

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)	
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LP210200938 Couperthwaite, A/Prof Sara J	Doped alumina with tailored material properties for battery applications This project aims to develop tailored alumina materials for lithium ion battery separators through a novel in-situ approach that will: (1) produce uniform doped alumina for improved safety, (2) target specific surface and bulk material properties to increase the overall performance, and (3) reduce manufacturing costs by integrating the process with new technology developed for the production of high purity alumina. Significant advances are proposed for overcoming current manufacturing limitations of doped alumina. Building research capacity and knowledge in battery material manufacturing will benefit a range of industries across Australia, whilst providing new opportunities for growth in local communities.	49,996.50	111,612.50	126,991.50	125,980.00	60,604.50	0.00	475,185.00	LAVA BLUE LTD	
		National Interest Test Statement	Australia is positioned to become a world-class hub of battery manufacturing and research. Improving the safety and efficiency of lithium ion batteries through development of new battery materials will contribute to the realisation of this opportunity. The research proposed will deliver advanced materials for key lithium ion battery components. Advancing research capacity in this area will boost the adoption of renewable energy technologies that will: (1) reduce our reliance on fossil fuels, (2) create jobs in a new manufacturing sector, and (3) bring economic opportunities to Australia. This project strongly aligns with Australia's priorities of developing new clean energy sources and storage technologies, where lithium ion batteries have been identified as a key component. Furthermore, the project will build capability in the manufacture and design of next generation battery materials.							
		Queensland University of Technology	380,995.00	767,154.00	729,098.00	403,543.50	60,604.50	0.00	2,341,395.00	
The University of Queensland										
LP210200225 Amiralian, Dr Nasim	Nanoarchitected anti-corrosion coatings for zinc-plated steel Zinc-plated steel is widely used in buildings, households and vehicles, but the long-term performance is limited due to corrosion resulting from exposure to high humidity or alkaline conditions. Currently, available chromium coatings are toxic, while polymeric coatings lack durability. This project aims to use nanotechnology to develop highly effective, multifunctional anti-corrosive coatings in which long-term protection is achieved by controlling the wettability and self-healing properties. The project is expected to generate new knowledge in coating materials that limit corrosion and address environmental problems. This advanced manufacturing technology should be of high-value benefit to manufacturers and consumers of zinc-plated steel.	57,026.00	129,218.50	141,301.00	69,108.50	0.00	0.00	396,654.00	BAOSHAN IRON AND STEEL CO LTD	
		National Interest Test Statement	Australia needs new and non-toxic anti-corrosion coatings for zinc-plated steel. Chromium-based coatings are being phased out due to toxicity concerns, and Australia has an environmental responsibility to find alternative coating materials. This project aims to develop sustainable and more durable nano-coatings with superior anti-corrosion properties to address this issue. This will ensure the longest possible service life of steel in building and manufacturing materials which will benefit Australia's economy, environment, and society. Manufacturing, maintenance and replacement costs of steel would be reduced, as would energy requirement and carbon dioxide emission in making and using steel. The expected outcomes will enhance Australia's international position in steel production and will have a value-add for Australian steel manufacturing. In addition, Australian consumers will have access to more durable steel-based materials, which will benefit diverse industries from construction to vehicle manufacture.							

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LP210200348 Zhang, Prof Ming-Xing	AM of MAX Phase parts for applications in extreme environments This project aims to develop techniques to synthesize MAX Phase compound materials in-situ using laser additive manufacturing. The project expects to increase jet engine fuel efficiency and thrust, and to fabricate longer-lasting parts for supersonic speed applications. The expected outcomes include well-developed additive manufacturing processes to make high performance engineering components with shape complexity for extreme environment applications, and new methods to increase the 3D printability of brittle materials. This should provide significant benefits to aerospace and defense industries through solving their long standing bottleneck material and processing problems. The outcomes also enhance Australia's manufacturing capacity.	59,412.00	121,266.50	124,361.00	62,506.50	0.00	0.00	367,546.00	GRAVITAS TECHNOLOGIES PTY LTD
	National Interest Test Statement MAX phase compounds are lightweight materials with both metallic and ceramic characteristics, and have strong potential for engineering applications at special and extreme conditions. However, the current synthesis processes have difficulties to produce high purity materials in large quantities and to manufacture parts with shape complexity. This research takes the advantages of 3D printing to develop novel in-situ synthesis techniques with laser 3D printing to produce high performance MAX phase materials, and to 3D print engineering components with complicated geometrical shapes and superior properties for extreme environment applications. In aerospace industry, use of the 3D printed MAX phase parts can increase fuel efficiency and jet engine thrust. It also provides materials solution to fabricate critical parts for supersonic speed applications in defense sector. Furthermore, the research enhances Australia's high-value manufacturing capacity, and provides Australia with a competitive advantage to make economic benefit through advanced manufacturing in critical Australian investment areas.								
LP210200586 McColl-Kennedy, Prof Janet R	Transforming Primary Healthcare Service Delivery: A Digital-Human Approach This project aims to address the urgent need for a transformational shift in thinking and actions in primary healthcare service delivery. Primary care clinics, the front door of Australia's healthcare, are under considerable strain. By using a four-phase mixed methodology design across four Australian states, this project expects to generate a national evidence-based framework which takes a dual approach combining the use of digital technology with humanness. Expected outcomes include the development of an Australian-first evidence-based digital resource kit, including two new tools, and a new co-designed roadmap to better facilitate this important change journey to enhance patient experience, employee wellbeing and clinic performance.	81,929.00	168,817.50	166,245.50	79,357.00	0.00	0.00	496,349.00	INALA PRIMARY CARE LIMITED, PRESTANTIA HEALTH PTY LTD, AUSTRALIAN ASSOCIATION OF PRACTICE MANAGEMENT LTD, AUSTRALIAN PRIMARY HEALTH CARE NURSES ASSOCIATION LTD
	National Interest Test Statement Tasked with addressing a wide spectrum of Australia's healthcare needs, primary care (GP) clinics seek to provide a vital service to the whole nation. But primary care clinics are experiencing considerable tensions, especially in the current turbulent environment from increasing consumer demands, advances in digital technologies, and the lack of resources and skills to enact the much needed transformation. While trained in technical areas of medicine, nursing and allied health, GP clinics have not all kept pace with key digital technologies, nor the necessary skillsets to effectively manage the business side of clinics - customers, employees and performance. This innovative project will provide a national evidence-based resource toolkit including two new tools, a typology, and a new practical roadmap co-designed with industry to equip GP clinics with the necessary skills to make the required transformational shift in both mindset and practice, combining digital technologies with humanness, to enhance patient experience, employee wellbeing, and clinic performance. Thus, future-proofing this critical service.								

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LP210200636 Fedorov, A/Prof Arkady	Surface and Interface Engineering for Superconducting Quantum Circuits The limiting factor for current quantum computers is a process called decoherence. This project aims to identify new strategies to reduce decoherence in quantum computer components using an interdisciplinary approach based on quantum physics, materials science, and engineering. This project involves investigating the effect of atomically sharp interfaces on decoherence and using capping layers to control and/or inhibit oxide growth that reduce the contribution of interfaces to decoherence. Expected outcomes of this project include development of solutions to fabricate long-lived superconducting qubits benefiting superconducting quantum technologies and making a significant step towards realisation of a practical quantum computer.	89,801.50	160,694.00	154,540.50	83,648.00	0.00	0.00	488,684.00	IQM
	National Interest Test Statement Quantum computing is a rapidly emerging technology that is expected to radically transform the way we process information with practical benefits for medicine, chemistry, and material synthesis. Building a quantum computer is a grand challenge and requires solutions to many problems in science and engineering. This project addresses the problem of decoherence, the biggest roadblock to building a practical quantum computer. This project aims to develop new fabrication methods and circuit designs that reduce decoherence. The knowledge and engineering solutions developed here are directly applicable to the fabrication of superconducting quantum computers. The project will enhance capacity to generate international, interdisciplinary research and build collaborations between the leading Australian research labs and industrial leaders in quantum computing outside of Australia. This expanded capacity gives Australia access to cutting-edge technology not yet available in Australia, provides a base for future development, and provides a much-needed push for the national field of superconducting quantum devices.								
LP210200703 Liu, A/Prof Shuang	Integrating community and family aged care for diverse Australians This project aims to identify optimal ways to integrate community and family care to support older Australians from diverse cultural backgrounds to age well at home and in their communities. Using an innovative research design, the project seeks to generate new policy and practice relevant knowledge of care networks and expectations of diverse older Australians, their families and service providers to identify new avenues for enabling family and community collaboration to meet care needs. Expected outcomes include enhancing Australia's capacity to provide accessible, tailored and culturally responsive aged care, with significant benefits for improving care experiences for diverse older Australians, their families and service providers.	67,160.50	133,292.00	124,556.50	58,425.00	0.00	0.00	383,434.00	FEDERATION OF ETHNIC COMMUNITIES COUNCILS OF AUSTRALIA, MULTICULTURAL COMMUNITIES COUNCIL - GOLD COAST LIMITED
	National Interest Test Statement Effectively supporting older Australians to age at home and in their communities relies on integrating community and family care. Yet, under-use of needed community services and over-reliance on families often ill-equipped to provide the needed care remains an ongoing well-being concern among older Australians from culturally and linguistically diverse (CALD) backgrounds. This project aims to generate new practice and policy relevant knowledge to facilitate community and family care collaboration. The research will advance understanding of care networks, experiences, and expectations of older CALD people, family carers, and community service providers. Using this new knowledge, it will engage community leaders and policy makers in identifying optimal ways to integrate community and family care to meet care needs. Significant benefits include building Australia's capacity to provide accessible, tailored and culturally responsive support to enable diverse older Australians to age well and prevent premature entry into residential care facilities, with long-term social and economic benefits for Australia.								

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LP210200723 Chenu, Dr Karine C	Enhancing Genomic Prediction for Changing Environments in Wheat Adverse weather is the primary risk faced by the Australian agriculture industry. This Project aims to develop the next generation of agriculture tools to unlock natural potential in wheat and improve yield stability across seasons and regions. Drawing on crop physiology, genetics and integrated modelling, this Project expects to generate new knowledge and technologies to untangle genetic and environmental interactions that affect productivity, enhance predictive capability, and initiate advanced breeding strategies to develop new crop varieties with superior resilience against changing climates. This should provide significant benefits, such as profit stability for wheat growers, elevated global market position and improved food security.	59,136.50	184,147.50	261,581.50	265,348.00	210,471.00	81,693.50	1,062,378.00	AUSTRALIAN GRAIN TECHNOLOGIES PTY LTD
	National Interest Test Statement As the fourth largest exporter of wheat, Australia is a key player in the global market. The Australian industry is valued at \$5B per annum and has a substantial footprint in rural Australia and the national economy. However, wheat productivity is severely impacted by adverse weather. Yield reductions of 4.6% per decade are already being experienced, and these losses are expected to intensify in the future. This project expects to develop innovative trans-disciplinary approaches to enhance breeding efficiency and produce climate-adapted wheat varieties. Successful outcomes will reduce crippling yield variability in the industry and provide income security and a degree of much-needed stability for growers. As wheat is the primary source of protein in low-income nations, outcomes will also contribute to society more broadly through improved global food security. Importantly, new insights and tools from this Project are expected to be transferrable to other high-value crops, such as barley, oats, sorghum, canola and pulses, with further substantial economic, social, research and industry benefits for Australia.								
	The University of Queensland	414,465.50	897,436.00	972,586.00	618,393.00	210,471.00	81,693.50	3,195,045.00	
	Queensland	1,012,915.00	2,087,857.50	2,106,847.50	1,221,287.00	271,075.50	81,693.50	6,781,676.00	

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South Australia

Flinders University

LP210200165	Reuniting cargoes: Underwater Cultural Heritage of the Maritime Silk Route	111,140.00	178,640.00	135,000.00	133,837.50	66,337.50	0.00	624,955.00	MINISTRY OF MARINE AFFAIRS AND FISHERIES, REPUBLIC OF INDONESIA - KEMENTERIAN KELAUTAN DAN PERIKANAN, SOUTHEAST ASIAN REGIONAL CENTRE FOR ARCHAEOLOGY AND FINE ARTS , GAJAH MADA UNIVERSITY INDONESIA, THE NARA NATIONAL RESEARCH INSTITUTE FOR CULTURAL PROPERTIES, MR MICHAEL LEWIS ABBOTT
Polkinghorne, Dr Martin	Beginning in the mid 1400s the Maritime Silk Route witnessed the largest known expansion of global trade. But the legacy of artefacts retrieved from this time has not been appropriately understood because the objects were mostly salvaged and dispersed without recording the archaeological details of their find-spots. Our multilateral consortium aims to discover the cultural value of the largest Southeast Asian ceramic collections in Indonesia and Australia with archaeological science. By employing and enhancing international conventions, the project will generate new knowledge about this decisive epoch in world history and build capacity to preserve the underwater cultural heritage of our region for future generations.								

National Interest Test Statement

This research aligns with Australia's national interest by contributing to the 'Plan of Action for the Indonesia Australia Comprehensive Strategic Partnership 2020 – 2024' and by addressing antiquities held by Australian public institutions and private individuals. It will deepen Australia's existing bilateral relationships with the Indonesian government and cultural institutions. Researching the most significant collections of Asian ceramics recovered from shipwrecks in Indonesian waters tell the stories of the first direct trade routes between Europe and China. An international team of experts will use the latest methods in archaeological science to discover the find-spots of these objects and develop procedures for Australians and relevant communities in the Asia-Pacific to restore meaning to public and private collections of cultural heritage that have been disconnected from their origins. Importantly, the project will provide Australians with the opportunity to experience and enjoy the shared heritage of our region.

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LP210200536	Confronting everyday harms: preventing abuse of people with disability	61,430.00	166,996.00	171,996.00	66,430.00	0.00	0.00	466,852.00	NDIS QUALITY AND SAFEGUARDS COMMISSION, DEPARTMENT OF HUMAN SERVICES, THE NORTHCOTT SOCIETY, BEDFORD PHOENIX INCORPORATED, MABLE TECHNOLOGIES PTY LTD, VICTORIAN ASSOCIATION FOR THE CARE AND RESETTLEMENT OF OFFENDERS, DISABILITY ADVOCACY NETWORK AUSTRALIA (DANA) LIMITED, JULIA FARR ASSOCIATION INC, NOVITA CHILDREN'S SERVICES, GENU KARINGAL ST LAURENCE
Robinson, Prof Sally A	The findings of the Disability Royal Commission necessitate new approaches to prevent violence, abuse, neglect and exploitation. Framed by recognition theory, this project proposes empirical research with young people with cognitive disability, using a new concept of 'everyday harms' in their paid relationships. The results will inform early responses to poor quality interactions in disability support. The strategic alliances with the government, industry and community partners will develop a practice framework to prevent everyday harms and the escalation to abuse, and to promote safety and wellbeing. The research has policy benefits for capacity-building in the sector to act on the rights and voices of people with disability.								
	National Interest Test Statement								
	The project will use extensive observations, interviews and analysis to understand and define 'everyday harms' arising from poor support worker interactions with people with cognitive disability, to then devise policy, organisational and practice-based approaches to address them before they escalate to abuse. It addresses a key national interest, the safety and wellbeing of people with disability. New evidence is needed to address the stark problems of abuse and neglect identified in the Disability Royal Commission. Incorporating new understandings of abuse, safety and wellbeing into national policy and practice collaboration will help organisations efficiently and safely improve the quality of disability support, improving effectiveness and value of key mechanisms such as the NDIS. The research will contribute to achieving Australia's Disability Strategy 2022-2032, addressing Outcome Area: Safety, Rights and Justice. It will also support conceptual and practical approaches to enhance safety and wellbeing in the related sectors of aged care and children's services.								
LP210200740	Using facial recognition for bird conservation management	34,006.00	72,566.00	38,560.00	0.00	0.00	0.00	145,132.00	KONRAD LORENZ INSTITUTE FOR COMPARATIVE ETHOLOGY, CLELAND WILDLIFE PARK, UNIVERSITY OF VIENNA, AUSTRIA
Colombelli-Negrel, Dr Diane	Long-term monitoring of reintroduced species is essential to measure conservation success. This project aims to use a novel and non-invasive facial recognition software developed by our research group to measure the recovery of a vulnerable and native bird species following introduction outside of its historic range. This project expects to generate new knowledge in the field of animal monitoring. Expected outcomes of this project include improved ability to track individuals and their persistence to better inform conservation priorities. This should provide significant benefits to researchers, government agencies and industries to improve conservation planning as well as the outcomes of reintroductions and other translocations.								
	National Interest Test Statement								
	This project aims to use facial recognition for individual bird tracking to better understand the recovery of a vulnerable and native bird species following introduction outside of its historic range. The project merges animal behaviour, population dynamics, conservation, and artificial intelligence to deliver improved conservation planning for Australian's wildlife. Practical outcomes include the development of software that will track individual birds with minimal training and time, and that can be transferred across species and readily adopted by researchers, government agencies and industries to enhance their management plans. The findings of this research will have important implications for informing conservation planning policies, which will benefit various end-users at the departmental, national and international level and will set the world standard for non-invasive monitoring. The research will improve the efficiency and reduce the cost of monitoring programs, producing actionable outcomes for environmental agencies for less effort and with lower impacts on target species.								
	Flinders University	206,576.00	418,202.00	345,556.00	200,267.50	66,337.50	0.00	1,236,939.00	

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The University of Adelaide									
LP210200822	Novel isotope techniques to explore the Centralian Superbasin, Australia	65,000.00	130,000.00	137,500.00	72,500.00	0.00	0.00	405,000.00	NORTHERN TERRITORY GEOLOGICAL SURVEY, GEOLOGICAL SURVEY OF WESTERN AUSTRALIA , DEPARTMENT FOR ENERGY AND MINING, AGILENT TECHNOLOGIES, ISOTOPX
Farkas, Dr Juraj	This project will leverage new advances in analytical instrumentation and isotope techniques to generate improved geochronological and stratigraphic framework for the Centralian Superbasin, a vast ancient depositional system covering much of central Australia. The project aims to apply novel laser-based dating of sedimentary rocks, coupled with metal isotope proxy reconstructions of the basin's palaeogeography, hydrological connectivity and past redox conditions, which are all critical parameters to guide and de-risk future exploration of sediment-hosted resources in this frontier basin. Anticipated outcomes will benefit Australia's resources economy, while providing insights into the evolution of Earth's surface environment in deep time.								
	National Interest Test Statement								
	The project has the potential to generate large economic benefits for Australia by developing knowledge and datasets that will transform exploration for energy and mineral resources in the vast and currently under-explored Centralian Superbasin. This basin has demonstrated energy, critical minerals and subsurface gas storage potential, but exploration in this frontier basin system is hampered by general lack of spatially and temporally resolved data and geochronological constraints. This project leverages recent advances in analytical instrumentation to generate new isotope datasets to constrain the basin's long-term evolution and resource framework via novel dating of sedimentary rocks and proxy-based reconstructions. The methods to be employed will be equally applicable to exploring for energy and metal resources in other sedimentary basins in Australia or overseas. In addition, the project outcomes will also contribute to better understanding of past Earth's surface environment and its evolution during a critical interval recording the rise of atmospheric oxygen and the emergence of first animal life.								
	The University of Adelaide	65,000.00	130,000.00	137,500.00	72,500.00	0.00	0.00	405,000.00	
	South Australia	271,576.00	548,202.00	483,056.00	272,767.50	66,337.50	0.00	1,641,939.00	

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Tasmania

University of Tasmania

LP210200539	Working with wind energy and forestry for effective eagle conservation	87,328.50	199,170.00	193,555.50	160,364.00	78,650.00	0.00	719,068.00	FOREST PRACTICES AUTHORITY, THE TRUSTEE FOR THE PENNICOTT WILDERNESS JOURNEYS NATURE CONSERVATION TRUST, EPA TASMANIA, UPC RENEWABLES AUSTRALIA PTY LTD, EPURON PTY LTD, WOOLNORTH RENEWABLES
Johnson, Prof Christopher N	This project aims to reduce the impacts of wind turbines and disturbance from forestry activity on the Tasmanian wedge-tailed eagle. It will do this by understanding the flight behaviour, movements and mortality of eagles, and the behavioural responses of breeding birds to forestry-related disturbance. The project will build new knowledge and institutional partnerships that will be used to minimise impacts on the Tasmanian eagle population, and develop models for use in planning. This will safeguard Australia's largest eagle and improve the sustainability of energy and forest industries. This research will also provide a model for the resolution of similar problems elsewhere in the world.								

National Interest Test Statement

This project will contribute to the national interest in three ways. (1) Environmental: the Tasmanian wedge-tailed eagle is listed as Endangered. As well as being important to the Tasmanian ecosystem, the Tasmanian eagle population is nationally significant because it is one of only two subspecies of the wedge-tailed eagle. The project will help secure the viability of the Tasmanian eagle population. (2) Economic: eagles in Tasmania are threatened by two industries that are important to the current and future economy of Tasmanian and Australia. Renewable energy generation in particular is growing strongly, but its development could be limited by conflicts with eagle conservation. The project will produce knowledge to resolve these problems, and similar problems in other places. (3) Cultural: the wedge-tailed eagle is Australia's largest bird of prey, and is highly valued by the Tasmanian community. The project will increase public understanding and appreciation of it, both in general and through support of a citizen science project.

LP210200955	Reducing environmental footprint by improving phosphorous use efficiency	59,177.00	109,304.00	98,254.00	81,640.50	33,513.50	0.00	381,889.00	ZHEJIANG UNIVERSITY, NANTONG RUIHUA BIOENGINEERING CO LTD, FLUX ADVANCE SCIENTIFIC CO., LTD., SEED FORCE PTY LTD
Shabala, Prof Sergey	While modern agriculture relies heavily on the use of phosphorous fertilizers, most of them are not used by plants and lost in runoff, resulting in a massive environmental damage through contamination of waterways (termed eutrophication). This project takes advantage of an untapped resource - a unique collection of Tibetan wild barley genotypes, to reveal key traits that confer superior phosphorus use efficiency in wild barley and identify appropriate candidate genes and their position on chromosomes for further incorporating these traits into commercial barley cultivars. This will reduce the environmental footprint of modern agricultural practices on terrestrial and aquatic ecosystems without compromising food security.								

National Interest Test Statement

Phosphorous deficiency is considered one of the greatest limitations to agricultural production in Australia. Rock phosphate, the major source of phosphorous fertilizers and one of the cornerstones of modern agriculture, is a non-renewable resource that could be depleted within 50 to 200 years. At the same time, the bulk of phosphorous fertilizers added to the soil end up in the nearby waterways and not used by the plants. This causes major environmental concerns and comes at a massive cost to farmers. This project will contribute to improving plants ability to take up and utilize phosphorous fertilizers thereby reducing the environmental footprint of modern production systems on terrestrial and aquatic ecosystems. It will also greatly reduce the cost of phosphorous fertilizer input into farming systems, reducing the cost of food production to growers. This project will address two National research priorities "Minimizing damage to soil, fresh and potable water, urban catchments and marine systems" and "Enhanced food production".

University of Tasmania	146,505.50	308,474.00	291,809.50	242,004.50	112,163.50	0.00	1,100,957.00
Tasmania	146,505.50	308,474.00	291,809.50	242,004.50	112,163.50	0.00	1,100,957.00

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Victoria

Deakin University

LP210200707 Harvey, A/Prof Michelle L	Novel semio-chemical approach to control the Australian Sheep Blowfly The Australian Federal Government through the 'Smart Farming' initiative highlights the need for improved multidisciplinary measures in order to remain at the global forefront of the invention and adoption of technology. This multidisciplinary project (entomology, biotechnology, analytical chemistry and genomics) will rapidly inform the management of fly strike on an important Australian resource merino sheep. This will build the key biochemical data in order to develop a novel fly lure technology (at scale) to be used on farm delivering national benefit through improved animal welfare and safety considerations for producers, and will establish the best approach to disseminate this scientific information to stakeholders such as farmers.	135,212.00	261,396.50	256,145.00	129,960.50	0.00	0.00	782,714.00	SOURCE CERTAIN INTERNATIONAL PTY LTD
	National Interest Test Statement This project aims to develop protocols which will significantly improve on-farm practice in respect of flystrike management. Through improved control over fly production, the technology would add significant value to an already world class Australian sheep wool and meat industry. The initiative would assist in maintaining the Australian wool industry's competitive edge internationally and to strengthen Australia's own food security position. The project has potential to make a direct contribution to Australia's economic stability, and to promote Australian scientific research capacity more generally. The technology also offers beneficial new outcomes for Australian farming industries' OH&S and animal welfare practices. The project emphasises a national approach, benefitting rural end users by improving the consistency of the messaging of scientific information across both industry and farm-based stakeholders.								
	Deakin University	135,212.00	261,396.50	256,145.00	129,960.50	0.00	0.00	782,714.00	

La Trobe University

LP210200706 Crook, A/Prof David A	Fish Jenga: metapopulation management for coastal river fish This project aims to address the escalating threats to coastal freshwater fish from drought, fire, and other disturbances. The project expects to generate new knowledge on contemporary distributions of NSW coastal freshwater fishes, and will develop models of population dynamics to explore the consequences of alternative water management and disturbance scenarios. The expected outcome of the project is to revolutionise management by replacing the current practice of managing river basins separately, with a framework that accounts for among-basin linkages that are essential for the long-term persistence of fish populations. Significant benefits include more efficient use of water resources and improved conservation outcomes for native fish.	95,000.00	168,801.00	151,927.50	78,126.50	0.00	0.00	493,855.00	NSW DEPARTMENT OF PLANNING INDUSTRY AND ENVIRONMENT, DEPARTMENT OF PRIMARY INDUSTRIES - NSW
	National Interest Test Statement Water scarcity is a key limitation to the future development of Australia's national economy and is forecast to intensify under a changing climate. In line with the objectives of the National Water Initiative, this project aims to improve the efficiency of water allocations directed towards achieving environmental benefits. The project will deliver bespoke monitoring and modelling tools and a new management framework to optimise the delivery of environmental flows for native fish in coastal rivers. By improving our capacity to monitor and manage populations at appropriate spatial and temporal scales, the project will address the decline of coastal river fishes (including threatened species), and help Australia meet its international obligations for biodiversity conservation. This outcome will protect high-value commercial, recreational, and traditional fisheries that contribute significantly to community well-being from economic, social, cultural, and mental health perspectives.								

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	La Trobe University	95,000.00	168,801.00	151,927.50	78,126.50	0.00	0.00	493,855.00	
Monash University									
LP210200213 Dorin, A/Prof Alan	Precision Pollination: Data-driven enhancements to boost crop yield The project aims to transform industrial crop pollination from an intuitive domain to one where decisions are based on sound data and best-practice principles. It proposes to achieve this modernisation of global pollination practice by developing novel technologies to operate a three-stage loop: honeybee pollination monitoring, simulation-based forecasting, and management. This is intended to ensure that the capability of honeybees to provide essential ecosystem services is informed by transferable, standardised data acquisition and management techniques that maintain bee health and maximise pollination. The anticipated outcomes are higher fruit yields and quality, and a beneficial step-change in industry productivity and profitability.	90,000.00	180,000.00	180,000.00	90,000.00	0.00	0.00	540,000.00	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, COSTA BERRY INTERNATIONAL PTY LTD, AUSTRALIAN BLUEBERRY GROWERS ASSOCIATION INC
National Interest Test Statement									
The project tackles industrial fruit production, protected cropping and pollination. As crops move indoors away from extreme weather, greenhouse culture is Australia's fastest growing food producing sector (>60% p.a., value \$1.6B p.a.). For fruit production under cover, pollination is essential, but problematic, since honeybees operate poorly indoors. Outcomes of poor pollination are poor fruit yield and quality – issues that must urgently be addressed for food security and profitability. We address this need and the national research priority for enhanced food production through novel technologies (sensors and real-time data systems). Our partners, the Australian Blueberry Growers Association and Costa Group, include the national body representing 95% of Australia's blueberry industry and Australia's largest supplier of fruit and vegetables to supermarkets. Hence, our project directly and broadly benefits national fruit production and pollination under cover. With these nation-wide stakeholders we will address pollination issues through new technology for bee monitoring, forecasting and management.									
LP210200490 McCarthy, A/Prof David M	Activating lazy stormwater wetlands through real time monitoring & control Constructed stormwater wetlands are the last line of defence preventing pollution of urban waterways, but wetlands often fail, with their passive operation unable to adapt to the highly variable climate and hydrology they experience. This project aims to use advances in real-time control technology to turn these lazy wetlands into active wetland systems, optimising their performance. It aims to deliver new-generation technologies to enhance water quality treatment, enhance urban water security and guarantee environmental flows to maintain healthy waterways. Working in partnership with waterway managers and water retailers, this project strives to deliver a nationally and globally relevant technology to change how we manage water in cities.	108,822.00	201,885.00	181,288.50	88,225.50	0.00	0.00	580,221.00	MELBOURNE WATER CORPORATION, SOUTH EAST WATER CORPORATION
National Interest Test Statement									
This project will build the next generation of technologies required to sustainably manage the polluted stormwater generated by our rapidly expanding urban centres. Current wetland technologies are designed to operate passively, making them "lazy" and unable to adapt to the highly dynamic climate and hydrology they experience. Deploying real-time monitoring and control to "activate" constructed stormwater wetlands will not only improve removal of pollutants and pathogens, but also create the means to meet competing objectives for increasingly scarce water resources. This project will provide the knowledge required to transform this technology into the standard practice of waterway managers and water retailers throughout Australia. The water industry is set for a boom in capital investment in water infrastructure, to take advantage of innovative monitoring and control technologies. Our project will help optimise that investment and establish Australia as a world leader in smart water technologies.									

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LP210200616 Dhital, Dr Sushil	High-value functional ingredients from bean processing waste Legumes are considered highly nutritious and sustainable food. Accordingly, there is a steady growth in the consumption of legumes worldwide, including in Australia. Due to lengthy soaking and cooking times, consumers prefer ready-to-eat canned legumes. The current processing technologies are energy and water-intensive and generate considerable waste. This project investigates the application of non-thermal technologies to reduce processing time, water and energy use and enable the recovery of valuable polyphenols and soluble dietary fibres normally lost in the wastewater. This knowledge will lead to sustainable beans processing, delivering improved productivity to Australian manufacturers and quality food to Australian consumers.	69,761.50	146,216.00	155,095.50	78,641.00	0.00	0.00	449,714.00	H.J. HEINZ COMPANY AUSTRALIA LIMITED
	National Interest Test Statement The diverse agro-climatic zones across Australia have produced a wide array of high-quality legumes for human consumption. Legumes are considered one of the world's most nutritious and sustainable crops, and their demand is steadily increasing in Australia and worldwide. However, current legume processing technologies are inefficient in terms of resource consumption and waste generation. This project aims to demonstrate the value of novel non-thermal technologies to save water and energy for the legume processing industry and valorise the wasted functional components such as polyphenols and prebiotic soluble dietary fibres. The recovered nutrients have great potential for the nutraceutical and infant food formula industries. Recovering the nutrients from wastewater reduces the burden on the environment, the cost to the manufacturer and could provide additional revenue. The application of novel technologies and valorisation of waste gives the Australian legume processing industry a competitive edge, benefitting the economy and improving sustainability.								
LP210200656 Mueller, Prof Florian	Advancing Australia's hospitality industry through interactive food This project aims to develop the first framework for the design of interactive food to advance Australia's hospitality industry. The project expects to co-develop with restaurateurs and chefs interactive sounds, smells and tastes technologies that enable them to create novel eating out experiences and evaluate diners' reactions. The expected outcome is an easy-to-use toolkit (comprising a software suite and low-cost sensors) that can be readily incorporated into hospitality operations. This should provide significant benefits, such as enticing people to go out and visit restaurants, supporting some of Australia's 600,000 hospitality jobs while fostering Australia's innovative food culture.	69,347.00	127,242.50	111,071.00	53,175.50	0.00	0.00	360,836.00	WORKSMITH COWORKING PTY LTD
	National Interest Test Statement This research will produce the world's first understanding of how to incorporate interactive technology as an additional ingredient into restaurant eating and drinking experiences. It will support Australia's hospitality industry (8% of Australian jobs) to offer experiences people cannot get at home. In doing so, this project will equip restaurateurs and chefs with the ability to use interactive technology as a unique selling point to entice more people to go out, reviving Australia's challenged hospitality industry (worth \$24 billion to the economy) and elevating its standing as a global food and tourist destination. In addition, it will facilitate collaboration between technology developers and the hospitality sector, supporting the digital media and creative sectors. In the longer term, knowledge gains from this work will also support the meaningful evaluation of multisensory interventions such as digital food campaigns, which helps enhance campaign efficacy and assist government organisations and wellbeing advocates to create better interventions that positively affect what and how people eat and drink.								

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LP210200765 Chiu, Prof Wing K	A novel physical-digital approach for the assessing a large critical asset This project aims to deliver an artificial intelligence-enabled decision-making tool to maintain and manage the floating covers of vast lagoons that treat raw sewage. The cover harvests the biogas released from the anaerobic digestion of sewage for electric power generation that exceeds the plant's requirement. The approach involves an innovative thermographic technique and exploits transfer learning to adapt neural networks trained on lab-scale and synthetic data to field implementation. The outcome is a machine learning framework to optimise biogas harvesting and renewable energy generation, and to avoid structural failure, that is capable of continuous improvement to take into account improved data and/or modelling capabilities.	58,321.50	120,670.50	128,125.00	65,776.00	0.00	0.00	372,893.00	MELBOURNE WATER CORPORATION, JACOBS GROUP (AUSTRALIA) PTY LTD
	National Interest Test Statement This project aims to deliver an artificial intelligence-enabled decision-making tool to maintain and manage the floating covers of reactors that treat raw sewage. These covers are designed to create an airtight environment for the anaerobic digestion of sewage by bacteria. This process releases methane-rich biogas that is harvested to generate renewable energy that is more than sufficient for the plant's requirement, with excess electricity exported to the grid. An unexpected failure of these covers can be very costly, both in terms of replacement costs that exceed \$20m, due to the bespoke design and vast size that exceeds four times the size of the Melbourne Cricket Ground, as well as lost energy production valued at \$8m per year, and a very detrimental environmental impact due to the release of foul-smelling, potent greenhouse gas. The expected benefits will include the creation of machine learning framework designed for continuous learning and improvement that strives to optimise biogas harvesting and renewable energy generation, and to safe-guard the structural integrity of critical assets.								
LP210200844 Homan, A/Prof Shane	Community Music Radio: Building the Music-Media Ecosystem This project aims to investigate the economic and sociocultural impact of community music radio. It seeks to generate new knowledge about the detailed relationships between community music radio stations and the Australian music industry, documenting for the first time national activities and infrastructures. Anticipated outcomes include the identification of policies and strategies to improve the audibility and visibility of Australian music domestically and on global digital platforms; providing a new model for evaluating both economic and sociocultural outputs of creative industries; and building the music-media ecosystem as a vital component of the Australian creative industries.	45,142.00	83,221.50	63,997.00	25,917.50	0.00	0.00	218,278.00	COMMUNITY BROADCASTING ASSOCIATION OF AUSTRALIA LIMITED, COMMUNITY BROADCASTING FOUNDATION, AUSTRALIA COUNCIL, APRA AMCOS
	National Interest Test Statement Community music radio delivers a diverse range of music programs to Australians in many regional and urban locations. It also plays a vital role in the Australian music-media ecosystem in promoting artists and local music economies. This project examines the economic and cultural value of community music radio to the Australian creative economy. It will assist both the community music radio sector and music industries in building infrastructure; providing Australian content on digital music platforms; and maintaining community music radio's 'incubator' role for the Australian music industry. The project will produce a nationwide database, case studies and reports to inform industry and policy development as part of Partner Organisations' creative digital strategies.								

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LP210200903 Yu, Prof Aibing B	Model studies of Australian lump ore applied to blast furnace ironmaking Ore lump use in ironmaking blast furnaces (BFs) requires no preprocessing and has a lower carbon footprint. However, it suffers various technical problems. This project aims to understand and optimize the conditions for such operations. This will be achieved by means of a combined theoretical and experimental program, involving the use of state-of-the-art multiscale computer modelling and simulation techniques. The research outcomes will be tested in the design and control of lump charging operations in practice through collaboration with the industrial partner. This will ultimately increase Australian ore lump usage in BFs, leading to significant financial and environmental benefits to Australia and the entire steel industry worldwide.	120,000.00	255,000.00	272,500.00	137,500.00	0.00	0.00	785,000.00	HAMERSLEY IRON PTY. LIMITED
	National Interest Test Statement (1) The outcomes of this project expect to substantially increase Australian ore lump exports by developing an effective platform to guide direct use in ironmaking blast furnaces. (2) The direct lump use help cut the massive cost for constructing, running, and maintaining sinter and pellet plants, leading to unmeasurable financial and environmental benefits to Australia and the entire steel industry worldwide. (3) The project outcomes, such as theories, models, and knowledge, will be valuable intellectual assets for Australia, helping position Australia at the forefront of this field that is of paramount importance to modern industries in this country. (4) The project will train young research scientists and/or qualified engineers to meet the continuous challenges in innovation, cost reduction, and efficiency improvement in Australia's iron ore industries.								
LP210200908 Currie, Prof Peter D	Developing macrophage-based technologies for tissue regeneration Different tissues show distinct regenerative capacities with an organism and across the phylogeny. What underlies this diversity in regenerative ability at cellular and molecular level is far from clear. Building on foundational discoveries in zebrafish, this study seeks to determine if this capacity could, in part, be explained through the properties of a component of the innate immune system, the macrophage, which preliminary data shows generates a transient pro-regenerative muscle stem cell niche in zebrafish. This study will determine if macrophage subtypes acts to coordinate regeneration in other tissues and systems and if a programable pro-regenerative cell can be made in vitro that stimulate regeneration in different settings.	142,600.00	285,750.00	286,300.00	143,150.00	0.00	0.00	857,800.00	ASTRAZENECA, SWEDEN
	National Interest Test Statement This project seeks to unlock one of the holy grails of regenerative biology; why some organisms and tissues can regenerate and some cannot? Specifically, the project will uncover the role of the innate immune system in coordinating regenerative capacity across different species. Knowledge and valuable intellectual property generated in cellular production and biotechnology, will underpin a new and growing industry in Australia: synthetic cellular biology. This nascent industry seeks to manufacture and control cellular plasticity, with downstream improvements in both veterinary and human health. An understanding of the factors secreted by these cells, for example, or new production methods to create these cells to deliver products in cell therapy, could one day be used in a wide variety of regenerative and biomedical applications.								
	Monash University	703,994.00	1,399,985.50	1,378,377.00	682,385.50	0.00	0.00	4,164,742.00	

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Swinburne University of Technology									
LP210200345 Jia, Prof Baohua	Tailoring smart film for energy efficient protected cropping Cooling cost represents a major running cost for greenhouse, preventing the wide adoption of highly beneficial protected cropping technology. This project aims at solving this critical issue by developing a world-first tailored smart film that can simultaneously reject solar heat, cool down the greenhouse and maximise the yields of crops. This is made possible by advanced spectral engineering and light management with frontier nanostructures combined with a scalable and low cost manufacturing process. Deliverables of the project include game-changing energy efficient solutions for protected cropping and marketable smart films readily integratable with existing greenhouse for dramatic energy saving and immediate economic and social benefits.	84,319.50	171,530.00	176,547.50	171,510.50	82,173.50	0.00	686,081.00	INNOFOCUS PHOTONICS TECHNOLOGY PTY LTD
National Interest Test Statement									
Protected cropping is a highly beneficial horticulture approach, representing the future of urban farming. However, Australian protected cropping industries face significant challenges in remaining internationally competitive, not least being energy costs. Australia's hot dry climates result in high usage of energy by protected cropping companies, largely as a result of having to cool large volumes of air. At the same time, Australia has natural advantages of abundant sunlight. Working with leading manufacturer in the field, this project seeks to develop completely new 'smart films', based on nanotechnology, that meet industry needs to reduce the negative effects of solar heating whilst retaining the positive effects of year-round solar radiation for high plant yields. This project helps Australian industry to become more energy efficient and remain internationally competitive. The success of this project will create new intellectual properties, providing an innovative technology platform for Australian solar, architecture, and agriculture industries, producing significant social and economic benefits.									
LP210200504 Ma, A/Prof Tianyi	Rechargeable lithium carbon dioxide battery - catalyst design to prototype This project aims to develop a new concept of rechargeable lithium carbon dioxide batteries and scaled-up prototypes. Such a battery will be first of its kind to show high power comparable to gasoline and superior rechargeability over existing gas-involved batteries, ensuring realistic use for industrial purposes. Expected outcomes include 2-dimensional catalysts made from earth-abundant elements lowering large-scale production cost, a novel but reliable working principle based on reversible carbon dioxide/oxalate conversion, and prototypes featuring high specific capacity, large energy density and excellent durability. Via industrial pilot trials, commercial benefits will be fast tracked for energy security and carbon dioxide utilisation.	89,000.00	181,000.00	185,000.00	93,000.00	0.00	0.00	548,000.00	GRAPHENEX PTY LTD
National Interest Test Statement									
This project has significant benefits for Australia's renewable energy industry, environmental security and economic growth. It will deliver high-power and reliable lithium carbon dioxide batteries and prototypes by using the greenhouse gas as the fuel and earth-abundant elements as the battery materials, to accelerate the development of large-scale and cost-effective carbon dioxide utilisation and clean energy storage. By boosting the laboratory-scale research to industry pilot manufacture, the project will promote R&D of new-generation carbon dioxide conversion catalysts and energy devices, which are highly promising for commercialisation and scaled-up industry-level application, and put Australia at the forefront of carbon dioxide fixation and advanced battery technology. Therefore, it will bring substantial environmental benefit to Australia and the world, as well as reap huge savings for renewable energy industry. The outcomes of this project will create substantial innovations in clean energy, attain a secure and reliable low-emission energy future, open new industries, and generate job opportunities.									
Swinburne University of Technology		173,319.50	352,530.00	361,547.50	264,510.50	82,173.50	0.00	1,234,081.00	

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The University of Melbourne									
LP210200216 Disfani, A/Prof Mahdi M	Advancing the Engineering of Minipile Systems to Frontier Applications This project aims to develop new knowledge on the performance of battered minipile systems used in a wide range of applications from solar panels to traffic signs. Minipiles provide concrete-free foundation systems, yet their behaviour under more complex loading such as wind, is yet to be fully understood. This project will examine the loading conditions experienced during installation and throughout service life. This will include complex full-scale laboratory tests and advanced computer modelling to verify the performance against expected cyclic loading. New design approaches will be developed for this emerging foundation system, enabling more widespread adoption of this technology in the building and construction industry.	54,265.50	103,906.00	99,281.00	49,640.50	0.00	0.00	307,093.00	THE TRUSTEE FOR ALL FOOTINGS SOLUTIONS TRUST
National Interest Test Statement									
This project will create new knowledge to support the development of an innovative and effective concrete-free minipile footing that offers a rapid and easy installation process with minimal disturbance to the surrounding environment. Outcomes will provide benefits to the national building and construction industry by helping to fast-track the delivery of a wide array of structures including solar panels, traffic signals and other types of lightweight structures. This will directly support infrastructure projects funded by the Commonwealth Government's \$200 billion investment over the next decade. The new design guidelines developed by the project will also encourage adoption by the construction sector and enable onshore manufacturing scale-up. The project's robust study will increase the efficiency of designs and build confidence in this emerging system. This will provide a market-leading technology for domestic and international markets, supporting local jobs and growth in Australia's export economy.									
LP210200733 Wilson, Dr Tom G	Innovations in Demographic Modelling for Government Analysis and Planning This project aims to create innovative and cutting-edge demographic models to better meet the needs of practitioners and researchers. Together with the partner organisations, Commonwealth Treasury and the Australian Bureau of Statistics, it will focus on creating more accurate and fit-for-purpose forecasting methods for Australian fertility, mortality, and migration, including a policy scenario model to produce population projections by visa/citizenship category and Australians overseas. Expected outcomes of this project include improved forecasting methods reported in open-access papers, user-friendly forecasting software and tools for the partner organisations, and a stronger relationship between researchers and practitioners.	99,415.50	198,831.00	99,415.50	0.00	0.00	0.00	397,662.00	DEPARTMENT OF TREASURY, AUSTRALIAN BUREAU OF STATISTICS
National Interest Test Statement									
Population forecasts are widely used for planning and policy development. For example, they influence discussion about long-term economic policy options (as shown in the Intergenerational Report), affect superannuation expenditure forecasts, and inform decisions about the number of new schools needed. However, current methods have many limitations. This project will seek to improve the usefulness, detail, and accuracy of population projections and forecasts for Australia at the national, State/Territory, and large region scales. Historically, some population forecasts have proved highly inaccurate. The project will aim to increase the accuracy of fertility, mortality, and mortality forecasts, which are the key inputs to population projections, using the latest computational and statistical methods. It will also focus on creating user-friendly tools and programs for practitioners to try to narrow the gap between research and practice, and encourage greater exchange of knowledge and insights between researchers and practitioners.									

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LP210200774 Ngo, Prof Tuan D	HyPoCrete: Hydrogen storage using an innovative concrete composite system This project aims to develop an innovative polymer concrete composite system for the safe and efficient storage of hydrogen. New knowledge is expected to be generated on the novel use of polymer and concrete materials in hydrogen storage technologies. The expected outcomes include a new class of prefabricated, modular storage system that is highly efficient and low cost. The scalability and resilience of the system will be achieved by using concrete, a material widely used in the construction industry for its mechanical performance, durability and affordability. This should provide significant benefits in fostering the hydrogen economy by providing an efficient and resilient storage system for industrial quantities of hydrogen.	80,000.00	157,500.00	162,500.00	85,000.00	0.00	0.00	485,000.00	HAZPROTECT PTY LTD, M MODULAR PTY LTD, BESTECH AUSTRALIA PTY LTD
	National Interest Test Statement The Australian Government has identified hydrogen as the key pillar to decarbonise the future economy and address climate change. According to the National Hydrogen Strategy, the hydrogen economy will generate \$26 billion in GDP and 17,000 jobs by 2050. This project aims to develop a safe, efficient and low-cost hydrogen storage system, which is essential to accelerate widespread adoption of hydrogen as the primary fuel in a wide range of priority sectors. New knowledge developed in the use of polymer concrete composites for hydrogen storage will place Australia at the forefront of research and development in the emerging hydrogen industry. The development of this new technology is well-aligned with the Australian Science and Research Priorities including Advanced Manufacturing and Energy. This project has significant potential to deliver economic and social impact for the energy and construction sectors. The training opportunities in advanced material and hydrogen storage technologies will develop the skills needed by the new generation of researchers supporting innovation in our emerging hydrogen industry.								
LP210200798 Bailey, Prof Simon R	Artificial intelligence algorithms to predict risk of injury in racehorses. This project will address the urgent need for predicting and preventing catastrophic and career limiting limb injuries and cardiac arrhythmias in racehorses due to over (or under) training. Using data from GPS and movement sensors integrated into saddlecloths, artificial intelligence algorithms will convert cumulative data on speed, gait, and stride characteristics during training, along with injury data, into a risk matrix. Recorded heart rate and ECG data will also be analysed using artificial intelligence to detect early evidence of the development of cardiac arrhythmias. The system will improve racehorse welfare, providing a simple interface to warn trainers when risk of injury becomes high, in order to prevent catastrophic breakdown.	72,141.00	123,622.00	90,547.50	39,066.50	0.00	0.00	325,377.00	ALERTE EQUINE SCIENCE LTD
	National Interest Test Statement The social license to use animals for sport can be compromised when the welfare of those animals is below a standard that is acceptable to society. In Australia, each year there are about 40,000 horses in race training. The economic impact of the Thoroughbred horse racing industry in Australia is substantial, exceeding \$9B per annum. At present, the welfare of those animals is difficult to routinely assess, and the incidence of catastrophic limb injury (necessitating euthanasia) or sudden cardiac failure (which may in some circumstances cause sudden death) are unacceptably high. The biosensor system that will be developed in this project, and the real-time analysis of data from the sensors, will allow trainers, veterinarians and racing authorities to accurately and efficiently monitor individual animals under their care, and will facilitate transparency in the racing industry. The device has the potential to become a monitoring tool that will inform not only the animal carer, but also the regulators of animal welfare, in real-time.								

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LP210200837 Disfani, A/Prof Mahdi M	<p>Paving the way to greener roads and healthier waterways</p> <p>Waste tyre permeable pavement is emerging as an effective stormwater surge mitigation solution. Yet, its behaviour under traffic loads and varied environmental conditions are not fully understood which undermines industry confidence in this technology. This project aims to advance the engineering of waste tyre permeable pavements by creating new knowledge on their mechanical and hydrological performance. The project will develop design guidelines, identify the governing mechanisms and develop a performance prediction framework based on laboratory and field tests, and advanced numerical modelling. The mechanisms of performance from micro to macro level will be identified, generating knowledge for industry to support widespread uptake.</p> <p>National Interest Test Statement</p> <p>Each year approximately 50 million used tyres end up in landfills. From July 2021, Australia must process all its waste onshore, requiring innovative solutions to help achieve a circular economy to reduce the financial burden to the nation and the impact on our environment. This project will provide significant national benefits in helping to solve a major waste problem for Australia by diverting waste from landfills. It will also reduce the impact of urbanisation by helping to filter pollutants and improve the quality of our waterways, especially after storm surges. These innovations will build capacity in Australia's waste and stormwater management industry, help deliver new markets for Australian industries and create opportunities for IP export. The project addresses the National Science and Research Priority in Environmental Change by addressing two challenges: 'resilient urban, rural and regional infrastructure' and 'developing new solutions for responding and adapting to the impacts of environmental change on urban and rural communities and industry.'</p>	57,500.00	107,500.00	106,000.00	56,000.00	0.00	0.00	327,000.00	POROUS LANE PTY LTD, YARRA CITY COUNCIL, TYRE STEWARDSHIP AUSTRALIA LIMITED
LP210200917 Baldwin, Prof Timothy J	<p>AI for Legal Problem Diagnosis in the Diverse Language of Australians</p> <p>The number of Australians with unmet legal needs is estimated to be over four million people per year and growing, and free legal assistance is severely under-resourced. A bottleneck for free legal assistance providers is the determination of what (if any) specific legal needs the individual has, to which end this project proposes to develop AI models to semi-automate the process, with particular focus on fairness across users of all backgrounds, generalisation from small amounts of curated data, and dynamic interaction with the help-seeker. The project will help deliver legal assistance to some of the most vulnerable members of Australian society, and reinforce Australia's position as a world leader in AI for Law.</p> <p>National Interest Test Statement</p> <p>Levels of unmet legal need in Australia are high, and free legal assistance services are severely under-resourced. Each year 8.5 million Australians have legal problems and only 4.5 million are able to access assistance. Unresolved legal problems cause financial strain, stress-related illness, physical ill health, relationship breakdown, and having to move home. This project will enhance the provision of free legal assistance by alleviating the bottleneck of manually reading and classifying the legal problem descriptions submitted by potential clients of the service. In doing so, it will enable Justice Connect to provide more efficient, flexible service to vulnerable members of society in need of free legal assistance, contributing to a fairer and more just Australian society. The project's innovations will be made freely available to the broader legal assistance community in Australia and overseas, to maximise societal impact. It will also place Australia at the forefront of the emerging high-impact area of Legal Natural Language Processing, and further showcase Australia's world-leading expertise in AI.</p>	62,500.00	116,896.00	109,162.50	54,766.50	0.00	0.00	343,325.00	JUSTICE CONNECT

* 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 2021 Round 2 for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure (\$)			Indicative Funding (\$)			Total (\$)	Partner Organisation(s)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	2026-27* (Column 9)		
LP210200927	The future of shipping: achieving autonomous navigation	93,095.00	182,807.50	169,525.00	79,812.50	0.00	0.00	525,240.00	PIVOT MARITIME INTERNATIONAL PTY LTD
Toffoli, A/Prof Alessandro	This project aims to develop autonomous decision systems and onshore control stations to support the design and operation of unmanned cargo ships. Blending observations, numerical models, virtual reality and machine learning, the project will develop algorithms for unsupervised navigation and embed these in an advanced ship simulator platform capable of responding to environmental conditions and optimising sea freight transport capabilities. The expected outcomes will enable the integration of automated controls in ships, including remote-control capabilities. This will support Australia's transition towards an autonomous shipping industry, delivering greater reliability, efficiency, productivity and safety.								
	National Interest Test Statement								
	Over 90% of world trade is transported by sea and shipping is crucial to our imports and exports. In 2019-20, Australia recorded a trade surplus in excess of \$75 billion with exports growing 18% per year on average over the past five years. Cost-effective and reliable shipping is foundational to the competitiveness of our exports, yet it is lagging. Autonomous ships promise to revolutionise world trade within 20 years, delivering efficiency gains, greater safety, reduced costs and reduced environmental impact. This project leverages advanced research, virtual reality technology and machine learning to drive new developments for automated on-board ship navigational control systems. Artificial Intelligence will automate human control and optimise ship performance. Algorithms will be embedded in Pivot Maritime International's full-scale virtual reality simulation facility in Tasmania to enhance the design and operation of unmanned ships. The project is expected to position Australia at the forefront of autonomous shipping technology to support ongoing competitiveness and growth in Australia's export industries.								
	The University of Melbourne	518,917.00	991,062.50	836,431.50	364,286.00	0.00	0.00	2,710,697.00	
	Victoria	1,626,442.50	3,173,775.50	2,984,428.50	1,519,269.00	82,173.50	0.00	9,386,089.00	

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Approved Organisation, Leader of Approved Research Program (Columns 1 and 2) (Column 3)	Approved Research Program (Column 4)	Estimated and Approved Expenditure (\$)			Indicative Funding (\$)			Total (\$) (Column 10)	Partner Organisation(s) (Column 11)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	2026-27* (Column 9)		

Western Australia

Curtin University

LP210200888 Rackham, Prof Oliver	Universal transcriptome editing technologies Ribonucleic acid (RNA) is life's most essential molecule – as no living cell or virus can function without it. Although RNA plays many critical roles in cells, from information transfer and regulation of gene expression to scaffolding macromolecular structures and catalysis, the current approaches to manipulate RNA for technological purposes are limited in many respects. This project brings together the scientists who were the first to discover a universal code for recognition of RNA by proteins and one of the world's leading RNA-focused biotechnology companies, Locana Biosciences, with the goal of providing robust and versatile tools to target RNA in diverse organisms.	100,433.00	202,238.00	205,496.00	103,691.00	0.00	0.00	611,858.00	LOCANA BIOSCIENCES	
National Interest Test Statement										
This project will generate new biotechnological tools to target RNA and manipulate it in any cell or subcellular compartment. This will be of significant national interest through commercialisation of these technologies as well as the resulting engineered cells and chemical products as valuable commodities that will enhance the agricultural, mining, health and defence industries, which are the core strengths of Australia. These developments will make Australia economically stronger and significantly more competitive in the international markets while improving our security and well-being. The global gene editing market is projected to reach \$15.79 billion USD by 2027, according to a recent report by Emergen Research. The innovative technologies that will be generated by this project will position Australia to be internationally leading to generate increased income and employment. Trainees and researchers from this project will be the next generation of multidisciplinary scientists, able to apply powerful new technologies to future challenges facing Australia.										
LP210200907 Mancera, Prof Ricardo L	Cryobiotechnology innovations to help fight the Myrtle rust pandemic This project aims to mitigate the impacts of Myrtle rust, a disease affecting >380 Australian taxa in the family Myrtaceae, by developing advanced techniques to conserve susceptible species. The project is expected to generate the biotechnology advances necessary to conserve multiple taxa on the brink of extinction, including species important to our emerging native botanicals industry. Expected outcomes for the project include novel protocols for initiating and maintaining sterile tissue cultures and advanced techniques for cryopreservation of susceptible species, providing insurance against extinction and sources of ex situ material for re-establishing the species in safe sites and for research into disease resistance.	91,383.00	180,701.50	176,573.50	174,510.00	87,255.00	0.00	710,423.00	ROYAL BOTANIC GARDENS AND DOMAIN TRUST, DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS, AUSTRALIAN NETWORK FOR PLANT CONSERVATION INC, NATIVE PLANTS QUEENSLAND	
National Interest Test Statement										
This project addresses the serious impacts of an invasive plant pathogen on Australia's wild plant diversity and native plant industries. Myrtle rust, a disease caused by the pathogen <i>Austropuccinia psidii</i> , affects more than 380 species in the Myrtaceae family in Australia. It is listed as a Key Threatening Process for its impact on biodiversity under the Commonwealth Biodiversity Conservation Act 1999 and has already driven three species to the brink of extinction. Australia has an obligation to preserve these species under national and international conservation agreements, but the impact of the disease on seed production and new growth limits the effectiveness of conventional conservation techniques. This project aims to develop micropropagation and cryopreservation technologies to enable secure conservation of species requiring urgent and immediate intervention. The technologies developed will provide a source of material for re-establishing the species in safe sites and techniques for conserving and propagating disease-resistant individuals that may potentially be returned to the wild.										
Curtin University		191,816.00	382,939.50	382,069.50	278,201.00	87,255.00	0.00	1,322,281.00		

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Approved Organisation, Leader of Approved Research Program (Columns 1 and 2) (Column 3)	Approved Research Program (Column 3)	Estimated and Approved Expenditure (\$)			Indicative Funding (\$)			Total (\$) (Column 10)	Partner Organisation(s) (Column 11)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	2026-27* (Column 9)		
The University of Western Australia									
LP210200140 Rengel, Prof Zed	Alleviating herbicide damage to crops by using fulvate and manganese Glyphosate is a widely used herbicide, but its drift can cause growth depression in sensitive plants such as wheat by reducing uptake of metallic micronutrients, particularly manganese. In pot and field trials, this project aims to assess the alleviating potential of fulvate and manganese on growth and micronutrient uptake by wheat exposed to glyphosate drift. The influence of land management on the effect of these treatments will also be assessed. The underlying mechanisms will be characterised, eg. by determining metal speciation in soil and assessing soil microbial community composition. The outcome of this project will contribute to sustainable agriculture by giving land managers options to reduce glyphosate damage in sensitive crops.	83,999.00	173,070.00	181,015.50	91,944.50	0.00	0.00	530,029.00	TROFORTE INNOVATIONS PTY LTD
National Interest Test Statement									
Crop growth in many soils is limited by weed infestation. Therefore, farmers regularly apply herbicides such as glyphosate for controlling weeds. Glyphosate is one of the most widely used herbicides, particularly since the introduction of glyphosate-resistant crops such as canola, allowing its application during crop growth. However, glyphosate drift to neighbouring sensitive crops (such as wheat) can cause growth depression. One of the main reasons for this growth decline is reduced micronutrient uptake, particularly of manganese. The aim of this project is to characterise the potential of applying fulvate and manganese before or after exposure to glyphosate to reduce or eliminate damage in wheat. Additionally, the effect of land management (conventional fertilisation or biological based on biofertilisers) on alleviation of glyphosate damage by fulvate and manganese will be investigated. The outcome will provide new management options to reduce damage of herbicide drift to sensitive crops and contribute to profitable and sustainable crop production.									
LP210200613 Rayson, Dr Matthew D	Remote sensing techniques to infer fine-scale ocean surface currents This project aims to develop new technology for measuring ocean surface currents at unprecedented fine resolution using aerial imagery and theory that describes how surface waves are refracted by currents. The project will generate new knowledge on ocean surface current processes and variability across a range of scales, and critically, improve our understanding of surface current uncertainty through application of advanced statistical analysis techniques. The outcomes of this project will deliver Australian capability to leverage the enhanced spatial and temporal resolution of next generation Earth observations to directly benefit search and rescue, offshore industry operations, defence, and pollution response in Australian waters.	85,614.50	182,085.50	208,299.00	171,900.00	60,072.00	0.00	707,971.00	RPS AUSTRALIA WEST PTY LTD
National Interest Test Statement									
The Australian Blue Economy had an estimated worth of over \$80 billion in 2020 and has a projected value exceeding \$100 billion by 2025. Much of this economic activity is underpinned by effective engineering design and safe, yet efficient, operations. This project will develop new technology to measure and characterise surface currents in the ocean which are key inputs to both engineering design and operations across a broad swath of marine industries from offshore oil and gas, marine renewables, and sea search and rescue. Existing techniques to measure surface currents are either prohibitively expensive and/or lack the spatial and temporal resolution required. The technology developed through this project will enable ocean surface current measurements at an unprecedented fine scale using existing low-cost components that can be mounted on platforms ranging from drones to manned aircraft. This new technology, which can be applied by Australian and global marine service providers and industries, and will enhance marine design, operations, and safety at sea.									
The University of Western Australia		169,613.50	355,155.50	389,314.50	263,844.50	60,072.00	0.00	1,238,000.00	
Western Australia		361,429.50	738,095.00	771,384.00	542,045.50	147,327.00	0.00	2,560,281.00	
		5,182,861.00	10,377,849.50	9,940,468.50	5,438,363.50	774,577.00	81,693.50	31,795,813.00	