

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

Approved Organisation, Leader of Approved Research Program  (Columns 1 and 2)	Approved Research Program  (Column 3)	Estimated and Approved Expenditure (\$)		Indicative Funding (\$)			Total (\$)	Partner Organisation(s)
		2023-24 (Column 4)	2024-25 (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	(Column 9)	(Column 10)

## New South Wales

### Macquarie University

LP220200578  Griffen-Foley, Prof Bridget L	<b>The ABC, its Archives and its Audiences</b>  This project aims to enable deeper understandings of the role of Australia's principal public service broadcaster in the lives of audience members across the country, and the community needs and interests that have shaped it. The project, in partnership with the Australian Broadcasting Corporation and the National Archives of Australia, is significant because it will uncover and interpret paper records relating to listeners and viewers during the broadcaster's first 50 years. Expected outcomes include an enlarged and more discoverable media archive for the benefit of researchers, industry and all Australians; an innovative audience-centred approach to the ABC's history; and enhanced academic, archival and media collaborations.	104,543.00	108,912.00	148,867.00	0.00	0.00	362,322.00	AUSTRALIAN BROADCASTING CORPORATION, NATIONAL ARCHIVES OF AUSTRALIA
	<b>National Interest Test Statement</b>  This project, in partnership with the Australian Broadcasting Corporation and the National Archives of Australia, will uncover and interpret records relating to listeners and viewers during the broadcaster's first 50 years. It will enhance links between the ABC and the NAA, which holds its enormous paper archive, as well as links between the Commonwealth institutions and the higher education sector. It will help the ABC to better understand its audiences, from children to adults, Australian-born to migrants, and from metropolitan to rural. It will make known and accessible a large volume of under-utilised records in the NAA and create a discoverable body of archival material for the benefit of students, researchers, industry, and all Australians. By crossing not just platforms (radio and television) but genres (from science and current affairs to music and drama), this project and its program of research dissemination will illuminate diverse aspects of our national broadcaster's long but under-examined history as it develops plans to mark its centenary in 2032.							
LP220200834  Cain, Dr Amy K	<b>Flipping the mattress: infinite polyurethane recycling by synthetic biology</b>  Australia is covered in billions of tonnes of plastic and yet <10% is recycled today. Polyurethane (PU) is ubiquitous in our everyday lives, from lacquer coatings to elastane clothing to durable foam padding in car seats, cushions and mattresses. Currently, there are few avenues for PU recycling and much ends up in landfill e.g., a single mattress produces 15-20kg of PU foam waste. Luckily, biodegradation of PU can occur naturally via various microbial means and from insects, like <i>Galleria mellonella</i> larvae. The overall aim of this research project is to understand plastic biodegradation and translate nature's solutions into flexible and efficient synthetic enzyme technologies that can sustainably recycle commonly used PU foams.	104,072.00	272,738.00	297,194.00	0.00	0.00	674,004.00	SAMSARA ECO PTY LIMITED
	<b>National Interest Test Statement</b>  Polyurethane (PU) foams, such as those in mattresses, are durable and dense plastics and particularly difficult to recycle. This project will harness nature's solutions to plastic waste, by identifying naturally occurring molecular machines (enzymes), optimising them and applying them to recycling of PU. We will start by searching for new plastic degrading enzymes in the gut microbiome of plastic-degrading caterpillars and environmental bacteria. Nature's enzymes will be cleverly redesigned by computer modeling to make them more efficient and produced in yeast cell factories. Then our optimised PU recycling enzymes will be used to recycle real world PU foams in a working prototype. The outcomes have the potential to transform the ineffective current methods for PU disposal into flexible, cost-effective and sustainable solutions of benefit to multiple sectors, in particular manufacturing and recycling and aligns with the National Waste Policy. The prototypes produced will have great commercial potential, positioning Australian partner organisation Samsara Eco as a world leader in PU recycling.							

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LP220200897  Huang, Prof Shujuan	<b>Highly Efficient Solar Window Technology Enabled by Quantum Dots</b>  The transition to zero-greenhouse gas emitting buildings is hindered by the lack of efficient energy generating building components with good aesthetics. This project will develop integrated solar windows that can effectively convert the facades of urban buildings into energy generation sites, enabled by our nanomaterials having outstanding light emission efficiencies of over 90%, accompanied by our advanced light guiding strategies and innovative PV cell integration. This next generation technology can reduce the electricity cost and increase renewable energy adoption, placing Australia in a competitive position in the billion-dollar building integrated photovoltaic market whilst also contributing to decarbonising electricity generation.  <b>National Interest Test Statement</b>  To protect the environment from climate change, the project will make advanced nanomaterials that guide light to solar cells for application in green buildings. Nanomaterials with sufficiently high light emission efficiency currently do not exist, nor do light guides and solar cells optimized for integration into electricity generating solar windows. The project aims to develop these solar windows. Australia's large urban population requires substantial renewable energy to power our buildings. We can lead the way by transforming our building facades into clean electricity generation sites, using the highly efficient solar windows that will be developed in this project with our Australian partner, ClearVue Pty Ltd. They will commercialise this technology by integrating these innovations into their products. Our innovations will lead to Australia having the best performing solar window products globally. This low-cost and high efficiency technology will pave the way for rapid adoption in expanded markets and revolutionise the billion-dollar building integrated PV industry not just in Australia but globally.	182,000.00	189,000.00	195,000.00	0.00	0.00	566,000.00	CLEARVUE TECHNOLOGIES LIMITED
	<b>Macquarie University</b>	390,615.00	570,650.00	641,061.00	0.00	0.00	1,602,326.00	
<b>Southern Cross University</b>								
LP220200287  Moloney, A/Prof Gail	<b>Boosting organ donation registration in diverse communities</b>  This project aims to increase the number and diversity of people on the Australian Organ Donor Register. Transplant success can increase when organs are matched between people of similar ethnic backgrounds, but diverse communities have historically low registration rates. This project is significant because it focuses on this disparity to co-create with two diverse communities interactive media and community dissemination strategies that respect cultural and religious beliefs while addressing concerns about donation raised in our previous research. Tested with a third diverse community, the outcome will be a model that can be both scaled and tailored to ensure equitable access to transplantation for all, benefiting the lives of many.  <b>National Interest Test Statement</b>  Australia currently cannot meet the demand for organ transplantation. Increasing the number and diversity of people who register on the Australian Organ Donor Register is fundamental to increasing the donation of organs and tissue and, therefore, fundamental to ensuring equitable access to transplantation for all Australians. Registration on the Australian Organ Donor Register is a critical and immediate issue for those in culturally-diverse communities who historically have low registration rates. Communicating effectively with these communities is crucial to increase this. This project will address this by co-creating with communities interactive media interventions that respect cultural and religious beliefs while addressing concerns and issues about donation and provide a pathway to registration. The project will provide substantial economic and health benefits for Australia through influencing policy and ultimately preventing deaths and transforming lives.	100,722.00	104,895.00	98,000.00	0.00	0.00	303,617.00	SOUTH EASTERN SYDNEY LOCAL HEALTH DISTRICT, SOUTH WESTERN SYDNEY LOCAL HEALTH DISTRICT, SHRIMAD RAJCHANDRA MISSION DHARAMPUR (AUSTRALIA) LIMITED
	<b>Southern Cross University</b>	100,722.00	104,895.00	98,000.00	0.00	0.00	303,617.00	

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<b>The University of New South Wales</b>								
LP220200350  Holley, Prof Cameron	<b>Non-urban water regulation: next generation compliance &amp; enforcement</b>  This project aims to develop the next generation of regulatory technology in non-urban water compliance and enforcement. Effective technologies are needed to make government regulation more efficient, reduce regulatory burdens and improve compliance with complex laws. This project delivers new ways to optimise regulatory technologies that drive innovation, reduce costs and enhance sustainable water use. Expected outcomes include regulatory guidance strategies and training, advances in applied regulatory theory, and innovative technology tools capturing the complexity of water regulation and supporting decision-making. This will provide public resource savings and ensure fairness and effectiveness of water compliance and enforcement.	128,119.00	170,302.00	125,332.00	0.00	0.00	423,753.00	NATURAL RESOURCES ACCESS REGULATOR
<b>National Interest Test Statement</b>								
To achieve more sustainable and equitable agricultural water use there needs to be a vast improvement in compliance and enforcement. Advances in technology offer to help regulators and water users do this. There is a knowledge gap in the current information available that will be closed by this partnership. This project will gather and analyse data on the use of technologies in non-urban water use compliance and enforcement, and use those to identify new policy innovations to greatly improve compliance and enforcement for water and other environmental issues. Publications, policy reports, education and training resources and workshops with regulators and water users will translate outcomes that provide legal and policy prescriptions and decision support technology to improve enforcement strategies and regulatory effectiveness and efficiency. This will enhance agricultural and regional job creation and profits by reducing compliance and enforcement costs to agricultural industries and governments and enhance sustainability and protect the environment by reducing risks of illegal water overuse.								
LP220200583  Koshy, A/Prof Pramod	<b>Electrodeposited Cathodes with Tunable Stoichiometry for Alkaline Batteries</b>  The growing dependency on intermittently-available renewable energy sources has resulted in metal-ion batteries being adopted as the most common solution; yet its fabrication requires multi-stage high-temperature processing leading to high costs, quality issues, and reduced service life. Thus, the present project targets the room-temperature fabrication of binary and ternary oxide cathodes by a single-step, high-yield, cost-effective technique and their integration into Na-ion batteries with minimal and no processing. The expected outcomes from this novel and efficient device fabrication can lead to significant commercial, social, and environmental benefits owing to the advancement of the battery industry and associated job creation.	156,440.00	178,727.00	172,851.00	0.00	0.00	508,018.00	VECOR TECHNOLOGIES PTY LTD
<b>National Interest Test Statement</b>								
Australia is well positioned to focus on solar-based renewable energy due to our abundant sources of sunlight, but effective and efficient battery storage is critical to realise this potential. Production of lithium-ion batteries is increasingly limited by resource availability and existing manufacturing techniques, which rely on 'binders' (to bring components together), reducing performance, and high temperatures, increasing costs. This project will implement a new paradigm in the design and synthesis of electrodes for sodium-ion rechargeable batteries that uses low-cost and readily available sodium, with no binders, through a rapid (approximately one hour) process at room temperature. This new generation of batteries offers higher efficiency, greater stability, lower cost, and lower environmental impact. Working closely with our industrial partner, the project will focus on translation from laboratory-scale to commercial-prototype-scale batteries for direct manufacture in Australia, for both industrial (large-scale solar energy generators, wind farms) and domestic (small business, domestic) consumers.								

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LP220200721  Zhang, Dr Jin	<b>Lightweight Photovoltaic Modules for Low-Load Capacity Building Roofs</b>  This project aims to develop lightweight and reliable high efficiency photovoltaic modules that expand solar energy installations onto low-load capacity building roofs. New lightweight materials will be developed for packaging with multi-functionalities such as fast heat dissipation. This project will produce economical prototypes and enable and facilitate cost reduction of crystalline silicon photovoltaic module installations on lightweight buildings, overcoming current constraints of heavy glass modules and making more solar energy exploited in both Australia's urban and rural areas. This will get steps closer to zero emission buildings, by providing renewable energy alternative to conventional fossil fuel-based power generation.	85,000.00	89,884.00	87,284.00	0.00	0.00	262,168.00	LOCATION SMART PTY LTD, RENEWABLE ENERGY LABORATORY PTY. LTD.
	<b>National Interest Test Statement</b>  This project will utilize fibre reinforced composites to develop a new generation of highly efficient and durable photovoltaic modules with significant weight reductions. This will accelerate the exploitation of solar energy by enabling installations onto low-load capacity building roofs and facades. The newly developed lightweight photovoltaic modules will provide a viable solution to nearly 40% of commercial and industrial roofs that lack the load capacity to support conventional glass modules. This project closely aligns with the "Advanced Manufacturing", "Energy" and "Environmental Change" Science and Research Priorities identified by the Australian Government. Leveraging the knowledge gained from this work will place Australia at the forefront of lightweight photovoltaic module technologies, significantly increasing the rooftop solar penetration to support the realisation of zero-emission buildings and combat global climate change. In addition, the technological advancements will lead to economic benefits by enhancing the performance of photovoltaic modules and reducing electricity bills.							
LP220200780  Harley, Dr Mitchell D	<b>A smartphone rip-detection tool to improve rip current awareness</b>  This project aims to develop a smartphone rip-detection tool and online education game to help reduce the number of Australians drowning in rips each year. The project expects to develop an optimised deep learning algorithm to detect rips from smartphone video taken at Australian beaches, which can then be used by Surf Life Saving Australia for training and education. Expected outcomes of this project are enhanced identification and literacy of rip currents, particularly among priority high-risk demographics like young males, culturally and linguistic diverse communities and rural visitors. This should provide significant benefits in reducing rip-current drowning and rescue incidents in Australia, particularly at unpatrolled beaches.	84,223.00	116,735.00	141,966.00	0.00	0.00	342,924.00	SURF LIFE SAVING AUSTRALIA LIMITED
	<b>National Interest Test Statement</b>  Swimming at the beach is an integral part of the Australian lifestyle but each year Australians continue to drown in hazardous rip currents. This project aims to enhance rip current identification skills of Australian beachgoers through a new smartphone rip-current detection tool and game powered by artificial intelligence. The project will work with high-risk demographics to co-design the education tool and evaluate it for a range of Australian beach conditions. This new approach to rip current education is designed to address critical difficulties in engaging priority groups like young males that make up a disproportionate amount of coastal drowning deaths in Australia. It is envisioned that this new tool will help reduce the drowning burden on lifeguards, society and the economy - and help make beaches a safer place for all Australians.							

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LP220200901  Kalantari Soltanieh, A/Prof Saeid Mohsen	<b>Reconstructing land tenure maps of Australia in 3D</b>  Existing land tenure maps of above and below ground, such as apartment ownership, tunnels, and mining, are maintained using 2D drawings. However, the drawings are not structured and valuable for detailed and advanced visualisation, analytics, and simulation, which are essential for testing potential interventions and policy development. This project aims to develop a data validation framework for transforming current drawings and reconstructing them into 3D models. The outcomes include validation principles, formal mathematical terms, and computational algorithms. Benefits include a cost-effective onshore alternative to offshore 3D reconstruction practices, efficient land development and infrastructure planning, and fewer property disputes.	57,740.00	57,740.00	57,740.00	0.00	0.00	173,220.00	AUSTRALIAN SPATIAL ANALYTICS LTD
	<b>National Interest Test Statement</b>  Land tenure maps of above and below ground, such as apartment ownership, tunnels, and mines, are central to Australia's economic, social, and environmental activities. However, they are still maintained using 2D drawings, which cannot be effectively used for planning and policy development. Australia needs 3D land tenure maps to effectively face emerging challenges, such as high population growth and associated housing and infrastructure investment, climate change and sustainable development, and community expectations of improved liveability and equity. To this end, governments and corporations in Australia send land tenure data overseas to be converted manually into 3D to reduce costs. Consequently, more than \$1 billion of data processing is offshored by Australian companies every year. The project develops computational methods to reconstruct and transform Australia's current 2D drawings into 3D models. The project outcome will enable Australia to process data within its borders, mitigate sovereign data risk, improve customer service and ensure employment stays in the country.							
LP220200912  Waite, Prof David	<b>Hydrogen generation by subsurface iron mineral transformations</b>  Aim The aim of this project is to elucidate key factors responsible for natural hydrogen generation in Australian subsurface environments. Significance Large amounts of this valuable resource are produced naturally with estimates of production rates of this "gold" hydrogen at least 100 times the annual demand for this critical resource. Expected Outcomes Based on improved understanding of the source of natural hydrogen, predictive tools will be developed that will assist in assessing the viability in Australia of hydrogen exploration and engineered retrieval. Benefits Ready access to naturally produced hydrogen could enable Australia to replace hydrogen that is currently generated via the use of unabated hydrocarbons.	197,201.00	205,123.00	210,365.00	0.00	0.00	612,689.00	GEOSCIENCE AUSTRALIA, GEOLOGICAL SURVEY OF WESTERN AUSTRALIA , GEOLOGICAL SURVEY OF NSW, DEPARTMENT FOR ENERGY AND MINING, DEPARTMENT OF STATE GROWTH
	<b>National Interest Test Statement</b>  Hydrogen based technologies are emerging as a key enabler for the decarbonisation of the global economy. Large quantities of hydrogen are generated in subsurface environments in various parts of Australia but there are significant knowledge gaps regarding the way this "natural" hydrogen is formed and whether retrieval of this potentially valuable resource is both possible and sustainable. Using a mix of innovative mineral characterisation methods and advanced modelling capabilities, we will work with our State Government geoscience agency partners to determine the key factors responsible for hydrogen generation and use this information to identify the locations where significant amounts of hydrogen are expected to occur. We will develop predictive tools that will assist State and Federal governments in assessing the viability of retrieving this valuable resource. Outcomes of this project will also assist companies to better target locations where recovery of this potentially cheaper and more environmentally sustainable source of hydrogen may be viable.							

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LP220200934  Borghesani, A/Prof Pietro	<b>Condition Monitoring of Steering System for Autonomous Vehicles</b>  The integrity of the steering system is crucial for the safe operation of autonomous vehicles. This project aims at developing a new condition monitoring system able to diagnose steering faults earlier, provide a root-cause-analysis of malfunctions, and estimate associated failure risks in the future. The outcomes of this project will be a better understanding of steering faults and their effect on autonomous driving, timely diagnostics and prognostics and innovative proactive control measures that mitigate their impact on autonomous driving quality and safety. The expected benefits for the automotive industry and end-users include increased safety and reliability of steering systems, and higher confidence in autonomous driving.	90,000.00	86,838.00	230,000.00	0.00	0.00	406,838.00	FORD MOTOR COMPANY
	<b>National Interest Test Statement</b>  By working with Ford on this project, this Australian research team will improve the reliability and safety of steering systems for autonomous vehicles. Autonomous driving is a billion-dollar, fast-growing industry, and a key transformative element of Transport in this century. Safety is the most critical element in highly autonomous vehicles, and building a critical mass of National expertise in this area will enable Australia to play an active role in this epochal transformation, and foster citizens' safety and prosperity. This project will uncover the safety impact of different faults in the steering system, develop methods to detect them before they are harmful, and produce countermeasures for their mitigation. This research will be the necessary foundation of future industry best-practices and National regulatory interventions so far absent in Australia, which are a key driver for innovation (see case of emission regulation). The collaboration with a leading automotive company, with a strong presence in Australia, will ensure effective adoption pathways for the innovative outcomes of this project.							
LP220200950  Verges, Prof Adriana	<b>Restoring &amp; future-proofing the biocultural values of endangered seagrasses</b>  This project aims to develop best-practice methods for the biocultural restoration of the endangered seagrass Posidonia australis. This species is highly productive, supports fisheries and biodiversity, and plays a key role in mitigating climate change. This project will generate valuable new genetic information to guide restoration strategies including climate-adjusted genotypes. Working with Indigenous groups, we aim to document and restore cultural values associated with Posidonia. Working with industrial designers, we seek to develop cost-effective techniques to scale-up seagrass restoration. This research should provide significant environmental, economic, social and cultural benefits by improving seagrass restoration.	108,509.00	112,984.00	66,764.00	0.00	0.00	288,257.00	DELTA ELECTRICITY, THE ROYAL BOTANIC GARDENS & DOMAIN TRUST, NORTHEASTERN UNIVERSITY, PORT AUTHORITY OF NEW SOUTH WALES, BAHTABAH LOCAL ABORIGINAL LAND COUNCIL, GAMAY RANGERS
	<b>National Interest Test Statement</b>  Australia has the largest seagrass meadows in the world. This critically important ecosystem captures and stores large amounts of carbon, supports key fisheries and protects our shorelines from erosion. Over 275,000 hectares of seagrasses have been lost in Australia due to human activities, and restoration is now critical for reversing historical declines. This project aims to develop best-practise methods for optimising and scaling up the biocultural restoration of endangered seagrass, including identification of climate-resistant plant populations, documentation and restoration of Indigenous cultural values, and development of cost-effective techniques to scale up restoration. Working with our partners including Indigenous Traditional Owners, government agencies, international collaborators and industry, this research will enable the development of a practical framework for seagrass restoration that can be applied to new restoration projects. This research will enable the significant environmental, cultural and economic benefit of this vital ecosystem to be fully realised.							

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

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LP220200957  Laws, A/Prof Kevin J	<b>Next-Generation Advanced Ammunition Alloy Production Technologies</b>  This project aims to address a major shortfall in Australia's ammunition supply chain and security by providing alloy solutions that enable the bypassing of the energy-intensive ammunition production steps currently imported from foreign nations as semi-finished products. By using a range of innovative new alloy design approaches that fundamentally address alloy strength, workability and castability, this project expects to provide higher performance cartridge alloys amenable to modern economic production technologies available within Australia simply not possible with existing cartridge brass. This shall provide a flexible, cost-competitive and secure sovereign ammunition supply chain while simultaneously improving ammunition performance.  <b>National Interest Test Statement</b>  In order to defend a country and train an armed force, a nation, in the most basic sense requires ammunition. Currently, Australia is unable to independently mass produce ammunition, with the initial stages of military small-arms ammunition production for the Australian Defence Force currently imported from foreign sources as a semi-finished product due to the high cost of local manufacturing. This highlights a major shortfall in sovereign defence capability and poses a significant issue for the Australian Defence Force in the event existing supply chains are disrupted. This project aims to design and develop new, high-performance alloys for munitions cases suited to both traditional munitions manufacture and new streamlined manufacturing technologies that bypass the energy intensive steps of ammunition production currently imported from foreign nations as semi-finished products in an effort to regain our sovereign ammunition manufacturing capability.	132,351.00	136,958.00	0.00	0.00	0.00	269,309.00	THALES AUSTRALIA LIMITED, ADVANCED ALLOY HOLDINGS PTY LTD
	<b>The University of New South Wales</b>	1,039,583.00	1,155,291.00	1,092,302.00	0.00	0.00	3,287,176.00	
<b>The University of Newcastle</b>								
LP220200839  McIntyre, Prof Phillip	<b>Saving our Species: Creating Systemic Change in Regional Communities.</b>  Australia is facing a crisis of species extinction. The Dept of Planning and Environment has identified a serious problem; a lack of effective communication with environmentally disengaged communities located with threatened species. To address this, our aim is to research 5 regional communities, run a series of targeted events with them and, through effective communication, build community stewardship of the identified species. This is significant as it addresses an important problem for conservation managers worldwide. The expected outcome will be a change in community attitude. The benefits to Australians will be an expansion of knowledge of how communities can be successfully communicated with to encourage environmental sustainability.  <b>National Interest Test Statement</b>  The Saving our Species program is one of the biggest conservation efforts undertaken in New South Wales. However, the program suffers from ineffective communication, especially in regional communities. This limits the involvement of communities with saving threatened species activities and hampers the program's effectiveness. In partnership with the program's project officers and the community, our team will gather evidence to determine new and effective communication strategies to help regional communities understand and engage with conservation. With these strategies, we will develop targeted activities to deepen the community's connection to threatened species, while helping them develop trust and cooperation with the program. The project will identify more effective ways of communicating conservation and species extinction to different regional communities to encourage broader ownership of environmental sustainability. Project findings will be shared through our partner conservation managers to related programs, enabling them to incorporate our recommendations across the country.	140,000.00	230,123.00	135,908.00	0.00	0.00	506,031.00	DEPARTMENT OF PLANNING AND ENVIRONMENT NSW

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LP220200866  Johnson, Prof Sarah J	<b>Reconciliation strategies for continuous variable quantum key distribution</b>  This project aims to advance a novel key distribution method, called quantum key distribution, which distributes secure keys using the quantum state of optical channels. Key distribution is a foundational part of data security, allowing digital keys to be securely exchanged between two or more parties, before they are used to protect and share information. The expected outcome is new rateless error correction codes designed specifically to implement quantum key distribution over long distances. Quantum key distribution is beneficial for ultra-secure communications as it avoids the vulnerability to weak random numbers and quantum-computing brute force attacks that currently threatened the security of data protected by existing methods.  <b>National Interest Test Statement</b>  Key distribution is a foundational part of data security, allowing digital keys to be securely exchanged between two or more parties, before they are used to protect and share information. This project will strengthen and future proof an alternative to traditional key distribution, quantum key distribution. By developing and testing new techniques to extend the range of existing systems, this research will provide better protection for critical data from the threat posed by quantum computers. This research will benefit QuintessenceLabs and Australia economically by helping to compete in the global market, potentially creating new jobs as success in the export market will boost employment in this specialist field. This research aligns with the National Quantum Strategy, will help maintain Australia's sovereign quantum capability and keep pace with the latest advances in quantum key distribution technology. In addition to sharing findings with other academics, project outcomes can be adopted into existing products for sale locally and overseas, competing against systems from overseas suppliers.	74,987.00	74,987.00	0.00	0.00	0.00	149,974.00	QUINTESSENCELABS PTY LTD
	<b>The University of Newcastle</b>	214,987.00	305,110.00	135,908.00	0.00	0.00	656,005.00	
<b>The University of Sydney</b>								
LP220200115  Postnova, Dr Svetlana	<b>Paving the way for ultra-long haul flights: strategies to mitigate jetlag</b>  This project aims to develop and test strategies to mitigate jetlag, founded on biophysical modelling of circadian rhythms. It sets out to quantify the speed of circadian adaptation of sleep, alertness, and metabolism after transmeridian travel and to maximise speed of adaptation via optimised timing of light exposure, food, and exercise in-flight and on-the-ground. Expected outcomes include powerful models for jetlag strategies, ready for application in air travel. The project will directly inform Qantas' operations for ultra-long haul flights and their international network more broadly. Project outcomes will benefit society and the economy through improving travellers' alertness, sleep, and reducing the risk of fatigue-related accidents.  <b>National Interest Test Statement</b>  Long (6-16 hour) and ultra-long haul (>16 hour) flights enable rapid travel between distant locations, but lead to inadequate sleep, fatigue, and disturbed metabolism for days, sometimes weeks, after arrival – the condition known as 'jetlag'. Mounting evidence suggests that jetlag can be reduced by following optimised schedules of light, food, and exercise but their effectiveness has not yet been shown in the real world. In this project we will develop tools to produce optimised schedules to mitigate jetlag for any flight and test these jetlag strategies in the field by partnering with Qantas Airways. Expected economic and social benefits to Australia include minimising jetlag for travellers, thereby improving alertness and productivity, and reducing risks associated with inadequate sleep. Translation of outcomes to commercial aviation will be implemented by Qantas who aim to deploy jetlag strategies in Project Sunrise flights in 2025 and, later, in their entire international network. This is expected to produce commercial benefits by increasing Qantas' international competitiveness.	271,909.00	253,348.00	265,019.00	0.00	0.00	790,276.00	QANTAS AIRWAYS LIMITED



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LP220200211  Curran, Dr Georgia E	<b>Reconnecting Warlpiri communities with cultural heritage materials</b>  The projects aims to reconnect Warlpiri communities with past documentation and recordings of their cultural heritage. Centred in Yuendumu, the project expects to unpack the significance of past documentation of cultural heritage for present day Warlpiri people who live in vastly different social worlds from their forebears. Through collaborations with Warlpiri families, and Partner Organisation, Pintupi Anmatyerr Warlpiri (PAW) Media and Communications, the project will see the set up of activities to engage with these materials and the production of resources for use by future generations.	85,578.00	84,184.00	85,430.00	0.00	0.00	255,192.00	WARLPURI MEDIA ABORIGINAL CORPORATION
	<b>National Interest Test Statement</b>  The project is centred on reconnection of Warlpiri communities with documented materials including audio/visual recordings, photographs and notes taken with previous generations. It will uncover the contemporary relevance of these cultural materials to present day Warlpiri families through identifying materials connected through lines of cultural authority to particular groups. Previously inaccessible to appropriate families, the project will set up opportunities for these families to engage with the materials and will produce a video documentary film as well as a series of short training videos. The project team will also produce a co-authored book and articles with details on the localised and context specific aspects of the return of particular materials, as well as the surrounding processes, discussions and politics. These activities will contribute to enhanced self-esteem for Warlpiri people through deeper connection to and knowledge of their cultural heritage, as well as through the development of research and archival management skills in younger Warlpiri researchers.							
LP220200329  Hawkeitt, A/Prof Brian S	<b>Safe Emulsion Explosives for High Temperature Deep Level Mining</b>  This project aims to develop a new class of emulsion explosives, which are not susceptible to hot and reactive rock conditions in very deep-level ore mines. These emulsions will contain a tuneable polymer network to prevent collapsing of the emulsion columns in hot upholes in high temperature mines, along with additives to eliminate the exothermic reaction with the rocks. If not prevented the reaction can cause premature detonation or deflagration of the emulsion causing fatal injuries and generation of toxic NOx gases. Increase in economically and safely extractable deep-level ore volume that generates greater export earnings and more jobs are expected project outcomes, as is reduced atmospheric pollution.	256,021.00	267,130.00	222,159.00	0.00	0.00	745,310.00	DYNO NOBEL ASIA PACIFIC PTY LIMITED
	<b>National Interest Test Statement</b>  Mining contributes significantly to Australia's economy. As economically extractable near surface deposits continue to diminish in number and value, a current key priority of the mining industry is the development of new efficient technologies to mine deep-level deposits. In this project we will develop new rock blasting agents, which will enable the safe and efficient extraction of deep level deposits, not currently accessible using existing blasting agents. This technological advancement will enhance the industry's productivity, as it will contribute to expanding the volume of our economically extractable ore deposits. The flow-on positive impacts will be seen in jobs created, increased export earnings, a reduction in atmospheric pollution and the strengthening of Australia's reputation as a major advanced mining technology supplier.							
LP220200396  Taylor, A/Prof Anthea	<b>Digital Labour, Australian Women Authors, and Public Persona-Building</b>  Women authors are vital to Australia's creative economy and cultural life. To ensure their wider cultural resonance as well as commercial success, such authors have long been actively engaged in the business of image management. However, digital media have significantly altered how renown is manufactured and sustained, in ways that are yet to be understood in the Australian context. Generating new knowledge about the role of digital media in promoting women authors, this project's findings will be of use to authors, publishers, cultural policy makers and funding bodies to help better support these vital cultural workers in their digital media usage.	64,413.00	77,290.00	73,197.00	0.00	0.00	214,900.00	THE AUSTRALIAN SOCIETY OF AUTHORS LIMITED, AUSTRALIAN PUBLISHERS ASSOCIATION LIMITED, BOOKPEOPLE

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	<b>National Interest Test Statement</b>	<p>Digital media have become central to ensuring the success of Australian women authors in transnational publishing circuits, while also significantly increasing authors' labour. Working with three key industry partners – the Australian Society of Authors, Australian Publishers Association, and Book People, this research will advance understandings of how digital media have changed the nature of women's authorship, the publishing industry, and reader engagements with women authors and their writing in Australia. It seeks to better understand new forms of digital labour in reputation-building processes, especially for the authors themselves, and consider the implications of this online work for these important cultural workers. Through its mixed methods and interdisciplinary approach, it will comprehensively demonstrate the cultural, political, and economic impact of digital celebrity culture on the Australian publishing field. Findings will be shared with authors, publishers, funding bodies, and cultural policy makers, to help guarantee women's voices can continue to enrich Australia's cultural landscape.</p>						
LP220200893  Yuan, Dr Dong	<b>A Data-Centric Mobile Edge Platform for Resilient Logistics &amp; Supply Chain</b>  This project aims to develop a secure mobile edge computing platform for resilient logistic and supply chain management. It consists of easy-used functions that help businesses realise low latency, high reliability, low cost, and high security in their logistics and supply chain system. To cope with the vast generated application data, we invent new data replication, placement, and deduplication techniques to optimise the mobile edge computing platform from the computation, storage, and network aspects. The invented mobile edge computing platform will enable more intelligent business applications for various industries, e.g., IT, manufacturing, and media, to appear, thus benefiting both the economy of Australia.	223,000.00	234,000.00	256,000.00	0.00	0.00	713,000.00	ALPHANEST PTY LTD
	<b>National Interest Test Statement</b>	<p>As an island nation with a small market, Australia heavily relies on global trade to maintain the prosperity of its economy. Due to the COVID-19 pandemic, Australian businesses are still experiencing supply chain disruptions; therefore, building a resilient logistics and supply chain is one of the goals of the National Reconstruction Fund (NRF) Priorities. This project will deliver a data-centric mobile edge platform for optimising the logistics system that will directly mitigate the uncertain risks to supply chain operations. Incorporating the invented data management techniques enables IT companies to provide small to medium-sized enterprises with logistics services that can manage the large volume of application data and save massive costs without jeopardising user satisfaction. Besides, the mobile edge platform is generic to be adopted by applications from other industries as well, e.g. smart cities, smart grid, and social networks, thereby boosting the capacity of the Australian economy.</p>						
LP220200949  Williams, Prof Stefan B	<b>Self-supervised feature learning for rapid processing of marine imagery</b>  Fast and reliable quantitative estimates of marine environmental health are needed for scientific studies, design and management of protected areas, and regulatory compliance of industrial activity in the ocean. Australia is collecting seafloor images at increasing rates but expert annotations are not keeping up, meaning that typical machine learning approaches struggle. This project will develop self-supervised techniques that use large amounts of unlabeled data to enhance performance. Our design takes advantage of additional information available for marine imagery such as geolocation and remote sensing context. We will explore how these representations can guide additional sampling and improve performance in classification tasks.	154,498.00	159,748.00	164,748.00	0.00	0.00	478,994.00	GREYBITS ENGINEERING, FATHOM PACIFIC PTY LTD
	<b>National Interest Test Statement</b>	<p>This project will enable faster, cheaper and more accurate scientific understanding of marine environments through the development of two interrelated capabilities: automated interpretation of seafloor imagery and associated remote sensing data, and automated exploration of the environment to gather informative imagery. These capabilities are essential for rapid characterisation of the state of the marine environment that would enable frequent synoptic views of the health of the oceans. Comprehensive and up to date scientific understanding forms the basis of sound planning and management decisions such as the establishment of marine protected areas. The ability to establish an environmental baseline and assess any impacts is also key for industry operating in the ocean while complying with environmental regulation. A wide range of activities from construction, operation and maintenance of infrastructure in ports and oil and gas facilities, offshore wind farms and desalination plants will benefit from the ability to safeguard the environment at lower costs.</p>						

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LP220200965  Kassiou, Prof Michael	<p><b>Oxytocin receptor PET ligands: imaging the love receptor's engagement</b></p> <p>This project aims to develop a positron emission tomography (PET) ligand for the oxytocin receptor. This novel platform is significant as it will allow the scientific community to answer questions about the role of the oxytocin receptor in the important process of social behaviour which underlies quality of life. This knowledge gap has remained unanswered for decades due to the lack of specific techniques to measure oxytocin receptor engagement. It is also significant as it will equip Australian startup Kinosis Therapeutics to progress their molecules to market, a process enabled by measuring oxytocin receptor engagement. Our dual expertise on the oxytocin receptor and PET ligand development uniquely situate us to generate this technology.</p> <p><b>National Interest Test Statement</b></p> <p>There is a protein in the brain that has direct influence on people's social behaviour, because a hormone known as oxytocin (also known as the "love hormone") connects with it. However, it is hard to know whether a drug can connect to this same protein. We are creating a method that will show us whether a drug can connect to this protein, and this research will answer questions about how such a connection affects the interactions between people. Through this research, we will be able to visualise this connection and provide the necessary information about how this affects human health. Because it will provide a better understanding of the mechanisms in the brain that support social connections, this research will be advantageous to all Australians by improving health and wellbeing. Furthermore, this research will enable the Australian biotechnology industry such as the Australian start-up Kinosis Therapeutics to advance its innovative research towards commercialisation of new therapies. This process is made possible by an understanding of the function of the oxytocin receptor and by determining whether drugs bind to it.</p>	250,682.00	239,345.00	233,614.00	0.00	0.00	723,641.00	KINOXIS THERAPEUTICS PTY LTD
	<b>The University of Sydney</b>	1,306,101.00	1,315,045.00	1,300,167.00	0.00	0.00	3,921,313.00	
<b>University of Technology Sydney</b>								
LP220200796  Li, Dr Jun	<p><b>Structural Protection of flywheel energy storage system</b></p> <p>A flywheel energy storage system stores a large amount of energy in a rotating mass. Compared with other energy storage systems such as large-capacity batteries, the flywheel energy storage system features high power density, long lifespan, high efficiency and is carbon-free. Flywheel energy storage systems are typically constructed underground due to safety concerns from a potential rotor burst. In the present project, a high-performance confinement system is developed aiming at above-ground construction. The confinement systems which comprise low-carbon, rubberized concrete, energy-absorbing aluminum foam, and ductile steel cladding will allow for high-impact resistance, off-site prefabrication, and easy on-site installation.</p> <p><b>National Interest Test Statement</b></p> <p>Flywheel systems store energy in a rotating mass from which electricity can be generated on demand. They have distinct advantages over chemical batteries – being carbon free, having longer lifespans and higher charging efficiencies. But their uptake in Australia is currently limited, because safety protocols mandate they be constructed underground, which is difficult and expensive to install. This project will develop a containment system that allows flywheels to be safely and economically constructed above ground, using protective structures made of rubberised concrete, metallic foam and steel cladding. Flywheel systems will benefit Australia by giving the energy sector a competitive edge, while boosting performance in industries where "green" energy is increasingly prioritised. For example, they could power irrigation in farming and heavy machinery in mining, and supplement the performance of wind and solar panels by storing and releasing energy as needed. To enable adoption, we will test and scale-up manufacturing with our industry partner and promote the product in relevant industry roadshows.</p>	65,000.00	70,000.00	65,000.00	0.00	0.00	200,000.00	KEY ENERGY PTY LTD

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LP220200808  Zhu, A/Prof Tianqing	<b>Improved security and privacy for online platforms</b>  Online platforms provide goods and services to people all over the world in a flexible way. Due to COVID-19, the number of online platforms increased significantly. As more and more business activities are conducted in a virtual environment, there is a corresponding increase in major privacy and security challenges. This project aims to work in the online education industry to provide a revolutionary secure environment for both business owners and users. This secure online environment will enable privacy and security guarantees that will be first implemented on our Partner Organisation's education platform. The developed technologies can be easily adapted to most online-service industries and can be commercialised immediately.  <b>National Interest Test Statement</b>  By strengthening the privacy and security of online platforms, Australian organisations will be able to better prevent identity theft, fraud and scams that currently plague many institutions. This project aims to deliver reliable and secure technologies to protect the identity and personal data of users on mobile device applications, in cloud-based infrastructure and during transmission. Currently, online services often require manual intervention to identify and respond to potential security breaches – a resource-intensive approach prone to delays and human error. By using machine learning to create intelligent and secure systems, the new platforms will not only be able to guarantee privacy in data sharing, but will also be able to intelligently detect and prevent security threats, including in cloud environments. Existing partnerships with technology providers will meet the growing demand from the finance, healthcare, online education and e-government sectors and re-establish community trust in data privacy and cybersecurity, making Australian businesses more reliable and competitive.	177,839.00	227,697.00	233,239.00	0.00	0.00	638,775.00	AUSTRALIA EDUCATION MANAGEMENT GROUP
LP220200906  Zhu, Dr Xi (Forest)	<b>Digitally Assisted Power Amplifier Design with Enhanced Energy Efficiency</b>  The project aims to advance design techniques for power amplifiers operating in the recently allocated spectrum for 5G New Radio, from approximately 24 GHz to 52 GHz. The intended outcome is a compact and high efficiency transmitter using digitally assisted power amplifier design techniques in low-cost Complementary Metal–Oxide–Semiconductor (CMOS) technology. Such innovation will have significant impacts on our daily life, as it will build the hardware foundation for the next generation of wireless systems. Consequently, various emerging applications such as virtual/augmented reality will be supported, maintaining national leadership in the development of wireless technology, and providing economic benefits for Australian industries.  <b>National Interest Test Statement</b>  This project will produce low-cost and energy-efficient integrated circuits for mobile communication systems. These technologies are essential for the evolution of mobile communication to enable ultra-high-speed mobile wireless networks that can match the performance of optical fibres at a fraction of the cost. The faster data transmission and enhanced reliability of these next-generation technologies will help connect consumers in rural, regional and metropolitan Australia, and enhance essential services and industries such as remote education and agriculture. This project will build capability in Australian technology companies, particularly the partner organisation, to develop low-cost, high-performance, innovative commercial products for global markets. Once commercialised, the technologies have the potential to create new Australian jobs and generate new export income.	160,363.00	135,363.00	135,363.00	0.00	0.00	431,089.00	SYDNICON RF PTY LTD
	<b>University of Technology Sydney</b>	403,202.00	433,060.00	433,602.00	0.00	0.00	1,269,864.00	

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<b>University of Wollongong</b>								
LP220200602  Wexler, Dr David	<b>Advanced refractory alloy components for aerospace and energy sectors</b>  This project aims to employ state-of-the-art alloy modelling and a new additive manufacturing approach to fabricate advanced alloy components with superior high temperature and chemical properties. Components will be manufactured from both existing and completely new alloys. Expected outcomes include stronger and more damage resistant high temperature parts for high-speed aerospace vehicles, and more stable corrosion resistant alloys for application in molten salts. The project expects to increase our sovereign capabilities in advanced alloy component manufacture, for the benefit of sectors including high-velocity aerospace, defence and molten salt-based energy storage and power generation.	170,944.00	162,759.00	168,736.00	0.00	0.00	502,439.00	GRAVITAS TECHNOLOGIES PTY LTD
<b>National Interest Test Statement</b>		The project offers benefits for Australia's Aerospace, Defence, Green Energy and Nuclear Energy Sectors. We will develop and improve a 3D metal printing method using a robot-controlled welder to directly produce components layer by layer from molten alloy wires or from a spray of molten metal droplets. This approach has advantages in cost, product quality and production efficiency compared to current 3D metal printing technologies. Prototype alloys and alloy parts for high velocity aircraft and aerospace vehicles, and corrosion resistant coatings will be investigated and manufactured. Potential applications include small components for wing struts and high temperature engine parts, and components for next generation green thermal energy storage systems. Our Australian industry partner is an expert in the fields of materials design and engineering. Through our collaboration lies an opportunity to enhance our, currently lacking, sovereign capabilities in advanced alloy component manufacture in this strategically important field, delivering economic, commercial and environmental benefits for Australia's future.						
<b>University of Wollongong</b>		170,944.00	162,759.00	168,736.00	0.00	0.00	502,439.00	
<b>Western Sydney University</b>								
LP220200872  Johnson, A/Prof Scott N	<b>Silicon: a novel solution to reduce water use and pest damage in wheat</b>  The project aims to improve Australian wheat production by increasing drought resilience and reducing reliance on pesticides. This is achieved by incorporating amorphous silicon (Si), an abundant national resource. Si uptake by wheat has been proven to alleviate stress from drought and pests, but mechanisms and agronomic feasibility remain to be fully assessed. The project will deliver a mechanistic understanding of how Si alleviates stress in wheat, from gene to farm scale, providing cost-benefit analysis and a best-practice toolbox for implementation by farmers. Outcomes are anticipated to provide a cheaper and more environmentally sustainable solution to issues of water scarcity and yield losses to pests in Australia's leading crop.	185,318.00	195,552.00	175,405.00	148,695.00	0.00	704,970.00	AGRIPOWER AUSTRALIA LTD, AGRICULTURAL INNOVATION & RESEARCH EYRE PENINSULA INCORPORATED, FARMLINK RESEARCH LIMITED, BIRCHIP CROPPING GROUP INC., AUSTRALIAN GRAIN TECHNOLOGIES PTY LTD, MINGENEW IRWIN GROUP
<b>National Interest Test Statement</b>		Australia stands to increase exports of its leading crop, wheat, for export and domestic consumption because of recent declines in global production and supply. To achieve this, innovative approaches are needed to reduce costs, increase yields and minimise losses caused by drought and pest damage. Additionally, some synthetic insecticides that are widely used in wheat production are likely to be banned in the future because of harmful impacts on pollinators and the environment. By leveraging a key national resource, amorphous silicon (Australia has 86% of global supply), and through targeted collaboration between researchers, industry and farmers, this project will deliver an innovative solution to improve drought and pest resilience in Australian wheat production. This, in turn, will produce significant economic, environmental, and societal benefits to Australia.						
<b>Western Sydney University</b>		185,318.00	195,552.00	175,405.00	148,695.00	0.00	704,970.00	
<b>New South Wales</b>		3,811,472.00	4,242,362.00	4,045,181.00	148,695.00	0.00	12,247,710.00	

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## Northern Territory

### Charles Darwin University

LP220200184	<b>Improving desert fire management with culturally directed science</b>	206,897.00	189,072.00	227,202.00	118,001.00	0.00	741,172.00	ENVIRONS KIMBERLEY INC, KARAJARRI TRADITIONAL LANDS ASSOCIATION (ABORIGINAL CORPORATION) RNTBC, YANUNIJARRA ABORIGINAL CORPORATION RNTBC, NYANGUMARTA WARRARN ABORIGINAL CORPORATION RNTBC, DESERT SUPPORT SERVICES PTY LTD, INDIGENOUS DESERT ALLIANCE LIMITED
Legge, Prof Sarah M	This project aims to improve fire management in Australian deserts. Working with 4 Indigenous ranger teams managing >150,000 km2 of the Great Sandy Desert, the project expects to document fire patterns caused by pre-European, traditional burning practices over large environmental gradients; compare these with contemporary fire patterns; and undertake extensive fieldwork to understand how fire affects native fauna, including culturally significant species. This information will shape a template for fire management planning and evaluation that is culturally meaningful to local managers. The project should support Indigenous rangers to access sustainable funding pathways for conservation management through emerging biodiversity markets.							

#### National Interest Test Statement

Aboriginal people used fire in Australia's deserts for millennia. Colonisation disrupted these practices; the resulting fire pattern shift led to declines in the ecological and cultural health of desert Country. Many Indigenous groups seek to restore 'right-way fire', to meet inter-related social, cultural and biodiversity objectives, but knowledge, capacity and funding gaps are slowing progress. This project aims to fill these gaps. Working with 4 ranger teams managing >150,000km2 of the Great Sandy Desert, historical photography, remote sensing, and fauna surveys will be used to understand where traditional burning occurred, and how different fire patterns affect biodiversity, including culturally important species. The information will be used to create a template for fire management planning and evaluation that other ranger groups can adopt as desert fire management gradually increases in scale. The project aims to develop an accredited method for measuring the biodiversity impacts of desert fire management, thus positioning Indigenous groups to access voluntary or future regulated biodiversity markets.

<b>Charles Darwin University</b>	206,897.00	189,072.00	227,202.00	118,001.00	0.00	741,172.00
<b>Northern Territory</b>	206,897.00	189,072.00	227,202.00	118,001.00	0.00	741,172.00

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<b>Queensland</b>								
<b>Griffith University</b>								
LP220200824	<b>Advanced geotechnical sensing and early warning system for smart highway</b>	143,332.00	143,332.00	143,332.00	0.00	0.00	429,996.00	GEOINVENTIONS CONSULTING SERVICES PTY LTD, SEE CIVIL PTY LTD
Dao, Prof Dzung V	This project aims to develop an advanced sensing system with interactive analytical road health monitoring for smart highways. The project expects to provide potential savings of millions of dollars and improved road quality through targeted, optimised, value-for-money highway maintenance, identified by deployment of cost-effective, energy-efficient miniaturised electromechanical sensors. The expected outcome of this project is the development of a fit-for-purpose and evidence-based early warning system for smart highway construction and maintenance. This should provide significant benefit through foreseeing potential geotechnical risks before they happen and enabling early intervention to enhance road safety and mitigate economic losses.							
	<b>National Interest Test Statement</b>							
	Geotechnical risks are ubiquitous and of paramount significance, as they can result in cost and time overruns and impact maintenance costs in infrastructure projects. There is an increasing maintenance backlog in Australia's road network nationally, including 885 km listed as 'high priority' for maintenance in Queensland alone (Infrastructure Australia, 2021). This project will address the problem of identifying geotechnical risks and prioritising highway maintenance by developing cost-effective, energy-efficient, robust sensors suitable for deployment under highways, and the necessary data analysis system for interpreting the collected data. Substantial commercial benefits are expected, since there is a huge market opportunity for infrastructure works totalling \$11B/year for the next 10 years (DITRDC, 2021) of which geotechnical works, including the sensor market, forecasted to reach \$500M/year through to the Brisbane Olympics 2032. The geotechnical sensor prototypes will be installed on project sites to monitor the performance of roads to improve construction safety and road network resilience.							
LP220200938	<b>A miniaturised laser manipulator for ultra-precise and pain-free dentistry</b>	166,746.00	166,746.00	173,974.00	0.00	0.00	507,466.00	EMUDENT TECHNOLOGIES PTY LTD
Dao, Prof Dzung V	This project aims to develop a miniaturized high-precision laser robotic device that can fit comfortably in the mouth to perform pain-free, vibration-free dental operations by utilising silicon-carbide on silicon technology to create a millimetre-sized two-axis controllable, highly-reflective mirror robust to high-power ultra-short laser pulses. This project expects to generate new knowledge in micro-mirror control using optically excited piezo-resistive sensors, and cold femtosecond laser ablation of hard dental tissue. Expected outcomes include a working prototype for laser removal of tooth materials at speeds exceeding dental drills, providing benefits in miniaturized laser devices and ultimately removing pain from dental procedures.							
	<b>National Interest Test Statement</b>							
	Dental caries affect almost half of the world's population. For millions of people, dental phobia is a health-altering problem as delayed checkups and treatments can lead to diseased teeth. While robotic assistance is widely adopted in the medical field, its application in dentistry remains very limited. This project will exploit the unique capabilities of ultrafast lasers to deliver a miniaturised robotic device that fits comfortably in the mouth of the patient and performs dental treatments with no pain and no anaesthesia. Dentists will be able to realise precise, repetitive, or delicate operations with the assistance of a computer, lowering human errors and avoiding the proximity of patients and thus the risk of infection from infectious saliva splatter. Early-stage diagnosis and intervention will become possible through units installed at Australian health centres and aged-care facilities. By introducing a new advanced technology in dentistry, this project will improve the oral healthcare of the Australian's population and facilitate its access to Australian communities in remote settings.							
	<b>Griffith University</b>	310,078.00	310,078.00	317,306.00	0.00	0.00	937,462.00	

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<b>The University of Queensland</b>								
LP220200572  Peng, Prof Yongjun	<b>Mitigating the negative effects of process water on recovering gold</b>  Low quality water has been used in the minerals industry to save fresh water but shows harmful effects on gold extraction. This project aims to understand the interactions of organic and inorganic components, existing in process water, with gold and determine problematic components that inhibit gold extraction. Expected outcomes will be developed bio-sorbents, based on agriculture waste, that can remove the problematic components in process water efficiently and economically. This will provide major benefits for the minerals industry by providing options to respond and adapt to the impacts of water quality change, leading to increases in yield, revenue and growth of the precious metal sector whilst cutting poisonous chemical consumptions.	211,682.00	137,000.00	141,000.00	0.00	0.00	489,682.00	BHP GROUP LIMITED, NEWMONT USA LIMITED
<b>National Interest Test Statement</b>								
Low quality water has been used in the minerals industry to save fresh water but shows harmful effects on gold extraction. This project aims to transform the extraction of gold from its ores by efficiently and economically mitigating the harmful effects of process water used at gold processing plants. The interactions of organic and inorganic components in process water with gold will be determined and bio-sorbents based on agriculture waste will be developed to remove the problematic components. The anticipated project outcomes expect to provide options for the Australian minerals industry to respond and adapt to the impacts of water quality change, leading to the benefits of increased yield, revenue, and growth of the precious metal sector as well as reduced operating costs and poisonous chemical consumptions at gold extraction plants. The developed bio-sorbents, based on the agriculture waste approach, have an additional benefit as they will add value to the Australian agriculture sector and reduce greenhouse gas emissions generated from agriculture waste sent to landfill.								
LP220200819  Masser, Prof Barbara M	<b>Engaging the over 50s to ensure the sustainability of our blood supply</b>  Australia faces blood shortages as our population ages and demand for blood-product derived treatments increase. Donors aged over 50 donate more regularly with fewer adverse events than younger donors, yet comprise under 24% of blood donors. This multi-method project aims to investigate how those aged over 50 understand and engage with blood donation in the context of ageing, and how their involvement can be managed to maintain psychosocial wellbeing. This project expects to generate new knowledge in recruiting, retaining, and deferring older blood donors. Expected outcomes include tailored, validated resources that may significantly benefit Australia by effectively engaging older adults to ensure the sustainability of the blood supply.	134,178.00	146,660.00	114,648.00	0.00	0.00	395,486.00	AUSTRALIAN RED CROSS LIFEBLOOD, SILVER CHAIN GROUP LIMITED
<b>National Interest Test Statement</b>								
As the Australian population ages, demand for blood-product treatments increases exponentially. However, the stability of the national blood supply is challenged by the infrequent engagement of young donors. Those aged 50+ donate more frequently yet comprise less than 24% of active and 14% of new donors annually. With increased life expectancy, blood donation is an important social role that can help people age well. This research program will build understanding of the motives and barriers to donating among older people and identify the impact of becoming ineligible to donate. The outputs of this research will provide long-term social and cultural benefits to Australia through producing validated resources for blood collectors to encourage greater inclusiveness of older people in blood donation and to effectively transition older people from this social role when they can no longer donate. This will generate cost-effective ways to increase participation in blood donation and provide significant long-term economic benefit to Australia in addition to ensuring the stability of the national blood supply.								



# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

Approved Organisation, Leader of Approved Research Program  (Columns 1 and 2)	Approved Research Program  (Column 3)	Estimated and Approved Expenditure (\$)		Indicative Funding (\$)			Total (\$)  (Column 9)	Partner Organisation(s)  (Column 10)
		2023-24 (Column 4)	2024-25 (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)		
LP220200874  Luo, Dr Bin	<b>Advanced all-Iron flow batteries for stationary energy storage</b>  Iron flow batteries are one of the most promising choices for clean, reliable and cost effective long-duration energy storage. The main obstacle for large scale commercial deployment is the low round-trip energy efficiency caused by the competitive side reaction that occurs at the negative electrode during battery charging. The project aims to address this issue by engineering the negative electrode-electrolyte interface with functional materials to improve battery performance and thus further reduce the cost of energy storage. Expected outcomes include new materials and methods for advanced battery technology and manufacturing. The success of the project will significantly support the national priority of net-zero carbon emissions by 2050.  <b>National Interest Test Statement</b>  Australia has an ambitious target to achieve net zero carbon emissions by 2050, and long duration energy storage technologies are vital for wide utilisation of renewable energy sources and increasing the spread of these technologies within energy infrastructure. Iron flow batteries with the remarkable advantage of low cost iron based raw materials are one of the most promising technologies for this purpose, but are still hindered by technical challenges. This project aims to solve this problem by developing new functional materials and technology for these batteries. The success of the project will help reduce energy storage costs and propel the Australian government's investment in material science and engineering for clean energy. The developed technology for the fabrication of low-cost iron flow batteries will be directly transferred to local industries for commercialisation, which will promote Australia's ability to deliver large-scale energy storage and enhance the industrial chain of energy materials, boosting the economic growth of Australia.	152,904.00	151,833.00	155,960.00	0.00	0.00	460,697.00	ENERGY STORAGE INDUSTRIES ASIA PACIFIC, AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION
LP220200939  Yu, Prof Chengzhong	<b>Designer Nanoparticles Enable mRNA Protein Factories</b>  Intracellular delivery of mRNA facilitates target protein production, which could build protein factories that are essential in biomanufacturing industries. However, the instability of mRNA greatly lowers the protein production performance, limiting the commercial translation potential. This project aims to develop a new generation of nanoparticle delivery system to enhance mRNA stability against intracellular unstable cue, enzymatic digestion and thermal stress. This will be achieved by tailoring the nanochemistry at multi-scales. Expected outcomes include new knowledge in custom-design of functional nanomaterials for mRNA delivery, and new technology that will bring commercial benefits to the partner organisation and the biopharma sector.  <b>National Interest Test Statement</b>  Using living cells to produce functional proteins is an important process in bio-manufacturing industry which will have a global market of \$3.93 billion by 2030. A crucial step in this production process is to deliver molecules enabling protein production, such as messenger ribonucleic acid (mRNA) into cells. As mRNA is safer, cheaper and faster in turnaround than the currently used methods, the industry calls for solutions to use mRNA in next-generation protein production. This project aims to develop a novel nanoplatform that can address the problems associated with using mRNA for protein production in cells. By protecting mRNA molecules and enhancing their cellular delivery performance, the protein productivity in cells can be boosted. This project will bring significant economic benefit to Australia's biomanufacturing industries by providing new nanotechnology tools that have broad application scope and high cost-effectiveness. By patent licensing and industry engagement, this project will create a competitive advantage for Australia in the global biomanufacturing field.	135,679.00	130,157.00	136,279.00	0.00	0.00	402,115.00	N4 PHARMA
LP220200963  Guo, Prof Jianhua	<b>Dual-membrane upgrading towards sustainable wastewater management</b>  Water utilities in Australia have set aspirational targets for energy- and carbon-neutral wastewater services by as early as 2030. However, these two aims are often incompatible because of excessive aeration energy consumption and substantial greenhouse gas emissions in wastewater treatment plants. This project aims to develop a novel biotechnology that enables simultaneous bioenergy recovery, cost-efficient nitrogen removal and mitigation of greenhouse gas emissions, thus bringing multifaceted benefits to wastewater management. The project will provide strong support to the Australian water industry in their endeavour to achieve economically and environmentally sustainable wastewater services.	126,000.00	142,000.00	139,000.00	0.00	0.00	407,000.00	WATER CORPORATION, SINOPEC RESEARCH INSTITUTE OF PETROLEUM PROCESSING

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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<b>National Interest Test Statement</b>								
In seeking sustainable water resources management, wastewater is now being considered more as a resource than as a waste. However, to do this, a completely new process design is required to overcome two key barriers, which are the cost-efficient nitrogen removal and mitigation of greenhouse gas emissions. This project will develop an innovative membrane-based biotechnology implemented in the main line of wastewater treatment that can simultaneously remove nitrogen and reduce greenhouse gas emissions. In close collaboration with Australian and international water industries, the technology's effectiveness and scalability will be showcased in both pilot-scale and large-scale systems. The adoption of this technology, facilitated by our industry partners, would benefit Australian society by reducing the carbon footprint of wastewater processes, ultimately enabling nation-wide water management facilities to realise energy- and carbon-neutral targets by as early as 2030. It would significantly contribute towards the goal of shifting Australia towards carbon-neutral economy.								
LP220200969  Hossain, A/Prof Md.Shahriar A	<b>A next generation 'smart' superconducting magnet system in persistent mode</b>  Superconducting magnet devices use splicing, a process required to maintain the persistence of operation. Currently, the formation mechanism of splicing using magnesium diboride superconductor is complex and not technologically robust for industrial magnet manufacturing. This project aims to develop novel, reliable and economical superconducting splicing technologies that can produce an ultra-stable and uniform magnetic field against unexpected power outages. Expected outcomes include the development of advanced green and cryogen free superconducting technologies, which would boost the Australian manufacturing industry through access to multi-billion-dollar global markets for power grids, medical imaging and energy generation and storage.	153,069.00	153,138.00	165,265.00	0.00	0.00	471,472.00	HYPER TECH RESEARCH INC
<b>National Interest Test Statement</b>								
Superconducting magnets producing ultra-stable magnetic field are a core component of many technologies including particle physics, fusion devices, power transmission, medical imaging tools, energy storage, and transportation. Current commercial low temperature superconducting magnets require liquid helium, which is expensive and difficult to handle. This project aims to develop liquid helium-free high temperature superconducting dry magnets that can be used in cheaper and safer next-generation superconducting technologies without any electrical power waste. This program will develop a robust platform technology for a broad range of superconducting devices and will expand Australia's advanced manufacturing capacity and enable access to multi-billion dollar global markets for MRI scanners (\$5b per year), NMR spectroscopy (\$1.8b per year) and superconducting magnetic energy storage (\$44.6b per year). The project will advance knowledge and bolster Australia's leadership in this burgeoning field and, finally, accelerate the translation of innovative laboratory discoveries to impactful real-world applications.								
		<b>The University of Queensland</b>	913,512.00	860,788.00	852,152.00	0.00	0.00	2,626,452.00
		<b>Queensland</b>	1,223,590.00	1,170,866.00	1,169,458.00	0.00	0.00	3,563,914.00

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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<b>South Australia</b>								
<b>The University of Adelaide</b>								
LP220200559  Tonkin, Dr Maggie (Margaret) K	<b>Re-Activating Australian Dance Theatre's Archive for the Future</b>  This project aims to investigate how the rich, vulnerable heritage of Australian Dance Theatre (ADT), Australia's oldest contemporary dance company, can be re-activated for the future. In partnership with Indigenous leadership from ADT, it will collaboratively research Western and Indigenous choreographies to generate an innovative work. Case studies of ADT's female Artistic Directors will produce new knowledge of gender in Australian dance, and it will experiment with 3D imaging of the costume collection. Outcomes include an exhibition, dance work, film, and a networked digital dance archive. It will benefit the performing arts by producing archival resources that can be adapted across the sector to preserve Australia's cultural heritage.	112,973.00	132,882.00	50,000.00	0.00	0.00	295,855.00	AUSTRALIAN DANCE THEATRE
	<b>National Interest Test Statement</b>  This project aims to enhance recognition and knowledge of the sixty-year heritage of Australian Dance Theatre (ADT), Australia's oldest contemporary dance company, as a significant cultural resource for the future. It will develop new ways of inheriting dance, through an archival and creative re-activation that combines Western and Indigenous methodologies and that allows a First Nations choreographer to re-imagine past representations of Indigenous culture in ADT's repertoire. Case studies of ADT's female Artistic Directors will produce new knowledge of the role of gender in Australian dance, and it will experiment with 3D imaging of the costume collection. Outcomes will be a major South Australian exhibition, a touring dance work, a documentary, and a networked digital dance archive. By producing a new archival approach to dance legacies, it will benefit the performing arts sector, and thus contribute to the preservation of Australia's cultural heritage.							
LP220200792  Karakus, A/Prof Murat	<b>Multi-phase modelling and characterisation of mudrush hazard in cave mining</b>  A mudrush is a sudden, uncontrolled flow of wet fine particles (mud) into an underground mine that damages equipment, infrastructure, and can even cause fatalities. This project aims to develop cost-effective management and monitoring of mudrush hazards within the at-risk Carrapateena cave mine operated by OZ Minerals. Building on recent technological and numerical advances, a novel experimental-theoretical-numerical approach will be used to simulate mudrush risk based on moisture content, particle sizes, compaction, geological conditions, and seismic energy. Outputs will include a practical framework to boost the safety, productivity, and profitability of caving operations to benefit miners and the broader resources industry.	222,844.00	226,499.00	233,707.00	69,352.00	0.00	752,402.00	OZ MINERALS LIMITED
	<b>National Interest Test Statement</b>  Mass mining methods, such as sub-level and block caving, are highly efficient and cost-effective. However their operations can be threatened by nearby aquifers, as water can seep into fractured rock, building pressure that erupts in an uncontrolled mudslide (mudrush). The Carrapateena cave mine in SA is moving through 2 aquifers, creating significant risks for miners, equipment, and operations. Our project will exploit technological advances in numerical and physical modelling, including an innovative 3D concrete printer that can generate controlled rock fractures, to build an accurate, field-scale simulation for mudrush hazards based on a mine's unique geological and physical profile. Further, we will collate a comprehensive database linking rock/soil properties with mudrush risk that will be available to the broader mining industry. Along with training 31 students to provide a significant uplift in a research capacity, these outputs will enhance the long-term safety, sustainability, and viability of Australia's resources industry, supporting National Science & Research and Manufacturing Priorities.							
	<b>The University of Adelaide</b>	335,817.00	359,381.00	283,707.00	69,352.00	0.00	1,048,257.00	

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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<b>University of South Australia</b>								
LP220200369  Semple, Dr Susan J	<b>Co-research supporting the development of Aboriginal plant knowledges</b>  Successful commercial development of products manufactured from Australian plant extracts based on shared Aboriginal Knowledges and Western scientific evidence is limited. This research project partnering with an Aboriginal Corporation and a skincare company aims to understand the processes that would be needed for Aboriginal-led product development from a traditionally-used plant. This includes examining how plant materials could be sustainably managed and harvested on Aboriginal homelands, the quantities of plant materials needed for product development and the feasibility of a homelands business. The learnings from this project are expected to inform other First Nations groups seeking to develop their plant knowledges.	120,318.00	137,874.00	122,641.00	0.00	0.00	380,833.00	CHUULANGUN ABORIGINAL CORPORATION, MELIO SKINCARE PTY LTD
<b>National Interest Test Statement</b>		There is limited development of Aboriginal medicinal plant products that is led by and of benefit to Aboriginal Traditional Custodians. This project, in partnership with an Aboriginal corporation and a skincare company, aims to understand locally relevant processes for developing a quality product from a traditionally used plant. This includes examining sustainable harvesting of plant materials on Aboriginal homelands, the quantities of plant materials needed, benefit-sharing, and the feasibility of a homelands business. The findings and recommendations would assist the Aboriginal corporation in understanding the practical steps towards product development. They would help the company, who aim to develop ethical products, to gain an understanding of the issues that Traditional Custodians consider important. The project could also be a case study for other First Nations groups looking to develop plant product enterprises. Such enterprises have the potential to provide economic returns, as well as wider social, cultural, wellbeing and environmental benefits.						
		<b>University of South Australia</b>	120,318.00	137,874.00	122,641.00	0.00	0.00	380,833.00
		<b>South Australia</b>	456,135.00	497,255.00	406,348.00	69,352.00	0.00	1,429,090.00

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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## Victoria

### Deakin University

LP220200915	<b>Online relationship therapy supporting those affected by substance use</b>	196,927.00	137,271.00	141,572.00	0.00	0.00	475,770.00	ODYSSEY HOUSE, VICTORIA, WINDANA SUPPORT CENTRE INCORPORATED, HELLO SUNDAY MORNING, ANGLICARE VICTORIA
Karantzas, A/Prof Gery	This project aims to evaluate the effectiveness of an online relationship therapy program for those experiencing relationship dysfunction and where one or both partners engage in problematic substance use. In doing so, the project addresses a major service gap, specifically, the lack of online programs to support this population in developing and maintaining positive romantic relationships. The expected outcomes include reduced relationship conflict, intimate partner violence, and relationship breakdown. The project's potential for wide-scale roll out will yield far-reaching benefits for Australian couples and families dealing with substance problems by enhancing relationship skills and fostering relationship stability.							
	<b>National Interest Test Statement</b>							
	Over 50% of calls to the national alcohol and other drug (AOD) hotline related to help-seeking for significant relationship dysfunction. This project will evaluate the effectiveness of an online relationship therapy program in reducing relationship conflict, intimate partner violence, and relationship breakdown in couples where one or both partners have substance use problems. The project addresses the lack of programs to support this vulnerable population in developing and maintaining positive romantic relationships. The project brings together a team of national and international researchers in couple relationships, substance misuse and intimate partner violence with four of Australia's leading services providers in the Alcohol and Other Drugs (AOD) sector. The project's potential for wide scale roll out through the AOD sector will yield far-reaching social and economic benefits for Australia given that the estimated combined cost of relationship breakdown and AOD misuse is \$94 billion per year.							
	<b>Deakin University</b>	196,927.00	137,271.00	141,572.00	0.00	0.00	475,770.00	

### Monash University

LP220200182	<b>Nanopore sensors for multiplexed, ultra-fast gene detection</b>	134,410.00	142,610.00	134,940.00	0.00	0.00	411,960.00	OXFORD NANOPORE TECHNOLOGIES
Dunstone, A/Prof Michelle A	The aim of this research is to develop the application of protein nanopores for multiplex identification of DNA samples for ultrafast gene detection. This is a type of barcoding of organism DNA that allows for rapid gene identification. This technology aims to address a significant need for rapid, on-the-spot identification of organisms. Applications include rapid identification of pathogenic bacteria in infections and identification of organisms in environmental sampling. Current methods are relative slow, require DNA amplification and specialised laboratories. This proposal aims to fine tune the properties of the large nanopore, polyC9, with respect to size and charge, as well as to identify and characterise novel large nanopores.							
	<b>National Interest Test Statement</b>							
	Rapid confirmation of species within a mix of living things is not yet possible. This project bar-codes genes for on-the-spot identification of living things in the field including those that cause disease, spoil food and pollute waterways. A great advantage of this Project technology is its many rapid and diverse applications across areas from environmental through to human health. It could allow doctors to quickly identify the cause of an infection and provide appropriate treatment to improve patient recovery time; determine if industry emissions are contaminating waterways; or detect agents of spoilage during food production. This quick and mobile identification tool will enable speedy intervention, improving the health of Australian industry, environment and communities. The novelty of project technology will encourage companies to invest further in Australian research and development. The project strongly aligns to the interests of the project Industry Partner, Oxford Nanopore, who have existing products that can be readily modified to include the project technology for use towards new applications.							

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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LP220200591  Wang, Prof Huanting	<p><b>Low-temperature ceramic electrolysis cells for renewable energy technology</b></p> <p>This project aims to develop advanced protonic ceramic electrolysis cells for greatly improving the efficiency of hydrogen production and carbon dioxide conversion using renewable energy. This will be achieved by nanoscale integration of proton-conducting two-dimensional materials with solid acids and ceramic proton conductors to lower the manufacturing costs and operating temperature of protonic ceramic electrolysis cells. Expected outcomes of the project include new intellectual property on materials formulation and process parameters for commercial development of this new type of ceramic electrolysis cell, thereby contributing to the growth of Australian manufacturing and renewable energy industries and reduction of carbon emissions.</p>	233,578.00	151,140.00	148,690.00	155,690.00	0.00	689,098.00	WOODSIDE ENERGY GROUP LTD
	<p><b>National Interest Test Statement</b></p> <p>Renewable fuels and energy sources need to be adopted at scale to reduce carbon dioxide emission and climate change. Hydrogen produced by splitting water is a desirable source of “green” energy and feedstock, particularly if carbon dioxide is used in the process. The process of splitting water is currently too expensive to adopt at large scale. This project aims to improve the efficiency of splitting water to produce hydrogen energy while converting carbon dioxide into renewable fuels. The main Project aim is to reduce the cost of the water splitting process and assembly of the involved device. This will hurry wide spread adoption of the technology and grow the renewable energy industry in Australia by providing a cheap source of clean, safe and renewable hydrogen energy. The project will help Australia act as a major global hydrogen provider. The adoption pathway for this project’s technology will be through the project industry partner, Woodside Energy Ltd, which looks to this project to help it transition its business to sustainable renewable energy.</p>							
LP220200856  Pavlova, Dr Alexandra	<p><b>Upscaling genetic management of wildlife populations</b></p> <p>Earth’s biodiversity is in crisis: many species are threatened with extinction and need our help. Genetic management helps to stop extinctions and promotes the health and continued existence of our wildlife. This project aims to understand how to use genome science to support preservation of four endangered species in changing climates and apply these learnings to help other species to survive and thrive. Anticipated outcomes include innovative approaches to aid conservation decision-making, automated analyses of genome data, and improved conservation training. The expected benefits include larger, healthier populations of four species, new ways of saving other species, and the provision of important resources for conservation managers.</p>	234,446.00	237,644.00	252,532.00	0.00	0.00	724,622.00	ZOOS VICTORIA, DEPARTMENT OF ENVIRONMENT LAND WATER AND PLANNING, COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, DEPARTMENT OF PRIMARY INDUSTRIES, REVIVE AND RESTORE, VICTORIAN FISHERIES AUTHORITY, DIVERSITY ARRAYS TECHNOLOGY PTY LIMITED
	<p><b>National Interest Test Statement</b></p> <p>Australia has many unique and much-loved wildlife whose populations are collapsing due to habitat loss and worsening conditions, notably warming climates, droughts, wildfires and floods. Their genetic diversity and population health are declining, threatening evolutionary resilience. Cheap and quick ways to monitor and improve population health are urgently needed. This project will create new ways to prevent extinctions and improve the health and resilience of native plants and animals using genome analyses. The project uses four endangered species to develop, automate and showcase innovative processes to rescue biodiversity. Healthy biodiversity supports human health, food security and the economy, and, with better tools and funding for environmental restoration, Australia’s alarming biodiversity loss could stop. The methods developed will be applicable to all species and will be globally deployed through Project members who specialise in upscaling and using such methods in biodiversity conservation. As climate change impacts world ecosystems, the benefits of healthy biodiversity cannot be overstated.</p>							

\* 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 Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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LP220200944  Trevaskis, A/Prof Natalie L	<b>Synergising nanoemulsion and lipid biomimetic design for advanced delivery</b>  This project aims to identify the critical design characteristics of lipid formulations of lipid-modified probes or drugs (lipid biomimetics) that together promote integration into lipid absorption pathways and target the lymphatic system that drains the small intestine. This has significant potential since the intestinal lymphatic system is a key immune tissue, the site of immune response to autoantigens and antigens derived from food and the microbiome. The project will deliver a design roadmap of the required characteristics for lymphatic targeting, and in particular, will identify novel lipid nanoemulsions that work synergistically with lipid biomimetics to enhance lymphatic imaging and delivery applications.	170,497.00	210,554.00	234,265.00	0.00	0.00	615,316.00	PURETECH HEALTH
	<b>National Interest Test Statement</b>  Understanding how the gut absorbs ingested material is critical for nutrition and the development of next-generation Australian food and drug products. Most food components and drugs are absorbed and taken up into the blood and pass through the liver before reaching the circulation. This can result in unwanted breakdown in the liver, calling for injection. This Project will develop new technology to deliver molecules into the lymph system and not the blood. This avoids breakdown in the liver and targets the gut lymph nodes where immune responses to environmental or dietary allergens occur. Project outcomes have the potential to revolutionise drug delivery and nutrition. Benefits to Australia will be the development of IP, new technologies and next generation products – supporting economic growth, employment and training in Australia. The commercial partner, PureTech, will lead development of these products with long-term benefits to Australians, especially those with autoimmune and gut inflammatory illness.							
LP220200956  MacFarlane, Prof Douglas R	<b>High performance electrolyte for the vanadium redox flow battery</b>  Vanadium batteries present a highly-scalable, sustainable solution for storage of renewable electricity, but the technology needs to be improved for robust and efficient operation in the warm Australian climate. This project aims to design and extensively test new high-performance electrolyte compositions with advanced thermal stabilising additives for safe long-term battery operation at 60 °C. New knowledge in materials science and electrochemistry will be generated. The core outcome of the project is a sustainable large-scale energy storage technology ready for immediate application in Australia. This will support the transition of the Australian energy sector to renewables and provide businesses with distributed energy storage solutions.	170,000.00	170,000.00	170,000.00	0.00	0.00	510,000.00	VFLOWTECH
	<b>National Interest Test Statement</b>  The challenge of large-scale renewable energy storage could be addressed through use of the Vanadium Redox Flow Battery (VRFB). These batteries have advantages such as unlimited upgrading capacity, long cycle life (>25yrs), safe and friendly to the environment (no fire risk), as well as active materials able to be recycled at low cost. There are challenges around the heat tolerance of these batteries, preventing broad uptake, especially under the hot Australian sun. This project seeks to expand the narrow temperature range of operation through developing new and innovative thermal stabilising additives for the electrolyte. Expected outcomes of this project include a new, advanced, more stable battery, with high energy holding ability and outstanding thermal stability that does not need an expensive and energy-consuming cooling system. Project outcomes will develop the Australian renewable energy sector and provide businesses with affordable and reliable on-demand electricity. Manufacture of the new electrolyte will take place in Australia for the local and international markets.							
	<b>Monash University</b>	942,931.00	911,948.00	940,427.00	155,690.00	0.00	2,950,996.00	

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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<b>RMIT University</b>								
LP220200159  Gordon, Dr Ascelin	<b>More than a reserve? Measuring the benefits of private protected areas</b>  This project aims to develop a framework for understanding the full suite of benefits derived from privately protected areas in Australia. It will develop and test a new interdisciplinary approach to measure the ecological, socio-cultural, and economic benefits of protected areas to both human and non-human beneficiaries. Outcomes will include a systematic process to effectively gather data, analyse, and report on the full suite of benefits derived from protected areas. The framework will provide a robust evidence base for the range of benefits provided by private protected areas. This will be vital to manage and grow Australia's protected area network to reduce biodiversity and environmental declines, and meet international commitments.	114,568.00	122,680.00	122,562.00	0.00	0.00	359,810.00	BUSH HERITAGE AUSTRALIA, BIRDLIFE AUSTRALIA, TRUST FOR NATURE, AUSTRALIAN LAND CONSERVATION ALLIANCE LIMITED
<b>National Interest Test Statement</b>								
Privately Protected Areas (PPAs) are land managed by individuals or organizations for the long-term conservation of native plants and animals, and the Australian environment. They are an important contribution to national protected areas and growing the number of PPAs is vital for averting the biodiversity crisis facing Australia. This project will reduce biodiversity loss by strengthening the network of PPAs and providing evidence-based guidelines to improve their effectiveness. This will enable PPA managers to invest their limited resources more effectively, guide philanthropic investment in PPAs, and assist government to better prioritise funding for the environment. Benefits of the project will be more effective conservation of Australia's environment, including increased resilience against climate change and a greater alignment of private land management with social and cultural values. We will work closely with our industry partners, including PPA organisations, to translate the results to an industry-ready format and produce open access tools for wider and immediate adoption of our guidelines.								
LP220200649  Yi, Prof Xun	<b>Privacy-Preserving Collaborative Analytics on Sensitive Data</b>  This project aims to develop efficient solutions that allow multiple institutes to carry out collaborative analytics on aggregated data without revealing their sensitive data to each other. The project expects to remedy acute privacy concerns when institutes share sensitive data across boundaries for collective insights. The expected outcomes include a hybrid trust model with distributed trusts to provide malicious security guarantees, lightweight privacy-enhancing techniques to express rich analytical functionalities, and a system platform for real-world applications. This should provide significant benefits such as facilitating industries to safeguard their customers' data and uplift their businesses in a secure and trustworthy fashion.	100,741.00	110,068.00	119,395.00	0.00	0.00	330,204.00	ANSEN INNOVATION
<b>National Interest Test Statement</b>								
Data analytics has catalysed a wide spectrum of intelligent and quality applications. A recurrent challenge society confronts is that institutes tend to combine their data and draw a mutual benefit through analysing their aggregated dataset, yet their sensitive data cannot be shared across boundaries. This project will enable new techniques for privacy-preserving collaborative analytics on sensitive data, which realise the mutual benefits while mitigating the renewed privacy concerns in this era of intelligence. The outcomes will directly benefit Australian businesses and citizens by protecting their business-sensitive data as well as the private individual information carried by these data. The techniques will be translated to commercial products and deployed to various data-driven services, such as a collaborative fraud detection platform among banks and Australian law enforcement sectors, thus advancing Australia's national critical infrastructure where the data are most valuable.								
<b>RMIT University</b>		215,309.00	232,748.00	241,957.00	0.00	0.00	690,014.00	

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# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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		2023-24 (Column 4)	2024-25 (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	(Column 9)	(Column 10)
<b>Swinburne University of Technology</b>								
LP220200548 Arulrajah, Prof Arul	<b>Building green roads with gasified municipal solid waste composites</b>  This project aims to develop gasified municipal solid waste composites as a novel and green road material. This project expects to generate new knowledge on the fundamental properties of the developed waste composites when used as road subgrades and bases, through experimental study, physical modelling, numerical simulation, and field trials. Expected outcomes include understanding the mechanical behaviour of these waste composites under static and cyclic loads, development of versatile constitutive models and numerical analysis tools, and determination of their optimal performance. Benefits include diversion of municipal and demolition wastes from landfills and the development of sustainable materials and technology for future roads.	184,470.00	262,264.00	116,089.00	0.00	0.00	562,823.00	ADVANCED ENERGY TECH PTY LTD
	<b>National Interest Test Statement</b>  Constructing pavements and roads currently requires the use of new quarry materials and significant quantities of cement or lime, both of which generate large amounts of waste and carbon dioxide. This project explores an alternative for road construction by combining ash produced by the processing of municipal solid waste with sustainable non-cement binders. In the short term, the project will develop an understanding of the method of construction, mechanical behaviour and performance of roads built from waste and non-cement binders. In the long term, use of municipal and demolition wastes in road construction will divert up to 35 million tonnes annually of these wastes from landfill, significantly reduce both cost and carbon footprint of roads, and drastically reduce the need for quarry materials. With an Australian waste-to-energy industry partner, this project will identify new markets in the Australian waste-to-energy, waste management and road construction industries for their waste by-products, reducing waste in landfill and increasing sustainability of future green metropolitan and regional roads.							
	<b>Swinburne University of Technology</b>	184,470.00	262,264.00	116,089.00	0.00	0.00	562,823.00	
<b>The University of Melbourne</b>								
LP220200160 Greet, Dr Joe	<b>Traditional Owner-led restoration of urban billabongs</b>  This Indigenous scientist led project aims to investigate the past and present fire, flooding and vegetation dynamics of urban billabongs through paleoenvironmental assays (sediment cores) and field surveys of vegetation, faunal and water quality responses to cultural burns and floods. In partnership with Melbourne Water and Traditional Owners, this innovative project intends to develop and combine historical and contemporary ecological and Indigenous peoples' knowledge and apply it to better manage culturally and ecologically significant billabongs in one of Australia's largest cities. This project expects to provide a template for effective Traditional Owner-led restoration and management of our threatened urban wetlands.	91,976.00	190,324.00	116,227.00	77,933.00	0.00	476,460.00	WURUNDJERI WOI WURRUNG CULTURAL HERITAGE ABORIGINAL CORPORATION, MELBOURNE WATER CORPORATION
	<b>National Interest Test Statement</b>  Australia's urban wetlands are sites of high ecological and cultural value yet those remaining are often highly degraded. Our project will investigate the past and present fire, flooding and vegetation dynamics of billabongs on the lower Birrarung (Yarra River) through Traditional Owner-led paleoenvironmental investigations (sediment core analyses) and monitoring of vegetation, faunal and water quality responses to cultural burns and inundation. Through these investigations, we will better understand billabong ecology and Indigenous people's historical land and water management and apply this knowledge to restore and care for Melbourne's billabongs. In doing so, we will demonstrate a template for the integration of scientific and Indigenous knowledge and its application to the management and restoration of threatened urban wetlands. Through close partnership with Melbourne Water, our project will provide an exemplar of Indigenous scientist and Traditional Owner-led solutions to the current environmental crisis facing this country, for the cultural and ecological benefit of all Australians.							

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LP220200614  Gasser, Prof Robin	<b>Artificial intelligence to explore and combat eukaryotic pathogens</b>  The revolution in artificial intelligence (AI) provides unprecedented opportunities for integrative analyses of complex multi-omics data sets and for creating radically new strategies to control some of the world's most serious animal diseases. In a strong partnership with international experts, we will use AI-based methods to make major conceptual advances in our understanding of eukaryotic pathogens and host-pathogen interactions, discover the "choke-points" in biological pathways, and develop novel treatments, vaccines and diagnostics. This leap forward will substantially enhance the global profile of pathogen research in Australia, build major capacity in a priority area, and enable access to international research funding and networks.	254,016.00	289,547.00	295,708.00	0.00	0.00	839,271.00	YOURGENE HEALTH CO., LTD.
	<b>National Interest Test Statement</b>  Parasites of animals and plants cause losses of hundreds of millions of dollars per year to the agricultural sector in Australia. This project is aimed at preventing the spread of parasites and associated diseases through better treatments in animals. It uses artificial intelligence to identify targets for novel drug treatments against these parasites. The project works toward alleviating parasite disease problems in livestock animals, resulting in better agricultural outcomes due to healthier animals and increased revenue. In working with industry and academic groups, this project will ensure the use of the latest technologies to discover and develop new tools and products against parasites to help farmers, the livestock industry and the agricultural sector. To help bring communities and farmers onboard with this endeavour, show-casing the technology, new drug treatment options and effects on animals will be implemented. Through the more efficient, effective and safe treatment of livestock, we can ensure a better agricultural future for Australia, and for many other countries around the world.							
LP220200719  Cleveland, A/Prof Benjamin W	<b>Designing Learning Spaces for Diversity, Inclusion and Participation</b>  This project aims to provide evidence-based guidance on how to design and/or modify mainstream schools to make it easier for students with disabilities to participate. It seeks to inform architects, educators, and policy makers about disabled students' spatial requirements and to develop strategies and tools to support the process of co-designing schools with people with lived experience of disability. The outcomes will include an inclusive learning spaces design framework. This is expected to benefit all students' access and meaningful involvement in learning through the development of more inclusive learning spaces. The research is significant because it integrates previously dissociated knowledge from architecture, education and health.	299,645.00	299,981.00	299,956.00	0.00	0.00	899,582.00	CLARKEHOPKINSCALARKE ARCHITECTS PTY LTD, BRAND ARCHITECTS, BILLARD LEECE PARTNERSHIP PTY LTD, MOTT MACDONALD AUSTRALIA PTY LIMITED, MELBOURNE ARCHDIOCESE CATHOLIC SCHOOLS LTD, ASSOCIATION FOR CHILDREN WITH A DISABILITY, HEADS TOGETHER FOR ABI LIMITED, MODERN STAR PTY LIMITED, DEPARTMENT OF EDUCATION AND TRAINING, SA DEPARTMENT FOR EDUCATION, DEPARTMENT OF EDUCATION
	<b>National Interest Test Statement</b>  This project will improve Australian school facilities to make it easier for students with disabilities to participate in learning/school. It will provide an evidence-based approach to designing/modifying mainstream school facilities to make them more inclusive. Of children with disability who attend school, 89% attend mainstream schools. With improved spatial provision, this could be higher and more supportive of students with disabilities. While inclusion is embedded in education policies, environmental barriers in schools persist that limit the participation and achievement of students with disability, exacerbating long-term disadvantage. Through a unique collaboration between people with disability and academic and industry experts in architecture, education, and health, this research will develop evaluation and design strategies and tools to help architects co-design more accessible, safer, and more welcoming school facilities. The creation of improved environmental conditions in schools will help more students reach their potential, providing long term social and economic benefits to all Australians.							

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LP220200724  McLean Davies, Prof Larissa J	<b>Reading climate: Indigenous literatures, school English and sustainability</b>  Reading Climate aims to investigate the connections between sustainability and Indigenous knowledge in the context of school English and directly responds to imperatives for climate education and racial justice in Australian schools. It links teachers, students, authors and scholars through book clubs, exploring the potential of literature as an interdisciplinary site for knowledge building and for reimagining social and environmental futures. With partners the Stella Prize, the Australian Association for the Teaching of English, Feral Arts and VoicEd Radio, the project will develop strong collaborations between literary education, industry, and Indigenous writing, producing an open access digital resource for use in schools nationally.	50,000.00	50,000.00	0.00	0.00	0.00	100,000.00	THE STELLA PRIZE INC, AUSTRALIAN ASSOCIATION FOR TEACHERS OF ENGLISH (AATE)/AUSTRALIAN LITERACY EDUCATORS ASSOCIATION (ALEA) NATIONAL CONFERENCE, FERAL ARTS CORP LTD, VOICED RADIO CANADA
	<b>National Interest Test Statement</b>  Climate education is an imperative for school systems internationally and nationally. Indigenous writers offer ways of understanding and responding to the climate crisis, but their texts, and the knowledges they represent, are yet to be effectively integrated into school curriculum areas. Taking English curriculum as a focus, this project links Indigenous literary texts, teachers, students and scholars to advance climate education in schools, building knowledge of climate and racial justice through an innovative book club approach. Responding to national commitments to 'Closing the Gap' and Australian curriculum priorities, this project seeks to embed Indigenous knowledges in schools nationally. Partnering with the Stella Prize, the Australian Association for the Teaching of English, Feral Arts and VoicEd Radio, the project will build collaborations across education, industry, and Indigenous writers, offering environmental, cultural, social and economic benefits through increased circulation of Indigenous texts, and a publicly available Reading Climate resource toolkit for use in Australian schools.							
LP220200787  Williams, Prof Nicholas S	<b>Repurposing urban construction waste to create diverse wildflower meadows</b>  Wildflower meadows have been planted extensively in European cities for aesthetic and biodiversity benefits. In SE Australia, they are stunning, but rare, features of critically endangered grassy woodlands because most native wildflowers cannot cope with intense grazing and high soil nutrients associated with agriculture. This project aims to develop a novel process for establishing native wildflower meadows in urban parks and degraded grassy woodlands by repurposing low nutrient mineral waste from the construction industry. It will have multiple benefits including restoring urban biodiversity, increasing people's mental well-being, developing new markets for recycled construction waste and reducing the amount of waste going to landfill.	247,135.00	292,050.00	152,487.00	174,010.00	0.00	865,682.00	MELBOURNE CITY COUNCIL ( CITY OF MELBOURNE ), REPURPOSEIT, MERRI-BEK CITY COUNCIL, CITY OF DAREBIN, BANYULE CITY COUNCIL, BOROONDARA CITY COUNCIL, WHITTLESEA COMMUNITY CONNECTIONS INC, NATURE LINKS LANDSCAPE MANAGEMENT PTY LTD, HUME CITY COUNCIL
	<b>National Interest Test Statement</b>  This project will contribute directly to the National Manufacturing Priority recycling and clean energy by developing new landscaping products from recycled construction waste. The products will be used as a low nutrient seed-bed to create diverse and colourful wildflower meadows typical of southern Australia's endangered grassy woodland ecosystems. We will create new markets for waste materials, reduce the use of mined resources used in urban horticulture (i.e. sand, scoria) and reduce the amount of construction waste going to landfills, extending their life. By establishing wildflower meadows as replicated field trials in six partner municipalities, the project will test a novel restoration process that has the potential to contribute to conservation of endangered plant species and communities and generate a better understanding of community assembly and ecological processes. The techniques we develop will be documented in landscape construction specifications to encourage widespread application, while engagement and interpretation materials will increase public appreciation of native grassy ecosystems.							
	<b>The University of Melbourne</b>	942,772.00	1,121,902.00	864,378.00	251,943.00	0.00	3,180,995.00	

# Minister's Approval for Linkage Projects 2022 Round 2 for Funding Commencing in 2023 Schedule

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## Victoria University

LP220200746	<b>Personalised Privacy-Preserving Network Data Publishing System</b>	115,904.00	117,644.00	119,420.00	0.00	0.00	352,968.00	ASync-WORKING PTY LTD
Wang, Prof Hua	Data sharing has become a driving force for many businesses in industrial sectors. This project aims to develop a privacy preserving network data publishing system that can preserve user privacy in a personalised way while maintaining maximal utility of the published data. To make accurate privacy preservation, this project will design novel learning models to derive accurate users' correlation and their privacy intention, develop efficient privacy preserving algorithms to deal with static and dynamic network data sharing. The success of this project will benefit many industries and government agencies to reduce users' privacy breaches, avoid illegal consequences of sharing data, and enhance these service providers' service quality.							

### National Interest Test Statement

User privacy protection and secure data sharing are critical to the cybersecurity of Australia. When service providers fail to implement the most effective protective measures due to cost and time constraints, the risk of security breaches significantly increases for consumers and providers alike. This project will address that gap by developing a cost-effective artificial-intelligence tool that learns and adapts security protocols to users' personalised requirements. This tool would support the dynamic but secure high-volume data sharing across different platforms. Our privacy-preserving system would significantly boost the Australian economy by enhancing cybersecurity and minimising data mismanagement risk for commercial businesses and government agencies. This project will grow the readiness of the Australian information processing and security research sectors to meet any challenges of emerging technologies. This novel system is designed to be readily adopted by industry partners to provide real-time privacy protection and increase confidence and utility of high-volume data sharing.

<b>Victoria University</b>	115,904.00	117,644.00	119,420.00	0.00	0.00	352,968.00
<b>Victoria</b>	2,598,313.00	2,783,777.00	2,423,843.00	407,633.00	0.00	8,213,566.00

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(Columns 1 and 2)	(Column 3)						(Column 9)	(Column 10)
<b>Western Australia</b>								
<b>Curtin University</b>								
LP220200920	<b>Regeneration of High Value-Added Materials from Spent Lithium-Ion Batteries</b>	160,992.00	159,000.00	157,000.00	0.00	0.00	476,992.00	ALTECH CHEMICALS LTD
Shao, Prof Dr Zongping	<p>This project aims to develop scalable processing techniques for the regeneration of cathode materials and the production of high-purity alumina and graphene from spent lithium-ion batteries. The techniques reduce the cost and time of the processing of degraded cathode materials and increase the value of the spent battery materials (e.g., metallic aluminum and graphite) by converting them into high value-added specialty chemicals. The outcomes and further technology adoptions will extend the capacity of the Partner Organisation for producing specialty battery materials. The outcomes could help Australia's battery industry switch to a more diversified pathway, which benefits the economic development of Australia in a long term.</p> <p><b>National Interest Test Statement</b></p> <p>Recycling used lithium-ion batteries is a profitable opportunity given their potential in the growing electric vehicle market. Recycling used lithium-ion battery materials involves complex processes and produces basic chemicals with low add value. This project will develop scaleable processing techniques for the direct regeneration of cathode materials from the used lithium-ion batteries. The techniques reduce the cost and time of processing the degraded materials and are suitable for processing the most commercially available cathode materials, which minimizes the investment in their adaption. This project will also develop techniques for producing high-purity alumina and graphene which are high-value-added specialty chemicals for the batteries industry. Further technology adoption in subsequent research projects for scale-up production will extend the capacity of the Partner Organisation for producing specialty battery materials. The project outcomes will help Australia's battery industry switch to a more diversified pathway that benefits the sustainable economic development of Australia in a long term.</p>							
	<b>Curtin University</b>	160,992.00	159,000.00	157,000.00	0.00	0.00	476,992.00	
<b>The University of Western Australia</b>								
LP220200004	<b>Resolving the role of kelp in blue carbon cycles to enable management</b>	215,616.00	260,516.00	247,766.00	83,505.00	0.00	807,403.00	DEPARTMENT OF PRIMARY INDUSTRIES, DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS
Wernberg, Prof Thomas	<p>We aim to uncover how kelp forests contribute to carbon storage, biodiversity enhancement and nutrient mitigation in Australia. We will combine mapping and modelling to identify local variation in kelp carbon stocks and sequestration potential and verify kelp carbon export to deep ocean sinks through genetic tracing in seawater and sediments. Co-benefits will be identified through nutrient experiments and reef surveys. We will also assess the risk that calcification and production of halogenic gas within the kelp forest could offset its climate mitigation potential. Project outcomes will enable management to consider kelp ecosystem services broadly and optimize our capacity to meet current emission reduction and biodiversity commitments.</p> <p><b>National Interest Test Statement</b></p> <p>Sound management of natural carbon sinks is key to confronting our current climate crisis. We aim to resolve carbon storage potential, and its overlap with other co-benefits from kelp forests, at scales relevant to marine management in Australia. We will characterize spatial and temporal variability of kelp carbon storage, linked with biodiversity and nutrient removal, and verify the transfer of kelp carbon to long-term sinks. The project will provide concrete information on the climate change mitigation potential of kelp forests, including maps and models of key areas across the Great Southern Reef. Australia's kelp forests are currently not managed for their role in carbon storage, so this will provide critical information to support marine estate management and policies required to deliver on Australia's commitments to reduce net emissions and protect biodiversity. Government scientists, marine managers and policy makers will be involved throughout the project, ensuring co-creation and integration of new knowledge into existing management and policy frameworks for informed decisions on kelp forests.</p>							

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LP220200882	<b>Between a hot place &amp; hypoxia: Quantifying fish-kill risk in inland rivers</b>	240,533.00	162,007.00	163,131.00	0.00	0.00	565,671.00	DEPARTMENT OF ENVIRONMENT AND SCIENCE, DEPARTMENT OF REGIONAL DEVELOPMENT MANUFACTURING AND WATER
Hipsey, A/Prof Matthew R	Native fish populations in Australian ephemeral rivers are highly valued but are subject to widespread decline. During drought waterholes serve as critical refuges for native fish, however thermal extremes and hypoxia (lack of oxygen) have led to regular fish-kill events. Whilst we know the general conditions that lead to fish-kills, we do not have a clear understanding of why some species are more tolerant than others, or how we can help decision-makers anticipate fish-kill risks. This project will combine laboratory ecophysiology investigations and novel field monitoring techniques to develop a next-generation fish habitat model for stakeholders to use to assess fish-kill risks and plan for restoration.							
	<b>National Interest Test Statement</b>							
	Fish-kills in stressed rivers have become unacceptable within the Australian community, yet the effects of water allocation and climate change is increasing the incidence and impact of these events. Waterholes are critical components of inland river ecosystems providing refuge for fish during times of drought, but high temperatures and low oxygen (hypoxia) means that these refuges – that should be a safe haven – have become fish-kill hot-spots. The aim of this project is to develop an understanding of how native an invasive fish respond to these extreme conditions by looking at their behaviour and metabolism, and to use this knowledge to develop a new model of river ecohydrology, that will give us an unprecedented understanding of drivers of fish-kill risks. The project partner has identified a clear pathway for adoption of the project outputs, whereby the model will provide the evidence to improve stewardship of Queensland river systems, by supporting managers and policy makers to anticipate catastrophic events brought about by hypoxia, and plan appropriate restoration activities for degraded river reaches.							
	<b>The University of Western Australia</b>	456,149.00	422,523.00	410,897.00	83,505.00	0.00	1,373,074.00	
	<b>Western Australia</b>	617,141.00	581,523.00	567,897.00	83,505.00	0.00	1,850,066.00	
		<b>8,913,548.00</b>	<b>9,464,855.00</b>	<b>8,839,929.00</b>	<b>827,186.00</b>	<b>0.00</b>	<b>28,045,518.00</b>	