microbiome in regulating other climate-active trace gasses such as methane, hydrogen and carbon monoxide is unknown. Combining cutting-edge molecular and biogeochemical approaches, this project aims to characterise and quantify trace gas oxidation rates of forest bark microbiome. The anticipated outcomes include fundamental knowledge surrounding bark-associated microbial trace gas oxidation within global biogeochemical cycles, and insights into their response to climatic variables.	79,502.00	158,440.50	149,075.50	70,137.00	457,155.00
	National Interest Test Statement Trees help mitigate greenhouse gasses by sequestering carbon from the atmosphere. Microbial communities living within the bark of trees may also help regulate climate-active gasses such as methane, however, the magnitude of this process is currently unknown. This project aims to determine the diversity and composition of bark-dwelling microbial communities, and for the first time will quantify the rates of bark-associated greenhouse gas mitigation, within endemic Australian forests. This new knowledge and improved understanding will increase Australia's capacity to predict how forests help regulate our climate both now and under forecasted climatic conditions. This research may be adopted in the future to guide reforestation efforts and offer alternative nature-based solutions to address climate change mitigation and carbon accounting schemes.					
	Southern Cross University	159,023.00	315,461.50	286,575.50	130,137.00	891,197.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
The University of New England						
DE240100802	**Enabling a circular economy for poultry via exploration of metabolism**	73,971.50	142,127.50	131,417.50	63,261.50	410,778.00
Moss, Dr Amy F	This project aims to address the environmental and economic burden of food waste by enabling its utilisation as a feed for poultry. This project expects to generate new knowledge in poultry nutrition using a holistic approach exploring the nutritional, health, welfare, economic and environmental effects of food waste diets for poultry. The expected outcomes of this project include enabling food waste diets for poultry and a greater understanding of basic nutrition including, carbohydrate and fat metabolism. This should provide significant environmental and economic benefits by utilising food waste that would otherwise go to landfill and improving our understanding of poultry nutrition, giving potential economic savings over $500 million.					
	National Interest Test Statement Food waste is a potential feed for poultry, but contains a different nutrient composition to traditional ingredients and thus the effects of food waste on poultry must be explored. Therefore, this project addresses the problem of the environmental burden of food waste by enabling its use in poultry diets by exploring its effect on the production of meat-chickens. In Australia, 7.3 million tonnes of food is disposed in landfill/year costing $20 billion and contributing to Australia's greenhouse gas (GHG) emissions annually. Australia has also committed to meeting the ambitious target of 43% less GHG submitted to United Nations Framework Convention on Climate Change. This will benefit Australia by generating an economic benefit of over $500 million per year for the poultry industry and thereby generating social impact by reducing the cost of poultry for the consumer, and reducing annual GHG emissions by up to 5%.					
	The University of New England	73,971.50	142,127.50	131,417.50	63,261.50	410,778.00
The University of New South Wales						
DE240100179	**Lead-free Perovskite Nanowires for Artificial Photo-synapse Arrays**	77,500.00	154,000.00	153,000.00	76,500.00	461,000.00
Lin, Dr Chun-Ho	This project aims to develop lead-free perovskite nanowires based nanoscale artificial photo-synapse arrays for energy-efficient and high-speed neuromorphic computing applications. The aim will be achieved through engineering the materials interfaces between the perovskite nanowires/electrodes and developing a novel orthogonal electron beam lithography process established by the candidate. The innovative nanoscale integration of perovskite photo-synapse circuits will be demonstrated for image recognition applications. The success of this project will advance perovskites in the next-generation memristor devices and ensure Australia as a global leader in the emerging technology of perovskite nanoelectronics for neuromorphic computations.					
	National Interest Test Statement Electronic devices are becoming more interconnected and complex, which is rapidly driving up demand for more advanced computing and data storage. However, such technological advances are posing significant challenges for technology manufacturers. Challenges include complex manufacturing processes involving hazardous materials, high power consumption, and data transmission bottlenecks. The project will overcome these challenges by developing safer, environmentally friendly materials and new manufacturing processes which will enable new ways of doing computing. Partnerships with Australian electronics industry stakeholders to patent and license this new IP will increase national capabilities in high-performance computing by supporting the production of next-generation information storage and processing devices. In addition to environmental benefits, Australian businesses will profit economically and commercially by capturing a share of the computing information storage market, which was valued at USD 104.58 billion in 2022 and is expected to exceed USD 200 billion by 2032.					
DE240100260	**Refugee moral injury: Linking interpersonal trauma and social functioning**	75,805.00	152,299.00	152,884.00	76,390.00	457,378.00
Hoffman, Dr Joel B	This project aims to understand how moral beliefs about past interpersonal traumatic experiences (e.g., torture, rape) are associated with social outcomes considered to be crucial in successful refugee resettlement. This project will investigate the causal impact of these moral beliefs on social adaptation and whether these beliefs are malleable. The project will be a better understanding of how moral beliefs can impact refugees' abilities to navigate and engage with novel social environments. The outcomes of this project will assist service providers and policy makers to					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	understand why some refugees are able to adapt more successfully than others and provide practical tools for improving social outcomes. **National Interest Test Statement** As Australia spends $605 million resettling refugees each year, it is important to understand why some refugees are able to adapt to life in Australia better than others. This project aims to identify how refugees' experiences of interpersonal trauma (e.g., torture, rape) shape their moral beliefs and influence their ability to adapt to new social environments. This knowledge will inform a new framework for managing refugee resettlement, by demonstrating how these moral beliefs influence how refugees are able to engage with others, and whether these beliefs can be modified to improve social adaptation. This framework will be used by refugee service providers to identify the specific needs of refugees while providing ways to facilitate greater social engagement. The outcomes of this research will ultimately improve refugee wellbeing, facilitate greater integration with the Australian community, reduce the economic burden of refugee resettlement, and enable greater economic, social and cultural contributions of refugees to Australia.					
DE240100497 Zhai, Dr Qingfeng	**In-situ Imaging and Detecting Electron Transfer for Single Site Reaction** This research aims to investigate and detect electron transfer numbers in oxygen reduction under atomic scale at one single active site through in-situ Electrochemical Scanning Tunneling Microscopy (ECSTM). Innovations are expected in the novel detection concept, novel nanofabrication approach and innovative ECSTM tip-based imaging and detection technique. Expected outcomes of the project include a reliable detection technique for electron transfer detection and precisely synthesized catalysts for certain applications. This fundamental groundwork provides the guidance to design and develop a high-efficiency electrocatalyst to facilitate green energy storage technology and accelerate Australia's transition into a sustainable economy. **National Interest Test Statement** There is an urgent need for more efficient and cost-effective storage of clean, renewable energy and its conversion into power. These processes involve multiple chemical reactions for which ‘catalysts’ can be used to increase their speed, precision, and efficiency; however, there remain knowledge gaps in how catalysts can improve clean energy storage and conversion. The project will develop new ways for simultaneously creating, measuring, and seeing chemical reactions. These advances will permit the discovery and selection of new, improved catalysts for clean energy storage and conversion. Through partnerships with stakeholders across Australia’s clean energy technology industries, the project’s new IP will enable the production of more efficient and cost-effective technology, such as fuel cells. This will strengthen Australia’s leadership in clean energy technologies and generate significant commercial and economic benefits across multiple technological sectors.	68,974.50	137,949.00	137,949.00	68,974.50	413,847.00
DE240100590 Cassidy, Dr Maja C	**On-chip microwave generation and detection with Josephson photonics** The ability to generate and detect a single photon, a single particle of light, is a key requirement of many quantum technologies from quantum sensors, to quantum computing and quantum communications protocols. This project aims to develop next-generation microwave photon sources and detectors that are based on superconducting effects. It will lead to new knowledge in how to control, entangle and detect single microwave photons in order to make devices that are simpler to build and operate and more efficient than state-of-the-art technologies. This has direct economic benefits in developing new sensors for biological, chemical and astronomical processes and will advance Australia's efforts to build a scalable quantum computer. **National Interest Test Statement** Many advanced technologies, including communications, imaging, and quantum computing, rely on the transmission of information via microwave signals. However, these technologies are limited by an inability to generate and detect individual microwaves, which are called "photons". This project will use superconducting materials to develop new devices and techniques for making and detecting single microwave photons, which can improve the efficiency and accuracy of critical components of sensors and computers. The IP underpinning the techniques will be promoted and licensed to Australian manufacturers for use across multiple strategically important industries and sectors—for example, in components for quantum computers, for advanced radar for defence, and in sensors to detect diseases and locate critical minerals. These advanced techniques will generate commercial and economic benefit at the forefront of Australia’s quantum technologies ecosystem, which the CSIRO predicts will become a $6 billion industry in Australia and provide 16,000 new jobs by 2040.	77,000.00	154,000.00	151,750.00	74,750.00	457,500.00
DE240100614 Lay, Dr Belinda	**How does the brain process conflicting information?** Learning is the means by which we adapt to our environments. Occasionally, what we learn	75,219.50	148,361.50	146,284.00	73,142.00	443,007.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	contradicts our present knowledge about the world. When this occurs, the old and new (contradictory) information compete for control over behaviour. Yet, how the brain processes contradictory information and resolves this competition is poorly understood. This project uses modern genetic tools in rodents to examine how the brain encodes and retrieves contradictory information to influence behaviour. The outcomes include new insights regarding the neural basis of adaptive behaviour; and the benefits include an understanding of why we sometimes fail to adapt to change, and disorders characterized by such failures (e.g., anxiety disorders, addiction). **National Interest Test Statement** The things we learn each day sometimes contradict our existing beliefs about the world, causing old and new information to coexist and compete for control over our behaviour. However, very little is known about how this competition is resolved in the brain. For example, one might learn that huntsman spiders are not dangerous. Yet we do not know why seeing a huntsman spider can still cause panic and avoidance. This project will determine how contradictory information is stored and retrieved in the brain, generating new knowledge about why we sometimes fail to adapt to change, as well as disorders characterized by such failures, including anxiety disorders and addiction. Outcomes of the project will be disseminated to scientists, practitioners, and policymakers, such as those in healthcare, education, and criminology. Social, health and economic benefits are expected by informing and enhancing strategies for managing behaviour.					
DE240100664 Peeks, Dr Martin D	**Pushing the limits of electronic delocalization in organic molecules** This project aims to uncover the factors which control how molecules delocalize electrons in 1, 2, and 3 dimensions. Electronic delocalization is essential for many applications of molecular materials, such as light-harvesting and energy storage, but it remains poorly understood. The expected outcomes of this project include new highly-conductive molecules, transferrable knowledge about aromaticity, and design principles for future organic materials. The expected benefits flow from the foundational nature of this research: pi-conjugated organic molecules have many potential uses, including: sensors (e.g. for environmental monitoring), solar cells, and OLED screens, and this project is expected to improve these technologies and industries. **National Interest Test Statement** The affordability of computational power and the capabilities of computers have increased dramatically since the 1960s, but the rate of advancement is slowing: it is getting more and more difficult to engineer ever-smaller silicon nanostructures for computer chips. The solution is to use nanoscale molecules for electronics, where each individual circuit element (a molecule) is 50,000 times smaller than the width of a hair. In this project we will identify the key design principles which control molecules' ability to transmit electrons. Through partnerships with users and IP licensing, this research will contribute to the Australian advanced manufacturing sector and will help to establish an onshore semiconductor industry (current global value: $860bn). For the Australian community, our research will underpin the electronic devices of the future, with uses from energy storage (e.g., improved batteries), to miniature sensors (e.g., wearable devices), and computing (e.g., faster processing).	73,974.50	149,849.00	151,949.00	76,074.50	451,847.00
DE240100668 Wen, Dr Dong	**Towards Processing of Big Streaming Temporal Graphs** This project aims to develop efficient and scalable algorithms to process big streaming temporal graphs, which is in high demand for many data-intensive applications such as cybersecurity, crime monitoring, and e-marketing. In particular, I will investigate three most representative types of queries including vertex-based queries, path-based queries, and subgraph-based queries. Expected outcomes of this project include theoretical foundations and scalable algorithms to process big streaming temporal graphs as well as a system prototype for evaluation and to demonstrate the practical value. Success in this project should see significant benefits for many important applications such as cybersecurity, e-commerce, health and social analysis. **National Interest Test Statement** As data systems and networks become more complex, we need new ways to visualise and understand changing data quickly and accurately—for example, dynamic graphs that can swiftly detect fraudulent financial transactions. Existing techniques for representing data are insufficient, as they are mostly limited to graphs that represent data at one point in time. This project will develop techniques for filtering, analysing, and querying data using graphs that present data streams in real time. The project's novel, scalable and efficient graph processing will have broad applications from e-commerce to public health. Through industry partnerships and the licensing of IP, enhanced graph processing capability will address pressing industry needs, such as detection of financial fraud in e-commerce, malware in cyber-security systems, terrorist activity on social networks in defence, or contact tracing in public health. This will deliver significant commercial and social benefits across all key Australian industry sectors handling big data and reassert Australia's leadership in big data analytics.	72,500.00	145,000.00	145,000.00	72,500.00	435,000.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100674	**New Frontiers in Large-Scale Polynomial Optimisation**	58,039.50	122,579.00	127,079.00	62,539.50	370,237.00
Dressler, Dr Mareike	Polynomial optimisation is ubiquitous in many areas of engineering and applied mathematics. The mathematical methods and algorithms used for polynomial problems of large size are not sufficiently developed, limiting their applicability for real-world problems. This project aims to develop a mathematical foundation and computational methods for large-scale polynomial optimisation. By using an innovative combination of a novel theory of algebraic geometry and convex optimisation, this project expects to generate new knowledge and tools for solving these problems. Anticipated outcomes include a new generation of large-scale optimisation technologies, providing significant benefit to Australia's industries and international research standing.					
	National Interest Test Statement					
	Optimisation problems are common in many industries and include optimal power flow in energy networks, collision avoidance models for drone aircrafts and efficient surgery scheduling and resource management problems in hospitals. Optimisation of power flow in large-scale networks for example consists of planning the production and distribution of electric power flows, at minimal cost, meeting energy consumption at different network points. Recent changes in large-scale data collections and growth in online operating environments in many areas, have limited our ability to provide physically realisable solutions for these problems. They have caused significant operational and management problems for industries in Australia. The project will deliver state-of-the-art optimisation technologies and off-the-shelve software that can handle the large volumes of data of real-world problems. This will provide significant benefit to Australia's industry sectors such as energy, healthcare and transport sectors.					
DE240100917	**Manufacturing Nanostructured Metallic Materials via 3D Printed Polymers**	73,624.50	150,849.00	155,199.00	77,974.50	457,647.00
Corrigan, Dr Nathaniel A	This project aims to develop additive manufacturing processes capable of rapidly producing nanostructured polymer and metallic materials with tuneable physical and chemical properties. This project expects to develop new knowledge and chemical processes, allowing the rational design of functional materials with applications in catalysis, energy storage, and chemical separations. Expected outcomes include more energy efficient and environmentally benign methods for functional materials synthesis, and increased understanding of structure-property-performance relationships in nanostructured materials. This should provide benefits to Australia by providing cost-effective routes for materials used in energy, health, and water.					
	National Interest Test Statement					
	Materials that have features as small as one-billionth of a metre, known as nanomaterials, are critical for the manufacture of green technologies, such as batteries. However, making nanomaterials involves slow, expensive, resource-intensive processes that create a lot of waste. This project will solve these issues by developing a novel 3D printing process for making nanomaterials more quickly, sustainably, and affordably while using cheap and readily available chemicals. The process will also be more energy efficient than current methods thanks to an innovative use of energy from light (instead of the conventional use of heat) in 3D printing. The project will generate IP of commercial benefit to manufacturers across a range of industry sectors, including energy, water, and health, through applications related to batteries. By licensing IP to industry partners, the project will enhance Australia’s ability to make “greener” nanomaterials and accelerate the adoption of new commercial manufacturing processes.					
DE240100987	**Multifunctional polymers for combined algal inactivation and flocculation**	67,714.50	135,429.00	133,429.00	65,714.50	402,287.00
Hanumanth Rao, Dr Narasinga Rao	Algal cells are harmful because they produce toxins and other undesirable metabolites. So, they are killed, aggregated, and separated from the water in distinct steps. Cell killing and aggregation are achieved via chemical dosing, which damages the cells and releases undesirable compounds. The aim is to develop multifunctional polymers that can simultaneously kill and aggregate the cells without causing cell damage. Additionally, this project provides insight into the mechanisms of polymer-induced cell damage and death that will be used to improve existing treatment methods. By combining treatment steps, chemical demand and costs will decrease, while there will be an increase in sustainability and benefits to the Australian water industry.					
	National Interest Test Statement					
	Due to recent extreme climatic shifts, Australian surface waters have become prone to the proliferation of harmful algae. These cells produce toxins and taste and odour compounds, which could disrupt water treatment operations and supply, in addition to impacting aquatic, animal, and human life. The existing approach for treating algae involves dosing chemicals that kill and damage cells, following which more chemicals are dosed to aggregate and separate the cells from water. In 2000, algal management cost the Australian water industry A$95 million/year. The current project focuses on developing a novel polymer that combines the cell killing and					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	aggregation-separation steps; importantly, the polymer will not damage the cells and release toxins and taste and odour compounds present inside the cells into the water. In the face of changing climate, the novel overarching outcome of combining treatment steps will improve sustainability and decrease costs, thereby supporting the Australian water industry immediately.					
DE240101039 Schweizer, Dr Susanne	**The Impact of Online Social Interactions on Adolescent Cognition** Human cognition has evolved to navigate our complex social interactions. Today these interactions often take place online, especially for adolescents. This project aims to investigate whether and how online interactions shape adolescent cognitive development. The project will overcome current methodological limitations through novel measurements of online interactions and cognition in the real-world and across development. Expected outcomes include new knowledge on the cognitive harms and benefits of online interactions and a framework to guide future developmental research in the digital age. These outcomes will provide significant benefits including novel assessments and insights to inform policy recommendations around digital behaviours.	79,539.50	159,079.00	154,756.50	75,217.00	468,592.00
	National Interest Test Statement Adolescents are increasingly interacting online, a trend that has accelerated since the COVID-19 pandemic. Yet we understand very little about how online social interactions influence the development of adolescents' cognitive skills - their ability to think and reason. This project will identify real-time and longer-term positive and negative consequences of online social interactions for adolescents' cognitive functioning, and how negative consequences can be reduced. Identifying the consequences of online interactions in adolescence is critical, because adolescent cognition predicts a wide range of economic and socioemotional outcomes in adulthood, including income and quality of life. The findings from this project will be communicated to the public through media and public engagement activities, which will allow young Australians and their parents to use the knowledge gained from this project to make informed decisions about their engagement in online social interactions. Findings will also be disseminated as targeted policy briefs to inform policy recommendations on online behaviours.					
DE240101049 Jiang, Dr Jiaojiao	**Modeling the Diffusion of Evolving Rumours in Social Networks** This project aims to model the complex evolution and diffusion process of evolving rumours in social media. This project expects to develop new theories and associated techniques from operational research (adaptive genetic algorithms), mathematics (network theory), and machine learning (generative adversarial networks) to tackle the challenges in this project. This project aims to develop (1) novel models for the evolution of a rumour, (2) novel models for the diffusion of an evolving rumour, and (3) techniques for detecting the diffusion sources of the original rumour and its mutations. This not only will constitute a major advancement in the theory and application of rumour study but also lead the decision-makers in debunking rumours.	73,163.50	144,828.00	143,079.00	71,414.50	432,485.00
	National Interest Test Statement This proposal aims to develop new mathematical methods to understand rumour evolution and rumour diffusion in social networks. By integrating adaptive genetic algorithms from operational research with generative adversarial networks from machine learning, it will create new methods to characterise the evolution or adaptation of a rumour and reproduce the information flow of the rumour in social networks. These tools will allow the derivation of fundamental limits of predictability for artificial intelligence (AI) methods applied to digital data. New theories and mathematics of information flow will produce insights into social influence in online social networks. Benefits include: (1) better understanding of how network structure may impact on the mutation and diffusion of rumours, (2) predictive models for how misinformation can spread online, such as during an emergency, and (3) creating the capabilities to eliminate rumours, especially in critical events, such as Australia Federal Election and Australia's COVID-19 strategy, and positioning Australia as an international technology leader in rumour study.					
DE240101219 Wells, Dr Ruth	**Uncovering epistemic injustice in Australian clinical psychology** This project aims to understand how clinical psychologists privilege Western forms of knowing in ways that have the potential to harm people from refugee and culturally and linguistically diverse (CALD) backgrounds. This is significant because a lack of understanding of diverse forms of knoweldge can lead to harmful or coercive interventions. The expected outcomes will be new knowledge about exclusionary practices in psychology and the design of educational tools to build capacity among clinical psychologists to notice and prevent exclusion. This should have significant benefits such as increasing inclusion for CALD people in Australian mental health services and preventing misunderstandings which can lead to coercive interventions.	68,974.50	137,949.00	137,949.00	68,974.50	413,847.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement It is important that Australia can provide effective psychological support to refugees and other individuals from culturally and linguistically diverse (CALD) backgrounds. Currently, members of CALD communities have unmet psychological needs, because support they receive is often tailored to Western and English-speaking individuals. This project will develop new knowledge and strategies on how to improve psychological support and make it more inclusive to individuals from different backgrounds. Educational tools will be developed and shared with the clinical psychology community, empowering them to meet the specific needs of refugees and CALD clients more effectively. The outcomes will benefit Australia socially and culturally by enhancing national capacity to provide psychological support to Australia's multicultural society across a range of social services.					
DE240101298 Liu, Dr Xu	**Strategies enabling stable perovskite PV devices with efficiency beyond 25%** This project aims to develop technologies enabling stable perovskite photovoltaic (PV) devices with efficiency beyond 25%. The project is built upon my up-to-date achievements on efficiency and patented technologies on stability. The key concept is to lay single-crystalline-featured electron-transport-layer as foundation, followed by superior and neat perovskite light harvesting material through backbone modulation, crystal-facets management and surface-impurity removal. The outcomes are expected to deliver intellectual property academically and commercially, including new knowledge in addressing challenges toward efficient and stable perovskite PV devices and the associated patents for next-stage commercialization.	68,234.50	139,074.00	139,629.00	68,789.50	415,727.00
	National Interest Test Statement To further lower the cost of solar panels requires the development of new materials and devices. This project aims to develop low-cost technologies enabling stable perovskite photovoltaic devices with efficiency beyond 25%. The intended outcome of the project will contribute to a substantial cost-reduction for solar energy conversion, improving further the economics of solar power by promoting the commercialization of perovskite solar cells and will play a vital role in reducing carbon emissions both in Australia and globally. The intellectual property created from this project will be licensed to companies involved in manufacturing of new generation of solar panels. With current global concerns regarding energy high prices and the criticality of supply chains, this project would also assist in developing the capability of establishing manufacturing of solar panels in Australia by overcoming the stability challenges of low-cost perovskite photovoltaics.					
	The University of New South Wales	1,010,264.00	2,031,245.50	2,029,936.50	1,008,955.00	6,080,401.00
The University of Newcastle						
DE240100507 Ruppert, Dr Michael G	**Integrated active microcantilevers for high-throughput nanometrology** This project aims to develop a new versatile, high-performance microsensor platform and microscopy method for measuring nano-scale structures. The proposed microscopy tool is expected to significantly increase imaging speed and miniaturize system footprint, thereby enabling high-throughput quality control of semiconductor devices. The expected outcome is a highly-scalable and low-cost imaging system that will close the technology gap between fabrication and inspection at the nanoscale. The benefits to Australia should include the potential for commercialization to develop this next-generation microscopy tool in high-value market sectors.	74,078.50	148,157.00	148,157.00	74,078.50	444,471.00
	National Interest Test Statement The atomic force microscope is one of the most powerful tools for imaging surfaces down to the atomic level and has remained the key enabling technology for breakthroughs in surface physics, materials science, and nanotechnology. However, a single high-resolution image can take hours which is an economic burden and an enormous barrier for scientific advancement. This project aims to solve the long-standing obstacle of low imaging speeds and slow throughput by developing a new highly scalable microsensor imaging system. This will enable quality control of next-generation semiconductor devices resulting in lower manufacturing costs and increases in reliability of everyday consumer electronics such as smartphones and computers. With approximately half of the global $550 billion semiconductor chip market located in the Asia-Pacific region, Australia is in an ideal position to take the lead on this next-generation technology. In collaboration with already established industry partners, this project has significant potential for commercialisation of this powerful new imaging tool.					
	The University of Newcastle	74,078.50	148,157.00	148,157.00	74,078.50	444,471.00
The University of Sydney						

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100006	**Robust Derivative-Free Algorithms for Complex Optimisation Problems**	72,474.50	147,449.00	149,949.00	74,974.50	444,847.00
Roberts, Dr Lindon J	Mathematical optimisation gives a systematic way for optimal decision-making. This project aims to develop new mathematical tools for complex optimisation problems where limited problem information is available. It will generate new foundational theories for alternative optimisation tools, introducing substantial new capability and rigour to the discipline. The project will create significant new mathematical optimisation techniques and create world-leading and publicly available software. These new techniques and software may ultimately be able to solve some of the most complex optimisation problems in research and industry, such as improving long-term climate predictions and designing 3D-printed medical implants.					
	National Interest Test Statement					
	Mathematical optimisation techniques have been successfully employed in many different fields ranging from manufacturing and production to transportation and scheduling such as timing of sporting events or medical appointments or selecting the best location for a store or a service. Making optimal decisions is crucial to the success of any business or organisation, from maximising profits to minimising pollution. Mathematical optimisation offers a systematic and automated way to make optimal decisions. However, existing mathematical optimisation techniques do not perform adequately in situations involving huge quantities of information that are hard to calculate or uncertain, and where choices are influenced by factors outside the control of the decision maker. This project will develop new mathematical methods for optimising complex, uncertain quantities under constraints, and produce state-of-the-art mathematical algorithms for optimising some of our most complex decisions. Australian firms will be able to employ these algorithms to solve some of their most complex optimisation problems. This research will support scientists and industry to unlock benefits such as improved climate forecasts for a stronger environment, and the ability to design customised and durable 3D-printed medical implants to improve Australia's healthcare and advanced manufacturing capabilities.					
DE240100059	**Robust Renewables Hosting Capacity Enhancement for Distribution Networks**	74,974.50	148,139.00	147,529.00	74,364.50	445,007.00
Zhang, Dr Cuo	This project aims to quantify technical margins and devise novel robust renewables hosting capacity enhancement methods for active distribution networks. High renewables penetration has impaired power quality and network operational reliability, thus reducing renewables utilisation rate and impeding further installation. The intended outcomes are innovative data-driven robustness design methods against complex and uncertain operating conditions, which are able to secure increasing renewables penetration and installation. With emerging community battery and hydrogen electrolyser, a suite of operation and planning methods will be developed, allowing utility operators and government agencies to expedite zero-emission energy transition.					
	National Interest Test Statement					
	Promoting renewable power generation and clean hydrogen production are key priorities as Australia strives to reach its target of net zero emissions by 2050. However, a high proportion of renewables have caused severe technical challenges in our current power distribution systems. These include reduced quality of power supply and restrictions on utilising rooftop solar power, which have economic flow on effects for industry and individuals. This project will identify and address the technical barriers that cause such challenges and offer robust operation methods and innovative optimisation tools resulting in high operational reliability and efficiency of the power grid. The theoretical advances and immediate solutions from this project will contribute to reducing our electricity bills, securing increasing renewables installation, and further supporting Australian clean hydrogen production. Once adopted by utility operators and government agencies, these advances will speed up the national decarbonisation campaign by supplying eco-friendly, cost-effective, reliable, and sustainable energy for Australia.					
DE240100074	**Future-proofing Australia's care economy: A relational mobilities approach**	77,118.00	156,047.00	157,439.00	78,510.00	469,114.00
Williams Veazey, Dr Leah	This project aims to investigate the experiences of Australia's migrant and mobile health workforce in the context of severe worker shortages worldwide. It will explore how healthcare workers' family relationships and informal care responsibilities shape their migration decisions, experiences in the workplace and plans for the future. Expected outcomes include a comprehensive evidence-base about healthcare workers' experiences of mobility, care, knowledge and skills to inform sustainable and person-centred policy solutions. The project should yield significant benefit by maximising Australia's capacity to attract and retain a highly mobile workforce and their transnational knowledge and expertise to meet Australia's growing care needs.					
	National Interest Test Statement					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	Australia faces chronic and worsening shortages of healthcare workers, compromising its ability to provide world-class care. Successive Australian governments have been unsuccessful in attracting and retaining enough skilled migrants to help fill this shortfall. This project takes a novel person-centred approach to understanding international healthcare workers' decisions about whether to migrate to Australia and whether to stay long-term. Moving beyond two-dimensional understandings of these workers as professionally-driven 'skilled migrants', it explores how international healthcare workers' family relationships and informal care responsibilities shape their migration decisions. Findings from this research will help Australia to develop policies that are better able to attract and retain these much-needed workers by taking account of their whole lives as carers at work and at home. Project findings will advance the objectives of the National Medical Workforce Strategy 2021-2031 and provide the evidence-base necessary to address a pressing national need.					
DE240100168 Bi, Dr Lei	**Self-Supervised Sequential Biomedical Image-Omics** This project aims to develop a self-supervised sequential biomedical image-omics model to uncover the underlying biological processes e.g., normal or abnormal. Sequential biomedical images are state-of-the-art imaging modalities which allow to depict changes in progression to the human body. New self-supervised machine learning algorithms are proposed to derive features from heterogenous and unlabelled sequential images. These derived features will then be used to characterise the morphological and functional changes, which provide opportunities to increase understanding of progression of diseases of individual subject. The outcome from this project will provide new insights into system biology with potential future benefits in healthcare.	68,974.50	137,949.00	137,949.00	68,974.50	413,847.00
	National Interest Test Statement Accurate characterisation of functional changes in the human body over time is key to understanding when and why 'things go wrong'. Biomedical image scanners depict these changes with high resolution and sensitivity, but the machine learning algorithms that currently analyse this image data only work on individual images rather than sequential data over time. The aim of this project is to develop new machine learning algorithms that will automatically compute subtle and gross functional changes from sequential scans. This research will lead to improved decision making and new discoveries in biomedical research, for example, in the early detection and understanding of drug resistance. This new capability will give Australian biomedical industry a competitive advantage and ultimately improve the wellbeing of all Australians. The outcomes of this project can also benefit other sectors that rely on imaging data over time to inform decision making – such as remote sensing, satellite and aerial images for agriculture, forestry, land and sea surveillance.					
DE240100295 Calvani, Dr Nichola E	**Unlocking the helminth 'early infection gap' using 3D cell culture models** This project aims to revolutionise the study of critical early host-parasite interactions using innovative 3D cell culture models, reducing our dependence on animal infections. Liver fluke is the most economically important zoonotic parasite of Australian livestock and is a significant contributor to global food insecurity. Due to the reliance of parasites on mammalian hosts to survive, very little is known about the early infection process. Expected outcomes include new knowledge on key migratory stimuli and liver fluke biology. Benefits include the identification of drug targets and vaccine candidates for use in livestock via the development of animal-free in vitro screening platforms that will serve as a prototype for other parasites.	77,842.50	155,242.00	149,939.00	72,539.50	455,563.00
	National Interest Test Statement Minimising the impacts of internal parasites is essential to ensure efficient livestock production that meets the nutritional demands of a growing world. A limited number of drugs to control parasites are available, but they are rapidly being rendered ineffective by the spread of drug resistance. The development of new drugs and vaccines is limited by 1) a lack of understanding about the ways parasites establish infection in mammalian hosts, and 2) a reliance on animal models to sustain parasite infections. These models are expensive, time consuming, ethically undesirable and prevent access to parasites during early infection. This project will revolutionise our understanding of the methods parasites use to infect livestock and cause disease by exploiting 3D cell culture to replicate host tissues in the laboratory. Outcomes include the identification of drug and vaccine targets that are essential to limit the impacts of parasites in livestock, which will benefit Australian farmers. By reducing our reliance on animal testing, this project will establish Australia as a leader in ethical research practices.					
DE240100352 Mizumoto, Dr Nobuaki	**Reconstructing evolutionary history of termite collective nest construction** This project aims to ask and answer fundamental questions about how complex animal collective behaviour has evolved in the history of life. It combines the quantification of termite building behaviour and nest structures using a state-of-the-art video tracking technique with the latest molecular phylogenetics. This project expects to provide the first comprehensive information on termite collective building in a phylogenetic framework, which will be a showcase study of future studies on the evolution of complex phenotypes and resolve a debate over termite social evolution. Furthermore, it provides new knowledge of Australian native termite fauna as economically	66,114.50	132,404.00	128,129.00	61,839.50	388,487.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	destructive pest insects. **National Interest Test Statement** Australia is home to endemic and unique termite fauna. This is valuable biodiversity to the world, and some species cause structural damages costing $910 million annually. Nest construction is a key for termites to be such ecologically and economically important insects. However, their behavioural mechanism for building structures is poorly understood. This project will fill a gap in our knowledge of Australian unique termite fauna, including how they find wood resources through foraging. An improved understanding of termite behaviour would lead to more effective and environmental-friendly termite control methods, which will benefit the health and safety of Australian society. The results will be shared at the Australian Pest Control Association, beyond biological academic society. Furthermore, behavioural algorithms of termites to coordinate their actions within a highly confined space (e.g., inside a nest gallery) have potential applications in engineering systems, including a swarm of rescue robots surrounded by disaster rubble, swarm robots in a warehouse, and nanorobots within a blood vessel.					
DE240100483 Boichak, Dr Olga	**Digital sovereignty and colonialisms in the Russian-Ukrainian war** This project investigates how weaponisation of information and communication technologies affects territorial integrity of sovereign democratic states. Documenting and analysing the architectures, practices and discourses surrounding digital sovereignty in Ukraine's Russian-occupied territories, it contributes a unique regional case to understanding how digital communication infrastructures can be used as tools of colonial expansion. Expected outcomes include a theoretical model of colonial techno-geopolitics and a suite of critical visual approaches to mapping the topographies of digital sovereignty. Benefits include a set of policy recommendations on building and preserving resilient information and communication ecosystems. **National Interest Test Statement** The project offers the first systematic mapping of digital sovereignty in Ukraine by documenting the historically unprecedented weaponisation of telecommunication infrastructures following the Russian invasion. Promoting a stable, peaceful and prosperous region where rules and sovereignty are respected is a key goal driving Australia's foreign policy. Yet, maintaining technological autonomy is contingent on understanding how internet connectivity may be weaponised in the interests of colonial expansion. In light of Australia's ongoing commitment to provide significant military and humanitarian assistance to Ukraine, knowledge generated by this project will contribute to helping Ukraine rebuild its digital communication infrastructures in ways that are resilient to future attacks. This project aims to strengthen Australia's bilateral security cooperation and knowledge transfer with Ukraine through a series of educational and policy events. Lessons from Ukraine could further be applied to strengthen regional security in the Indo-Pacific by increasing autonomy and resilience to modern-day colonialisms.	64,299.50	126,989.00	126,834.00	64,144.50	382,267.00
DE240100531 Crossley, A/Prof Penelope J	**Circular clean energy regulation to solve the PV solar waste crisis** This project aims to design a new analytical framework, circular clean energy regulation, to fundamentally re-orient renewable energy law from the accelerated uptake of new technologies to a lifecycle approach. This re-orientation is urgently needed because while Australia is world leading in its uptake of rooftop solar, 90% of used panels go to landfill as hazardous waste. This project will explore how circular clean energy regulation can improve the management of solar waste to reap the significant environmental, security and health benefits associated with solar recycling and critical mineral recovery. Expected outcomes include a new circular model of regulating renewable technologies, and better regulation and recovery of solar waste. **National Interest Test Statement** Australia is world leading in its uptake of rooftop solar, but 90% of used solar panels currently go to landfill as hazardous waste. To address the national solar waste crisis, this project aims to design a new analytical framework, circular clean energy regulation, to fundamentally re-orient renewable energy law from the accelerated uptake of new technologies to a lifecycle approach. This project will explore how circular clean energy regulation can improve the management of solar waste in Australia to realise the significant environmental, security and health benefits associated with solar recycling and critical mineral recovery. Expected outcomes include a new circular model of regulating renewable technologies throughout the product lifecycle, and better regulation and rates of recovery of solar waste. Through the stakeholder focus groups, workshops and visiting fellowships, the project will facilitate knowledge sharing and establish a solid foundation for the translation of research into regulatory reform, collaboration and engagement.	72,500.00	143,000.00	141,000.00	70,500.00	427,000.00
DE240100711 Latham, Dr Andrew J	**Understanding Psychological Impossibility** This project will develop the first account of psychological impossibility by combining philosophical theorizing with results from the cognitive and brain sciences, and experimental philosophy.	69,039.50	138,079.00	139,079.00	70,039.50	416,237.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	Something is psychologically impossible when it is not available in our psychology as an option to choose. Through developing an account of psychological impossibility this project will advance our understanding of the nature of autonomy, free will and moral responsibility. It will also provide major benefits to policy makers and legal and health professionals by giving them the theoretical resources required for ethical decision making when dealing with people that have different affordances for choice and action. **National Interest Test Statement** People often consider options that would be psychologically impossible for them to choose, despite being physically able to perform them. For example, some mental health conditions such as phobias are characterized by what options a patient finds psychologically impossible to choose and do. By combining philosophical insights regarding people and their choices, with results from the cognitive and brain sciences, this project will develop the first description of psychological impossibility. Our findings will be shared with Australian policy makers, legal and health professionals, and community members, enabling them to engage in more ethical decision making when dealing with people that have different psychological resources for choice and action. By understanding psychological impossibility, we not only advance our understanding of ourselves, and what we are morally responsible for, we also advance our understanding of how to intervene and help people, contributing to the overall wellbeing of Australian society.					
DE240101033 Croot, Dr Xanthe G	**Superconducting Circuits for Error-Resilient Quantum Computers** This project aims to build a new class of intrinsically error-resilient quantum bits, harnessing the power of superconducting and hybrid superconducting circuits. The core goal of this research is to improve the performance of modern quantum processors, in order to reap the benefits of their vast computational power in real world applications like cryptography, chemistry, machine learning and finance. The outcomes of this project are expected to accelerate quantum computing efforts globally and generate critical insights into quantum circuit technology, thus expanding Australia's capabilities in nanotechnology, superconducting quantum systems and quantum processing. **National Interest Test Statement** This project will bolster the performance of superconducting quantum computers by engineering their fundamental building blocks – "qubits" – to be resilient to error. By designing new types of circuits for storing and controlling quantum information, this project is expected to substantially reduce the frequency of qubit errors, addressing one of the key challenges in the construction of large-scale quantum computers. Companies in Australia and abroad who are commercialising quantum computing hardware will be able to incorporate these improved designs, bringing quantum computers that can solve practical, real-world problems a step closer to market. This research will benefit the Australian community by developing quantum technology which, when fully realised, will enhance national security and contribute to pharmaceutical development, machine learning and finance. The quantum circuits developed in this project will contribute to industrial and government efforts to realise large-scale superconducting quantum computers, establishing Australia as a leader in the development of core quantum technology.	75,527.00	146,649.50	149,345.00	78,222.50	449,744.00
DE240101106 Wei, Dr Deheng	**Experimental and numerical studies on internal erosion of granular soils** This research aims to improve our understanding of the mechanisms involved in internal erosion in soil that can trigger instabilities and damage in large scale infrastructures. Specifically, influences of morphology features, at both grain and structure scales, and applied stress on the initiation and evolution of internal erosion will be clarified, to predict where and when the catastrophic failure happens. The proposed proposal will not only surely benefit a broad range of science and engineering communities, but also directly address the second most urgent problems, 'soil and water', in Australia, by rephrasing the Australia standards or guidelines for construction, surveillance, and decommissioning of civil engineering structures. **National Interest Test Statement** Internal erosion in soils can trigger instabilities and damage large scale civil engineering projects including tunnels, deep excavations, and embankment dams, especially for more frequent extreme weathers, such as heavy rain and floods, induced by climate changes. This research will improve our understanding of the mechanisms involved and how they can be predicted. Specifically, we will clarify the influences of morphology features, at both grain and structure scales, and applied stress on the initiation and evolution of internal erosion in granular media. The project is directly relevant to some critical assets appealed by Austalian government, such as the preservation of the Great Barrier Reef from losing its area/soils, and water retainment of Northern Australia. The outcome from this project with environmental change into consideration is certainly helpful to rephrase the Australia standards or guidelines for underground infrastructure structure construction, surveillance, and decommissioning.	68,974.50	137,949.00	137,949.00	68,974.50	413,847.00
DE240101364	**Governing Industrial Data Ecosystems: Open Innovation in a Digital Economy**	74,325.00	148,280.00	148,470.50	74,515.50	445,591.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Randhawa, Dr Krithika	This project aims to investigate how governance mechanisms incentivise multilateral data-sharing to enable open innovation in industrial data ecosystems. Based on a rigorous multi-method study at ecosystem, firm and managerial levels, a framework of generative open innovation to govern multilateral data sharing will be developed. By addressing data-sharing barriers at all levels, the framework helps create collective value at the ecosystem level and capture a portion of that value at the firm and managerial levels. This should enable participants in industrial data ecosystems to share data confidently and unlock the full potential of open innovation for Australia's digital economy, with estimated benefits of $315bn over the next decade. **National Interest Test Statement** Data is the single most valuable resource driving innovation today, with most of the value in industrial organisations. Yet, data is also the most underutilised resource in Australia today – mainly due to regulatory, competitive and trust barriers that hamper the sharing and use of data across industrial organisations, as acknowledged by the 2017 Productivity Commission Report. To close this gap, this project will reveal how to design and deploy governance mechanisms addressing data-sharing barriers across industrial data ecosystems, firms and managers. It will develop a new framework of data governance that incentivises participants in industrial data ecosystems to share data confidently, thus generating open innovation in the digital economy. This will help institute effective large-scale data-sharing arrangements and boost industries, such as advanced manufacturing, following a 30-year decline. Insights will directly contribute to the Digital Economy Strategy and Modern Manufacturing Strategy to improve Australia's innovation and competitiveness, with estimated benefits of $315bn over the next decade.					
	The University of Sydney	862,164.00	1,718,176.50	1,713,611.50	857,599.00	5,151,551.00
University of Technology Sydney						
DE240100272	**Protecting oyster aquaculture from heatwaves and flooding rains**	79,538.00	158,577.50	158,079.00	79,039.50	475,234.00
Scanes, Dr Elliot	This project aims to grow our understanding of disease in oysters following extreme weather events such as heatwaves and floods. Working with industry partners, I will use field and lab-based experiments to determine the underlying causes of oyster mortality following extreme weather. Critically, this project will trial real solutions to reduce disease including selective breeding and co-culture of seaweeds. Expected outcomes include new knowledge on the causes of bacterial disease in aquaculture and real progress towards solutions to mitigate oyster disease following extreme weather events. This project expects to enable the iconic Australian oyster aquaculture industry to grow despite the extreme weather brought by climate change. **National Interest Test Statement** Australia's oyster industry, worth more than $300 million annually, is under threat from extreme weather. In recent years, severe outbreaks of disease in oysters have been triggered by extreme weather events like heatwaves and floods. This project will work closely with industry partners to better understand oyster diseases and how they can be mitigated, and will test novel solutions to mitigate the effects of extreme weather on oysters. It will provide oyster farmers with practices they can implement to reduce the risks of oyster disease and new solutions to mitigate extreme weather events, and these solutions also have potential to generate a secondary source of income. The knowledge generated from this project will be transferable to the rest of Australia's $3.1 billion seafood industry and safeguard the resilience of Australia's food production systems to extreme climate events.					
DE240100321	**Optical Metasurface for Single Small Extracellular Vesicle Analysis**	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
Zhu, Dr Ying	This project aims to develop an innovative nanobiotechnology to study small extracellular vesicles (sEVs) – small biological particles that are important in intercellular communication. The technology will enable unprecedented depth of analysis and single particle resolution. It will generate new knowledge in both engineering and biological sciences by improving sEV image resolution and collecting information regarding the distribution of different sEV subpopulations based on their protein phenotypes. Expected outcomes include a universal and ultrasensitive platform with many applications in analytical biochemistry such as disease diagnostics, environmental sciences, food safety and agriculture. **National Interest Test Statement**					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	The COVID-19 pandemic highlighted the importance of ultrasensitive analytical tools to detect small biological particles, such as virus particles. This project tackles this important issue by developing a new nanotechnology with single-particle resolution, that takes advantage of the ability of engineered nanostructures to manipulate light. The multidisciplinary project will enable the collection of unprecedented depth of molecular information on small biological particles that cannot be achieved with traditional methods. It will increase Australia's global competitiveness as a leading nanobiotechnology innovation hub. Expected outcomes include a universal and ultrasensitive technological platform with diverse applications in analytical biochemistry such as disease diagnostics, environmental sciences, food safety and agriculture with enormous social benefit.					
DE240100417 Ha, Dr Son Tung	**Light-emitting devices for next-generation optoelectronic applications** High-efficiency, multifunction light sources are essential in the new era of intelligent connectivity and hyper-automation for emerging applications in advanced display technologies (e.g., holographic/augmented reality displays), communication devices (e.g., 6th-generation (6G) telecommunication networks), and optical sensing (e.g., for self-driving vehicles & robotics). Realising such devices requires a paradigm shift in optical technology beyond conventional optics. This project aims to develop new light-emitting device concepts that can deliver the technical requirements of these applications by tailoring advanced nanophotonic technologies and recent breakthroughs in advanced functional materials.	75,224.50	150,699.00	150,949.00	75,474.50	452,347.00
	National Interest Test Statement Optoelectronic technologies use optical and electronic mechanisms to generate, manipulate, and convert light. They are becoming increasingly prevalent across computing, consumer electronics, and communications domains due to their low cost, efficiency, and advanced performance. Further innovations are urgently required to ensure the light-emitting technology underpinning optoelectronics applications can keep pace. It is expected that this project's new high-performance, miniaturised, functional light sources will be capable of meeting the demanding technical requirements of future optoelectronic applications, such as tomorrow's quantum optical telecommunication networks, ultra-small virtual and augmented reality displays, and advanced optical sensing systems that guide self-driving vehicles and robots. Commercialisation and adoption of the technology would enhance the competitiveness of Australian automotive, display, and telecommunication industries within the global photonics market predicted to reach $1627B by 2027, and cement Australia's position as a global leader in these technologies.					
DE240100454 Hobbs, Dr Harry	**A Made in Australia Model for Indigenous-State Treaty-Making** This project aims to address the key public law issues that must be resolved for the negotiation of treaties between Aboriginal and Torres Strait Islander communities and Australian governments. This project expects to generate new knowledge about the legal, political, institutional, and other factors behind successful treaty-making in the comparative states of Canada and New Zealand and the legal capacity of Australian governments to engage in treaty-making. Expected outcomes of this project include the development of uniquely innovative and flexible 'made in Australia' models of treaty-making that are constitutionally viable. This should provide significant benefits, such as improving the likelihood of successful treaty processes.	73,557.50	141,990.00	136,092.50	67,660.00	419,300.00
	National Interest Test Statement Since 2016, several Australian governments have formally committed to entering treaty processes with Aboriginal and Torres Strait Islander communities. This is significant. International scholarship reveals that treaties between Indigenous communities and the State can lead to improved economic, social, and cultural outcomes for both Indigenous and non-Indigenous communities. However, because no treaties have ever been signed in Australia, many fundamental questions, such as what a treaty might contain or what a proper negotiation process might look like, remain unclear. Drawing on modern treaty processes in the key comparative states of Canada and New Zealand, this project will identify the critical legal and institutional factors that promote treaty making and address the series of public law questions that must be resolved if Australian treaty processes are to succeed. It will contribute economic and social benefits to Australia by improving the likelihood of successful treaty processes.					
DE240100787 Zhu, Dr Jianfeng	**Multi-Beam and Beam-Scanning Antenna Arrays for Intelligent Wireless System** This project aims to develop and validate the fundamental theory and pioneering multi-beam and beam-scanning transmissive and reflective antenna arrays for intelligent wireless systems. Advanced engineering methodologies will be developed to address the related technical challenges. The expected outcomes are multi-beam antenna supporting frequency-polarization multiplexed communication and two-dimensional dual-beam scanning systems with continuous scan capability over a wide angular range. The developed low-cost and fully passive antennas will	72,480.00	144,800.00	145,245.00	72,925.00	435,450.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	significantly improve the information capacity of the wireless network, providing reliable and highly secure wireless communication. **National Interest Test Statement** Australia is increasingly reliant on modern, high-speed wireless telecommunication systems for efficient functioning of the economy, government, defence as well as police, emergency and health services. However, current telecommunication components do not meet the expectations of future communication needs for emerging applications, especially in terms of power consumption, cybersecurity and the prevention of eavesdropping. This project aims to develop intelligent antenna systems which are low-cost, suitable for next-generation (6G) wireless networks and are inherently designed to minimise eavesdropping opportunities. It will deliver a working prototype system that would allow the fast-growing, Australian telecommunications start-up sector to adopt and commercialise this technology as a key enabler for future 6G networks. This would allow Australia to build local capability in a global growth area and create high-skilled jobs in a global export market. Simultaneously, superior communication equipment designed for cybersecurity will have flow-on benefits for the Australian society, economy and government.					
DE240100868 Zhang, Dr Jinqiang	**High-energy lithium-air batteries, a breathable future for renewable energy** Lithium-air (Li-air) batteries have the highest energy density which is ten folds over commercial lithium-ion batteries. However, the development of Li-air batteries has been impeded by challenges including low capacity, poor energy efficiency and limited cycle life. This project aims to develop a high-energy Li-air battery prototype with long cycle life by designing functional quasi-solid gel polymer electrolytes with multi-layer structures via molecular tuning, which could potentially power next-generation electric vehicles. This project is expected to facilitate the commercialisation of high-performance Li-air batteries and promote the development of energy storage devices that are reliable, benefiting both the economy and environment. **National Interest Test Statement** Lithium-ion batteries are currently the most viable energy supply for electric vehicles. However, current lithium-ion batteries are struggling to break the 500-mile barrier, due to the limitation of the theoretical energy density. Thus, a new high-energy battery system that is safe and reliable is required to propel the electric vehicle industry, which is projected to realise the 50% electrification target for new cars by 2030. By designing gel polymer electrolytes through molecular tuning, this project will advance the fabrication of ‘breathable’ lithium-air (Li-air) batteries that use air as feedstock to produce an energy density of more than 10 times that of current lithium-ion batteries. The outcomes of this project will mark a breakthrough in materials design and system optimisation, as well as prototype fabrication in high-energy batteries. This project will facilitate interdisciplinary collaborations across environmental and material sciences to advance the Li-air battery research field, while also providing industries with cheaper, cleaner and more reliable energy from direct air conversion.	74,774.50	151,799.00	152,149.00	75,124.50	453,847.00
	University of Technology Sydney	450,574.50	897,865.50	892,514.50	445,223.50	2,686,178.00
University of Wollongong						
DE240100204 Pabasara Kumari, Dr Wanniarachchige G	**Geothermal heat recovery and energy storage from underground mines** This project aims to investigate the technological aspects of re-using underground mines as a source for low-carbon heat extraction and storage – while simultaneously providing sustainable solutions for mine rehabilitation. Expected outcomes of this project include a framework to evaluate the viability of a mine-water system as a geothermal heat source; experimental and field exploration of the proposed technology; and strategies to optimise the heat extraction process. Overall, the research provides significant benefits for renewable-based energy transformation while minimising the adverse impacts of post-mining landscapes. **National Interest Test Statement** Whilst mining has long been a significant contributor to Australia’s economic development, the nation is transforming towards a portfolio of diverse low-carbon energy and resources. As a country with a strong mining legacy, Australia has strong potential to convert underground mines to become low-enthalpy geothermal resources to provide heating, cooling and heat storage for homes and businesses. This project aims to develop a new method for harnessing heat from elevated rock temperatures of underground mines, integrating heat pump technology utilising existing mine workings with no drilling or excavation related to the geothermal system. The proposed technology further promotes the effective transition of post-mining landscapes supporting the communities in which it operates. Challenges associated with harnessing geothermal energy safely and economically from underground mines have been overlooked globally. Thus the proposed comprehensive research method contributes to knowledge advancement of a unique scientific problem while improving the country’s reputation to reach climate action targets.	74,699.50	149,199.00	151,374.00	76,874.50	452,147.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100207	**Next-generation system resilience-based design of infrastructure facilities**	69,237.50	138,475.00	139,325.00	70,087.50	417,125.00
Wang, Dr Cao	This project aims to develop a framework for system resilience-based design of infrastructure facilities. In Australia, the costs of natural disasters will rise to $33B per year by 2050 unless steps are taken to guarantee resilience. This project expects to quantify the impacts that structural deterioration, external hazards, and component interaction have on infrastructure resilience. Expected outcomes include new practices for resilience-based structural design, reflecting a next-generation evolution of design philosophy. Expected benefits stem from the development of novel decision-making tools for community planners and designers that will guarantee the resilience of infrastructure systems, and thus mitigate hazard-induced damage costs.					
	National Interest Test Statement					
	Australian infrastructure systems (e.g. transportation and power grids) have suffered significant economic losses and service disruptions due to more frequent natural hazards. To better protect infrastructure, community planners need more sophisticated quantitative tools that enhance resilience, improving the ability to resist, absorb, adjust to, and recover from disruptive events. Infrastructure also needs to become more robust to withstand the effects of a harsher, volatile climate. However, current Australian design standards and codes do not adequately address the need for infrastructure-resilience. This project will develop a novel, resilience-orientated method to guide the design of future infrastructure. Outcomes from this project will be translated into new design standards for the Australian construction industry to build resilient infrastructure to mitigate costs of hazard-induced damage and interruption of services to our communities. Through this project, Australia will play a leading global role in next-generation, resilience-based design of infrastructure facilities for a changing climate.					
DE240100282	**New Frontiers for Anonymous Authentication**	72,000.00	144,000.00	144,000.00	72,000.00	432,000.00
Yu, Dr Zuoxia	The project aims to investigate the new concepts and constructions of anonymous authentication protocols, which can both fill existing research gap and address new challenges raised by new computing technologies. The expected outcomes are novel concepts and methods in constructing anonymous authentication protocols with enhanced functionalities and better efficiency. The project will contribute to safeguard cybersecurity for all Australians and provide significant benefits, such as advancing theoretical knowledge in the research field and enhancing privacy and security of all Australian online services.					
	National Interest Test Statement					
	The project will deliver new concepts and tools in the field of anonymous authentication, which allows users to authenticate himself/herself to a service provider in an anonymous manner. Its aim is to develop cryptographic primitives that can be used to protect the privacy of online users. The project will provide new definitions and constructions of anonymous authentication protocols, which are of great significance to prevent cyber-attacks that damaging the privacy of online users by stealing their personal information. The outcome of the project will help transit the traditional online identity-based authentication method into a new set of privacy-preserving authentication protocols, which would provide a better protection for online services and bring benefits across commercial, research, and governance fields.					
DE240100340	**Identifying key fire drivers in Australia; biomass, climate or people**	77,101.50	147,351.00	143,539.00	73,289.50	441,281.00
Cadd, Dr Haidee	This project aims to provide a greater understanding of Australia's bushfire risk in the face of climate change. By comparing fire occurrence in three Australian bioclimates across two millennial-scale time periods, one prior to human settlement and one during active Indigenous management, this research expects to define which factors — climate, vegetation profile, or landscape management —most impact fire frequency and severity. Outcomes will likely create new knowledge on how past climates affected the Australian environment; enhance predictive ability for future fire risks under emerging climate scenarios; and provide new insights into how cultural burning can be incorporated into fire management plans to reduce catastrophic bushfires.					
	National Interest Test Statement					
	Accurate reconstructions of past fire histories are essential to place current catastrophic fire events into context: are the 2019–20 fires really the worst ever experienced, or merely the worst in recorded history (<100 years)? Understanding the difference, and which factors most affect fire regimes (severity, intensity, and fire return interval) over the long term, will enable important advances in predicting future fire risks and planning effective mitigation strategies. This project aims to understand how fire regimes in eastern Australia over the past 15,000 years and from 125,000 years ago have responded to climate and vegetation. These two timeframes capture environments prior to human settlement, and during active Indigenous fire management, to unravel the benefits of cultural burning practices. Outcomes of this project will provide necessary knowledge					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	to mitigate bushfire risk in Australia in the face of changing climates, supporting Australia's Strategy for Nature, the National Climate Resilience and Adaptation Strategy, and the National Science & Research Priority for Environmental Change.					
DE240100627 Wang, Dr Xiaotian	**Topological phonons in solids** This project aims to create a complete list of possible topological phonons in time-reversal-invariant systems via symmetry analysis, to determine ideal topological phononic materials, and to study topological phonon-related properties and possible applications. The significant outcomes of this project will be the generation of new knowledge that will help conclude the search for novel topological phonons and the prediction of novel topological phononic materials based on the complete classification list of topological phonons. The outcomes of this project should unlock the physics of the exotic topological phonons and lay a solid foundation for applying topological phononic materials based on their unprecedented properties.	71,375.00	144,750.00	146,750.00	73,375.00	436,250.00
	National Interest Test Statement A phonon is a common particle that makes critical contributions to many physical properties, such as thermal conductivity, thermoelectricity or superconductivity. More recently topological phonon is a new physical phenomenon observed in quantum matter that is expected to assist the discovery of new quantum materials. This project will develop a comprehensive library of materials exhibiting this exciting and promising physical property. Researchers in quantum materials harness quantum mechanics to develop new or improved states of material leading to innovative devices and systems, with the goal of furthering our understanding of nature and creating new or improved technologies. These strange properties can be exploited to deliver devices that have new capability in telecommunications, defence and medical sciences such as digital power electronics for electric vehicles and power grids, or high energy radio-frequency electronics for radar applications. Furthermore, topological phonon materials are strongly aligned with quantum computing, thus opening new opportunities and possibilities in the areas of artificial intelligence and information technology. The knowledge generated from this project will place Australia at the forefront of global efforts in this rapidly advancing research field, and provide a strong fundamental platform for translational research in the future and benefit a range of Australian industries and manufacturers.					
DE240100707 Cox, Dr Dezerae	**Towards a molecular fingerprint for human-specific endogenous retroviruses** This project aims to understand how ancient viral sequences resident in the human genome can contribute to cellular processes. Using a novel molecular toolbox that combines affinity-directed proximity labelling mass spectrometry and single molecule microscopy, this project will characterise the cellular fingerprint of a human endogenous retrovirus family HERV-K (HML-2). This fingerprint will comprehensively describe how expressed HERV-K loci engage with the homeostasis network in human cells. This will provide significant benefits in the form of new knowledge concerning fundamental aspects of cellular homeostasis, and a state-of-the-art molecular biology toolbox ready to explore quantitatively the role of HERV-K in human health and disease.	77,347.00	154,831.50	148,116.00	70,631.50	450,926.00
	National Interest Test Statement Almost one-tenth of human DNA came from ancient infectious viruses. The presence of these DNA sequences, known as retroviruses, means our cells produce building blocks originally of viral origin. We lack understanding of how these viral building blocks impact the normal function of human cells and may lead to disease. To address this knowledge gap, this project will bring together powerful biochemical, biophysical and molecular biology techniques to provide unparalleled insight into how viral sequences embedded in the human genome affect molecular processes in human cells. This new knowledge will yield fundamental insights into human biology. This knowledge is of great economic value to Australia as it has the potential to super-charge diagnostic and therapeutic strategies for diseases such as cancer, Alzheimer's and motor neuron diseases. This benefit will be realised by working with the Australian medical biotechnology sector, and through contributing to future fundamental research seeking to advance the health of Australians.					
DE240100780 Lewis, Dr Jacob S	**Functional and structural dissection of the human replisome** This project aims to develop technology to visualise the structure and enzymatic activities of the human replisome, the multiprotein assembly that copies DNA before cell division. A combination of novel single-molecule and state-of-the-art cryo-electron microscopy will be used to define how the human replisome coordinates DNA synthesis during times of replication stress. Key outcomes of this project include development of novel molecular visualisation technologies, leading to the first molecular description of dynamic processes used by the human replisome. Benefits include improved understanding of a fundamental biological process that often malfunctions in cancers, development of novel methodology, and interdisciplinary training.	74,539.50	151,079.00	153,079.00	76,539.50	455,237.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Every time a cell divides, it must copy all of its DNA without any errors, and then split the DNA equally into two new cells, a process fundamental to life. The process of copying DNA is complicated and barriers to this process cause many diseases, including cancer. This project will examine how the protein machinery that copies our DNA overcomes these barriers. By using cutting-edge electron and light microscopes, this project will help us better understand this molecular process, by determining the individual shapes and visualise the dynamic behaviours of these protein complexes, for the first time. This project will generate new scientific techniques that will support the biotechnological and pharmaceutical industries in Australia and provide new information that may lead to new therapeutic strategies to treat cancer and other diseases. The project will provide exceptional multidisciplinary training opportunities for Australian researchers and will build Australia's capability in the rapidly expanding fields of biochemistry and high-resolution electron microscopy.					
	University of Wollongong	516,300.00	1,029,685.50	1,026,183.00	512,797.50	3,084,966.00
Western Sydney University						
DE240101131 Dalziell, Dr Anastasia H	**Animal cultures and anthropogenic change** This project aims to investigate the impacts of anthropogenic change on the elaborate song cultures of declining Australian songbirds. Culture is fundamental to the biology of social animals, and has profound implications for biodiversity conservation; however, the drivers of animal cultural change are unclear. This project will analyse how lyrebird song cultures respond to anthropogenic environmental change, including Australia's 2019-20 megafires. Furthermore, it will assess the mechanisms linking environmental and cultural change, and examine the utility of vocal cultures as bioindicators of ecological health. This project will advance fundamental research in animal culture and enhance the conservation of cultural diversity in the wild.	76,839.50	152,379.00	153,429.00	77,889.50	460,537.00
	National Interest Test Statement Australia's songbirds produce some of the most elaborate songs in the world and these songs are learned in part from others, creating a network of song cultures across our continent. Like human languages, avian song cultures can be impoverished by environmental change, therefore leading to a loss in an important component of biodiversity. Yet, we do not have the information required to understand and conserve animal cultures in the wild. This project will analyse archival and new song recordings at a subcontinental scale to determine how lyrebird song cultures respond to human-mediated environmental change, including Australia's recent Black Summer megafires. This project will deliver explicit recommendations for the conservation management of song cultures in Australian birds and provide a model for the conservation of animal culture more broadly.					
DE240101422 Alim, Dr Md Abdul	**Chameleon-Inspired Building Envelope for the Australian Building Sector** The project aims to develop an intelligent reflective coating that can act like a chameleon skin on a building surface, allowing sunlight to reflect efficiently in summer and be absorbed in winter without using pigments or dyes. The research will reveal how microstructural architecture can mimic a chameleon skin on building envelopes to address the critical challenge of this technology, which is overcooling in winter. The expected outcome is a smart coating technology that is easy to manufacture on small and large scales with no winter penalty, compatible with even, uneven and rough surfaces, free from the use of pigment and durable under sunlight.	78,625.50	156,355.50	155,254.50	77,524.50	467,760.00
	National Interest Test Statement Reflective coating on building surfaces effectively protects buildings from weather and reduces indoor energy consumption by lowering space-cooling energy demand. The major challenge in adopting this technology in the climate of many parts of Australia is its winter penalty – an increased heating energy demand. This project will address the issue by developing an innovative coating technology that relies on the meticulous design of microstructural architectures. The expected outcome is a smart coating technology that is easy to manufacture at small and large scales with no overcooling in winter. New knowledge on the mechanism of how microstructural architecture can be used to mimic a chameleon skin on building envelopes will be developed. Applying this coating on buildings will save energy, reduce electricity costs and lower CO2 emissions, which will benefit Australia towards achieving its 2050 net-zero target. The study will produce research evidence for industry and government to adopt this technology.					
	Western Sydney University	155,465.00	308,734.50	308,683.50	155,414.00	928,297.00
	New South Wales	3,503,697.00	7,008,621.50	6,958,855.50	3,453,931.00	20,925,105.00

* 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 2024 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Northern Territory						
Charles Darwin University						
DE240101337	**Unpacking the policy process: alcohol policy in complex social environments**	73,500.00	145,000.00	143,000.00	71,500.00	433,000.00
Wright, Dr Cassandra J	In pursuit of effective alcohol policies, experts have focused on promoting evidence-based solutions, assuming that policymakers will select policies on the basis of research evidence. However, this linear model of evidence-based policy rarely plays out when related to highly contested social issues such as alcohol use. We need new ways of thinking about influencing alcohol policy that account for and engage with the realities of policymaking in socially complex regions, particularly policy relating to Aboriginal and Torres Strait Islander peoples. This DECRA will address this critical gap in knowledge by generating knowledge on alcohol policy processes, with a view to informing more effective engagement in the alcohol policymaking process.					
	National Interest Test Statement Effective alcohol policies are an essential component of responding to the significant social harms caused by alcohol use. Researchers and advocates often assume that promoting evidence-based solutions will influence the uptake of policies, but research suggests that this does not account for the complex political factors which also influence decision-making such as the political climate and the framing of the problem. This is especially the case in Northern Australia where alcohol has been highly politicised. We therefore need new ways of thinking about influencing alcohol policy that account for and engage with the realities of policymaking in socially complex regions, particularly that relating to Aboriginal and Torres Strait Islander peoples. This research will provide critical new knowledge on the alcohol policymaking process in socially complex regions. The research will offer training and resources on how to engage more effectively in the alcohol policymaking process for researchers, advocates and health and social welfare professionals.					
	Charles Darwin University	73,500.00	145,000.00	143,000.00	71,500.00	433,000.00
	Northern Territory	73,500.00	145,000.00	143,000.00	71,500.00	433,000.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Queensland						
Griffith University						
DE240100030	**Applying digital archeology to rock art placement**	74,347.00	147,539.50	144,540.00	71,347.50	437,774.00
Jalandoni, Dr Andrea	Digital archaeology can be used answer fundamental questions about rock art that reflect key cognitive behaviour. This project aims to develop innovative digital archaeology techniques to allow for more data to be collected along with more sophisticated tools for analyses that leads to a more holistic interpretation of rock art. This project expects to generate a state-of-the-art detailed 3D record of Injalak Hill, a methodology that can be tested and replicated worldwide, and new techniques that advance rock art research. The benefits of this project are improving methods to manage cultural heritage, and exploring new ways for Indigenous communities to engage with their cultural heritage using digital products.					
	National Interest Test Statement					
	Rock art is a significant cultural heritage for Australia, but traditional methods of research have not been able to answer one of the fundamental questions everyone asks about rock art: why is it there? Digital archaeology can be used to expedite the collection, processing, and analysis of large amounts of data that will lead to new understandings of rock art placement and provide insight into the decision-making process of our ancestors. The resulting digital products can also be used to help communities engage and manage cultural heritage. For most in the Indigenous community of Gunbalanya, it will be first time for them to experience their rock art digitally, which provides new ways to access and interact with their cultural heritage. As physically reaching some sites is difficult for many Traditional Owners, particularly the elderly, the digital products of the rock art will be evocative and provide the opportunity for wider community discussions that may also lead to better interpretations of their art.					
DE240100236	**Designing and fabricating artificial blood cells for global shortages**	76,440.50	152,437.50	155,351.00	79,354.00	463,583.00
McNamee, Dr Antony P	This project aims to create the first biophysically accurate artificial blood cells through fabrication of novel synthetic particles that mimic the complex layers of red blood cells. Using innovative methods from engineering and biology, this project expects to advance biofabrication techniques for biosynthetic microparticles. Expected outcomes from this project include the development of a portable, cost-effective platform technology to immediately advance foundational understanding of cell membrane dynamics, interactions, and integrity. We anticipate that the new bioengineered blood product will provide significant future benefits for blood storage and transfusion, including potentially alleviating global blood shortages.					
	National Interest Test Statement					
	If an individual loses too much blood during traumatic injury or surgery, blood transfusion is required for survival. Internationally, blood availability is challenged by severe stock shortages. Given no Therapeutic Goods Administration (TGA) approved alternative exists for blood transfusion, there is an essential need to innovate a technical solution. This project aims to bioengineer the first mechanically accurate artificial blood with synthetic particles that mimic the many complex layers found in human blood cells. Using innovative methods, this project is expected to generate foundational advances in biological fabrication techniques and membrane biophysics, that will inform new discoveries of cell membrane dynamics, interactions, and integrity. This novel platform technology, and associated cost-effective manufacturing device, are expected to provide significant benefits to Australia's biomedical industry. Following future clinical trials (outside the scope of this project), this discovery may help alleviate global blood shortages, thus addressing international health and economic priorities.					
DE240100408	**Advancing bioelectronics with silicon carbide on microfluidics**	73,915.00	149,666.00	149,290.50	73,539.50	446,411.00
Nguyen, Dr Tuan-Khoa	Flexible bioelectronics is an emerging technology for real-time monitoring of vital signals on skin and in the body. Microfluidics is a technology for fluid handling in microscale. This project aims to develop the first platform technology with both flexible bioelectronics and microfluidics for enhanced sensing, thermal management and actuation. The project is expected to establish new fundamental knowledge in sensitivity boosting mechanisms with nano-thin semiconducting films, practical prototypes for long-lasting bioelectronics with integrated microfluidics and their large-scale manufacturing processes. Outcomes include step changes in designing innovative wearable and implantable devices and their massive commercialisation opportunities.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement					
	Integrating electronic devices inside the body enables unprecedented novel diagnostic and therapeutic capabilities to address personal health conditions. Current electronic medical implants pose a high risk of degradation and poor performance in the body due to their lack of flexibility, sensitivity and longevity. To address this gap, this project will explore new physics and develop advanced manufacturing technologies for implantable neurological devices using ultra-thin semiconducting membranes with flexible microfluidics. The proposed technology will support the development of a new class of therapeutic devices, such as local nerve coolers and stimulators for treatment of chronic neurological conditions and pain management. The project will generate innovations in soft implantable bioelectronics, offering Australian biotechnology industry access to a new platform technology with massive commercial opportunities in the global market of $169 billion by 2030. The findings will be made widely available through open access publications and licensing agreements with industry partners.					
DE240100416 Backhaus, Dr Bridget J	**Beyond broadcasting: Community radio as a model community organisation** With 20,000 volunteers, almost six million weekly listeners, and 50 years of history, Australia has one of the most well-established community radio sectors in the world. Yet discussions about community radio are limited to debates about media. Community radio stations are diverse and community-engaged organisations, with much more to offer than just what's on air. This research aims to explore community radio as a model for successful, sustainable, and diverse community organisations. The findings of this project will help other community organisations improve their community connections and engagement, and articulate their value, which will contribute to re-engaging Australians in civic life.	73,467.00	146,894.50	152,896.50	79,469.00	452,727.00
	National Interest Test Statement					
	Community life in Australia was already on the decline before the pandemic. While many community organisations are struggling with low volunteer numbers and community engagement, community radio stations are going from strength to strength. Australia's community radio sector is one of the best in the world - representing diverse communities on 450 services around the country, powered by the work of more than 20,000 volunteers. There is an urgent need to encourage everyday people to get out into their communities and reinvigorate public life through service and volunteering, and community radio offers a sustainable and diverse model for doing just that. There is a lot to learn about how community radio stations provide value to their volunteers and stakeholders, and how they maintain such diverse and engaged communities. Working closely with sector peak bodies, this research will produce a toolkit for community organisations to apply the learnings of community radio to their own work which will contribute to more connected, engaged, and diverse community organisations.					
DE240100562 Rourke, Dr Michelle F	**International virus regulation: a novel legal framework** COVID-19 highlighted the fragmented and poorly defined state of international virus regulation. This project aims to investigate the range of international institutions, structures, laws and stakeholders that regulate virus samples and viral genetic sequence data. The project expects to generate a comprehensive understanding of the international legal landscape and will recommend reforms to create a cohesive approach to international virus regulation. Expected outcomes include a robust legal framework to help stakeholders navigate the complex web of international laws about viruses. Benefits include improved access to viruses and viral genetic sequence data for scientists and the more equitable dissemination of the results of virus R&D.	70,943.50	141,887.00	136,043.50	65,100.00	413,974.00
	National Interest Test Statement					
	Viruses are not simply a threat to public health, they are also vital inputs to scientific research that aims to address some of Australia’s most pressing problems in food security, medicine and environmental management. The international rules around who can access virus samples and for what purposes are poorly understood and unsuited to the modern scientific research and development landscape. This project will develop a complete picture of how transactions with viruses are regulated at the international level and will use that information to develop international legal reforms and regulatory tools for policy and decision-makers. This research will also provide practical advice to help Australian scientists navigate a complex legal landscape when accessing and utilising viruses. This project will contribute to the development of more harmonious laws about viruses and ensure that Australian scientists can secure access to important virus samples and associated genetic sequence data to conduct scientific research important to Australia's interests, without the fear of infringing the laws of other countries.					
DE240101090 Zhang, Dr Lei	**In-depth Investigation of Lithium Dendrite Formation Processes** Battery failure is mainly derived from uncontrollable lithium dendrite formation. This project aims to investigate fundamental lithium dendrite formation mechanism by utilizing a novel in-situ transmission electron microscopy cell. This project expects to build a new set up which is	71,539.50	144,069.00	145,069.00	72,539.50	433,217.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	capable of simultaneous in-situ electrical and nanomechanical measurements of lithium dendrite growth. This project aims to reveal how lithium dendrite growth is affected by different surface modifications on the commercial graphite electrodes. The success of the project will lead to a fundamental understanding of the lithium dendrite formation mechanism, enabling the construction of significantly safer batteries.					
	National Interest Test Statement					
	The lithium ion battery is the most important energy storage system dominating the commercial market and used in products ranging from mobile phones to solar energy storage. However, its further deployment is impeded by safety issues derived from its uncontrollable lithium dendrite formation. This project overcomes this technological challenge by developing a new experimental set-up to enable an enhanced fundamental understanding of the lithium dendrite formation process through simultaneous in-situ electrical and nanomechanical measurements. The success of the project will lead to a suite of new safer battery designs. This project directly addresses the Australian Government Science and Research Priorities: Energy - New clean energy sources and storage technologies that are efficient, cost-effective and reliable. The cutting-edge science and enabling technology developed through this project will provide solid benefits to Australian clean energy and chemical engineering industries.					
	Griffith University	440,652.50	882,493.50	883,190.50	441,349.50	2,647,686.00
James Cook University						
DE240100654	**Critical metal fluid migration in shear zones during tectonic switches**	77,909.50	157,434.00	156,274.00	76,749.50	468,367.00
Finch, Dr Melanie A	This project aims to investigate why critical metal ore deposits form in inverted shear zones, which are zones of deformation that result from tectonic plates moving away from then towards each other. Numerical modelling of inverted shear zones will reveal drivers of ore fluid migration and will be combined with investigation of mineralised and non-mineralised inverted shear zones. This project will generate a new understanding of how inverted shear zones pump fluids through rocks to cause enrichment and ore deposition. This type of deposit is common in Queensland and the expected outcomes are improved exploration models, leading to discovery of new ore deposits, which is pivotal as the global demand for critical metals increases.					
	National Interest Test Statement					
	As the world moves toward net zero emissions, unprecedented quantities of ‘critical’ metals will be required in wind turbines, solar panels and electric cars. This includes rare earth elements and copper, which concentrate into ore deposits when hot, metal-laden fluids move through zones of deforming rocks (shear zones), which are weak rock layers hosting many of the critical metal deposits that form when divergent (stretching) tectonic plate boundaries become convergent (squeezing) during tectonic switches. The project will determine how tectonic switches changed fluid migration in shear zones and generated Queensland’s critical metal deposits. For the first time the geological processes that govern mineralisation in shear zones will be fully understood. The characteristics of mineralised shear zones determined through this research can be used by explorers to improve search criteria, potentially leading to new discoveries of critical metal ore deposits. These ore deposits are among the world’s richest sources of critical metals and new discoveries will generate jobs and economic wealth for Australia.					
	James Cook University	77,909.50	157,434.00	156,274.00	76,749.50	468,367.00
Queensland University of Technology						
DE240100128	**Engineering microenvironments to regulate osteocyte 3D networks in vitro**	75,000.00	150,000.00	150,000.00	75,000.00	450,000.00
Bock, Dr Nathalie	Most knowledge of bone is based on only a fraction of cells found in bone because the majority of cells in our bones (called osteocyte cell networks) cannot easily be grown or studied outside the body. This results in the inability to understand how the bone organ functions. Using bioinspired engineering, this project will use advanced biomaterials to biofabricate, for the first time, osteocyte cell networks in vitro. By unravelling how they are formed and controlled by manipulating their microenvironment, we will discover how different types of bones are formed. The benefits will be a valuable tool for the bone research community, allowing unresolved questions to be addressed in the future, such as how bone forms, repairs, and remodels.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Most knowledge of bone is based on a small fraction of cells found in bone because the largest (>90%) population of one cell type in our bones cannot be easily grown outside the body. These cells (osteocytes) instruct all biological events in bone by forming a network, like neurons in our brain. The lack of a reliable in vitro model to study osteocytes results in the inability to understand how the bone organ functions, as osteocytes are the key players dictating bone growth and repair. Using advanced manufacturing technology, this project uses smart biomaterials to biofabricate, for the first time, osteocyte networks in vitro. By manipulating their environment, we will unravel how osteocyte networks are formed and controlled and discover how different types of bones are formed; weak bone during fracture repair and lamellar bone, the strong bone that enable us to move. The benefits will be a valuable tool for the bone research community, allowing unresolved questions to be addressed in the future, such as how bone forms and repairs and how bone diseases can be treated at an individual level.					
DE240100149 Fischer, Dr Tobias	**Adaptive and Efficient Robot Positioning Through Model and Task Fusion** This project aims to create fit-for-purpose positioning systems that continuously adapt to diverse and changing environments. The project expects to contribute to the knowledge across robotics, computer vision, and neuromorphic computing. Expected outcomes of this project include ground-breaking place recognition techniques that address two fundamental limitations in the state-of-the-art: continuous adaptation, critically important in safety-critical systems, and energy efficiency, critically important in resource-constrained systems. This should provide significant benefits, such as accelerated deployment of mobile robots, drones and augmented reality solutions in manufacturing, defence, healthcare, household, and space.	79,522.00	154,522.00	151,500.00	76,500.00	462,044.00
	National Interest Test Statement This project aims to advance the capabilities of visual positioning and navigation systems. Knowing where one is located is a critical capability that improves informed decision making and performance for robots, augmented reality devices and people alike. The project focuses on overcoming current limitations of positioning systems – a reliance on vulnerable GPS satellites, high energy consumption and a lack of robustness – by combining the best performance of different techniques and using brain-inspired computing. Anticipated economic and commercial benefits include reducing Australia's dependence on external satellite-based positioning systems and bolstering capabilities in priority sectors like robotics, artificial intelligence, transport, and defence. Australia's society will also benefit from the project's non-technical consideration of data privacy, sustainability and ethics. We will collaborate with industry partners, government organisations, and policymakers to ensure our research outcomes are widely adopted, reinforcing Australia's position as a global leader in autonomous technology.					
DE240100189 Watson, Dr Danielle V	**Beyond Imported Understandings of Domestic Violence in the Pacific** High occurrences of domestic violence across the Pacific region threatens the growth and development of all sectors. This project aims to investigate local understandings of the causes, manifestations, and best-suited responses to the problem in the Pacific. It advances a study of local stakeholder's perspectives of domestic violence in two of the least developed Pacific Island countries to generate non-Western, context-specific insight into developing policies and practices to inform improved frontline responses. Expected outcomes include the development of an evidence base to inform contextually appropriate and innovative responses to domestic violence, with benefits to islander/indigenous communities and economies in Oceania.	72,500.00	145,000.00	146,500.00	74,000.00	438,000.00
	National Interest Test Statement This project will provide timely new knowledge on peripheral understandings of domestic violence informed by geopolitical, historical, cultural and social context. It will advance a multi-island case-based study of contextualised responses to domestic violence in the Pacific and build on existing priority areas within the Australian Aid and Development programme about the significance of domestic violence prevention in the Pacific region. Project insight will inform more effective and focused investments to help lower the high costs of domestic violence in Pacific Island states. It will offer innovative understandings of domestic violence and applicable responses to inform improved international engagement between Australia and its Pacific partners.					
DE240100519 Shi, Dr Xiaolei	**Solving key issues in wearable thermoelectrics for practical applications** Wearable thermoelectrics can directly harvest electricity from body heat, offering a new technology to charge wearable electronics sustainably, but their unsatisfied performance and durability limit their applications. This project aims to design efficient and durable wearable thermoelectrics based on novel carbon/polymer/semiconductor (CPS) hybrid films. The key breakthrough is to develop advanced hybrid materials and devices with record-high	70,064.50	140,104.00	140,079.00	70,039.50	420,287.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	thermoelectric performance, high stability, and high durability to tackle long-lasting practical application issues. The expected outcomes will lead to innovative technology for energy conversion and advanced manufacturing and place Australia at the forefront of energy and manufacturing. **National Interest Test Statement** Wearable thermoelectric generators can harvest electricity from body heat to charge wearable devices, which will open an avenue in the electronic industry. Cost-effective, eco-friendly, and wearable thermoelectrics composed of high-performing and durable carbon/polymer/semiconductor (CPS) hybrid films as key thermoelectric materials will be integrated with the human body for thermal regulations and power generation, which will bring tremendous economic and environmental benefits to our society. The success of this project will provide brand-new technology and scientific fundamental outputs in the field of thermoelectrics and the electronics industry, which will significantly enhance the international visibility and impact of Australia in the area of the development of sustainable energy and smart electronics. The developed technology will be utilised in the electronics industry for wearable microelectronics. In this case, the consequence of this project will help to create new employment opportunities in the fields of energy and electronics and will provide wealth generation for Australia.					
DE240100650 Jenner, Dr Adrianne L	**Behind the barrier: using mathematics to understand the neuro-immune system** This project aims to develop new mathematical methods to study healthy immune cell regulation in the brain and movement across the Blood Brain Barrier. The project expects to develop novel deterministic and stochastic mathematics that captures the stochasticity of immune cells in the Central Nervous System (brain and spine) and form the foundation of a new field of mathematical research: mathematical neuroimmunology. Expected benefits of this project include new mathematical tools, biological insight, and strong interdisciplinary collaborations. From this project, Australia will be placed at the forefront of mathematical research in neuroimmunology, and there will be a complete understanding of homeostasis of the neuro-immune system. **National Interest Test Statement** A complex network of immune cells protects the brain and keeps it healthy, however, breakdowns in this network can lead to neurological issues. Much remains unknown about how immune cells cross into the brain from the blood and how they communicate with each other. This project will develop new mathematical methods to better understand the immune cells of the brain. The mathematics pioneered in this research will have immediate impact on the data science and mathematical community and lead to a broad range of societal benefits including health benefits. The knowledge gained on how cells move through tight barriers will provide insight for biomedical engineers developing porous materials. The mathematics developed for multi-agent decision making will potentially have impact in other areas where coordinated decision making is important, such as understanding public responses to policy changes or transport modelling. This project will also lead to the creation of a new field of research, mathematical neuroimmunology, with outcomes, in the long-term, of improved treatment for brain-related illnesses. This will only be achieved by working collaboratively by domestic and international interdisciplinary scientists.	74,539.50	147,079.00	147,079.00	74,539.50	443,237.00
DE240101045 Bai, Dr Juan	**Bioinspired 2D nanocatalysts for inorganic nitrogen cycle** This project aims to develop novel catalysts for high-efficient nitrogen fixation by learning from the natural enzymes, which can convert nitrogen or nitrate into reactive ammonia at very mild conditions. It is expected that the enzyme-mimicking catalysts possessing the nitrogen active sites similar with the natural enzymes will allow the effective fixation of nitrogen from both the atmosphere and the nitrogen excessively fertilized environment into reusable ammonia. The outcomes of this project will provide a sustainable approach to solve the issues in current unbalanced inorganic nitrogen cycle in the world and contribute to a green artificial nitrogen cycle while with minimized environmental impact. **National Interest Test Statement** The project seeks to find a solution to address the high levels of nitrogen discharged into the environment from industrial waste and fertilizers used in agriculture. High-performance materials that increase rates of reaction will be developed by drawing inspiration from how plants use nitrogen. These materials will convert excessive nitrogen discharge into agricultural fertilizers with low energy consumption and cost. The outcomes of this project will transform the energy-consuming and environmentally destructive ammonia production industry (on which fertilizers are based and of which nitrogen is a key component).This innovative project will contribute to the sustainability goals of Australia and will position Australian as a leader in clean agricultural and environmental technologies by providing a platform for the development of alternative technologies to convert nitrogen into ammonia, that are both low energy and undertaken at room temperature.	75,124.50	150,164.00	149,079.00	74,039.50	448,407.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240101152	**A Justice-based Approach to Climate-related Planned Relocation**	76,674.50	153,275.00	153,362.00	76,761.50	460,073.00
Piggott-McKellar, Dr Annah E	Planned relocation of populations away from climate risk is a critical adaptation strategy. Yet relocation is fraught as it disrupts livelihoods, social networks and place-attachment. This project aims to examine how justice can be centred in planned relocation using innovative cross-cultural methods in six case studies across Australia and Fiji. New knowledge will be generated on effective governance, barriers to participation, and long-term impacts of relocation. Expected outcomes of this project are innovations at the nexus of adaptation, relocation and justice, new international research networks, and direct improvement of how relocation is planned and managed by governments, through recommendations and a framework for Just Relocation.					
	National Interest Test Statement					
	This project examines the planned relocation of households and communities in response to climate and disaster risk, and how a justice-based approach can improve relocation processes and outcomes. This research project addresses and contributes to significant gaps in the relocation literature including what factors shape household decision-making, the role of governance, and the long-term outcomes and implications of planned relocation. A framework and recommendations on 'Just Relocation' will be developed enhancing stakeholders, including governments, ability to plan for relocations in Australia and beyond. These recommendations will give end-users learnings of how relocation can be designed and managed to be more equitable for affected populations, how procedural justice can be mobilised in relocation decision-making, and how relocation can be planned to enhance positive outcomes for affected people, having not only economic benefits in ensuring high participation and sustainability of relocation programs, but also creating strong social and cultural benefits.					
DE240101170	**Design new-generation microscale thermoelectric device**	75,039.50	152,079.00	154,079.00	77,039.50	458,237.00
Liu, Dr Weidi	This project aims at realizing ultrahigh thermoelectric power generating performance in the microscale device by developing new theoretical models for thermoelectric power-generation to guide the synergistic thin-film material and device design, and corresponding fabrication. The outcomes are expected to lead to revolutionary development of the thermoelectric technology, significantly extend the application of this emission/vibration/noise/service-free technology and expand the corresponding market, which will benefit the wide Australian community academically, educationally, socially, economically and environmentally.					
	National Interest Test Statement					
	Thermoelectric technology is emission/vibration/noise/service-free technology capable of direct/reversible energy conversion between heat and electricity, has wide application potentials, such as wearable chargers, personal and microchip cooling. However, low power-generating performance and large size of typical bulk thermoelectric materials and devices have limited their applications. In this project, theoretical modelling guided new-generation thermoelectric thin films and microscale thermoelectric devices will realize ultrahigh thermoelectric power generating performance with minimized device size. The new theoretical understanding will significantly extend the understanding of thermoelectric technology, place Australia in world-leading position in this field. The newly developed thermoelectric materials and devices will make thermoelectric applications mini-sized and bring this technology into the daily life of the wide Australian community, and create new investment opportunities.					
DE240101190	**Innovating and Validating Scalable Monte Carlo Methods**	77,400.00	151,200.00	148,100.00	74,300.00	451,000.00
South, Dr Leah F	This project aims to develop innovative scalable Monte Carlo methods for statistical analysis in the presence of big data or complex mathematical models. Existing approaches to scalable Monte Carlo are only approximate, and their inaccuracies are difficult to quantify. This can have a detrimental impact on data-based decision making. The expected outcomes of this project are scalable Monte Carlo methods that are more accurate, fast and capable of quantifying inaccuracies. Scientists and decision-makers will benefit from the ability to obtain timely, reliable insights for challenging applications.					
	National Interest Test Statement					
	This project will improve the ability to extract timely and reliable insights from data, which could aid decision-making in critical applications such as weather forecasting and threat assessment in defence. Computer programs use a series of instructions to transform data into useful information about the world but many fast programs give biased results, which can lead to detrimental outcomes such as unknowingly underestimating the probability of an extreme weather event. This project will develop tools to assess and reduce this bias so that practitioners can rely on their output for decision-making. The new statistical methods could be adopted by anyone wishing to turn data into meaningful and reliable insights for timely decision-making. Access to the new methods will be facilitated through the production of open-source software.					

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
DE240101231	**Quinoid Polymers for Organic Electrochemical Transistors and Bioelectronics**	65,289.50	135,504.00	140,629.00	70,414.50	411,837.00
Liu, Dr Qian	This project aims to develop organic semiconductors (OSCs) with excellent mechanical flexibility and biocompatibility to exploit their potentials in bioelectronics. It connects the electronic world with ionic world of biology to push the biomedical application of OSCs a big step forward. Interdisciplinary knowledge, intellectual properties (IPs), top-notch publications, invited talks, and international collaborations are expected. Additionally, it will earn Australia a commercial lead in the biomedical sector to attract more talents to serve Australia. This project also matches well with several government's strategic research priorities, attracting industries to realise IPs transfer to bring "great value for money" to feed back Australia.					
	National Interest Test Statement					
	This project aims to develop a new class of functional polymeric materials that can store and transport both ionic and electronic charges. This advancement will improve the properties of organic materials to offer greater flexibility and compatibility with biological systems. This work will lead to a deeper understanding beyond the current knowledge of organic thin films that will facilitate improved material properties including air and water stability. These new high-performance materials will have applications in bioelectronic and energy storage devices and enable transistor devices to be wearable, foldable and implantable. For example, these new materials could be used as sensors to monitor the physical condition of people in real-time, by converting physical signals into a format that makes self-analysis of a person's condition easier. Once the materials technology is developed, collaborations with industry will ensure prototypes are translated into practical electronic applications that will bring social and economic benefits to the Australian community.					
DE240101275	**Paying and playing: Assessing and regulating digital games-as-a-service**	61,709.00	136,211.50	129,511.00	55,008.50	382,440.00
Egliston, Dr Ben	The digital games industry has turned to a service-based business model reliant on the generation of continuous user revenue. This project assesses the implications of service-based monetisation for how games are designed, consumed, and regulated, focusing on three controversial, yet insufficiently understood monetisation strategies: advertising, in-game transactions, and blockchain-based play. While promising benefit for consumers and industry, these monetisation strategies carry the potential for risks like surveillance, harmful advertising, and predatory design. Discoveries from this project will help policymakers, industry, and consumers regulate, design, and use games featuring service-based monetisation in effective and ethical ways.					
	National Interest Test Statement					
	The digital game industry's shift to a service-based business model introduces heady challenges for policymakers globally. It is often that policy concerning new, service-based game monetisation strategies fails to strike the right balance between protecting consumers from harmful monetisation, while still supporting the games industry. In response, this project develops a comprehensive account of the consumer, developer, and policy impacts of service-based game monetisation. This will inform future regulation and support strategies for Australian game developers, ensuring monetisation design that is ethical and effective (allowing Australian developers to compete in a $240B global market). It will also provide guidance and recommendations for user best practices. Research will be disseminated to industry bodies (e.g., the Interactive Games and Entertainment Association), government and policymakers (e.g., Australian Competition & Consumer Commission), and users (e.g., parents of children) via reports, online media, a website, and information-sharing symposia.					
	Queensland University of Technology	802,863.00	1,615,138.50	1,609,918.00	797,642.50	4,825,562.00
The University of Queensland						
DE240100014	**Causal relationship between taste and smell perception and eating behaviour**	73,539.50	147,829.00	138,579.00	64,289.50	424,237.00
Hwang, Dr Liang-Dar	Around half of all Australians have a poor diet, which is a leading cause of many chronic conditions costing over $70 billion annually. This project aims to develop and apply novel statistical methods for determining the genetic basis of human taste and smell perception and its causal effects on eating behaviour. Expected outcomes include delivering new insights into such underlying individual differences for a wide range of taste and olfactory traits; advanced analytical methods to assess causality; and a causal network of these sensory traits across over 100 consumable food items. From these outcomes, the benefits will be new strategies for					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	improving food flavours and eating behaviours to enhance agri-food industry growth. **National Interest Test Statement** Poor diet is a leading personal, social and economic burden affecting Australia at a cost of over $70 billion annually. Taste and smell perception are a fundamental driving factor in such dietary behaviours. This project will determine underlying differences across individuals and the impacts of these perceptions on dietary preferences and food consumption. This knowledge will be shared with the food and flavour industry to enable manufacturing advances that deliver healthier consumer choices that meet smell and flavour preferences. The benefit to Australia – where around half of the population currently have a poor diet – will be food choices that meet nutritional requirements with enhanced flavour. This will have major implications for improving public health and reducing the economic burden associated with unhealthy diets. This project is directly aligned with the Australian Government's National Food and Beverage Manufacturing Priority to support targeted research on innovative foods/beverages and increase the product value-adding capability of established agri-food industries.					
DE240100095 Hulme, Dr Adam	**Using systems science to secure the health workforce against climate change** The widespread maldistribution of the Australian health workforce is creating significant health human resource shortages in non-urban areas of need. Climate-related extreme weather events (i.e., heat, droughts, fires, floods) are projected to exacerbate workforce deficiencies in rural regions. This project aims to explore how climate change will impact the future of the rural health workforce through a novel integration of computational systems science methods. The project expects to discover new policies to correct the maldistribution and strengthen the resilience of the rural health workforce against climate change impacts. Benefits include a sustained and more adaptable workforce leading to improved health for vulnerable communities. **National Interest Test Statement** Australia is facing a critical health workforce maldistribution and shortage crisis. The lack of access to, and provision of, health services is significantly affecting the health of the seven million people who live and work in regional, rural and remote areas. These are the same 7.1 million people who contribute two-thirds of Australia's total export earnings, including $400 billion in resources and agricultural exports. To make matters worse, the risks posed by climate change, the greatest global health threat of the 21st Century, are exacerbating the socioeconomic and health inequalities that disproportionately impact rural communities. This computational modelling project will help to identify new health workforce policies that account for the impacts of climate change on the future supply and retention of workers which will benefit vulnerable communities. Knowledge from this research will inform novel decision-support tools that enable policymakers to better manage uncertainty and proactively build adaptive capacity and climate-related disaster resilience into Australia's rural health workforce system.	64,274.00	134,920.50	125,186.00	54,539.50	378,920.00
DE240100105 Luo, Dr Yadan	**Towards Evolvable and Sustainable Multimodal Machine Learning** Machine learning is commonly limited to a single operational modality. To enable image, sound and language comprehension simultaneously would require machines to reuse knowledge and understand concepts from multimodal data. The project aims to build a sparse model and present a set of innovative algorithms to enhance model generalisation for addressing distributional and semantic shifts and minimise the computational and labelling costs for training multimodal systems. Its outcomes will enable evolvable learning of models to suit varying testing scenarios after deployment and whilst reducing energy consumption and carbon emission. The application of these techniques could benefit sectors such as E-commerce, agriculture and transport. **National Interest Test Statement** Advancements in technology have led to an unprecedented generation of different types of data. How can we best make use of this data efficiently to benefit society? This project introduces a revolutionary solution: evolvable and sustainable multimodal machine learning. The research aims to enable machines to understand human intentions and perform tasks in a variety of different situations and contexts. Unlike previous approaches, it makes use of simpler calculations that will require only a tenth of the computing power, thus reducing electricity consumption, and proposes new methods to enable the system to dynamically learn as it goes along. The outcomes could be integrated into digital products designed to address different industry requirements, such as improving product retrieval for online customers, or supporting a self-adaptive conversational platform similar to a chat-bot for agriculture. This project offers immense promise for industries and society, driving digital empowerment, sustainability, and innovation. Existing collaboration with Logan City Council ensures practical product implementation.	76,470.50	152,941.00	152,941.00	76,470.50	458,823.00
DE240100202	**Too quick or too slow? Unpacking digital temporalities in networked Vietnam**	66,339.50	134,669.00	138,262.50	69,933.00	409,204.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Nguyen, Dr Thu G	This project aims to study how digital media shape ordinary people's lived experience of time in Vietnam. It investigates the hidden costs of promoting a digital future without accounting for stagnating structural reforms on the ground. Using ethnographic research, the project examines the lives of online petty traders, rideshare Grab bikers, tech developers, and residents in designated high-tech neighbourhoods to reveal how fast-paced digital technologies, slow-moving infrastructural change, and indelible sociocultural histories intersect. Expected outcomes include vital new knowledge of Southeast Asian digital cultures that will benefit the sustainability of Australian aid in technological development in Southeast Asia. **National Interest Test Statement** Australia's relationship with Southeast Asia – and Vietnam in particular – is vital to the region's economic development. Vietnam is rapidly digitising itself and already plays a critical role in global supply chains for the digital economy. Australia prioritises the digital economy in its strategic partnerships with Vietnam, investing millions in initiatives like Aus4Innovation, through which Australia and Vietnam work together to explore emerging areas of technology and digital transformation, trial new models for partnerships between public and private sector institutions, and strengthen Vietnamese capability in digital foresight, scenario planning, commercialisation, and innovation policy to achieve social and economic benefit for both countries. By conducting an in-depth study of lived experience in Vietnam, this project seeks to understand how digital technologies meaningfully respond to existing sociocultural problems. Outcomes of this project will provide essential knowledge from the humanities and social sciences to ensure that the digital transfer between Australia and Vietnam is socially inclusive, culturally sensitive, and locally sustainable. The research examines the lives of small online traders, rideshare Grab bikers, tech developers, and residents in high-tech neighbourhoods to reveal how fast-paced digital technologies, slow-moving infrastructural change, and historic cultural settings intersect. Expected outcomes include vital new knowledge of Southeast Asian digital cultures that will benefit technological development, supply chains and businesses. This will position Australia as a regional leader in digital development and expertise and directly benefit its strategic commitment to promote a sustainable digital future in Southeast Asia. Insights will be shared with DFAT, CSIRO, ASEAN scholars, and Vietnamese policymakers, which will ensure this knowledge is available to those working directly on these initiatives, such as resilient agriculture and food, introducing appropriate interventions for the digital era, and responsible artificial intelligence.					
DE240100259 Lei, Dr Chang	**Next Generation Mass Spectrometry for Single-Cell Metabolomics** Characterising metabolites at the single cell level will provide valuable insights into the functionality of individual cells and reveal mechanisms that cannot be observed in bulk cell analysis. To address existing challenges in single-cell metabolite analysis, this project aims to develop an ultra-sensitive nanostructure-initiator mass spectrometry (NIMS) platform, which uses an innovative carbon material with a carefully designed nanostructure to enhance detection efficiency. Expected outcomes include the development of a revolutionary carbon assisted NIMS platform for single-cell metabolomics analysis, and valuable intellectual property of commercial interest to provide economic benefit to Australia through technology advancement. **National Interest Test Statement** Mass spectrometry (MS) is a sensitive analytical technique that can measure chemical compounds and biological molecules. It is widely used for diverse applications including biological research, drug testing, food contamination detection, and pesticide residue analysis. Metabolomics is the scientific study of metabolites present in biological systems. This project will develop a novel nanotechnology-equipped platform to enhance the sensitivity of MS to achieve high quality single-cell metabolomics analysis. This will increase Australia's competitiveness in biosensing and cell biology, and deliver substantial benefits to many departments such as forensic science, national defence, food safety and agriculture. It has the potential to generate valuable intellectual property, with the platform likely attracting commercial interest from biosensor companies and mass spectrometer manufacturers, and delivering economic benefit to Australia through technology advancement.	73,139.50	149,604.00	149,579.00	73,114.50	445,437.00
DE240100269 Rinta-Kahila, Dr Tapani V	**Maintaining Human Expertise in an AI-driven World** While information systems with artificial intelligence are increasingly used to support or automate work tasks, this can come at a cost to the development and retention of essential skills in workers. Skill erosion can jeopardise safety and fairness in contexts where humans' skills are needed. This innovative project leverages systems thinking, case studies and action design research to investigate how leveraging artificial intelligence shapes workers' skills. Its expected outcomes include a new systems theory of skill erosion and organisational guidelines for managing artificial intelligence. These can help organisations maximise human potential by striking a balance between relying on automation and maintaining workers' skills. **National Interest Test Statement**	73,421.00	148,664.00	150,637.50	75,394.50	448,117.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	This project addresses the impacts of leveraging artificial intelligence on human experts' skills in organisations. Over time automated technologies like artificial intelligence tend to erode human experts' domain skills, and such erosion has been shown to jeopardise safety and fairness in sectors such as accounting, social services and healthcare. Yet, how exactly skill erosion happens remains poorly understood. This project proposes a new model to finally provide a comprehensive explanation of how AI contributes to skill erosion and how human experts can protect their domain skills by leveraging artificial intelligence mindfully. The model enables the identification of specific managerial guidelines that organisations can implement to protect their employees' expertise while benefitting from artificial intelligence. This project can help Australia to upskill the nation's workforce to the age of artificial intelligence, helping the nation ensure safety and maximise human potential while pioneering the use of cutting-edge technologies.					
DE240100327 Moore, Dr Margaret J	**Understanding how predictions modulate visual perception** The brain uses sensory predictions to help efficiently make sense of complex visual input. This project aims to explore how the brain generates, uses, and integrates different sources of predictive information to facilitate efficient visual perception. The outcomes are expected to be of both theoretical and practical benefit as they will help to refine influential theoretical models and generate findings with practical, real-world applications in computer vision.	71,893.00	146,096.00	148,592.00	74,389.00	440,970.00
	National Interest Test Statement Prediction plays a key role in facilitating efficient visual perception. However, it is not yet well understood how the brain generates and uses these perceptual predictions. The findings of this project are expected to greatly extend our understanding of both normal and abnormal human visual perception by clarifying the type, timing, and location of perceptual predictions in the human brain. The study's outcomes are expected to serve as the theoretical foundation for a range of future applications, including bio-inspired computer-vision software, e.g., for autonomous cars or augmented reality. The results of this project could also be built upon by clinically focused researchers to reduce the societal and economic burden of post-stroke disorders of visuospatial attention. This project will advance Australian neuroscience by building a novel and impactful research stream, thereby solidifying Australia as an international leader in cognitive neuroscience.					
DE240100398 Staples, Dr Timothy L	**Advancing detection and understanding of anomalous ecological change** Human impacts are driving ecosystems into new, anomalous states. Reliably detecting these ecological anomalies is essential to better understand how ecosystems change over time, and effectively manage natural resources. This project aims to advance ecological anomaly detection using techniques from complex fields such as banking fraud, cybersecurity and video surveillance. Expected project outcomes will improve understanding of patterns and drivers of both biodiversity and ecosystem change. Tools to reliably detect anomalous changes in complex ecological systems will provide significant benefits to ecosystem management, conservation decision-making and environmental remediation.	60,364.00	117,903.50	114,579.00	57,039.50	349,886.00
	National Interest Test Statement Australian ecosystems provide cultural and economic value but are vulnerable to adverse change driven by human activity. For instance, the Great Barrier Reef is sea country to many Traditional Owner groups and provides tourism, storm protection and fish habitat worth $6.4 billion annually, but is threatened by warming oceans and pollution. Detecting adverse ecosystem changes can improve the allocation of conservation resources. However, current ecosystem monitoring does not account for natural ecosystem dynamics, limiting detection of truly adverse change. This project will repurpose tools from banking fraud, cybersecurity and video surveillance that can compensate for ecosystem dynamics, to create and test algorithms that can detect 'anomalies' of adverse ecosystem change. These algorithms will be integrated into ecological monitoring programs (such as Bush Heritage Australia) to improve the identification of ecosystems at risk of collapse. This will increase the cost-effectiveness of conservation of Australia's unique landscapes and preserve their contribution and value for current and future Australians.					
DE240100533 Rekker, Dr Saphira A	**Paris-compliance: assessing companies and portfolios** The aim of this research project is to turn the tide on misleading corporate climate pledges and systematise the assessment of companies' climate performance by using a science-based approach. A critical strategic priority urgently called for during recent international climate negotiations, the research conducted will be translated into a global platform where corporate Paris Compliance information will be shared openly and transparently. This will bolster businesses' climate action by outlining meaningful and effective decarbonisation pathways, allowing all stakeholders to make climate-safe decisions, and guiding policy makers to enforce the required changes for any business to become Paris-compliant.	69,514.50	143,439.00	147,849.00	73,924.50	434,727.00
	National Interest Test Statement					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	Recent years have seen an increase in the number of companies and institutions pledging to achieve “net-zero” emissions by 2050. However, such commitments are not sufficient to maintain a safe climate. What matters is the cumulative emissions over time, and so emissions reductions must start immediately, and be halved by 2030, along the way to net-zero. My research found flaws in current assessment frameworks and will focus on developing science-based methods to assess corporate alignment with globally agreed climate goals. These methods will then be used to translate complex decarbonisation models into an open-access, online and interactive tool for investors, companies, policymakers and the public to independently track progress of companies, with an initial focus on the ASX200. This research is critical to assess the authenticity of corporate climate commitments, and track their climate performance. It will also enable governments to develop and implement more robust and effective regulation around corporate emission reductions needed for Australia and the world to meet their carbon reduction targets.					
DE240100561 Leiter, Dr Odette	**Understanding how platelets mediate new neuron formation in the adult brain** Exercise boosts the generation of new nerve cells from adult neural stem cells in the part of the brain responsible for learning and memory, the hippocampus. This project aims to investigate the mechanisms behind this effect, in particular, how blood cells known as platelets mediate this process. The expected outcomes include the discovery of new communication pathways between platelets and the brain following exercise and will determine the importance of these blood cells in mediating brain function. This will help to explain how exercise affects the brain and may benefit Australian society through the implementation of new methods to support learning and memory in schools and workplaces, thereby enhancing performance and productivity.	77,039.50	154,079.00	154,079.00	77,039.50	462,237.00
	National Interest Test Statement Learning and memory are essential brain functions that contribute to many social and cultural aspects of life and ensure a strong and stable economy. It is known that exercise enhances learning and memory across the lifespan; however, little is known about how and why exercise does this. This project investigates the mechanisms behind this effect, more specifically, how cells of our blood known as platelets boost the growth of new nerve cells in the part of the brain which is responsible for learning and memory. Understanding how exercise affects brain function will benefit Australian society in various ways. These could include the development of new learning strategies in the education and information technology sectors, or the incorporation of targeted programs into workplaces to enhance performance and boost productivity. In the longer term, the mechanisms by which platelets regulate nerve cell growth could be an attractive target for future translational studies in conditions in which learning and memory are affected, thereby reducing the social and economic burden associated with these conditions.					
DE240100584 Sharman, Dr Leah	**Social isolation and loneliness as factors maintaining domestic violence** Isolating victims from support systems is a common tactic of domestic violence, yet we know very little about a key psychological consequence of this: Loneliness. Early research has identified loneliness as a factor in victim-survivor decisions to stay in violent relationships and to return after escape. This project aims to understand loneliness as a feature of domestic violence and its long-term impacts on victim-survivors using a mixed-methods approach. This will include collection of repeated measures and qualitative data with victim-survivors and service workers. This project will endeavour to provide a comprehensive picture of the impact of loneliness on victims of domestic violence and how we can shape our future service responses.	69,699.50	138,118.50	134,508.50	66,089.50	408,416.00
	National Interest Test Statement Social isolation is a key tactic in domestic violence that involves severing a victim from their social supports. It is experienced by over half of people reporting domestic violence and it is associated with increased risk of more serious abuse and loneliness. Early data indicates that loneliness may be associated with reasons a victim stays in an abusive relationship and why they return after escape, suggesting that loneliness may be a major obstacle in leaving abusive relationships. This DECRA will advance our knowledge in two key areas of research - loneliness and domestic violence - by generating new data on an under-researched experience and one that has never been investigated in Australia. Understanding experiences of loneliness that arise from social isolation abuse is an essential step to furthering our knowledge of the impacts of domestic violence and how we can tailor our responses more effectively to victim/survivors and reduce the risk of future abuse. This research is expected to have direct policy impact working to further the National Plan to End Violence Against Women and Children.					
DE240100623 Tebyetekerwa, Dr Mike	**New electrodes for green electrochemical carbon dioxide capture** This project aims to develop new electrochemical carbon capture technology. By designing and fabricating new functional electrodes and high-performance electrochemical devices based on water and driven by renewable electricity, this project will enhance the ability to capture CO2, the	65,189.50	137,129.00	140,829.00	68,889.50	412,037.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	primary greenhouse gas that causes global climate change. Expected outcomes include new multi-dimension electrodes with unique chemistry and state-of-the-art CO2 capture devices plus in-depth knowledge of electrochemical CO2 capture mechanisms for optimised device design and control. Benefits include the development of circular carbon economies with capabilities to effectively capture CO2, supporting Australian industries to achieve net zero emissions by 2050. **National Interest Test Statement** Carbon dioxide (CO2) is the primary greenhouse gas emitted through human activities and the major driver for global climate change. Therefore, CO2 capture, storage and utilisation are essential for reducing CO2 intensity in the environment. Mainly, CO2 capture is critical because it is the first step. However, the currently used CO2 thermochemical capture technology is not sustainable as it requires high amounts of heat energy and suffers solvent degradation, leading to increased costs and toxic emissions. This project proposes and explores the development of renewable energy-driven and water-based green capture technology for a sustainable and clean Australia. The proposed technology will enable the production of devices that can be integrated as plug-and-play modules at various scales, including large industrial sites or on CO2-emitting devices such as vehicles. This technology will therefore enable more effective CO2 capture, supporting progress toward Australia's net zero emissions. New intellectual property will be protected for licensing by interested parties to drive innovation within Australia.					
DE240100722 NGUYEN, Dr Ngoc Nguyen	**Enabling Novel Hydrogen Storage via Combustible Ice for a Low-Carbon Future** This project aims to develop a new method for sustainable hydrogen storage. Hydrogen is vital for decarbonising Australia's economy, yet finding an efficient way for hydrogen storage is a global challenge. This project seeks to encapsulate hydrogen effectively in water to produce hydrogen-carrying combustible ice for efficient large-scale hydrogen storage, taking the advantages of water as the safest and cheapest raw material. Expected outcomes are cutting-edge knowledge and a new pathway of hydrogen storage. This project would contribute to turning Australia’s abundant renewable energy resources into substantial economic and environmental benefits and promote Australia's competitive edge in the global transition toward a low-carbon future. **National Interest Test Statement** In Australia's roadmap towards net-zero CO2-emissions, hydrogen is a critical technology. However, finding a safe and efficient hydrogen storage technology remains a global challenge. Conventional hydrogen storage in compressed tanks is expensive and hazardous due to the involved high compression and pressures. This project seeks innovations that enable massive encapsulation of hydrogen in water to produce a compact hydrogen-carrying solid called combustible ice, creating an efficient pathway of large-scale hydrogen storage. This method allows to store hydrogen in a water-based material, taking the unique advantage of water as the safest, cheapest and most sustainable raw material on Earth. The expected method would work under low pressure to eliminate the risks and costs of high compression typical of conventional hydrogen technology. The project is expected to contribute significantly to turning Australia’s abundant renewable energy resources into substantial economic and environmental benefits, and promote Australia’s competitive edge in the global transition towards a carbon neutrality future.	60,478.50	119,683.00	120,644.00	61,439.50	362,245.00
DE240100793 Chen, Dr Zhian	**Unraveling a new cytokine working model in immune cell exhaustion** This project will investigate a novel paradigm of how a key messenger protein can be sensed by fundamental immune cells, preventing their ‘exhaustion’. Immune cell exhaustion is a fundamental mechanism to maintain the internal homeostasis of vertebrates. However, it is often hijacked by pathogens to dampen the defensive capacity of the immune system. And this specific messenger protein is the only known soluble factor that can deliver ‘anti-exhaustion’ signals to immune cells. This study will advance basic knowledge in biochemistry and immunology by combining interdisciplinary and cutting-edge approaches. The expected outcomes include the developing new scientific theories and identifying novel molecular basis of biological processes. **National Interest Test Statement** Immune cells protect animals from external and internal threats, such as viruses and cancer. However, immune cells can become “exhausted”, allowing persistent and severe illness. How and why immune cells become exhausted requires further understanding. We have identified a key molecule that regulates a pathway that corrects immune exhaustion. This project aims to determine how this molecule works. This knowledge could lead to novel treatments and vaccines that improve outcomes for Australians with infectious diseases and cancers, and increase the resistance of agricultural livestock to infections, such as foot and mouth disease. Intellectual property generated from this project could bring economic and commercial benefits to Australia by supporting local biotech companies’ growth, with the global immunology market expected	78,865.50	158,200.50	152,724.50	73,389.50	463,180.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	to exceed AUD $200 billion by 2028. We are ideally placed to adopt our findings into practice, with onsite access to world-class manufacturing facilities, leading biotechnology companies, and commercialisation support.					
DE240100810 XIAO, Dr MU	**Solar-powered methanol conversion for on-demand hydrogen production** Methanol is an ideal hydrogen carrier due to its low cost, high hydrogen content, and liquid phase for easy storage and transport but facing problems with hydrogen release. This project aims to achieve cost-effective and emission-free methanol conversion for on-demand hydrogen production. The key concept is the rational design of high-performance single-atom catalytic materials for solar-powered photocatalytic methanol conversion to hydrogen and value-added chemical formaldehyde with high productivity and selectivity. Expected outcomes include cutting-edge knowledge in the synthesis of functional materials and technology for efficient methanol-to-hydrogen conversion, contributing to the development of the hydrogen economy in Australia. **National Interest Test Statement** The hydrogen export industry will be worth up to AU$ 10 billion each year to Australia's economy by 2040. However, it is difficult to transport hydrogen safely and effectively in large commercial amounts due to its low density and high explosiveness. Methanol can solve this problem, as it can be transported safely and effectively as a liquid hydrogen carrier. This project will develop a new, efficient, and emission-free technology that can use Australia's abundant solar energy to convert methanol to hydrogen on demand. This technology will enable Australia to tap into the lucrative hydrogen export industry by transporting methanol and efficiently converting it to hydrogen on arrival. The conversion process will produce a high-value by-product, an organic compound called formaldehyde, which is an important component for manufacturing cosmetics, glues, and resins. Beyond these economic benefits, this technology will provide environmental benefits by accelerating Australia's transition to a low-carbon society. The potential intellectual property will be licensed to industry partners for commercial realisation.	65,842.00	132,191.50	132,694.00	66,344.50	397,072.00
DE240100816 Ruggeri, Dr Rossana	**Probing dark energy with the largest 3D Map of the Universe** Dark Energy is one of the most profound mysteries of modern physics. It makes up about 70 percent of the Universe, but no compelling theory can explain its nature. This project aims to measure the properties of Dark Energy with unprecedented accuracy: an order of magnitude better than the state of the art. It aims to accomplish this by extracting information from the largest 3D map of the cosmos, built with the optical spectra of 35 million galaxies, observed by the Dark Energy Spectroscopic Instrument. This project will foster Australia's historic leadership and investments in galaxy surveys via unique international partnerships, and produce cutting-edge tools for big data analyses with important applications in a wide range of industries. **National Interest Test Statement** Dark energy is believed to permeate all of space, causing the accelerated expansion of the Universe. Its nature is one of the most significant puzzles in modern physics. This project aims to uncover its origin and behaviour, leveraging a partnership with the $100M Dark Energy Spectroscopic Instrument. This telescope maps the Universe's evolution spanning 11 billion years. Extracting information from the 40 million galaxies observed by this facility is a serious Big Data challenge. This project will produce new machine-learning algorithms that will not only apply to mapping galaxies but will have direct applications in medical research, climate modelling, and financial forecasting. Further, this project offers a testing ground for Australian expertise in artificial intelligence with cross-economy applications in mining, defence, and agriculture. For example, in collaboration with the Australian Space Industry, these tools could be used to map crop growth, water flow, and fire impact trends in satellite images of Australia, thus safeguarding food security and environmental health for all Australians.	74,000.00	148,000.00	148,000.00	74,000.00	444,000.00
DE240100817 Sufian, Dr Adnan	**Predicting internal erosion in dams using real-time coupled experiments** Internal erosion causes nearly half of embankment dam failures globally. This project aims to develop a mechanics-based understanding of internal erosion to overcome the limitations of existing empirical approaches that do not capture the underlying physics. By innovatively coupling computational and physical experiments in real-time, this project expects to generate new insights that identify the factors leading to the initiation and continuation of internal erosion. The expected outcome of this project is a probabilistic framework able to predict the internal erosion process. This should significantly enhance and inform the design of erosion control measures and provide a holistic risk assessment for embankment dams.	77,531.00	151,755.50	151,699.00	77,474.50	458,460.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement					
	The project outcomes will provide a framework for engineers and regulatory authorities to make a predictive assessment of the initiation and continuation of internal erosion in dams. This will enable informed decisions on the susceptibility of Australia's dams, as critical dams can be identified early, and mitigation strategies developed in advance. Dams play a crucial societal role in Australia by providing drinking water, energy through hydroelectricity, and protection against extreme climatic events such as droughts and floods. With the increasing population and urbanisation in Australia, there is a need for new and upgraded dams to meet these social expectations. However, dam failures pose substantial societal, environmental, and economic risks, as underscored by two recent Commission of Inquiry into Wivenhoe Dam and Paradise Dam in Queensland. Risk assessment of Wivenhoe Dam, the primary source of water supply in Brisbane, identified that the potential consequence of failure would put 270,000 people at risk with the loss of life in the order of 400, along with damage costs of over $100 billion.					
DE240100822	**Haloalkaliphilic sulphur oxidising bacteria in dealkalising bauxite residue**	65,114.50	126,904.00	126,829.00	65,039.50	383,887.00
Zhao, Dr Jing	This project aims to establish breakthrough technology for neutralising bauxite refinery wastes by creating new knowledge about the taxonomic composition and molecular metabolism of sulphur oxidising bacteria capable of oxidising low-cost element sulphur in extremely haloalkaline niches. The findings will be translated into field feasible ecological engineering technology in partnership with industry partners. This DECRA project will also contribute to the net zero waste strategy in Australia and could significantly contribute to global problems of mining waste, carbon emission, and soil depletion if implemented. The commercialisation of the technology package will increase economic advantages and employment in Australia.					
	National Interest Test Statement					
	Aluminium is produced from alumina, and is found in everyday items like cans, automobiles, and smartphones. Australia is the second-largest alumina producer in the world, generating about $10 billion annually and employing thousands of people. However, the industry faces the challenge of managing and rehabilitating thousands of hectares of red mud, the hazardous waste generated in alumina production. Failure to address this issue could result in pollution to air, water, and land, thus endangering environmental and public health. This project aims to address this challenge by discovering novel native microorganisms that can transform red mud into non-hazardous soil. Through collaboration with Australia’s leading alumina producers (e.g., Rio Tinto), this knowledge will be developed into innovative procedures for sustainably managing and rehabilitating red mud in field operations. This endeavour will contribute long-term environmental and economic sustainability to the Australian alumina sector that will also safeguard the future of Australia's environment, public health, and wellbeing.					
DE240100839	**Nanoarchitectured platform technology for molecular profiling of exosomes**	72,839.50	144,341.50	148,241.50	76,739.50	442,162.00
Masud, Dr Mostafa Kamal	The aim of this project is to develop a set of cutting-edge nanotechnologies and a nanofabrication strategy to create a highly sensitive platform technology for exosome and exosomal miRNA analysis. This project aims to generate new knowledge in mesoporus nanomaterials and transudcer as well as exosome chemistry by developing nanostructure-based platform technology (device) for automated and rapid analysis. This project's findings are expected to provide Australia with cutting-edge expertise for developing a next-generation platform technology for analysing exosomes and other relevant biomolecules, with the potential to deliver valuable intellectual property of commercial interest and economic benefit through technological advancements.					
	National Interest Test Statement					
	Exosomes are small sac-like structures that cells release into the bloodstream to communicate with other cells. Exosomes can contain information about diseases (e.g., cancer, pregnancy disorders, cardiovascular and infectious disease) and thus have enormous potential for use in diagnosis and monitoring. However, exosome-based clinical diagnosis is currently limited by a lack of robust, automated, and sensitive technologies. This project aims to develop a precise, reliable, and automated advanced nanotechnology platform to analyse individual exosomes from patient blood and urine samples. This platform will enable simultaneous and rapid analysis of multiple diseases without sophisticated laboratory facilities, allowing easy implementation as a disease screening tool across Australia, particularly in rural clinics. We will work with biomedical industries and state governments to adopt this platform into practice. Beyond the potential health benefits to all Australians, the platform will position Australia at the forefront of the multibillion-dollar nanotechnology-based diagnostic device market.					
DE240100842	**Roles of emerging pollutants in spreading antimicrobial resistance**	75,039.50	150,489.00	152,489.00	77,039.50	455,057.00
Lu, Dr Ji	Antimicrobial resistance is a growing global challenge, yet the impact of environmental agents on the spread of antimicrobial resistance is poorly understood. Drawing on my recent findings and a					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	tight integration of a model microbial ecology system, this project aims to investigate the impact of environmental pollutants on the colonisation and spread of antimicrobial resistance in situ ecological communities. This project expects to generate new knowledge at the forefront of research into antimicrobial resistance in a complex ecosystem. The outcomes should provide a deep mechanistic understanding of environmental factors associated with antimicrobial resistance, with applications to antimicrobial resistance risk management for One Health. **National Interest Test Statement** Antimicrobial resistance, where bacteria develop a resistance to the antibiotics designed to control them, is one of the top 10 global public health threats facing humanity. It is estimated that by 2050, 10 million excess deaths globally will have occurred at a cumulative cost of US$100 trillion, if no action is taken. Current research on antimicrobial resistance mainly focuses on clinical settings and has primarily looked at the misuse or overuse of antibiotics. However there is a gap in our understanding of the way resistance arises and spreads between organisms and the environment. To fill this knowledge gap, this project will establish the first ever high-throughput platform and a laboratory-scale sewage treatment plant for identifying emerging pollutants in the spread of antimicrobial resistance, and evaluating the long-term effects of those identified pollutants on the spread of antimicrobial resistance in wastewater systems. This project will provide an unprecedented level of understanding of the environmental factors driving antimicrobial resistance, informing Australia's response to this crisis.					
DE240100883 Bulley, Dr Adam D	**The cognitive science of farsighted deliberation** Many fundamental decisions in life require us to deliberate about sooner versus later consequences. This cognitive psychology project aims to determine how the capacities that enable people to think about the future (prospection) and reflect on their own thinking (metacognition) influence how they manage such decisions. By using innovative methods, this project is expected to advance our understanding of future-oriented cognition across the lifespan. Expected outcomes include new knowledge about how people deliberate through important everyday decisions. This should provide significant benefits by laying the foundation for improving effective choices about the future. **National Interest Test Statement** Difficulty making farsighted choices can manifest in retirement saving shortfalls, educational dropout, credit card debt, and environmental impacts. However, little is currently understood about how people think through their decisions about the future. This project will elucidate the psychology of farsighted decision-making with a suite of innovative experiments in which participants deliberate and reflect on trade-offs between short-term and long-term outcomes, such as financial rewards available at different points in the future. Findings may be adopted into the design of evidence-based behaviour change interventions to foster farsighted decisions in everyday life. For example, superannuation policies could adopt such approaches to increase Australian retirement savings rates. To enable broad adoption of new insights about how people make long-term choices, findings may be shared via public sector presentations and workshops (e.g., at Australian federal and state government behavioural insights units), behaviour science practitioner conferences, and articles for the general public.	75,559.00	150,829.50	150,829.50	75,559.00	452,777.00
DE240101027 Yuan, Dr Dan	**Deciphering the mechanisms of object manipulation with viscoelastic fluids** This project aims to innovate how tiny objects in mixed samples are sorted using the forces generated by fluids that are both viscous and elastic. The developed technology is expected to break the limitations of conventional methods by automating sample processing and by enabling the sorting capability based on not only size, but also shape and fluid properties. This will meet the growing demand for rapid processing of complex real-world environmental samples. The expected outcomes include new knowledge and techniques for sorting algae and insects from water samples for the assessment of water quality and biodiversity. It is expected to benefit Australians by providing faster, cheaper, and more efficient environmental monitoring methods. **National Interest Test Statement** Assessment of water quality and aquatic biodiversity is essential for the health of Australians and Australian ecosystems, particularly after natural disasters like floods, fires and storms. Microscopic organisms found in water, such as algae and larvae are used by scientists to assess water quality and environmental changes. Scientists first need to separate the organisms to identify and quantify them. However, current systems for separating organisms in water are labour-intensive and prone to technical issues like clogging. This research aims to develop a new system capable of integrating multiple separating functions so that organisms from water samples can be studied. Using a series of microscopic channels, we can sort particles based on size, shape and fluid properties. By automating the system, it will facilitate faster, more efficient and cost-effective monitoring of water quality and biodiversity. This will allow ecologists or environmental monitoring agencies to rapidly assess or respond to any adverse changes in water sources, thus supporting overall	65,000.00	136,000.00	142,000.00	71,000.00	414,000.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	environmental and human health.					
DE240101055	**How blood vessel stiffness regulates their growth and maintenance**	74,789.50	149,579.00	149,579.00	74,789.50	448,737.00
Schimmel, Dr Lilian	This project aims to reveal an unidentified molecular mechanism of how endothelial cells in the walls of blood vessels detect stiffness of the surrounding environment in order to regulate blood vessel growth and maintenance. The results are expected to advance the emerging field of mechanobiology by combining cutting-edge cell biology and microscopy techniques carried out in novel 3D cell culture and unique quail models. The benefits of these outcomes include generation of knowledge on the impact of tissue stiffness on the signalling mechanisms that drive formation and maintenance of blood vessels. In the long term, this fundamental understanding could give rise to major developments in emerging industries such as organ bioengineering.					
	National Interest Test Statement					
	There is a lack of understanding how blood vessels specifically grow inside different organs to maintain organ functionality. This project aims to discover the fundamental processes that determine organ specific blood vessel formation. By understanding the mechanism that regulate this process, we have the potential to selectively target blood vessel growth by developing new drugs with the pharmaceutical industry or create organs with emerging bioengineering industries. This project will generate essential new knowledge by using a novel technology for genetic editing of quails which was recently developed in Australia and available in only 3 facilities worldwide. Combining this new Australian facility with the latest technical advancements will enable research that was not possible before, driving novel discoveries on our fundamental knowledge of organ specific blood vessel growth. In the long term, the discoveries of this project could make Australia a world-leader in an interesting novel industry of creating bioengineered organs which will likely result in major commercial, economical, and social benefits.					
DE240101233	**Developing the toolbox of compounds that target acid-sensing proteins**	74,539.50	149,079.00	149,079.00	74,539.50	447,237.00
Cristofori-Armstrong, Dr Ben	This project aims to examine the interaction between acid-sensing proteins and their modulatory compounds. Animals, including humans, must sense changes in environmental acidity to successfully interact with the surrounding world. Expected outcomes of the project include a better understanding of which regions of these proteins detect acidity, and to develop new compounds that modulate the proteins' function. This would advance our fundamental knowledge in the physiological process of acid sensing. This expects to provide significant benefits, by aiding the potential development of agrochemicals and pain-relieving medications that regulate acid-sensing protein function, resulting in economic benefit to Australia via these new products.					
	National Interest Test Statement					
	An animals' ability to sense and respond to changes in the acidity of their environment is essential for survival. However, we lack an understanding of how animals detect environmental acidity. This project will provide fundamental insights into the way certain proteins can detect acid and will develop new molecules that can block the activity of these proteins. These new molecules could help mitigate the detrimental effects ocean acidification can have on commercial seafood products. Preventing commercial seafood from sensing local acidity could lead to better farming yields with less environmental impact. This project will also provide future commercialisation opportunities for the pharmaceutical and veterinary industries. New molecules from this project could develop into anti-inflammatory and pain-relief medications by blocking acid induced disease progression in these conditions. Thus, this project will contribute to Australia's national interest through new knowledge, potential economic benefits via translating this research to commercial outcomes, and the accompanying social benefits to Australians.					
	The University of Queensland	1,700,482.50	3,422,445.00	3,420,430.00	1,698,467.50	10,241,825.00
University of the Sunshine Coast						
DE240100336	**Harnessing creative heritage for migrant wellbeing in museums and libraries**	71,436.00	142,919.00	142,134.00	70,651.00	427,140.00
Istvandity, Dr Lauren I	This project investigates the use of novel cultural heritage preservation methods to support migrant wellbeing in Australian museums and libraries. Subject to forced migration, Ukrainian, Afghani, and Sri Lankan communities will re-story their lived experiences through music,					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	engaging audiences and enhancing the relevance of case study collections for increasingly multicultural societies. The project will generate evidence on the impact of creative heritage methods on migrant wellbeing and produce an evidenced-based framework. Significant community benefits include increased public access to at-risk cultural heritage. The project's reframing of heritage practice can assist industry in the pivot to future-focused heritage management. **National Interest Test Statement** Australia has become home to many diverse migrant groups forced to leave their homelands with significant implications for their wellbeing. This project seeks to improve the wellbeing of Ukrainian, Sri Lankan and Afghani communities in Australia by involving them in migration collections at Queensland Museum and State Library of Queensland. Participants will use heritage objects and community stories as the inspiration for new music using a process of 'creative heritage'. Performances by migrant groups will amplify untold stories and invite new audiences to connect within museum and library spaces. The research will measure the impact on migrant wellbeing and produce a framework so other heritage institutions can apply this new method. By strengthening the voices of underrepresented communities within national heritage stories, this project will assist in maintaining the future relevance of Australian heritage collections. In trialling immersive tools, this project will help position Australia as a leader in creative solutions to present and future challenges faced by a rapidly changing heritage sector.					
DE240100611 Elrick-Barr, Dr Carmen E	**Building community resilience to coastal climate hazards in Australia** More frequent and intense climate hazards are devastating Australian communities and are projected to worsen as climate changes. This project aims to develop and communicate urgently needed strategies to assist coastal communities to prepare for and respond to climate hazards. The relationship between local-scale connection and capacity to prepare and respond will be investigated using mixed methods research in at-risk communities. The research will deliver practical guidance to policy makers and managers that will optimise investments in building community resilience, advance the discipline of human geography, and benefit over 20 million Australians living in coastal areas by creating new knowledge on neighbourhood adaptive capacity. **National Interest Test Statement** Natural disasters are forecast to cost Australia $1.2 trillion over the next forty years. While we all have a role to play in responding to natural hazards, local citizens are provided with limited practical support to truly build their resilience. This project will redress the current lack of pragmatic strategies to help coastal communities prepare for, and respond to, climate hazards. Surveys and interviews will be used to create an effective support framework by exploring how social connection and resource sharing can help people in at-risk coastal communities deal with hazards. Key benefits to Australia include achieving its national resilience goal of empowering communities, and reducing the significant social, economic, and environmental impacts of climate hazards. By working with the Australian Red Cross, state and local government agencies and community members across 4 states, this data will guide the delivery of targeted financial and educational support, empowering individuals in effectively and collaboratively managing their preparation and response to natural disasters.	58,914.50	127,034.50	137,917.50	69,797.50	393,664.00
	University of the Sunshine Coast	130,350.50	269,953.50	280,051.50	140,448.50	820,804.00
	Queensland	3,152,258.00	6,347,464.50	6,349,864.00	3,154,657.50	19,004,244.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
South Australia						
The University of Adelaide						
DE240100159	**Developing Room-Temperature Liquid Metal Batteries for Safe Energy Storage**	77,974.50	157,449.00	158,949.00	79,474.50	473,847.00
Zhang, Dr Shilin	To overcome safety issues intrinsic to the prevalent solid metal anodes in battery technology, this project aims to develop room-temperature liquid metal batteries by employing liquid Sodium-Potassium alloy. Innovations will span the development of the electrode concept, interface-oriented electrolyte design guided by theory and experiment, and prototype battery cell examples to illustrate how high round-trip efficiencies at fast charging can be achieved over a prolonged time. The anticipated outcomes would transform battery technology concepts while providing a critical scientific basis for commercialisation. Further, the success of this project would help Australia realise its shift from traditional to emerging sustainable energy systems.					
	National Interest Test Statement					
	Australia's energy industry is experiencing a transition from fossil fuels to renewables, where diverse energy storage technologies are required to mitigate the problem of grid reliability. This project aims to establish room-temperature liquid metal batteries as scalable devices to efficiently store intermittent energy sources (e.g. solar, wind, geothermal power) for off-grid applications. It will do so via interdisciplinary research starting from rational materials science, electrochemical analysis, and advanced characterisations, through to device engineering–addressing key gaps between the fundamental science of liquid-metal-based energy storage systems and their practical application. The new battery technologies enabled by this project would benefit: the Australian community with options for responding to the impacts of decarbonisation; energy-conscious consumers with reduced upfront battery costs; and the battery industry with accelerated onshore manufacturing. Here, the project's collaborative end-user design elements will leverage Australian industry expertise and open up translation pathways.					
DE240100481	**Illuminating Dark Fibres for Smart Water Asset Monitoring**	72,204.50	137,908.00	122,132.00	56,428.50	388,673.00
Zeng, Dr Wei	Smart water networks formed by fleets of acoustic sensors to detect developing cracks in water networks have grown rapidly in the past decade but are costly to install and maintain. This project aims to overcome this challenge by exploiting unused underground optical fibre cables that are ubiquitous in cities. The result will be low-cost and ready-made distributed sensing systems that protect critical water supplies, supported by intelligent data analytic algorithms that can translate real-time data into valuable information to optimise water asset monitoring. The research outcomes will stimulate a technological revolution in smart water networks, accelerate water digitalisation globally and bring significant economic and social benefits.					
	National Interest Test Statement					
	Australia has $160 billion worth of urban water assets which are 80 years old on average and suffer from regular failures. Smart water networks formed by fleets of acoustic sensors are used to monitor our water systems, however, their development reaches the bottleneck due to high capital and ongoing costs. The project will use existing telecommunication optical fibre cables to monitor underground water networks and detect pipe cracks before evolving into failures. Australia has 250,000 km (6.5 circles around the equator) of unused optical fibre cables underground. Translating a small part of them into numerous valuable sensors to monitor water assets by this project represents a huge amount of saving compared with the current multi-million dollar smart water networks. With new systems and technology adopted, Australia's aging water assets can be extensively protected. Cities will see fewer pipe breaks, meaning less interruption to service and traffic, less property damage and less water loss. Australia will become a leader in this transferable technology which has commercial potential globally.					
DE240100625	**Integrated slab-mode beam engineering for handheld terahertz systems**	75,850.00	149,600.00	147,500.00	73,750.00	446,700.00
Headland, Dr Daniel	Current dominant system architectures for terahertz waves are adapted from other ranges, leading to critical bottlenecks. This project will address this with a new integration platform that is tailored to the particular needs of terahertz waves. This requires advances in the emerging field of micro-scale integrated optics, combined with antenna-theory principles, semiconductor science, and advanced microfabrication to incorporate active devices. Novel spatially-dependent dispersion engineering techniques will also be pioneered for phased-array-free beamforming. This will enable a broad variety of all-in-one handheld systems for practical applications of terahertz waves such as noninvasive standoff sensing and self-aligning wireless links.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Electromagnetic waves have a vast range of everyday uses like low-frequency microwaves for mobile phones, and high-frequency light waves for fibre optics. Radio- and light-wave technology are two ends of the same spectrum, and between them lies the less-well-known terahertz range, which has potential to cause another fundamental leap forward, but is held back by the unimaginative way that we have built terahertz devices up to this point; simply combining pre-established radio- and light-wave devices together. This leads to critical bottlenecks in implementing proof-of-concept lab demonstrations on a larger scale. In contrast, this project will re-think terahertz systems from the ground up, pioneering new techniques and structures to target the particular needs of terahertz waves, with the end-goal of hand-held terahertz devices and modules that are innately suited to practical applications of terahertz waves. Through this project, Australia will become a trailblazer in what is projected to be a multi-billion dollar global market by 2029, and furthermore, Australians' quality of life will be improved by applications of terahertz waves, including noninvasive medical imaging e.g. to contactlessly screen for skin cancer, which is a serious issue due to Australia's high solar intensity. This project will also develop hand-held modules for real-world uses such as high-speed, ~100 Gbit/s wireless systems for interconnected cities, and safe, non-damaging security screening of hidden weapons and dangerous items in public places. We will actively share the outcomes with researchers and industries via journals, conferences, and media. The success of this project will advance knowledge in the field, positioning Australia at the forefront of commercial applications of terahertz waves—a projected multi-billion-dollar global market by 2029.					
DE240100660 Zhang, Dr Huayang	**A Solar Photoelectrochemical Cell for Unbiased Hydrogen Production** This project aims to develop a photoelectrochemical cell for photoelectric conversion and green hydrogen production by using solar power as the only energy input. This project expects to generate new knowledge in photoelectrode material design by combining low-cost semiconductors with natural or synthetic molecular catalysts. Expected outcomes are to generate a sustainable solar hydrogen technique with no electricity consumption, high solar-to-hydrogen conversion efficiency and long-term stability, promoting the development of green hydrogen industries in Australia with zero carbon emissions. This should provide significant benefits to reduce greenhouse gas emissions, achieve environmental sustainability and meet renewable energy demand.	71,479.50	142,019.00	139,079.00	68,539.50	421,117.00
	National Interest Test Statement Green hydrogen requires better production ways to shift from the current fossil fuel-involved production methods in the industry to approaches that utilise renewable energy sources only. This project will develop cost-effective, efficient, and stable photoelectrode materials to construct an unbiased and scalable photoelectrochemical platform that can solely exploit abundant solar light to produce sustainable hydrogen from water. This project will enhance Australia's global competitiveness in green hydrogen production and help Australia develop its future solar hydrogen economy, bringing predictable commercial and economic benefits. It will also support Australia's strong action on climate change and help Australia meet the net-zero emission target, by avoiding fossil fuel usage during hydrogen production and replacing fossil fuels with clean hydrogen for energy supply, bringing tangible social and environmental benefits. This project is expected to underpin valuable technological and intellectual property that can be licensed to the local industry sector for advanced manufacturing.					
DE240100661 Li, Dr Haobo	**Designing Multi-Metallic Compound Electrocatalysts for Chemicals Production** This project aims to design highly active, specifically selective, satisfactorily stable catalysts based on advanced ionic compound materials for carbon dioxide (CO2) electroreduction. Innovations are expected in the multi-metallic composition to ensure catalytic performance while maintain stability under electrochemical conditions. With assistance of artificial-intelligence approaches, numerous atomic-scale modelling, speed-up theoretical simulation and rational screening can be achieved. Expected outcomes include providing guidance in elemental composition ratio and suitable reaction conditions for experiments. Benefits include reduced CO2 to fight climate change and increased green-fuel production for sustainable growth of Australia.	73,239.50	147,079.00	146,379.00	72,539.50	439,237.00
	National Interest Test Statement Using electricity to transform carbon dioxide (CO2) into useful chemical compounds offers a promising approach to turning excess carbon into valuable chemicals and further mitigating the pressing carbon emission issues. The bottleneck challenge of this process is to identify efficient catalyst materials with suitable elemental compositions and ratios. Combining artificial intelligence (AI) and computational chemistry tools, we aim to develop a programming-based platform that can rapidly screen and intelligent design high-performance catalysts to boost CO2 conversion that is urgently needed in the energy conversion field and can be directly adopted by the energy industry. The findings including new knowledge generated in the fields of catalysis, advanced materials, and AI applications will be widely disseminated to the academic community, industry and the general public through publications, public talks and social media outlets to enable translation. Project outcomes will help address future challenges in CO2 reduction, sustainable development, environmental and economic benefits in Australia and beyond.					
DE240100756 Kabiri, Dr Shervin	**Closing the data gap: Systematic monitoring of PFAS remediation in soil** Extensive past use of perfluorinated chemicals (PFASs) has resulted in soil and waterway	63,539.50	135,458.00	135,933.00	64,014.50	398,945.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	contamination, damaging human and environmental health. The best option for treatment is often soil remediation with sorbents to immobilise PFASs, but the long-term fate of PFASs in treated soil is poorly understood. This project aims to generate new insights into PFASs and sorbent behaviour in soils over time, and re-design analytical methods to better mimic field conditions. Expected outcomes include strategies and methods to allow industry and government agencies to tailor remediation strategies to each site's environmental and chemical profile, and effectively monitor progress to create longer lasting benefits to human health and the environment. **National Interest Test Statement** Contamination of soil and water supplies by per and poly-fluoroalkyl substances chemicals (PFASs) is near ubiquitous. The adverse effects of PFASs on human and environmental health are becoming increasingly well recognised—and expensive. These 'forever chemicals' are extremely stable; ongoing clean-up costs exceed $100M per year, while treatment of related health issues is estimated to exceed $1B per year. Immobilisation of PFASs in contaminated soils using sorbents, e.g., activated carbon, is an efficient, cost-effective option but its effectiveness over time is not well understood. This project aims to establish the first toolbox of strategies and methods that allows remediation managers to select tailored options for each site's unique profile—soil type, PFAS species, sorbent types—to generate optimum outcomes. Redesigned methods that explore new aspects of PFAS chemistry and enable soil testing under field-like conditions will facilitate monitoring of progress. These results will support Australia's Strategy for Nature, Soil Strategy, and the goals of the Australian Government's PFAS Taskforce.					
DE240100846 Bai, Dr Xiaowan	**Probing Electrochemical Interface in CO2 reduction by Operando Computation** This project aims to explore the structure and dynamics of electrochemical interfaces using operando computational techniques, reveal the influence of catalyst structure and electrolyte environment on catalytic performance, and propose effective design strategies to facilitate the conversion of CO2 to high value-added fuels and chemicals. Innovations are expected in the new mechanism and rational design of electrocatalysts. Expected outcomes include the discovery of new mechanisms at the electrochemical interface, the effect of local environmental changes on catalytic performance, and effective strategies for C2+ product. Benefits include a sustainable future for Australia with decreased CO2 emissions and increased green-fuel production. **National Interest Test Statement** Global concerns about depleting fossil fuels and rising carbon emissions have created an urgent need for technologies that can convert carbon dioxide (CO2) efficiently using renewable energy sources, however, there is a significant knowledge gap about the optimal catalyst to facilitate this conversion process. Using advanced computational techniques, this project aims to study the catalyst structure and dynamic behaviour, investigate how the structure and the surrounding environment impact its performance, and provide catalyst design strategies to facilitate the conversion of CO2 to valuable fuels and chemicals. To enable its translation and adoption, we will share the findings with academics and the broader public via publications, conferences, and workshops, and explore real-life applications with industries that will further advance the development of cutting-edge sustainable technologies. This project will not only provide cutting-edge strategies for achieving highly efficient CO2 conversion technology but also place Australia at the forefront in combating carbon emissions and addressing climate change.	60,039.50	117,579.00	115,079.00	57,539.50	350,237.00
DE240100952 Li, Dr Huan	**Developing aluminium-sulfur batteries with high voltage and low cost** As use of renewable energy sources increases, so too does the need for suitable storage systems for the energy produced. Aluminium-Sulfur (Al-S) batteries provide a reliable energy storage option, but suffer from a low voltage output and despite aluminium and sulfur being two of the world's most abundant and low-cost materials, other components in batteries are prohibitively expensive. This project aims to address these challenges by designing an Al-S battery technology with efficient electrode materials and low-cost electrolytes, making them both cost effective and capable of high levels of energy storage. The outcome will place Australia as a world leader in battery technology and support our future renewable energy storage needs. **National Interest Test Statement** An integral part of the large-scale use of renewable energy sources is the development of cost-effective energy storage technologies. Widely used lithium-ion batteries (in portable electronic devices and electric vehicles) are expensive to manufacture due to the increasing consumption of lithium source and high cost of lithium mining techniques. This project aims to develop alternatives to lithium-ion batteries for future energy storage. It will use two chemicals called aluminium and sulfur (Al-S) in batteries and design efficient electrode materials with low-cost electrolyte that will significantly improve the voltage output and energy storage capacity. These batteries will provide a safe and reliable energy storage solution for the Australian renewable energy sector and reduce the cost of battery manufacturing.	72,039.50	144,079.00	144,079.00	72,039.50	432,237.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100967	**Open-world computer vision by detecting and tracking hierarchical objects**	65,000.00	125,000.00	118,000.00	58,000.00	366,000.00
Valmadre, Dr Jack L	This project examines the problem of detecting and tracking objects using computer vision. A fundamental limitation of current algorithms is that they require labelled training data for every object class and therefore cannot be trusted to operate in unconstrained environments. This project aims to address this limitation using novel techniques that incorporate hierarchical relationships between object classes. Expected outcomes include new paradigms for algorithm design and evaluation, and establishing the problem as a focus of international research. The key practical benefit would be to accelerate the wider deployment of visual perception in applications such as autonomous vehicles, interactive robotics, and video analysis.					
	National Interest Test Statement					
	Computer vision systems based on machine learning enable computers to perceive the world through cameras. However, existing systems can only reliably see the objects which they were trained to recognise. This project will develop new computer vision systems that can detect and track any type of object. This will be achieved by considering the more general task of learning to decompose an image into a hierarchy of objects and sub-objects. Critically, the development of this technology will enable computer vision to operate in unconstrained environments. It will enhance Australia's global standing in artificial intelligence and unleash its immense potential for applications to benefit various domains, such as waterways and biodiversity monitoring, cost reduction in autonomous vehicles and driver assistance, improved public safety at large events, and the implementation of robotics in agriculture and waste management. Results will be communicated through international conferences on computer vision and artificial intelligence as well as through public and industry presentations to the wider Australian public.					
DE240101283	**Linking Australia's basement and cover mineral systems**	61,500.00	121,000.00	119,000.00	59,500.00	361,000.00
Mulder, Dr Jacob A	The aim of this research is to use revolutionary new mineral-dating techniques to test the hypothesis that low-temperature fluids can transport metals from Australia's richly endowed geological basement to form new mineral deposits in the sedimentary basins that cover most of the continent. Sedimentary-hosted mineral systems are the largest source of the critical metal cobalt and the second largest source of copper on Earth. These two metals are essential to developing the green energy infrastructure and technologies that underpin a net zero economy. The expected outcomes are a detailed record of paleo-fluid flow and metal cycling in Australia's highly prospective sedimentary basins.					
	National Interest Test Statement					
	Australia's transition to a net zero economy requires a secure supply of copper and cobalt to build green energy infrastructure and manufacture electric vehicles. The world's largest copper-cobalt resources are found in sedimentary basins, similar to those covering most of the Australian continent. However, Australia's sedimentary basins have not been considered prospective for copper-cobalt mineral deposits because a source for these metals has not been identified. This project will determine whether copper and cobalt can be transferred from older, deeply buried mineral deposits to form new mineral deposits in sedimentary basins. Global demand for copper and cobalt is forecast to rise up to 350% and 460%, respectively, by 2050. Australia must find new copper and cobalt resources to secure the domestic green energy industry and capitalise on the profound economic opportunity offered by the rapid expansion of low-emission technologies. Identifying the source of copper and cobalt in the deeply buried crust will help mineral explorers identify where new resources might be found in sedimentary basins.					
	The University of Adelaide	692,866.50	1,377,171.00	1,346,130.00	661,825.50	4,077,993.00
University of South Australia						
DE240100097	**Mathematical models for actin scavenging and biofilm removal**	66,335.00	131,335.00	128,500.00	63,500.00	389,670.00
Tam, Dr Alexander K	The project aims to develop mathematical models for actin scavenging and biofilm removal, processes that combine to alleviate tissue damage and inflammation. Actin scavenging eliminates the protein F-actin which is released during cell death, but this process is not fully-understood. Biofilms are colonies of micro-organisms, for example bacteria, that are highly resistant to antimicrobial treatment. This project expects to generate new knowledge, using an innovative combination of mathematical modelling and cell biology experiments. Expected outcomes include new theory and software, yielding the benefits of increased understanding of cell biology, and potential to enhance development of smart materials that eliminate biofilms.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Biofilms are communities of bacteria enclosed in a naturally produced semi-solid structure. They play a role in the development of antibiotic resistance in humans and animals, corrosion of industrial equipment, such as oil and gas pipelines, and cause contamination and waste in food and beverage production. This project will develop mathematical theory and simulation tools to investigate (1) how nanotechnology can help remove bacterial biofilms and (2) improve our understanding of the cellular interactions involved when cells experience stress. The combination of the technology and a greater understanding of the fundamental biological processes which occur when cells experience stress may have widespread applications in the future, including wound healing. This can also provide the fundamental knowledge required for our collaborators and their industry partners to advance the development of wound healing technology in Australia.					
DE240101261 Liu, Dr Yue	**Carbon-negative concrete produced with innovative artificial aggregates** To achieve net-zero carbon emissions in Australia by 2050, this project proposes to develop carbon-negative concrete using two typical industrial wastes, recycled powder from construction and demolition waste and drinking water treatment sludge from the water industry. This project first aims to develop innovative artificial aggregates containing sludge-derived biochar and recycled powder under carbonation curing. The developed artificial aggregates with superior carbon absorption capacity are then used to produce carbon-negative concrete. The properties of artificial aggregates and carbon-negative concrete will be comprehensively investigated. This project creates a green engineering solution to stockpiled industrial wastes.	73,224.50	143,699.00	141,449.00	70,974.50	429,347.00
	National Interest Test Statement The Australian government aims to achieve net-zero carbon emissions by 2050. Therefore, it's expected that a market-oriented carbon emissions trading scheme will be introduced, offering financial reward or penalty to those who emit below or beyond the allowed limits, respectively. Under such a scheme, the construction industry will be forced to significantly reduce its carbon emissions. This project aims to develop carbon-negative concrete with improved carbon dioxide absorption capacity using two typical industrial wastes: recycled powder from construction and demolition waste and drinking water treatment sludge from the water industry. Rather than releasing large amounts of carbon dioxide, the new concrete would be transformed into a carbon sink. In addition, using industrial wastes as innovative construction materials offers a green engineering solution, linking to Australia's new National Waste Policy in the transition to a circular economy.					
	University of South Australia	139,559.50	275,034.00	269,949.00	134,474.50	819,017.00
	South Australia	832,426.00	1,652,205.00	1,616,079.00	796,300.00	4,897,010.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Tasmania						
University of Tasmania						
DE240100068	**Original metal-based catalysts for enzyme-inspired CO2 activation**	69,539.50	139,079.00	139,079.00	69,539.50	417,237.00
Ho, Dr Curtis C	The chemical utilisation of CO2 is one of two major strategies in achieving net negative CO2 emissions mitigating the environmental and socioeconomic damage of global warming. Inspired by the ability of natural enzymes to efficiently utilise molecules like CO2, this project aims to develop original metal-based catalysts as enzyme mimics for the efficient transformation of CO2. It will deliver practical strategies to transform CO2 into value-added materials permanently removing it from the atmosphere. Project outcomes are expected to enhance industry's capacity to use CO2 as a feedstock chemical for the production of fuels and materials, providing significant economic and environmental benefits through CO2 upcycling and recycling.					
	National Interest Test Statement					
	Carbon dioxide, the most abundant greenhouse gas, contributes significantly to global climate change and the current environmental crisis. There is an urgent need to lower atmospheric carbon dioxide concentrations to prevent further, irreversible impact on our planet. This project aims to develop highly efficient metal-based catalysts that mimic the ability of biological enzymes to capture and utilise carbon dioxide with low energy demand. The findings of this research will translate directly into industrially important and economically efficient processes that can repurpose carbon dioxide into higher value, low-carbon chemicals (nitrogen-based fertilisers), sustainable materials (biodegradable plastics) and renewable fuels (methanol and formic acid for hydrogen fuel cells). This can be used to inform and enhance Australia's environmentally sustainable manufacturing industries and clean energy production sectors. Globally, this research will place Australia at the forefront of developing innovative low-energy processes for a circular carbon economy and lead in achieving net negative carbon emissions.					
DE240100115	**Evaluating the Impact and Efficiency of Engineering the Ocean to Remove CO2**	74,709.50	150,740.00	151,139.00	75,108.50	451,697.00
Rohr, Dr Tyler W	This project aims to evaluate the viability of engineering the ocean to remove carbon dioxide from the atmosphere by simulating a suite of climate intervention and baseline scenarios. To better predict changes in marine carbon cycling, I will first make novel observations of zooplankton grazing dynamics, then use them to improve, validate and constrain a new marine biogeochemical model. Using this model, coupled to an ocean, atmosphere and fisheries model, I will quantify the long-term efficiency with which marine carbon dioxide removal strategies sequester carbon along with their impact on fisheries catch. These projections will help scientists, policy-makers, and industry leaders decide if, when, and how we should geoengineer the ocean.					
	National Interest Test Statement					
	International consensus is that to keep global warming below 1.5°C, it will be necessary to employ human engineering to remove CO2 from the atmosphere. This project will develop novel observation techniques and computer models to accurately evaluate the risks, costs, and benefits of engineering the Southern Ocean to remove CO2 from the atmosphere. The outcome will be a comprehensive assessment of marine CO2 removal strategies which quantifies their currently poorly understood impact on fisheries and potential for long-term carbon storage. By combining observations with physical, biogeochemical, fisheries, and economic models, this project will culminate with estimations of the dollar value of different deployment strategies. Peer-reviewed publications and widely disseminated briefing documents produced through this research will enable scientists, policy-makers and industry leaders to evaluate the economic and environmental trade-offs and decide if, when and how we should engineer the Southern Ocean to help abate climate change. Australia will benefit from clarity and insight on how to responsibly manage, leverage, and protect one of its most valuable natural resources.					
DE240100201	**Learning how we learn: linking inhibitory brain circuits to motor learning**	79,441.00	156,080.50	150,962.00	74,322.50	460,806.00
Hamel, Dr Raphael	Understanding the relationship between brain activity and human behaviour is a fundamental question in neuroscience. This project aims to contribute to this question by using cutting-edge brain stimulation techniques to demonstrate causal relationships between inhibitory brain circuit activity and motor learning. This project expects to generate fundamental knowledge about the relationship between the brain and behaviours. Eventually, this may contribute to the development of optimised training protocols in healthy populations such as school children, recreational and elite athletes, medical and military personnel, and ageing adults, as well as the development of brain stimulation					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	interventions to improve motor learning. **National Interest Test Statement** Humans have an amazing capacity to learn new skills but exactly how this unfolds in the brain is unknown. This DECRA will use non-invasive brain stimulation protocols to provide insights into how the human brain adapts during learning; i.e., how does the healthy brain learn? This will assist the development of training protocols that focus on brain adaptation (i.e., modify the brain to improve learning) to be used in conjunction with traditional 'bottom-up' methodologies (i.e., practicing a new skill to drive learning and associated brain adaptation). This critical knowledge, shared via public seminars, workshops, easy-access articles and UTAS degrees, will be especially relevant for those who train Australians whose learning capacity is critical to protect and save lives (e.g., pilots, surgeons, military) and those seeking maximum performance (e.g., elite sport, performing artists). The knowledge gained may ultimately help preserve/restore motor function of ageing Australians or those suffering traumatic brain injury, which has direct implications for maintaining functional independence and quality of life.					
DE240100267 Zhao, Dr Chen	**Great Antarctic uncertainties: How to better predict rising sea levels** This DECRA project aims to significantly reduce the uncertainties in future projections of the Antarctic contribution to global and regional sea-level rise. This will be achieved by including, for the first time, the influence of interactions with the subglacial hydrologic system and surrounding ocean circulation on the ice sheet dynamics, using a coupled ice–ocean–hydrology model. This research will build on Dr Zhao's international expertise in ice sheet modelling and coupled ice–ocean modelling. This project provide substantial benefits to Australia and internationally, particularly in regions vulnerable to rising sea levels, by producing more accurate sea-level rise projections for policy and mitigation strategies. **National Interest Test Statement** Sea-level rise will have widespread and costly impacts on Australian society, industry, and environment. In Australia, 1.1 m of sea-level rise will expose over $226 billion worth of infrastructure to coastal flooding and erosion. Improved projection in regional sea level changes around Australia will greatly support the Australian government and policy makers to adapt to sea-level rise and adjust its greenhouse gas emissions reduction targets by 2030 and 2050. The outcomes of this research will be a reduction in the uncertainty associated with Antarctica's contribution to future sea-level rise and improved understanding on the influences of ice–ocean interaction and subglacial discharge to narrow down uncertainties. This DECRA aligns strongly with the Australian Antarctic Science Strategic Plan and the Australian Antarctic Strategy and 20 Year Action Plan Update priorities. This research will benefit Australian federal, state, and local policy-makers who are developing cost-effective and reliable climate-change planning, mitigation, and adaptation strategies on sea-level rise.	74,000.00	148,000.00	148,000.00	74,000.00	444,000.00
	University of Tasmania	297,690.00	593,899.50	589,180.00	292,970.50	1,773,740.00
	Tasmania	297,690.00	593,899.50	589,180.00	292,970.50	1,773,740.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Victoria						
Deakin University						
DE240100318	**Investigating Telehealth Psychological Support**	63,846.50	130,297.00	132,897.50	66,447.00	393,488.00
Latham, Dr Joe R	This project aims to investigate how practitioners and LGBTIQ+ patients engaged in long term psychological support experience telehealth and navigate continuity of care in their experience of this support. This project expects to generate new knowledge to support the provision of best practice in telehealth support for disadvantaged and vulnerable groups. Expected outcomes will be enhanced understanding of how practitioners and patients navigate continuity of care and psychological support via telehealth and practice-ready resources for medical providers. This should provide significant benefits such as expanded accessibility, improved service delivery, usability and effectiveness in mental healthcare in Australia.					
	National Interest Test Statement					
	Expanding telehealth access has been vital, but its suitability in delivering mental health treatment, especially for marginalised and vulnerable groups, is unclear. Taking a targeted population identified by the Royal Commission into Victoria's Mental Health System (LGBTIQ+ people) as an example, the project aims to investigate the experiences of practitioners and patients with telehealth in mental healthcare to provide a broad understanding of the benefits and limitations of this rapidly expanding treatment modality. The project will generate cutting-edge knowledge on telehealth practices for psychological support, and innovative education resources to expand accessibility and usability for LGBTIQ+ and other vulnerable groups in Australia. Addressing a key priority of the National Mental Health and Wellbeing Pandemic Response Plan by focusing on innovation and real-world effectiveness of innovative support services for mental health, the project expects to guide these services to be better tailored to vulnerable groups, providing value for money and improved models of service delivery for all.					
DE240100452	**TransformUs Higher Ed: Developing confident, 'classroom-ready' graduates**	59,322.00	118,604.50	123,065.00	63,782.50	364,774.00
Lander, Dr Natalie J	The impact of the COVID-19 pandemic on children has been far-reaching. Many students have fallen behind academically, are experiencing mental health challenges and have critically low levels of physical activity. These issues have become a global research priority, the focus of national and state policies, and urgently need addressing. This project offers a novel initial teacher education program that integrates meaningful physical activity into classroom learning to address critical classroom challenges, exacerbated by COVID-19. The empirical findings are expected to generate new knowledge and practices to strengthen teaching degrees from a robust evidence base and benefit the learning and health outcomes of all Australian students.					
	National Interest Test Statement					
	Teacher shortages are impacting schools across Australia, with teachers working in challenging environments and systems, further exacerbated by COVID-19. In addition, the impact of the pandemic on children has been far-reaching. Many students have fallen behind academically, are experiencing mental health challenges and have critically low levels of physical activity. Collaborating with key education stakeholders across three Australian universities, this research aims to strengthen initial teacher education programs to deliver 'classroom-ready' graduates who provide optimal learning and health outcomes for the children they teach. Educational research, behavioral research and evidenced-based models of implementation science, are being brought together as an exemplar of innovative, interdisciplinary research. The findings will generate new knowledge to strengthen teaching degrees and benefit the learning and health outcomes of all Australian students. Participation of key Education stakeholders and existing curriculum authority relationships would greatly facilitate the translation of research outcomes.					
DE240100458	**Understanding the role of cosmeceuticals in health, gender and ageing**	71,488.50	148,526.50	150,842.50	73,804.50	444,662.00
Fomiatti, Dr Renae	Cosmeceuticals are a new category of product at the intersection of cosmetics and pharmaceuticals taken to prevent and treat the physical signs of ageing. This project aims to investigate the advertising, regulation and use of cosmeceuticals, drawing on an innovative theoretical approach and qualitative methods. This project expects to generate new knowledge on the relationship between cosmeceuticals and contemporary experiences of health, ageing and gender. Expected outcomes include recommendations to improve healthcare and regulation and public outputs to help consumers navigate anti-ageing imperatives. This should provide significant					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	benefit by reducing consumer harms and the associated social, health and economic consequences. **National Interest Test Statement** Australian consumers are increasingly using cosmeceutical drugs to prevent and treat the physical signs of ageing. Neither cosmetic nor medicine, cosmeceuticals have avoided pharmaceutical regulation and are contributing to consumer harms, healthcare risks and the normalisation of anti-ageing attitudes. Little is known about how people consume cosmeceuticals, make decisions about different products and practices, and manage risks and harms. This project will assemble the first national dataset on cosmeceutical consumption to build a high-quality knowledge base on an emerging policy problem. It will provide insights into the transformation of contemporary experiences of health and ageing and the informational needs of consumers and health practitioners. This will inform the development of recommendations for improving healthcare, government policy and regulation to minimise consumer harms. Through the creation of novel-public outputs (interactive digital story and accompanying audio documentary), this project will also assist consumers to navigate the cosmeceutical industry and anti-ageing imperatives.					
DE240100480 Kar, Dr Mega K	**Electrolyte design for high-performance, sustainable sodium batteries** This project aims to develop sustainable high-performance sodium batteries by investigating new non-flammable and safe electrolyte chemistries. The project will generate knowledge in materials chemistry for battery electrolytes that will underpin improvements in battery technology and help to move society towards a zero-carbon economy. The outcomes will provide materials suitable for prototyping reliable, safe and sustainable batteries in Australia and enhance research collaborations with local and international industry partners. These advances will contribute to reliable, affordable, and sustainable energy storage systems, positioning Australia at the forefront of advanced battery research. **National Interest Test Statement** The proposed research aims to develop next generation high-performance sodium batteries, that are currently the most promising alternative to lithium-ion batteries and offer the ability to overcome critical safety and material supply chain issues. Novel non-flammable, thermally stable electrolyte materials will be designed to ensure sustainability and enhanced cycle life of sodium batteries. This will progress a technology that is just at the cusp of widespread commercial deployment and become a viable complementary alternative to lithium-ion batteries. These new energy storage systems address Australia's "National Energy Performance Strategy" by improving energy reliability, delivering a high energy performance technology, reducing carbon emissions and providing energy security for Australia. The project will provide fundamental knowledge, training, intellectual property and commercialization opportunities that will foster job creation and lay the groundwork for an Australian sodium battery manufacturing industry.	75,039.50	149,579.00	147,579.00	73,039.50	445,237.00
DE240100616 Blake, Dr Miranda R	**Sustained innovations to promote healthier food in the retail environment** This project aims to provide empirical evidence to drive sustained retailer change in favour of healthier food offerings. Australian food environments drive unhealthy diets and are a major cause of social, productivity and wellbeing loss. Using implementation science methods applied to rigorous real-world trials and policy collaborations, the project will test the effectiveness of innovative methods for sustaining organisational change across a range of retail settings. Outcomes would deliver significant benefits by enabling retailers, governments, and public health advocates nationally and internationally to make the lasting changes to retail environments needed to improve productivity and population wellbeing. **National Interest Test Statement** We already know initiatives within food retail outlets, such as increasing the availability of healthier products, can improve customer diets. This fellowship extends our understanding by investigating how government policies can support retail outlets to maintain these practice changes in the long-term. The predominance of and advertising of unhealthy foods in Australia has driven increases in levels of obesity and unhealthy diets. These in turn, cause up to $13 billion each year in healthcare costs and lost productivity. This project will work with retailers and policymakers to co-create and test which policies are effective at supporting long-term retail change for food manufacturers, and food outlets in public settings (e.g., sport and recreation centres, hospitals). This fellowship has the potential to benefit community productivity and wellbeing by working with Australian governments (local, state and national) to translate research findings into policies to support retail outlets to maintain healthy food initiatives.	71,250.00	138,250.00	134,500.00	67,500.00	411,500.00
DE240100633 Adyel, Dr Tanveer Mehedi	**Microplastics accumulation in Australian coastal wetlands** This project aims to quantify the intensity, rate and impact of the accumulation of microplastic particles in Australia's coastal wetlands for the first time. This multidisciplinary project will examine	78,897.50	153,793.50	151,389.00	76,493.00	460,573.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
	interactions between microplastics, wetland ecology and carbon dynamics using advanced analytical chemistry, biogeochemistry and environmental microbiology. Expected outcomes of this project include the world's first nationwide analysis of the sequestration of microplastics and their influence on the carbon cycle in coastal ecosystems. This work will provide significant benefits, such as facilitating decision-making about microplastics emissions reduction and coastal wetlands conservation. **National Interest Test Statement** Australia is home to vast coastal wetlands, such as tidal marshes, mangrove forests and seagrass meadows. Australian coastal wetlands contribute the world's largest amount of blue carbon wealth- carbon captured by these wetlands- worth billions of dollars. Coastal wetlands also trap microplastics, preventing them from being discharged into the ocean. However, accumulated microplastics in coastal wetlands can cause severe consequences to the ecological, socio-economic, and nature-based services that wetlands provide to Australians. This project addresses government-identified priorities about environmental change, and soil and water health. It will deliver new evidence on the extent to which coastal wetlands trap microplastics and predict the impact of such ecosystems under projected microplastics exposure. This research will contribute to Australia's commitments to global action on marine plastic pollution and the Environment Restoration Fund. Globally applicable project findings will take Australia to the forefront of the growing field of microplastics research and promote environmental conservation.					
DE240100635 Zheng, Dr Miaobing J	**Understanding the development of lifestyle behaviours in early childhood** This project adopts novel statistical modelling and machine learning approaches to understand the development of lifestyle behaviours in early childhood. Despite the pivotal role of lifestyle behaviours in influencing health and quality of life, little research exists on lifestyle behaviours in early childhood. This project will establish a comprehensive understanding of lifestyle behaviours in early childhood by identifying key developmental time points, mechanisms of behavioural change, and children at risk of developing poor lifestyle behaviours. The project will inform strategies and policies to optimise lifestyle behaviours from the start of life and showcase the capabilities of novel methods in advancing behavioural epidemiology. **National Interest Test Statement** Poor lifestyle behaviours, including unhealthy diet and physical inactivity, are national threats with substantial adverse health and economic impacts. Knowledge of who will develop poor lifestyle behaviours, when, and why, is of major relevance to Australia's national interest. Our understanding of lifestyle behaviours in critical preschool years when biology is most plastic is limited. Leveraging high-quality cohort data, novel statistical modelling and machine learning approaches, the project would identify critical developmental time points of lifestyle behaviours in early childhood, elucidate the mechanisms of behavioural change, and characterise children with poor lifestyle behaviours. The project would enhance Australia's leading position in nutritional and behavioural epidemiology, and synthesise a strong new evidence base for government policy and design of targeted pre-emptive strategies to improve lifestyle behaviours in the pivotal period of early childhood development. Critically, the project would promote health and economic benefits for the Australian community longer term.	73,987.50	147,975.00	150,413.00	76,425.50	448,801.00
DE240100960 Zolfagharian, Dr Ali	**Reverse Design of Tuneable 4D Printed Materials for Soft Robotics** This project aims to facilitate the design and manufacture of specialised objects that can change their shape over time. These types of objects are made from 'tuneable metamaterials', which can be made by 4D printing: 3D printing with an added dimension of time. These materials are becoming indispensable in many fields- including non-metallic soft robots used in medicine or the exploration of harsh environments like space- but are currently onerous to make. This project will develop a revolutionary new method for a user to work backward from defining the desired qualities to the manufacture of the object that satisfies their needs. It will also create a library that will allow users to quickly select a material that will be appropriate. **National Interest Test Statement** Additive manufacturing (3D printing) is revolutionizing industries by creating components quickly, cheaply and flexibly. 4D printing is 3D printing of products that change shape over time, providing additional advanced functionality. The project will create a theoretical model allowing design of bespoke, time varying responses of 4D printed products by predicting optimal printing conditions. Commercially, this will accelerate production of soft (non-metallic) robots, a growing part of the $100B national advanced manufacturing sector. Soft robotics are used in healthcare as prosthetics and for surgical procedures for example, to improve patient's lives. Economically and environmentally, the project facilitates circular design, and production cost and waste reduction. It will boost Australia's leadership in additive manufacturing and sovereign capabilities in soft robotics and 4D printing. Translation will involve early engagement of innovative medical device companies to understand unmet needs the technology can address, and to provide technology transfer partners for the outcomes	68,059.50	141,030.50	142,039.50	69,068.50	420,198.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	of the project.					
	Deakin University	561,891.00	1,128,056.00	1,132,725.50	566,560.50	3,389,233.00
La Trobe University						
DE240100131 Dehm, Dr Julia	**Resource Struggles and International Law: Navigating Global Transformations** This project will examine how international law both shapes, and is shaped by, struggles over natural resources in periods of global transformation. It aims generate new knowledge about how international law is used by different actors to assert their authority and power over resources and to secure access to natural resources. Expected outcomes include empirical analyses of three key periods of global transformation in the twentieth century and a socio-legal analysis of how international law is shaping struggles over natural resources during the current transition to a net zero world. This should provide significant benefits by assisting countries to better navigate the current legal, geopolitical and economic transformations.	75,032.50	149,947.00	151,556.00	76,641.50	453,177.00
	National Interest Test Statement This project will produce novel insights about how international law both shapes, and is shaped by, struggles over natural resource in periods of global transformation. The current transition to a net zero world presents Australia with both risks and opportunities. The Federal Minister for resources, Madeleine King, has described Australia has having ‘an unmissable opportunity and a remarkable responsibility’ to help lead the global transition to a decarbonised future. Australia is currently one of the world’s largest exporters of fossil fuels, but also has the potential to become the world’s largest exporter of lithium and other critical mineral resources. A deeper understanding of how different actors utilise international law to assert authority and power over key resources and to secure access and control to natural resource will enable Australia to intervene strategically in international legal debates and to promote international legal changes to better advantage Australia’s interests.					
DE240100188 Chapuis, Dr Lucille	**Sensory and bioengineering approaches to predict hearing abilities in fish** This project aims to understand the factors responsible for the extraordinary diversity in the shape and size of fish ears and why some fishes are more sensitive to sound than others, which is little understood. Using innovative techniques and a multidisciplinary approach, expected outcomes of this project include the first model representing the hearing function of fish underwater. This may allow unique insights into the importance of sound for fish, as well as inspire the development of new sensor technologies, including in robotics and biomedical applications. Benefits include the ability to predict the vulnerability of a fish species to noise pollution and to inform conservation strategies and policy guidelines.	73,059.50	142,149.00	140,063.00	70,973.50	426,245.00
	National Interest Test Statement This project aims to elucidate why and how fish have developed a wide variety of ear shapes and hearing abilities, unique in the animal kingdom. By developing biomechanical models and using artificial intelligence, the project will tackle this enduring mystery in sensory biology. It will also test, for the first time, the influence of the surrounding sound environment on shaping the hearing system of an animal. While the health of ocean and fishes are threatened by the rise of human-made noise, it is now critical to predict the effects of this pollution on different species. Such knowledge also has the potential to unlock new technologies in sound sensors, robotics, and biomedical applications, such as sensors that are able to discriminate sounds in noisy conditions, a feature of huge potential for industry and defence. Benefits to Australia include the ability to predict the vulnerability of a fish species to noise pollution, which can inform the development of policies for conservation strategies and guidelines targeting the effects of noise on fish.					
DE240100477 Deane, Dr David C	**Quantifying climate change impacts for wetlands in agricultural landscapes** This project aims to quantify the impacts of changed water availability on wetland biodiversity. Research will focus on high conservation value wetlands in agricultural regions, which face significant climatic risk. Novel integration of biodiversity theory with hydroecological and spatial modelling is expected to generate new understanding of how water availability drives wetland diversity. Intended outcomes include new techniques to model wetland biodiversity, building of international collaborations and enhanced ability to support policy development to ameliorate climate-related wetland impacts. This should promote sustainable management of water and	72,713.00	150,472.00	152,083.00	74,324.00	449,592.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	biodiversity in farmlands, benefitting productive capacity and environmental amenity. **National Interest Test Statement** Wetlands are among the most biodiverse and threatened habitats on Earth. In agricultural regions of Australia, wetlands can be among the last habitat available for native species and thus critical for biodiversity conservation. Yet, these wetlands only persist because they are simply too wet for other uses. Climate change could alter this delicate balance, but the possible impacts range from changes in wetland species composition to complete loss of wetland habitat. A quantitative understanding of wetland responses to water is the key to optimising their environmental amenity, both now and into the future. This project aims to develop such an understanding and provide new tools to predict the magnitude of impacts on wetlands from changing water availability. Models developed through this research will allow us to interpret alternative climate scenarios in terms of likely changes to wetland biodiversity. Such understanding will benefit catchment management or conservation agencies and community groups. These end-users of the research will be engaged throughout the project to ensure maximum benefits.					
DE240100501 Crowe-Riddell, Dr Jenna M	**Serpent sensory innovation in the evolutionary transition from land to sea** This project aims to investigate the mechanisms underlying sensory adaptation, which underpins the behavioural capacity of animals to adapt to environmental change. This research will harness innovative phenotypic imaging and genomic sequencing, to study the coordinated changes among sensory systems in a range of ecologically diverse snakes. Expected outcomes include a large database of 3D digital anatomical models from Australian and international museum collections, and new knowledge on the genetic processes influencing sensory receptor evolution in vertebrates. The should provide significant benefits for conservation by using sensory adaptability as a framework for estimating potential extinction risk for vulnerable species. **National Interest Test Statement** Modifying behaviour is one of the first 'lines-of-defense' animals have against environmental and climate change, but what determines how animals behave? To generate new knowledge in behavioural adaptability, this project aims to study how serpent senses (such as eyes, ears, tongues) evolve together in response to past and ongoing environmental change. The project will create 3D models of snakes archived in Australian and international museums. These vast collections are an invaluable asset for tracking how species respond to changing environments, and will ensure that natural treasures are not lost to degradation over time. By making digital replicas free online, and through outreach with school children, this project will increase accessibility and longevity of Australian museum collections, providing significant social and environmental benefits.	71,272.00	142,701.50	140,344.00	68,914.50	423,232.00
DE240101215 Russell, Dr Emma K	**New Bail Regimes: Reconceptualising Risk to Reduce Remand Imprisonment** More than one in three prisoners in Australia are on remand, double that of two decades ago. This project aims to investigate how risk management in new bail regimes affects accused individuals experiencing social disadvantage. It employs innovative critical criminological methods to generate much-needed knowledge about how criminal justice actors interpret and respond to risk in the bail decision-making process, and 'lived' experiences of bail conditions and remand imprisonment. Expected outcomes include a new framework for conceptualising risk in the context of bail. This should bring significant benefits to policymakers and law reformers seeking to reduce imprisonment and its impacts on disadvantaged groups. **National Interest Test Statement** More than one in three prisoners in Australia are on remand, double that of two decades ago, with increases attributed to changes in bail laws and decision-making practices. This project will be the first to comprehensively assess how risk is interpreted and managed through bail and remand practices and how this affects accused individuals experiencing social disadvantage. Expected outcomes include a new framework for conceptualising risk in the context of bail that will reduce high rates of remand. Given the many individual, social, and economic costs of remand, this research will have many benefits for affected individuals and their families; criminal justice and legal professionals; and governments and communities more broadly (e.g., less inequality, improved safety, cost savings). Findings will be translated for policy and practitioner audiences by working with an expert advisory panel to make policy, practice and law reform recommendations. The research will be of use to policymakers and law reformers seeking to reduce imprisonment rates.	73,822.50	148,068.50	148,908.00	74,662.00	445,461.00
DE240101286 Phan, Dr Thanh Kha	**SARS-CoV-2-induced dead cell fragments drive viral uptake and inflammation** This project will apply advanced cell biology and imaging techniques to investigate how macrophages, which lacks a canonical receptor for viral entry, become infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and elicit inflammatory responses. Its insights into a novel pathway of viral entry is expected to advance our understanding of host-pathogen	77,224.50	156,649.00	157,629.00	78,204.50	469,707.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	interaction. The project is intended to uncover the role of SARS-CoV-2-induced dead cell fragmentation in promoting viral uptake and inflammation. Its findings should provide significant scientific, health and economic benefits by informing new research directions on infection and innate immunity as well as future therapeutic designs for infection treatment. **National Interest Test Statement** For many individuals, infectious diseases like Covid-19 leave a lasting impact through cardiovascular damage and neurological complications. Central to these long-term health impacts is severe inflammation, produced by immune cells called macrophages when they become infected by the virus. However, it is unknown exactly how macrophages become infected by the virus. This project will determine if the Covid-19 virus enters macrophages when they engulf fragments of other cells that have been killed by the virus. Although focused on fundamental knowledge, the results of the project will inform new therapeutic designs that target dead cell fragmentation to control inflammatory responses, leading to new treatments for Covid and infectious diseases more broadly. To ensure adoption, the project findings will be shared with other scientists and clinicians through journal articles, international and national level conferences, and open access datasets. Outcomes will also be promoted in the media and via public outreach activities to improve awareness of the importance of this research.					
	La Trobe University	443,124.00	889,987.00	890,583.00	443,720.00	2,667,414.00
Monash University						
DE240100040 Chen, Dr Chunyang	**Quality Assurance of Mobile Applications by Effective Testing and Repair** This project aims to create advanced techniques that will enable software engineers to effectively develop quality assured and robust software systems. This project expects to generate new and innovative approaches that automate software testing and repair. The expected outcomes of this project include new knowledge of software engineering, development of an automated and cost-effective testing system with improved coverage, greater bug detection and repair, and faster testing protocols. This should provide significant benefits to software users by providing reliable and user-friendly systems and to software companies to position Australia as a global leader in software development and technological advancement. **National Interest Test Statement** With the significant increase in demand for high-quality software and the forecast workforce shortage, Australia's software industry needs to find ways to provide reliable and high throughput software systems. Current testing of software systems uses manual testing protocols which are labour-intensive and unreliable because they often leave bugs undetected causing major disruptions in software usage. This project will develop an effective GUI testing and repair framework for quality assurance of mobile apps based on program analysis and machine learning methods. This research will likely lead to significantly improved economic, commercial and social benefits to the Australian community. This proposal relies on new methodologies that only exist in our laboratory and will enable Australian software development teams to integrate automated and cost-effective steps in their GUI testing and repair processes. Application of this technology will lead to a faster and more effective communication platform to avoid potential financial losses or even serious harm to human life due to software malfunction.	71,699.50	149,694.50	149,451.50	71,456.50	442,302.00
DE240100042 Lam, Dr Edward	**Hybrid optimisation for coordinating autonomous trucks and drones** This project aims to build analytics for controlling a fleet of autonomous trucks and drones working in tandem to deliver retail goods and disaster relief. This project expects to develop new mathematical and artificial intelligence algorithms for routing and scheduling the vehicles and for directing the multi-modal transfer of goods between vehicles in real-time as traffic conditions change. Expected outcomes of this project include new theories and technologies that enable a central computer to remotely control the autonomous fleet for maximum efficiency. Benefits in transport and logistics include improved freight productivity through reducing costs and delivery times. **National Interest Test Statement** Australia's freight transport productivity has been stagnant for nearly three decades. The "last-mile" cost to deliver pasta sauce from your local supermarket to your home is now about the same as from Italy to Sydney. The Australian Government determined that a 1% improvement in freight efficiency will save $8-20 billion over 20 years and is encouraging drones and autonomous vehicles to both restart productivity growth and meet	56,539.50	113,079.00	113,079.00	56,539.50	339,237.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	increasing demand. This project will investigate a new system of cooperative truck-and-drone last-mile transport and develop analytics technologies to maximise efficiency by rerouting and transferring goods between ground and air vehicles as traffic and weather conditions change. Australians will benefit from less road congestion, lower costs, faster delivery times and higher reliability in everyday retail and in emergency response, where prompt delivery of aid can save lives. This project will be implemented in partnership with innovative transport and logistics businesses, and could contribute to growing the nation's economic prosperity.					
DE240100066 McCarthy, Dr Molly M	**Contemporary social and environmental risks for youth offending** While social and technology changes have led to reductions in low-level youth offending, chronic youth offending has not reduced notably, and is growing in areas of Australia. This project aims to generate new knowledge on underlying social and environmental risks for chronic youth offending in Australia to improve the effectiveness of crime prevention and desistance strategies to reduce reoffending. This project uses longitudinal survey and youth justice data, and interviews with young people, to identify key social and environmental risks for chronic youth offending. Expected outcomes of the project include evidence to inform effective crime prevention and desistance strategies for young people ‘at risk’ or engaged in chronic offending.	72,678.00	147,782.50	149,830.50	74,726.00	445,017.00
	National Interest Test Statement Technological and social changes have led to reductions in low-level youth offending in Australia, but chronic youth offending has not notably reduced, and is growing in some populations. Contemporary social and environmental contexts for youth offending across different populations are poorly understood. This project aims to generate new evidence on the contemporary social and environmental contexts for youth offending in Australia, including consideration of complex disadvantage commonly experienced by First Nations young people. The project will identify key social and environmental risks for chronic youth offending, and co-design crime prevention and desistance strategies to address these risks with youth justice, police and community stakeholders. The results will be shared with the public and policy makers and will benefit young people at risk or engaged in offending, and the broader Australian community, by reducing reoffending and victimisation, and associated harms and costs.					
DE240100080 Vakhitova, Dr Zarina	**Harnessing the power of ordinary people to prevent cyber abuse** Cyber abuse is a serious social problem that requires an urgent solution. The project aims to improve our understanding of cyber abuse intervention by ordinary citizens by utilising innovative research methods. The project expects to generate new knowledge about the mechanisms of prevention of cyber abuse victimisation and to produce an evidence-based intervention training program. Expected outcomes of this project include a new theoretical paradigm as well as evidence-based policy recommendations for preventing cyber abuse. These could provide significant benefits, such as reduced physical, psychological and economic costs associated with victimisation and the burden on the police and criminal justice system.	70,853.50	137,382.00	131,807.00	65,278.50	405,321.00
	National Interest Test Statement Nearly half of adult Australians have experienced some form of cyber abuse at least once in their lifetime with such abuse associated with various psychological, social, physical and economic harms. Effective solutions to cyber abuse in Australia are yet to be identified with traditional policing approaches proven ineffective. The present project will examine whether ordinary Internet users can help disrupt cyber abuse and reduce harm to victims. It will do this by identifying the underlying factors that support or inhibit third-party intervention in cyber abuse and develop a new theoretical framework to inform practical crime prevention efforts in cyberspace. The benefits of the project include the development and testing of a new intervention for encouraging ordinary people to intervene in cyber abuse. In so doing, the work has the potential to reduce the burden on the police and the criminal justice system in dealing with cyber abuse. The resulting evidence will be shared with various stakeholders and the public through the provision of policy briefings and media communications.					
DE240100091 Hirata, Dr Koji	**Rethinking Mao’s China from a Global Economic Perspective: A History** The project examines how China was connected to the global economy through international trade and technology transfer during the period of Mao Zedong’s leadership (1949-1976). It will provide the first comprehensive historical account of Maoist China’s economic relationship with its major trade partners, including the Soviet Union and Japan, by analysing key archival documents in Chinese, Japanese, Russian, and English. Expected outcomes include a new understanding of Maoist China as a part of the economic Cold War and the East Asian model of economic development. The project’s findings could benefit Australia by providing new insights into how China’s early policies under Mao shaped its present and future.	73,089.50	147,329.00	134,329.00	60,089.50	414,837.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement China's recent global emergence has provided arguably the largest economic opportunity and challenge to Australia. This project seeks to develop a new understanding of China's recent economic history and its standing in the world during the leadership of Mao Zedong, by examining archival records of relationships with key trading partners. The project will challenge the conventional notion that Mao's China was secluded from the world and has little relevance today, by instead examining how Maoist China was economically linked to the outside world, including Australia, through trade and technology. It will also explore how the legacies of the Mao era are more relevant to China today than is often assumed. Expected outcomes include a new understanding of Maoist China's contribution to the economic Cold War and to the East Asian model of economic development. The findings of the project will be shared with the Australian public, government officials, and business people to help understand how China's economic policies are made and implemented, and how Australia can engage with them constructively in the future.					
DE240100092 Thompson, Dr Benjamin S	**Sustainable Business Models for Marine Conservation** Marine conservation remains severely underfunded, with the private sector increasingly promoted as a solution. This project investigates under which circumstances sustainable business models can be developed to generate profit alongside positive marine conservation outcomes. By collecting data from coastal stakeholders in Fiji and the Philippines, the project will conduct the first in depth examination of relationships between the institutional, financial, and business aspects of marine conservation. Expected outcomes include enhanced cooperation and decision-making among entrepreneurs, investors, and environmental managers – to implement solutions to effectively and equitably safeguard ocean resources, ecosystems, and coastal communities.	74,163.50	146,078.00	135,759.00	63,844.50	419,845.00
	National Interest Test Statement With the health of our oceans under severe threat, Australia has pledged to help protect 30% of ocean area by 2030. Protected & Conserved Areas (PCAs) help conserve and rebuild marine life but are chronically underfunded and rely on infrequent philanthropic funding. Better financing approaches are needed. This project investigates how Sustainable Business Models – related to e.g., ecotourism and sustainable aquaculture – can be developed to finance marine PCAs through their profits. Entrepreneurs, investors, local communities, and policy makers will be interviewed to identify viable business models and supporting policies. The project will benefit Australia economically and socially by identifying ways for investors to fund business models that can deliver sustained financing for PCA management. It also offers to help protect marine environments, species, food sources, and tourism areas for all Australians. Results will be shared with business investors, entrepreneurs, communities, and policy makers through a series of workshops, meetings, and site re-visits, allowing them to collaborate on implementation.					
DE240100154 Morris, Dr Heather M	**Theory use in social care practice: improving implementation and outcomes** This project aims to harness the power of theorising to advance implementation science. The project expects to generate new knowledge on how frontline workers can use and move beyond their tacit knowledge to strengthen the implementation and effectiveness of programs designed to address pervasive disadvantage and promote positive child and family outcomes. The expected outcome is a tested theoretical model that will inform how frontline workers' critical thinking supports the consolidation of tacit and new knowledge and the use of implementation science. Strengthening understanding of effective program implementation through theory driven inquiry is viable and may generate urgently needed population level change in the social care sector.	69,000.00	134,000.00	130,500.00	65,500.00	399,000.00
	National Interest Test Statement Addressing disadvantage in childhood is a national priority and could save $15.2 billion/yr, yet the social care programs delivered to achieve this aim presently do not work for everyone. Theorising, when social care workers use knowledge and data for decision-making, may be the key to these programs being delivered more effectively. This project will generate new knowledge about how theorising, workplace supports, and researchers in practice settings, together can strengthen program delivery to achieve reliable outcomes and sustainable change for children and families. Best-practice tools and training needed to support social care workers' theorising will also be developed. Well established industry partnerships will ensure knowledge is shared system-wide, and that the supports are adopted for more effective and consistent program delivery. This project contributes economic and social benefit by building sector capacity, in both the workers and the workplace, to provide programs that enable children and families living with disadvantage to achieve consistent, positive outcomes.					
DE240100161 Page, Dr Rowan C	**Translational Design: Product Development for Research Commercialisation** Australia is a world leader in fundamental research. Yet, ranks as one of the worst developed nations for translating research into new-to-market innovation. This project explores a new role for design as a critical component of research commercialisation and innovation ecosystems. It	75,535.50	136,201.50	128,263.50	67,597.50	407,598.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	expects to contribute novel insights into how designers can be better integrated into interdisciplinary research directed towards commercial outcomes. Expected outcomes include a framework and toolkit for a paradigm-shifting design approach to translating fundamental research into products commercialised and manufactured in Australia. This should provide enhanced economic benefit, building Australia's sovereign capability in new-to-market innovation. **National Interest Test Statement** The University Research Commercialisation Action Plan (Australian Government, 2022) outlines the need to reform our poorly-performing commercialisation ecosystem to match the calibre of Australia's world-leading fundamental research. Designers and product development consultancies play a pivotal role in bringing new innovations to market. Design practice has evolved to take on a strategic, upstream role in innovative companies (ed. 3M, Apple). Yet little is known about how designers effectively interface with research organisations to further early-stage product development. Based on an investigation of world-best practices and current Australian practices, this project will develop, evaluate, and disseminate a framework and toolkit to empower designers to engage in early-stage research commercialisation. Embedding design skill sets in research commercialisation projects has the potential to enhance the dissemination of research to non-academic audiences, advance innovation in Australian universities, and ensure more new-to-market innovations are designed and manufactured in this country.					
DE240100449 Smedley, Dr Christopher J	**Diversity Oriented Clicking - Streamlined Synthesis of Molecular Frameworks** Innovation in synthetic chemistry drives the discovery of new life-changing drugs, agrochemicals and functional materials. This project aims to use a novel chemical concept, termed Diversity Oriented Clicking, for new sustainable and streamlined synthetic transformations. The new chemical processes are expected to deliver improved economy, efficiency and precision in the synthesis of bioactive molecules and functional materials that are inaccessible or challenging to prepare with existing technologies. The conceptual and practical outcomes of this project are expected to benefit both academia and industry as the synthetic routes to diverse complex molecules can be greatly streamlined, and reducing chemical waste and required purification. **National Interest Test Statement** The chemical sector is the third largest manufacturing sector in Australia, contributing $38 billion to the economy. The discovery of new approaches to synthesise chemicals is vital to ensure current and future manufacturing demands for fine chemicals, pharmaceuticals, functional materials and agrochemicals are met. This project develops new chemical reagents that are uniquely designed to enable the rapid construction of complex molecules, delivering new sustainable strategies to access valuable chemicals with improved efficiency and economy and decreased energy consumption. The discoveries from this project will offer more efficient manufacturing processes, strengthening Australia's chemical sector and enhancing Australia's supply chain resilience for key chemicals and pharmaceuticals. Existing links to national and international chemical, biotechnology and pharmaceutical sectors will assist putting project discoveries to use. The research program will provide a valuable training platform that produces a highly skilled workforce to support the Australian chemical and pharmaceutical manufacturing sectors.	71,100.00	142,200.00	142,200.00	71,100.00	426,600.00
DE240100502 Murray, Dr Lauren A	**Building Molecular Complexity Through Enzyme-Enabled Synthesis** Many valuable natural molecules are too complex to be commercially synthesised by current technologies. Despite advances in synthetic chemistry there is great need to adopt the elegant biocatalytic strategies for complex molecule synthesis found in nature, employing sophisticated enzyme catalysts. This interdisciplinary research program aims to address the shortcomings of traditional synthetic methods through the development of enzyme catalysts to rapidly generate complex molecular structures. These novel molecules can be readily converted into pharmaceuticals and agrochemicals leading to advancements in the bio-enabled production and application of organic molecules in these vital fields. **National Interest Test Statement** The isolation of molecules from nature has for decades contributed to the discovery of new therapeutic agents and agrochemicals. Finding a reliable method to access these important molecules within a laboratory provides great advantages, allowing for commercial availability, but often comes at the cost of energy-intensive and environmentally harmful reactions. This project aims to develop efficient routes to synthesise important molecules by incorporating natures catalysts (enzymes) into organic synthesis. This multi-disciplinary project focusses on the use of enzyme catalysts to access complex chemical scaffolds in an efficient, more environmentally benign manner. The outcomes of this project will increase Australia's global research standing whilst also enabling the generation of novel bio-enabled syntheses with decreased environmental impact for Australian industry. The development of the designer biocatalysts envisioned in this proposal will ultimately pave the way for environmentally benign syntheses of novel pharmaceuticals and agrochemicals, thus providing important commercial gains for Australia.	70,812.50	141,625.00	141,625.00	70,812.50	424,875.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100552	**Landscape-climate disequilibrium in dune fields**	69,000.00	138,000.00	138,000.00	69,000.00	414,000.00
Gunn, Dr Andrew	This project aims to predict how wind-blown landscapes respond to changes in climate. This project expects to use novel experiments and theoretical advances to meet this aim, then apply the prediction to the dune fields which cover a third of Australia's surface to generate new knowledge on what climate shaped them in the past, and how they will respond to anthropogenic climate change. Expected outcomes of this project will strengthen collaboration with discipline-leading international researchers and develop a globally-unique laboratory experimental capability in Australia. This should provide significant benefits to understanding environmental change in Australia by vastly improving predictions of dune-field response to future climate.					
	National Interest Test Statement					
	Sand dunes cover over a third of the Australian continent and are the most common landform in Australia. They are dynamic forms which migrate and deform depending on wind climate. Currently there is no way to predict how they will respond to future climate change, which includes changes in wind patterns, since all current theories only describe dune behaviour when climate is constant. This project will develop new understanding of dune field response to climate change and apply it to Australia's vast linear dune fields. The application to Australia's dune fields will greatly improve our understanding of past climates and Australia's environmental history. This project will lead to improved predictions of future change to landscapes which host significant road, rail, livestock, and natural resource assets. Project outcomes will inform how environmental managers and policy makers plan for the future, and will build our capability in predicting landscape change. Findings will be communicated to industry and government via professional organisations, and to the public via journalism and media outlets.					
DE240100582	**Unlocking Rare Earth Elements from the Earth Crust**	65,000.00	130,000.00	130,000.00	65,000.00	390,000.00
Xing, Dr Yanlu	This project will explore the mechanisms controlling the mobility of Rare Earth Elements (REE) in natural and engineered hydrothermal systems. The project will generate essential geochemical and thermodynamic data of important REE host minerals, and thereby significantly improve our capacity to quantify the behaviour of REE during complex ore-forming and hydrometallurgical processes. The anticipated outcomes include: facilitate discovery of new REE deposits by improving understanding of their formation; and facilitate optimisation and development of innovative techniques for REE ore processing. This knowledge and expertise will help Australia to become a world leader in supplying REE for the transition to a carbon-neutral economy.					
	National Interest Test Statement					
	Australia has among the world's largest recoverable reserves of the critical minerals used in advanced technologies (e.g., renewable energy, aerospace, defence, electric mobility, agri-tech). The Australian Government is investing heavily to help realise this momentous opportunity, particularly helping companies who hold Rare Earth Elements (REE) reserves to ramp up production and build on-shore infrastructure for processing. Mineral criticality is associated with risks due to geological, environmental, social, economic and geopolitical factors. This project will help minimising these risks by generating essential data for accurate prediction of REE behaviour in various geological and engineered systems. This new knowledge will promote a predictive approach to the discovery of large-scale REE resources. By allowing realistic predictions of REE behaviour in complex hydrometallurgical processes, the project will help facilitate the optimisation and design of metallurgical extraction, resulting in significant cost-savings, and helping to minimise the energy and environmental costs of REE mining and extraction.					
DE240100885	**Molecular characterisation of pore-forming proteins as pest control agents**	70,000.00	145,000.00	147,500.00	72,500.00	435,000.00
Spicer, Dr Bradley A	This project aims to utilise protein engineering, structural biology, and biochemistry to characterise the function of key members of the aerolysin/epsilon toxin/Toxin_10 pore-forming protein superfamily. Pore formation is a ubiquitous mechanism deployed by all kingdoms as defences against invading organisms. The expected outcomes of this project include the development of novel techniques aimed, broadly, at studying pore-forming proteins during the assembly pathway. This project should be of benefit to the wider research community by improving our understanding of pore-forming proteins as potential pest control agents.					
	National Interest Test Statement					
	In Australia, many of the foods we eat are grown on farms. Insects can sometimes eat these crops, which puts a lot of strain on our agriculture system and results in enormous food waste. But there are natural proteins that can kill insects and act as a protective shield for the crops. This multidisciplinary project will study how these proteins, called "pore-forming proteins," work. These pore-forming proteins act like a pin to a balloon and					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	can pop insects from the inside as they ingest the proteins. This project aims to gain a better understanding of how these proteins target certain insects and how they change shape to do their job. The outcomes will increase Australia's global standing in research with the commercial development of intellectual property for crop protection. The knowledge gained from this project will offer tools that will be used by biotechnology companies to design new ways to control insects on farms and maximise the protection to our agriculture.					
DE240100931 Batista Gondin, Dr Arisbel	**Molecular insights into the allosteric regulation of opioid receptors** Allosteric regulation is the biological process by which molecules bind to proteins someplace other than their active site, regulating their activity. Proteins on the cell surface called membrane receptors can be allosterically regulated to fine-tune the response of cells to the environment. This project aims to investigate how small molecules regulate receptor activity at a molecular level, using opioid receptors as an exemplar system. I will use an interdisciplinary approach that combines structural biology, medicinal chemistry, analytical pharmacology, and cell biology. The knowledge gained from these studies will advance fundamental understanding of receptor function and can lay the foundation for future drug discovery efforts.	75,539.50	151,079.00	151,079.00	75,539.50	453,237.00
	National Interest Test Statement Cells rely on receptor proteins on their surface to detect and respond to signals from the environment. These receptors are essential for maintaining life and well-being. It remains unknown how different molecules precisely regulate receptor activity to produce various effects in our cells, which limits our ability to develop effective medicines. This project will develop new methods to uncover the complex mechanisms that regulate opioid receptors, which are involved in pain sensation. The knowledge gained will provide an essential first step towards the development of safer and more effective pain medications, and will be readily transferrable to study other important cell receptors involved in a wide range of conditions. The outcomes will ultimately provide economic benefit for Australia via innovations of interest to pharmaceuticals industries, with expected downstream benefits for the health of Australians. The valuable intellectual property in the new methods to be developed, plus existing links with pharmaceutical industries, will ensure translation of the outcomes to benefit Australia.					
DE240100933 Augusto Santos Nogueira, Dr Petronio	**Noise-reduction mechanisms in jet engines: chevrons are the answer** This project aims to develop new models to study the influence of chevrons on the exhaust of aircraft engines, which is one of the strongest sound sources during take-off. As constant exposure to high-amplitude noise in areas close to airports leads to a myriad of health problems, new strategies have been sought to mitigate this noise component. Chevrons may modify the dynamics of the noise-generating coherent structures, but most of their parameters are chosen by trial and error, and the mechanism that maximises noise reduction is not clear. By understanding the underlying noise-reduction mechanisms, this project will facilitate the optimal design of quieter exhaust nozzles, ameliorating the effect of aircraft noise on the local community.	75,728.50	154,127.50	153,363.00	74,964.00	458,183.00
	National Interest Test Statement Due to the high correlation between high-amplitude noise in the vicinity of airports and the reporting of health issues in the surrounding communities, aircraft noise has been the focus of study among researchers across the world. This project aims to uncover noise reduction mechanisms in one of the most important components of aircraft noise: the jet flow. Current noise reduction strategies use serrations across the nozzle lip to reduce noise; however, most of the parameters of these devices are chosen by trial and error, and the physical mechanism of noise reduction is still unknown. By shedding light on this mechanism, this project aims to propose physics-informed nozzle design to optimally mitigate jet noise, leading to benefits for both the community and aircraft manufacturers, which are often constrained by noise regulations. This would also lead to significant savings for the Australian Government, who has been investing in noise mitigation strategies, including insulation for homes affected by aircraft noise and alternative operating plans for Australian airports.					
DE240100950 Reichenbach, Dr ALEXANDER	**Identifying hypothalamic circuits that integrate stress and metabolism** This project aims to investigate how the brain integrates threat during hunger. Using cutting-edge technology to manipulate and record neural activity this project will elucidate the brain circuits that integrate threat and appetite to minimize stress exposure during foraging. This will expand our knowledge on how the brain perceives and responds to hunger and may provide relevant information for a large number of basic biological processes controlling the brain. Expected outcomes of this project will contribute to a better understanding of the circuitry controlling more complex decisions from food selection through to social interactions. This should provide significant benefits for Australia’s competitiveness within neuroscience research.	78,456.50	153,991.00	151,069.00	75,534.50	459,051.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement					
	Animals maximise survival by balancing food intake and feeding behaviour against threats such as predation. This project examines how the brain balances the conflict between avoiding threats and maintaining food intake, especially during stress. Stress suppressed feeding negatively impacts animal growth rates, breeding, health, and survival. Therefore, the knowledge gained may be economically valuable for the meat and egg industries in Australia that rely on optimal production at minimal cost, while also prioritising animal welfare, an issue of increasing concern to consumers. The impacts of stress, including reduced feeding, can markedly impact survival of wildlife. The project outcomes may lead to improved conservation strategies, such as innovation in wildlife corridors, and in guiding programs that oversee captive wild animals. The research will contribute to vital understanding of how brains compute risk/reward decisions and affect decision-making under different environmental contexts, particularly stress. Results will be disseminated via avenues targeting meat/egg industries and conservation managers.					
DE240100992 Bayly-Jones, Dr Charles	**New methods to capture protein dynamics of the TSC-mTOR signalling axis.** Protein flexibility, the way proteins move, has a major role in how they function. However, we still do not have the tools to analyse this flexibility. Our cells have evolved many complex and flexible systems to sense and respond to their environment. For example, the TSC-mTOR system is found across life, from baker's yeast to humans, however it remains poorly understood. This proposal will study TSC as an exemplar to develop novel machine-learning approaches to capture protein flexibility and shape. This proposal will advance fundamental understanding of the TSC-mTOR pathway and build transformative methodologies to study flexible proteins more broadly.	75,789.50	150,579.00	148,329.00	73,539.50	448,237.00
	National Interest Test Statement					
	The building blocks of our bodies, or cells, multiply in a very controlled way, but we don't fully understand how this control happens. This project develops highly specialised and sensitive methodologies involving artificial intelligence and microscopy. These methodologies will be used to investigate the series of fundamental events that control cell multiplication at the molecular level of a wide range of living things running the gamut from yeast, to plants, to humans. The advanced algorithms and software developed by this project will be provided to the research community to assist them to expand the basic knowledge of how cells function at a molecular level. Ultimately this knowledge may assist many things from improving how plants survive in adverse conditions or development of medical treatments. Findings from this research will support future academic-industry partnerships benefiting Australia's biotech and pharmaceutical sectors.					
DE240101058 Prescott, Dr Michaela F	**Partnering with local knowledge systems to impact river management** The project aims to connect Local and Indigenous Knowledge Systems (LINKS) to other actors and processes involved in river transformation. Working in partnership with holders of Local and Indigenous knowledge, and using Indonesian river catchments as case studies, the project expects to generate new knowledge in development and planning studies. Expected outcomes include the development and dissemination of recommendations and strategies for how LINKS can inform river management. Anticipated benefits include significant new knowledge on how river management actors can partner with local communities to innovate to meet the compounding challenges of climate change and deliver greater impact and efficiency of investment.	76,539.50	147,079.00	141,579.00	71,039.50	436,237.00
	National Interest Test Statement					
	Climate change notably challenges vulnerable communities, and Australia has invested $billions to support neighbouring countries. However, such investments don't always result in lasting improvements. Engaging Local and Indigenous Knowledge Systems (LINKS) helps to represent the people affected by programs/policies in their development. Supporting locally accepted programs leads to sustained uptake. This project partners with communities living in Indonesian river basins to identify how their knowledge can inform local river management. The project will explore challenges and models for improved practices, integrating LINKS into river management, in the context of climate change. Anticipated benefits include improved geopolitical stability in our region through economic growth, water pollution control and developing climate change resilience. This project is connected to large, well-funded development projects already underway in Indonesia, supporting uptake directly into communities. The project will be broadly applicable in showing how including local communities can promote long-term river management.					
DE240101348 Hendrikse, Dr Joshua J	**Synergies between physical exercise, brain stimulation, and neuroplasticity** The brain is a highly dynamic organ. This capacity, known as neuroplasticity, governs our ability to learn new skills, acquire new knowledge, and fine-tune cognition. This project aims to investigate synergies between exercise, brain stimulation, and neuroplasticity, via application of a highly innovative interdisciplinary approach combining exercise physiology and cognitive neuroscience techniques. This project will pioneer novel, non-invasive methods of harnessing neuroplasticity to	78,026.50	156,253.00	157,473.00	79,246.50	470,999.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	improve brain function, and generate fundamental insights into the mechanisms mediating learning and memory. **National Interest Test Statement** The brain is a highly adaptable organ. This capacity to change, known as neuroplasticity, is fundamental to our ability to learn and adapt to changes in our environment. However, we currently have a very limited understanding of the brain processes underlying neuroplasticity, and how they enable learning and memory. Aerobic exercise and non-invasive brain stimulation are two proven ways to improve neuroplasticity. This project will investigate the benefits of combining these methods, and pioneer new ways of harnessing neuroplasticity in structures deep within the brain. This project will generate important new insights into how the brain learns and retains information. This knowledge stands to benefit Australians by generating novel approaches to improve brain health, which may have implications for optimising learning outcomes in education, health, and workplace settings. The knowledge generated may be applied in the future to treat brain dysfunction. Research findings will be shared with the public through news media, social media, and engagement with high school students.					
	Monash University	1,369,551.50	2,721,480.00	2,675,236.50	1,323,308.00	8,089,576.00
RMIT University						
DE240100038 Spiers, Dr Amy R	**Truth-telling Australia's colonial past with art by non-Indigenous artists** This project aims to address creative practices by non-Indigenous artists that confront Australia's difficult colonial past by advancing best practice approaches for the creation of such artworks. This project expects to generate new knowledge in the area of contemporary art using an innovative approach that combines practice-led, artistic research with interdisciplinary decolonial methodologies. Expected outcomes of this project include improved approaches to how the art sector engages with uncomfortable colonial histories. This should provide significant benefits such as enhanced relations between Indigenous and non-Indigenous people by supporting non-Indigenous artists to engage in sensitive truth-telling about Australia’s colonial past. **National Interest Test Statement** Non-Indigenous artists are increasingly engaging in truth-telling about Australia’s colonial past through art, often impactfully. At present, however, there are no industry guides that address artists responsibilities when creatively confronting colonial histories. Through scholarly and creative research that engages Indigenous and non-Indigenous arts workers, this project aims to advance knowledge about the opportunities and challenges presented when non-Indigenous artists address difficult histories through art, with the research producing a comprehensive handbook that offers practical guidance to arts workers and communities engaged in this work. Benefits of this research include enhanced Indigenous and non-Indigenous relations by supporting the art sector to contribute to sensitive truth-telling about Australia’s colonial past. This urgent research shared through art industry partners including peak body NAVA will be used by the art sector, researchers and communities that are engaged in the recognition of difficult histories and addressing Indigenous and non-Indigenous cross-cultural relations.	72,500.00	145,000.00	142,500.00	70,000.00	430,000.00
DE240100100 Middha, Dr Bhavna	**Tackling food-related single-use plastics in diverse consumption contexts** This project aims to investigate the uneven impacts of interventions that target consumers' engagement with single-use food plastics by utilising critical social science approaches. This research expects to create new knowledge through an evidence base in the area of sustainable consumption and waste studies using innovative qualitative techniques. Expected outcomes of this project include conceptual and methodological approaches that enhance societal capabilities for practicable waste management. This will provide significant benefits by enhancing Australia’s capacity to develop and integrate lived experiences of single-use food plastics use into the current and future National Waste Policy and National Plastics Plan. **National Interest Test Statement** Food-related single-use plastics are one of the primary materials fuelling the waste crisis. This project will analyse the ways that people, particularly in disadvantaged groups, engage with single-use food plastics, and the industrial and regulatory management of the waste. The result will be realistic, effective strategies to minimise the use and maximise the replacement of food-related single-use plastics. This will mean environmental benefits to Australia through the reduction and reuse of plastic waste, and economic and social benefits to industry and consumers through the increased adoption of sustainable products. The recommendations will be tested and refined with key policymakers, industry experts and consumers to ensure that they can be implemented successfully.	75,039.50	151,579.00	154,579.00	78,039.50	459,237.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100109	**Sexual offence interviewing: Towards victim-survivor well-being and justice**	79,353.50	154,625.00	150,725.00	75,453.50	460,157.00
Hamilton, Dr Gemma	This project aims to improve the way victim-survivors are interviewed in sexual offence cases by examining their experiences and perceptions of investigative interview techniques. It expects to generate new knowledge about interview techniques that can promote victim well-being and the disclosure of sensitive information during investigative interviews. Expected outcomes include new theoretical frameworks in the field of investigative interviewing and an innovative toolkit of victim-centred training resources to directly inform investigative interview policies and practices in sexual offence cases. Anticipated benefits include better victim experiences of investigative interviews and enhanced justice responses to sexual violence.					
	National Interest Test Statement Sexual violence impacts millions of Australians but reporting, prosecution, and conviction rates are low. Ensuring effective justice responses for sexual offence victims is a key priority of the National Plan to End Violence Against Women and Children, and is an internationally recognised human rights issue, which Australia is committed to improving under United Nations obligations. This research project will contribute towards better justice responses to sexual violence by improving investigative interview techniques with victim-survivors. This project will provide detailed insight into Australian victims' experiences and perceptions of investigative interview techniques and generate new evidence to promote victim well-being and the disclosure of sensitive details in sexual offence interviews. This research will deliver important social benefits to the Australian community by advancing investigative interview policies and practices in response to sexual violence. Investigative organisations will be consulted throughout the project, in the design, adoption, and promotion of innovative training resources.					
	RMIT University	226,893.00	451,204.00	447,804.00	223,493.00	1,349,394.00
Swinburne University of Technology						
DE240100136	**Galactic Outflows: Pushing the Distance Frontiers**	75,000.00	148,000.00	145,850.00	72,850.00	441,700.00
Davies, Dr Rebecca L	This project aims to push the frontiers of our knowledge of galactic outflows: a key physical process shaping galaxy formation and evolution. Using cutting-edge facilities including the new, high-profile James Webb Space Telescope, this project expects to build the first holistic picture of outflows in the distant past, when present-day galaxies were still taking shape. Expected outcomes include a novel framework for measuring outflow properties, and new understanding of the physics of distant outflows. This research is expected to provide strong benefits by enhancing the legacy of Australia's $122M partnership with the European Southern Observatory and placing Australia at the forefront of the James Webb Space Telescope revolution.					
	National Interest Test Statement Exploding stars power huge fountain flows that remove gas from galaxies and transport life-critical elements like carbon and oxygen across the Universe. Fountain flows launched during the Universe's infancy fundamentally shaped the growth of present-day galaxies, but our understanding of these early fountains is limited. This project will solve this shortcoming by leveraging novel analysis methods and cutting-edge facilities including the Very Large Telescope and the James Webb Space Telescope. The program will dramatically improve our understanding of the physics and chemistry of the Universe, enhancing Australia's reputation as a global leader in astronomy research and promoting the growth of our burgeoning space industry. Exciting new discoveries will be realised through academic collaborations and shared through accessible media releases, increasing the scientific literacy of the Australian public. The project will also train young Australians in data analysis, problem solving and computer programming which are crucial to many industries including engineering, climate science and finance.					
DE240100200	**Cohesive Multipartite Subgraph Discovery in Large Heterogeneous Networks**	71,474.50	142,949.00	142,949.00	71,474.50	428,847.00
Chen, Dr Lu	This project aims to devise novel cohesive multipartite subgraph models and corresponding efficient search algorithms based on various applications. Significant advances in understanding big data will be enabled by the proposed novel theories and algorithms, which can leverage the value of heterogeneous network data and serve as the foundation of network analytics. Expected outcomes of this project include novel cohesive multipartite subgraph models, efficient searching algorithms and platforms for heterogeneous networks. This should provide significant benefits for different organisations and a myriad of applications dealing with heterogeneous network data,					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	including but not limited to e-commerce, cybersecurity, health and social networks. **National Interest Test Statement** Big data generated by modern applications, such as online shopping systems, video-sharing platforms, and so on, are represented as relationships between a wide range of different types of objects. Mapping and searching these interactions requires specific types of modelling, but the variety poses challenges. This project will develop data analysis techniques that do not currently exist to enable complex searches of big data networks. Understanding such data will help organisations make intelligent decisions on finding the right groups to conduct different types of activities, such as marketing, research and business collaboration, and discovery and monitoring of potential criminal activities and various cyber-attacks. There is thus potentially significant economic and social benefit to Australia. The project will also build a system prototype to demonstrate the research, laying the groundwork for further studies with or adopting the methods by businesses and organisations.					
DE240100433 Bhandari, Dr Shivani	**Origins and implications of cosmic explosions** This project aims to solve the origin of Fast Radio Bursts (FRBs) by conducting a study of a large sample (>100) of localised bursts detected with a new coherent FRB detection system called CRACO deployed at the Australia Square Kilometre Array Pathfinder (ASKAP). Such a rich sample will enable novel studies of the structure of the Universe. The powerful and sensitive CRACO system will also search for transients that last for hundreds of milliseconds, exploring new types of astrophysical phenomena that give insight into the Universe's extremes. These discoveries will have a significant impact on science, establishing Australia as a key player in the international FRB community. **National Interest Test Statement** Fast Radio Bursts (FRBs), enigmatic radio flashes that appear and disappear faster than the blink of an eye, have perplexed scientists for years. Australian Square Kilometre Array Pathfinder (ASKAP) has made crucial breakthroughs, pinpointing a handful of these elusive bursts. This project will leverage ASKAP's new detection system to revolutionise our understanding of FRBs by capturing sensitive images of the radio sky at an unprecedented rate and localising hundreds of FRBs. This vast sample, coupled with detailed studies of FRB host galaxies, promises to uncover their origin piquing the public's interest in astronomy while also encouraging student interest in science and technology. These groundbreaking discoveries will yield high-impact scientific results, disseminated through national and international collaborations. It leverages cutting-edge instrumentation to enhance our understanding of fundamental physics processes and cement Australia's position as a key player in the international astronomy community.	65,104.50	130,209.00	130,209.00	65,104.50	390,627.00
	Swinburne University of Technology	211,579.00	421,158.00	419,008.00	209,429.00	1,261,174.00
The University of Melbourne						
DE240100144 Hodgkinson, Dr Liam S	**Universal Model Selection Criteria for Scientific Machine Learning** This project aims to develop provably reliable universal model selection criteria to facilitate trustworthy scientific machine learning. Combining stochastic methods with an innovative geometric approach to basic statistical principles, this project expects to characterise, combine, and refine the most successful heuristics for designing and training huge models, such as deep neural networks, into a cohesive theoretical framework. The expected outcomes include a general toolkit for assisting neural network design at the forefront of scientific applications. This should significantly improve the quality of scientific predictions by facilitating confident adoption of deep learning methods into the pantheon of trustworthy modeling techniques. **National Interest Test Statement** Artificial intelligence (AI) is valued throughout the engineering sector for its ability to make accurate predictions based on collected data. Scientific machine learning applies AI techniques to the greatest challenges of our time, including climate change and epidemic forecasting, forging an industry valued at over 31 billion AUD. Australia hosts 130+ startups developing medical treatments and advanced imaging techniques using AI technology. However, predictive AI models can facilitate errors that are hard to detect, making them less trustworthy for some critical tasks. This project will develop provable global diagnostics to assess model quality and package them into freely available software that ensures correct use of AI across many scientific and technological fields. Distribution to local Australian businesses and research groups that rely upon machine learning will provide significant commercial benefits, making their processes more efficient and reliable to the consumer, and placing them at the forefront of scientific and industrial applications of machine learning.	73,794.50	147,499.00	148,429.00	74,724.50	444,447.00
DE240100316	**Population genomic methods for modelling bacterial pathogen evolution**	68,974.50	144,266.50	148,741.00	73,449.00	435,431.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Tonkin-Hill, Dr Gerry	This project aims to develop novel techniques to model bacterial genome evolution and improve our understanding of how major agricultural and human pathogens, including Enterococcus, Salmonella and E. coli, evolve. The project expects to generate new knowledge about how horizontal gene transfer shapes the evolution of bacteria and how these dynamics vary over different temporal scales. Expected outcomes include methodological advances that will enable the analysis of massive contemporary datasets. These methods and resulting analyses will provide significant benefits including informing the design of superior long-term interventions to reduce bacterial disease in both agriculture and health that are robust to the evolution of bacteria. **National Interest Test Statement** Bacterial diseases are a major global economic burden, fuelled by the ability of bacteria to become resistant to treatment and vaccines. Such harmful bacteria represent an escalating threat to Australia's economy and public health, with estimated costs reaching between $142 and $283 billion by 2050. Bacteria can rapidly alter their genome, a process that drives their evolution in response to therapeutic interventions. This project aims to create sophisticated statistical and computational techniques to analyse large bacterial genome databases to study how bacteria evolve. Understanding this process will aid in devising affordable, long-term solutions to prevent bacterial diseases. For instance, if we find that resistance to an antibiotic evolves during heavy cattle farming, we can reduce antibiotic use on farms or test beef and dairy products for resistant bacteria before people consume them. To strengthen adoption of findings, accessible reports and presentations will be prepared for international and Australian public health and agricultural policymakers.					
DE240100317 Chan, Dr Wing Yan	**Single-cell metabolite imaging of the coral-microalgal symbiosis** Corals sustain some of the most diverse ecosystems on Earth but are at risk due to warming and acidifying oceans. Coral survival critically depends on the photosynthetic microalgae that live inside the coral and provide the coral with nutrients. Many aspects of this coral-algal relationship remain poorly defined. This project aims to unravel coral-algal interactions with single-cell imaging. Insights from extreme environment corals will reveal how these microalgae may facilitate coral survival under future climate change, providing vital information for reef managers and restoration practitioners. By establishing a novel method, databases and networks, this project will create a powerful forward momentum for coral-algal research. **National Interest Test Statement** The Great Barrier Reef (GBR) has tremendous economic, environmental and cultural values to Australia. However, the GBR is under threat, as evidenced by recent repeated mass bleaching events that have prompted the national call for collaboration and knowledge advancement in coral resilience under the Australian Government’s Reef 2050 Long-Term Sustainability Plan. This DECRA project will answer this national call by creating a national and international network across scientific disciplines, industry and community and reveal the mechanisms that enable coral survival in extreme reef environments. This network and novel knowledge generated will improve Australia’s capacity to safeguard the GBR’s economic, environmental and cultural values for future generations. The development of advanced single-cell imaging technology in this DECRA project will establish critical capability in Australia with broad applications across many areas of biology and biomedical research, leading to new research opportunities and placing Australia at the forefront of the latest technology.	76,452.00	155,526.50	153,329.00	74,254.50	459,562.00
DE240100535 Ride, Dr Jemimah R	**Workplace mental health: Aligning employer incentives with societal benefit** The workplace is an underutilised platform to improve mental health. This is a particularly urgent problem for the healthcare workforce. This project aims to investigate ways to encourage employers to create mentally healthy workplaces. By pioneering use of economic methods, this project expects to generate much-needed knowledge on conflicting incentives that are hindering employer action. Expected outcomes include evidence on how potential policy reforms would affect employers' behaviour, and how they see value for money of workplace mental health initiatives. By informing successful policy change, the project should improve employee wellbeing and increase productivity, which will benefit employers, employees, and society. **National Interest Test Statement** Mental health is one of the biggest challenges of our time and workplaces are under-utilised sites for improving mental health. Yet most organisations lack effective action, contrary to assumptions that employers have sufficient incentives to improve workplace mental health. This project aims to fill critical gaps in our knowledge of employer incentives, with a focus on the high-priority healthcare workforce. It will investigate how factors, that may be overlooked in policy, influence employer decision-making, such as the timing of costs versus outcomes, impact on reputation, and personal effort. It will examine the impact of proposed policies (e.g. ranking	70,000.00	140,000.00	135,000.00	65,000.00	410,000.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	organisations on workplace mental health) before widespread implementation. It will also provide a missing piece of the puzzle: what do workers want their employers to do? Insights will be developed with and disseminated among employers, employees, and government. By informing strategies that motivate employers to make real changes, the project will contribute to economic and wellbeing benefits for workers, employers, and society.					
DE240100548 Nguyen, Dr Tuan	**A novel high-temperature concrete-based system for renewable energy storage** This project aims to develop a novel alkali-activated concrete-based system for renewable energy storage. The system is based on the excellent performance, durability and affordability of concrete, which is widely used in the construction industry. The project expects to generate new knowledge in concrete thermal energy storage by using a holistic experimental and computational approach. Expected outcomes include insights into the novel high-temperature concrete, the advanced numerical, data-driven model and the system, that is highly scalable, efficient and low cost. This should provide significant benefits in accelerating the use of concrete for energy storage technologies and fostering the national and global renewable energy transition.	72,974.50	148,449.00	146,949.00	71,474.50	439,847.00
	National Interest Test Statement This project aims to develop an efficient, affordable, and scalable concrete-based system for renewable energy storage. This technology will enable a wide range of priority sectors to replace their reliance on fossil fuels, lowering costs and emissions. The state and federal governments firmly support the development of energy storage technologies to address the variability of renewable energy. Developing storage technologies is urgently needed to accelerate Australia's renewable and decarbonisation transition in the fight against climate change. New knowledge in the use of a novel high-temperature alkali-activated concrete for energy storage generated through this project will place Australia at the forefront of research and development in the interdisciplinary area of construction and energy storage sector. This project is well-aligned with the Australian Science and Research Priorities including Advanced Manufacturing and Energy and has significant potential to deliver economic, social, and environmental benefits to the nation by directly contributing to the decarbonisation and renewable transition.					
DE240100699 Bush, Dr Judy	**Nature-based solutions for the climate change-biodiversity nexus in cities** This project aims to advance knowledge of governance and implementation of nature-based solutions to address the climate change-biodiversity nexus in cities. Nature-based solutions offer multiple synergistic solutions for climate change and biodiversity, yet implementation is challenging due to complex governance and policy. The project will generate new knowledge of governance and policy, using transdisciplinary research. Outcomes include a framework for transformative governance, to support enhanced capacity for urgent, integrated action for the climate-biodiversity nexus. The project will deliver environmental and social benefits to Australia and internationally through new approaches to address these intersecting environmental crises.	72,794.50	147,910.50	150,260.50	75,144.50	446,110.00
	National Interest Test Statement Climate change and biodiversity loss are interconnected crises that threaten planetary wellbeing, and produce rising economic, health and social costs. Urban areas contribute significantly to this situation, making them critical sites for addressing the causes and responding to these challenges. However, planning and management of these interconnected issues often happens separately, and the potential benefits from a coordinated approach are lost. This project aims to identify new approaches for co-planning and co-managing climate change and biodiversity through nature-based solutions that improve societal outcomes through better care of the natural and built environments. Case studies of Melbourne streets, waterways, and the broader city will be examined, alongside international best practice in climate and biodiversity governance. In bringing these findings together, this project seeks to provide policy makers, urban planners, and communities with new knowledge on integrated approaches to climate and biodiversity action, including a practitioner-focused framework and guidelines. The results of the project will inform new approaches to collaborative governance and implementation of nature-based solutions in Australian cities. The project will generate environmental, economic and social benefits to city dwellers and urban biodiversity through improved governance, policy and management.					
DE240100719 Karidakis, Dr Maria	**Interpreting services for Australian Aboriginal languages** This project aims to investigate interpreting practice with First Nations Peoples. This project expects to generate new knowledge in the area of healthcare interpreting using an ethnographic and micro-analytical approach to actual in situ interpreter mediated interactions. Expected outcomes include enhanced capacity to improve interpreter service delivery for First Nations Peoples via the development of resources for best-practice communication in plain language and Australian Aboriginal languages spoken in Western Australia. This should provide significant benefits such as improving First Nations Peoples' wellbeing and interpreter and practitioner health	71,814.00	149,288.50	152,840.00	75,365.50	449,308.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	literacy, as well as enabling governing bodies to finetune multilingual policies. **National Interest Test Statement** This project will advance knowledge of interpreting practice with First Nations Peoples to improve national and international interpreter service provision, a high priority Australian government area, as evident in the Closing the Gap Commonwealth Implementation Plan 2021. Effective communication in people's first language is crucial to improving First Nations Peoples' engagement, wellbeing and their trust in institutions. This depends on the incorporation of Australian Aboriginal languages in the design, implementation, and evaluation of services. The project addresses barriers to cross-cultural interpreting by examining language and communication strategies within a culturally appropriate context, when interpreting with First Nations Peoples in healthcare settings. Outcomes include best-practice communication resources in plain language and Australian Aboriginal languages spoken in Western Australia to guide interpreting policy and practice. The project will contribute fundamental research to support interpreting services for First Nations Australians.					
DE240100730 Rogerson, Dr Melissa J	**Hybrid Technologies for Tabletop Games** This project aims to develop design tools for hybrid games that combine technology with tabletop play. Through a detailed examination of successful hybrid boardgames and an iterative, human-centered design and evaluation process that explores embedding novel sensors and tools into boardgames, it will explore the design, use, and experience of hybrid games. Expected outcomes include design of innovative and reusable components, a framework for understanding technologies that enable hybrid play, and a theory-based design methodology. Benefits include innovation in the tabletop game sector, fostering social connections for distanced families, and new applications of games for simulations in health, defence, and logistics. **National Interest Test Statement** Boardgames are an under-explored site of digital innovation, with increasing use of technologies increasingly to augment and enhance physical pieces. The methodology for hybrid technologies developed through this project will provide implementable models for game designers, developers, and researchers, boosting Australia's international contribution to game design. This will extend the digital games industry in Australia, which is worth more than $3.6 billion and is supported by government strategies at state and federal levels. These technologies offer new possibilities for simulation gaming, used in logistics, emergency planning, and defence. Playing games also contributes to social well-being. For the millions of Australians with connections to family and friends in faraway places, hybrid games that can be played across a distance can support and enrich these connections, strengthening these important relationships.	76,000.00	151,000.00	151,500.00	76,500.00	455,000.00
DE240100743 Zavabeti, Dr Ali	**High-mobility transparent p-type materials synthesised from metal surfaces** This project aims to investigate the novel high mobility atomically thin materials synthesised from solid and liquid metal surfaces and to analyse the interfacial properties of their crystal. This project is expected to generate fundamental knowledge and applied research capability in interdisciplinary fields of advanced materials, nanomaterials, and electrical and chemical engineering using innovative synthesis approaches. This project promises to support the development of new sustainable, low-waste and green technology for transparent, reliable, energy-efficient, high-performance nanoelectronics that can help to build high throughput and low dissipating power electronics components for energy generation, distribution and utilisation. **National Interest Test Statement** The electrification of Australia is essential to reach our net zero emission goals. Australia's power grid must expand to increase capacity for renewables and charging electric cars. Future energy generation, distribution and utilisation requires new electronic components, but gaps in our fundamental knowledge are preventing their development. This project will advance the fundamental science of liquid metal technology in nanoelectronics for semiconductor device design. It will develop innovative large-scale approaches to support new sustainable, low-waste fabrication technologies for next-generation nanoelectronics while downsizing our electronic footprint. Providing a competitive advantage for Australia, these nanoelectronics will be transparent, reliable, energy-efficient and high-performing for use in solar energy, power electronics and semiconductors. Attractive to industry, this research has commercial and economic benefits. New knowledge will be conveyed to the public, industry and government via blogs, standard and social media. Longer-term benefits for all Australians are environmental and social.	70,834.50	141,569.00	140,699.00	69,964.50	423,067.00
DE240100755 Hinton, Dr Edward M	**Fluid dynamics of underground hydrogen storage** The project seeks to understand the flow of hydrogen in underground porous layers. This will be achieved through mathematical models of the continuum mechanics governing the injection and withdrawal of hydrogen. The framework will account for a variety of physical and biological	70,974.50	141,949.00	144,419.50	73,445.00	430,788.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	mechanisms. Underground storage of zero-carbon hydrogen provides an ideal route to overcome the intermittency of renewable energy. The project outcomes include a mathematical description of the response of two-phase flow instabilities to injection and withdrawal, and dynamical insights into the role of microbial growth on flow in porous media. Expected benefits are increased efficiency of hydrogen recovery and the reduced cost of site selection. **National Interest Test Statement** The intermittency of wind and solar energy is a great challenge facing the current transition away from fossil fuels. Efficient energy storage is critically important for Australia to secure a low-carbon future whilst protecting quality of life. Large-scale injection of hydrogen in underground porous layers provides a safe, low-cost, and zero-carbon back-up energy supply. This project will provide new fluid dynamical insights to hydrogen flow in underground porous rocks, through mathematical modelling and analysis, and numerical simulations. The novel features that will be captured are the microbial consumption of hydrogen and the response of flow instabilities to the combination of injection and withdrawal. The major benefits will include a low-cost framework for selecting optimal storage sites and new strategies for maximising the proportion of hydrogen that may be recovered. Improving the economics of hydrogen storage is vital for its widespread adoption. Underground hydrogen storage is also a promising avenue for supporting the export of Australia's abundant potential for renewable energy.					
DE240100827 Tsui, Dr Carlson	**Delineating the developmental requirements for stem-like T cells** Stem-like CD8 T cells are critical for sustaining long-term systemic T cell activity. The signalling required for their development, however, remains elusive. Integrating multidisciplinary expertise, cutting-edge technology and highly innovative methods, this project aims to define the signalling cues provided by tissue microenvironment that control the development and maintenance of stem-like T cells, and thereby dictate systemic immunity. This project is expected to generate fundamental knowledge on basic immunology and T cell biology, which can benefit the academic, public health and biotechnology sectors by enhancing the international standing of Australian research on basic immunology and fostering new commercial opportunities. **National Interest Test Statement** T cells play a significant role in defending the body against chronic infections and cancers. Yet there is a critical knowledge gap in cell biology about how long-term T cell response is maintained in the context of prolonged infection. This project aims to understand how T cells develop and persist over time to provide long-term protection against chronic infection. We will use genetic tools and mouse models to investigate the precise role of the tissue microenvironment on immunity. The project will generate new knowledge on immunology and provide the foundational research for biotechnology industries to develop novel treatments for chronic viral infections and cancer in humans and animals. Insights gained can also be shared with agriculture, tourism, and wildlife preservation sectors to combat diseases in livestock, native animals, and endangered species, bringing social and economic benefits to Australia. Key outcomes from this research will be disseminated through scientific publications, and accessible reports via social media platforms and press releases.	75,789.50	152,579.00	153,579.00	76,789.50	458,737.00
DE240100959 Rabanus-Wallace, Dr Mark T	**Unlocking The Agricultural Potential Of The Dark Genome** Sustaining competitive agricultural production in the face of climate change demands more resilient, diverse, and adaptable crop varieties. Studies on the genes of crop plants have had huge benefits for agriculture, but genes themselves make up only a tiny fraction of the genome. It has until recently been impossible to assemble the 'dark' space between genes. Using ultra-modern barley genomes, this project aims to harness information from the dark genome to (i) discover new genes with agricultural importance, (ii) illuminate invisible genomic features that can slow down plant breeding programs, and (iii) identify opportunities to transfer useful new genes into the cultivated gene pool. **National Interest Test Statement** Crop genome research has had huge practical benefits to agriculture, but technological limitations have so far prevented detailed study of the the spaces in between genes, which accounts for the vast majority of the genome. This 'dark' genome has great potential to improve gene discovery and accelerate the process of developing new crop varieties, but methods necessary to exploit its great potential are very poorly developed. This study aims to fill this gap with new comparative genomics methods developed on barley, that directly address the needs of plant researchers, breeders, and growers. Methods for identifying hidden genetic barriers to crop crossing will improve the economics of developing improved commercial varieties, while proposing exploitable avenues for genetic diversity exchange both aids commercial breeders and provides invaluable tools for biologists aiming to monitor and conserve genetic diversity in both cultivated and even native plants--while expanding the reach and profile of Australian research in the revolutionary field of comparative genomics.	70,000.00	127,500.00	117,500.00	60,000.00	375,000.00
DE240100962	**Resistance to gender equality in the Australian construction sector**	76,610.00	154,461.50	149,943.50	72,092.00	453,107.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Galea, Dr Natalie R	This project aims to investigate policy failure of gender equality initiatives and specifically, how institutional and individual resistance to gender equality is applied and adapted over time and across different contexts in construction, Australia's most male dominated sector. This project expects to generate new knowledge for policy authors in government and business, helping them deliver robust policy outcomes to shift gender equality in male dominated sectors. This project should provide significant social and economic benefits to Australia, enabling greater attraction and retention of women to construction jobs, reducing the sectors critical skills shortage. **National Interest Test Statement** Addressing women's participation and success within the workforce is an economic and social imperative for Australia. However, employment sectors like the construction sector, remain stubbornly male dominated despite longstanding efforts by government and business to increase women's participation. Analysis of policy failure in construction has overlooked the role of resistance to gender equality and how resistance operates and adapts across the development of gender equality policies from agenda setting to policy implementation. By tracing the way resistance is individually and institutionally applied to the development and implantation of three prominent gender equality initiatives, this project will offer government and business policy architects new insights about how resistance to gender equality can be circumvented and provide new knowledge about the design of robust gender equality policies that will strengthen the construction sectors attraction and retention of women, and address the sectors impending labour shortage that has been identified as a 'critical risk' of national and social significance.					
DE240101022 Franklin, Dr Amanda M	**Linking movement and animal vision to uncover functions of dynamic colours** This project aims to address a fundamental biological question: what drives the extraordinary diversity of colours in nature? Using cutting-edge, interdisciplinary techniques, this project expects to link visual properties, movement and animal vision to discover functions of animal colouration, generating significant new insights for the fields of visual ecology, animal behaviour and camouflage. The outcomes of this project include enhanced national and international collaboration and new tools for animal behaviour, perception and camouflage research. This work will benefit our understanding of vision, colour and the relationship between the two, with significant scope for bio-inspired solutions to sensor and image processing problems. **National Interest Test Statement** Most animals must move to find food, mates and shelter, but movement is dangerous because it can dramatically increase vulnerability to predation by breaking camouflage. Animal colour patterns can play a crucial role helping moving prey to escape predators. However, research frequently employs a static framework, posing a major limitation to progress the field of visual ecology. This project will pioneer innovative protocols (e.g. high speed videography, 3D animation) to uncover how colouration helps Australian insects to avoid predation. The results will provide key insights into visual processing of colour, pattern and movement under different environmental conditions. This directly relates to the Science and Research Priorities of "Transport" through the potential to identify improvements in sensor design and image processing algorithms relevant for autonomous vehicles, and "Environmental Change" by providing greater understanding of our native animals. The project also strongly aligns with the National Science Statement and Australia's Strategy for Nature to connect Australians with science and nature.	78,000.00	154,500.00	150,500.00	74,000.00	457,000.00
DE240101035 Mito, Dr Remika	**Charting the brain's wiring over the human lifespan** This project aims to produce a large-scale model of brain wiring over the human lifespan by utilising normative modelling approaches on state-of-the-art diffusion magnetic resonance imaging (diffusion MRI) data. This project expects to generate new understanding of how the brain's connections change with age in healthy individuals. Expected outcomes of this project include a reference chart for healthy brain wiring, and major advances in diffusion MRI data harmonisation approaches. This should provide significant benefits for the translation of advanced diffusion MRI methods, as normative charts for brain wiring will be made broadly available. This could have broad implications for interpreting individual diffusion MRI scans in future. **National Interest Test Statement** Currently, there are no reference standards that exist to understand healthy brain wiring. Using state-of-the-art diffusion MRI technologies developed in Australia, this project will produce a large-scale model of healthy brain wiring over the human lifespan, as a resource to benchmark individual differences in the brain's connectivity. This project will capitalise on big data, which is transforming neuroimaging research, while leveraging collaborations both within Australia and internationally. The major expected outcome of this project is a reference chart for brain wiring, akin to paediatric height and weight charts. The development of such a normative	79,538.50	158,310.50	145,841.50	67,069.50	450,760.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	reference for advanced neuroimaging measures will be beneficial both at the individual and societal level: it will enable individual MRI scans to be interpreted, which will help to democratise access to interpretable advanced brain imaging techniques, and it will also solidify Australia's place as research leaders in diffusion MRI technologies. This reference could help to transform diffusion MRI from research methodology into clinical use in future.					
DE240101070 Johnson, Dr Ryan S	**Modernism's East Asia: Semi-Asiatic Literature and Global Modernity** This project aims to harness two important topics in the humanities: the global significance of culturally hybrid nations for global modernity, and the significance of East Asian Studies for World Literature. It compares the reception of French and Russian literatures in the West and East Asia by examining texts written mainly in English, French, and Japanese. Its expected outcome is a reevaluation of East Asia's role in the conceptualization of global modernism and modernity in the arts and society. Its innovative methodology combines East Asian Studies, English and French Literature, philosophy, and the history of ideas. It intends to fortify Australia's position in the humanities and increase its understanding of its own diverse history.	55,677.00	114,028.00	119,890.50	61,539.50	351,135.00
	National Interest Test Statement The current project will contribute to Australian culture by providing the first systematic account of how modern English, French, and Japanese writers were influenced by the idea of Asian and European mixing in the arts and society. The history of Asian-European cultural relations concerns scholars of both modern literature and current geopolitical tensions such as those in Taiwan and Ukraine. Working with the GLAM sector, this project will create a public archive that shows how novelists, philosophers, poets, and translators in East Asia and the West believed that a mixed Asian and European culture was necessary for the health of modern society. By bringing this intellectual history to public awareness, this project will aid Australia by giving it a fresh perspective on the value of its own unique place as a Western nation in the Asia Pacific Region, deepening Australia's comprehension of its rich mixed heritage and assisting it in valorizing its multiethnic population and cultural diversity.					
DE240101089 Liu, Dr Feng	**Trustworthy Hypothesis Transfer Learning** It is urgent to develop a new hypothesis transfer learning scheme that can overcome potential risks when finetuning unreliable large-scale pre-trained models. This project aims to develop an advanced and reliable scheme of hypothesis transfer learning, called Trustworthy Hypothesis Transfer Learning (TrustHTL). A new theoretically guaranteed heterogeneous hypothesis transfer learning framework will be developed to handle heterogeneous situations; a methodology to disinherit risks of pre-trained models and a new fuzzy relation based distributional discrepancy in heterogeneous transfer learning scenarios. The outcomes should significantly improve the reliability of machine learning with benefits for safety learning in data analytics.	74,474.50	146,449.00	143,949.00	71,974.50	436,847.00
	National Interest Test Statement Large-scale model-based machine learning methodologies play an increasingly central role in data analytics, business decision support systems and other digitalized applications in Australian industry and government, but they are currently extremely vulnerable to risks contained in such large-scale models. The intended outcome of this project is to develop fundamental, translation-ready know-how to significantly ameliorate such risks and to improve the safety and reliability of machine learning and related intelligence information systems. This will benefit numerous sectors in the Australian e-commence, e-business, e-learning, and e-government landscapes. Businesses and government agencies will be able to increase customer trust and improve the sustainability of data analytics in dynamic and complex environments by preventing the risks brought from the large-scale models and reduce sensitive/unreliable predictions of machine learning systems. These potential applications will directly increase public trust in Australia's transformation into a leading and reliable digital economy and society.					
DE240101101 Gordon, Dr Claire L	**Dissecting the heterogeniety of human tissue-resident memory T cells** Tissue-resident memory T cells (TRM) are key to immune protection against infection and cancer, yet dysfunctional TRM cause autoimmune disease. Whilst much of our understanding of TRM comes from animal models, how these cells work in humans is largely unknown. This project aims to define the phenotypic, functional and regulatory heterogeneity of human TRM subsets in organs like the gut, liver, and skin using a unique human organ donor tissue resource. The expected outcomes are to generate fundamental new knowledge that will have significance for the development of new therapies against infectious diseases, cancer and autoimmunity.	78,607.50	157,965.00	147,431.00	68,073.50	452,077.00
	National Interest Test Statement					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	This project will generate fundamental new knowledge on how the immune system functions and is regulated in human organs like the gut, liver and skin. Knowledge generated through this effort will lead to new insights for innovative strategies for vaccination and immune therapies against disease, with the ultimate goal of improving veterinary and human health. These advances will impact a wide range of common diseases including infection, cancer and autoimmune disease, therefore improving the health and social outlook of many Australians. We expect to develop new collaborations to build commercial products and patent applications for improved vaccination strategies, encouraging multi-disciplinary research that will foster Australian research capacity and economic growth.					
DE240101109	**Colonial History, Contemporary Justice**	71,139.00	143,041.00	139,541.50	67,639.50	421,361.00
McKinnon, Dr Crystal A	Indigenous scholars have long argued that violence is embedded in colonialism, which impacts and manifests in the everyday lives of Indigenous people today in Australia. This project aims to conceptualise the connection between colonial history and contemporary justice matters in Australia by investigating violence and deaths that have occurred through encounters with police or agents of the state. By deploying an innovative methodology of historical tracing, this project will generate new knowledge by identifying patterns of violence and historicising contemporary justice matters, to bring new theorising of colonial violence and inform social justice.					
	National Interest Test Statement					
	Aboriginal communities continue to be disproportionately negatively effected by policing and incarceration in Australia. Government Inquiries, Royal Commissions, and Coronial Inquests inadequately address the role of colonial history in these contemporary justice matters. This project is about expanding our understanding complex contemporary justice matters which continue to effect Aboriginal families and communities. At present the connections between these seemingly separate historical and contemporary matters are yet to be drawn, and there is a lack of understanding of how colonial history impacts and informs the present day. This research will benefit Australia socially and culturally through developing new ways to practice history and know the past, and providing critical understandings of contemporary justice matters. Creating a podcast, oral history archive and other publications, it will build new knowledge and provide a basis for furthering our understanding of social justice matters and of the history of Australia.					
DE240101135	**Housing, social wellbeing and climate change resilience in Australia**	71,884.50	145,314.50	148,448.00	75,018.00	440,665.00
Li, Dr Ang	The project aims to investigate the capacity for current and future housing policy to build social wellbeing and reduce vulnerability to climate change. It will be the first systematic evaluation of housing-based reforms in terms of their social and equity impacts in the context of climate change. The evidence generated will inform the development of climate adaptation strategies across Australian jurisdictions. It will also contribute to improving housing suitability in the private rental market and reducing energy hardship. The project will deliver new knowledge using novel data linkage and rigorous methods. By focusing on social wellbeing, findings will contribute to an assessment and monitoring framework based on equity principles.					
	National Interest Test Statement					
	Australia faces a complex set of challenges at the intersection of housing and climate change: the proportion of Australians renting is increasing, private rental conditions and affordability are of concern, energy hardship is increasing, and natural disasters become more frequent. While evidence to tackle these issues is urgently required, there is a lack of systematic evaluation of what can be done in the domain of housing to reduce vulnerability and improve resilience from climate change. This project will test the capacity for current and future policy to build social wellbeing and climate resilience and examine the social impact of Australia's policy reforms in rental standards, residential energy efficiency, and disaster response. It will provide communities and government agencies with robust evidence and a framework for effective measures to meet current and anticipated social and climate challenges. This will support community wellbeing and guide policy action, leading to economic, social and environmental benefits to the Australian community.					
DE240101246	**Beyond Big Brother: New Narratives for Understanding Surveillance**	66,425.50	127,012.00	123,181.50	62,595.00	379,214.00
Sumner, Dr Tyne D	This project aims to investigate how recent forms of narrative fiction reflect and shape understandings of digital surveillance. It expects to generate new knowledge about the personal and social implications of digital surveillance across different cultural, technological and geographical contexts. Expected outcomes include a significant interdisciplinary methodology that integrates surveillance studies, digital humanities, and literary studies to improve our understanding of surveillance. The project also aims to generate teaching and public engagement resources for research, industry, and government. This will substantially improve our understanding of the impact of digital surveillance at the individual, community, and national levels.					

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement					
	How people experience and think about surveillance is a key question for the digital age. We are now monitored and watched everywhere we go, and personal data is being used in unprecedented ways. This project investigates recent changes in the nature and extent of surveillance and how Australian citizens feel about this. It examines these changes through narrative sources and online reviews, exploring how stories about surveillance circulate and are interpreted. This will help us better understand contemporary Australian responses to surveillance, including the influences on these ideas. The project will create a comprehensive new account of surveillance history and culture, for use by students, researchers, local communities, and government. It will make its findings available via workshops, exhibitions, and a digital archive of stories about how people from diverse geographical and cultural contexts experience surveillance. This will engage wide-ranging audiences across Australia and help us meet future social challenges arising from emerging forms of surveillance.					
	The University of Melbourne	1,522,759.00	3,048,618.50	3,011,972.50	1,486,113.00	9,069,463.00
Victoria University						
DE240100165	**Evolving privacy and utility in data storage and publishing**	73,974.50	147,949.00	147,949.00	73,974.50	443,847.00
Ge, Dr Yongfeng	This project aims to develop a distributed evolutionary computation-based framework to optimize data privacy and utility in distributed database systems. It intends to synchronously solve the conflicting challenges of privacy preservation and utility maintenance in multi-objective, dynamic, and multitasking scenarios. Expected outcomes include a new computation framework as a service and freely available distributed computation models, evolutionary algorithms, and knowledge-transfer strategies. Anticipated benefits include theoretical contributions to artificial intelligence, cyber security, distributed computation, and a service to eliminate data owners' privacy concerns while guaranteeing the value of data in further utilization.					
	National Interest Test Statement					
	Expected outcomes of this project include the computation framework as a service that protects the data owners' privacy while maintaining the data utility for further utilization. The produced computation framework can be made freely available to Australian Government and companies to better protect their data in an economically efficient manner. Due to the recent data breaches, millions of consumers' personal information has been disclosed. These consumers are facing privacy violations, suffering phone scams, and having to replace driver's licenses. This project provides theory and a practical demonstration of how to build a reliable and strong system for privacy preservation and utility maintenance in various environments. Data utility maintenance brings significant economic benefits, reducing network costs, conducting faster transactions, and cutting energy expenditure on processing. The project outcomes are state-of-the-art and significant, given the resurgence of database technologies with emerging applications such as government and commercial environments.					
	Victoria University	73,974.50	147,949.00	147,949.00	73,974.50	443,847.00
	Victoria	4,409,772.00	8,808,452.50	8,725,278.50	4,326,598.00	26,270,101.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
		2023-24	2024-25*	2025-26*	2026-27*	
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)
Western Australia						
Curtin University						
DE240100176	**Quantum studies of dissociative electron attachment to molecules**	56,814.50	115,904.00	118,179.00	59,089.50	349,987.00
Scarlett, Dr Liam H	The ability to predict the outcomes of molecular collisions is a difficult, yet important, problem with many applications in science and industry. Recent work at Curtin University has led to the first complete solution of the electronic part of the scattering problem for collisions with the hydrogen molecule, a major breakthrough in the field. This project will build on this progress to accurately model the nuclear motion during collisions, which will enable the first calculations of molecular dissociation processes without the use of approximations. The data which will be produced is highly sought-after in fusion energy and astrophysics applications.					
	National Interest Test Statement					
	Nuclear fusion, produced on an industrial scale, can provide large amounts of clean, safe, and cheap energy. At present this process is not reliable, however researchers all over the world are working towards perfecting the technology. This project will provide high-quality data to help a global team of researchers understand the basic chemical reactions involved in the nuclear fusion process and more importantly, generate predictive models to help improve our ability to control these reactions. Australia is a key global partner contributing towards understanding this technology. Computer models developed in this project are critical for progressing this technology. The success of this project will be a major factor in meeting the UN sustainability goals of affordable and clean energy and climate action, by reducing carbon emissions and ensuring the energy needs of future generations are met. Via a collaboration between Curtin University and the Max-Planck Institute for Plasma Physics in Germany, the results of this project will be applied immediately to construct diagnostic methods for the International Thermonuclear Experimental Reactor, the largest fusion experiment in the world.					
DE240101013	**New water-inserted perovskites for high-current-density water electrolysis**	76,539.50	152,579.00	141,079.00	65,039.50	435,237.00
Xu, Dr Xiaomin	This project aims to develop a new type of water-inserted perovskite oxide materials to realise high-current-density hydrogen production in anion-exchange-membrane water elecrolysers using renewable electricity. Innovations are expected in the rational design and engineering of novel materials, elucidation of new catalytic mechanisms from experimental and computational studies, and breakthroughs in commercially-relevant water electrolysis processes. Expected outcomes include innovative materials engineering methods, in-depth reaction mechanism understandings, and demonstration of robust electrolysers. This project will provide significant benefit to Australia's hydrogen industry and economic growth and energy sustainability in the long run.					
	National Interest Test Statement					
	Water electrolysis, a process that splits water into hydrogen and oxygen using renewable electricity, is an essential component of the efficient production of green hydrogen and thus key to the achievement of a sustainable energy future and mitigated carbon emissions. However, there are still huge challenges in realizing hydrogen production at both high efficiency and low cost due to a lack of catalyst materials that can accelerate the water splitting process. This project will design, develop, and apply a new class of catalyst materials called water-inserted perovskites that can overcome these challenges. The innovative processes developed will lift Australia's position in green hydrogen production and energy sustainability. There will also be commercial opportunities for the renewable energy sector to use this technology to produce green hydrogen, opening avenues for hydrogen storage, utilization, and export in the future.					
DE240101056	**Police custody and young people: Informing human rights responses**	76,580.50	152,300.00	151,074.50	75,355.00	455,310.00
Walker, Dr Shelley J	The conditions of police custody have received national and international criticism since the Royal Commission into Aboriginal Deaths in Custody. Youth detainees are amongst the most vulnerable. Using a case study design in three Australian states, this project aims to attend to these concerns by building new knowledge about police custody and young people from multiple perspectives. Results will inform evidence-based solutions grounded in human rights principles. Intervening early in the criminal justice process to address young people's health and wellbeing needs can prevent their future re-incarceration and derive significant social and economic benefits, including government savings in social services, policing, the courts and prisons.					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	National Interest Test Statement Since the Royal Commission into Aboriginal Deaths in Custody, human rights organisations, academics, and Ombudsmen have called on governments to address concerns regarding the human rights of people detained in police custody in Australia. Youth detainees are amongst the most vulnerable, often experiencing social disadvantage and complex mental health and drug dependence issues. Being detained young often establishes entrenched patterns of reoffending that extend across the life course, producing a long-term cumulative burden on their lives. In addition to direct personal costs for young people and their families, detention produces growing economic costs for government. This project will attend to these issues by informing policy and practice to improve the management and care of youth detainees. Intervening early in the criminal justice cycle and addressing youth detainees' unmet health and wellbeing needs can help divert them from a system that consumes an increasing amount of government expenditure. In doing so, future economic savings can be made in the areas of policing, our legal systems, and prisons.					
DE240101072 Thomson, Dr Giles R	**Transforming Australian cities through net-zero transit activated corridors** Cities represent a huge, but largely untapped, opportunity to meet Australian commitments to become 'net zero by 2050'. Transforming Australian cities through net-zero transit activated corridors is a transdisciplinary research project about sustainable urban planning. It builds upon past research on integrating land use and transport planning and places it within a net zero frame. It will involve national and international academic collaboration. Expected outcomes include evidence-based urban planning recommendations focused on increased liveability, sustainability and affordability through new spatial structures (urban design) and new governance structures (planning policy) necessary to deliver thriving net zero Australian cities.	63,597.00	127,955.50	133,818.00	69,459.50	394,830.00
	National Interest Test Statement Every Australian metropolitan plan has 'infill' targets, these are rarely met. It is easier to keep releasing land on the fringes, resulting in car dependent urban sprawl and congestion with many associated social and sustainability problems. There is a need to transform Australian cities to be more sustainable and more liveable. Net-zero transit (train and tram) activated corridors appear to address many of these challenges, but effective models for integrating transport and planning have not been widely adopted. This research will focus on best practice, as well as barriers and enablers for net-zero transit activated corridors. It will also investigate whether technological advances promising cheaper electric solutions (e.g. trackless trams), and net zero financing could catalyse a change in the way cities are developed. The project will involve national and international academic collaboration. Expected outcomes include urban planning recommendations focussed upon new spatial structures (urban design) and new governance structures (planning policy) necessary to deliver thriving net zero Australian cities.					
DE240101377 Barry, Dr Nichole A	**Measuring the glow from our Cosmic Dawn** The Cosmic Dawn is one of the last unexplored periods of the history of the Universe. The faint glow of intergalactic hydrogen during the birth of the first galaxies can shed light on the formation of structure in the Universe. Many are seeking the first detection, notably teams in Australia, the USA, and the Netherlands. This project proposes to synthesise the knowledge across these communities for the first time, resulting in a new, cross-validated analysis utilising worldwide expertise, for the benefit of Australia's Murchison Widefield Array. This collaborative approach will discover the best methods for precision analysis of the early Universe, and definitively embed Australia as the global leader in the search for our Cosmic Dawn.	63,639.50	128,079.00	126,979.00	62,539.50	381,237.00
	National Interest Test Statement This project seeks to uncover a mysterious epoch of the Universe, the time period when the first stars and galaxies formed. This never-before-seen era can shed light on the formation of the Universe. Globally, the scientific community is racing to find better analytical techniques to decode this extremely faint signal. For the first time, this project will attempt to converge diverse analyses into a fully flexible, modular software. The most precise techniques will be employed to search for the mysterious signal using the Murchison Widefield Array in Western Australia. The software will then be used to ensure the upcoming Square Kilometre Array, a one-billion-dollar project, can fully measure the Universe and thus contribute to the economic benefit of the Western Australian community. Outcomes/outputs from this project would promote Australia's scientific profile in this domain, strengthen Australian-led radio-astronomy telescopes, and ensure Western Australia becomes an international hub for astronomy.					
	Curtin University	337,171.00	676,817.50	671,129.50	331,483.00	2,016,601.00
Edith Cowan University						
DE240100532	**Inclusive community planning for a just transition to net zero emissions**	79,532.00	159,048.50	159,050.50	79,534.00	477,165.00

* 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 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
Godden, Dr Naomi J	This project aims to understand how a just transition to net zero emissions can support First Nations peoples' self-determination with the case study of Collie on Wilman Noongar Country (WA), a community phasing out coal-fired power. The project expects to generate significant new theoretical and applied understandings about community practice for climate justice. With the support and engagement of Wilman Elders, this project expects to generate outcomes of guidance for the field of community development about just transition planning with First Nations peoples. As Australia transitions to net zero emissions by 2050, this project should provide significant benefits such as greater understanding of, and capacity in, just transition planning. **National Interest Test Statement** Rapid social and economic change is required to reach net zero emissions and it is crucial that this process does not disadvantage already marginalised groups. This project will foster understanding of the self-determination of First Nations peoples in planning for a just and equitable transition from fossil-fuel based industries to renewable, sustainable economies. With the support and engagement of Wilman Noongar Elders in the case study site of Collie, Western Australia, the project will explore how First Nations peoples currently participate in transition planning and identify effective and meaningful strategies for a just transition. Outcomes, including a practical guide disseminated to community development practitioners, will advance the knowledge and practice of practitioners who are facilitating and supporting just transition planning processes. This project will benefit Australia by documenting First Nations peoples' leadership in just transition, providing an international benchmark of meaningful engagement, and contribute to strengthening Australia's pathway to net zero emissions by 2050.					
	Edith Cowan University	79,532.00	159,048.50	159,050.50	79,534.00	477,165.00
The University of Notre Dame Australia						
DE240100475	**Exploring Business Approaches to the Modern Slavery - Climate Change Nexus**	74,250.50	150,110.00	149,753.50	73,894.00	448,008.00
Boersma, Dr Martijn	This project aims to generate awareness and knowledge about the modern slavery – climate change nexus. Businesses can be linked to modern slavery and climate change through their operations and supply chains, and play a major role in mitigating these critical issues. The project will: (1) reveal the extent to which businesses recognise and address modern slavery and climate change as related issues; (2) develop an evidence-base detailing what constitutes meaningful and holistic business approaches and disclosures; (3) assess how market-based mechanisms are used to incentivise action and hold businesses to account. The outcomes will advance business efforts and accountability in relation to these problems and benefit impacted communities. **National Interest Test Statement** Despite growing evidence showing the connection between modern slavery and climate change, businesses continue to address these problems in isolation. The nexus of modern slavery and climate change is a nascent topic that has received limited attention from business academics and practitioners. Businesses can be linked to these issues through their operations and supply chains and play a key role in mitigation. Despite growing evidence illustrating the connection between modern slavery and climate change, businesses continue to address these problems in isolation. By critically analysing current efforts to address modern slavery and climate change, the project aims to advance knowledge of the intersection of these problems to enhance future interventions. Expected outcomes include: (1) identifying ways in which businesses can address these issues holistically, to more effectively harness their economic power; (2) recommending meaningful action and disclosures, to aid the appraisal of business efforts by investors, consumers and civil society; and (3) assessing the use of market mechanisms to spur action and hold businesses accountable. The outcomes will benefit businesses addressing these problems as well as impacted communities, in Australia and overseas. Data will be gathered by closely cooperating with businesses, policymakers, and civil society. Findings and recommendations will be shared with that cohort in practically oriented output. The results will provide input into the reviews of the Modern Slavery Act 2018 and the National Action Plan to Combat Modern Slavery and will assist Australian businesses and the Government in meeting Sustainable Development Goals 8.7 and 13 by 2030.					
	The University of Notre Dame Australia	74,250.50	150,110.00	149,753.50	73,894.00	448,008.00
The University of Western Australia						
DE240100337	**Revitalising Wunda shields: Safeguarding endangered cultural practices**	73,369.50	147,069.00	145,969.00	72,269.50	438,677.00
Gilchrist, Dr Stephen	This project investigates endangered shield-making practices of northwest Western Australia and explores the potential of cultural revitalisation. By researching existing museum holdings of Wunda					

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
	Shields in Australia and overseas, this project expects to generate new forms of knowledge that have been ignored or misunderstood by the archive. Developing a Digital Keeping Place that can re-house the Wunda Shields and re-prioritise Indigenous curatorial methodologies, these shields will be re-circulated through descendant communities to encourage shield revitalisation. Renewing the knowledge of Wunda shields, the outcomes of this project are expected to inform intangible cultural heritage projects and contribute to Indigenous wellbeing. **National Interest Test Statement** This research expands existing understandings of how material and cultural practices contribute to Indigenous well-being and social cohesion in regional Indigenous contexts. It is focused on Wunda shields, historically made by the Yamatji people of northwest Western Australia and the potential for the revitalisation of shield-making practices. Wunda shields were collected widely by early anthropologists but have been misrepresented in archives. Employing digital repatriation methods, this research addresses the significant knowledge gaps of Wunda shields in Australian and international collections and recirculates this knowledge to descendant communities. Customarily used by men, the collection of shields disarmed communities. In contrast, this project seeks to renew and resurface the knowledge of Wunda shields and invite shield-making as a form of cultural empowerment. Offering government agencies and cultural institutions a model of digital repatriation and cultural revitalisation, this project contributes to the strength and diversity of Australia's intangible cultural heritage and Indigenous well-being.					
DE240100388 Knight, Dr Daniel R	**Ecological and phylogenomic insights into infectious diseases in animals** This project aims to address major knowledge gaps in our understanding of Clostridium difficile, a leading cause of severe gastrointestinal disease in animals. The project is expected to define the epidemiology of C. difficile infection in Australian horses, characterise the genetic and phenotypic traits of C. difficile strains causing equine disease and develop a new tool for enhanced genomic tracking of C. difficile in animals. These outcomes will support strategies by the veterinary sector to improve the detection, prevention and control of C. difficile infections in animals, providing long-term socio-economic benefits arising from reduced incidence and mortality associated with C. difficile infections in Australian horses and livestock. **National Interest Test Statement** Bacterial infections are a threat to animal health and biosecurity worldwide. One so-called “superbug”, Clostridium difficile or ‘Cdiff’, is a leading cause of life-threatening diarrhea in animals, resulting in economic loss to both livestock and horse-racing industries. Currently, an understanding of how, where and why Cdiff causes infections in Australian horses is lacking, hindering opportunities to improve animal health and/or productivity. By unravelling and exploiting the genetic code of the bacterium, this project is a unique opportunity for major advancements in our understanding of the causes and impact of Cdiff infections in Australian horse populations including how this complex pathogen evolves and is transmitted between animal hosts. The national benefit for the thoroughbred horse and livestock industries will be realised through new and enhanced diagnostic tools for veterinarians to detect, survey, prevent and control Cdiff infections in Australian animals, ultimately improving animal health and productivity.	77,039.50	154,549.00	141,949.00	64,439.50	437,977.00
DE240100587 Gozzard, Dr David R	**A quantum telescope for extremely high-resolution imaging** This project will combine world-leading Australian signal stabilisation technology with recent developments in quantum sensors to demonstrate the world’s first quantum telescope. This project expects to demonstrate that quantum detectors can feasibly link optical telescopes, separated by hundreds of kilometres, to achieve extremely high-resolution imaging. Expected outcomes are the development of technologies that will enable imaging with resolution more than 20 times better than any existing telescope. This will provide significant benefits for astronomy, space situational awareness, and defence. **National Interest Test Statement** Due to recent large Government investments in space exploration, Australia has become a world leader in telescope technology. We have numerous excellent telescopes, but there is significant scope to improve the quality of the images they generate. This project will develop technology that will result in the generation of images that are 1000 times clearer, and allow us to study planets outside of our solar system, the behaviour of black holes, and the origins of star systems like our own. This technology will also have more immediate economic and practical benefits to Australians by enabling better satellite imaging for Earth observation such as crop monitoring and resource exploration, as well as better imaging and tracking of spacecraft and space debris in Earth’s orbit, safeguarding satellites we use for communications, navigation, and disaster response. Adoption of the outcomes of this work will be through future work with the international astronomy community, and with defence who will be able to use the improved imaging technology to keep critical satellites safe from collisions with space debris.	74,874.50	148,274.00	146,799.00	73,399.50	443,347.00

Minister's Approval for Discovery Early Career Researcher Award for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)			Total ($)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	(Column 8)
DE240100863	**High-Efficiency, Modular and Low-Cost Hydrogen Liquefaction and Storage**	79,474.50	154,949.00	150,949.00	75,474.50	460,847.00
Siahvashi, Dr Arman	Australia's first modular hydrogen liquefaction and storage. This project aims to develop a novel multi-faceted cooling system and software to increase efficiency, lower cost, and improve the safety of hydrogen liquefaction and storage. The project will establish a new multi-disciplinary research capability in Australia and expand our fundamental knowledge to model, design, and build modular liquefaction and zero-boil-off storage systems, allowing widespread distribution and usage of hydrogen. It will create a paradigm shift from traditional scale-up to modern number-up approaches. This level of innovation is crucial for Australia to lead the world in hydrogen and also enable accessible and sustainable clean energy sources for Australians.					
	National Interest Test Statement Australia aims to become a world leader in the export of hydrogen as a renewable energy source by 2030, but this hydrogen should be converted to a liquid form to enable its shipment in large export-scale amounts. The technology needed to accomplish this is currently only available in the US, and is expensive and inefficient. This project will design and develop novel cooling technology to liquefy, store and transport hydrogen that will be more efficient, cheaper, and safer. Doing so will deliver economic benefits to Australia with a predicted hydrogen export value of $5 billion annually by 2030, commercial benefits through the intellectual property generated, and environmental benefits from a zero-emission energy source. Energy companies will easily and quickly be able to adopt this new technology, creating hundreds of highly-skilled jobs as well as increasing Australia's manufacturing capability.					
DE240101210	**A liquid protein platform for dynamic bio-inspired reaction compartments**	61,864.50	127,829.00	126,054.00	60,089.50	375,837.00
Marshall, Dr Andrew C	This project aims to investigate liquid protein as a novel material for biotechnology by producing protein droplets with a range of material and structural properties and assess the activity of internalised enzymes. The project will combine concepts from protein-based subcellular super-structure and enzyme protein structure and apply cutting-edge biochemistry methods to study how catalysis can be controlled and directed through liquid protein design. Expected outcomes include a new platform for using protein droplets to engineer dynamic catalytic compartments, strong international and interdisciplinary collaborations, and a knowledge-base for building synthetic biology tools and technologies for future green chemistry-based industries.					
	National Interest Test Statement Enzymes are the 'builders' inside cells, assembling the molecules that the organism needs to survive, grow, and reproduce. The remarkable efficiency of enzymes has sparked great interest from the biotechnology field in using them to build molecules such as vitamins, antibiotics and the mRNA found in RNA vaccines. However, when enzymes are removed from cells for these purposes, they do not work as well as expected because the liquid inside cells has properties that are vital for enzyme function. This project will unlock the secrets of these liquids, and determine how we can produce liquids similar to those inside cells that will allow us to fully harness the power of enzymes for efficient and environmentally-friendly chemical manufacturing. Via existing industry connections, the resulting technology could be rapidly adopted by the growing number of mRNA manufacturing facilities in Australia, providing economic benefits for Australia in an industry with a market value projected to reach $23 billion by 2035.					
	The University of Western Australia	366,622.50	732,670.00	711,720.00	345,672.50	2,156,685.00
	Western Australia	857,576.00	1,718,646.00	1,691,653.50	830,583.50	5,098,459.00
		14,469,669.50	**28,934,976.50**	**28,678,471.50**	**14,213,164.50**	**86,296,282.00**

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