

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 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)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)
Australian Capital Territory								
The Australian National University								
LP200300577 Lu, A/Prof Yuerui	Scalable high-density hydrogen storage by nano-bubbles in layered materials Stable and low-cost hydrogen storage and transportation are cornerstones of a global hydrogen economy. This project aims to advance a novel hydrogen storage technology based on highly pressurised nano-bubbles in layered materials. The project expects to expand our fundamental knowledge of the interactions between hydrogen and layered materials. Expected outcomes include a hydrogen storage technology that exhibits a remarkable energy density, high stability and low cost. This should provide significant benefits, such as improving the capacity and robustness of low-cost hydrogen storage and transportation, reducing energy costs and making hydrogen energy a more accessible and sustainable clean energy source for Australia.	140,454.00	150,626.00	185,304.00	178,258.00	0.00	654,642.00	TOSHIBA CORPORATION, GLOBAL POWER GENERATION AUSTRALIA PTY LTD, EVOENERGY
National Interest Test Statement								
Energy is one of the major drivers for the economic development of any country. Owing to its vast solar and wind resources, Australia has the potential to become a global powerhouse in renewable energy exports. Hydrogen is widely regarded as a potential candidate to replace fossil fuels in an eco-friendly economy. The knowledge and methods developed in this project will make hydrogen energy become an accessible, affordable and sustainable energy source. Importantly, the proposed technology could enable Australia to export renewable hydrogen to other nations, e.g. Japan and South Korea, where a hydrogen economy is being sought. Hence, this research will support the development of new industries and job creation in the future. The proposed project is well aligned with the Science and Research Priority of Energy. The project also offers an excellent opportunity for the generation of patentable and commercially valuable IP, through the development of new hydrogen storage technologies. The project will strengthen the strategic alliance between key Australian (ANU) and Japanese (Toshiba) drivers of innovation.								
LP200301612 Kurniawati, A/Prof Hanna	Integrated Planning for Uncertainty-Centric Pilot Assistance Systems This project aims to deliver a novel pilot assistance system to improve the viability, speed and safety of Helicopter Emergency Medical Services (HEMS) and Search and Rescue (SAR) missions. It will advance fundamental algorithms for probabilistic planning in partially observable scenarios to form the core technology of a pilot assistance system that accounts the various types of uncertainty faced by pilots in a typical HEMS/SAR missions. It will exploit recent advances in Partially Observable Markov Decision Processes (POMDPs) to recommend robust, safe, and pilot-aware mission and manoeuvring strategies to make HEMS/SAR operations safer for helicopter crews, and more effective for those in need of the service.	168,940.00	171,220.00	157,470.00	0.00	0.00	497,630.00	SAFRAN ELECTRONICS & DEFENSE AUSTRALASIA PTY LTD
National Interest Test Statement								
Tens of thousands of Australians benefit from rapid Helicopter Emergency Medical Service and Search and Rescue response every year. However, missions may often be too dangerous to perform and the accident rate remains significantly higher than commercial aviation. This project will develop new technologies to provide significant assistance to helicopter pilots during complex unplanned missions, thereby helping improve the viability, speed and safety of time-critical life-saving services. This project will seed development of a new AI-based industry in Australia relating to assistive aviation technology: AI co-pilots. Furthermore, the project will provide opportunities for students to experience research translation to real-world industrial outcomes, preparing them to compete globally in the era of industry 5.0. This research will have high commercial potential with collaboration with Safran ensuring it has high visibility in the aerospace industry. The global helicopter market size is expected to reach USD 68.34B by 2027 with integration of autonomous capabilities helping drive significant growth.								
The Australian National University		309,394.00	321,846.00	342,774.00	178,258.00	0.00	1,152,272.00	

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University of Canberra								
LP200301446	Everyday Heritage	90,733.00	123,969.00	130,000.00	0.00	0.00	344,702.00	GML HERITAGE PTY LTD
Ireland, Prof Tracy J	<p>This project aims to uncover everyday but overlooked forms of Australian heritage. Working collaboratively to bridge academic and industry practice, it seeks to develop innovative methods with outcomes expected to include enhanced collaboration between heritage, digital humanities, and historical research, and new resources for communities and the heritage sector. This should provide significant social and cultural benefits such as more inclusive forms of heritage, and broader intellectual and practical understandings of shared history and citizenship. The project will promote public debate on the role of the past in modern Australia through a range of new forms of history and heritage, digital resources and heritage management tools.</p> <p>National Interest Test Statement</p> <p>'Everyday Heritage' will advance Australians' understanding of our society by building new and more accessible forms of heritage that should contribute to more inclusive cultural dialogue, with important cultural benefits. The project seeks to uncover forms of heritage that recognise the diverse experiences of 'ordinary' people in the past and 'everyday' places in the present, leading to greater public and civic engagement. 'Everyday Heritage' would enhance capacity in the heritage sector by developing innovative digital tools to bridge diverse communities, to produce significant social and economic benefits. Through supporting Early Career Researchers; strengthening international networks to enhance the recognition of Australian research in a global context; and building effective collaborations between universities and the heritage industry, the project aims to strengthen long-term, strategic research partnerships . By developing practical heritage tools and digital literacies these outcomes can be used by professionals and communities to build citizenship and civic engagement.</p>							
	University of Canberra	90,733.00	123,969.00	130,000.00	0.00	0.00	344,702.00	
	Australian Capital Territory	400,127.00	445,815.00	472,774.00	178,258.00	0.00	1,496,974.00	

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New South Wales

Macquarie University

LP200301118	Creating Sustainability-Oriented Fintech Lending Platforms in Australia	69,693.00	71,725.00	119,882.00	0.00	0.00	261,300.00	FINTECH AUSTRALIA LIMITED, GUIZHOU SMALL- AND MEDIUM-SIZED ENTERPRISES SERVICE GROUP, LTD.
Smith, Prof Tom	<p>This project aims to investigate how FinTech lending companies can use customers' environmental information to access their creditworthiness, and whether lending decisions based on environmental information can promote pro-environmental behaviour and expedite the societal transformation towards a low-carbon economy. These aims will be achieved through a quantitative analysis that evaluates the use of a customer's "carbon footprint" for predicting default risk, and a field experiment that analyses the economic and environmental benefits of the proposal. The project intends to develop a new approach that contributes to developing a sustainable lending platform for Fintech firms and establishing sustainable FinTech standards for policymakers.</p> <p>National Interest Test Statement</p> <p>Individuals' carbon footprints are of increasing interest to central bankers, FinTech professionals, and climate change policymakers. The expected national benefit of this project will be to create knowledge about whether and how Australia's FinTech lending firms should use individual carbon footprints in their lending decisions, and the associated economic and environmental impacts. The intended outcomes of this project will not only be relevant to the partner organisations listed on this project, but also to the Australian and international FinTech industry more broadly, in developing sustainability-oriented lending platforms. Using carbon footprints in FinTech lending decisions will also benefit customers with little or no banking history by expanding their credit access to digital financial services. Finally, this project will benefit the Australian and international policymakers in establishing sustainable FinTech standards. Additional outcomes and benefits of the project include the training of graduate researchers, and the generation of new research in an emerging area.</p>							
LP200301589	Warrakan'puy Djäma: A new biocultural approach to fauna conservation	158,098.00	180,745.00	178,125.00	0.00	0.00	516,968.00	LAYNHAPUY HOMELANDS ABORIGINAL CORPORATION, THE NATURE CONSERVANCY
Ens, Dr Emilie-Jane	<p>This project aims to record endangered Indigenous knowledge of fauna and integrate this with innovative Western science to develop Australia's first cross-cultural fauna conservation strategy. In partnership with the Laynhapuy Indigenous Protected Area and one of Australia's strongest Aboriginal cultural groups, the Yolngu, this project expects to generate new biocultural solutions to two of the most urgent challenges of our time: species and cultural loss. The expected outcomes include targeted on-ground fauna surveys with Elders, Rangers and youth, cross-cultural knowledge mapping, new species and landscape genetics. Innovative multimedia knowledge sharing platforms will demonstrate the multiple benefits of cross-cultural fauna science.</p> <p>National Interest Test Statement</p> <p>Australia is experiencing species and cultural extinction crises. There are increasing calls to include Indigenous people and knowledge in environmental and cultural conservation strategies. In partnership with one of Australia's strongest Indigenous cultural groups, the Yolngu, this project will document Yolngu knowledge of culturally significant species through on-country camps with Elders, Rangers and youth. Yolngu knowledge will be combined with innovative Western science to develop an innovative and uniquely Australian cross-cultural species management strategy. Multimedia and interactive learning resources will be collaboratively developed with Indigenous project partners and the Atlas of Living Australia to have broad impact and empower communities to activate better fauna management strategies. This project will have environmental, social, economic and cultural benefits from local to national scales through enhanced land management, species conservation and maintenance of cultural knowledge.</p>							

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LP200301594 Mildren, Prof Richard P	Removing the blur: Guidestar lasers for the space industry The speed and quality of transferring information between earth and space can be greatly enhanced by adaptive optical systems that provide correction for atmospheric aberrations. The laser-generated guidestars that lie at the heart of these systems must be bright, preferably multi-coloured and with low background. By taking advantage of the unique optical properties of diamond, this project aims to develop lasers that produce these advanced features to fulfil the needs of the space industry sector. These outcomes are expected to create new services and products in the areas of space situational awareness, space debris management and satellite communications, and have major spin-off benefits to astronomy and defence.	251,657.00	230,170.00	181,714.00	0.00	0.00	663,541.00	EOS SPACE SYSTEMS PTY LIMITED
	National Interest Test Statement Australia has large investments in a range of space applications that rely on the transmission of data and images through the atmosphere and which stand to benefit from guidestar-assisted adaptive optics. The laser technology to be developed in this project is to provide industry end-users with bright guide stars with low background noise, and a practical method of greatly increasing data quality with full sky coverage. By collaborating with EOS Space Systems Ltd, a world-leader in space environment management, the outcomes will enable new and extended capabilities in space situational awareness and satellite communications. Anticipated benefits to Australia include the development of new services and products in a growth industry of strategic importance to defence and space infrastructure protection, and with parallel benefits to Australia's astronomy community through increased roles in large global astronomy programs. The knowledge and concepts to be created are of a fundamental nature and are well placed to impact other fields that require high-power high-coherence lasers, such as in quantum science.							
	Macquarie University	479,448.00	482,640.00	479,721.00	0.00	0.00	1,441,809.00	
The University of New South Wales								
LP200300982 Nielsen, Dr Michael P	Nonlinear Optical Metrology of Electronic Interfaces for Silicon Devices This project aims to develop a prototype electric field induced second harmonic generation metrology setup for studying thin film dielectric interfaces on silicon in partnership with Femtomatrix. The quality of these silicon-dielectric interfaces, which are affected by trapped charges and defects, are critical for microelectronic and optoelectronic device manufacturing. Through several proposed methodologies to separate the effect of interface and bulk signals, it is expected that the sensitivity of the prototype setup will exceed the previous record of 1 kV/cm. This metrology technique will be further expanded for applicability to silicon photovoltaics, specifically passivating contacts which cannot be studied via conventional techniques.	150,927.00	133,696.00	132,775.00	0.00	0.00	417,398.00	FEMTOMETRIX, INC.
	National Interest Test Statement Semiconductor electronic devices are prevalent in the everyday lives of Australians, from the solar cells generating our electricity to the processors running our computers and cell phones. With the performance of these semiconductor devices governed in part by the quality of semiconductor-dielectric interfaces, this project will develop a non-contact optical metrology system to interrogate the interface physics on silicon. It is expected that uptake of the metrology technology generated by this project will lead to tangible improvements in semiconductor device manufacturing, resulting in better performing and lower cost devices for Australians. It is expected that any improvements in silicon device manufacturing will support the future development of silicon-based quantum technologies in Australia. As such, this project stands to produce economic benefits to Australia through the generation of valuable intellectual property and technological leadership. The technology's application to improving next generation silicon solar cells will lead to environmental benefits via improved renewable energy efficiency.							

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LP200301253 Liddell, Dr Belinda L	<p>Understanding the impact of missing family on forcibly displaced people</p> <p>This project aims to investigate the psychological and social effects of having missing family on forcibly displaced people settled in Australia. This world-first project enlists a longitudinal mixed-method approach to compare those with missing family to those whose connections have been restored on key outcomes and coping strategies. Project outcomes will enhance the ability of Australian Red Cross and the International Committee of the Red Cross to understand and support the needs of families of the missing. This should provide significant practice and policy benefits for Red Cross' humanitarian work in restoring family links in Australia and worldwide.</p> <p>National Interest Test Statement</p> <p>Not knowing the fate of missing family can have profound negative psychological and social consequences for refugees. This project responds to the need identified by Red Cross to understand the impact of missing family on forcibly displaced people settled in Australia, and how they adapt as they search for their loved ones. Such knowledge is vital so that key services like the Australian Red Cross and the International Committee of the Red Cross can ensure clients engaged in their Restoring Family Links tracing programs receive the right support at the right time. Project outcomes will enhancing coping and strengthen wellbeing of those directly affected by missing family, which will have important social and economic benefits for the wider Australian community. This project will also provide an evidence-base to inform policy and practice with the missing and their families on a global level, cementing Australia's leadership role on this important humanitarian issue.</p>	203,033.00	188,006.00	248,788.00	197,213.00	0.00	837,040.00	AUSTRALIAN RED CROSS SOCIETY, INTERNATIONAL COMMITTEE OF THE RED CROSS
LP200301386 Hameiri, A/Prof Ziv	<p>Luminescence-based imaging system for industrial tandem solar cells</p> <p>This project aims to develop an Australian-made inspection system for next-generation solar cells. Besides allowing, for the first time, fast measurements of large-size tandem solar cells, the system will also enable the determination of key parameters that cannot be measured by current methods. This capability is expected to generate new knowledge in the areas of perovskite and tandem solar cells. The expected outcomes include the development of new characterisation methods for advanced solar cells and improvement of their quality, as well as enhancing Australian capabilities in building sophisticated characterisation instruments. This should provide benefits such as cheaper solar energy and the development of local inspection industry.</p> <p>National Interest Test Statement</p> <p>The project contributes to several economic, social and commercial interests of Australia. By aiming to develop an Australian-made advanced inspection system for the next-generation solar cells, the project enhances economic growth in this promising area. It directly supports an Australian company to expand its capabilities to new markets, creating new jobs in Australia. The outcome of this project will lead to higher-efficiency photovoltaic (PV) modules with improved reliability at lower production costs. Cheaper modules will encourage the adoption of PV-generated electricity in Australia, contributing to the national environmental and social interests by lessening Australia's dependence on fossil fuels and reducing its pollution and greenhouse gas emission levels. More broadly, cheaper PV-generated electricity will provide direct economic benefits to Australian customers. Cheaper PV, in combination with Australia's superb sun resources, also opens a new range of commercial opportunities to Australian companies, such as producing hydrogen and generating electricity that can be exported to other countries.</p>	200,000.00	180,000.00	150,000.00	0.00	0.00	530,000.00	BT IMAGING PTY LTD, OXFORD PHOTOVOLTAICS LTD
LP200301404 Si, Dr Guangyao	<p>Maximise goaf gas drainage for safe coal extraction and emissions reduction</p> <p>Coal mine methane is a serious mining hazard and greenhouse gas emissions. This project seeks to enhance mining safety by maximising gas capture during coal extraction. This will be achieved through field data back-analysis, coupled Multiphysics modelling, and stochastic risk assessment. Gas explosion and spontaneous combustion risks associated with intensive gas drainage will be quantitatively assessed and eliminated to help mine managers' decision making, design optimisation, and mitigation planning. This will provide significant benefit for the mining industry in maintaining production commitments in a safe workplace while addressing environmental concerns by capturing the fugitive emissions to be converted into a useful energy resource.</p>	56,212.00	119,818.00	122,359.00	0.00	0.00	298,389.00	ANGLO AMERICAN METALLURGICAL COAL PTY LTD, ACARP, CHINA COAL TECHNOLOGY & ENGINEERING GROUP CORP

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National Interest Test Statement								
This project will lead to improved safety, increased productivity, and reduced fugitive emissions in mining operations, which underpins the Australian economy and COVID-19 recovery. Using a risk-based approach to maximise coal mine methane capture performance, the project will achieve safe and efficient resource extraction, and ultimately minimise production downtime caused by gas exceedance. Million tonnes of fugitive emissions from coal mines will be captured through optimal goaf drainage designs, which can be utilised later to create add-on values and provide a competitive edge to the Australian mining industry. The project also helps improve mining social acceptance, creates research training opportunities, and attracts young talents into the resource sector. Next generation engineers will be trained with a clear vision about mining-associated environmental concerns and equipped with knowledge on safe mining. Moreover, this project will place Australia at the forefront of mining technology development and research outcomes can be commercialised in emerging economies via our international partners.								
LP200301482 Yuan, Prof Jinhong	Low-Complexity Capacity-Scalable Multiple Antenna Wireless Communications The project aims to develop innovative solutions for low-complexity, capacity-scalable multiple antenna wireless communications, in order to meet future data rate requirements whilst maintaining a practical system at a sustainable cost. By leveraging delay-Doppler domain channel properties and geometric reciprocity, pragmatic transceiver technologies and innovative delay-Doppler domain signal processing algorithms for channel prediction and multi-user transmissions will be developed. The outcomes of the project are expected to significantly improve users' data rates with low system complexity and reduced signalling overhead for future wireless communications.	162,579.00	176,988.00	182,095.00	0.00	0.00	521,662.00	TELSTRA CORPORATION LIMITED
National Interest Test Statement								
Recent advances in converting data to radio waves, known as orthogonal time frequency space (OTFS), have been widely recognised as ground-breaking and enabling technology for future high data rate and low cost communications infrastructure. This work builds on our recent successful collaboration with Australia's leading telecommunications provider, Telstra, which demonstrated the potential of deploying OTFS to its 5G mobile networks. This project will develop novel theories and practical solutions based on delay-Doppler signal processing to design low-cost capacity-scalable wireless communications. It is expected that the project outcomes will be compatible with Australia's existing 4G/5G air-interface and base-stations via software updates, which can increase the wireless system data rate with low complexity. These low-cost software based solutions will enable Telstra and Australian telecommunications companies to build future sustainable mobile infrastructure, bringing considerable economic and social benefits to telecommunications services at a time of critical dependence on connectivity.								
LP200301593 Hao, A/Prof Xiaojing	Efficient, durable and green chalcopyrite solar powered building steel This project aims to develop a long-life, stable, high-performance, and green chalcopyrite solar powered building steel, which is expected to offer a shapable truly green building integrated photovoltaic (BIPV) product for building deployment. This will be realized by synergising multidiscipline expertise, integrating established technologies of steel surface treatment, steel and solar cell integration and shaping, high-efficiency chalcopyrite, identified strategies for tackling its durability and toxicity, and advanced macro-to-micro characterizations. The project completion will accelerate the transition to the zero-emission building, establish Australia's excellence in green steel for BIPV, and access a share in the soaring BIPV market.	177,539.00	189,171.00	222,427.00	0.00	0.00	589,137.00	BAOSTEEL COMPANY, SOLSPAN PTY LTD, SHENZHEN INSTITUTES OF ADVANCED TECHNOLOGY, CHINESE ACADEMY OF SCIENCES, CHINA
National Interest Test Statement								
This project will extend the Australian tradition of excellence in photovoltaic from silicon and kesterite, to chalcopyrite light-harvesting materials. Aiming for truly green building integrated photovoltaic (BIPV) product for building application, this project will extend Australia's excellence from solar farm and solar roof to solar building, making Australia a world leader in developing durable green truly steel-based BIPV product, which will be suitable for "mass deployment" across residential, commercial and industrial rooftops and facades. The completion of this project will allow Australia to access a significant share in the soaring BIPV market, which is expected to increase 10-fold across the globe in the coming years and become a key part of new construction and even building retrofits. With multi-discipline expertise involved in the developed steel-based BIPV product, this project will also benefit building, steel, and start-up BIPV companies, turning existing building infrastructure into a power generator for low- Carbon Energy System, contributing to meet the targets of the Paris Agreement.								
The University of New South Wales		950,290.00	987,679.00	1,058,444.00	197,213.00	0.00	3,193,626.00	

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The University of Sydney								
LP200301563 Kepert, Prof Cameron J	Advanced framework materials for hydrogen storage applications This project aims to develop new molecular materials capable of the highly efficient storage of hydrogen gas. Through an innovative interdisciplinary approach that targets the synthesis and detailed characterisation of two classes of molecular material this project expects to generate step-change advances in the understanding of how hydrogen gas uptake relates to the chemical and physical attributes of porous molecular systems. Significant anticipated outcomes and benefits include the development of new material design approaches that optimise performance across a diverse parameter space, and the generation of advanced new materials worthy of commercial development, spanning small scale mobile to large scale stationary storage applications.	200,080.00	194,985.00	207,701.00	0.00	0.00	602,766.00	RUX ENERGY PTY LIMITED, AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION
National Interest Test Statement								
Following major recent scientific and technological advancements the expansion of molecular framework materials into hi-tech industries is underway. Immense opportunities now exist for the development of materials that will underpin these new technologies. A key attribute of these systems is their unprecedented porosity, a feature that makes them particularly suited for the efficient storage of hydrogen gas. This Project aims to develop two families of molecular materials with highly promising hydrogen storage capabilities, to yield key materials design approaches and discrete materials suited to targeted storage applications. The development of these materials promises major national economic benefits through local production opportunities. More broadly, the work promises to accelerate the global push towards the adoption of a renewable hydrogen energy cycle, replacing carbon-based cycles. The Project will provide essential training of early career researchers in state-of-the-art multidisciplinary science and technology, fostering leadership and promoting a long-term creative research culture in Australia.								
LP200301639 Zreiqat, Prof Hala	Interface structures mediating load transfer between soft and hard tissues This project aims to develop a novel technology platform to mediate load transfer between synthetic and biological materials with dissimilar mechanical properties, creating an effective interface mechanism. It will generate new knowledge in materials engineering by combining interdisciplinary expertise and state-of-the-art technologies in computational modelling, biomaterials, and additive manufacturing. Expected outcomes are high-tech ceramic structures optimized to interface effectively between synthetic soft tissues and natural hard tissues. This could ultimately benefit Australian industry engaged in developing next-generation synthetic orthopaedic solutions, providing a significant competitive advantage in an expanding global market.	132,214.00	134,991.00	137,826.00	0.00	0.00	405,031.00	ALLEGRA ORTHOPAEDICS LIMITED
National Interest Test Statement								
The novel technology platform to be developed by this project could give Australia's biotechnology industry a significant competitive advantage in the expanding global market for high-tech orthopaedic solutions. Using state-of-the-art computational modelling and additive manufacturing, the technology platform will enable cost-effective development of materials that act as effective interfaces between very dissimilar synthetic and biological materials, such as synthetic ligaments and natural bone. Subsequently, if these interface materials were combined with synthetic tissues, they could offer inexpensive and highly effective solutions to significant challenges in orthopaedics – a global multi-billion-dollar industry. The project's partnership between the University of Sydney and Allegra Orthopaedics will produce mutual benefits for academia and industry through the sharing of expertise, skills and resources. Importantly, it will boost capabilities in advanced technologies at the intersection of materials science, mechanical engineering, and biology, building Australia's high-tech STEM workforce.								

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LP200301672	Development of prefabricated composite building panels and connections	141,921.00	142,346.00	146,054.00	0.00	0.00	430,321.00	BRICKWORKS BUILDING PRODUCTS PTY LTD, AUSTRAL PRECAST (NSW) PTY LTD, HILLSIDE ENGINEERING PTY LTD
Ranzi, Prof Gianluca	This project will develop a new prefabricated composite brick-concrete panel technology, by exploiting cutting-edge manufacturing capabilities for the production of bricks and concrete components. It is expected to generate new robust design methodologies at both service and ultimate conditions by relying on advanced testing and theoretical modelling. The project is expected to transform the current brick industry by replacing traditional labour-intensive brick construction with advanced and cost-effective prefabricated technologies that will enable brick construction to enter new markets, such as those of multi-storey buildings and complex load-bearing facades, previously not feasible or cost-effective with traditional brick technology.							
	National Interest Test Statement							
	Prefabricated concrete technology is a highly efficient and cost-effective form of construction that has been progressively displacing traditional on-site, labour-intensive traditional brick construction. This project intends to establish a transformational technology that will enable the brick industry to move away from sole reliance upon traditional labour-intensive installations by embracing advanced manufacturing capabilities that enable the production of optimised bricks and support prefabrication. It is expected that this new technology will deliver cost-efficient solutions and provide growing employment opportunities in coming years. This research advancement will support the establishment of design recommendations for prefabricated components and connections that will deliver safe designs and that will be disseminated throughout the Australian prefabricated construction industry.							
	The University of Sydney	474,215.00	472,322.00	491,581.00	0.00	0.00	1,438,118.00	
University of Technology Sydney								
LP200301196	A sentinel network for vibration-based termite control	50,000.00	167,462.00	153,848.00	208,855.00	0.00	580,165.00	BARKO SECURITY PTY LTD, ROBOTIC SYSTEMS PTY LTD, ZEDELEF PTY. LTD.
Oberst, A/Prof Sebastian M	Termite damage is costly and eradication via chemicals is hazardous to environment and health. As termites use vibrations to make foraging decisions and eavesdrop on competitors/predators, it is feasible but not attempted hitherto to detect and control termites using vibrations. A smart sentinel network will be developed to enable timber infrastructure to be continuously monitored for termites and for termites to be repelled using specific vibration signals and manipulated structures, with minimal environmental and health impacts. For this network to be efficient and effective, an improved understanding on how vibrations influence termite sociality will be obtained by studying habituation and signal adaptation on collective behaviour.							
	National Interest Test Statement							
	Australia is the third largest market for termite control, after the USA and Japan. It has been estimated by CSIRO that about one in three Australian houses will be attacked by termites in their lifetime. Currently, an Australian designed, patented and manufactured product based on microwave scattering is the only reliable termite detector, but it does not monitor the structure continuously, because it requires a trained pest control professional and is too expensive to be retrofitted and deployed over many locations; also, it is not able to drive termites out of already infested timber. This project aims at developing a novel smart sentinel network technology which detects as well as repels termites based on microvibrations. This project will contribute significantly to innovative smart sensing and non-chemical based control of termites, to reduce termite damage and costs, with benefits for the environment, health and economy and further consolidating Australia's world leading position in termite detection as well as innovative pest control.							

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LP200301506 Zhu, Dr Xi F	<p>Low-Cost Wireless Transmitter with Compact Package for Industrial Sensing</p> <p>This project aims to provide a solid foundation for silicon-based transmitter design with beam-steering capability operating beyond 100 GHz. The project expects to advance knowledge in low-cost radio-frequency integrated circuit design with miniaturised packaging technology for use in industrial sensing. Expected outcomes of this project include a prototype consisting of a miniaturised 140-GHz phased-array transmitter with packaged antenna arrays, along with a developed selection guideline to choose the "best" silicon-based technology node for cost-effective design. This should provide benefits for organisations working on wireless sensing technologies and lead to new ways of using these technologies for a variety of emerging applications.</p> <p>National Interest Test Statement</p> <p>This project will create low-cost, advanced designs of radio-frequency integrated circuits which are essential for ultra-fast wireless communications and high-resolution imaging. In particular, the new technology will be critical for many safety and collision avoidance features of future vehicles, including autonomous vehicles. The global market for advanced imaging and communication technologies is growing rapidly, and this project will enable Australian companies to play a significant role in offering high-performance, innovative commercial products to global export markets. The advanced chip designs will not only save resources and lower production cost, but will ultimately provide better safety to drivers, cyclists and pedestrians and improve wireless communication technologies for offices, schools, public spaces and homes. Importantly, this industry-relevant research project will provide training opportunities for the next-generation of job-ready researchers and engineers in Australia with advanced chip design skills, enabling local companies to create new jobs and to generate more export revenue.</p>	130,081.00	130,081.00	130,081.00	0.00	0.00	390,243.00	ANDAR TECHNOLOGIES PTY LTD
	University of Technology Sydney	180,081.00	297,543.00	283,929.00	208,855.00	0.00	970,408.00	
University of Wollongong								
LP200300895 Voyer, Dr Michelle A	<p>Better oceans, better futures:Indigenous knowledges and oceans governance</p> <p>This project aims to re-imagine oceans governance by drawing inspiration and guidance from Indigenous ontologies and epistemologies. Using an Indigenous lens, it will explore opportunities for more inclusive approaches to oceans governance and economic development. Current systems privilege and valorise 'rational' knowledge and data, marginalising subjective, relational and cultural values. The project outcomes will include the identification of opportunities for better consideration of diverse values, knowledges and worldviews in existing governing systems. This will provide significant benefits, including greater agency for civil society, especially Indigenous communities at local, regional, national and international scales.</p> <p>National Interest Test Statement</p> <p>Current systems of governance are failing to address the many threats that our oceans face, including resource depletion, ocean warming, habitat loss and pollution. This project will look to Indigenous ways of being as inspiration for a different way of governing our oceans. It will explore how principles of stewardship and custodianship, embedded in Indigenous approaches, might drive reform of law and policy, renewal of stakeholder engagement practices and realignment of economic development activities. As we enter the Decade of Ocean Science for Sustainable Development this project will provide invaluable new knowledge to inform Indigenous and non-Indigenous scholars, community members, Governments and the private sector on the practicalities of ensuring equitable approaches to ocean governance. This will include guidance on how to consider diverse values, beliefs and aspirations in ocean governance through a values based decision making framework. It will also identify potential areas of reform in legal systems and ocean based business incubation and acceleration models.</p>	152,184.00	158,677.00	107,740.00	0.00	0.00	418,601.00	ILLAWARRA LOCAL ABORIGINAL LAND COUNCIL, DJUNGGA ABORIGINAL CORPORATION
	University of Wollongong	152,184.00	158,677.00	107,740.00	0.00	0.00	418,601.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 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)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)		

Western Sydney University

LP200300272	A novel method to stabilise expansive soils by alkali-activation	55,218.00	55,218.00	113,198.00	59,719.00	0.00	283,353.00	EIC ACTIVITIES PTY LTD
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Leo, Prof Chin J
This project aims to address durability and sustainability issues with traditional lime-based methods used to stabilize expansive soils by alternatively advancing an alkali-activation approach. It expects to generate new knowledge in using alkali-activation to suppress the swelling potential of expansive soils which have been deleterious to roads, pavements and overlying structures. Expected outcomes of this project include development of a long-term durable treatment with reduced carbon footprint and use of waste materials. This should provide significant benefits commercially and critical insights to overcome expansive soils which cover approximately one-fifth of Australia's surface area and six out of eight of its largest cities.

National Interest Test Statement

Traditional lime-based methods used to treat expansive soils are not easily replaceable despite long-term sustainability and durability issues. Alkali-activated treatment is uniquely positioned as an alternative non-lime method that addresses these concerns. Discovering the best ways to dispense alkali-activated treatment through understanding of the interactions between alkali and expansive minerals will pave the way for constructing durable pavement and light structures built on expansive soils. The socioeconomic benefits of building resilient infrastructure using sustainable methods will help to ensure an economically sustainable future for all including the community that the infrastructure serves. This project provides research training to four PhD students in a novel area directly impacting Australian infrastructure development especially in Western Sydney with a prevalence of expansive soils. This research will extend the technical capability of Australian construction industry and enable consistent application of best practices and training of human resources in a critical area of Australian economy.

LP200301401	To map and enhance Australian musical improvisation as a creative industry	59,672.00	67,483.00	62,682.00	72,293.00	0.00	262,130.00	AUSTRALIAN MUSIC CENTRE LTD, EARSHIFT MUSIC
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Dean, Prof Roger T
The project maps transforming improviser networks in Australian music since 1970, to inform how cultural innovation develops and disseminates. Application of new statistical techniques (temporal network analysis) will combine with in-depth focus groups to show how improvisation excellence depends on a mix of artistic craft, networked collaboration and institutional support. This knowledge will assist music venues and industry in nurturing improvisation as a cultural force and commercial opportunity for export and tourism attraction post Covid-19. The novel method, integrating computational network analysis with qualitative research, will also inform and build capacity for future understandings of cultural fields and industries.

National Interest Test Statement

The Australian music industry is a 1.8 billion-dollar industry, with usually more than 8 million live attendees/year, and disproportionate international representation for a nation of our size. However economically, socially and in curation Australian improvised music has been subordinated to overseas classical composed music, to the detriment of our local industry. This project focuses on Australian improvised music since 1970 and into the future in order to revivify our music scene. It will do so by providing resources and analysis to make such music more accessible, comprehensible and widely utilised, forming a springboard to enhance future improvisatory practice. Most importantly, it will research novel tools to promote musical accessibility, for example to further disseminate inter-cultural music, and to help improvised music find a place in online performance, film and television. Such approaches will potentially position Australia even more strongly in international music arenas, help the industry adapt to the post-Covid norm, and will later also be valuable around the world.

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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LP200301481 Ang, Prof May len	The Collaborative Museum: Embedding Cultural Infrastructure in the City In partnership with the Museum of Arts and Applied Sciences, this project analyses the developing, complex processes of collaboration needed to embed the new Powerhouse Museum within the key Western Sydney city of Parramatta. The project's significance lies in exploring the concept of the 'collaborative museum' as a synergising agent, proposing an invaluable, ground-breaking framework for establishing community-embedded cultural infrastructure. Its outcomes will be beneficial across the entire cultural sector in shaping dynamic programs and encounters that resonate both locally and globally in underpinning an exciting model for conducting innovative, engaged research in large, diverse and culturally under-resourced metropolitan regions.	179,922.00	189,240.00	124,275.00	77,970.00	0.00	571,407.00	MUSEUM OF APPLIED ARTS AND SCIENCES
	National Interest Test Statement The appropriate return on investment of tax-payer funds requires that public museums contribute directly to the social, cultural and economic wellbeing of their localities. This project ensures that the new Powerhouse Parramatta, the first nationally significant cultural institution in Western Sydney, will be developed as a world-class museum relevant to both the wider community and local residents, especially local Indigenous people and recent migrants from diverse cultural backgrounds. In partnership with museum staff a 'living lab' will be housed in the museum, where the interests and ideas of local communities will be integrated into the development of collections, exhibitions and public programs on an ongoing basis. Focused on applied arts, science, technology, culture and the environment, the lab will provide a model for how museums can be pre-eminent civic spaces for active citizen engagement with urban development in the 21st century.							
	Western Sydney University	294,812.00	311,941.00	300,155.00	209,982.00	0.00	1,116,890.00	
	New South Wales	2,531,030.00	2,710,802.00	2,721,570.00	616,050.00	0.00	8,579,452.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure (\$)			Indicative Funding (\$)		Total (\$)	Partner Organisation(s)
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Queensland								
Griffith University								
LP200301043	Developing a national rural volunteering roadmap	95,134.00	88,153.00	111,758.00	89,879.00	0.00	384,924.00	VOLUNTEERING AUSTRALIA INCORPORATED, VOLUNTEERING QUEENSLAND INC, VOLUNTEERING VICTORIA INCORPORATED, VOLUNTEERING SA AND NT INCORPORATED, VOLUNTEER CENTRE OF WESTERN AUSTRALIA (INC.)
Lockstone-Binney, A/Prof Leonie A	This project aims to investigate the challenges affecting rural volunteering in Australia. Conducting a national analysis of volunteering demand and supply, this project expects to generate new interdisciplinary knowledge of the structural, demographic, organisational and personal factors affecting the sustainability of rural volunteering. Expected outcomes of this project include a world-first index of volunteering vulnerabilities and a spatial map of volunteering unevenness, leading to the development of an evidence-based National Rural Volunteering Roadmap (2025-2035), which will guide our volunteering peak body partners, governments and rural communities to plan for and support rural volunteering over the longer-term.							
	National Interest Test Statement							
	It is in Australia's interest to ensure that its reliance on rural volunteers can be sustained in light of unprecedented challenges affecting the supply of volunteers and increasing demand for their services. Volunteering supply and demand is affected by a complex mix of factors including population ageing, out-migration, increasing natural disaster risk and the withdrawal of government from direct service delivery. Ensuring a sustainable pool of rural volunteers is vital for maintaining essential services, promoting local leadership, supporting rural adaptive capacity and responding to environmental disasters, underpinning the economic, environmental and social wellbeing of rural communities. There is an urgent need to support rural volunteering in Australia but a lack of sector-wide evidence informing interventions to do so. This project will address these challenges by building a national evidence base to establish how structural, demographic, organisational and personal factors are affecting the sustainability of rural volunteering across Australia.							
	Griffith University	95,134.00	88,153.00	111,758.00	89,879.00	0.00	384,924.00	
Queensland University of Technology								
LP200301274	The impact of urban vertical schools on students' capability and wellbeing	99,864.00	127,796.00	136,194.00	0.00	0.00	363,854.00	FORTITUDE VALLEY STATE SECONDARY COLLEGE, ADELAIDE BOTANIC HIGH SCHOOL GOVERNING COUNCIL INC, PRAHRAN HIGH SCHOOL, AUSTRALIAN SECONDARY PRINCIPALS' ASSOCIATION INC., COX ARCHITECTURE, GRAY PUKSAND PTY. LTD., THOMSONADSETT, BFX FURNITURE, J. HUTCHINSON PTY. LTD., SPECIAL BROADCASTING SERVICE CORPORATION, SOUND OFF FOR SCHOOLS
Willis, A/Prof Jillian E	Urban vertical schools are new types of schools in Australia. There are no evidence-based Australian precedents to guide designers or educators, no formal knowledge sharing processes that draw on experiences of pioneers, and little understanding of what these spaces mean for student capability and wellbeing. This evaluative case study will bring together evidence from designers, educators and students in three newly built urban, vertical schools. Project findings will point to inclusive principles for designing and leading in physical, digital and social school spaces to maximise student wellbeing and capability. Insights into student experiences in urban, vertical school spaces will have value for infrastructure spending in all schools.							

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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National Interest Test Statement								
This project will produce robust evidence of student and teacher experiences in new urban vertical schools to inform educational and built environment decision making. It will evaluate how these innovative physical, digital and social school spaces impact student wellbeing and capability. School designers, educators and students will identify factors that link design aspirations for school spaces to their experiences. Expected outcomes include maps that highlight the impacts of physical, digital and social school spaces, and factors that influence student wellbeing and capability. Resulting design and education principles, and evaluation methods, will enable knowledge sharing between educational leaders, architects, builders and designers and governments. The project focus on inclusive design will bring social benefit for generations of students and educators, and benefit public investment in current and future urban, vertical schools, and other schools undertaking renovations or new buildings.								
LP200301310	Advanced Fibre Interfaces in Active Water Management Systems	160,000.00	160,000.00	160,000.00	0.00	0.00	480,000.00	ROCKWOOL
Barner-Kowollik, Prof Christopher	Flooding is a critical issue in Australia, generating considerable economic losses, including by stormwater contamination. The current project will pioneer an integrated solution for stormwater retention, while removing chemical pollutants. In collaboration with the company ROCKWOOL-Lapinus - based on a stonewool fibre platform - we will (i) design fibre coatings based on a versatile and chemically simple deposition process, (ii) incorporate functionalities onto the fibres allowing active stormwater treatment to e.g. retain pollutants or target heavy metals and (iii) investigate these interfaces in-depth by advanced surface and interface characterisation methods to understand the fibre interface properties from nano- to macroscale.							
National Interest Test Statement								
Diminishing water security due to stormwater pollution and urban flooding caused by intense urbanisation are compound challenges that most developed nations face. Australia, with 71% of its population living in large urban environments, is especially affected by flooding which has detrimental impacts on the economy and society. Moreover, untreated stormwater contains significant concentrations of pollutants, which can raise human health risks and damage urban ecosystems. As climate change and urban intensification will continue to exacerbate, sustainable city concepts to address this pressing issue must be implemented. The project will establish an advanced technology platform with a high performance stonewool material that is applicable to reduce urban flooding. Not only will we develop an advanced stonewool barrier acting as a 'passive' rainwater retention system, but critically as an 'active' filtration for pollutants. The developed system can be further translated to other materials, giving the unique opportunity to target alternative water filtration systems.								
Queensland University of Technology		259,864.00	287,796.00	296,194.00	0.00	0.00	843,854.00	
The University of Queensland								
LP200300740	Reasonable Adjustments to Maths for Students with Intellectual Disabilities	52,105.00	64,070.00	57,194.00	0.00	0.00	173,369.00	EDMUND RICE EDUCATION AUSTRALIA, INDEPENDENT SCHOOLS QUEENSLAND, ST. JAMES COLLEGE BRISBANE, MORETON BAY COLLEGE, ST JOSEPHS NUDGEE COLLEGE, RIPLEY VALLEY STATE SECONDARY COLLEGE, THE TRUSTEE FOR THE SOCIETY OF THE SACRED ADVENT - ST AIDAN'S TRUST
Faragher, A/Prof Rhonda M	Reasonable adjustments to secondary mathematics – parents want it, students need it, the Australian law requires it – but how do teachers achieve it? The aim of this project is to find ways to adjust, teach and assess secondary mathematics for students with intellectual and developmental disabilities. The significance of this study is in solving a problem facing teachers who are required by law to teach mathematics without evidence informed approaches. Expected outcomes are an evidence-base for reasonable adjustments to secondary mathematics and approaches and strategies for teachers for inclusive practices. If ways for teaching year-level mathematics to learners with intellectual disability are developed, many more students may benefit.							

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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National Interest Test Statement								
All Australian students deserve the right to engage with learning the Australian Curriculum: Mathematics. Some need legally mandated reasonable adjustments to do so, and yet an evidence-informed basis for making these adjustments does not exist. This places educators in a perilous position, as recent submissions to the Disability Royal Commission into Violence, Abuse, Neglect and Exploitation attest. This research will conceptualise reasonable adjustments in the context of secondary mathematics for learners with intellectual and developmental disabilities. Finding ways for teachers to successfully engage these learners in secondary mathematics will not only lead to greater prospects for the productive contribution of these students to Australian society, but the very real potential exists for other students who currently experience difficulties or who are disengaged from learning mathematics to succeed with the year level curriculum in Mathematics. There are substantial economic benefits to Australia of having a more skilled population who finish secondary school with improved maths and numeracy outcomes.								
LP200301160	Industrial disasters, disclosure deficit: Can transparency level the field?	117,567.00	151,049.00	130,351.00	0.00	0.00	398,967.00	UNIVERSITY OF THE FREE STATE, THE UNIVERSITY OF BRITISH COLUMBIA, ANGLO AMERICAN, NEWCREST MINING LIMITED
Kemp, Prof Deanna L	This project aims to identify and apply innovative forms of transparency and new processes of public accountability for energy transition minerals. Recent tailings dam disasters have damaged the global mining industry's reputation, eroded public trust, weakened investor confidence, and raised new challenges for insurers and other stakeholders. Companies are under intense pressure to disclose information about their activities and satisfy a concerned public that they are not putting people and the environment at risk. The research will benefit end users by improving Australia's ability to maximise its mineral resource endowment, supporting the transition to low-carbon technology, and safeguarding these assets for future generations.							
National Interest Test Statement								
In an age of unparalleled consumption and climate uncertainty, the link between resource extraction and socio-ecological impact is critical. This link is overt in mining, where impacts are increasingly subject to public scrutiny. While there is an increasing demand for minerals globally, anti-mining sentiment is rising and conventional methods of public disclosure and stakeholder engagement are not proving useful. This project has the potential to boost the contribution of metal mining to Australia's macro-economic development in sustainable and equitable ways. Through this ground-breaking project on new and innovative forms of tailings transparency and public accountability, unique models and methods will be developed that promise to significantly improve Australia's ability to maximise its own natural resource endowment in ways that reduce conflict, respect the individual and collective human rights and culture of indigenous peoples, and safeguard natural assets for future generations.								
LP200301212	Plant based foods: Towards sustainable and acceptable meat analogues	201,206.00	219,300.00	217,153.00	0.00	0.00	637,659.00	MOTIF FOODWORKS, INC.
Stokes, Prof Jason R	The project aims to address the need for engineering plant-based food products to deliver a sensory experience akin to meat. The project expects to generate new knowledge on the structural drivers for emulating meat-like texture and taste within burger products. Expected outcomes of this project include new ingredients and food characterisation methodologies, including rheology and sensory, which can be employed in rational food structure design. This should provide significant benefits in enhancing the consumer acceptance of plant-based foods that is required to support the rapidly growing market opportunity for them and sustainable food production.							
National Interest Test Statement								
The outcomes of this should have significant economic and environmental benefits to the Australian community. Economic benefits include those arising from the wider consumer acceptance of plant-based protein foods if they meet sensory expectations, which we anticipate enabling using food colloids and engineered structures and rheology. Success should stimulate new opportunities and innovations for growth, which will benefit the entrepreneurial start-up culture currently emerging in the plant-based foods sector globally and in Australia. Environmental benefits arise because it addresses the growing concerns with the sustainability of animal meat production, which is the driver for market demand of plant-based meats. Alternative protein sources are also needed to supplement animals as the population increases. Australian industry will also benefit from the development of a knowledge base and training of innovative researchers in world class rheology, chemical engineering, food colloids, sensory and food laboratories, which will be enhanced by working with an entrepreneurial global company.								

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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LP200301393 Bollmann, Dr Steffen R	<p>Robust, valid and interpretable deep learning for quantitative imaging</p> <p>One of the biggest challenges in employing artificial intelligence is the “black-box” nature of the models used. This project aims to improve the effectiveness and trustworthiness of deep learning within quantitative magnetic resonance imaging. Deep learning has great promise in speeding-up complex image processing tasks, but currently suffers from variable data inputs, predictions are not guaranteed to be plausible and it is not clear to the end user how reliable the results are. The outcomes intend to deliver advanced knowledge and capability in artificial intelligence and machine learning that Australia urgently needs to capitalise on bringing deep learning into practical applications delivering economic, commercial and social impact.</p> <p>National Interest Test Statement</p> <p>The proposed development of deep learning techniques for trusted and effective AI has the potential to lower costs of magnetic resonance imaging systems and make them easier to operate. This proposal will reduce the need for the manual steps that are currently involved in analysing quantitative imaging data. This could be especially beneficial in rural areas in Australia that currently have limited access to advanced imaging technology due to high costs and the lack of trained personnel. Our proposal aims at lowering the barrier to quantitative imaging and making it accessible to a wide range of applications, including neuroscientific and pharmaceutical research, healthcare, or education. Thus, there are potential benefits to improve quality of life in regional areas through improved access to services and benefits to the economy through the creation of more jobs.</p>	115,622.00	128,429.00	136,064.00	0.00	0.00	380,115.00	SIEMENS HEALTHCARE PTY LTD
LP200301402 Leardini, Dr Paola M	<p>Offsite manufacture reimaged for high-performance adaptable housing</p> <p>The project aims to address housing performance and affordability in Australia by deploying adaptable design for spatial reconfiguration and component reuse, to advance offsite timber manufacture towards energy efficient and healthy homes as mainstream practice. The intended outcome is the development, prototyping and monitoring of an offsite manufactured panelised lightweight timber system for high-performance homes, that is adaptable to all Australian climates and long-term household changes. This will contribute to the sustainable growth of the Australian housing market with significant benefits on housing affordability, adaptable design and long-lasting performance, while boosting the offsite manufactured timber construction sector.</p> <p>National Interest Test Statement</p> <p>This project aims to provide remarkable benefits to the Australian housing sector from both the industry and end-user perspective. It will enable the project partners, and the offsite timber industry, to supply innovative adaptable housing systems and reconfigurable components that are set to revolutionise the way houses are built, operated and maintained over an extended lifespan. Mainstreaming high-performance building standards for residential construction and linking the volume builder market to advanced offsite manufactured timber construction aim at providing a tangible pathway to meet Australia’s net zero carbon target by 2050. These benefits are transferable to the homeowners, who are given access to affordable, high-performance dwellings that are suitable to their disposable income and needs through adaptable design, and scalable through measurable impacts of healthy homes and cost-effective climate adaptation responses. This project may also produce new evidence of health and wellbeing impacts of high-performance homes to inform minimum permissible building performance standard in public policy.</p>	72,360.00	83,637.00	66,708.00	54,657.00	58,864.00	336,226.00	FAIRWEATHER HOMES PTY LTD, PRO CLIMA AUSTRALIA PTY. LTD.
LP200301483 Masser, Prof Barbara M	<p>Engaging ethnic minority and majority blood donors in donor recruitment</p> <p>Word-of-mouth is a potentially powerful way to recruit blood donors. Talking about donation increases awareness, trust, commitment and positive feelings about donating, particularly in ethnic minority groups. However, donors seldom tell others about donating. This project aims to determine how to motivate blood donors to recruit new donors using word-of-mouth, through research comprising co-design, surveys, and experiments. This project will generate new knowledge of how to encourage effective word-of-mouth for pro-social behaviours. Expected outcomes include producing culturally relevant, validated resources that will significantly benefit Australia by encouraging effective conversations to promote blood donation in all communities.</p>	108,771.00	141,138.00	139,965.00	0.00	0.00	389,874.00	AUSTRALIAN RED CROSS LIFEBLOOD, FEDERATION OF ETHNIC COMMUNITIES COUNCILS OF AUSTRALIA

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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National Interest Test Statement								
Australia faces ongoing challenges to ensure both the sufficiency of the blood supply and the suitability of the products donated to meet the transfusion needs of its increasingly ethnically diverse people. Donor-recruit-donor programs, such as telling others about blood donation (word-of-mouth), are the most cost-effective donor recruitment strategy, but how to encourage this behaviour is unknown. This program of research will build knowledge through identifying the motivators, barriers, and current practice of giving word-of-mouth endorsements for blood donation among ethnic minority and majority blood donors. Further, this program will provide social and cultural benefits to the Australian community through improving the social inclusiveness of blood donation by producing culturally relevant and validated resources in collaboration with ethnic minority and majority communities. These materials will facilitate effective conversations about blood donation and becoming a blood donor, providing an economic benefit to Australia through being a cost-effective way to improve donor recruitment.								
LP200301540	Predicting Perfect Partners: climate resilient seed production technology	206,709.00	205,069.00	195,633.00	0.00	0.00	607,411.00	GENTECH SEEDS PTY LTD, DEPARTMENT OF AGRICULTURE AND FISHERIES
Mace, Dr Emma S	This project aims to increase productivity and profitability of the Australian sorghum industry in the face of risks imposed by an increasingly variable climate. This project expects to generate new knowledge of processes limiting hybrid seed production and translate this world-class research into tools and services that can be used by seed companies to improve its efficiency and reliability. The intended outcome will increase the security and sustainability of farming by minimising the risk of climate-induced seed shortages, maintaining Australia's leadership in agricultural technology development. The expected benefits support profitable and productive businesses, providing Australian agriculture with a competitive, sustainable edge.							
National Interest Test Statement								
Australia needs to maintain a viable hybrid seed industry in order to support the production of sorghum, its 3rd largest cereal grain crop, which is pivotal to summer cropping systems and underpins a multi-billion dollar intensive livestock industry. The hybrid seed production industry is threatened by the impacts of extreme weather events, particularly high temperatures. Sorghum is the centre piece of cropping systems of the northern grain belt which stretches from central NSW to north QLD where it is critical to economic health of rural communities, supports employment in downstream industries such as meat processing and provides a major source of export income as well as. The proposed research will increase the productivity of the seed industry and reduce the risk of production failures associated with extreme weather events, maintaining Australia's leadership in agricultural technology development.								
LP200301583	Reducing plate waste in hotels - which interventions are most effective?	127,128.00	138,246.00	95,384.00	0.00	0.00	360,758.00	QUEENSLAND HOTELS ASSOCIATION UNION OF EMPLOYERS, AUSTRALIAN HOTELS ASSOCIATION NSW, PACIFIC ASIA TRAVEL ASSOCIATION, ASSOCIATION OF TOURISM FARMS OF SLOVENIA, HOTELIERS COOPERATIVE MARIBOR, SLOVENIAN ASSOCIATION OF HOTELIERS
Dolnicar, Prof Sara	This project aims to quantify the comparative effectiveness of belief-based and choice-architecture-based interventions in reducing food waste generated by tourists at hotel buffets. Expected outcomes include: new insights into effective triggers of pro-environmental tourist behaviour; the first empirical data on carbon emissions caused by plate waste in tourism; an automatic plate waste measurement system and benchmarking app for monitoring and comparison; and effective practical measures to reduce avoidable food leftovers generated by tourists. This should provide significant benefits by: lowering food cost for the struggling tourism industry, reducing carbon emissions, and contributing to Australia's aim of halving food waste by 2030.							
National Interest Test Statement								
Food waste is a major environmental challenge. It causes 6% of global greenhouse gas emissions and costs Australia \$20 billion a year. Australia aims to halve food waste by 2030. Tourism is critical to achieving this aim because tourists are a big part of the problem: at buffets they fill up their plates generously, just to leave 30% behind uneaten. Leftovers go to landfill and generate powerful greenhouse gas emissions. This project will: quantify the emissions caused by plate waste in tourism; design and experimentally test practical measures to entice tourists to eat up; and develop a benchmarking app for tourism businesses to monitor their plate waste continuously and in real time, and compare it with other tourism service providers. The measurement system and benchmarking app will outlive the project to inform the future development of more practical measures to reduce plate waste created by service providers in the tourism industry. Reducing the amount of food that is disposed of in landfill saves tourism businesses money, reduces carbon emissions, and helps Australia to halve its food waste by 2030.								
The University of Queensland		1,001,468.00	1,130,938.00	1,038,452.00	54,657.00	58,864.00	3,284,379.00	

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

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

Approved Organisation, Approved Research Program Leader of Approved Research Program		Estimated and Approved Expenditure (\$)			Indicative Funding (\$)		Total (\$)	Partner Organisation(s)
(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)
University of Southern Queensland								
LP200300887	Wearable thermoelectrics for personal heat management	138,747.00	141,047.00	148,747.00	0.00	0.00	428,541.00	AUZWOOLFAMILY
Chen, Prof Dr Zhi-Gang	Thermoregulation has substantial implications for energy consumption and human comfort and health. This project aims to develop wearable thermoelectric materials and devices with high cooling performance for personal heat management. A novel assembly approach, coupled with device design and materials engineering strategies, will be developed to engineer flexible thermoelectric materials with unique structures and chemistry. The key breakthrough is to design wearable thermoelectric devices with high flexibility and user comfort. The expected outcomes of this project will lead to an innovative cooling technology for personal heat management, which will place Australia at the forefront of wearable electronics and garment industry.							
	National Interest Test Statement							
	Personal heat management includes personal cooling, heating, heat insulation, and temperature adjustment functions, which are more flexible and extensive than traditional air/liquid cooling suits for the human body. Cost-effective, eco-friendly, and wearable thermoelectrics will be integrated with wool or fabrics to form smart textiles for personal thermal regulation, which will bring tremendous economic and environmental benefits to our society. The success of this project will provide brand-new technology and fundamental scientific discoveries in the field of thermoelectrics to the wool industry, which will significantly enhance the international visibility and impact of Australia in the area of development of smart textiles. The developed technology will be utilised in the wool and electronics industry for personal heat management. In this case, the outcomes of this project will help to create new employment opportunities in the fields of electronics and wool industry, and will provide wealth generation for Australia.							
	University of Southern Queensland	138,747.00	141,047.00	148,747.00	0.00	0.00	428,541.00	
	Queensland	1,495,213.00	1,647,934.00	1,595,151.00	144,536.00	58,864.00	4,941,698.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)		
(Columns 1 and 2)	(Column 3)						(Column 9)	(Column 10)
South Australia								
Flinders University								
LP200301660	Polymer technologies for oil spill remediation and slow-release fertilisers	285,256.00	273,728.00	0.00	0.00	0.00	558,984.00	CLEAN EARTH TECHNOLOGIES PTE LTD
Chalker, A/Prof Justin M	<p>This project aims to evaluate a patented sulfur polymer in commercial oil spill remediation and slow-release fertilisers. Key objectives are to determine how the polymer degrades, assess the effectiveness of the polymer in oil spill sorption in different contexts, and investigate the polymer as a matrix for slow-release fertilisers. The project expects to generate new approaches to sustainable remediation and crop production. Expected outcomes include new knowledge about the biodegradation of the polymer, new methods for deploying the polymer in oil spill cleanup, and new fertilisers that prevent nutrient waste and runoff. Significant benefits are expected for the environment, as well as economic benefits to the manufacturer and end-users.</p> <p>National Interest Test Statement</p> <p>This research has significant likely benefit to the economy and environment in Australia. The project builds on research and commercialisation that has already seen the establishment of a new Australian factory with new Australian jobs. In the research proposed here, the domestically manufactured polymer will be tested in entirely new commercial areas such as oil spill sorption, which has the potential to protect Australia's precious waterways and coastlines, including the Great Barrier Reef. The research also aims to make novel slow release fertilisers using the same polymer, which is likely to benefit Australian farmers economically, for instance Australian sugarcane farmers who will collaborate in this project. The fertiliser application will also benefit the environment because the fertiliser is designed to reduce harmful nutrient runoff.</p>							
LP200301661	New technologies for e-waste recycling	231,705.00	209,919.00	218,045.00	0.00	0.00	659,669.00	CLEAN EARTH TECHNOLOGIES PTE LTD
Chalker, A/Prof Justin M	<p>This project aims to provide commercially viable methods for recycling electronic waste (e-waste), with a focus on plastic recycling and precious metal recovery from circuit boards. This project expects to generate new knowledge in the separation and recovery of gold, silver, and palladium using novel leach reagents and sorbents. Additionally, new techniques will be evaluated for converting e-waste plastic into construction materials. Expected outcomes of this project include new capabilities for Australia's e-waste recycling industry, as the majority of circuit board waste is shipped overseas. This should provide significant economic benefits such as the recovery of valuable metals and the development of novel construction materials.</p> <p>National Interest Test Statement</p> <p>Australia currently ships the majority of its circuit board e-waste overseas for recycling. This project aims to develop commercially viable techniques for e-waste recycling that can be used to build this industry in Australia. The global e-waste recycling market is estimated to be nearly \$80 billion AUD. Each year in Australia, nearly \$200M AUD worth of gold, silver, and palladium is discarded in e-waste. Accordingly, there is a strong economic incentive to recover these valuable metals in Australia. Recovering these metals from e-waste is also beneficial to the environment, as it decreases the reliance on primary mining. This project also aims to repurpose the plastic in e-waste, which is too-often sent to landfill. The aim is to convert the plastic into novel construction materials that could serve as an alternative to concrete. Partner organisation, Clean Earth Technologies, will use the knowledge generated in this project to design a pilot e-waste recycling plant at their industrial hub in Adelaide, South Australia. This project has the potential to bring jobs and new economic activity to Australia.</p>							
	Flinders University	516,961.00	483,647.00	218,045.00	0.00	0.00	1,218,653.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)	(Column 10)
The University of Adelaide								
LP200300899	Rebooting the Muse: Post-COVID-19 sustainability in the performing arts	99,639.00	98,860.00	87,322.00	0.00	0.00	285,821.00	THE ADELAIDE SYMPHONY ORCHESTRA, STATE THEATRE COMPANY OF SOUTH AUSTRALIA, PATCH THEATRE COMPANY INCORPORATED, LIGHT CULTURAL FOUNDATION LIMITED, ILLUMINATE ADELAIDE FOUNDATION LTD
Goldsworthy, A/Prof Anna L	Rebooting the Muse advocates new ways of tackling the urgent challenges facing the Australian performing arts in the wake of the COVID-19 pandemic and climate change emergency. The research explores how new digital technologies can be deployed to offer new audience experiences, and documents the impact on artist and community wellbeing of these innovations. Project participants include prominent South Australian music and theatre organisations, and features children's theatre and Indigenous music performance groups. The research findings will drive a revision of organisational business models to better ensure sustainability across the sector, and with that, improve the wellbeing of individuals and the broader community.							
	National Interest Test Statement							
	Rebooting the Muse addresses the sustainability of the performing arts in Australia in the wake of the COVID-19 pandemic. Social distancing requirements have slashed audience numbers in an industry that is also grappling with its carbon footprint. This project confronts these challenges by analysing the impact of immersive technologies on creativity, artist participation, and audience reception, heeding the call by The House of Representatives Standing Committee on Communications and the Arts (August 2020) to 'rethink the way we create and interact with art'. Partners include prestigious arts organisations and festivals, Indigenous musicians, and children's theatre groups. Benefits include delivery of business models informed by the creative potential of technology, and innovative modes of artist collaboration that offset the economic impact of COVID, and reduce the need for travel. Evidence-based insights into the links between technology, creativity and wellbeing will build industry resilience, resulting in greater career certainty for arts workers, while culturally enriching the community at large.							
LP200301457	Reconstructing the Beetaloo/Greater McArthur Basin System	143,724.00	207,187.00	185,287.00	0.00	0.00	536,198.00	NORTHERN TERRITORY GEOLOGICAL SURVEY, COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, SANTOS LIMITED, EMPIRE ENERGY PTY LTD
Collins, Prof Alan S	This project aims to build a stratigraphic and water chemistry framework for the greater McArthur Basin—a rock system that covers northern Australia from WA to Queensland. This will be a vital resource for researchers and energy/mineral explorers. This project expects to develop novel sediment dating and isotopic proxies for salinity, redox and bioproductivity and use them to build a sequence stratigraphic framework of the basin. The expected outcome is a unique 3D lithological, geochronological and geochemical framework for the basin. Expected benefits include de-risked information for the petroleum and minerals industry, assisting northern Australia's resources economy, as well as insights into the development of our planet in deep time.							
	National Interest Test Statement							
	The project has the potential to generate large economic benefits for Australia by developing knowledge that could transform our understanding of gas resources in the Beetaloo Sub-basin and the vast greater McArthur Basin, in which it sits. Reserve estimates of gas in the Beetaloo alone make it a critical national asset. Yet, it is >1 billion years old, making it the most unconventional petroleum resource known. This project will develop new methods to understand the resource framework, including new ways to date sedimentary rocks and understand the basin's ancient water chemistry. These methods are equally applicable to exploring for sedimentary-hosted metal deposits (e.g. zinc, rare earth elements, copper), and in basins of this age elsewhere in Australia or overseas. Social and cultural benefits will come from building a nuanced understanding of how the planet developed towards habitability through this critical period as complex cells evolved and the Earth's surface was progressively oxygenated. The results will be widely disseminated to inspire the next generation of earth scientists.							

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)		
(Columns 1 and 2)	(Column 3)						(Column 9)	(Column 10)
LP200301543	Pioneering seed solutions for the industrial hemp industry	171,352.00	186,419.00	155,501.00	0.00	0.00	513,272.00	AUSTRALIAN HEMP SEED COMPANY PTY LTD
Burton, Prof Rachel A	<p>This project aims to develop the next generation of elite industrial hemp cultivars, grown for their seed with high protein and oil contents, that are drought resistant and make minimal THC, teamed with research into their feminisation to provide a safer and better method of producing premium female seed to supply to growers. Project outcomes will include increased fundamental knowledge of drought tolerance, cannabinoid biosynthesis and the feminisation process, converted to practical ways to manipulate these important agronomic traits. This will derisk the industrial hemp industry, encouraging increased cultivation of a nutritionally and economically valuable crop in Australia and create valuable intellectual property applicable globally.</p> <p>National Interest Test Statement</p> <p>Industrial hemp (IH) is a versatile plant with a broad range of uses, in particular providing nutritious seeds high in protein and oil and superior fibres for textiles and construction. It is gaining ground as a valuable crop in Australia but is dogged by unclear information about its agronomy plus lack of stable cultivars that perform consistently in the Australian climate. Legislated levels of THC are low and crops that exceed these have to be destroyed, posing an uncomfortable economic risk to growers. Through this project we will provide clear information about drought tolerance and how hemp plants respond to such stresses, enabling the introduction of strategies to reduce the ability of IH plants to make THC. This will be combined with the development of a safer and more effective way to produce high quality female seed stocks, ensuring the supply of elite lines to domestic and international growers. These advances will support and derisk growth of the hemp industry, allowing access to a global market predicted to reach US\$41 billion by 2027.</p>							
LP200301568	Maximising the value of Australia's sheepmeat industry with smart photonics	210,000.00	210,000.00	210,000.00	0.00	0.00	630,000.00	MEAT & LIVESTOCK AUSTRALIA LIMITED, MINIPROBES PTY LTD
McLaughlin, Prof Robert A	<p>This project aims to investigate new photonics technologies to measure meat quality in lamb and mutton. It expects to develop new knowledge in the areas of fibre optics and 3D printing for use by the red meat and livestock industries. Expected outcomes of this project include development of a new technology to rapidly identify premium meat during meat processing. This should provide significant benefits for Australia's red meat industry, helping to establish Australia as a leading supplier of high-quality meat to domestic and international markets.</p> <p>National Interest Test Statement</p> <p>Australia is the world's largest exporter of lamb and mutton. However, Australia has only a small proportion of the world's sheep flock and has several long-term threats to its position. There is an urgent need to develop Australian technology to provide our red meat and livestock industries with a competitive advantage. Our most significant and profitable opportunity lies in supplying premium lamb, which builds upon Australia's established brand as a provider of high-quality agricultural products. This project will develop a new technology to rapidly assess meat quality in sheep and mutton. This could allow Australian producers to offer a new, premium product to both domestic and international markets. It has the potential to increase the value of Australian sheepmeat sales by up to \$183mil annually and help to support the 190,000 Australians employed in the red meat and livestock industries.</p>							
	The University of Adelaide	624,715.00	702,466.00	638,110.00	0.00	0.00	1,965,291.00	
University of South Australia								
LP200300841	Determining the social value of extreme, mixed-use urban developments	87,520.00	98,200.00	102,274.00	0.00	0.00	287,994.00	UNITING COMMUNITIES INCORPORATED, AUSTRALIAN INSTITUTE OF ARCHITECTS
Barrie, Dr Helen R	<p>Using an Adelaide case study, UCity, this project will investigate the social benefit of building mixed-use vertical communities in the Australian urban context. Using an innovative Social Value Framework, the project will establish and demonstrate the multi-dimensional impacts of such developments in practice. The project utilises citizen science for real time auditing of the built environment by residents and users; smart technologies for environmental and behavioural monitoring; and data analytics and design automation for spatial analysis of building use. The results will inform new models of sustainable high-rise, mixed-use buildings; providing evidence for a Social Value Framework to become a core consideration in Australian industry.</p>							

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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National Interest Test Statement								
In an increasingly urbanised world, cities must meet the needs of disparate and often vulnerable communities. Denser, increasingly diverse urban populations require serious consideration of how to create resilient neighbourhoods and thriving communities. There is growing consensus about the impact of architecture and design on wellbeing and placemaking; and that buildings themselves have inherent social value in the way they influence social connectedness, healthier lifestyles, sense of belonging, and positive emotions. The value of this 'social good' can be determined through a series of metrics using a Social Values Framework. This project will address a market opportunity for innovative, vertical urban communities with alternative forms of housing for more vulnerable population groups in a supportive, sustainable environment, co-located with social services, social opportunities and commercial businesses. The development of new Social Values tools and good-practice guides for Australia will provide end-user benefits by providing socially and environmentally appropriate housing for diverse end-user groups.								
LP200301399 Lee, Dr Gun	Immersive Technologies for Rapid Metallic Tank Inspection and Repairs	169,039.00	153,649.00	157,546.00	0.00	0.00	480,234.00	NDE SOLUTIONS PTY LTD
Metal tank silos house some of the most dangerous chemicals, which erode the internal structure of the tank over time. It is critical to check the integrity of the tank to prevent disasters from occurring. NDE solutions uses a rapid motion scanner (RMS) to scan the interior surface of the container while it is still full of its storage material. It is the aim of this project to use Augmented Reality, to overlay the scan provided by the RMS, onto the worker's view of the tank, control the robot via. hand gestures, and facilitate remote training/guidance. The result will allow for inspection workers to quickly and accurately the location of critical failures, without performing the hazardous procedures of internal tank inspection.								
National Interest Test Statement								
Overall, this project has the potential to prevent catastrophic accidents caused by the failure of storage containers, saving millions of dollars in both environment damages (especially in the case of toxic chemical spills) and hazard prevention (saving man hours by performing the task faster). While this project focuses on inspection of metallic containers that contain oil/chemicals, the results of this project apply to a wide scope of industries as the applications of the RMS are expandable to the inspection of any metallic container, such as grain silos (agricultural) and and welding inspection, ensuring that welds are air-tight, preventing gas/dangerous chemical leaks (affecting industrial construction). Additionally, there is presently a strong push in the Oil, Gas & Mining industries to remove as many personnel as they can from the field and into the cities. The benefit being a safer work environment at reduced cost with the drawback of being unable to directly inspect the tank. An AR system that will allow a remote engineer to observe and assist a local inspector will be of great value to industry.								
University of South Australia		256,559.00	251,849.00	259,820.00	0.00	0.00	768,228.00	
South Australia		1,398,235.00	1,437,962.00	1,115,975.00	0.00	0.00	3,952,172.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)

Tasmania

University of Tasmania

LP200301578	Sustainable Hydrogen Certification: A Multistakeholder Governance Approach	78,485.00	78,044.00	86,254.00	0.00	0.00	242,783.00	DEPARTMENT OF STATE GROWTH
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Gale, Prof Fred P

The project aims to assist policy analysts to devise a sustainable certification scheme for hydrogen that meets multistakeholder requirements. Its significance lies in challenging a techno-economic mindset focusing only on the fuel's carbon intensity within a production plant. Taking a comparative historical approach, and incorporating the views of energy experts and stakeholders, the expected outcome is options for a new sustainable certification scheme that addresses all technical, economic, social, environmental and governance requirements. The benefits to Australia are a 'gold standard' sustainable certification scheme that assures the country's competitiveness in export markets and influence in global certification negotiations.

National Interest Test Statement

Australia and peripheral regions like Tasmania stand to benefit enormously from the emerging global hydrogen economy, projected to add over 17,000 jobs and \$26 billion in GDP. To secure these benefits, it is vital that hydrogen exported from Australia meet supply chain actors and stakeholders expectations which are being shaped by competing discourses of nationalism, globalism and sustainability. Existing certification approaches may be too narrowly focused on hydrogen's techno-economic aspects creating the risk that consumers will prefer hydrogen produced according to broader, more sustainable criteria. It is in Australia's national interest therefore to consider what a sustainable hydrogen certification scheme would look like so that it can pivot to adopt such a scheme should markets subsequently demand one. This project investigates the requirements of a sustainable hydrogen certification scheme and trials and refines it based on renewable energy expert and stakeholder responses.

University of Tasmania	78,485.00	78,044.00	86,254.00	0.00	0.00	242,783.00
Tasmania	78,485.00	78,044.00	86,254.00	0.00	0.00	242,783.00

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)		
Victoria								
Deakin University								
LP200301442 Rajkhowa, A/Prof Rangam	Elastic and biodegradable sponges/aerogels from exfoliated silk nanofibres The aim of this project is to investigate methods to produce highly porous elastic sponges from silk protein nanofibres. These sponges will have optimal mechanical, insulation and degradation properties making them suitable for a wide range of applications including the biomedical and personal care sectors, where current products have significant drawbacks due to the use of non-biodegradable synthetic materials. Outcomes include new knowledge on controlling porous structures and tailoring properties to targeted applications. This project, by laying the groundwork for a new generation of bio-based materials, will benefit the Australian advanced manufacturing sector, and enhance Australia's standing in materials science and engineering.	114,672.00	118,761.00	122,847.00	0.00	0.00	356,280.00	EAR SCIENCE INSTITUTE AUSTRALIA INCORPORATED
National Interest Test Statement								
This project will develop novel bio-based materials which will contribute to addressing the increasing pressure to replace non-renewable synthetic products with sustainable material solutions across numerous sectors, with improved environmental implications. Silk-based materials offer the advantages of controllable degradation and enhanced functionality, leading to a new generation of degradable drug eluting sponges for the biomedical industry, super absorbent sponges for personal care industry and biodegradable super-insulating aerogels for applications across the insulation and energy storage industries. Research outcomes will benefit Australia's advanced manufacturing sector and will improve competitiveness with new sustainable and smart materials. This technology could encourage development of future products to benefit improved hearing outcomes for patients suffering complex health issues within the middle ear, including the Indigenous community, and more efficient wound healing solutions.								
LP200301537 Chen, Prof Ying I	Novel Fuel Materials for Radiation-Free Proton-Boron Fusion Power Source Laser proton-boron fusion reactions are a radiation-free nuclear energy source but are limited by a low reaction rate due to a lack of efficient fuel materials. This project aims to develop new fuel materials by synthesising isotope boron 11 enriched hydrogen borides and hydrogen adsorbed boron nitride nanosheets using our research experience in hydrogen storage and nanomaterials synthesis. The expected outcomes include two new hydrogen storage nanomaterials, the associated new synthesis technologies, and a clean and safe nuclear power source, which helps to reduce carbon dioxide emissions.	189,084.00	203,615.00	176,277.00	0.00	0.00	568,976.00	HB11 ENERGY HOLDINGS PTY LTD
National Interest Test Statement								
By 2030, Australia is predicted to generate at least 48% of its electricity via renewable sources. However, renewables face challenges of scale, decentralised production, distribution and storage. An alternative has emerged in the Australian-discovered fusion reaction between hydrogen and boron. This reaction has been demonstrated to open a new possibility of unlimited clean and safe electricity production. Unlike nuclear fission, the non-thermal fusion reaction uses non-radioactive hydrogen-boron fuel, produces no dangerous penetrating radiation and leaves no radioactive waste. The project is a collaboration with Australian company HB11 Energy Holdings Pty Ltd, a world-leader in this technology. It aims to develop world-first hydrogen storage technologies to identify the optimal fusion fuel and its manufacturing processes. This would retain Australia's global leadership in non-thermal fusion, and ultimately assist in Australia's transition to clean, safe and sustainable sovereign energy security.								
Deakin University		303,756.00	322,376.00	299,124.00	0.00	0.00	925,256.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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La Trobe University								
LP200301428 Pakes, Prof Christopher I	An atom-scale fabrication technique for diamond quantum microprocessors This project aims to develop an atomically-precise fabrication technique for the production of diamond quantum microprocessors through the pursuit of a novel bottom-up approach. This project expects to create significant new knowledge and capability in precision diamond growth, surface chemistry, electronics and characterisation, establish a long-term strategic partnership between Quantum Brilliance and the participating organisations, and enable the realisation of high-performance quantum microprocessors. These outcomes will potentially deliver Australia and Quantum Brilliance a profound advantage in quantum computing, thereby securing their positions in the emerging global quantum market and the associated economic and security benefits.	277,591.00	283,706.00	0.00	0.00	0.00	561,297.00	QUANTUM BRILLIANCE PTY LTD
	National Interest Test Statement Quantum computing is rapidly emerging with an expected \$50B+ global market by 2040, driven by the potential for transformative applications across science, industry and defence. Significant current investment is directed towards engineering quantum computers that offer a large-facility mainframe supercomputer. This project will take a different approach by manufacturing a diamond quantum microprocessor at lower cost that is compact and robust, expanding the scope of quantum computer applications and where they can be employed. This will deliver unparalleled capabilities to Australian industry through applications in chemical and materials innovation, drug discovery, food production and defence. Australia's diamond material science capability will be combined with an innovative microprocessor design to develop a technique for atom-scale engineering of diamond quantum microprocessors, enabling the Australian quantum industry to capture a significant share of the global quantum computer market, enhancing its sovereign quantum capability, and supporting the training of a future quantum industry workforce.							
	La Trobe University	277,591.00	283,706.00	0.00	0.00	0.00	561,297.00	
Monash University								
LP200300843 Kippen, A/Prof Rebecca	Putting death in its place The project aims to link 890,000 population records to place of residence from 1838 to 1930, to examine the relationships between where people live, mortality, life expectancy and health. Where people live impacts their life-course outcomes. Using novel matching techniques, the project expects to identify intergenerational changes and the spatial dynamics of inequality and social mobility. Expected outcomes include the creation of a public resource of linked data and a better understanding of long-run health and inequality. These should provide economic and social benefits by informing policy aimed at contemporary social and health challenges, enhancing our understanding of Australian history, and developing public resources.	146,524.00	146,524.00	148,524.00	0.00	0.00	441,572.00	LIBRARIES TASMANIA
	National Interest Test Statement One of the most fundamental issues facing people is where, and in what circumstances they live. The focus of this research is on how this relates to mortality, and the factors that influence this through generations. Inequalities in these types of outcome are often correlated with particular geographic locations, or urban characteristics, which themselves originate from more fundamental issues such as environmental effects, and the availability of public services. These relationships are complex and are only beginning to be understood. This study, by exploring a long run history of the interplay between mortality, health and place for Tasmania, aims to inform contemporary policy and research. Of equal importance is an understanding of our past. To this end, this work will generate a unique set of matched data, freely accessible through a user-friendly interface. This resource will stand as a means by which Australians can explore their more personal histories, and provide a window into the overall evolution of Australian society.							

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)
LP200301063 Hutchinson, Prof Christopher R	The development of lead-free silicon brass for the plumbing industry The worldwide brass industry is currently undergoing a transition away from lead-containing brass water fittings to lead-free fittings. The transition is driven by concerns surrounding lead-leaching into drinking water. This project is focussed on the development of new lead-free brasses that can be used to manufacture plumbing fittings with superior combinations of processability, performance and cost. National Interest Test Statement The objective of this project is to develop lead-free brass fitting alternatives for the plumbing industry. In other parts of the world, this transition has already been legislated due to a concern around lead-leaching from brass fittings in contact with drinking water, and it is anticipated that Australia will soon follow. Developing the necessary understanding of the metallurgy, corrosion and processability of the commercially available silicon-containing lead-free brasses, as well as developing new and improved silicon-containing replacement brasses is therefore critical to the industry sector. The project will co-develop new products with the industry partner and demonstrate proof of concept techniques for designing and manufacturing 'Pb-lean' and 'Pb-free' brasses, which can lead the development of eco-friendly plumbing fittings in the future for the industry as a whole. This project will therefore lead to economic, commercial and social benefits, and long-term environmental benefits resulting from the replacement of lead-containing brasses with lead-free brasses.	69,738.00	128,238.00	59,738.00	0.00	0.00	257,714.00	RELIANCE WORLDWIDE CORPORATION (AUST.) PTY. LTD.
LP200301320 Zhang, Prof Xiwang	Sustainable Hydrogen Production from Used Water The project aims to address the pressing challenge of water scarcity in hydrogen production by developing an innovative approach of using used water as the feed for water electrolysis. The project will result in an in-depth understanding of the impacts of water impurities in used water on the performance and durability of water electrolyzers, and develop guidelines for the design of highly durable water electrolyzers and the operation and upgrade of existing wastewater treatment plants. The project will advance the practical applications of water electrolysis for scalable and sustainable hydrogen production and help Australia secure a leading position in the global emerging hydrogen economy. National Interest Test Statement The sustainable production of clean, renewable hydrogen energy provides an attractive alternative to the traditional fossil fuels to address the increasing climate change concerns over the development and sustainability of Australia and the world. Abundant renewable energy and consistent water supply are both crucial for sustainable hydrogen production via water electrolysis. Australia has rich renewables including solar and wind, which is a strong drive for developing the hydrogen economy. However, as an arid country, Australia has been facing the challenge of ensuring a robust and resilient water supply to sustain its economic and social development. Instead of using fresh water, the project proposes a novel concept of using used water for scalable and sustainable hydrogen production and addresses the knowledge gap in co-design of water electrolysis and wastewater treatment processes. Aligning with the National Hydrogen Strategy, the project will help Australia become a global leader in the emerging hydrogen economy.	165,046.00	184,887.00	191,216.00	0.00	0.00	541,149.00	WATER RESEARCH AUSTRALIA LIMITED, GRAPHENEX PTY LTD
LP200301403 Cain, A/Prof Sean W	Next generation smart lighting to improve sleep and alertness Light has a powerful influence on our sleep and alertness. The manipulation of the amount of blue in a light source and the visual brightness of a light source are key factors, but there has been no systematic study that can guide manufacturers in the design of the ideal light source for promoting either sleep or alertness. This study will systematically examine the impact of the amount of blue light in a light source and the visual brightness, creating a wide range of combinations that can be used to model the optimal light specifications for sleep and alertness, while maintaining visual acuity and colour discrimination. This will be the evidence base needed by the lighting industry to create the next generation of smart lighting.	176,539.00	161,224.00	141,825.00	0.00	0.00	479,588.00	VERSALUX LIGHTING SYSTEMS PTY LTD

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 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)
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National Interest Test Statement								
Light has powerful effects on sleep and alertness. The move to energy-efficient LED lighting is occurring world-wide, with little systematic study to optimise their design for human physiology, resulting in unwanted negative effects on sleep and alertness. Australia's transition to LEDs has resulted in national savings of an estimated \$5.5 billion per year. Current LED systems, however, do not take human biology into account and contribute to inadequate sleep (costing the Australian economy \$26 billion per year), workplace accidents (costing the Australian economy \$61 billion per year), and incalculable costs to general health. Our team is ideally positioned to figure out how to build the next generation of smart lighting. We will achieve this through a strategic partnership between world experts in the effects of light on human biology and an Australian leader in the manufacturing of human-centric lighting. Our project will fill a major gap in the evidence needed to generate the lighting specifications needed for any home or operational setting to improve sleep and alertness.								
LP200301587 Martin, Dr Brian J	Repairing memory & place: An Indigenous-led approach to urban water design This project aims to integrate Indigenous ways of knowing with urban water management by pioneering an interdisciplinary approach that enmeshes Indigenous practice with mainstream water management techniques. It expects to generate new knowledge in urban water management by using On Country Learning and design-led approaches to integrating disparate knowledge. Expected outcomes include new tools for urban water management and a framework for engaging Indigenous water-management expertise. This should provide significant benefits by enabling the repair of ecological and cultural memory of place and enabling government agencies to apply Indigenous practices to everyday management of urban water towards a more sustainable water future.	78,480.00	80,000.00	81,520.00	0.00	0.00	240,000.00	MELBOURNE WATER CORPORATION, BAYSIDE CITY COUNCIL, CITY OF PORT PHILLIP, BOON WURRUNG FOUNDATION LIMITED, MUSEUM VICTORIA
National Interest Test Statement								
This project will elevate Indigenous urban water design as an approach for reconceptualising and better using urban space in Australian cities, through a southeast Melbourne case study. The project addresses the priorities outlined by the Australian Housing and Urban Research Institute: that Indigenous perspectives should be better integrated in Australian urban policies, particularly through in-depth involvement in urban planning process. The project will directly benefit Melbourne's urban environment through the development of more sustainable water management systems able to cope with continued change in water conditions, with findings indirectly benefiting other Australian cities. By producing an integrated water management model – premised on the importance of Country and embodying the interconnected, above and below ground flows of water – this project will have environmental benefits for biodiversity and water ecologies, economic benefits from a better understanding of flood conditions in the city, and socio-cultural benefits through better protection of culturally significant sites and systems.								
Monash University		636,327.00	700,873.00	622,823.00	0.00	0.00	1,960,023.00	
RMIT University								
LP200301027 Hickey-Moody, Prof Anna C	Creative industries pathways to youth employment in the COVID-19 recession This project aims to accredit 21st century skills developed through youth arts. The significance of this project lies in our response to the increase in Australia's youth unemployment caused by the COVID-19 pandemic and industry demand for 21st century skills. Outcomes include pathways from arts to employment and job-ready skill development, through micro-creds that showcase skills to employers. Benefits align with UN Sustainable Development Goals 4, 5 and 8: to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, achieve gender equality and empower all women and girls, and promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.	110,471.00	112,367.00	115,757.00	0.00	0.00	338,595.00	AUSTRALIA COUNCIL, AUSTRALIAN THEATRE FOR YOUNG PEOPLE, THE PUSH INCORPORATED, FUTURE FOUNDATIONS LIMITED, CENTRE FOR MULTICULTURAL YOUTH

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 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)
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National Interest Test Statement								
Australia's Productivity Commission has noted that young people carry a heavy burden in the downstream of crises, citing strong historical evidence most recently from the Global Financial Crisis of 2008-09. Economic and social crises are predicted as a result of COVID, which entered a world dealing with the challenges and opportunities of the 4th Industrial Revolution and the climate crisis. In July 2020 youth unemployment in Australia sat at 16.3%. Governments, businesses and NGOs acknowledge the severity of this youth crisis, and the urgent need to develop interventions that provide innovative education, training and employment pathways. By instituting industry-focused accreditations of 21st century skills, such as critical thinking, creativity, leadership, persistence, this project will improve the economic and social inclusion of Australian young people. This, in turn, will increase the productivity of Australian industry, re-establish the value of high-quality arts education and address the deleterious effects of several social upheavals on Australian youth.								
	RMIT University	110,471.00	112,367.00	115,757.00	0.00	0.00	338,595.00	
Swinburne University of Technology								
LP200300726 Hughes, A/Prof Karen E	Photography and Reconciliation: the Ngarrindjeri and the SA Museum The project aims to recover, curate and exhibit a large archive of photographs of national significance created by Aboriginal photographers in the mid-20th century. Working with Ngarrindjeri custodians and the South Australian Museum, it expects to raise the status and diversity of Aboriginal voices in Australian visual culture and public life, undertaking a process of healing. Cultural revitalisation and generational learning via the creation of a Living Archive and public exhibition are expected outcomes. Benefits include ensuring longevity of endangered heritage, broadening knowledge of southeastern Aboriginal lives and contributing new evidence to better understand the correlation between cultural revitalisation and community wellbeing.	131,630.00	130,437.00	180,511.00	0.00	0.00	442,578.00	NGARRINDJERI REGIONAL AUTHORITY INC, SOUTH AUSTRALIAN MUSEUM, MOORUNDI ABORIGINAL COMMUNITY CONTROLLED HEALTH SERVICE INC
National Interest Test Statement								
Historical photographs taken and owned by Aboriginal and Torres Strait Islander people have proven to be powerful narrative tools that restore community histories and relationships, yet such collections are endangered and rarely circulated. This project will contribute to the national interest by producing a major new digital cultural resource that will safeguard this cultural heritage which is at imminent risk of loss. An innovative model of collaboration between Indigenous people, universities and the South Australian museum will be generated, which will have wide application to other Indigenous nations and collecting institutions. The project will support innovative models of reconciliation in Australian museum practice. It will foster better understanding of shared histories, using historical resources created and cared for by Indigenous peoples, and elevating Indigenous voices. Importantly, the project will support an evidence base for Aboriginal wellbeing by better understanding the correlation between community wellbeing and community-governed processes of cultural revitalisation.								
LP200301010 Heckenberg, Dr Sadie L	Empowering Aboriginal & Torres Strait Islander Girls, Changing Communities This project applies Indigenous knowledges to develop new understandings and insights in the area of Aboriginal and Torres Strait Islander girls' education. Expected outcomes of the project include: the development of a national framework that supports the education of girls and acknowledges the importance of self-determination, culture, gender and place in creating life changing educational opportunities; addressing Close the Gap targets; and creating broader long lasting positive changes regarding access, participation and success for Aboriginal and Torres Strait Islander students. The outcomes of this project can provide significant benefits to the broad Australian schooling system.	254,132.00	250,632.00	228,632.00	0.00	0.00	733,396.00	ROLE MODELS AND LEADERS AUSTRALIA LTD.
National Interest Test Statement								
Our understandings of Aboriginal and Torres Strait Islander girls' education in Australia could be greatly improved if we explore the significant influences of self-determination, culture, place and gender on education. This project will explore best practice models for Aboriginal and Torres Strait Islander girls' education. In increasing our understandings of these models, the project aims to: develop a national framework to ensure culturally safe spaces in our schools and education settings; provide benefits to local communities who will use these frameworks; and strengthen educational outcomes for Aboriginal and Torres Strait Islander girls, including increasing national success, completion and retention rates. This model could in turn be an international example of best practice for engaging First Nations students and ensuring the school system becomes a place of inclusion and safety for Indigenous peoples.								

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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LP200301154 Arulrajah, Prof Arul	<p>Fatigue life and biodegradation of biomass waste composites in roads</p> <p>This project aims to develop a new low-carbon pavement stabilisation technology by utilising biomass waste composites in road subgrades and bases. This research expects to generate new knowledge on the performance of biomass composites in roads, when subjected to high traffic loads using experimental, numerical approaches and field trials. Expected project outcomes include evaluating the long-term performance of this new road construction material, developing predictive models and building enduring collaborations with industry. Benefits include: diversion of wastes from landfills, reduction in greenhouse gas emissions and the potential for commercial applications of biomass waste composites in future roads.</p> <p>National Interest Test Statement</p> <p>This project will benefit the Australian pavement geotechnology, waste management and road construction industries, as it will open new markets for the usage of biomass, biomass ash, demolition wastes and geopolymers in road projects. This project offers an alternative road construction material, incorporating the innovative usage of biomass waste composites, with a significantly lower carbon footprint and longer lifespan than traditional virgin quarry materials. National benefits arising from this research include: (a) diversion of 15 million tonnes of biomass and 21 million tonnes of demolition wastes annually from Australian landfills, (b) significant reduction in the need for virgin quarry materials, (c) environmental preservation by reducing greenhouse gas emissions, with projected carbon savings of 1.1 Mt CO₂-e/annum, (d) cost savings of \$58 million/annum through use of existing waste materials, and (e) opening new markets for Australia's waste management, road construction and pavement geotechnology industries.</p>	162,312.00	199,522.00	199,822.00	0.00	0.00	561,656.00	IQ ENERGY AUSTRALIA PTY LTD, GEOFRONTIERS GROUP PTY LTD, GEOTESTA PTY LTD, CHAIYONG KAMAI CO. LTD
LP200301335 Farmer, Prof Jane C	<p>Activating social connection to address isolation in Australia</p> <p>Surveys of wellbeing repeatedly emphasise social isolation, but there is a gap in positive approaches that can be used to grow connection. This research aims to design an approach to activate social connection for people and communities. Using a pre-tested evidence-based framework, experiences of vulnerable cohorts, and affordances of ways to connect on and offline, this project takes a strengths focus to develop a joined-up place-based strategy. Expected outcomes include world-first practical tools and guidance for local social connection activation and new knowledge about how interwoven on/offline services assist social connection. Increasing social connection is expected to improve individuals' mental wellbeing and community resilience.</p> <p>National Interest Test Statement</p> <p>This project seeks to address Australians' high social isolation by developing an evidence-based, strengths-based approach and toolkit enabling both individuals and communities to activate social connection. In doing so, it offers social benefits in improving individuals' mental health and inclusion, and communities' cohesion, social capital and resilience. Project outcomes will provide comprehensive, actionable strategies for specific vulnerable groups and places (new migrants, isolated youth, isolated older people and people with enduring psychosocial disability, in the highest growth suburbs). The coalition of community partners involved means outputs will be immediately applied and disseminated in Australia and overseas, conferring wider benefits. Many community services are moving to online, and this project will be able to inform on optimal on/offline infrastructure investment for social connection, based on identifying best practice. Reducing social isolation will also confer economic benefits including large savings in healthcare spend and boosts to workplace engagement from well-networked employees.</p>	155,663.00	161,589.00	167,525.00	0.00	0.00	484,777.00	AUSTRALIAN RED CROSS SOCIETY VICTORIA, NEAMI NATIONAL, CASEY CITY COUNCIL, CITY OF WHITTLESEA, WYNDHAM CITY COUNCIL, TODAY STRATEGIC DESIGN PTY LTD
LP200301659 Hameed, Dr Nishar	<p>Scalable Graphene Enabled Smart Composites</p> <p>The need for lightweight composite materials is increasing exponentially in the context of renewable energy, e-mobility and related emission reductions. This project aims to develop novel approaches to integrate graphene nanomaterials into structural composites, enabling damage sensing and structural health monitoring functionalities. The outcome of this project will be a new class of smart composites that will address the critical need for improving structural integrity, safety and reliability, while significantly reducing lifecycle costs. This should provide significant benefits in creating confidence to increase investment in Australia for manufacturing graphene enabled smart materials and technologies with enormous export potential.</p>	132,100.00	127,858.00	148,061.00	0.00	0.00	408,019.00	IMAGINE INTELLIGENT MATERIALS LIMITED., COMPOSITE MATERIALS ENGINEERING PTY. LTD.

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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National Interest Test Statement								
Graphene is the lightest, strongest, most electrically conductive material yet to be discovered, and is predicted to generate revolutionary new products across all industry sectors. This project will develop an Australian breakthrough 'smart technology' that provides multiple functionalities in light weight composites such as in-built sensing, structural health monitoring, damage detection and information processing. The outcomes will enable large volume applications of graphene use in composites and will connect Australian industry to the development of Industry 4.0 capabilities internationally. This project will develop Australia's leadership in graphene enabled smart materials and technologies in this strategic area that will further fuel growth in the advanced manufacturing sectors. It will support partner organisations, Imagine Intelligent Materials and Composite Materials Engineering, and their supply chain partners, at bringing advanced graphene and composite material solutions with access to the global advanced manufacturing supply chains.								
Swinburne University of Technology		835,837.00	870,038.00	924,551.00	0.00	0.00	2,630,426.00	
The University of Melbourne								
LP200300478 Praver, Prof Steven	Diamond Microneedles for Minimally Invasive Blood Collection Blood sampling is a routine procedure for medical purposes to determine the physiological and biochemical status of patients. The aim of this project is to develop a reliable microneedle array for a blood collection procedures. Micro-scale needles for low-volume perforated blood samples are highly desirable due to its minimal invasiveness and painlessness. The miniaturization of sampling platforms driven by microneedles has the potential to shift disease diagnosis and monitoring closer to the point of care. Expected outcomes include the development of synthetic diamond-based microneedles for the potential to greatly benefit society through improved and affordable healthcare and the development of new high-tech industries.	139,000.00	152,000.00	152,000.00	0.00	0.00	443,000.00	TRAJAN SCIENTIFIC AND MEDICAL PTY LTD
National Interest Test Statement								
This project aims to develop a reliable microneedle array for blood collection procedures in medical treatment. It will develop and provide state of the art microneedles that enable minimally invasive blood extraction. Successful developments will bring significant national benefits. They have the potential to shift disease diagnosis and monitoring closer to the point of care. This will create substantial economic opportunities in enabling the growth of medical consumables industries in Australia through linkage to existing Australian companies. There is also a significant opportunity for increases in social well-being and community health through new blood extraction technologies, for example, with less traumatic blood extraction from infants and diabetics patients and others who require this procedure regularly. Finally, research on microneedle-based collection devices will reduce reliance on technicians to collect blood samples, thereby making point-of-care diagnostics more cost-effective and more widely available, bringing significant social benefits to Australians of all ages.								
LP200300530 Humphreys, Prof Cathy F	Disrupting Child Exploitation - the DICE project Child sexual exploitation is an insidious social problem which impacts the most vulnerable children and young people in Australia. The DICE project (Disrupting Child Sexual Exploitation) aims to develop a multi-agency response which pivots the focus of intervention to the sexual exploitation predators who target vulnerable young people in statutory care. Previous interventions have prioritised protecting (and controlling) the young people, with limited success. Through a trauma informed approach which supports young people, combined with disruptive police strategies targeting perpetrators, and co-ordinated multiagency working, it is anticipated that there will be measurable changes to the protection of vulnerable young people.	175,105.00	228,255.00	234,474.00	0.00	0.00	637,834.00	MACKILLOP FAMILY SERVICES LIMITED, DEPARTMENT OF HEALTH AND HUMAN SERVICES, DEPARTMENT OF COMMUNITIES AND JUSTICE, POLICE DEPARTMENT (VIC), NSW POLICE DEPARTMENT, DEPARTMENT OF SOCIAL SERVICES, UNITINGCARE VICTORIA AND TASMANIA, AUSTRALIAN FEDERAL POLICE, ALLAMBI CARE LIMITED, IFYS LIMITED, BRAVEHEARTS FOUNDATION LIMITED

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 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)
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	National Interest Test Statement	<p>The DICE project will contribute significantly to the Australian community by ameliorating the economic and social costs of child sexual abuse through the co-design and testing of a multiagency and disruptive policing approach to child sexual exploitation, as well as a cost benefit analysis of this approach. A significant proportion of the 21.5% of Australian girls and 7.9% of Australian boys affected by sexual abuse by the age of 18 are subject to child sexual exploitation. It is estimated that every child sexual abuse offence costs the Australian economy \$67,600.54. The project will also contribute to better health and well-being in Australia. The evidence is clear that the negative health and social sequelae of child sexual abuse – including suicidal thoughts and actions, post-traumatic stress disorder, drug and alcohol misuse, obesity, criminal behaviour – significantly impact upon the wellbeing of Australians who have been sexually abused. Overall, it will be in Australia's healthy, economic and social interests to support an evidence-informed response to child sexual exploitation.</p>						
LP200300898 Evans, A/Prof Michelle M	Evaluating the impact of Indigenous preferential procurement programs This project aims to conduct a multi-disciplinary, multi-method evaluation of the implementation and impacts of Indigenous preferential procurement programs (IPPPs) on Indigenous businesses, Indigenous communities, procurers' operations and outcomes. Bringing together researchers in partnership with corporate and government procurers, Indigenous data custodians and the Australian Bureau of Statistics we aim to produce a significant national program evaluation of IPPPs and the impact at the community level. The project aims to highlight ways in which IPPPs can be [re]designed to reduce implementation friction, facilitate access and participation among Indigenous businesses and help guarantee positive effects on Indigenous communities.	297,249.00	287,758.00	290,437.00	0.00	0.00	875,444.00	FORTESCUE METALS GROUP LTD, NATIONAL INDIGENOUS AUSTRALIANS AGENCY, AUSTRALIAN BUREAU OF STATISTICS, CROWN RESORTS LIMITED, MINERALS COUNCIL OF AUSTRALIA, VICTORIAN DEPARTMENT OF PREMIER AND CABINET, PROCUREMENT AUSTRALASIA LTD.
	National Interest Test Statement	<p>This project aims to (i) empirically describe the Indigenous business sector, (ii) discover the impact of Indigenous Preferential Procurement Programs (IPPPs) on the Indigenous business sector, (iii) understand the flow on benefits to Indigenous communities of the implementation of IPPPs and (iv) propose redesigns to IPPPs to maximise their benefits. This research has the potential to contribute economic and social benefits to the Australian community by working with Indigenous business stakeholders to [re]design a significant policy to enhance Indigenous business participation and the positive flow-on effects on Indigenous communities. We will train 5 new Australian researchers and progress a new national data asset in partnership with the Australian Bureau of Statistics that could be used by scientists and policy makers. The governance framework for the new national data asset will also be a leading contribution, integrating Indigenous data custodians and Indigenous data sovereignty principles. Finally, the evaluation framework will have future and diverse applicability for policy evaluation.</p>						
LP200301120 Gras, Prof Sally L	Industrial biotechnology for the manufacture of alkaloid pharmaceuticals Drugs that treat opioid dependence and overdose are increasingly needed but their manufacture is difficult, inefficient and expensive. This project aims to develop enzymatic N-demethylation as a simpler and more sustainable approach to the manufacture and modification of opioid antagonists, alkaloids and other drug targets. It will increase our understanding of enzymatic N-demethylation and address engineering and biotechnology challenges to improve yield and product isolation and concentration. Improvements in drug manufacturing processes will assist drug affected communities and industry will benefit from value adding, greater market share and flexibility, increased innovation and de-risked processes and new products.	180,000.00	175,000.00	167,000.00	0.00	0.00	522,000.00	RIVER STONE BIOTECH AUSTRALIA PTY LTD
	National Interest Test Statement	<p>This project will increase availability of drugs used to treat opiate addiction and abuse by replacing complex, costly and unsustainable manufacturing processes. Advances in industrial biotechnology and separation technologies will be used to address key technical challenges, de-risk a new manufacturing process and identify opportunities to add value to Australian opiates and other alkaloids. The project aligns with advanced manufacturing research priorities and Australia's strength in agriculture, opiate extraction and biopharma manufacturing. It will have broad social impact, substantially reducing manufacturing costs and increasing the availability of drug treatments. It will help meet growing domestic and global demand for opiate antidotes, using agricultural feedstocks from poppy growers and producers in regional Australia. It will increase sovereign capabilities in drug manufacture, support growth of Australia's biopharma exports, increase environmental sustainability, pave the way for local extraction and pharmaceutical production and provide training and innovation for the biopharma industry.</p>						

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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LP200301355 Schaffer, Prof Graham	<p>Computational alloy design for cold spray deposition</p> <p>The aim of this project is to design a new generation of proprietary, high performance alloys and composites that are optimised for cold spray deposition. Cold spray is a new manufacturing technology that is used to create coatings for enhancement, repair, restoration and for additive manufacturing. Using a systems approach and by integrating experiment with computational models, this project will generate new knowledge for enhanced materials design. Partnering with Ruag Australia, a leading Defence aerospace supplier, the project will deliver a practical tool for the accelerated design of metal powders for cold spray and invent commercially useful advanced materials to improve the competitiveness of Australian manufacturing industry.</p> <p>National Interest Test Statement</p> <p>The aims of this project support the Australian Government's JobMaker Plan and the Modern Manufacturing Strategy to rebuild the economy, create jobs and recover from the COVID-19 recession. Partnering with Ruag Australia, a supplier to the Defence aerospace industry, this project will drive growth by transforming the efficiency with which advanced materials are developed and applied. This will contribute significantly to Australian competitive advantage across the sector and generate national economic and social benefits. The computational driven design of materials will be a disruptive influence on material and process development, significantly accelerating the insertion of new materials into production and the introduction of whole new products and platforms. This will shorten product development timelines and substantially reduce the cost of manufacturing. By enabling the rapid deployment of advanced materials and components, this project will contribute to the competitiveness of manufacturing companies, driving growth and creating jobs in the Australian economy.</p>	94,732.00	99,272.00	108,812.00	0.00	0.00	302,816.00	RUAG AUSTRALIA PTY LTD
LP200301370 Skerratt, A/Prof Lee F	<p>Increasing amphibian immunity to combat disease causing mass extinction</p> <p>This project aims to increase amphibian survival to combat the devastating chytrid fungus by identifying resistance genes and increasing their frequency in the host population. The project is interdisciplinary and uses targeted genetic manipulation techniques developed for agriculture to improve disease resistance in wildlife for the first time. Expected outcomes include 1) enhanced international collaborations in comparative immunology, 2) a comprehensive understanding of immunity to chytridiomycosis, and 3) disease resistant amphibians. The anticipated benefit is ability to apply the optimal method to improve conservation of wildlife threatened by emerging disease, such as marker assisted selective breeding or genetic engineering.</p> <p>National Interest Test Statement</p> <p>This project will have broad-reaching impacts for the Australian environment by developing new methods for conserving threatened wildlife, starting here with amphibians. By enabling self-sustaining wild populations to flourish without the need for continuous interventions, the project increases the success and efficiency of costly reintroduction programs bringing a large economic return. The environmental and economic benefits of protecting amphibian biodiversity and ecosystem functions are diverse, including healthy waterways, biodiscovery for pharmaceuticals, and tourism. Social benefits also include extensive training for students and researchers in revolutionary genomic techniques. This collaborative work will strengthen and establish alliances with industry leaders, end-users, and international academic researchers.</p>	83,763.00	77,763.00	97,853.00	0.00	0.00	259,379.00	NSW DEPARTMENT OF PLANNING INDUSTRY AND ENVIRONMENT, UNIVERSITY OF ROCHESTER, NEW YORK, TARONGA CONSERVATION SOCIETY AUSTRALIA, ZOOS VICTORIA
LP200301389 Sarvi, Prof Majid	<p>Predictive Analytics and Real-time Traffic Control for Urban Corridors</p> <p>This project aims to develop predictive data analytics and real-time traffic control and safety models for multimodal management of urban corridors, serving two salient objectives: (1) optimising person-throughput of multimodal traffic; while (2) minimising safety risks for all modes. The outcome will be an automated, sensor-based platform to monitor traffic flows from all modes and make proactive and coordinated control decisions in real-time. The expected benefits are profound; the developed algorithms and platform will significantly reduce traffic congestion, travel delays and safety risks for all modes of transport, especially for vulnerable road users (e.g. pedestrians and cyclists).</p>	298,190.00	278,101.00	170,366.00	0.00	0.00	746,657.00	KAPSCH TRAFFICOM AUSTRALIA PTY. LTD., ADVANCED MOBILITY ANALYTICS GROUP PTY LTD, SWISS FEDERAL INSTITUTE OF TECHNOLOGY, LAUSANNE

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)		

National Interest Test Statement

Every year, urban congestion costs the Australian economy \$16.5 billion in the form of travel delays. In addition, the national equivalent cost of road crashes was approximated at \$33.2 billion in 2016. In Melbourne alone, 492 people lost their lives in crashes at urban intersections between 2006 and 2019; more than half of these people were pedestrians, cyclists or motorcyclists. This project aims to develop novel person-centric and safety-aware traffic management capabilities that benefit from recent advances in sensing and communication technologies to revolutionise the practice of urban traffic control. The outcomes will significantly reduce traffic congestion costs and minimise crash fatalities and injuries. The major economic and social benefits of this project will serve the Australian general public and the everyday users of the urban network while boosting the productivity of economy. The scientific research outcomes will support the Intelligent Transport Systems industries in Australia including the project partners and the government transport authorities and operators in Australian capitals.

The University of Melbourne	1,268,039.00	1,298,149.00	1,220,942.00	0.00	0.00	3,787,130.00
Victoria	3,432,021.00	3,587,509.00	3,183,197.00	0.00	0.00	10,202,727.00

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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 (\$)	Partner Organisation(s)
		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)

Western Australia

Curtin University

LP200301507	Collision Avoidance in Shipping Lanes via Intelligent Sensor Data Fusion	131,000.00	132,000.00	133,000.00	0.00	0.00	396,000.00	LATCONNECT 60 PTY LTD
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Vo, Prof Ba-Ngu
 This project aims to develop an online maritime traffic monitoring system for reliable collision/contact avoidance that exploits complementary data from high-resolution airborne sensors and surface vessel sensors. Our approach is based on optimal scheduling and fusion of the sensor data and possibly other sources of data to construct a comprehensive dynamic picture of maritime traffic, in real-time. Moreover, the proposed methodology enables quantification of confidence in the predictions. This will provide ship owners, directly to their vessels and/or at the fleet management centres, information such as weather reports, reliable collision/no-collision warnings and avoidance strategies, on-the-fly.

National Interest Test Statement

Leveraging on locally grown state-of-the-art satellite technology and information systems, this project will develop a world-first maritime traffic management system for the global shipping sector, and a new high value-adding industry to Australia that contributes to the expansion of the export service sector. Safety-at-sea is a core national interest because, as an island nation and a net exporter, Australia is reliant on the safe and timely flow of goods and trade that underpins our prosperity. The proposed project directly addresses Frontier Technologies for Building and Transforming Australian Industries, and specifically the Priority Goals: Frontier Technologies and Smart Information Use. In addition to the shipping industry, the technology developed has a wide range of applications from traffic management, autonomous driving, to surveillance, which all have the potential to generate further hi-tech jobs and contributing to a tech-based economy.

Curtin University	131,000.00	132,000.00	133,000.00	0.00	0.00	396,000.00
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The University of Western Australia

LP200300886	From the Desert to the Sea: Managing Rock Art, Country and Culture	164,651.00	224,516.00	214,690.00	213,078.00	218,884.00	1,035,819.00	MURUJUGA ABORIGINAL CORPORATION, MUNGARLU NGURRARANKATJA RIRRAUNKAJA (ABORIGINAL CORPORATION)RNTBC, WESTERN DESERT LANDS ABORIGINAL CORPORATION, WOODSIDE PETROLEUM LTD., BHP BILLITON IRON ORE PTY. LTD., NEWCREST MINING LIMITED, WESTERN AUSTRALIAN MUSEUM, DEPARTMENT OF BIODIVERSITY CONSERVATION AND ATTRACTIONS, DESERT SUPPORT SERVICES PTY LTD
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McDonald, Prof Jo M
 This Project will expand our understanding of Aboriginal settlement and land-use in north-west Australia by investigating how the mythological narratives of Australia's deserts enable the transmission of knowledge in water-limited environments. Combining traditional ecological knowledge and novel scientific approaches (e.g. anthracology, remote sensing, oxygen-isotopes) will provide new insights into human behaviours at rock art site complexes. It will develop management regimes and formal certification for Indigenous rangers while building heritage capacity in these partner communities: enabling intergenerational, culturally appropriate knowledge transfer protocols are in place to ensure sustainable economic heritage futures.

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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		2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)
National Interest Test Statement								
Northwest Australia has rock art provinces that are globally recognised for their outstanding cultural heritage values. They are part of vast conservation estates which are increasingly co-managed by Indigenous groups. The impact of burgeoning resource extraction has seen unacceptable destruction of these significant sites, highlighting gaps in heritage policy, procedure, documentation and management. This project will directly address these gaps through strategic alliances with industry, government and Indigenous corporations. (1) Economic benefits will result from better planning and management around significant site complexes. (2) Commercial benefits will flow from improved heritage compliances, social licence and sustainable economies. (3) Environmental benefits will accrue from informed approaches to arid zone biodiversity, firing practice and water use. (4) Social benefits will follow with new capacity for Indigenous communities to manage their vast cultural estates with training pathways for Indigenous rangers. These project outcomes will contribute to Indigenous wellbeing and national prosperity.								
LP200301570 Santini, Dr Talitha	Accelerated tailings remediation with plant and microbial biotechnologies The Australian alumina industry produces 32 million tonnes of bauxite residue (alumina refining tailings) each year, most of which is stored in perpetuity in landfill-type tailings storage facilities. The high pH, high salinity, lack of plant nutrients, and poor physical properties of bauxite residue are major barriers to safe storage and successful closure of tailings storage facilities. Existing remediation approaches are expensive, slow, and often ineffective. We will deliver new microbial- and plant-driven biotechnologies for rapid, cost-effective remediation of bauxite residue. This will enable safe, sustainable closure of storage facilities, and safeguard the strong contribution of this \$15 billion industry to Australia's economy.	140,566.00	139,052.00	0.00	0.00	0.00	279,618.00	INTERNATIONAL ALUMINIUM INSTITUTE, ALCOA OF AUSTRALIA LIMITED
National Interest Test Statement								
This application will have direct economic, environmental, and social benefits for Australia. Australia is the world's largest producer of bauxite (27% of global production) and world's largest exporter of alumina (17 kT in 2019, worth over \$8 billion). The Australian aluminium industry contributes over \$15 billion to the Australian economy in export revenue, directly employs over 14500 people, and provides income for 40000 Australian families. However, their regulatory and social licences to operate are under threat from growing environmental concerns, particularly around tailings management in the wake of recent high profile international failures such as Brumadinho (Brazil; 2019). Our new biotechnologies for rapid, cost-effective transformation of tailings into productive, functional soils will support safe, stable, sustainable, non-polluting tailings facility closure, improving environmental outcomes and directly contributing to future-proofing the revenue and jobs generated by the \$15 billion Australian alumina industry.								
LP200301658 MyIne, A/Prof Joshua S	Rethinking and revitalising herbicides to counter resistance Weeds and increasingly herbicide resistant weeds are the major yield penalty for agriculture. This project aims to develop innovative ways to overcome resistance. This project expects to (i) make herbicides work more efficiently, (ii) reveal a new mode of action for an under-used herbicide and (iii) assign breakdown pathways to herbicides. Expected outcomes of this project are to (i) find rare, but truly synergistic herbicide combinations; (ii) reveal a herbicide against which weeds outside of Japan have not evolved resistance to; and (iii) establish how best to make breakdown blockers. A benefit of using existing herbicides is the approaches are close to market, so with partner Nexgen Plants, its outcomes can be commercialised.	199,165.00	199,165.00	199,165.00	0.00	0.00	597,495.00	NEXGEN PLANTS PTY LTD
National Interest Test Statement								
Weeds are a major issue for agriculture, responsible for a \$2.5 billion annual loss in Australia's agricultural production. Widespread use of herbicides against weeds causes serious herbicide resistance. Glyphosate-based products are under intense scrutiny from governments at all levels and the possibility of farming without glyphosate is a big issue for the agri-food sector. There is an urgent need to improve use of commercial herbicides, and discover herbicides with new ways of acting on plants. The research will benefit Australia by building capability to meet the challenge of herbicide resistance. It will explore the way different herbicides work together, examine the potential of a little-used herbicide, and work on a new approach to boosting herbicide effectiveness. The project outcomes offer economic, commercial and environmental benefits to Australia: by enabling herbicides to be used more sustainably, we can help secure Australia's food security and increase the value of food exports.								
The University of Western Australia		504,382.00	562,733.00	413,855.00	213,078.00	218,884.00	1,912,932.00	

Minister's Approval for Linkage Projects 2020 Round 3 for Funding Commencing in 2021 Schedule

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(Columns 1 and 2)	(Column 3)	2021-22 (Column 4)	2022-23 (Column 5)	2023-24 (Column 6)	2024-25* (Column 7)	2025-26* (Column 8)	(Column 9)	(Column 10)
	Western Australia	635,382.00	694,733.00	546,855.00	213,078.00	218,884.00	2,308,932.00	
		9,970,493.00	10,602,799.00	9,721,776.00	1,151,922.00	277,748.00	31,724,738.00	

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