Minister's Approval for Linkage Infrastructure, Equipment and Facilities for Funding Commencing in 2024 Schedule

Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)					Total ($)	Partner Organisation(s)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)

New South Wales

Macquarie University

LE240100086

Wang, Prof Yuling

Integrated multimodal microscopy facility for single molecule analysis

510,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 510,000.00

This project aims to establish an integrated multimodal microscopy facility in Australia for extensive structural characterization of functional and biological materials at the nanoscale and single molecule level. Discoveries using the facility will provide new insights into the relationship between molecules, materials, and their functions. The key outcomes and benefits of this facility are to i) strengthen the research effort in materials science and biotechnology, ii) advance the development of functional materials for biosensing and energy storage, and iii) create new catalysts for green energy conversion. The funding will ensure researchers have access to the latest technology critical to maintaining world-class research.

National Interest Test Statement

This project seeks to establish an integrated multimodal microscopy facility in Australia to address critical research challenges in surface feature-related molecular analysis. The new equipment integrates atomic force microscopy which gives a picture of surface features with enhanced Raman spectroscopy which gives the chemical signature at each position. The facility will provide new insights into the relationship between molecules and materials, by structural/chemical characterization of functional and biological materials at the nanoscale within their local microenvironment. This facility will enable cutting-edge research into biomolecules and nanostructures to address fundamental questions and guide the design of next-generation devices and healthcare solutions across multiple sectors. The proposed facility is significant as it will strengthen research in biotechnology, advance the development of functional materials for biosensing and energy storage, and create new catalysts for green energy conversion. There is no such facility in Australia, so we anticipate high demand for the capability from the 6 participating institutions and the wider community. It will lead to new cross-discipline collaborations and reciprocal instrument access. This funding will ensure that researchers in materials and biological science, chemical and biomedical engineering have access to the latest technology critical to maintaining world-class research and opening new research areas.

Macquarie University 510,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 510,000.00

The University of New South Wales

LE240100004

Schmidt, Prof Timothy

Ultrafast Infrared Spectroscopy Facility

762,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 762,800.00

The Ultrafast Infrared Spectroscopy Facility will provide a suite of techniques spanning the visible to mid-infrared spectral regions, on time scales corresponding to the emission of light, and energy conversion in low energy advanced functional materials. Research performed with this equipment will include photonic and thermal energy conversion; nanophotonics; quantum technologies and new infrared functional materials. This facility will enhance capacity in probing new materials and devices in the near and mid-infrared regions, and will increase institutional and cross-disciplinary research collaboration.

National Interest Test Statement

This project aims to address the pressing need for measuring low energy, invisible light in diverse areas of research, including the development of new light-driven power sources, negative carbon solar fuels, and quantum communications for improved cybersecurity. The research gap that it addresses is the lack of equipment for measuring and generating infrared light, which is critical for these areas of research. The research outcomes of this project will benefit Australians in many ways. Economically, the development of new high-value technologies for export will create new jobs and drive economic growth. Environmentally the project will help Australia to reduce carbon emissions and mitigate climate change, contributing to a more sustainable future. Additionally, the development of new quantum communication technologies will ensure the security and resilience of Australia's digital

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	infrastructure. To promote the research outcomes beyond academia and maximize understanding, translation, use, and adoption of the research in the future, several strategies will be employed. These include: Engaging with industry stakeholders and policymakers to showcase the potential benefits of the research outcomes and encourage adoption and investment; Communicating research findings through various media channels, including social media, press releases, and public seminars; and Generating IP for local uptake and the foundation of local spin-off companies to commercialize outcomes.								
LE240100015 Xia, Prof Zhenhai	**Integrated Tip-Enabled Nanofabrication and Characterisation at Atomic Scale** This project aims to establish the most advanced all-in-one multifunctional system going beyond the best system in the world. This facility is expected to combine tip-enabled nanofabrication, imaging, photo-/electrochemical, and electromechanical measurement to realise atomically precisely controlled nanofabrication, in-situ imaging, and real-time measurement of single active sites in micro and nanoscale devices.The proposed facility features high-quality measurements in an unmatched spatial and temporal range, allowing studying physical and chemical phenomena that are difficult to detect using conventional methods. The proposed integrated system will be the first of its kind in Australia.	523,899.00	0.00	0.00	0.00	0.00	0.00	523,899.00	
	National Interest Test Statement The proposed facility will fill the gaps in integrated tip-enabled nanofabrication and characterisation research at the atomic scales, and benefits the broader research community, including catalysis science and technology, advanced materials science and engineering, nanoscience and nanotechnology, and biomedicine. The establishment of this facility is timely and will enable Australia to take a leading role in these areas. The proposed project is aligned with the Science and Research National research Priority, Energy and Advanced Manufacturing, and the supported research outcomes will impact in advanced catalysis, novel multifunctional materials, advanced energy storage system, optoelectronic devices, bio-systems and smart sensors. The proposed facility will support many industry-linked and development grants. The research supported by the facility is to explore fundamental phenomena and mechanisms in broader aeras, which will generate new knowledge, advancing science. The research areas supported by the facility also have highly potential in technological breakthroughs, creating disruptive technologies in critical sectors. This will cultivate the future industries, stimulate growth of the Australian economy, create jobs, and lift productivity and economic growth by maximising Australia's competitive advantage. The facility also provides excellent training opportunities for the students, fostering international competitiveness of Australian graduates.								
LE240100036 Gludovatz, A/Prof Bernd	**Ultra-fast structure-property characterisation of materials** The design of materials for functional and damage-tolerant applications requires detailed knowledge of their structure and the mechanisms that operate at length scales ranging from interatomic layers to micro, meso and macro scales. This project aims to establish ultra-fast processing capabilities that enable ion-damage free structural modifications and microstructure-mechanical properties characterisation across multiple length scales at unprecedented speed and accuracy. Expected outcomes include the ability to create new knowledge about multi-scale structure, composition and deformation mechanisms for the design of novel materials systems that enable manufacturing benefits throughout transportation, defence and clean energy sectors.	754,700.00	0.00	0.00	0.00	0.00	0.00	754,700.00	
	National Interest Test Statement This ultra-fast laser will enable unique processing capabilities and provide the ability to combine structural modifications of novel materials with property characterisation techniques at unprecedented speed and accuracy. The system will build on existing investment in electron microscopy and will be among the most advanced micro-machining systems worldwide, open to researchers and industries across Australia. It will support cutting-edge research programs in advanced manufacturing and the design of next-generation materials for renewable energy and transportation, as well as for defence and health-related applications. The new research enabled by this equipment will enhance Australia's position as a hub of world-leading scientific innovation while simultaneously enabling collaborations with commercial enterprises and industrial partners. Furthermore, this proposed equipment will provide opportunities to develop new technologies and train the highly skilled workforce needed by Australian industries to grow towards an economically prosperous future.								
LE240100045 Cassidy, Dr Maja C	**Cryogenic microwave characterization facility for quantum technologies** This project will establish a multi-user, fast-turn-around cryogenic characterization facility for microwave superconducting quantum technologies that are critical	410,000.00	0.00	0.00	0.00	0.00	0.00	410,000.00	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH

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	components for quantum computer, networks and sensor systems. This facility will lead to a significant improvement in research efficiency, allowing for rapid optimization of devices and components prior to integration into a larger quantum system. Expected outcomes include the creation of new intellectual property, enhanced engagement with industry, and will further boost Australia's efforts to build a commercially scalable quantum computer.								ORGANISATION
	National Interest Test Statement								
	The quantum industry is predicted to play a transformative role in Australia's future prosperity through the development of quantum computers, quantum communication networks and quantum sensors. Advanced manufacturing of quantum components that enable these technologies is key to realizing this impact. For many quantum technologies, cryogenic characterization is an essential part of the manufacturing process, as they only begin to operate at temperatures close to absolute zero. This project will establish a multi-user, fast-turn-around cryogenic characterization facility for critical components in the quantum supply chain. The facility will lead to a significant improvement in research efficiency, allowing for rapid optimization of devices and components prior to integration into a larger quantum system, as well as enabling opportunities for new academic researchers and industry players to access key equipment required to participate in the quantum economy. Expected outcomes include the creation of new intellectual property, enhanced engagement with industry, and will further boost the Australian quantum ecosystem that is predicted to generate $6 billion in revenue in Australia and create 19,400 jobs nationally by 2045.								
LE240100092 Seidel, Prof Jan	**Quantum microscopy facility for ultrasensitive nanoscale magnetic imaging** Investigations of 2D and van der Waals materials, biological samples, energy materials, and quantum devices on the nano- and microscale are revolutionising medicine, communications, information technology, energy production and storage by virtue of new phenomena. The new quantum microscopy facility will enable state-of-the-art capabilities in mapping chemical, magnetic, optical, electronic, and spectral properties, providing cutting-edge tools that will enable breakthroughs in both existing and future multi-disciplinary projects in photonics, quantum devices, nanomaterials, nanoelectronics, biotechnology, and energy technology as key drivers of the new economy in Australia.	1,100,000.00	0.00	0.00	0.00	0.00	0.00	1,100,000.00	
	National Interest Test Statement								
	Australia's development of quantum technology is based on local advanced manufacturing industry designing nanoelectronic devices that are capable of efficient information storage and high-speed processing. The industry's ability to extend the limits of this technology, in particular, using new functional materials, relies on state-of-the-art microscope technology to study and improve such materials. This project will establish such a new quantum microscope facility in Australia to study unprecedented, man-made materials. These are new, high value-added materials for applications in medicine, electronic communication, information technology and energy production, among others. The facility will be accessible by academic and industrial research, thus outcomes will be directly shared with industry stakeholders in the form of immediate technology transfer. Therefore, this project will enable the development of advanced materials engineering capabilities in Australia, and it will foster the design, manufacturing and commercial exploitation of these new materials. This will place Australia at the forefront of this critical area for future technology demand.								
LE240100118 Pettit, Prof Christopher J	**The National Cycling Data and Analysis Platform (NCDAP)** A National Cycling Data and Analytics Platform to collect, integrate and communicate new and historic data on cycling infrastructure, attitudes, and behaviours. This project will address the significant issue of data fragmentation, pilot a national cycling survey, and develop a cycling toolkit to allow exploring and testing various cycling infrastructure scenarios. The platform will provide an open access e-Infrastructure to enable tracking social and cultural changes that influence transport choices, create effective behaviour change programs and prioritise cycling infrastructure investment. This project will contribute to healthier lifestyles, reduced traffic congestion and emissions and energy efficiency of Australia's transport sector.	500,000.00	0.00	0.00	0.00	0.00	0.00	500,000.00	WESTCYCLE INCORPORATED, BICYCLE NETWORK INCORPORATED, AUSTRALIAN CYCLING ENVIRONMENTAL AND HEALTH FOUNDATION LIMITED, BICYCLE INDUSTRIES AUSTRALIA LTD., AUSTRALIAN URBAN RESEARCH INFRASTRUCTURE NETWORK (UNIMELB)

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

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	National Interest Test Statement Australian cities are facing a variety of critical transport, environmental, health, and sustainability issues. Australian governments at every level acknowledge that cycling can help address many of these issues. However, the development of effective interventions is hindered by insufficient and disconnected data, as well as a shortage of decision support tools. This project will facilitate the integration, sharing, and dissemination of new and existing cycling-related data. In order to address gaps in the current data and provide a seamless data hub for understanding current cycling trends and the needs of future or potential cyclists, a nationwide survey of cycling attitudes and behaviours will be conducted. The integrated data will enable the development of planning support tools through an interactive, online map-based dashboard. This will allow researchers, planners, and designers to visualise data, monitor evolving attitudes and sentiment towards cycling, identify gaps and opportunities in cycling networks, test various infrastructure provision scenarios and analyse economic impacts to justify targeted infrastructure investments. The project will aid in promoting more active and healthier lifestyles, alleviating traffic congestion and public transport crowding, and promoting decarbonisation and energy efficiency in Australian cities.								
LE240100130 Li, Prof Sean S	**Thermophysical Property Analysers for Materials under Extreme Environments** The development of new materials with properties specifically tailored to withstand the extreme environments begins with understanding the physical nature of the processes involved, including the properties of atoms and molecules extending from the nanoscale to the collective behaviour at the macroscale. This relies on the knowledge achieved with new capabilities of analytical tools to open new avenues for developing the materials. This project aims to strengthen Australian research activities in the development of advanced materials for energy, defence and space, and advanced manufacturing technologies through establishing a high temperature, high pressure and high force materials characterisation suite for extreme environments at UNSW.	1,300,000.00	0.00	0.00	0.00	0.00	0.00	1,300,000.00	AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION, LAVO HYDROGEN STORAGE TECHNOLOGY PTY LTD, GRAVITAS TECHNOLOGIES PTY LTD
	National Interest Test Statement Breakthrough technologies for the energy, defence, space and advanced manufacturing sectors require improved materials that can perform and survive under the extreme environments such as ultrahigh temperatures, high pressure, corrosive, radiative or oxidising atmospheres. This project will set up a new facility to test materials under ultrahigh temperature, high pressure and high force conditions, to support research into next generation materials as well as providing testing and development capabilities for Australian industry. Access to and adoption of the new facility will be enabled via the collaborations and partnerships of the UNSW Materials and Manufacturing Institute, and by engaging with existing and newly developing industry research networks in defence, clean energy and space technologies.								
LE240100133 Raftery, A/Prof Mark J	**An Open Access Native Mass Spectrometry Facility** This project aims to create a world-class Native Mass Spectrometry Facility to allow measurement of proteins, protein complexes and other biomolecules, in a way such that key structural information is maintained. This instrumentation will be the first of its type in Australia allowing measurement of very high mass ions with high precision and accuracy. A better understanding of protein structure will enable new discoveries in chemistry, biotechnology and medicinal research.	657,987.00	0.00	0.00	0.00	0.00	0.00	657,987.00	
	National Interest Test Statement This project will provide the infrastructure needed for a Native Mass Spectrometry facility within NSW and will be available to all Australian researchers. The new equipment will enable novel details to be obtained about proteins and how they exist naturally and provide information on how they interact with other molecules. The new equipment will also complement existing mass spectrometry instruments used for proteomics and discovery science. Projects in drug development, discovery of new enzymatic inhibitors and how modification of amino acid sequence effect structure and function will benefit. The equipment has potential to provide positive economic impacts for Australia through training the next generation national and international STEM students and providing easy access to unique capabilities for researchers in academia and industry.								
	The University of New South Wales	6,009,386.00	0.00	0.00	0.00	0.00	0.00	6,009,386.00	

The University of Newcastle

Small Animal In Vivo Imaging Facility with microCT imaging capabilities

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LE240100032 Hua, A/Prof Susan	This project aims to establish a state-of-the-art small animal in vivo imaging facility with microCT imaging capabilities, which is the first of its kind in the regional growth area of Hunter New England and the Central Coast in NSW. This facility will provide high resolution and high-speed scanning of anatomical structures in 2D and 3D, which is expected to generate detailed knowledge of the fundamental biological processes in humans and animals in real-time across longitudinal studies as well as improve animal welfare by addressing the 3Rs by reducing animal usage. This project will foster interdisciplinary local, national, and international research stemming from world-class research in this region.	450,000.00	0.00	0.00	0.00	0.00	0.00	450,000.00	
	National Interest Test Statement Micro-computed tomography (micro-CT) is an advanced imaging technology that enables high-resolution & high-speed 2D/3D imaging of the detailed anatomy of living animals in real-time. The non-invasive nature of this approach enables the repeated imaging of an individual animal, facilitating the tracking of biological processes over time & reducing the usage of research animals, a current priority for the Australian government & research community. The closest animal imaging facility is in Sydney; however, issues of animal welfare preclude the routine transport of animals between Newcastle & Sydney – seriously disadvantaging research projects & the R&D pipeline in our region. This project will establish a state-of-the-art small animal in vivo imaging facility with micro-CT capability to directly serve the Hunter, New England & Central Coast regions of NSW. The facility will enable interdisciplinary research in human biology, veterinary sciences, conservation biology & bioengineering – accelerating the generation of intellectual property & commercialisation outputs. It will build critical capacity in regional NSW, attracting investment & industry to the region & stimulating the development of new local industries. The facility will capitalise on existing research talent in regional NSW & benefit Australians by (for example) advancing understanding of fertility & pregnancy, protecting endangered species & eradicating pests, and creating new bioengineering & technology platforms.								
	The University of Newcastle	450,000.00	0.00	0.00	0.00	0.00	0.00	450,000.00	
The University of Sydney									
LE240100010 Ju, A/Prof Lining (Arnold) A	**Single-molecule Manipulation and Interaction Facility (SMIF)** This LIEF project aims to establish Australia's first Single-molecule Manipulation and Interaction Facility (SMIF), providing multidisciplinary researchers with a platform to explore cellular processes and reveal molecular mechanisms at the nanoscale. The SMIF facility incorporates cutting-edge technologies for bio-manipulation, real-time visualisation, and characterisation of single-molecule interactions, overcoming the technical complexity of traditional tools requiring highly specialised personnel. By offering accessible, easy-to-use advanced systems, this project will significantly boost scientific discovery across physics, chemistry, and biology, fostering collaboration and innovation to better understand life at the molecular level.	928,291.00	0.00	0.00	0.00	0.00	0.00	928,291.00	
	National Interest Test Statement The Single-molecule Manipulation and Interaction Facility (SMIF) will significantly advance Australia's research capabilities in rapidly growing fields such as mechanobiology, biophysics, biomaterials, biophotonics, and bio-nanotechnology. No such integrated facility exists in Australia today. Catering to strong demand for cutting-edge research infrastructure, SMIF will foster multidisciplinary collaborations and drive innovation across various disciplines. SMIF will enable a deeper understanding of fundamental mechanisms governing biological systems, materials, and nanoscale devices. This knowledge will facilitate the development of advanced functional biomaterials, biosensors, imaging, organ-on-a-chip, and microfluidic systems, ultimately improving the quality of life in Australia. The facility aligns with the Australian Government's National Innovation and Science Agenda and the 2030 Strategic Plan. Moreover, SMIF will contribute to Australia's knowledge economy by enabling the development of new technologies and products with commercial potential, generating revenue, creating job opportunities, and developing a skilled workforce for Australia's future. The SMIF facility will be broadly accessible to researchers from various institutions, including regional and remote institutions. This marks a significant step towards driving innovation and discovery in Australia, with far-reaching benefits for the nation's economy, industries, and society.								
LE240100049	**In-situ nanomechanical testing for materials under extreme environments**	1,200,000.00	0.00	0.00	0.00	0.00	0.00	1,200,000.00	

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Liao, Prof Xiaozhou	This project aims to establish a state-of-the-art in-situ nanomechanical testing capability for materials under extreme environments. A cutting-edge nanoindentation stage with customisable modules, as well as an optimally configured scanning electron microscope, will enable this capability for the first time in Australia. The expected outcomes will provide valuable insights into how microstructures affect mechanical properties at temperatures ranging from -150 to 1000 °C, strain rates from 10E-5/s to 10E5/s, and liquid environments. The resulting knowledge will guide the development of structural materials that withstand harsh environmental conditions, thereby advancing Australia's advanced manufacturing and sustainable energy sectors. **National Interest Test Statement** The proposed facilities will establish a cutting-edge research capability in Australia by utilizing state-of-the-art instrumentation to solve real-world problems. Specifically, the in-situ nano-mechanical scanning electron microscopy technology will enable real-time imaging of dynamic processes within material structures under mechanical loadings, expanding Australia's in-situ capabilities to better understand the structure–property relationships of materials under extreme environments, including high or low temperatures, impact loading, corrosive liquids, and hydrogen environments. The new capabilities enabled by the requested facility will not only enhance Australia's research capabilities but also have practical applications in solving real-world problems. By developing this advanced platform, Australian scientists and engineers will have access to valuable first-hand information to develop advanced materials, giving Australia a significant advantage in burgeoning industries such as advanced manufacturing, space engineering, marine engineering, nanotechnology, and sustainable hydrogen economy.								
LE240100054 Ling, Prof Chris D	**Dedicated High-throughput 3D-Electron Diffractometer** This proposal aims to install the first dedicated high-throughput 3D-electron diffractometer in the Southern Hemisphere, and one of the first in the world. It will be able to rapidly solve the atomic-scale structures of molecules and materials for which this is now extremely difficult and time-consuming – or impossible – due to the inability to grow large enough crystals for traditional X-ray diffraction. It will thus provide a significant advantage for chemists, physicists, biologists, geologists, and engineers who rely on detailed structural knowledge to rationally optimise the properties of their compounds, from pharmaceutical activity to carbon capture to superconductivity, to the substantial benefit of multiple national priority areas. **National Interest Test Statement** Every important property of molecules and materials arises due to the types and arrangements of atoms within them. Rapid and reliable structure determination thus underpins every field of applied science, engineering and medicine. The requested high-throughput 3D-electron diffractometer will rapidly determine the atomic structures of molecules and materials from the smallest possible crystal samples, orders of magnitude below what can be studied using traditional X-ray (including synchrotron) diffraction. By providing structural details of a huge variety of new compounds in a matter of hours, that would otherwise be unobtainable or take months of effort, it will accelerate research projects and revive stalled or abandoned ones, leading to breakthrough outcomes in areas as diverse as energy storage, drug discovery, electronic components and petrochemical processing. The technology is genuinely revolutionary, but now sufficiently proven that installing the first such instrument in the Southern Hemisphere is a low-risk investment with a huge return. It will give Australian public and private sector research a world-leading edge, complement existing national infrastructure for structure determination, and train students and early career researchers in cutting-edge methodology. Its capabilities and outcomes will be promoted beyond academia through the CIs' current CRC, Linkage and other partnerships, and the networks of university and national structure determination facilities.	1,341,398.00	0.00	0.00	0.00	0.00	0.00	1,341,398.00	
LE240100084 Aguey-Zinsou, Prof Kondo-Francois	**Australia's fuel cells and electrolysers prototyping and testing facility** This project aims to address a major gap in Australian infrastructure for researching and developing technologies for Power to X, including hydrogen production and use. The aspiration is to establish an integrated fuel cell and electrolyser prototyping and testing facility to support Australia's excellent fundamental research in advanced energy materials, electrocatalysis, and engineering design. The aim is to equip the research community with the capability to fabricate electrolyser and fuel cell prototypes at relevant scales to accelerate translational research in these areas. Doing so will also enable the technical and expertise platform needed to	950,000.00	0.00	0.00	0.00	0.00	0.00	950,000.00	

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	support industry's transition toward Australia's 2050 net zero objective. **National Interest Test Statement** Australia aims to become a renewable energy superpower. Australian-made and supported hydrogen technologies will be essential to this ambition. The Australian government has already announced $127 billion pipeline of large-scale hydrogen investment. This pipeline of projects is diverse, with the potential to help revitalise manufacturing, support regional economies, and create jobs, investment and trade opportunities while assisting Australia in achieving its net zero targets. This proposal seeks support to establish a national fuel cell and electrolyser benchmarking facility, a multidisciplinary, state-of-the-art experimental, prototyping and validation facility. The facility will help fill critical gaps to enable innovation and translation in hydrogen and Power to X conversion (where X is a chemical commodity including hydrogen). It will equip Australian researchers, already punching well above their weight in fundamental research in hydrogen-related technologies, whether in material science, catalyst development, or membrane humidification, … with capability to translate our basic science into commercial products in this nascent and rapidly growing industry. Establishing this facility will also provide industry with validation and testing capability, and help the broader community to transition toward Australia's 2050 net zero objective.								
LE240100091 New, Prof Elizabeth J	**Deep imaging for understanding molecular processes in complex organisms** This project aims to establish a new fluorescence-based imaging platform that provides an unprecedented combination of sensitivity and spectral discrimination for investigating molecular processes deep within biological tissues. It aims to generate fundamental knowledge in biology, chemistry and materials science relevant to emerging technologies including synthetic tissue construction, nanoparticle assisted delivery of bioactive compounds, molecular sensors, and designer plants. Expected outcomes are high impact discoveries, training opportunities, cross-disciplinary and cross-institutional collaborations and publications addressing fundamental questions that will ultimately contribute to improved crop production and biomedical products. **National Interest Test Statement** In order to understand and manipulate plant and animal biological systems we need to be able to see processes that are happening deep within their tissues. Existing facilities in Australia are not able to capture spatiotemporal detail of tissues at sufficient resolution. The proposed facility will be a multi-photon microscope unique in Australia in its ability to penetrate complex tissues and discern biochemical processes. This facility will advance our understanding of how macromolecules and cells interact, which will promote the development of different disciplines ranging from nanobiotechnology to neurophysiology to developmental biology. Such understanding will form the basis for future technologies in synthetic tissue construction, nanoparticle-assisted delivery of bioactive compounds, molecular sensors, and designer plants. Potential future applications of these technologies in medicine and food include new ways to heal wounds, deliver targeted medicines and improve food production by changing plant architecture. The imaging enabled by this microscope will enable the broad collaborative networks of the team to better understand agricultural and biological systems, therefore bringing together new cross-institutional expertise. The team will use their extensive industry networks to ensure impacts beyond academia. The unprecedented images available from the microscope will facilitate engaging public and schools outreach activities.	1,000,000.00	0.00	0.00	0.00	0.00	0.00	1,000,000.00	
LE240100120 Proust, Prof Gwenaelle	**Powder Manufacturing Facility for Additive Manufacturing** This proposal aims to enhance Australian capability in advanced manufacturing by enabling academia and industry to access a new Powder Manufacturing Facility for Additive Manufacturing (AM) to produce and characterise metallic powders for AM. There is presently an urgent need to develop metallic powders specific to AM instead of relying on alloys that were developed for traditional processes and that are not performing optimally in AM due to the fundamental physical differences between modern and traditional manufacturing technologies. Additionally, within this new facility, investigations on recycling metal products into powders to be used in AM will be conducted, providing new opportunities to achieve a circular economy. **National Interest Test Statement** This new facility will provide opportunities to Australian researchers to advance the field of additive manufacturing (AM) and to develop new metallic alloys for AM applications. This unique powder manufacturing facility will enable innovations and collaborations in AM, as well as providing training for the next generation of materials and manufacturing scientists and engineers that are needed to support the local manufacturing industry. This project	546,254.00	0.00	0.00	0.00	0.00	0.00	546,254.00	

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	will leverage substantially existing capabilities at the five universities involved in this proposal by giving them access to a much-needed capability. This new equipment will be available to all Australian researchers, including those in remote and rural areas. This facility will also enable research into material recycling which will have a positive environmental impact by providing an alternative to the depletion of natural resources. This new research facility will be part of an advanced manufacturing research facility at USYD that has been collaborating with industry since its creation to enhance Australian manufacturing. All the CIs on this proposal have long-standing collaborations with industry and have experience translating their research outcomes to industrial applications. The outcomes of the research projects conducted using this new facility will enable the development of new alloys and open opportunities to Australia to produce its own metallic powder for its growing AM industry.								
	The University of Sydney	5,965,943.00	0.00	0.00	0.00	0.00	0.00	5,965,943.00	
University of Technology Sydney									
LE240100131 Cao, Prof Longbing	**Federated Omniverse Facilities for Smart Digital Futures** A world-first trans-disciplinary, -domain, and -institutional smart 3D omniverse R&D ecosystem AuVerse will be built in NSW, affiliated with Queensland, and accessible to academia and industry. AuVerse will support cloud-based, reality-virtuality-fused, immersive, interactive and secure future-oriented digital design, development, training and society. In the new era of digital innovation and paradigm shift, AuVerse will substantially boost Australia's pivotal research leadership and business competitiveness in nurturing new-generation, collaborative and transformative digital R&D and talent pipeline. It will enable large-scale strategic business innovation and transformation including smart manufacturing and Industry 4.0.	539,000.00	0.00	0.00	0.00	0.00	0.00	539,000.00	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
	National Interest Test Statement This project aims to create a smart omniverse ecosystem called AuVerse. It will be Australia's first decentralised, trans-disciplinary, and cross-domain R&D facility. An omniverse ecosystem describes an interactive computer platform integrating next-generation AI technologies and real-time data to create a shared immersive space, a copy of the real world. It can be used to develop and test virtual simulations of true-to-life environments and conditions in a secure space and drive a new era of digital innovation, transforming many aspects of the economy and society. While a few countries and companies prioritise research into the virtual omniverse, Australia still lacks capacities and capabilities and is falling behind fast. Unlike conventional systems, AuVerse will be able to create a digital twin of every object, living being and process, enabling futuristic immersive and interactive digital design, development and training at a fraction of the costs. It can be deployed to areas such as cybersecurity, health, emergency services, defence, space, finance and banking, insurance, farming, food and manufacturing. It supports emerging digital research and next-generation talent training. The team will maximise the benefits and outcomes beyond academia by providing access to companies and the public, working with strategic industrial, governmental, and international organisations, and translating research outputs into smart digital business innovations.								
	University of Technology Sydney	539,000.00	0.00	0.00	0.00	0.00	0.00	539,000.00	
Western Sydney University									
LE240100068 McQuinn, Dr Ryan P	**Australian Advanced Metabolic Signal Discovery, and Imaging Platform** This proposal aims to establish an Australian Advanced Metabolic Signal Discovery and Imaging platform. The platform consists of an ultra-high resolution gas chromatography mass spectrometer and an imaging mass spectrometry upgrade for a second existing high resolution mass spectrometer. The facility will break barriers currently limiting discovery and localisation of metabolic changes during plant and animal development under environmental stress; integral chemical signals exchanged in host-microbe interactions; and volatile signatures linked to ecosystem health and developmental anomalies in animals. Results will inform innovative strategies to enhance biological adaptation, climate resilience and plant, animal, and ecosystem health.	931,950.00	0.00	0.00	0.00	0.00	0.00	931,950.00	

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

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Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)					Total ($)	Partner Organisation(s)
		2023-24	2024-25*	2025-26*	2026-27*	2027-28*	2028-29*		
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)	(Column 10)	(Column 11)
	National Interest Test Statement Australia is facing ongoing threats to crop, soil and ecosystem health due to environmental stresses related to climate change, increased agricultural emissions, and other human impacts. All forms of life have evolved an intricate form of chemical communication to guide and safeguard development in the presence of these stressful encounters. It is increasingly clear that microbes, such as beneficial bacteria and fungi, can help protect plants and animals from such stresses and improve ecosystem resilience through dynamic forms of chemical communication. Some bacteria produce biological fertilisers for plants when under nitrogen stress, while others protect coral reefs from increased water temperatures or contribute to animal health by preventing internal infections. The proposed instruments will identify the minute chemical signals microbes exchange within plants and animals. Identified signals represent innovative targets for manipulation or replication to achieve the desired effect, improving the protective effect of microbes that live in soils, and that area associated with plants and animals. The ability to detect, locate, and decipher these chemical signals is currently a limitation in Australia. The new instrument capabilities will secure agricultural profits with higher crop yields while reducing agricultural inputs and under environmental stress, safeguard coral reefs and their ecosystems in warming waters, and deliver better health outcomes for plants and animals.								
	Western Sydney University	931,950.00	0.00	0.00	0.00	0.00	0.00	931,950.00	
	New South Wales	14,406,279.00	0.00	0.00	0.00	0.00	0.00	14,406,279.00	

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		2023-24	2024-25*	2025-26*	2026-27*	2027-28*	2028-29*		
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)	(Column 10)	(Column 11)
Queensland									
Griffith University									
LE240100064	**Sediment Drilling Facility for environmental and genetic archives**	193,125.00	0.00	0.00	0.00	0.00	0.00	193,125.00	
Kemp, Dr Justine	This Sediment Drilling Facility for Environmental and Genetic Archives combines versatile augers with new field spectrometers that will enable sediment extraction and rapid, in situ measurements from coastal, lake and riverine environments. The facility includes a compact geotechnical drill rig, a portable power auger with hydraulic extraction unit, a vibracorer with motorised pontoon, laser induced breakdown spectrometer and magnetic susceptibility. With access co-ordinated through the Queensland Geochronology Alliance, the new facility will enable university researchers unprecedented access to field equipment required to address questions about changing ecology, landscape and climate on recent and geological timescales.								
	National Interest Test Statement								
	This facility will contribute to our understanding of climate and environmental change in Australia and neighbouring Pacific islands by enabling the reconstruction of environmental records from sedimentary archives contained in lakes, swamps and floodplains. In the past, extracting long sediment cores from terrestrial environments required professional drillers at significant cost. This new infrastructure aims to provide inexpensive, mobile coring rigs with state-of-the-art field spectrometers that make possible efficient data collection relating to changes in catchment erosion, changing ecology, the occurrence of natural hazards, and fluctuations in rainfall and temperature. Such information is vital for the development of effective management strategies, and enables better management outcomes for culturally, environmentally and economically important landscapes including the tropical savanna, semiarid rangelands, wetlands, and the Great Barrier Reef. These projects provide critical data required for Australian national climate models, which are used to predict seasonal rainfall for agriculture and disaster planning in the light of recent and projected anthropogenic warming. More broadly, long records of climate change and variability are critical to answer the arguments of climate sceptics that greenhouse warming is within the range of natural variability.								
	Griffith University	193,125.00	0.00	0.00	0.00	0.00	0.00	193,125.00	
James Cook University									
LE240100006	**Northern Australia Plant Biosecurity Facility**	350,000.00	0.00	0.00	0.00	0.00	0.00	350,000.00	
Cernusak, A/Prof Lucas A	Quarantine glasshouses (Biosecurity Containment Level 2) are required to develop research with invasive plants. However, in Australia, no quarantine glasshouses exist north of parallel 27 (Brisbane), posing a remarkable barrier to research on tropical biosecurity. This proposal aims to establish a quarantine glasshouse for a broad range of internal and external users, enabling scientists based in the Australian tropics and other interested parties to address plant biosecurity risks from and for northern Australia. Tropical biosecurity is a key area of strategic focus for JCU and its network of partners, who will benefit from the targeted research, quarantine services, and specialized training that will be enabled by this facility.								
	National Interest Test Statement								
	At present, there are no plant quarantine glasshouses (Biosecurity Containment Level 2) in northern Australia, with the northernmost facilities located in either Brisbane or Perth. This poses a severe disadvantage to northern Australia's institutions and industry, who cannot develop plant biosecurity research programs tailored to the environments prevalent in the north. This facility will be able to support tropical biosecurity research that is difficult to develop elsewhere, and to provide regional plant quarantine services that are unpractical to outsource and currently not available in northern Australia. Tropical Australia is a critical region for biosecurity due to its proximity to neighbouring countries with high biosecurity risks, and its unique environment and diversity of habitats sensitive to the introduction of weeds. Our northernmost land is the island of Saibai, in the Torres Strait, located only 3.5 km								

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(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
	from Papua New Guinea's land (PNG). Cairns is the northernmost regional capital in the Cape York Peninsula, and it is located less than 500 km from the southern limit of the biosecurity buffer areas north of Coen, and less than 1,000 km from PNG. Biosecurity threats can potentially spread through the country from the north, and the presence of this plant quarantine facility would play an important role not only in promoting tropical biosecurity research, but also in rapid response to future plant biosecurity needs and emergencies.								
	James Cook University	350,000.00	0.00	0.00	0.00	0.00	0.00	350,000.00	
Queensland University of Technology									
LE240100060	**High speed multi modal in-situ Transmission Electron Microscopy platform**	638,853.00	0.00	0.00	0.00	0.00	0.00	638,853.00	
Golberg, Prof Dmitri	This project aims to establish an in situ transmission electron microscope that will allow the atomic scale imaging of materials, while simultaneously measuring physical, chemical, electrical and optical properties, using a novel combination of cutting edge in-situ sample holders and an instrument mounted laser system. The instrument will be optimised for imaging of dynamic phenomena and the combination of spatial resolution in the picometre scale, with microsecond level temporal resolution will be unique. The instrument will accelerate research into hydrogen production and carbon dioxide transformation, and thus support Australia's move to a more sustainable economy.								
	National Interest Test Statement								
	Climate change poses one of the great challenges for Australia, but it also provides an opportunity to reposition ourselves as a clean energy superpower. In order to achieve this, we need to develop more efficient ways of generating green hydrogen, and also to transform carbon dioxide into valuable products. The proposed research infrastructure will allow us to achieve both of these goals, by studying the relevant electrochemical reactions in situ to atomic resolution and observing dynamic changes in the systems. It will also provide greater understanding of the properties of other future materials at the nano-scale, and help underpin development of these economically important materials.								
	Queensland University of Technology	638,853.00	0.00	0.00	0.00	0.00	0.00	638,853.00	
The University of Queensland									
LE240100044	**Cryogenic Experimental Laboratory for Low-background Australian Research**	860,000.00	0.00	0.00	0.00	0.00	0.00	860,000.00	STAWELL UNDERGROUND PHYSICS LABORATORY LTD
Harris, Dr Glen I	This project aims to build an open-access cryogenic facility in the only deep-underground physics laboratory in the southern hemisphere. This facility, called the Cryogenic Experimental Laboratory for Low-background Australian Research (CELLAR), will provide extreme shielding from sources of noise, enabling ultra-precise experiments for fundamental science and emerging applications. The expected outcomes include a deeper understanding of astrophysics, alongside technological advances in emerging quantum technologies. CELLAR's unique capabilities will attract strong international collaborations with multidisciplinary teams, educating the next generation of scientists and advancing the growth of Australian high-technology industries.								
	National Interest Test Statement								
	Over the last 100 years, many of the ground-breaking experiments in fundamental physics were performed in underground laboratories. These facilities provide extreme levels of shielding from external sources of noise and enable the development of advanced sensing platforms. Indeed, four Nobel prizes in Physics have been awarded to discoveries only accessible in an underground setting. The Stawell Underground Physics Laboratory (SUPL), located within a mine in regional Victoria, was commissioned in 2022 and is the only underground laboratory in the southern hemisphere. This project aims to establish the first national facility, within SUPL, with cryogenic capabilities in an extremely low-noise environment. This unique facility will attract international collaboration and foster multidisciplinary research, generating scientific breakthroughs with the development of advanced sensing								

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(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
	technologies. This will directly benefit Australia by contributing know-how and workforce to our advanced manufacturing capabilities, enhancing global competitiveness in high-technology industries. Furthermore, the pursuit of fundamental science will stimulate the imagination of the general public, inspiring our youth to pursue meaningful careers in science and technology.								
LE240100050	**A national network for magnetic resonance spectroscopy**	1,681,491.00	0.00	0.00	0.00	0.00	0.00	1,681,491.00	
Mobli, Prof Mehdi	Our proposed network of high-end facilities for solid-state nuclear magnetic resonance spectroscopy aims to establish cutting-edge capabilities nationally for molecular and materials characterisation. The new infrastructure will enable advanced studies in chemistry, drug design, materials science, and environmental sciences. The expected outcomes include new discoveries, innovative applications, and potential commercialisation of new products, which will bring significant economic benefits to the Australian economy. Additionally, the network will foster collaborations with international researchers and industry partners in areas of biotechnology, energy capture and storage, and environmental sustainability.								
	National Interest Test Statement								
	Molecular and materials characterisation is critical in the development of new products, but it is also essential for monitoring changes in complex systems such as human health, food quality, and the environment. Nuclear magnetic resonance (NMR) spectroscopy is a key analytical technique used ubiquitously in advanced manufacturing, given its non-destructive nature and ability to provide chemical and geometric information on the atomic scale. However, advanced NMR capabilities and expertise are currently limited in Australia, creating a bottleneck for research and innovation in critical areas such as food security, biomedical research, polymer science, energy storage, and environmental sciences. In this proposal, we aim to enhance NMR capabilities in Australia by addressing gaps in existing facilities in key areas of materials and molecular characterisation. We will also establish a virtual network for remote access to these facilities by researchers and private companies. The proposed facilities will provide valuable analytical capabilities in the rapidly growing advanced manufacturing sector, as well as in important areas of research, including biotechnology, environmental monitoring, and energy capture and storage.								
LE240100134	**Super-resolution platform to accelerate biological and molecular research**	796,206.00	0.00	0.00	0.00	0.00	0.00	796,206.00	
Fairlie, Prof David	This application aims to establish a new molecular analysis platform integrating a microfluid capillary electrophoresis interface directly to a mass spectrometer with advanced data scanning technology. This enables label-free detection, quantitation and characterisation of intact proteins, lipids and metabolites with unprecedented sensitivity, resolution and throughput. It will enhance ARC projects spanning natural product discovery, biotechnology, agriculture, and animal, plant and marine biology, as well as single-cell proteomics, lipidomics and metabolomics. It will ensure Australia remains at the forefront of molecular and biological research and create new training and collaborative opportunities both nationally and internationally.								
	National Interest Test Statement								
	Mass spectrometry is a method for analysing molecules' size, structure and amounts. It has been used in chemistry for a century for small molecules, with Nobel prize-winning advances making it possible to use it also in biology to study larger molecules (proteins, lipids, metabolites) in cells and organisms. However, there are still limitations that hinder progress in biological research and application development, such as the need to break down molecules for analysis, the complexity of biomolecules in cells, and the requirements for high detection sensitivity. Filling this technology gap, the requested infrastructure is the first in the world to couple a capillary electrophoresis microfluidic chip to a mass spectrometer with sophisticated new data scanning technology. This enables faster detection of intact biomolecules from cells and organisms with unprecedented resolution and sensitivity. The platform will support >20 ARC-funded research leaders and >200 students and staff in Queensland and Northern New South Wales, as well as Australian and international collaborators, to obtain new knowledge of cells, animals, plants and marine organisms. This new analysis capability will provide a competitive edge for high-impact outcomes and enhance Australia's research and training capacity. It will underpin applications for agriculture, food security and the biotech industry, which will lead to new commercialisation opportunities, stimulate R&D investment, and create new jobs.								
	The University of Queensland	3,337,697.00	0.00	0.00	0.00	0.00	0.00	3,337,697.00	
	Queensland	4,519,675.00	0.00	0.00	0.00	0.00	0.00	4,519,675.00	

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		2023-24	2024-25*	2025-26*	2026-27*	2027-28*	2028-29*		
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)	(Column 10)	(Column 11)
South Australia									
Flinders University									
LE240100073	**A femtosecond beamline for time-resolved momentum microscopy**	1,150,000.00	0.00	0.00	0.00	0.00	0.00	1,150,000.00	
Jones, Dr Darryl B	This project aims to obtain a femtosecond high-harmonic generation beamline that will be integrated with a photoemission electron microscope to create Australia's first time-resolved momentum microscope. This project expects to use ultrafast spectromicroscopy to observe the changes to the excited electron motion within materials after they absorb light. Expected outcomes of this project include improving our understanding of light-driven physical and chemical processes that occur in materials and optoelectronic devices. This should provide significant benefits through the development of new cost effective and efficient materials for energy harvesting, sensors and photocatalysts.								
	National Interest Test Statement								
	This project is requesting an extremely short duration high-energy ultraviolet light source that will be connected to Australia's only momentum microscope. Using ultrashort light pulses, we will be able to observe the motion and location of the energetic electrons created when materials absorb light. This will create a world-class facility for investigating the photoabsorption behaviour of materials that underpins their light sensing, energy harvesting, and photocatalytic capabilities. Understanding these processes will generate new knowledge that will assist in developing cost effective and efficient materials that are essential for improving the performance of organic electronic devices, solar cells and clean hydrogen production technologies. This can offer tangible benefits to the Australian people and environment through helping to manufacture technologies with better performance, at reduced costs and with a minimal environmental footprint. This capability will further be used for training the next generation of material scientists and engineers in the skills they need to grow and support the Advanced Manufacturing and Energy sectors. The advanced techniques, only available through this instrumentation, can be used to forge new partnerships with industry to develop technologies and de-risk their implementation at large scales.								
LE240100147	**Revitalising NMR facilities in South Australia - Stage 2**	900,000.00	0.00	0.00	0.00	0.00	0.00	900,000.00	
Johnston, A/Prof Martin R	The determination of molecular structure using Nuclear Magnetic Resonance (NMR) is a fundamental and powerful technique that is utilised by researchers across numerous disciplines. We are proposing to upgrade NMR facilities within South Australia in a carefully staged process so as to provide researchers access to state of the art experiments on modern instrumentation. In this proposal we aim to replace end of life components as well as provide increased sensitivity and capability by installing new probes. We aim to minimise duplication and maximise capability by undertaking a coordinated approach to NMR upgrades.								
	National Interest Test Statement								
	Nuclear Magnetic Resonance (NMR) is one of the most powerful techniques used by researchers when investigating molecular structure and is fundamental to numerous research arenas. The technique has proven applications in research arenas such as polymers, pharmaceuticals, materials sciences, food sciences and other technologies. This project aims to upgrade South Australia's ageing current NMR capabilities to ensure researchers have access to modern spectrometers capable of state-of-the-art experiments and will provide world-class facilities of comparable standard to those used by many top universities, research institutes and industries across Australia, and globally. Such facilities will enable cutting edge research and technology development to be undertaken and significantly contribute to the training of job ready graduates and a highly skilled and adaptable workforce.								
	Flinders University	2,050,000.00	0.00	0.00	0.00	0.00	0.00	2,050,000.00	
The University of Adelaide									
LE240100116	**Facilities for Atmospheric Boundary Layer Evaluation and Testing**	1,200,000.00	0.00	0.00	0.00	0.00	0.00	1,200,000.00	

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(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
Arjomandi, Prof Maziar	This proposal aims to establish state-of-the-art stationary and mobile facilities for atmospheric wind, dust and plume measurements with unique capability to quantify the effect of climate change, surface topography and urbanisation on near-surface microclimate where humans live. To better predict microclimate, mitigate air pollution impacts and exploit local conditions for improved urban planning and agricultural yield, high quality observations of the near-surface atmosphere at fine temporal and spatial resolutions are required. The proposed Facilities for Atmospheric Boundary Layer Evaluation and Testing (FABLET) will advance Australia's capability to make these difficult measurements of atmospheric boundary layer.								
	National Interest Test Statement								
	The proposed Facilities for Atmospheric Boundary Layer Evaluation and Testing (FABLET) will provide unique data that is needed to understand the impact of climate change and urbanisation on human life, which currently does not exist. Both academia and industry can extensively benefit from FABLET. In academia FABLET can provide the required dataset for development of fundamental understanding of the changes in atmospheric boundary layer and ultimately microclimate due to global warming and urbanisation. FABLET also can support development of new technologies in different sectors; for example, FABLET data can support increasing agricultural productivity, reducing cost of solar and wind energy technologies, and improving the comfort and health of humans around the world. By taking advantage of the state-of-the-art stationary and mobile facility, FABLET will allow unprecedented benchmarking and capability to assess and predict pollution, dust and wind in different environments including rural, urban, in densely populated cities or in the harsh Australian outback. FABLET data will be shared beyond academia using open-access web-based platforms. The facilities will establish the required fundamental and applied knowledge with a goal to improve accuracy and precision in predicting and measuring the impact of environmental changes caused by climate and local factors and provide significant support to the Australian Government's Science and Research Priority on Environmental Change.								
LE240100135 Pukala, Prof Tara L	**An ion mobility-mass spectrometry based platform for structural proteomics** This project aims to establish a nationally unique facility dedicated to structural proteomics, combining high resolution ion mobility mass spectrometry with advanced separation, hydrogen/deuterium exchange and imaging platforms. Such technology is critical to characterise 3D biomacromolecular structures, dynamics, interactions and spatial location on a proteome-wide scale, and overcome current analytical limitations for structure determination from complex biological samples, particularly for closely related (isomeric) components. Servicing a diverse research community, this will enable new molecular insights to better understand the natural world, and accelerate cutting edge biotechnology advances intersecting life and chemical sciences.	880,000.00	0.00	0.00	0.00	0.00	0.00	880,000.00	AUSTRALIAN WINE RESEARCH INSTITUTE, SAHMRI, CENTRAL ADELAIDE LOCAL HEALTH NETWORK INCORPORATED
	National Interest Test Statement								
	Proteins regulate essentially all biochemical processes critical to cellular life. Our ability to understand and modulate biological function is therefore directly dependent on an ability to determine the structure and interactions of these molecules at an atomic level. This is an unsolved frontier challenge, particularly for closely related, difficult to resolve structures, and the many systems in complex biological samples not amenable to study by conventional methods. This project aims to develop new analytical capabilities to rapidly profile the 3D structures and dynamic interactions of proteins on an organism-wide scale, with a pipeline from discovery to functional understanding. It will address unmet national need for dedicated mass spectrometry-based structural proteomics infrastructure, to tackle interdisciplinary cutting-edge problems across chemistry, health/life sciences, food and agricultural sciences. Resulting molecular insights will accelerate translation of fundamental collaborative research to real benefits to Australian industries and communities, enabling growth in Australian biotechnology, agriculture and advanced manufacturing sectors through enhanced biomolecule analysis, and deliver research training to build a skilled national workforce. We will engage technology end-users through local workshops, open-source data/software and online protocol sharing, and disseminate results to the scientific and local community through varied print/electronic means.								
	The University of Adelaide	2,080,000.00	0.00	0.00	0.00	0.00	0.00	2,080,000.00	
University of South Australia									
LE240100129 Blencowe, A/Prof	**State-of-the-art atomic force microscopy facilities for South Australia** This project aims to transform our national capability in nano-(bio)characterisation by establishing a state-of-the-art atomic force microscopy (AFM) facility in South	530,721.00	0.00	0.00	0.00	0.00	0.00	530,721.00	

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Anton	Australia. The facility will provide unparalleled capabilities not currently available in Australia and will catapult knowledge in multiple fields, from critical minerals and clean energy to mechanobiology. Expected outcomes include more efficient and eco-friendly resource recovery and energy production, future foods and cures, and advanced (bio)materials. The project will strengthen and amplify Australia's capacity and global leadership to translate fundamental nano-scale phenomena and properties into innovative materials, technologies, and processes.								
	National Interest Test Statement Currently, there are no instruments in South Australia that allow high-resolution, real-time imaging or measurements of events in controlled environments occurring at the nanoscale – a scale around a millionth of a pinhead at which the physical and chemical properties of matter change. This project aims to install a high-end instrument for the imaging and characterisation of surfaces at the nanoscale and create a hub for research excellence into fundamental nanoscale phenomena occurring in real-time. The instrument would enable us to visualise nanoscale processes as they occur and measure how living organisms interact with their surroundings, helping us to understand fundamental processes and generate new knowledge. This would lead to innovative advances and technologies across a range of fields, including mineral and resource recovery, energy production and storage, advanced materials engineering and biological processes. Therefore, the facility will benefit the Australian economy, society and environment by contributing to new technologies that allow more ecofriendly and efficient mining, energy storage and catalysis, and a deeper understanding of biological processes. Translation pathways would be driven by the demand for new technologies and knowledge that could lead to improved processes, manufacturing and medical treatments.								
	University of South Australia	530,721.00	0.00	0.00	0.00	0.00	0.00	530,721.00	
	South Australia	4,660,721.00	0.00	0.00	0.00	0.00	0.00	4,660,721.00	

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Tasmania									
University of Tasmania									
LE240100039 Bowie, Prof Andrew R	**Advanced HR-ICP-MS facility for marine, Antarctic and environmental samples** This proposal seeks support for a shared High Resolution Inductively Coupled Plasma Mass Spectrometry facility for Tasmanian researchers. The existing UTAS instrument is approaching end-of-life and is becoming increasingly unreliable. Access to enhanced capabilities embodied in a rejuvenated facility, along with a renewed lifespan, is essential for continued analysis of ultra-trace elements and isotopes in challenging samples from southern environments. The new instrument will allow TAS researchers and their (inter)national collaborators to undertake world-leading research, enhancing competitive profiles in a diverse range of research areas (oceanography, analytical chemistry, Antarctic studies, environmental assessment, geochemistry).	470,000.00	0.00	0.00	0.00	0.00	0.00	470,000.00	AUSTRALIAN ANTARCTIC DIVISION, COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION, ANALYTICAL SERVICES TASMANIA
	National Interest Test Statement Australia faces significant environmental and climatic challenges in coming decades. Our ability to respond effectively to these challenges is closely linked to our ability to measure the concentration of trace elements and their isotopes which form the basis of many marine and terrestrial ecosystems on Earth. An advanced ICP-MS facility is now accepted as the premier analytical technique for multi-elemental determinations requiring ultra-trace detection levels. In partnership with world leading Tasmanian researchers, the proposed infrastructure will build research capacity and address practical research challenges across a number of Science Research Priorities, delivering environmental and economic benefits for the nation. The requested facility will allow accurate analyses of the majority of chemical elements in the periodic table, at the lowest levels, enabling important research advances in three key priority areas: (1) Soil and Water - Improving the use of soils and water resources, both terrestrial and marine, (2) Environmental Change - Mitigating, managing or adapting to changes in the environment, and (3) Energy and Resources - Supporting the development of reliable, low cost, sustainable energy supplies and enhancing the long-term viability of Australia's resources industries.								
LE240100080 Taberlay, A/Prof Phillippa C	**Acquisition of an advanced Fluorescence-Activated Cell Sorter for Tasmania.** Tasmania has immediate need for contemporary flow cytometry infrastructure to maintain world-class research for local and global benefit. This project aims to establish next generation, single cell sorting capability to study the impact of ageing and environmental stressors on human, animal and plant biology. Outcomes of this project include: 1) multi-disciplinary expansion across the areas of neuroscience, ecology, evolutionary biology, oceanography, epi/genomics and immunology, 2) ability to develop innovative assays and vaccines, and 3) increase the scale of national and international collaborations. This project will provide direct benefit through our contribution of new knowledge, commercial uptake and impact on policy.	500,000.00	0.00	0.00	0.00	0.00	0.00	500,000.00	
	National Interest Test Statement The population of Australia is ageing and our location is under increasing climate pressures. From Tasmania, we have a unique location to study and address these challenges, whilst enhancing the scale of nationally relevant, world-leading research in neuroscience, ecology, evolutionary biology, oceanography, epi/genomics and immunology. Our stakeholders are leaders in these portfolios and their research programs address future health, economic and environmental challenges. However, lack of appropriate infrastructure is inhibiting knowledge gain that would facilitate next steps in assay development, vaccine trials, pest management in fisheries and government policy. This project will equip researchers with single cell or particle-level capability to capture information about the inner workings of cells and animals in high definition. The breakthroughs possible from this capability will be expandable in breadth and depth. For example, the plight of the Tasmanian Devil has driven the development of innovative vaccine technologies that are directly translatable to protecting other Australian species and ecosystems. A modern and accessible flow cytometry cell sorting instrument underpins our continued innovation and continuity of Australian-driven discoveries, training and vital links to industry and community. The commercialisation and policy development outcomes of this research are achievable within five years and will provide economic and ecological benefit to Australia.								
	University of Tasmania	970,000.00	0.00	0.00	0.00	0.00	0.00	970,000.00	

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Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)					Total ($)	Partner Organisation(s)
		2023-24	2024-25*	2025-26*	2026-27*	2027-28*	2028-29*		
(Columns 1 and 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)	(Column 8)	(Column 9)	(Column 10)	(Column 11)
	Tasmania	970,000.00	0.00	0.00	0.00	0.00	0.00	970,000.00	

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

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Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)					Total ($)	Partner Organisation(s)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
Victoria									
Monash University									
LE240100038 Wood, Prof Bayden R	**A multimodal infrared, Raman and fluorescence submicron imaging microscope** A new multimodal microscope system incorporating infrared, Raman and fluorescence imaging can study the chemical composition of single bacteria, plants, small organisms along with hard and soft materials at an unprecedented level of detail. This breakthrough technology has various applications in biology, aquatic chemistry, nanochemistry and forensic archaeology. The system will also support sustainable chemistry, material analysis, green energy and battery development, placing Australia at the forefront of multimodal materials characterisation. Overall, this advancement will deepen our understanding of the chemical and biological world and have broad-reaching benefits across multiple disciplines.	670,000.00	0.00	0.00	0.00	0.00	0.00	670,000.00	VICTORIAN INSTITUTE OF FORENSIC MEDICINE
	National Interest Test Statement This project aims to use a new multimodal submicron imaging microscope to perform chemical imaging on both hard and soft materials. The technology will enable researchers to better understand biological systems and develop materials with important technological applications. Chemical imaging at an unparalleled level of detail will facilitate the detection of progenitor stem cells, antimicrobial resistance, toxins in plant tissue, and toxicity of microplastics containing pharmaceuticals. The effects of nanoparticles on cells and associated toxicity can also be studied. New protocols will be developed for measuring materials in green energy technologies, such as the development of new lithium batteries and electrocatalysis. The technology will be used to characterise the deactivation/regeneration of catalytically converting carbon dioxide to fuels and investigate water splitting. In addition, materials from Egyptian mummies will be studied to understand the embalming processes and causes of death. Expected outcomes include interdisciplinary collaborations to develop new protocols for studying cell phenotypes, material characterisation for green energy, environmental monitoring, advanced catalytic materials and forensic archaeology. Overall, this project offers an exciting opportunity to advance our understanding of the chemical and biological world and develop new materials with important technological applications.								
LE240100063 Bourgeois, A/Prof Laure N	**Scanning Transmission Electron Microscope for Beam-Sensitive Materials** This project aims to establish a transmission electron microscopy facility for the high-throughput characterisation of delicate materials, at the atomic scale and a broad range of temperatures. Unique in Australia, this capability will enable the location and type of atoms critical to materials properties to be determined for materials as diverse as lithium-bearing minerals, next-generation solar cells and drug-delivery agents. In this way it will foster the engineering of new materials for addressing current challenges in energy, environment, transport, health and manufacturing. This will be a national, open access facility for use by research institutions and industry, and for training the next generation of postgraduate students.	1,900,000.00	0.00	0.00	0.00	0.00	0.00	1,900,000.00	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
	National Interest Test Statement With the capability to characterise delicate materials down to the atomic scale and at their temperature of use, the proposed facility will constitute a new tool in Australia for the understanding, optimisation and design of materials for a multitude of applications. This will benefit many industries including in the manufacturing, transport, health, environment, food, communication and energy sectors. This will also underpin research with the longer-term goals of engineering materials with entirely new properties. The new facility will enable the advanced training in sophisticated instrumentation of hundreds of students and young researchers, thus significantly contributing to the knowledge economy and to the education of a highly skilled workforce.								
	Monash University	2,570,000.00	0.00	0.00	0.00	0.00	0.00	2,570,000.00	

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

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Approved Organisation, Leader of Approved Research Program	Approved Research Program	Estimated and Approved Expenditure ($)	Indicative Funding ($)					Total ($)	Partner Organisation(s)
(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
RMIT University									
LE240100019 Gibson, Prof Brant C	**National Electron Beam Irradiation Facility** This project aims to address a gap for Australian researchers and start-ups by establishing a high energy electron beam facility. This project expects to generate new knowledge and manufacturing capacity in the areas of quantum sensing and quantum computing by enriching doped diamond and other wide band gap materials via controlled electron irradiation techniques. Expected outcomes include the creation of new quantum engineered materials and devices via an academic and industry collaborative effort. The proposed facility should provide significant benefits to Australian researchers and quantum start-ups through unrestricted access to a sovereign facility entirely dedicated to their needs, aiding training of the future quantum workforce.	740,000.00	0.00	0.00	0.00	0.00	0.00	740,000.00	QUANTUM BRILLIANCE PTY LTD
	National Interest Test Statement Global investment in quantum technology over the past 5 years is upward of US$13 Billion and is ever increasing. This emerging quantum industry will permeate a number of key sectors including defence, finance, medicine and communications. Diamond materials will feature heavily in this emerging industry given their ability to operate under ambient conditions. This proposal aims to provide Australia with an advanced high energy electron source to enable the creation of diamond quantum sensing and computing materials. Currently, this electron irradiation process is typically performed using facilities located overseas. The national electron beam irradiation facility would service the large diamond community in Australia and would provide industry, government and defence departments with a competitive advantage in areas such as quantum metrology and secure quantum communications. The investment into this facility will complement the significant programs of quantum research around Australia and will help maintain our international lead in this emerging area. The facility will provide research training to equip the workforce with the skills needed to support future quantum technology enterprises. Leveraging this joint research and industry partnership, through unrestricted access to a sovereign facility, outcomes will be translated beyond academia to maximise commercial opportunities and allow a freedom to operate for Australian businesses.								
	RMIT University	740,000.00	0.00	0.00	0.00	0.00	0.00	740,000.00	
	Victoria	3,310,000.00	0.00	0.00	0.00	0.00	0.00	3,310,000.00	

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(Columns 1 and 2)	(Column 3)	2023-24 (Column 4)	2024-25* (Column 5)	2025-26* (Column 6)	2026-27* (Column 7)	2027-28* (Column 8)	2028-29* (Column 9)	(Column 10)	(Column 11)
Western Australia									
Curtin University									
LE240100109	**Compound specific isotopes of polar organic molecules in complex mixtures**	291,672.00	0.00	0.00	0.00	0.00	0.00	291,672.00	CHEMCENTRE
Grice, Prof Kliti	This project aims to develop a liquid chromatography – isotope ratio mass spectrometry facility for the measurement of stable carbon isotope ratios of individual organic compounds in complex mixtures, most significantly sugars and amino acids. This will be the first such facility in Western Australia, strategically ranked to greatly expand existing world-class capabilities in stable isotope analysis. An important goal of this project is the analysis of sugars in high-value foodstuffs such as honey, to develop a robust method of provenancing and authentication for important export markets. Other outcomes include elucidation of modern and ancient biological and ecological systems through the isotope analysis of natural products from microbes.								
	National Interest Test Statement National and international export of high-value foodstuffs such as honey are important to Australia's economy. To support this market there is an increased need for scientifically robust methods of determining food provenance and ensuring authenticity. This proposal will establish a state-of-the-art facility in Western Australia for food provenancing by compound-specific stable carbon isotope analysis of sugars in foodstuffs. The benefits of this facility will be reduced costs of interstate or overseas analyses, and increased consumer confidence in these valuable export markets. Western Australia has been at the forefront of scientific fields such as geochemistry, ecology, food science, archaeology and microbiology, with great contributions from the world-leading compound specific isotope expertise at Curtin University. This proposal will allow WA to maintain this leading position in isotope analysis with the latest technology in liquid chromatography isotope ratio mass spectrometry.								
	Curtin University	291,672.00	0.00	0.00	0.00	0.00	0.00	291,672.00	
	Western Australia	291,672.00	0.00	0.00	0.00	0.00	0.00	291,672.00	
		28,158,347.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**28,158,347.00**	

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