Minister's Approval for Australian Laureate Fellowships for Funding Commencing in 2022 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)			Indicative Funding ($)		Total ($)
(Columns 1 and 2)	(Column 3)	2022-23 (Column 4)	2023-24 (Column 5)	2024-25 (Column 6)	2025-26* (Column 7)	2026-27* (Column 8)	(Column 9)
Australian Capital Territory							
The Australian National University							
FL220100020	**Unveiling the Winds of Star-Forming Galaxies**	592,688.00	534,541.00	508,296.00	508,296.00	503,916.00	2,647,737.00
Krumholz, Prof Mark R	This project seeks to resolve an outstanding problem in the formation of cosmic structure: what is the nature of galactic winds, and what physical mechanisms are responsible for driving them? Answering these questions requires computer simulations of greater resolution than have previously been possible, coupled to next-generation telescopic observations. This research aims to develop novel methods to enable the required simulations, leveraging new hardware architectures at Australian supercomputer facilities, and to use these approaches to solve a major open problem in astrophysics, open new frontiers in simulation, and multiply the return on Australia's investment in both computer facilities and telescopes that will study galactic winds.						
	National Interest Test Statement						
	In recent years, Australia has spent more than $100m on supercomputer facilities, and more than $300m in international telescopes including the Square Kilometre Array, Giant Magellan Telescope, and Cherenkov Telescope Array. Maximising the return on these hardware investments requires developing the methods and software tools that can use them most efficiently. That is exactly what this Fellowship will accomplish: I will develop new GPU-accelerated computing methods that can drive the supercomputers to peak performance, and use the new computations these innovations enable to develop analysis tools and interpretation for the telescopes. This will benefit Australia culturally by answering fundamental questions about human origins, and economically by providing free, open-source software and methods to accelerate calculations in fields far beyond astrophysics, for example weather modelling and aerospace applications. The project will also produce a workforce of researchers trained to use and develop these new methods, with skills in high demand in industry and government.						
FL220100072	**Mathematical Breakthroughs in Wave Propagation**	516,696.00	495,308.00	495,308.00	545,308.00	438,084.00	2,490,704.00
Hassell, Prof Andrew W	This Fellowship proposal in theoretical mathematics aims to solve three major open problems in wave propagation. These are the long-time behaviour of nonlinear waves, including the behaviour and interaction of solitary waves; the propagation of waves in rough media; and the small-scale behaviour of interacting waves under the assumption of chaotic ray dynamics. The research aims to analyse wave equations that model problems in optical media and waveguides, medical and seismic imaging, and nano-electronic devices. Outcomes and benefits are expected in new mathematical theory, Australian research capability, better algorithms for numerically computing waves, and technological advances in communications, medical imaging, and seismic imaging.						
	National Interest Test Statement						
	Many modern technologies – such as communications, imaging, and advanced computing – rely on transmission of information via wave motion. For example, invisible radio waves travel between mobile phones and transmission towers to enable us to communicate with each other. When the speed and direction of these waves changes suddenly transmission is interrupted. This Fellowship aims to solve such fundamental problems in the mathematics of wave motion. These advances will help launch partnerships with applied scientists and engineers to create new software that industry partners can adopt for Australian industry to design and manufacture numerous 21st century technologies, including technology that will feature in next generation batteries and information storage devices. These advances will also benefit Australia and everyday Australians in areas such as communication technologies, medical imaging, mineral exploration, and prediction of extreme weather events such as floods and cyclones.						
	The Australian National University	1,109,384.00	1,029,849.00	1,003,604.00	1,053,604.00	942,000.00	5,138,441.00
	Australian Capital Territory	1,109,384.00	1,029,849.00	1,003,604.00	1,053,604.00	942,000.00	5,138,441.00

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New South Wales							
Macquarie University							
FL220100061	**Literacy in adolescence: The next major challenge in the science of reading**	640,896.00	640,896.00	640,896.00	640,896.00	583,672.00	3,147,256.00
Castles, Prof Anne E	This project aims to address the pressing problem of why Australian secondary school children have been declining in literacy. To do so is crucial, since adolescence is a period when strong literacy is critical for knowledge acquisition and preparation for adult life. The project will use a range of theoretically-informed methods to scrutinise cognitive processes in adolescent reading, as well as identify interactions between reading progress and socio-emotional functioning and motivation. Expected outcomes will be the first comprehensive account of secondary school reading acquisition and new insights into how to optimise progress. These will inform research, policy, and reading instruction practice, to the benefit of Australia's children.						
	National Interest Test Statement Becoming proficient in reading and writing transforms children's lives. It opens up vast new opportunities for them to acquire knowledge and communicate, and maximises their potential to become productive members of society. For this reason, it is of major national concern that Australian literacy rates have been steadily falling over the past two decades, with as many as 40% of 15-year-olds failing to meet international minimum standards (PISA, 2018). This Laureate Program seeks to identify ways to improve literacy outcomes in Australian secondary school students by conducting a comprehensive, theoretically-informed investigation of literacy in this cohort - focussing particularly on disadvantaged and non-English speaking students - and situating the research within the broader socio-emotional context of adolescence. The outcomes will inform state and national policy in secondary school teaching, and guide practice and intervention. In doing so, it will contribute to the national effort to reduce the social and economic cost of low literacy, with the ultimate beneficiaries being Australia's children.						
	Macquarie University	640,896.00	640,896.00	640,896.00	640,896.00	583,672.00	3,147,256.00
The University of New South Wales							
FL220100016	**Light-Driven Manufacturing for (Re)Programmable Materials**	516,486.00	568,798.00	577,498.00	568,798.00	507,274.00	2,738,854.00
Boyer, Prof Cyrille A	This Laureate Fellowship aims to develop a suite of chemical reactions independently activated by specific colours of light for the precise synthesis of functional macromolecules and the fabrication of (re)programmable polymeric materials. The outcome of this Laureate will be the direct production of advanced 3D printed objects with tuneable properties and functions by exploiting different wavelengths of light. This research unlocks the structural precision of Nature and the next-generation capabilities of reshapability. These innovative tools will revolutionise 3D printing methods, which will create a new era of advanced manufacturing.						
	National Interest Test Statement This project uses visible light to create customised materials for 3D printing. Whereas traditional processes for producing polymers such as plastic and synthetics are complex and energy intensive, it is now possible to make these using light of different wavelengths. This not only improves the efficiency of the production process, but also creates a range of new materials capable of self-healing, thus extending their lifespan and use, for economic and environmental benefit. New forms of plastic will find use in the flexible electronics, automotive, smartphone, batteries, military, and aeronautics/aerospace industries. The technology will give Australian manufacturers a competitive advantage in the smart materials space. It will increase not only the productivity of advanced manufacturing and 3D printing (USD100Bn market by 2031), but also Australia's capability in nano-manufacturing and high-performance materials. To translate this, the project will actively engage industries, including those with which the team has previous association.						
	The University of New South Wales	516,486.00	568,798.00	577,498.00	568,798.00	507,274.00	2,738,854.00

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(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)
The University of Sydney							
FL220100117	**How Old Are The Stars? Looking Inside Stars with Asteroseismology**	510,888.00	510,888.00	510,888.00	510,888.00	453,664.00	2,497,216.00
Bedding, Prof Timothy R	Stars are the building blocks of the Universe. Understanding their structure and evolution underpins much of modern astrophysics, from characterising the growing number of extra-solar planets to unravelling the history of our Milky Way Galaxy. This research program will use the technique of asteroseismology, the study of starquakes, to probe the interiors of stars in extraordinary detail and measure their ages with unprecedented precision. Having accurate ages for large numbers of stars will help us understand how the Milky Way galaxy formed and developed. We will generate a deep understanding of the processes that occur inside stars, mentor a new generation of researchers and establish Australia as a world leader in stellar astrophysics.						
	National Interest Test Statement This project uses the study of 'starquakes' (stars experiencing events similar to earthquakes) to dramatically advance our understanding of stars. It exploits the wealth of data coming from high-profile international space missions to probe star interiors in extraordinary detail and measure their ages with unparalleled accuracy. Establishing accurate ages for stars will significantly build on Australia's world-leading contributions to understanding how our Milky Way galaxy formed and developed. The research team will employ new scientific methods to achieve these results, creating publicly available data sets to inform research and teaching. This project will provide opportunities for Australia to lead collaborations with the world's top institutions and for Australian researchers to participate in global research programs, that will provide training in analytical and computational skills that are needed for jobs in Australia's key technology sectors, including the research, health, and financial sectors. The new understanding of stars generated by this project will inform decisionmakers as well as the public about Australia's place in the universe. Knowledge of starquakes applied to our own sun can inform predictions about space weather events that have the potential to disrupt satellites and global communications systems.						
	The University of Sydney	510,888.00	510,888.00	510,888.00	510,888.00	453,664.00	2,497,216.00
University of Technology Sydney							
FL220100088	**A First Nations Sovereign Approach to Decolonising Colonial Institutions**	693,524.00	732,284.00	732,284.00	732,284.00	582,284.00	3,472,660.00
Behrendt, Prof Larissa Y	This Laureate Fellowship aims to fundamentally re-make Australia's colonial legal institutions in order to remove the harm they currently do to Indigenous people and communities. It is well known that colonial legal institutions such as the criminal justice system, coronial processes and child protection systems continue to have significant negative impacts on First Nations Australians in the twenty-first century. Researchers have not yet been able to answer the question of how we can best decolonise colonial legal systems. This project hypothesises that we can drive positive change by theorising and developing a coherent strengths-based self-determination model that is applicable across legal and regulatory sectors.						
	National Interest Test Statement This Laureate Project aims to reduce the harmful overrepresentation of Aboriginal and Torres Strait Islander people within the criminal justice, coronial and child protection systems. This will be achieved through the development of a framework that will be incorporated within these institutions, resulting in changed decision-making processes which specifically define the ways Indigenous peoples are treated. The new processes will support positive outcomes for Indigenous peoples and their communities: reducing the current overrepresentation will improve socio-economic outcomes for First Nations people; contribute to closing the gap in life outcomes; and support the broader national priority of ensuring safe and healthy communities. Meaningful collaboration with the Aboriginal community-controlled sector and utilisation of existing relationships with Australian legal institutions are hallmarks of project design. Research outcomes will be shared in forms directly accessible to Indigenous communities and the Aboriginal community-controlled sector - including as film, websites and podcasts.						
	University of Technology Sydney	693,524.00	732,284.00	732,284.00	732,284.00	582,284.00	3,472,660.00
	New South Wales	2,361,794.00	2,452,866.00	2,461,566.00	2,452,866.00	2,126,894.00	11,855,986.00

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Queensland							
Queensland University of Technology							
FL220100082	**My Air Space: the Science of Buildings that Make us Thrive**	700,896.00	700,000.00	700,000.00	700,000.00	650,000.00	3,450,896.00
Morawska, Prof Lidia	Nothing is more necessary in human life than the air we breathe, mostly indoors where air quality has been relatively overlooked. This project aims to deliver new science and technology as a foundation for optimising indoor atmospheres to improve health, wellbeing, and comfort. Expected outcomes include innovative, efficient, low-cost diagnostic sensing of indoor atmospheres and human–space interactions, real-time detection of airborne pathogens and particles that host them, and cost-effective localised conditioning of spaces for comfort at points of actual use. Benefits should be seen in areas of health, productivity, reduced energy use, and new industries for the design, modernising, and operation of buildings across Australia and beyond.						
	National Interest Test Statement						
	Poor air quality in modern buildings is a serious and neglected public health problem. Pre-COVID, indoor air pollution and excess respiratory infections-related health impacts cost the Australian economy more than $12Bn pa. This project aims to develop and deliver new methods for low-cost monitoring of pollutants in indoor air, real-time detection of airborne pathogens, and for overall optimization of indoor air for human health and well-being while lowering energy requirements. These capabilities are essential for developing Australian indoor air quality standards. The methods and standards will have extensive benefits for Australia. Modernisation of our buildings based on them will create a boon for Australian construction, maintenance and building technology industries. Social benefits will include improved general health, well-being and cognition for building occupants across Australia due to improved air quality. Tangible environmental benefits include improved air quality, reduced energy consumption and in turn emissions of pollutants associated with energy generation.						
	Queensland University of Technology	700,896.00	700,000.00	700,000.00	700,000.00	650,000.00	3,450,896.00
The University of Queensland							
FL220100059	**Digital chemistry and catalysis: redefining reactions in confined systems**	580,289.00	603,952.00	599,002.00	594,052.00	560,491.00	2,937,786.00
Trau, Prof Matt	This Laureate program aims to initiate a new era of chemical catalysis and reaction manipulation via an entirely novel nanofluidic approach discovered in Australia. By further studying this phenomenon, it aims to deliver new insights into what drives chemical reactions in confined systems controlled by applied electric fields. It will also develop novel technology platforms to miniaturise and enable on-demand software-controlled (digital) chemistry, with broad applications in pharmaceutical, biotechnology and chemical industries. Project success will have a profound impact in many areas of modern society, the environment and the high-tech and manufacturing industry, while further enhancing Australia's sovereign manufacturing capability.						
	National Interest Test Statement						
	Fuel, food ingredients, medicines and batteries all have one thing in common - chemistry and the manufacturing of the molecules needed to provide these common products for everyday use in a modern society. This project seeks to transform how these molecules are manufactured and through a unique, ground-breaking new technology to achieve high-quality, low-cost nano-manufacturing (the production of very small and precise materials used in products like sunscreen, bandages or antibacterial handwash). This unique nanotechnology platform can accelerate chemical reactions in ways currently not possible in conventional large-scale factories and often environmentally polluting manufacturing processes. This project's outcomes will enable on-demand, remote manufacturing (such as 3D printing) in a more environmentally friendly way with applications such as lifesaving medicines, food production, energy storage and vaccines. The unique intellectual property generated through this project will place Australia at the leading edge of this field, while accelerating Australia's growing high technology industry base, and enabling a greater level of manufacturing capability in Australia.						

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FL220100137	**10,000 Hours: Time in early education and care for better life opportunity**	670,000.00	670,000.00	670,000.00	670,000.00	640,000.00	3,320,000.00
Thorpe, Prof Karen J	An Australian child spends up to 10,000 hours in early care and education programs prior to school. These hours are a developmental opportunity. Their potential to improve life chances is well documented. Yet many programs do not deliver on this promise. Nearly 1 in 4 Australian children enter school developmentally vulnerable. This study aims to interrogate the meaning of quality in early education and care programs with focus in communities experiencing the greatest challenges. The expected result is understanding of the mechanisms that limit delivery of the highest quality learning opportunities and outcomes for children. The benefit will be for children attending early education and care programs, their families and the nation’s future.						
	National Interest Test Statement Early childhood care and education programs underpin Australia's economic productivity. They enable parent workforce participation. They also present the potential to promote the learning and development of the children who attend. Realising this potential is dependent on the effectiveness of the experiences provided. Children spend up to 10,000 hours in care and education programs. These hours matter. They occur at a critical point in human development in which social, emotional and learning experiences set the neural foundations for lifetime wellbeing and achievement. Understanding the ways in which programs can more effectively contribute to positive life-course development benefits Australian families, society and economy. This study applies complex analyses of unique, contemporary datasets and a longitudinal study with linkage to ongoing school records to identify strategies that promote child learning and redress current social inequities. It plans to advance theory, provide multidisciplinary research training and offer new directions for realising the promise of Australia's early learning programs.						
	The University of Queensland	1,250,289.00	1,273,952.00	1,269,002.00	1,264,052.00	1,200,491.00	6,257,786.00
	Queensland	1,951,185.00	1,973,952.00	1,969,002.00	1,964,052.00	1,850,491.00	9,708,682.00

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Tasmania							
University of Tasmania							
FL220100099	**Practical and sustainable pathways to community coexistence with bushfires**	684,880.00	684,180.00	684,276.00	681,970.00	625,680.00	3,360,986.00
Bowman, Prof David M	The project addresses an urgent national and global challenge to policy and practice: the escalating risk of bushfire disasters. It aims to develop adaptation pathways so Australian communities can co-exist safely and sustainably with intrinsically flammable landscapes, through an innovative integration of historical, social, economic, and biophysical lines of research. In collaboration with local councils, fire-management agencies, Aboriginal communities contributing traditional knowledge, and world-leading fire scientists, it is expected to deliver benefit through insights into the drivers of fire disaster, concrete outcomes such as optimal preventive and mitigation strategies, and greatly improved community understanding and involvement.						
	National Interest Test Statement Australia's disastrous Black Summer Bushfires of 2019–20, part of a global pattern of increasingly frequent and destructive wildfires, had massive social, economic, and environmental consequences. The Bushfire Royal Commission uncovered a constellation of complex social, administrative, and environmental factors contributing to their impact. Finding a pathway to sustainable bushfire management is an urgent national and global policy challenge. The program targets concrete ways of meeting that challenge, through a careful harmonisation of social, economic, and biophysical lines of research. These will involve collaboration with government at all levels, Aboriginal fire managers, and leading fire scientists nationally and internationally. This multidisciplinary and deeply consultative research aims to develop and apply innovative, cost-effective, evidence-based, public-education and fire-management programs that will positively transform the relationship Australians have with their inherently bushfire-prone landscapes, and to reinforce Australia's high standing in a vital area of research.						
	University of Tasmania	684,880.00	684,180.00	684,276.00	681,970.00	625,680.00	3,360,986.00
	Tasmania	684,880.00	684,180.00	684,276.00	681,970.00	625,680.00	3,360,986.00

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Victoria							
Monash University							
FL220100184 Fornito, Prof Alexander	**Next-generation maps and models of the human brain** This project aims to develop a new framework for understanding how the anatomy of the brain shapes its function and influences individual differences in human behaviour. The project expects to develop innovative methods for mapping and modelling human brain function by combining techniques from neuroscience, physics, informatics, psychology, and genetics. Expected outcomes include new tools for analysing brain imaging data, new models of brain structure and function, an understanding of how genes shape brain architecture, and a comprehensive characterization of how individual differences in brain organization relate to behaviour. These outcomes should benefit our understanding of how the brain works and of the biological basis of behaviour.	590,896.00	590,896.00	590,896.00	590,896.00	533,672.00	2,897,256.00
	National Interest Test Statement Understanding the human brain is one of the greatest scientific challenges of our time. It is essential to promote healthy development and ageing, and to better treat psychiatric and neurological disorders, which cost the Australian economy billions each year. This Fellowship contributes significantly to this endeavour by developing a new framework for understanding some of the fundamental mechanisms that shape human brain function and behaviour. It will also deliver new analysis tools for robustly mapping the human brain and for training the next generation of brain scientists. These analysis and training tools will be released as freely available software, ensuring widespread impact and adoption by diverse teams in both science and industry aiming to unlock the mysteries of the brain, to develop strategies for optimal development and ageing, and to ultimately discover new diagnostics and therapeutics for brain disorders such as depression, schizophrenia, Alzheimer's disease, multiple sclerosis, and autism.						
FL220100185 Voelcker, Prof Nicolas H	**Nanostructured Silicon-Based Wearable and Implantable Biosensors** The aim is to gain a deep understanding of the interface between nanostructured-silicon-based nanomaterials and biological systems, to develop a new generation of biosensor technologies applied on and in the body. Using innovative nanofabrication techniques, the team will integrate porous silicon nanomaterials with highly controllable optical and electrochemical properties into wearable and implantable biosensors for detecting bioanalytes directly and continuously in interstitial fluid, sweat, and blood; critically, they will be capable of long-term monitoring. The outcomes are expected to enable development of downstream applications across medical diagnostics, sports sciences, workplace testing as well as defence and space technologies.	658,973.00	658,674.00	665,233.00	677,976.00	608,752.00	3,269,608.00
	National Interest Test Statement Current wearable sensors (e.g fitness trackers) measure physical parameters such as temperature, heartbeat and movement. This project will design advanced sensors that allow monitoring of more detailed biological signals for long periods, either inside the body, or as a patch on the skin. The sensors would measure changes in the skin to help with decisions about a person's health or performance. The expected breakthroughs will enable us to build these sensors into new wearable devices that can continuously monitor human performance. The new wearables would be more comfortable to wear and better able to detect much more useful information than current devices. Such wearables could monitor health indicators, elite sports performance, as well as performance in high-risk environments (examples include glucose levels for people with diabetes or stress levels for soldiers and astronauts). The new knowledge and prototype devices will be of interest to existing industry partners to develop and manufacture wearable biosensors in Australia, accessing a $150 billion market.						

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FL220100202	**“New ways to see” - Reimagining Electron Microscopy**	566,584.00	699,048.00	672,208.00	678,408.00	605,184.00	3,221,432.00
Etheridge, Prof Joanne	Understanding materials at the level of individual atoms can be critical for understanding their properties. This program aims to develop new ways to measure the structure of matter at the level of atoms by reimagining the fundamental concepts behind an electron microscope. This will enable subtle classes of structures in materials to be seen, that were previously not visible. This new knowledge will provide fundamental insight into the properties of materials and how they can be engineered to deliver new functions. Expected outcomes include a microscope with unprecedented sensitivity to atomic scale structures and new understanding of material’s properties.						
	National Interest Test Statement						
	Electron microscopes can see features as small as an atom. They are used across Australia in universities, industry and hospitals to image small things, from the coronavirus to a computer chip to a solar cell, so we can understand how they work. This project aims to develop a new electron microscope capability that can achieve an entirely new level of sensitivity and thereby detect features that currently cannot be seen. This will provide scientists, engineers and industry with a new tool for investigating the natural world and for engineering new functional materials and devices. The new electron microscopy methods developed in the project will enable the precise design of materials and devices in areas as diverse as computing, energy storage and production, communications, drug delivery and lighting and will underpin advanced manufacturing industries. Through ongoing collaboration with industry, the project will also deliver a new analytical capability and intellectual property that could be commercialised and deployed worldwide.						
	Monash University	1,816,453.00	1,948,618.00	1,928,337.00	1,947,280.00	1,747,608.00	9,388,296.00
The University of Melbourne							
FL220100005	**CellMaps for cell fate decision making systems**	670,000.00	670,000.00	670,000.00	670,000.00	670,000.00	3,350,000.00
Stumpf, Prof Michael P	The cell is the fundamental unit exhibiting the hallmarks of life. The cell is also a fantastically intricate and complex system: its behaviour is shaped by molecular networks and processes that regulate cellular physiology, and the response of the cell to its environment. This Laureate Fellowship aims to describe and make sense of this complexity mathematically. At this sub-cellular level stochasticity and complex non-linear feedbacks are all pervasive. Building on recent advances in mathematics, statistics, theoretical physics, and data science will result in mathematical models of cells, CellMaps, that will generate mechanistic insights into the fundamental dynamical processes underlying cell fate decision making and differentiation.						
	National Interest Test Statement						
	Biotechnology uses biological processes to produce products such as medical vaccines, yoghurt, alcohols and even bread. This project aims to improve the industrial biological processes used to make these products. Improving biotechnology applications in science, agriculture and medicine can enhance the efficiency, yield and purity of valuable products made by biological processes. Improvements could be achieved by being able to predict conditions that control cell functions, such as temperature, pH levels, and molecular environment. This Fellowship will develop refined mathematical models of these biological processes to investigate how they operate and enable prediction of different conditions that will enhance the overall process and achieve scientific and commercial benefits. These models will assist the Australian biotechnology sector to create new products more rapidly and more efficiently. The Fellowship will increase knowledge in mathematics and biosciences, bringing these disciplines closer together, developing new skills and building workforce capacity that will strengthen Australia’s reputation as a world-leader in mathematical biology.						
	The University of Melbourne	670,000.00	670,000.00	670,000.00	670,000.00	670,000.00	3,350,000.00
	Victoria	2,486,453.00	2,618,618.00	2,598,337.00	2,617,280.00	2,417,608.00	12,738,296.00

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Western Australia							
The University of Western Australia							
FL220100046	**Desert People: Australian Perspectives**	577,672.00	610,596.00	672,596.00	682,596.00	681,496.00	3,224,956.00
Veth, Prof Peter M	This project will bring innovative science and Indigenous knowledge together to develop new understandings of the 60,000 year custodianship of Australian deserts. The archaeology will focus on the Ningaloo coast, Pilbara and Western Desert. This region is experiencing expansion in resource extraction, energy production and tourism, key to Australia's post-COVID recovery. This globally significant human record is poorly documented and at risk, as seen in the recent loss of Juukan Caves. The Desert People programme will work with Traditional Owners and use novel techniques to document places of the highest value for their management and protection. This will result in vastly improved planning outcomes and underwrite new regional economies.						
	National Interest Test Statement						
	Future prosperity in the mining and resources industries, and the ongoing protection of 60,000 year old Aboriginal sites are often conflicting and public battles. In the North-West Australian regions of the Ningaloo coast, Pilbara and Western Desert, mining and tourism contributes significantly to the regional economies, estimated as being worth over $100B/annum to the Western Australia economy. In parallel however, the cultural heritage value is not as well documented, and as a result the culturally significant heritage sites within these regions are at risk of being lost. By working with Traditional Custodians and using state of the art archaeological techniques including satellite surveys and ground-penetrating radar, this large-scale program will provide critical knowledge to Traditional Custodians, land managers and industry to guide future developments in these areas. The ultimate goal is to avoid another incident and loss like the Juukan Caves, enable heritage protection and future developments within the resources and green energy industries to co-exist, and provide a blueprint for regions where cultural heritage and industry can be co-managed and prosper, preserving the world's oldest continuing culture.						
FL220100191	**Unveiling the mass of the Universe: stars, gas, plasma and dark matter**	680,442.00	537,696.00	487,696.00	487,696.00	415,592.00	2,609,122.00
Driver, Prof Simon P	Using unique Australian-built fibre-positioning technologies, the Fellowship will measure the distances to 2 million galaxies, transforming our understanding of dark matter on the scales of galaxies, galaxy groups, and filaments – the largest structures that exist. There are two specific goals: (i) to test precise predictions of the leading cold dark matter model by constructing dark-matter halo catalogues based on the motions of galaxies measured to unprecedented accuracy; and (ii) to solve the long-standing "missing mass" problem by measuring the extent of the plasma, neutral gas, and stellar contents within these halos. Both programs will capitalise on our strategic engagement with the European Southern Observatory.						
	National Interest Test Statement						
	Dark matter cannot be detected with current scientific equipment but is known to make up most of the mass of our universe. This project is an opportunity for major advancements in our understanding of dark matter, and the role it plays in the growth of galaxies and the production of starlight and the impact on the earth. Beyond the potential to be a world leader in addressing one of the most important questions in modern physics (what is dark matter?), this project will also showcase the capability of Australian-built technology installed at the European Southern Observatory in Chile, and fast-track the establishment of a new space-telescope data centre in Perth. The national benefit for Australia will be realised through new partnerships with international space agencies, potentially translate into multi-million dollar contracts for Australian designed and built astronomical equipment, and place Australia at the forefront of dark matter studies worldwide.						
	The University of Western Australia	1,258,114.00	1,148,292.00	1,160,292.00	1,170,292.00	1,097,088.00	5,834,078.00
	Western Australia	1,258,114.00	1,148,292.00	1,160,292.00	1,170,292.00	1,097,088.00	5,834,078.00
		9,851,810.00	**9,907,757.00**	**9,877,077.00**	**9,940,064.00**	**9,059,761.00**	**48,636,469.00**

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