Issues Paper Consultation Survey – public and attributed responses
Topic 6 – New research infrastructure

This document includes public and attributed responses to the following questions of the Issues Paper Consultation Survey

- Q13. Review the full set of available suggestions for potential new or enhanced capabilities from the published Survey responses (Question 35) and identify up to 3 that you regard as most important to consider for inclusion in the 2026 NRI Roadmap. Please provide a brief rationale for your view and include the response number(s) for your selection.?
    - Capability 1
    - Capability 2
    - Capability 3
- Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Please note
- Where necessary, text answers to the above questions have been redacted to remove contact details and third-party personal information
- blank submissions have been removed
- respondents who wished to remain anonymous are contained in the document "Anonymous responses to Issues Paper Consultation Survey"

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Fri, Dec 19, 2025, 12:40 PM Australian Eastern Daylight Time
[ID: sbm39ca5c82480a48d32ad6d]

Title
Ms

First Name
Erin

Last Name
Vest

Organisation
Northern Australia Indigenous Reference Group

In what capacity are you responding?
A representative of an organisation or group

Capability 1
strengthen Indigenous-governed data and digital capabilities oriented to system-level metrics for capability, wealth and reliance;

Capability 2
enhance regional and Northern research infrastructure that underpins Net Zero, critical minerals, environmental stewardship and place-based humanities/social research

Capability 3
deepen public-interest digital observability, including humanities-led infrastructures that support the production–income–asset and legacy frames.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Northern Australia Indigenous Futures Observatory and Learning Infrastructure (NAIFOLI)

We propose the establishment of NAIFOLI as a distributed NRI capability for northern Australia that integrates environmental, economic, social and educational system-performance data under Indigenous-informed governance and provides tools to track production, incomes, assets and intergenerational capability using the agreed legacy indicators and timelines. It would be co-located with regional hubs and Indigenous organisations to build local technical and analytic capacity, and support AI-native learning and decision-support consistent with the National Digital Research Infrastructure Strategy. Over a 10–15-year horizon, NAIFOLI's mission would be to:

• provide a stable evidence base for the Action Plan and related strategies;
• demonstrate how NRI can assist in tracking and accelerating capability, resilience, ownership and substitution away from program dependence; and
• build a pipeline of Indigenous and regional researchers, data specialists and infrastructure professionals through co-designed pathways from school through VET and higher education into NRI careers.

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Thu, Dec 18, 2025, 10:19 AM Australian Eastern Daylight Time
[ID: sbm39c4b57be092eff95521e]

Title
Mr

First Name
Richard

Last Name
Brinkman

Organisation
AIMS

In what capacity are you responding?
A representative of an organisation or group

Capability 1

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Marine Technology Accelerator
Australia's marine science community needs to explore, understand, and monitor the marine estate at high spatial resolution for effective management and future R&D. Autonomous technologies can enhance research vessel operations, but access to these technologies is limited. The vast marine estate and limited research vessels necessitate leveraging technology to add value to marine research investments. Autonomous and semi-autonomous systems can operate in inaccessible areas and over extended timeframes, crucial for deep and shallow water marine science. The national research vessel (RV) fleet requires complementary autonomous and semi-autonomous vehicles for surface and sub-surface observations, which will also foster innovation in other maritime sectors.
There is a need for rapid, cost-effective translation between individual technologies and integrated operational systems, especially in robotics, automation, and artificial intelligence (RAS-AI). A modern Australian RV fleet must have access to these technologies.

Proposed Solution: AIMS proposes ReefWorks, a tropical marine technology test range, to support the progression of autonomous systems from proof-of-concept to operational capabilities. This facility will enable Australia to maintain pace with international counterparts by providing national testing grounds and funded test and evaluation through Commonwealth resources. ReefWorks will serve as a national test and evaluation facility

for next-generation marine technologies in RAS-AI, benefiting the Australian Government and Industry.

ReefWorks will deliver test and evaluation services for autonomous and uncrewed systems across all technology readiness levels for civilian and Defence marine applications. AIMS' proven track record in at-sea operations positions it to streamline the path from prototype to operational national capability. The facility will be the only autonomous tropical marine technology test range in Australia and the Southern Hemisphere, assisting the private defence and public sector in maturing marine technologies quickly and cost-effectively.

ReefWorks has demonstrated its utility in its foundation phase in partnership with the Qld government, but without ongoing funding support, this research infrastructure concept is not sustainable.

Modern National Coastal Class Research Vessel Fleet

Australia's coastal-shelf research capability is limited and in need of renewal. The southern region is serviced by three aging coastal research vessels: RV Naturaliste, MRV Ngerin, and TV Bluefin. These vessels require modernization to capture valuable bathymetric mapping and physical and biological data, which is critical for marine science and effective management. Additionally, there is inadequate access to Northern Australian territorial waters for marine and coastal research on fit-for-purpose Coastal Research Vessels. The remoteness, environmental constraints, and limited coastal infrastructure present significant challenges.

Proposed Solutions:

1. Modernisation of Existing Vessels: Fit existing vessels with up-to-date sensors and instruments, such as multi-beam and underway oceanographic sensors, to capture essential data.

Benefits: Immediate benefits include capturing invaluable physical and biological data, informing national and state priorities, and supporting sustainable development of marine industries. Long-term impacts include building a long time series of Essential Ocean Variables (EOVs) accessible to the marine and climate science community.

2. Replacement and Additional Vessels: Seek funding to replace existing vessels and add a new Northern Based Research Vessel with 100% merit-based access.

Benefits: Addressing the gap will support sustainable development in Northern Australia, provide access for meritorious science, and enhance research capabilities in remote locations.

Timeline: 2 – 5 years. Retrofitting can only occur during docking windows and design build cycle for a relatively complex vessel is 4 – 5 years.

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Tue, Dec 16, 2025, 04:41 PM Australian Eastern Daylight Time
[ID: sbm39bbc62f6232d3e8641e3]

Title
Dr

First Name
Rebecca

Last Name
Farrington

Organisation
AuScope Ltd

In what capacity are you responding?
A representative of an organisation or group

Capability 1
140 - Geoscience Australia. There is a clear need for terrestrial and coastal ecosystem monitoring and environmental predication and forecasting, along with the alignment of land and coast-based research infrastructure.

Capability 2
048 - Olivier Alard. There is a clear need for this specific ion mass spec resource.

Capability 3
190 - Rohan Glover. There is a clear need for increased support of the ground water research community. This proposal brings together existing institutional capabilities that have already piloted a national RI capability, and address a key national strategic challenge.

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Mon, Dec 15, 2025, 11:25 AM Australian Eastern Daylight Time
[ID: sbm3990e6ae8ee5be5d2df39]

Title
Ms

First Name
Laura

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Regan

Organisation
Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
167 – LDaCA

Capability 2
210 – AAH

Capability 3
255 – IIRC

277

Fri, Dec 12, 2025, 04:55 PM Australian Eastern Daylight Time
[ID: sbm39a6ef424bcc5a3c2e4ab]

Title
Prof

First Name
Michael

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Dobbie

Organisation
Phenomics Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
New Biological Modelling Infrastructure – Preclinical Models for discovery, validation and therapeutic development [NRI Roadmap Survey Submission ID: 051_Phenomics Australia] The technologies and approaches included three categories of model systems: Animal (in vivo), Non-Animal (cell-based, in vitro) and Computational (in silico and AI integration). The term New Approach Methodologies (NAMs) includes both cell-based and computational modelling systems, which is alternatively termed Non-Animal Models or Non-Animal Technologies (NATs).   Phenomics Australia's current multi-site NAMs pilot and the proposed new activity directly addresses sovereign capability gaps in validated preclinical platforms that are essential for both fundamental discovery (basic research) as well as therapeutic development (translational research). Importantly, timely investments in these capabilities will enhance Australia's ability to remain at the leading edge of international trends. In 2025, both the European Union and USA (Food and Drug Administration Modernisation Act 2.0) took the groundbreaking step of minimising testing of new medicines in animals by supporting more effective, complimentary, human-disease relevant NAMs, especially for toxicology and safety testing of new therapeutic products. This infrastructure is critical for several research fields including pharmacology and toxicology in Australia. Researchers require more accurate, human-relevant models while reducing reliance on animal testing. By integrating technologies like organ-on-a-chip systems, computational biology, and AI-driven simulations, NAMs accelerate drug discovery and development, improve safety assessments, and support ethical, cost-effective research. This infrastructure positions Australia at the forefront of innovative, predictive modelling essential for personalised medicine and regulatory science, increasing its sovereign capability in this rapidly evolving space.   A roadmap for Australia's response to these important trends and consequent opportunities in New Approach Methodologies is provided in the CSIRO (2023) Non-animal models: A strategy for maturing Australia's medical product development capabilities. CSIRO, Canberra.   Complementary to NAMs capabilities needs, vulnerabilities in the national supply of preclinical laboratory animals

was highlighted in the Survey Response by the University of NSW [Response ID 201]. Animal models requiring additional resourcing include rats, guinea pigs, and aquatic species.

Capability 2
New Biobanking Infrastructure [relating to many NRI Roadmap Survey Submissions including IDs: 058_Australasian Cognitive Neuroscience Society; 118_Steven Meikle; 159_National Imaging Facility; 169_Phenomics Australia; 184_Australasian Biospecimen Network Association (ABNA); 202_Victorian Cancer Biobank Consortium; 209_Collections Working Group; 286_Murdoch Children's Research Institute - Generation Australia]   All areas of Australia's biomedical research communities have identified a growing need for a national coordination that consolidates existing and new biological samples, genomic data, cohorts, and health records to support precision medicine, biomedical research, and environmental health studies. While there are valuable health samples stored in various Australian biobanks, these collections are often fragmented and siloed across different institutions. A centralized, well-coordinated national effort would allow for the integration of these existing resources, enabling more comprehensive studies that can drive major breakthroughs in public health and medicine.   One powerful and timely solution would be the implementation of the Digital Biobank Australia (DBA) proposal that will establish a secure, federated national digital platform that connects Australia's siloed human health biobanks, longitudinal cohort studies and health research data systems for centralised discovery and access. Phenomics Australia's joint proposal with Population Health Research Network would federate access to biospecimen data at population scale, enabling drug target identification and AI/ML applications currently impeded by fragmented collections.   A roadmap for Australia's response to these long-recognised needs is provided in the CSIRO (2025) Valuation of increased coordination in Australian biobanking. CSIRO, Canberra. An economic analysis calculated that a shared national platform would achieve an annual $39M net benefit, achieved largely from increased specimen access, utilisation, and reduced duplication.   These biobanks represent decades of effort to source and preserve many millions of irreplaceable health specimens, and are the key to unlocking critical insights into population health, disease mechanisms, and treatment outcomes. Internationally, coordinated and fit-for-purpose biobank platforms (such as BBMRI-ERIC and the UK Biobank) are accelerating health discovery, yet Australia lacks even a national system for biobank discovery and access. As technologies and data volumes grow, the absence of coordinated infrastructure risks duplication, missed opportunities, and reduced global competitiveness.   For example, a national biobanking solution is crucial for pharmacology and toxicology because it provides integrated access to biological samples and genomic data, enabling large-scale studies on drug efficacy, safety, and adverse reactions. By consolidating fragmented resources into a centralised platform, researchers can better understand genetic and environmental factors influencing drug response and toxicity, accelerating precision medicine and safer therapeutic development. Likewise, coordinated discovery and access to cohort collections such the Raine Study and Generation Australia offers the ability to use advanced analytics and AI to generate digital twins of collections to investigate a variety of complex research questions.

Capability 3
A collaborative, AI-enhanced research ecosystem [relating to many NRI Roadmap Survey Submissions including NRI Roadmap Survey Submission ID: 079_Bioplatforms Australia] Digital capabilities that advance Australian life-science across disciplines, from healthcare to biodiversity, ecology, and agriculture, enabling researchers to address complex challenges and contribute to societal and environmental wellbeing. The proposed

capabilities will enable more comprehensive, more accurate, and faster automated linking multimodal datasets and data types, combined with the ability to generate in silico models to predict biological interactions and function.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
1. New Capability Suggestion – Standardised Digital Phenomics Capability

Need: Three persistent national digital challenges: (1) Model discovery and access: Australia lacks a digital platform to discover high-demand preclinical models or link different model types for a given condition, limiting researchers' ability to select the most appropriate model; (2) Data analysis and standards: Preclinical health studies now routinely generate complex multimodal research datasets (genomics, imaging, screening), yet there is no accessible national infrastructure for advanced analysis, and common assays lack consistent metadata, security, and privacy standards. This restricts large-scale integration, including AI and machine learning; and (3) Data visibility and ownership: While researchers often default to restricted data access, disease communities and patients advocate openness to accelerate translation. Current infrastructure centred on individuals embeds barriers to openness and slows clinical benefit.

Capability: Integrated national digital capability that accelerates preclinical discovery and clinical outcomes through four coordinated activities: (1) Digital Infrastructure Uplift: implementing standards, repositories, and discovery tools to enable interoperability, reuse, and integration of complex datasets; (2) Data Partnerships: building high-quality, community-led data resources of lasting value to drive discovery and translational impact across nationally significant disease areas; (3) AI-Enhanced Computation Modelling: piloting capacity in AI-enabled research, digital twins & in silico modelling, image annotation, and digital biobanking to support predictive analytics and precision health discovery; and (4) Community Engagement: embedding co-design with users, clinicians, and disease communities to ensure trusted, relevant infrastructure aligned with real-world needs. Additionally, this capability will ensure that Australian phenomics outputs align with international standards (e.g. INFRAFRONTIER-ERIC, International Mouse Phenotyping Consortium) and FAIR/CARE principles for global data integration and reproducibility.

Medium-Term Goals: Four goals: (1) Coordinated and collaborative uplift in national digital infrastructure to enable interoperability, reuse, and integration of complex preclinical datasets; (2) Collaboration with research communities ot produce foundational digital assets of lasting preclinical value across nationally significant disease areas; (3) AI-enabled research to support predictive analytics, streamline processes, accelerate discovery; and (4) Researcher-led co-design approaches to ensure digital infrastructure is trusted, relevant and aligned with needs of researchers and disease communities.

Impacted Research Communities: Communities in genomics, bioinformatics, imaging, pathology, cell and organoid systems, rare disease, oncology, neuroscience, metabolic disease, and immunology will directly benefit from these capabilities. Translational programs such as Australian Centre of Excellence in Melanoma Imaging and Diagnosis (ACEMID) and the Australian Functional Genomics Network (AFGN) will be accelerated.

Timeframe: 3 years.
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2. New Capability Suggestion – National AI-Guided Structural Biology Capability

Need: The availability and number of AI applications for protein modelling is steeply increasing. However, many of these tools are incorrectly utilized, causing resource wastage and delays in translation. Researchers and the industry require expert direction, validated processes, and training to ensure reliable and reproducible outcomes. The proposed initiative complements current computational infrastructure by incorporating personnel, methodologies, and a validation framework that enhances the utility of AI for structural biology research.

Capability: The creation of a national team of specialists will offer certified protocols for protein structure prediction, molecular modelling, docking, and design; consulting services; publicly available training resources; validation documentation for scholarly and regulatory purposes; and collaboration with national computational, synchrotron, microscopy, and data platforms. This aligns with the Australian Structural Biology Deep-Learning Infrastructure Roadmap, which has been developed by a national panel of experts, including 13 contributors, and endorsed by 40 specialists across academic institutions, NCRIS facilities, and the industry; the NRI should evaluate and align with its guidelines (published after the conclusion of the NRI survey): https://zenodo.org/records/15786982.

Medium-Term Goals: Assist 200 laboratories and educate 1,500 individuals; publish 100 benchmark datasets; establish 50 partnerships with industry.

Impacted Research Communities: Health and medical research, pharmaceutical R&D, biotechnology and manufacturing, agriculture and biosecurity, environmental and resource sectors, education and workforce development, government and regulatory bodies, and startups/SMEs in these industries.

Timeframe: Initiate within 12 months; achieve full national coverage in 24–36 months.
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General Comment: It is important that the NRI Roadmap describes how new research infrastructure would be established to complement and enhance, but not disperse or weaken, the existing NRI system. The NRI Roadmap should distinctly specify if "new RI" indicates new priorities, additional capabilities, independent NCRIS Projects, or improvements that would be introduced as new Activities within existing projects. Incorporating a capability into an existing NCRIS Project can simplify delivery, reduce administrative workload, and leverage well-established governance and operational structures.

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Fri, Dec 12, 2025, 04:29 PM Australian Eastern Daylight Time
[ID: sbm39a721e970b78419e5cc4]

Title
Dr

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Sarah

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Tynan

Organisation
Science & Technology Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
As previously indicated, STA does not believe that it is a reasonable nor time efficient task to expect the sector to read and analysis nearly 200 pages of suggested ideas and select 3. We strongly encourage the NRIAG to, in first instance, use the scientific advisory committees of NCRIS capabilities to consider these potential infrastructure suggestions. We look forward to the Government and NRIAG's analysis and proposed prioritisation of these as part of further consultations and the Roadmap exposure draft.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
HPC and data capability underpins research across all STEM disciplines. As applications deploying ever-growing datasets and artificial intelligence (AI) processes continue to expand across research fields, this need is only going to grow. HPC is also critical to several areas of Government business, with deep capability embedded in the work of several Government departments, including the Bureau of Meteorology and Geoscience Australia.
Some research requires significant compute/software capability collocated with enormous datasets. The complexity of this work means it can not be done on institutional or commercial systems (traditionally known as Tier 2 systems) and requires an NRI-scale HPC and data capability, known as Tier 1. These areas include high-resolution climate modelling, atomic-scale modelling (e.g. particle physics, drug discovery) and fluid/aerodynamics modelling.
Both Tier 1 and Tier 2 systems are required to effectively support Australia's research sector. Australia's future research capability, from astronomy to complex, multi-modal modelling in health, agriculture and medical will require a cohesive, sustainable HPC system.

Importantly, while Tier 2 can often be provided through commercial facilities the profit-based business models for these facilities is not sensible for publicly funded research. The public should not expect companies and shareholders, especially if overseas based, to profit from publicly funded, merit-based research, such as those projects funded by the NHMRC, ARC or MRFF.

It is critical we maintain sufficient, predictable and capable underpinning HPC and data capability - separate to consideration of digital research infrastructure - as it is ubiquitous to Australian research.

HPC systems have a 4–5 yearly lifecycle, requiring mid- and full-cycle capital injections to maintain capability. This is in addition to operating costs, e.g. people and significant volumes of water and power (i.e. at the scale of suburbs). HPC systems also require trained personnel to support and upskill end-users to boost HPC efficiency via training, code reviews, job optimisation workshops and ongoing support.

The 2026 Roadmap must acknowledge the overarching need to develop and fund a long-term sustainable HPC capability with a single strong governance structure.

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Thu, Dec 11, 2025, 10:21 AM Australian Eastern Daylight Time
[ID: sbm39a0aa2c95b73041fc8a6]

Title
Ms

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Barceinas

Organisation
Cooperative Research Australia

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

1. First Nations Relational Digital Twin Network
Need: Integrate hydrological, ecological, cultural, economic, genomic, linguistic and satellite-derived data under First Nations governance.
Capability: Place-based relational digital twins that combine advanced modelling with Country-based knowledge and cultural feedback.
Medium-term goals: Support land and water decisions, restoration, regional planning and cultural heritage protection in priority regions.
Impacted communities: First Nations communities, environmental and water researchers, regional planners, CRCs in climate, environment and regional development.
Timeframe: Pilot sites within 2–3 years; scaled national network over 5–7 years.

2. Earth System Modelling & Integrated Environmental Observatories
Need: Nationally coherent climate, water and ecosystem intelligence for resilience, adaptation and just resource allocation.
Capability: Integrated observing networks and Earth system models that link atmosphere, land, water, coasts and ecosystems, ideally co-governed with First Nations authorities.
Medium-term goals: High-resolution projections, real-time monitoring and decision-support tools for climate, water and biodiversity policy.
Impacted communities: Climate, water and environmental scientists; natural resource managers; disaster resilience, agriculture and regional development sectors.
Timeframe: Enhancement of existing platforms in 2–4 years; fully integrated capability within 5–7 years.

3. Biobanking, Genomics and Synthetic Biology Modelling

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Need: Strengthened genomic and biosecurity infrastructure to respond to climate change, emerging diseases and ecosystem disruption.
Capability: Integrated biobanking and genomic platforms with modelling tools for species management, restoration and biosecurity, governed in culturally safe ways where First Nations materials are involved.
Medium-term goals: Support precision conservation, biosecurity responses and restoration economies; enable responsible synthetic biology applications.
Impacted communities: Health, agriculture, conservation, biosecurity and synthetic biology researchers; First Nations communities; biotech and enviro-tech industries.
Timeframe: Upgrade and coordination over 3–5 years.

4. Quantum Device and Secure Compute Testbeds
Need: Sovereign capability in next-generation computation, simulation and secure data storage
Medium-term goals: Support quantum R&D, secure handling of high-sensitivity data, and workforce development in quantum technologies.

5. National Prototyping, Pilot-Scale & Demonstration Capability (TRL 5–7)
Need: Overcome the "valley of death" between lab-scale research and commercial deployment.
Capability: Distributed pilot and demonstration facilities for key sectors (e.g. biotech, energy, advanced manufacturing, agrifood).
Medium-term goals: Accelerate translation, de-risk private investment and support mission-led innovation.

6. Integrated Regulatory, Standards and Certification Interface Capability
Need: Faster, clearer pathways from research to regulated deployment in complex domains (health, AI, bio, environment, critical tech).
Capability: A national interface that links NRIs with regulators, standards bodies and certification processes, with shared tools and expertise.

7. National Digital Twin & Secure Data Integration Capability for NRIs
Need: Fragmented NRI data and models limit cross-domain insight and system-level decision-making.
Capability: A cross-cutting digital twin and secure data integration layer connecting major NRIs, with strong governance and interoperability standards.
Medium-term goals: Enable system-wide modelling (e.g. climate–health–infrastructure), improve data reuse and support national missions.
Timeframe: Foundational integration within 3–4 years; broader coverage over 5–7 years.

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Tue, Dec 9, 2025, 04:06 PM Australian Eastern Daylight Time
[ID: sbm39975be5d17c1c9e159d5]

Title
Mr

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Andrew

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Outhwaite

Organisation
WA coastal RD&I survey respondents - this response is an aggregation and summary of the
relevant responses from a coastal RD&I survey we conducted which received 42 responses
from WA-based coastal researchers, innovators and managers.

In what capacity are you responding?
A representative of an organisation or group

Capability 1
055_Roadmap Survey_ Ryan Lowe - R&D coordination and investment in experimental
research to support technology development

Capability 2
033_Roadmap Survey_ Integrated Marine Observing System - fleet of vehicle and vessels to
collect ocean data + processing _ modelling capability.

Capability 3
140_Roadmap Survey_ Geoscience Australia - Geoscience Australia - environmental
prediction and forecasting

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.
An ocean technology accelerator to support the progression of ocean innovations from
proof-of-concept to the realisation of operational capabilities. Such an accelerator would
function as a national test and evaluation facility for next-generation marine technologies,
including both engineering solutions and bio-innovations, suitable for both civilian and
defence purposes. This would smooth the otherwise bumpy and erratic journey from
identified need/ideation through prototype to technology commercialisation. It can bring
together testing infrastructure with technical support for innovators and researchers to do
the testing, and connect with commercial advisors and capital. This will take advantage of

WA and Australia's global comparative advantage in marine science and engineering to create significant national social, economic and ecological outcomes.

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Tue, Dec 9, 2025, 02:54 PM Australian Eastern Daylight Time
[ID: sbm3993693f8e87b5764ba43]

Title
Mrs

First Name
Blagica

Last Name
Penova-Veselinovic

Organisation
University of Western Australia, (SPGH) The Raine Study

In what capacity are you responding?
An individual

Capability 1
National biobanking infrastructure Supported by submissions (051, 058, 159, 195, 286) A national biobanking infrastructure is critical and long overdue. Despite being a priority in every NRI Roadmap, no investment has been made. A coordinated approach that includes longitudinal cohorts, integrates digital systems for secure data sharing, ensures robust storage and equitable access, and supports linkage to administrative datasets will transform Australia's research ecosystem. This is not just infrastructure, it is the foundation for large-scale, reproducible research that will accelerate breakthroughs in health, genomics, and precision medicine. The time to invest is now to secure Australia's global leadership in research and improve health outcomes for all.

Capability 2
Capability 2: Infrastructure to support the access, use and linkage of Electronic Health Records (EHR) Supported by submissions (195, 051, 197) Australia urgently needs a coordinated national approach to ethically and securely reuse electronic health record (EHR) data for research and innovation that benefits the public. This initiative would unlock fragmented data, ensure strong governance for privacy and consent, and provide secure, cloud-based environments for analysis. It would enable advanced analytics, AI-driven health research, and precision medicine, while building workforce capability in digital health and data science. By leveraging already existing NCRIS investments like the Population Health Research Network (PHRN), we can create a federated, standards-based infrastructure that accelerates clinically relevant research and improves health outcomes nationwide.

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Tue, Dec 9, 2025, 12:35 PM Australian Eastern Daylight Time
[ID: sbm3996d7fd699f477fc7935]

Title
Mr

First Name
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Last Name
Dawson

Organisation
University of Newcastle

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National Biobanking 013 – Miranda Smith, 051 Phenomics Australia & 118 Seve Meikle.   A consistent, consolidated national biobanking capability is critical to ensure long-term preservation, accessibility, and interoperability of biological samples. Current efforts are fragmented, limiting scalability and impact. A unified approach would: •   Support reproducibility and cross-disciplinary research. •   Enable industry partnerships in health, agriculture, and biotechnology. •   Provide a trusted platform for policy and community benefit through equitable access.

Capability 2
Research Data hub/curation and AI optimised supercomputer network. 007 – Nick Theberger, 009 Lingbo Jiang & 156 Cloud Business Transformation. A national research data hub, combined with an AI-optimised supercomputing network, would provide a transformative backbone for future NRI capabilities. This integrated infrastructure would:
•   Enable advanced data curation and stewardship: ensuring research outputs are FAIR (Findable, Accessible, Interoperable, Reusable) and readily available for cross-disciplinary use. •   Accelerate AI-driven discovery: by providing optimised computational resources tailored to machine learning, modelling, and simulation at scale.
•   Support translation pathways: allowing industry, government, and community partners to leverage curated datasets and high-performance computing for innovation and policy impact. •   Enhance interoperability: by linking with existing national platforms, ensuring seamless access and reducing duplication. •   Build resilience and capacity: strengthening Australia's digital research ecosystem and positioning it competitively in global science and technology networks.

Capability 3

197_Roadmap Survey — Australian Research Data Commons This initiative aims to establish a federated, secure data infrastructure that connects diverse engineering research domains. Its immediate priority is to map and integrate existing datasets, while addressing critical gaps in areas such as sustainable manufacturing, energy transition technologies, and resource efficiency.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
N/A

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Department of Education

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Tue, Dec 9, 2025, 09:06 AM Australian Eastern Daylight Time
[ID: sbm399619162787ecd113cff]

Title
Ms

First Name
Chanel

Last Name
Beynon

Organisation
Children's Cancer Institute

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Biobanking Infrastructure - A national biobanking infrastructure consolidating biological samples, genomic and phenotypic data, and health records should be prioritised. This would enable large-scale, secure data linkage across research institutes, hospitals, and NRI facilities. Such a system would significantly strengthen translational research in precision medicine, particularly in paediatric oncology, by connecting genomic discovery with clinical outcomes and supporting participation in global consortia.

Capability 2
Translational Research Infrastructure - Australia should establish or enhance distributed translational platforms that bridge discovery research with clinical and regulatory translation. This would include facilities for pre-clinical testing, high-throughput screening, and bioanalytical characterisation. For institutes such as CCI, this capability would help progress novel cancer therapeutics from laboratory discovery to early-phase clinical trials and align with national health-translation and regulatory-science priorities.

Capability 3
Mathematical and Computational Modelling Infrastructure - A national modelling and analytics capability would provide advanced computational resources and AI-driven modelling frameworks across sectors. In medical research, this would underpin precision-medicine efforts by supporting complex data analysis, predictive modelling, and integration of multi-omics datasets with clinical outcomes.

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Tue, Dec 9, 2025, 08:17 AM Australian Eastern Daylight Time
[ID: sbm399160d29fcce63c4a102]

Title
Dr

First Name
Esther

Last Name
Pronker

Organisation
Non-Animal Technologies Network

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051_Roadmap Survey_ Phenomics Australia This capability is critical because it embeds human-relevant, non-animal methodologies (NAMs) at national scale, directly supporting safer and more predictive pharmacology and toxicology. By integrating organoids, microphysiological systems and advanced in vitro assays with existing phenomics platforms, it will accelerate drug discovery, de-risk development, and reduce reliance on animal models. For NAT-Net, this provides the essential national framework into which state-based NAM and organoid initiatives can plug, ensuring coordinated validation, regulatory acceptance and equitable access across Australia.

Capability 2
144_Roadmap Survey_ Australian Structural Biology Computing Modern drug discovery, biologics design and safety science rely heavily on deep-learning models for structure prediction, docking and protein design. Australia's current compute and workflow support for these tasks is fragmented and difficult for non-specialists to use. Backing Capability 144 would provide shared accelerator capacity, curated workflows and expert support so that researchers and industry can rapidly move from target identification to structure-enabled design. This strongly complements NAT-Net's organoid and NAM capabilities by ensuring that in silico design and in vitro human models are tightly integrated within the national infrastructure ecosystem.

Capability 3
169_Roadmap Survey_ Phenomics Australia A coordinated, national biobank is foundational infrastructure for precision medicine, pharmacology and toxicology. Integrating tissue, genomic and phenotypic data across sites will allow large-scale studies of drug efficacy, safety and variability in human populations. For NAT-Net, this capability underpins sustainable access to well-characterised clinical samples for organoid and

microphysiological systems, enabling ethically governed hospital-to-research pipelines. Without this biobanking backbone, Australia cannot fully realise sovereign, human-relevant translational platforms or support widespread uptake of NAMs.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Priority Suggestion: National Organoid, Microphysiological Systems (MPS) & Living Biobank Infrastructure Network

NeedAustralia currently lacks a coordinated national platform to generate, expand, standardise and validate human-derived organoids and microphysiological systems. These next-generation biomedical models are essential to reduce reliance on animal testing, accelerate therapeutic discovery, improve toxicity prediction, and build sovereign capability in precision medicine. Access to clinical specimens is fragmented and inequitable, and without national coordination we risk falling behind international competitors in the growth sector of NAMs.

Capability DescriptionA distributed but nationally governed infrastructure that provides:
• Hospital-to-research pipelines for ethically consented tissue and rapid processing
• Living biobanking of organoids and advanced cell systems, with national cataloguing
• High-throughput efficacy and safety screening using validated assays
• Standardised QC and regulatory documentation to support submission to regulators
• Secure data management linking clinical, multi-omic and functional readouts
• Training and workforce development in organoid engineering, MPS fabrication and NAMs validation

Medium-Term Goals (3–5 years)
• Support >200 labs and >50 industry users nationally
• Deliver validated human-relevant assays to replace low-value animal tests in early development
• Establish shared standards for clinical sample collection, data linkage and model characterisation
• Enable at least 20 therapeutic programs to progress into clinical development with NAM-generated evidence
• Secure formal engagement by Australia's medical product regulators and hospital networks

Impacted Research CommunitiesBiomedical and clinical researchers, hospitals, biopharma and biotech SMEs, medical technology developers, toxicologists, regulators, computational model developers, public health systems, and patients — especially those with rare, paediatric or variable disease phenotypes.

Timeframe
• Planning and pilot implementation: 12–18 months
• Full operational national network: 3–5 years

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Tue, Dec 9, 2025, 01:00 AM Australian Eastern Daylight Time
[ID: sbm399339e3937cce80af176]

Title
Ms

First Name
Erika

Last Name
Slavin

Organisation
University of Western Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Ocean Engineering and Technology. Australia's prosperity and resilience depend on sustainable use of its marine domain, yet national capability for large-scale ocean engineering, offshore renewables testing, and autonomous systems integration remains fragmented. A coordinated NRI in ocean engineering and technology would underpin innovation in offshore energy, coastal infrastructure, defence, and environmental monitoring. It would complement existing marine observation networks by providing experimental, modelling, and prototyping facilities for next-generation ocean systems bridging discovery and industry application.

Capability 2
Quantum Testbed

Capability 3
Coast RI. Climate adaptation, biodiversity protection, and coastal development all rely on integrated coastal data. A coordinated Coast RI would enhance interoperability of oceanographic, ecological, and geospatial datasets, linking terrestrial, estuarine, and marine systems. It would consolidate national data standards, improve access to modelling tools for hazard and habitat forecasting, and provide shared digital and sensor infrastructure to support decision-making for coastal communities and industries.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

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1. Enhanced Environmental and Agricultural Automation. Many aspects of environmental and agricultural research, such as measuring plant respiration, nutrient uptake, soil–water balance, and ecosystem responses, remain highly manual, labour-intensive, and fragmented across small-scale systems. Distributed investment in automated, sensor-integrated, and interoperable field and laboratory platforms would transform these processes, improving data quality, temporal resolution, and scalability.
Such automation should be underpinned by interoperable data architectures that link environmental monitoring networks, agricultural research stations, and modelling platforms. This would enable real-time data sharing and cross-domain analysis of soil, water, and plant systems.
By advancing automation and data integration in environmental and agricultural sciences, Australia could accelerate innovation in climate adaptation, sustainable resource use, food and agricultural productivity, while reducing duplication and manual burden across dispersed research sites.

2. Healthspan Infrastructure & Interoperability of Population Data. Australia's capacity to extend healthspan, not just lifespan, is constrained by fragmented and non-interoperable health, genomic, and lifestyle datasets. The absence of secure, linked, and analysable population-scale data limits our ability to identify early risk factors, design preventative interventions, and monitor wellbeing across the life course.

Investment is needed in healthspan infrastructure that integrates and connects biobanking, clinical, environmental, and longitudinal cohort data through interoperable, privacy-preserving digital platforms. Such infrastructure should support secure data linkage and analytics across discovery, clinical, and public-health domains, underpinned by consistent national governance frameworks that ensure ethical use, dynamic consent management, and respect for Indigenous data sovereignty.

Importantly, healthspan infrastructure should encourage co-location and shared use of allied health and preventative health facilities, fostering collaboration between clinical researchers, data scientists, and allied-health professionals. This approach would enable translation from population-level insights to practical interventions that improve quality of life, reduce chronic disease burden, and enhance equitable health outcomes across Australian communities

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Mon, Dec 8, 2025, 09:16 PM Australian Eastern Daylight Time
[ID: sbm39938f34b887b80a9f65e]

Title
A/Prof

First Name
Robyn

Last Name
Schofield

Organisation
The University of Melbourne

In what capacity are you responding?
An individual

Capability 1
Melita Keywood - 227

Capability 2
Robyn Schofield - 113

Capability 3
Zoe Loh - 143

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
New NRI: An integrated atmospheric composition observing network.

Need:
Atmospheric composition is fundamental for climate and represent our greatest environmental health risk factor. Observations require traceability to national and international calibration and data delivery standards to be useful. There is an urgent need within our modelling communities to provide quality assured, accessible atmospheric composition data

Capability:
A pilot Atmospheric Composition Observing Network NRI will bring together EnHealth (state EPAs and environmental regulators), CSIRO, MNF, ACCESS-NRI, NCI, Industry, Public Health, BoM and University sectors to provide an united and efficient capability to deliver

atmospheric composition observations quickly to national and international data repositories.

Medium-term goals:
- Stock-take of existing observational programs, and best practice national and international reporting
- Documentation of traceability, calibration and development of SOPs for all instruments and climate variables being observed in programs
- Creation of a national database for Atmospheric Composition, leveraging expertise for metadata, and international reporting
Impacted research communities:
- Health, climate, agricultural and industry research sectors will benefit. EnHealth (state EPAs and environmental regulators), ANSTO, CSIRO, MNF, ACCESS-NRI, NCI, TERN, AURIN, Industry, Public Health, BoM and University sectors

Timeframe for establishment:
Year 1 - begin stocktake and establishment of governance board and structures.
Years 2-3 - establish pilot team (4-5 people) to deliver the medium term goal of documentation of long-term datasets that includes calibration procedures and database establishment. This will enable identification of gaps in network and prepare a strategy to fill gaps
Years 2-5 - strengthening of network through deployment of common resources to existing atmospheric composition sites for observables of highest value. Creation of a 5-15 year resourcing plan and national atmospheric composition technical support hub.

260

Mon, Dec 8, 2025, 07:07 PM Australian Eastern Daylight Time
[ID: sbm39931874e89f247a53eae]

Title
Dr

First Name
Benjamin

Last Name
Padman

Organisation
The Kids Institute

In what capacity are you responding?
An individual

Capability 1
218 – Microscopy Australia

Capability 2
061 – AusBIAS and LMA

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The microscope is a universally recognized symbol of scientific progress for good reason: It is crucial to practically all terrestrial scientific endeavors. Responsibility for maintaining our microscopy infrastructure has been left in the hands of universities, who now look to slash support for that infrastructure in the interest of balancing their. I personally believe that the nationalization of microscopy infrastructure is the only way to ensure that we retain our imaging research capabilities. If you lose the instrumentation, you lose the scientists and industries who depend on it.

259

Mon, Dec 8, 2025, 06:44 PM Australian Eastern Daylight Time
[ID: sbm39930401337c20d6a6bfc]

Title
Dr

First Name
Callum

Last Name
Shakespeare

Organisation
The Australian National University

In what capacity are you responding?
An individual

Capability 1
196_Roadmap Survey_ Australasian Fluid Mechanics Society; hydrodynamic laboratory facilities; Physical lab facilities have been largely ignored in terms of infrastructure funding in the ocean/climate/fluid space, yet are critical to ground truthing computer models. It is well past time there was investment in these areas. Unfortunately, universities all over Australia are closing these facilities due to their cost; if we want to retain this capacity then now is the time for NRI funding. I would suggest a dispersed investment model supporting many smaller facilities across the country, rather than 1/2 very large facilities. This would make best use of existing infrastructure, allowing better bang for the buck.

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Mon, Dec 8, 2025, 06:08 PM Australian Eastern Daylight Time
[ID: sbm399170cccde5bb3b45a6e]

Title
Ms

First Name
Janet

Last Name
Catterall

Organisation
Open Access Australasia/Council of Australasian University Librarians (OAA/CAUL) joint submission

In what capacity are you responding?
A representative of an organisation or group

Capability 1
236_Roadmap Survey_National Open Science Task Force - Repository

Capability 2
210_Roadmap Survey_Australian Academy of the Humanities - Repository infrastructure for high value collections - STEM also has this problem; a 'joined up' discussion about future proofing is needed. Australia's sovereign data in the humanities is at risk

Capability 3
235_ Roadmap Survey_Australian Proteome Analysis Facility, Macquarie University. We advocate for substantial investment from the government and co-investment from industry to create a critical mass of inter-linked and systems-level data for training AI, machine learning, and large language models (LLMs).

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
These capabilities have been defined in consultation with the library sector, and input from key stakeholders:

Enhanced discovery of Australia's open research outputs - deliver in next 2 years:

- An enhanced aggregator and search capability will improve discovery, reuse, and uptake of Australia's open access research by all relevant stakeholders including researchers,

cultural sector, civil society, industry and SMEs. Similar capabilities have been developed in Europe, Brazil, UK, and other regions. This activity would involve investment in a platform to aggregate the content of existing Australian institutional and data repositories, search interface, and usage analytics.
- Such a capability will address the need for enhanced access controls and metadata, particularly to research about or produced with Aboriginal and Torres Strait Islander Peoples, and also research that is sensitive and requires mediated access.
- This holistic capability will also contribute to sovereign 'AI-ready' datasets, and potentially to research assessment.

Service models to enhance Australia's repository infrastructure for 2-3 years:

- All Australian universities and many other organisations have an institutional repository, used to provide access and to preserve journal outputs, theses, creative works, and datasets. Many institutions have limited system and staff resources to develop these infrastructures, putting ongoing access and discovery of these unique outputs at risk. At the same time, the need for a trustworthy, robust, and ethically acquired and described corpus of Australian research outputs is vital to achieving other research priorities, among them the potential for sovereign AI and 'AI-ready' corpora.
- Many institutions have moved away from open-source solutions to proprietary platforms to reduce costs and complexity, but these solutions are generally not tailored to the Australian market.
- The capability would develop a service model that enables institutions to opt-in to a multi-tenancy repository model, based on common infrastructure. This model preserves autonomy for institutions that prefer to retain their existing infrastructure, and cost-effective choices for institutions that prefer to take up a shared solution. International exemplars from Canada, Japan, and Portugal have achieved high uptake.

Networked diamond journal infrastructure - next 2-3 years:

- Similar to the repository infrastructure, researcher-led journals hosted in Australia require investment to improve access, discovery, preservation, and publishing capabilities at a time when there are significant policy and investment signals internationally encouraging journals to flip from commercial to researcher-led "diamond" open access publishing models. These models are much lower cost than commercial publishing and retain autonomy and ownership over research, but infrastructure and discovery requires investment as titles are fragmented across disciplines, institutions and platforms.
- The first capability would deliver an up to date analysis and landscape map of Australian diamond journals, and their discoverability.
- The second would extend the repository capability described previously to deliver a service model and options for extending repositories to host journals (already exists for instance in DSpace7), or other open platforms with shared hosting. Dedicated staff would be required to deliver this capability and ongoing running of a publishing service.

256

Mon, Dec 8, 2025, 05:32 PM Australian Eastern Daylight Time
[ID: sbm3992c1fa2b9f3e4b11de0]

Title
Mr

First Name
Benjy

Last Name
Lee

Organisation
HILT CRC

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Roadmap Survey Response 188 (The University of Adelaide)

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
HILT CRC developed a national research development and demonstration (RD&D) facilities plan in 2024, based on extensive engagement with its partners.

The plan identified the need for the following three types of facilities:
• Sub-pilot scale (bench to small pilot) – typically owned and operated by research partners, moderate in cost and required to support technology development and de-risking projects.
• Pilot scale facilities – typically owned and operated by a company or government research laboratory and used to demonstrate the variability of an integrated process or a specific technology pathway.
• Industrial-scale demonstration facilities – typically owned and operated by companies.

Different sized facilities provide complementary information and support each other: smaller scale facilities support large-scale deployments at commercial scale, since they are more flexible, cheaper to run and provide more data. In addition, all technology continues to evolve, so that research with smaller scale facilities is continuously needed to feed the pipeline of technology development and broaden the range of applications for new technology. Larger-scale trials/pilots and demonstrations are also needed to de-risk commercial projects and to take breakthrough ideas and low Technology Readiness Level (TRL) through the upscaling pathway.

The key facilities identified in the HILT CRC RD&D Facility Plan include:
• Metallurgical ore characterisation and testing facility to de-risk new projects being developed by industry and enable integration of Australian ores into new green metal processing technologies
• Iron ore reduction technology and testing facility to characterise ores in novel flash reduction, fluidised beds and shafts technologies, evaluate their performance and de-risk scale up.
• High temperature material testing facility to provide high-quality data that will overcome critical barriers to the design and optimisation of calciners and other reactors that are needed to decarbonise high-temperature industrial processes, such as for steel, alumina as well as cement production.

These facilities have all been identified as important for enabling cost-effective industry and government access to the research insights required to underpin further large-scale industrial pilots and commercialisation in the 2030s, as illustrated below. Proposals for these facilities are at various stages of development, from early stage conceptual thinking through to cost estimation. HILT CRC would welcome further engagement with the Government to discuss both the broader RD&D facilities plan and specific research infrastructure proposal development.

HILT CRC thanks the Government for the opportunity to comment on the design of the NRI Roadmap 2026 Issues Paper. The NRI Roadmap 2026 can play a key role in providing funding and support for decarbonising heavy industry facilities, as well as helping to address the process and technology integration risks to enable green products and markets.
If the Government would like to discuss any elements further, [Redacted – personal information not authorised for publication]

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Mon, Dec 8, 2025, 05:28 PM Australian Eastern Daylight Time
[ID: sbm39841f5d9e50e7f06c289]

Title
Ms

First Name
Jo

Last Name
Webb

Organisation
Animals Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051_Roadmap Survey_ Phenomics Australia

Capability 2
086_Roadmap Survey_ Phenomics Australia

Capability 3
169_Roadmap Survey_ Phenomics Australia   We consider these capabilities priority inclusions in the 2026 NRI Roadmap because they will assist with national coordination of biobanking in Australia. Biobanking is increasingly discussed as part of the broader national research infrastructure ecosystem (e.g. connections to omics, imaging, clinical trials and data platforms) which enables linking of samples to genomics and other analytics in a scalable way.   While Australia has numerous biobanks, national coordination is needed to improve the visibility, accessibility, and harmonisation of biospecimens across institutions. The CSIRO recently reported that increased coordination would improve the visibility / access and sustainability of biobanks, thereby reducing duplication and making collections more useful (CSIRO, 2025).   Reference - CSIRO, 2025 https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/CSIRO-futures/Health-and-Biosecurity

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Non-animal models in research are rapidly equating to or surpassing the performance of traditionally used animal models in multiple applications (CSIRO & AFSA, 2023). Therefore,

there is an urgent need to enhance capability in human-relevant research and innovation through NAMs in Australia.

The establishment of a national consortium within the next 2-3 years is recommended to:
• Provide coordinated capability to develop, validate and scale NAMs in Australia.
• Validate priority NAMs for drug development and toxicology.
• Enable centralised national datasets.
• Enhance research outcomes and predictive value.
• Reduce duplication, attrition, expenditure and waste.
• Rapidly reduce and replace the use of animals in research.

Thank you for the opportunity to provide input.

Reference

CSIRO & AFSA, 2023 - Non-animal models: A strategy for maturing Australia's medical product development capabilities

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Mon, Dec 8, 2025, 05:26 PM Australian Eastern Daylight Time
[ID: sbm3992bbf69e9f6ddb69ea2]

Title
Dr

First Name
Talia

Last Name
Avrahamzon

Organisation
Research Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Research Australia is supportive of the below capability suggestion outlined by the Population Health Research Network in their submission to the 2026 NRI Roadmap. Capability: National biobanking infrastructure Supported by submissions (051, 058, 159, 195, 286) A national approach to biobanking has been consistently recognised as a priority in every previous National Research Infrastructure (NRI) Roadmap, yet no investment has been made to date. Establishing a national biobanking infrastructure is critical to support Australia's research ecosystem.   This infrastructure should: •   Define biobanks broadly to include longitudinal cohort studies •   Integrate digital and data infrastructure for discovery, interoperability and secure data sharing •   Provide robust systems for storage, management, and equitable access to biospecimens •   Support linkage to administrative datasets Such an initiative would enable high-quality, large-scale research, improve reproducibility, and accelerate discoveries in health, genomics, and precision medicine.

Capability 2
Research Australia is supportive of the below capability suggestion outlined by the Population Health Research Network in their submission to the 2026 NRI Roadmap. Capability: Infrastructure to support the access, use and linkage of Electronic Health Records (EHR) Supported by submissions (195, 051, 197) Australia's health system generates vast amounts of digital clinical data through electronic health records (EHRs) in hospitals, primary care, and private practice. Despite significant investment in platforms such as My Health Record and state-based integrated EHR systems, this data remains underutilised for research due to fragmented systems, inconsistent governance, and limited secure access. A coordinated national approach is urgently needed to enable ethical, efficient, and privacy-preserving re-use of EHR data for public-good research and innovation. This capability would: •   Transform fragmented EHR data into a research-ready resource through harmonization and interoperability. • Establish

governance frameworks for consent, privacy, and ethics to ensure community trust. •   Provide secure, cloud-based environments for analysis of de-identified data without data leaving the system. • Support advanced analytics, AI-driven health research, and precision medicine. •   Build workforce capability in digital health and data science. By leveraging existing NCRIS investments such as the Population Health Research Network (PHRN), a national federated, standards-based infrastructure that accelerates clinically relevant research and improves health outcomes nationally could be developed.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Capability 1: A Unified National Health and Medical Data Infrastructure Strategy and Implementation Framework

Australia needs a Unified National Health and Medical Data Infrastructure Strategy to address fragmented data systems across systems, jurisdictions and research environments. A nationally coordinated approach is required to map existing assets, improve interoperability, streamline access, and reduce duplication of infrastructure and effort. The capability would deliver a national data blueprint, harmonised governance arrangements, and a multi-year, multi-party investment framework involving Commonwealth, state and territory governments, research organisations, and industry. This would create a coherent and interoperable data ecosystem that supports research, clinical care, policy development, and health system productivity. Research Australia, in partnership with Digital Health CRC and other NCRIS-funded partner organisations have been advocating to drive forward this national priority and critical asset for Australians' health and the nation's economic prosperity.

Capability 2: Establishing a Clinical Data Infrastructure for Australian Health Systems

Australian hospitals and health systems generate enormous volumes of clinical data, but chronic under-investment in data workforce capacity and infrastructure severely constrains the nation's ability to harness this data within health systems for research and system learning. There are various definitions of learning health systems, but in general it refers to the positive feedback loop that is created when every patient interaction offers an opportunity to learn how to improve future care. Data and advanced technology are a critical enabler of a modern and connected health system, as outlined in the National Health and Medical Research Strategy.

A model similar to the Patient-Centered Outcomes Research Institute (PCORI) in the United States provides a potential model for consideration to address this gap. PCORI funds the development and maintenance of data infrastructure inside hospitals to develop system-level capability. Translation of this model into the Australian context should be explored further, with a dedicated pilot program which funds hospitals and health systems to build and maintain core data infrastructure for research purposes, embedding capability where data is generated and enabling system-wide learning.

The Learning Health System Strategic Advisory Committee suggested that advancing a learning health system would:
• Meet public perceptions and expectations.
• Build trust across diverse communities.
• Avoid duplicative siloed infrastructure and systems.
• Provide an ethically compelling shared vision of how a patient centric system will deliver improved care in the best interests of all Australians.

Alongside these benefits, the opportunity to harness health system data will create a pathway to further research discoveries, leading to translation back into health systems and commercialisation opportunities – thereby improving the health and wealth of Australians. This would also support the growing focus on learning health systems, as noted in the draft National Health and Medical Research Strategy and by the Learning Health System Strategic Advisory Committee.

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Mon, Dec 8, 2025, 05:24 PM Australian Eastern Daylight Time
[ID: sbm3992ba627d878d0ff938a]

Title
Dr

First Name
Stuart

Last Name
Glover

Organisation
Australian Publishers Association

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposed capability: National Written Culture Data & Metadata Infrastructure

Need: Australia lacks an integrated, rights-aware national data infrastructure for books, reading and written culture to inform cultural, education, literacy, AI and export policy.

Capability: A distributed, interoperable infrastructure linking:

**bibliographic and publishing metadata

**library, education and sales/usage data

**literary research datasets

**ICIP-aligned First Nations literary and language collections.

Medium-term goals:

**provide robust evidence for policy and funding

**support AI transparency and provenance

**enhance discoverability of Australian and First Nations works.

Communities: humanities and social science researchers, publishers, libraries, education systems, First Nations organisations, governments.

Timeframe: staged establishment over 5–7 years, building on existing platforms (e.g. AustLit, HASS & Indigenous Data Commons, ARDC services).

249

Mon, Dec 8, 2025, 05:14 PM Australian Eastern Daylight Time
[ID: sbm3992b184818772cae5941]

Title
Prof

First Name
Richard

Last Name
McDermid

Organisation
AAO Research Data & Software, Macquarie University

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Proposed Additional Priority: National Astronomy & Multidomain Data Platform
A sovereign, standards-driven science data platform based on the successful AAO Data Central Science Platform model, built to serve astronomy at national scale first, and designed for seamless expansion to adjacent data-intensive domains such as neurodegenerative disease research, which have similar needs for managing imaging, catalogues and registries (digital biobanks).

Need
• Australian researchers increasingly rely on large, heterogeneous, multi-institution datasets and advanced analytics, yet current access is fragmented and domain-specific.
• Astronomy's next decade will bring a step-change in survey scale and diversity, demanding a coordinated national platform for discovery, analysis, and long-term stewardship of FAIR data.
• Parallel needs exist in health and biomedical communities for national coordination, discoverability, and interoperability, which are capabilities a modern astronomy data platform can generalise.

Proposed Capability
• Distributed yet centrally coordinated data platform, starting with astronomy and extensible to other domains.
• Data fabric & federation: federated catalogue, metadata and provenance services; FAIR/CARE compliance.
• Analysis & workflow layer: server-side reproducible science workflows, scalable query, governed workspaces.
• Research Infrastructure Workforce: Research Software Engineering cohort embedded with the platform.

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• Governance & community co-design: astronomy-led governance at inception, structured onboarding of partner communities.
Medium-Term Goals (3–6 years)
• Astronomy backbone live with federated archives and scalable analytics.
• Demonstrate interoperability exemplars ("data spaces").
• Expand into neurodegenerative disease imaging and digital biobank integration.
• AI/HPC uplift with GPU/accelerator capacity and fast efficient storage.
• Establish sustainable software and workforce programs.
Impacted Research Communities
• Astronomy: survey teams, precision instrumentation groups, theory & time-domain astronomy.
• Neuroscience & neurodegenerative disease: imaging, digital biobanking, registry.
• Research software & data infrastructure communities: RSE workforce, FAIR data and governance specialists.
Timeframe for Establishment
• Phase 0 (0–12 months): Scoping refinement & co-design.
• Phase 1 (12–30 months): Upgraded astronomy backbone live.
• Phase 2 (30–60 months): Multidomain expansion.
• Phase 3 (5+ years): Consolidation & scale.
Why Data Central is a good starting point
• Data Central's architecture is a perfect match to the many needs expressed by the NRI community: discoverability, scalable analysis, and sustainable data curation.
• Builds on that proven model to deliver a national capability led by the astronomy research community and designed to generalise into imaging-rich biomedical domains.
• Focuses on research project-based requirements, including distributed research teams, researcher mobility and the need for centrally managed data access.
• Maintains independence from institutional and specific research case constraints

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Mon, Dec 8, 2025, 05:13 PM Australian Eastern Daylight Time
[ID: sbm3992b0c3337c7c17ab9d4]

Title
Dr

First Name
Simon

Last Name
O'Toole

Organisation
AAO Research Data & Software

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposed Additional Priority: National Astronomy Data Platform
Australian astronomy needs a sovereign, standards-driven astronomy data platform that builds on the AAO Data Central Science Platform and is designed to serve Australia's astronomy community at national scale. The design of Data Central uses modern data infrastructure principles that could be used to translate to other data-intensive research domains with similar technical requirements.
Australian astronomy faces a critical infrastructure gap as the field enters an era of unprecedented survey scale and data complexity, requiring coordinated national capabilities for discovery, analysis, and long-term stewardship of FAIR astronomical data. The next decade of astronomy will deliver transformative datasets from facilities including the Square Kilometre Array, Vera C. Rubin Observatory, and next-generation space missions, demanding infrastructure that can federate, analyse, and preserve petabyte-scale multi-wavelength observations. Australia's astronomy research community requires sovereign data and computational infrastructure to maintain scientific leadership and ensure continued access to international collaborations.
Proposed Capability
We propose an astronomy data platform with centralised coordination, federating data from major Australian facilities and international survey partnerships. The platform will be based on FAIR data principles, comprehensive metadata standards through the International Virtual Observatory Alliance. We propose community co-design with representation from observational, theoretical, and instrumentation groups across Australian institutions.

The medium-term goals (3-6 years) of the platform are to:

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1. Launch fully operational astronomy backbone with federated access to major Australian and international survey archives;
2. Deploy scalable data infrastructure optimised for astronomical workflows covering image processing, catalogue crossmatching, time-series analysis, and spectral fitting;
3. Integrate AI/ML capabilities for astronomical discovery; and
4. Create example "astronomy data spaces" demonstrating federation across institutional boundaries.
Impact
* Survey astronomy research teams across all wavelengths and in the time-domain;
* Precision astronomy research for targeted studies of astrophysical phenomena;
* Theoretical and computational astronomy groups who require access to large observational datasets for model validation;
* Instrumentation teams developing next-generation instruments and requiring data systems expertise.
Timeframe to establish
• Phase 0 (0–12 months): Community consultation and technical scoping with astronomy stakeholders.
• Phase 1 (12–30 months): Deploy upgraded astronomy backbone with federated catalogue and analysis services.
• Phase 2 (30–60 months): Scale infrastructure to accommodate major international survey data flows; expand GPU/HPC capacity.
• Phase 3 (5+ years): Operational maturity with sustained astronomy community support; potential pathfinding for other domains.
Why Data Central is the Foundation
• Data Central's architecture directly addresses astronomy's core requirements: multi-wavelength data discovery, scalable catalogue queries, reproducible analysis workflows, and sustainable curation aligned with international astronomical data standards (IVOA).
• The platform has demonstrated success managing heterogeneous astronomical datasets and supporting distributed research teams across Australian institutions.
• Proven integration with astronomical workflow tools, virtual observatory protocols, and community data formats.
• Positions Australia to lead in astronomical data infrastructure while maintaining compatibility with international astronomy initiatives.
• Ensures the platform remains focused on astronomy research requirements rather than institutional or administrative constraints.
• Architecture principles developed for astronomy's demanding technical requirements (large imaging datasets, complex catalogues, time-critical transient follow-up) provide a mature foundation that could later inform other data-intensive disciplines.

247

Mon, Dec 8, 2025, 05:09 PM Australian Eastern Daylight Time
[ID: sbm399147a8eee16457387fd]

Title
A/Prof

First Name
Nicola

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Smith

Organisation
Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051_Roadmap Survey_ Phenomics Australia New Approach Methodology (NAM) infrastructure is critical for pharmacology and toxicology in Australia because it enables more accurate, human-relevant models while reducing reliance on animal testing. By integrating technologies like organ-on-a-chip systems, computational biology, and AI-driven simulations, NAMs accelerate drug discovery and development, improve safety assessments, and support ethical, cost-effective research. This infrastructure positions Australia at the forefront of innovative, predictive modelling essential for personalised medicine and regulatory science, increasing its sovereign capability in this rapidly evolving space.

Capability 2
144_Roadmap Survey_ Australian Structural Biology Computing Modern drug discovery and safety science now rely on deep-learning models for structure prediction, complex modelling, docking and protein design. Australia's current systems are difficult to use for these workloads, which slows target validation, off-target assessment and lead optimisation. Backing 144 would provide the shared accelerator capacity and supported workflows that clinical pharmacology and toxicology groups need to move faster and with more confidence.

Capability 3
169_Roadmap Survey_ Phenomics Australia A national biobank is crucial for pharmacology and toxicology because it provides integrated access to biological samples and genomic data, enabling large-scale studies on drug efficacy, safety, and adverse reactions. By consolidating fragmented resources into a centralised platform, researchers can better understand genetic and environmental factors influencing drug response and toxicity, accelerating precision medicine and safer therapeutic development.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Priority Suggestion: National AI-Guided Structural Biology Capability

Need:

Australia faces a surge of AI tools for protein modelling, many of which are misapplied, leading to wasted resources and delayed translation. Researchers and industry need expert guidance, validated workflows, and training to ensure reliable outcomes. This complements existing compute infrastructure by adding the people, processes, and validation layer that makes AI useful.

Capability:

A national expert team providing certified workflows for protein structure prediction, molecular modelling, docking, and design; consult services; open training materials; validation reports for publication and regulatory use; and integration with national compute, synchrotron, microscopy, and data platforms. Aligned with the Australian Structural Biology Deep-Learning Infrastructure Roadmap has been published by a national group of experts, with 13 contributors and endorsed by 40 domain experts across universities, NCRIS facilities and industry; NRI should review and align with its recommendations (published after the close of the NRI survey): https://zenodo.org/records/15786982.

Medium-term Goals (3–5 years):

Support 200 labs and train 1,500 people; publish 100 benchmark datasets; initiate 50 industry collaborations.

Impacted Communities:

Health and medical research, medicines R&D, biotech and manufacturing, agriculture and biosecurity, environment and resources, education and workforce, government and regulators, and start-ups/SMEs across these sectors.

Timeframe:

Commence within 12 months; achieve full national service in 24–36 months.

246

Mon, Dec 8, 2025, 05:03 PM Australian Eastern Daylight Time
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Title
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Organisation
RMIT University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Our stakeholders named two options as the first priority: 285_Roadmap Survey_Melbourne Initiative for Quantum Technology (MIQT), University of Melbourne. Translational research infrastructures - in particular a distributed quantum device testbed Such a facility is essential to provide a) support for new research breakthroughs that are impactful on a world stage and b) to provide the infrastructure that start-ups need in the early stages to de-risk their prototypes, before they have reached the stage where they can own the entire development chain. #223 - Australian Internet Observatory The digital transformation challenge is impacting almost every aspect of Australia's social, cultural and economic life in both positive and negative ways. To support research on the impact of rapidly changing and dynamic digital technologies across a range of fields and sectors we need to expand and enhance the capabilities of the Australian Internet Observatory. This includes capabilities to collect, analyse, and interpret the rapidly expanding range of data from new digital services, networks and devices. New visualisation tools that can work with Generative AI and digital simulations, open standards and data governance for digital public infrastructure and uplift the next generation of social science and humanities researchers in digital research methods and emerging technologies. The Australian Internet Observatory will provide national benefits including: •   Provide new insights into high-priority national challenges including health and wellbeing, social cohesion, digital culture and economy, Indigenous knowledge, the environment and national security. •   Minimise the harms and maximise the benefits of large-scale digital platforms and algorithmic decision-making through monitoring and auditing of technologies and systems and developing new tools and methods. •   Build HASS NRI capabilities that are collaborative, connected and able to address national research priorities and the digital transformation challenge. •   Collaborate and connect with NRI facilities across domains as well as with government, industry and civil society to maximise the benefit of existing investments and expertise.

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Capability 2
126_ Roadmap Survey_ Jan Pretorius 229 - ADM+S

Capability 3
137_Roadmap Survey_ Australian National Fabrication Facility Ltd

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Apart from the ones already mentioned in this paper, the key suggestion we see as important for translation facilities is:
1. Advanced Manufacturing and Materials - this was mentioned in the previous submission and above. There is already work within the sector on developing such a facility: https://ammaust.org.au/

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Mon, Dec 8, 2025, 04:59 PM Australian Eastern Daylight Time
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Title
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Organisation
Australian Academy of the Humanities

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Indigenous Research Capability: a ten-year vision, building on the successes of the
Indigenous Research Capability program led by Professor Marcia Langton. This is a case for
scaling an existing project (currently funded through the HASS & I RDC). See 255_Roadmap
Survey_ Indigenous Data Network. "Such investment is essential to meet growing demands
for digital infrastructure, data security, cultural protocols, and supporting Aboriginal and
Torres Strait Islander communities to maintain control over their knowledge"

Capability 2
National research collections infrastructure capability: a new research-led agenda,
bringing together Indigenous knowledge, sciences and humanities, taking full advantage of
AI. This is a new capability, it does not yet exist, but it builds on existing initiatives. We
single out two of the proposals from the March consultation which offer complementary
lenses on this issue: a.   211_Roadmap Survey_Australian Creative Histories and
Futures: Infrastructure Capability: Australian Centre for Cultural Data and Digitisation. We
note that 2026 is next phase of the National Cultural Policy with potential for alignments
for strong cultural data infrastructure and digitisation. b.225_ Roadmap Survey_
Collections as National Infrastructure Network: proposal for new national research
infrastructure for the collections in the GLAM sector – one that breaks disciplinary silos, is
able to connect collections that are multi-modal in nature and across institutions.

Capability 3
Integration and coordination capability across HASS and for structured collaboration across
NCRIS and wider system to leverage investment. This is a new capability, it does not yet
exist. To focus on: a. National workforce capability strategy for HASS. Skills mapping and
coordination is essential for the humanities. See proposal along these lines by
089_Roadmap Survey_ Melbourne Data Analytics Platform (MDAP), The University of

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Melbourne: A National Digital Research Infrastructure Workforce Coordination Group. b. Multi-pronged AI capability for HASS. There are two initiatives we would like to see developed in the 2026 Roadmap: 001_Roadmap Survey_Katherine Bode: Developing AI research capacity in national libraries; and 229_Roadmap Survey_ ARC Centre of Excellence for Automated Decision-Making + Society: opportunity extend the capabilities of the Australian Internet Observatory (AIO) to encompass the rapidly growing environment of AI, digital devices and services, from media platforms to health apps, connected vehicles and smart devices c. Data capture (digitisation) capability (see above: 211_Roadmap Survey_Australian Creative Histories and Futures: Infrastructure Capability: Australian Centre for Cultural Data and Digitisation. d. Repository infrastructure for high value collections - STEM also has this problem; a 'joined up' discussion about future proofing is needed. Australia's sovereign data in the humanities is at risk. See 236_Roadmap Survey_National Open Science Task Force: Developing a migration road map to a national repository.

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Mon, Dec 8, 2025, 04:55 PM Australian Eastern Daylight Time
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Organisation
SmartSat CRC

In what capacity are you responding?
An individual

Capability 1
161 Roadmap Survey_ Australian Plant Phenomics Network

Capability 2
140_Roadmap Survey_ Geoscience Australia

Capability 3
231_Roadmap Survey_ Charles Sturt University

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Description of the need:
Australia faces a significant knowledge-adoption gap in the agriculture and environmental management sectors. While our research sector generates world-class Earth Observation science and vast amounts of environmental data, this capability remains fragmented and siloed within specific institutions or state boundaries. There is currently no cohesive national infrastructure dedicated to translating this upstream research into downstream, operational decision-making tools for growers and land managers.
We are missing the "connective tissue" between data generation and on-ground adoption. Without a coordinated network to validate, integrate, and demonstrate these technologies, the agricultural sector struggles to utilise EO data for critical challenges like climate adaptation, biosecurity monitoring, and yield optimisation. We need to move beyond ad-hoc projects to a sustained, user-driven ecosystem.

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Proposed Infrastructure Capability:
We propose the establishment of a National Network of Earth Observation and Digital Twin Translation Hubs, modelled on successful initiatives like the Queensland Earth Observation Hub.
This capability would not just be a data repository, but a distributed infrastructure network that provides:
- State-based Translation Hubs: Physical and digital nodes in key states that bring together researchers, government agencies, and industry to co-design solutions for specific regional challenges (e.g., vegetation mapping, heatwave monitoring, or water quality). These hubs would act as the interface to ensure research is user-informed and industry-driven.
- National Digital Twin "Sandboxing" Infrastructure: A shared, pre-competitive digital environment where researchers can fuse EO data with on-ground sensor networks (IoT, soil, weather) to rigorously test and validate models. This allows for the development of "Digital Twins" for agriculture that are validated against real-world conditions before being deployed commercially.
- Cohesive National Strategy for Adoption: A mechanism to harmonise standards and adoption pathways across states, ensuring that an EO solution developed in one hub (e.g., for biosecurity in SA) can be rapidly adapted and scaled nationally.

Medium-Term Goals:
- Bridge the "Valley of Death" and systematically move EO and Digital Twin research from low TRL to TRL 7 (operational capability) by providing the infrastructure necessary for pilot testing and validation.
- Operational Resilience: Empower local and state governments with accurate, timely, and actionable spatial intelligence to manage natural disasters and environmental change.
- Industry Adoption: Accelerate the uptake of precision agriculture by ensuring that EO data is not just "available" but is integrated, trusted, and compatible with the existing farm management software used by growers.
Impacted Research Communities:
- Earth Observation & Space Science: Researchers needing pathways to apply novel sensor data (e.g., hyperspectral) to real-world problems.
- Agricultural Science: Researchers across all commodities requiring validated digital environments to model crop and pasture performance.
- Data Science & AI: Communities requiring structured, real-world testbeds to train and refine predictive models.
Regional Development: Stakeholders focused on translating high-tech research into regional economic benefits.

Timeframe:
2026 – 2031.
Immediate investment is required to capitalise on the rapid maturation of the Australian space sector and the urgent need for climate adaptation tools. A phased approach is recommended, establishing the coordination framework and initial hubs within the first two years to drive immediate collaboration.

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Mon, Dec 8, 2025, 04:48 PM Australian Eastern Daylight Time
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Organisation
Australian Nuclear Research and Education Network

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Our first suggestion is to facilitate research community road maps of their own that can feed into strategic discussions of Australia's National Research Infrastructure strategy. This would foster collaboration and offer more focused discussions on what national research infrastructure capabilities Australia would be best placed to support and would benefit from most. Communities like ANREN are well placed to facilitate such discussions in a collaborative way.

Beyond this, we have two additional priority suggestions for new capability that were not present in the original survey responses.

The first suggestion is that we establish advanced computational and collaborative nuclear research platforms to support both traditional Monte Carlo and emerging quantum Monte Carlo methods. This capability would provide nationally coordinated infrastructure to accelerate nuclear research while enabling applications in particle therapy, medical isotopes, and materials science. In addition, the platform would substantially strengthen the medical physics industry by supporting innovation in medical imaging, nuclear medicine, radiation therapy, and cancer treatment—areas that rely increasingly on high-fidelity simulation, dose-modeling, and radionuclide production research. Over the next 3–7 years, the goal is to develop these computational platforms, align national research infrastructure priorities through networks such as ANREN, and facilitate multi-institution projects with broad scientific and societal impact. This initiative would directly benefit communities in nuclear physics, medical isotopes, quantum computing, and materials research, as well as clinical and industry partners advancing next-generation diagnostic imaging technologies, treatment-planning systems, and radiopharmaceutical therapies.

The second suggestion is focused on the research needs of Australia's nuclear medicine community, which is currently underserved by national infrastructure. Australia's capacity to provide equitable access to diagnostic and therapeutic nuclear medicine is increasingly constrained by the structural vulnerabilities of its radionuclide supply chain and lack of research and development in new diagnostic and therapeutic radionuclides, particularly alpha emitters. A 30 MeV cyclotron would not only expand scientific capability but would address core humanities-based concerns that underpin ethical national research infrastructure, including health equity, justice, sovereignty and fairness. A 30 MeV cyclotron is not only critical scientific infrastructure, it is a justice-oriented investment that strengthens national sovereignty, ensures equitable access to life-saving theranostics, and supports a fair and ethically grounded future for Australian health research.

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Mon, Dec 8, 2025, 04:47 PM Australian Eastern Daylight Time
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Title
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Nuria

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Lorente

Organisation
Australian Astronomical Optics (AAO), Macquarie University

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
A National Astronomy and Multi-domain Data Platform modelled on AAO's Data Central

Proposal for an additional national research infrastructure priority: a sovereign, standards-driven National Astronomy and Multidomain Data Platform. This platform would build on the proven AAO Data Central model, initially serving astronomy at an expanded national scale, and later extending to other data-intensive domains.

Why this is needed:
Australia requires a coordinated, standards-based research data platform to support astronomy and other data-intensive research areas. Australian research increasingly depends on large, complex, multi-institution datasets, but current access is fragmented and domain-specific. Astronomy faces a major increase in survey scale and diversity over the next decade, requiring coordinated national infrastructure for data discovery, analysis, and stewardship. Similar needs exist in health and biomedical research, making astronomy an ideal starting point for a generalised solution.
A national platform would enable FAIR data discovery, scalable analysis, and long-term stewardship, starting with astronomy and expanding to other domains (e.g. neurodegenerative disease research) that share similar compute and data management needs.
The platform will provide federated catalogues, metadata and provenance services, server-side workflows, and embedded research software engineering expertise.
Governance would begin with astronomy and progressively onboard other communities.
Medium-term (3-6 year) goals include a live astronomy backbone, interoperability

demonstrations, and integration with biomedical imaging and digital biobanks, supported by AI and HPC capabilities.

Why start with Data Central:
Leveraging the proven AAO Data Central architecture provides an immediate, trusted foundation for national-scale data services. Its design already delivers key NRI priorities: discoverability, scalable analytics, and sustainable data stewardship, while supporting FAIR principles and researcher mobility. Building on this success accelerates implementation, reduces risk, and ensures interoperability from day one. This approach creates a flexible, future-ready platform that can evolve beyond astronomy to serve multiple data-intensive domains, maximising return on investment and fostering cross-disciplinary innovation.

239

Mon, Dec 8, 2025, 04:38 PM Australian Eastern Daylight Time
[ID: sbm3992907a2487bb504e518]

Title
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Rosie

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Hicks

Organisation
Australian Research Data Commons

In what capacity are you responding?
A representative of an organisation or group

Capability 1
The ARDC's proposal for an Engineering Research Data Commons (#197) responds to the critical need for NRI to support the full use of engineering data.   The scale of Australia's engineering research effort underscores the need for dedicated national research infrastructure in this domain. Engineering accounts for a significant share of national research activity, nearly 20% of ARC research funding since 2001, around 30% of CRC investment, and close to 40% of R&D investment in the early 2010s. These figures, alongside the National Reconstruction Fund's emphasis on engineering-intensive sectors such as renewables and low-emissions technologies, resources, transport and advanced manufacturing, highlight a clear gap: Australia's engineering research effort is not matched by corresponding digital or cross-NRI support. Data is by nature, complex, distributed and highly contextual. This challenge is magnified in the engineering domain because much of the relevant data is generated by industry making it fragmented, siloed and difficult for the research sector to access or reuse. As a result, substantial volumes of engineering data remain under-utilised, affected by inconsistent standards, limited discoverability and the absence of secure mechanisms for sharing. The proposed Engineering RDC directly addresses this gap by providing the national capability needed to integrate existing datasets, enable secure and efficient data sharing, and improve interoperability across research institutions, industry and government. By supporting the development and reuse of AI-driven analytics and advanced modelling tools, the Engineering RDC will allow Australia to leverage technological advances and accelerate engineering research translation. Engineering research underpins many of Australia's national science and innovation priorities, including sovereign capability in critical minerals, manufacturing, energy, recycling and materials science. Establishing the Engineering RDC will focus investment where it is most needed, enabling engineering research to drive national sustainability, competitiveness and innovation.

Capability 2

ARDC supports the Sydney Informatics Hub's proposal (#200) for a national capability that bridges the gap between compute and the emerging needs driven by AI. Multiple survey submissions reference the urgent need for secure, sovereign infrastructure to meet the requirements of researchers across disciplines analysing sensitive data at scale using advanced AI/ML techniques. Priority investment in enduring digital research infrastructure is necessary to equip Australian researchers with the scalable tools, services and governance components required for the analysis and secure sharing of health and other sensitive data. In particular, the Sydney Informatics Hub's proposal calls for trusted research environments on the ARDC Nectar Research Cloud. The ARDC's submission to the 2025 NCRIS Funding Round proposes a cybersecure, standards-aligned sovereign cloud for researchers. Building on the soon-to-be ISO27001-certified infrastructure of ARDC's National Node at AARNet, combined with federated identity and consistent access policies, the activity will deliver a trusted environment where AI/ML-ready compute and sensitive data handling can occur at scale. ARDC also recognises the need for coordinated governance across Australia's national compute environment and strongly endorses the establishment of the Australian Research Computing Advisory Panel and Australian Tier 2 Network.   The Sydney Informatics Hub also proposes a dedicated facility to support AI-driven research, including investing in large-scale GPU computing resources. ARDC agrees it is necessary to scale GPU capacity in Australia to support AI applications across various compute environments, including cloud, HPC and Tier 2 facilities.

Capability 3

ARDC strongly supports the Melbourne Data Analytics Platform's call for strategic and coordinated investment in workforce development, AI infrastructure and data storage capabilities (#89). Many survey submissions reference the increasing uptake of AI/ML for data analysis. However, robust AI/ML analysis requires high-quality AI ready data that is well described and machine-actionable. Urgent enhancement of Australia's critical data infrastructure – ARDC's Research Data Australia (RDA), Research Vocabularies Australia (RVA) and Persistent Identifier (PID) services – is necessary to keep pace with AI technology. Key areas for uplift include enabling wider acceptance of data types, machine-actionable licensing and copyright descriptions, and machine readability. This addresses the interoperable and reproducible principles of FAIR by providing critical infrastructure to support machine-actionable provenance and trust attributes, driving reuse at scale.   The MDAP submission notes investment is necessary for the "development of appropriate standards, codes-of-conduct, ethical requirements, etc. for the responsible use of AI in research." The ARDC's submission to the 2025 NCRIS Funding Round proposes an AI-Ready Standards and Ethics program, as well as working with Data61 and CSIRO to provide tooling and software for research data management uplift. The MDAP proposal also recognises the storage capacity required for computation. MDAP recommends "that all new computing infrastructure developments place a strong emphasis on ensuring new compute capabilities are coupled with suitable medium and long-term data storage solutions for all researchers." Expanded storage capacity, including on the ARDC Nectar Research Cloud, is essential to address the growing demand to support domain repositories, different data types and sensitive data analysis. In addition, ARDC notes it is critical to support domain data repositories that sit beyond the remit of any one university or institution. In collaboration with NCI and Pawsey, ARDC proposes to develop the Australian AI Data Platform to provide curation, repository and storage solutions, and a help desk for Australian researchers.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability,

the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
DATA FOR A HEALTH LEARNING SYSTEM

Building on ARDC's Australian Health Data Evidence Network (AHDEN) national-scale health data research infrastructure, two capabilities are proposed: 1. comprehensive health data standardisation for research; and 2. rapid data interrogation for health translation.

1. COMPREHENSIVE HEALTH DATA STANDARDISATION FOR RESEARCH
Australia collects vast amounts of clinical and administrative health data throughout the patient's journey within the health care system that is not currently interoperable for research. This means that complex research and policy questions cannot be asked of the data across all aspects of the health care continuum. Additionally, bespoke data delivery and custom analytics used for individual research questions are resource intensive, inefficient and cannot scale.

ARDC's AHDEN initiative has commenced making Australian hospital medical records interoperable by standardising them to the internationally recognised and supported OMOP (Observational Medical Outcomes Partnership) Common Data Model (CDM). However, key gaps remain in both primary care and aged care, where these data remain siloed and difficult to analyse. Expanded investment to support the standardisation of key primary care and aged care data sources to the OMOP CDM, in addition to tertiary care data, would enable:
- Rapid and efficient assessment across the health care continuum, supporting earlier detection of health issues, evaluation of treatment effectiveness and needs-based planning
- Robust evidence generation, supplementing clinical trials and better supporting healthcare guidelines and policy decisions
- Improved health equity, identifying gaps in care and ensuring diverse populations are represented
- Global collaboration, allowing Australia to contribute to international studies at scale while keeping data secure.

2. RAPID DATA INTERROGATION FOR HEALTH TRANSLATION
The comprehensive data standardisation for research described above could be extended and optimised to support policy makers, regulators and medtech innovators. But these users need rapid turnaround for less complex queries. To support their needs, the infrastructure in #1 above would need to support:
- Optimised governance frameworks that enable rapid evidence generation and timely characterisation studies for regulatory decision making
- Data-provider certification, for contributing to regulatory-grade evidence
- Development of sustainable data access and asset maintenance business models
- Multi-sector (industry, academia, government) secure data access and sharing capability.

This translation-focused infrastructure would support a range of health activities and end-users, including: state- and commonwealth-level health systems policy; regulatory evidence collation (e.g. Therapeutic Goods Administration, Australian Commission on Safety and Quality in Health Care and health technology assessment agencies - PBAC and MSAC); and med-tech, pharmaceutical and life sciences industries.

COMMUNITIES AND MILESTONES

Across a proposed investment timeline of 2028-2032, key health data activities and milestones supported by both capabilities would include:
- Expansion of the data partner network to include key Australian primary and aged care data sets translated to the OMOP common data model and additional tertiary care data sets – improving representation and data volume
- Operationalisation of a governance framework and data access model that supports standardised characterisation studies by government, academic and industry partners
- An increase in Australian non-interventional (observational) studies using real world evidence designed to address regulatory questions
- Demonstration of public health impact and rapid analytics infrastructure that safeguards against emerging public health threats.

Research communities expected to leverage the development of both capabilities include: population and public health, government health policy makers, clinical research, allied health research, health systems research, health economics, social sciences, biological and life sciences, biotechnology and pharmaceutical industries.

COMPLEMENTARY CAPABILITY
Impactful health research is multi-modal. The two capabilities described above are foundational for understanding clinical health services. But they complement and rely on the rich tapestry of NRI investment through other NCRIS capabilities in linked population health, phenomics disease models, genomics reference datasets, imaging, microscopy and therapeutic innovation.

Two other critical areas in need of extended national infrastructure investment are longitudinal cohort studies and clinical trials. Austrade has just reported that "Australia's involvement in clinical trials has already contributed over $1.4 billion to the national economy and created more than 8,000 jobs. Ranked 9th globally for life sciences research, Australia is uniquely positioned to build a world-class ecosystem that delivers real health outcomes."

ARDC's national infrastructure to support clinical trials and cohorts should be extended to support medical scientists with better data collection, secure data access and national scale analytics capability.

238

Mon, Dec 8, 2025, 04:36 PM Australian Eastern Daylight Time
[ID: sbm39928f12e487f43459169]

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ARDC / University of Melbourne / Austin Hospital

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Harmonised data for a learning health system

The need: Australia collects a vast array of health data that is captured at point of care (e.g. electronic health records, allied health functional assessments) as well as through the administration of health care (e.g. Medicare Benefits Scheme claims data). These data, however, remain siloed and not harmonised in a way that allows complex research and policy questions to be asked of the data across all aspects of the health care continuum. While bespoke data delivery and custom analytics can solve individual research challenges, these solutions are highly resource intensive and do not scale for fast automation and repeated queries. Additionally, this approach leads to significant research "waste" from duplicated effort and inconsistent approaches. The Patient journey through and illness and treatment cycle is almost impossible to fully understand through comprehensive data analysis due to significant data gaps, governance constraints and time / expense. Final data structures are frequently bespoke, siloed, insufficiently granular and require time consuming and expensive process to access, transform (+/- link) prior to analysis. Time frames of over 2 years to access health data are not uncommon and the opportunity cost is high and unmeasured.

Proposed Enhanced Capabilities to be delivered through the Australian Research Data Commons:

1) Comprehensive Australian health data standardisation for research.

This activity would standardise key data sources that are representative of the full patient journey within the Australian health care system (e.g. primary care, tertiary care, and aged care) to an internationally recognised and supported common data model (OMOP) to enable their interoperability for research. This capability would leverage and build upon data standardisation activities currently being undertaken by the ARDC's Australian Health Data Evidence Network (AHDEN) initiative.

2) Development of real-world data infrastructure to support rapid generation of real world evidence for health translation.

Capability #2 would leverage Capability #1 and its parallel data standardisation work to support the following activities and end-users: health technology industry (e.g. med-tech, pharmaceutical and life sciences industries); health systems policy (State and Commonwealth Health Departments), regulatory evidence collation (e.g. Therapeutic Goods Administration, Australian Commission on Safety and Quality in Health care) and health technology assessment agencies (PBAC and MSAC). Importantly, clinician and public health researchers, clinical quality audit registries and would have a resource for clinical trials research planning (illness prevalence), prediction modelling, outcomes evaluation and rare condition surveillance. Standing infrastructure enables rapid research into novel illness such as pandemics, vaccine outcomes, uptake of new treatments and adverse outcome identification.

The new infrastructure required to support this capability includes, but is not limited to: (1)Optimised governance frameworks that support rapid evidence generation and timely characterisation studies for regulatory decision making and efficient ethical approvals for researcher access cross multiple organisations; (2) Data provider certification to contribute to regulatory-grade evidence generation; (3) Sustainable business model development for data access and asset maintenance (4) Data sharing capability/secure data access across multiple sectors (industry, academia, government); (5) Standardisation of analytic tools for transparent and reproducible studies.

What will the new capabilities enable?:
By investing up front in the standardisation of the data to the common data model (where concepts are consistently coded in the same way), the benefits of standardised and repeatable analytics across separate data sources can then be realised, including:
● Rapid and efficient assessment – enabling earlier detection of health issues and evaluation of treatment effectiveness.
● Robust evidence generation – improved planning for large scale clinical trials, supplementing clinical trials data collection and better supporting healthcare guidelines and policy decisions.
● Improved health equity – identifying gaps in care and ensuring diverse populations are represented.
● Global collaboration – allowing Australia to contribute to international studies at scale whilst keeping data secure.
● Research and analytics sustainability - scaling Australia's research capability by an industrial rather than cottage industry approach to data delivery and data analytics
● Improved efficiency of data acquisition and reporting for clinical quality registries
Medium-term goals:
- Expand data partner network to include key Australian primary, specialist, private hospital, allied health and aged care data sets translated to the OMOP common data model to improve representativeness and data volume

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- Operationalise governance framework and data access model that supports the execution of standardised characterisation studies by government, academic and industry partners
- Increase the number of Australian non-interventional (observational) studies using real world evidence designed to address regulatory questions (targets to be determined)
- Deliver demonstrable public health impact and rapid analytics infrastructure that safeguards against emerging public health threats

Impacted research communities: The following communities would all be able to leverage the development of this broad serving infrastructure: population and public health, government health policy evaluation, clinical research, allied health research, health systems research, clinical quality audit and outcomes assessment, health economics, social sciences, biological and life sciences, biotechnology and pharmaceutical industries.

Timeframe of investment: 2028-2032

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Mon, Dec 8, 2025, 04:34 PM Australian Eastern Daylight Time
[ID: sbm39928c854b87432431d2a]

Title
Mr

First Name
Sam

Last Name
Perkins

Organisation
Cellular Agriculture Australia (co-signed by Eclipse Ingredients)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
CAA's submission (#277) calls for biomanufacturing to be nominated as a new NRI capability, with food as a priority bioindustry, recognising that a critical juncture has emerged in which the cellular agriculture industry is struggling to bridge the gap between foundational research and successful translation and scale-up.

Capability 2
 IDEA Bio (#99) advocates for bioprocess scale-up and manufacturing facilities. This will fill a similar need to Capabilities 1 & 2, but with a specific focus on synthetic biology only.

Capability 3
Australian Genome Foundry (#151) advocates for large-scale fermentation infrastructure (1000L+). This would help address the aforementioned critical bottlenecks in the cellular agriculture industry, with a specific focus on fermentation alone.

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Mon, Dec 8, 2025, 04:31 PM Australian Eastern Daylight Time
[ID: sbm39928a43167cd24b77883]

Title
Mr

First Name
Jarrod

Last Name
Ross

Organisation
Universities Australia

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.
Universities Australia does not have a list of particular infrastructure projects to suggest.
However, our members will undoubtably suggest a range of specific options for
consideration in the next government research infrastructure investment plan.

While NCRIS investment provides access to a range of nationally significant research
infrastructure and the Research Support Program provides a portion of funding universities
require for "soft infrastructure" and on costs it is important to note that since the
abolition of the Education Investment Fund there has been no dedicated ongoing funding
source for large-scale, institutional level infrastructure such as new laboratories and
specialised facilities aligned with university research missions.

At the time, the government considered universities were largely in a financial position to
fund infrastructure needs from operation surpluses. In 2025, this could not be further from
the truth. Financial pressures stemming from the Job Ready Graduates scheme will
continue to be exacerbated by International Student caps considerably limiting universities
ability to cross-subsidise their research and in particular, infrastructure costs.

In the context of the development of a new NRI Roadmap the government should consider
the broader university funding ecosystem and identify/create a sustainable array of
funding options for the full range of research infrastructure needs.

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Mon, Dec 8, 2025, 04:31 PM Australian Eastern Daylight Time
[ID: sbm39928a00c18781563c360]

Title
Prof

First Name
Julian

Last Name
Thomas

Organisation
Australian Internet Observatory

In what capacity are you responding?
A representative of an organisation or group

Capability 1
#223 Australian Internet Observatory - An expanded Australian Internet Observatory --
The digital transformation challenge is impacting almost every aspect of Australia's social,
cultural and economic life in both positive and negative ways. To support research on the
impact of rapidly changing and dynamic digital technologies across a range of fields and
sectors we need to expand and enhance the capabilities of the Australian Internet
Observatory. This includes capabilities to collect, analyse, and interpret the rapidly
expanding range of data from new digital services, networks and devices. New
visualisation tools that can work with Generative AI and digital simulations, open
standards and data governance for digital public infrastructure and uplift the next
generation of social science and humanities researchers in digital research methods and
emerging technologies. The Australian Internet Observatory will provide national benefits
including: Provide new insights into high-priority national challenges including health and
wellbeing, social cohesion, digital culture and economy, Indigenous knowledge, the
environment and national security. Minimise the harms and maximise the benefits of
large-scale digital platforms and algorithmic decision-making through monitoring and
auditing of technologies and systems and developing new tools and methods. Build HASS
NRI capabilities that are collaborative, connected and able to address national research
priorities and the digital transformation challenge. Collaborate and connect with NRI
facilities across domains as well as with government, industry and civil society to
maximise the benefit of existing investments and expertise. The Australian Internet
Observatory (Phase I) was established in 2024 with investment from the Australian
Research Data Commons (ARDC) as part of the HASS & Indigenous Research Data Commons
and funded under the National Collaborative Infrastructure Strategy (NCRIS) and is being
developed and led by RMIT University in partnership with Queensland University of
Technology, The University of Queensland, The University of Melbourne, Swinburne
University of Technology and Deakin University. AIO is an initiative of the ARC Centre of
Excellence for Automated Decision-Making + Society (ADM+S) and is being developed in

collaboration with researchers and research centres, university partners and organisations across Australia and internationally. The next phase of AIO will work closely with the wider NRI sector to develop cutting edge tools and interoperable, integrated and collaborative data and technology solutions across disciplines to address national science and research priorities. Phase II will also build on and extend partnerships internationally including collaboration with Smart Data Research UK, Data Donation projects in Europe and the National Internet Observatory in the US.

Capability 2

237 Humanities, Arts and Social Sciences Faculty, The University of Queensland - HASS NCRIS capability -- A new HASS NCRIS capability would support research and researchers addressing national science and research priorities. This will require new investment to: - enhance current focus areas of the HASS&l RDC; - build capability including further linkage between Government (e.g. ABS) and non-government research infrastructure with relevant NCRIS capabilities (e.g. ARDC, PHRN); and - develop new infrastructures through Improving Indigenous Research Capabilities (IIRC), the Australian Internet Observatory, Australian Creative and Historical Futures (ACHF), the Social Sciences Research Infrastructure Network (SSRIN), and Language Data Commons of Australia (LDaCA). In generative AI, the Australian Internet Observatory, SSRIN, and LDACA are already shaping tools and technologies to build sovereign capability and shape national sovereign capability, by testing offline capabilities to work in controlled environments and pressure test generative AI tools and AI-augmented research workflows. This work expands demand for high performance computing (HPC), training and support, and workforce development. Digital infrastructure plus AI technologies, generative AI and large language models (LLMs) will move us from statistical and computational analytics and empirics towards models, synthetic populations, and simulation. As well as analysing existing cultures, societies, social systems, structures, institutions and behaviours, we will be able to simulate and model these entities. The critical capabilities for this are local and national sovereign AI models built and trained on appropriate data for Australia. We also need secure offsite test environments to ensure cybersecurity, and support social licence, public and community acceptance, especially as we build models and synthetic data from increasingly rich digital traces of real human populations in time and space. In the future, understanding underlying social, cultural, and economic structures and how they shape policy, institutional design, behaviour change, and adoption will require different types of data - in terms of human behaviour, diverse languages, social interactions, cultural collections, community outreach, institutional and government assets - at different scales.

Capability 3

210 AHA - Indigenous RDC, National Research Collections Infrastructure Capability, Integration and Coordination Capability across HASS.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Digital Cultures & Society Research Infrastructure Network
An evidence-based understanding of digital culture and society requires a strategic network of organisations, infrastructure, data and tools to ensure Australian researchers and policymakers can respond effectively to rapidly changing online and physical environments. We propose an enhanced capability for the Australian Internet Observatory

to develop a Digital Cultures & Society Research Infrastructure Network. The NRI system has struggled to connect research and infrastructure across HASS, GLAM and STEM investments with many aspects of the system remaining siloed, limiting productivity and innovation. We need to invest in a capability to develop strong links between digital research and research infrastructure such as the Australian Internet Observatory, the Australian Urban Research Information Network (AURIN), RMIT Urban Dynamics facility, the Atlas of Living Australia, the Australian Research Data Commons, Indigenous data and cultural collections, and various other NRI and GLAM institutions in health, environment and technology.

A national Digital Cultures & Society Research Infrastructure Network (DCAS RIN) led by an experienced team of researchers and infrastructure experts from across humanities, social and computer sciences would provide the step-change needed to respond to social, environmental and technological change and drive innovation and research translation across the research and NRI system. The DCAS RIN would engage across education, industry, government and civil society sectors to develop new access mechanisms, research methods and tools, deliver skills and training, and respond to legal and ethical issues for connecting digital social data.

The DCAS RIN would support research and policy capacity, pilot the use of new data sources, and support cross-disciplinary and cross-sector collaborations through:

* National collaboration hub providing strategic leadership and coordination across disciplines, sectors and NRI facilities to facilitate and leverage national and international partnerships for social data and digital platform NRI
* Digital society research and policy strategy to transform the way digital platform and smart data is accessed, managed and regulated
*Dataspaces and governance program to expand data sharing and support safe and responsible digital platform research and adoption of FAIR and CARE practices and interoperable data schemas and dataspaces
*Digital capability uplift via skills and training programs in digital methods for research and policy applications
Cloud and HPC strategy and software incubator supporting innovation in data access and analysis including AI tools

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Mon, Dec 8, 2025, 04:22 PM Australian Eastern Daylight Time
[ID: sbm399281fb72874b1789f7c]

Title
Prof

First Name
Bradley John

Last Name
Evans

Organisation
The University of New England

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
1. A National Airborne and Hyperspectral Imaging Facility, aligned with and building on UNE ASPIRE – National Airborne Hyperspectral and LiDAR Research Facility as a proposed new NCRIS capability, to fill the gap between UAV and satellite EO and to support calibration/validation of global hyperspectral satellite missions and high resolution monitoring for national priorities. UNE proposes UNE ASPIRE – National Airborne Hyperspectral and LiDAR Research Facility as a new NCRIS capability. ASPIRE addresses a critical national gap in high signal to noise airborne hyperspectral, LiDAR and thermal observations that bridge UAV and satellite scales and support calibration and validation of upcoming global hyperspectral satellites (e.g. Carbon Mapper, Tanager 1, NASA SBG). As an open, multi user NCRIS facility, ASPIRE would integrate field and greenhouse hyperspectral (via the New England Greenhouse Hub and industry partners such as Costa) and an airborne and satellite data and feed AI enhanced Earth system models (including CLIMA like approaches). In the short term (0–2 years), ASPIRE will leverage an initial NASA led campaign with NASA JPL and CSIRO and establish calibration/validation sites, including on Anaiwan Country. Over the medium term (2–5 years), ASPIRE would mature into Australia's peak hyperspectral imaging body, supporting research, government and industry across climate, carbon, agriculture, biosecurity and water, and enabling Indigenous led monitoring of Anaiwan food bowls and other biocultural landscapes for long term benefit sharing. The Facility could be hosted at UNE and led scientifically by Professor Bradley Evans, working with a strong national consortium.

2. A National Earth Observation and Modelling Integration Facility, aligned with and building on existing NRIs (TERN, IMOS, ARDC, NCI, AuScope) and proposed capabilities such as UNE ASPIRE – National Airborne Hyperspectral and LiDAR Research Facility as a new

NCRIS capability, to connect observations and models and support advanced, including AI-enabled, Earth system modelling for national priorities. This Facility would be strongly complementary to Geoscience Australia's Survey Q35 proposal for enhanced EO infrastructure around Landsat Next, by providing the national integration, R&D and training layer that links long-term satellite land imaging (including Landsat Next), airborne EO (e.g. high-SNR hyperspectral from ASPIRE), novel EO sensors, and in situ networks to high-performance computing and both physics-based and AI-based Earth system models. As an open, multi-user NRI capability, it would deliver standardised data and metadata services, data assimilation pipelines, model-coupling frameworks, and R&D testbeds for new EO sensors and algorithms, as well as teaching and workforce development platforms in EO and Earth system modelling and a summer school open to all. In the short term (0–2 years), the Facility would focus on co-design, governance, technical architecture and pilot integrations across a small number of priority domains (e.g. carbon and water), working with a national consortium of universities and agencies (for example Curtin, RMIT, UQ, UNE, Geoscience Australia, BoM and CSIRO). Over the medium term (2–5 years), it would deliver routine national reanalyses, forecasts and scenario products, and operational AI-enhanced Earth system models (including CLIMA-like approaches), directly usable by research, government and industry. Impacted communities would include climate and Earth system scientists, hydrologists, ecologists, agricultural and marine researchers, EO and sensor-development groups, data and AI researchers, Commonwealth and state environment, climate, water and agriculture agencies, emergency management, and sectors such as agriculture, resources, energy, insurance and finance, as well as Aboriginal and Torres Strait Islander communities able to connect Indigenous-governed observations (including ASPIRE's monitoring of Anaiwan food bowls and other biocultural landscapes) to national-scale environmental information for on-Country decision-making and long-term benefit-sharing. The Facility could be hosted at UNE and led scientifically by Professor Bradley Evans, working with a strong national consortium.

3. An Aboriginal and Torres Strait Islander Peoples Research Data Commons with Indigenous led governance and strong technical and governance linkages to discipline NRIs.

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Mon, Dec 8, 2025, 04:20 PM Australian Eastern Daylight Time
[ID: sbm398ee2ff90a69f7652c44]

Title
Dr

First Name
Merran

Last Name
Smith

In what capacity are you responding?
An individual

Capability 1
195: PHRN. Digital Biobank. A national platform for discovery of and access to biospecimens and related data from across Australia, including from biobanks and cohort studies, is considered a top priority and should be included in the 2026 NRI Roadmap. This would grow Australia's health research ecosystem, coordinating access to valuable research, clinical and administrative data in cost-effective ways and support greater international research collaborations. Relevant responses include those from ABNA, PHRN and the Victorian Cancer BioBank (Responses184, 195 and 202). Other responses also highlight the importance of a more coordinated approach to biobanking. Note that a recent CSIRO study has highlighted/quantified the economic benefit of greater coordination.

Capability 2
189: ASSA. Digitisation of historical births, deaths and marriages records. Digitisation and linkage of historical births, deaths and marriages records as set out in the Academy of Social Science Australia's Decadal Plan for Social Science Research Infrastructure 2024-2033 is also a priority (see Response 189). Australia has not retained historical individual census returns which limits national demographic research. However, Australia's historical vital registration records are amongst the best in the world and can now be cost-effectively transformed and accessible for humanities, social science and health research.

Capability 3
208: SSRIN. Response 208 from SSRIN highlights the importance of greater integration of health and social sciences data, including data available through SSRIN, PHRN and AURIN. This should also be included in the 2026 NRI Roadmap.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

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A new capability to provide access to linked historical population data for demographic, economic, social and health research is a high priority. This can be achieved by the digitisation and linkage of historical births, deaths and marriages records, and linkage of these records to other relevant population data. The importance of this work has been recognised in the Academy of Social Science Australia's Decadal Plan for Social Science Research Infrastructure 2024-2033.

It is now possible to use AI to accurately digitise, link and provide access to historical births, deaths and marriages records, with additional value added by integrating them with other public records including inquests, probate, war service and immigration records, and to other linked population data assets including health, human services and cohort study data.

A proposal known as ARCHER (after Victoria's first Registrar of Births, Deaths and Marriages, William Henry Archer) has been developed to progress this work. The project would be undertaken in close collaboration with state Registrars of Births, Deaths and Marriages, jurisdictional and national data linkage and linked data asset managers, and data users.

Queensland and Victorian have high quality historical births, deaths and marriages records and the initial focus would be on these records. The medium-term goal would be to digitise, link and enable access to historical births, deaths and marriages records from all Australian jurisdictions.

Research communities across Australia including in the social sciences, health, longitudinal surveys and cohort studies areas would benefit. The investment would deliver a world-class data asset and would also be of international research interest.

A realistic timeframe for ARCHER is 3-5 years.

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Mon, Dec 8, 2025, 04:17 PM Australian Eastern Daylight Time
[ID: sbm39927d773b875a8460ca6]

Title
Prof

First Name
Devanshi

Last Name
Seth

In what capacity are you responding?
An individual

Capability 1
159 National Imaging facility

Capability 2
086 Phenomics Australia

Capability 3
169 Phenomics Australia

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.
Building a national resource data capability. USA has a national dbGaP (database of
genotype and phenotype) which is populated from the projects with national funding. This
is a great resource across populations for research, both in silico and clinical, generating
new projects and ideas. Similarly UK Biobank, another resource that has been widely used
and so much rich large scale data has been generated, not to mention international
collaborative research. But both are heavily Biased towards European population.
Australian population is unique with multi-ethnic and indigenous peoples which are largely
under-represented, and under benefitted from medical advances. It will actually benefit
indigenous health by having NRI invest in digital Australian population biobanks integrating
genetic, imaging, phenotypic, and health data across a population sample, offering
researchers secure access under ethical and legal guidelines.
In particular, building a database-biobank recognizing the value of and enhancing the
Indigenous population wellbeing.
National Research Infrastructure should invest in shaping research prioritising prevention
and healthy living, in addition to curing disease. Particularly, future NRI investments must
align with Indigenous Data Sovereignty principles, ensuring Aboriginal and Torres Strait
Islander communities have control over their data.

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Mon, Dec 8, 2025, 04:14 PM Australian Eastern Daylight Time
[ID: sbm39927a2c339fdf12aa016]

Title
Dr

First Name
Markus

Last Name
Herderich

Organisation
The Australian Wine Research Institute (AWRI)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Enhanced capabilities for Bioprocess Scale-up (99, 199, 277) We suggest to consider priority investments into modular fermentation facilities to bridge the gap between laboratory-based systems for R&D and large scale production facilities.   Background: Fermentation is a green manufacturing technology that uses yeast and other microorganisms to produce a range of valuable products, from pharmaceuticals and foods to biofuels, enzymes and fine chemicals. While some companies have been manufacturing fermentation-based products for over three decades, in recent years, 'precision fermentation' has attracted global attention and investment in the production of food ingredients used in vegan dairy and meat alternatives, aroma compounds, lipids and proteins. The biomass fermentation industry has seen a rapid diversification in microbial species, production methods and consumer products. To support translation of research and realise long-term growth, contract manufacturing organisations (CMOs) and innovation in technical capabilities play a crucial role in alleviating manufacturing capacity constraints, especially for early-stage companies working with precision or liquid-biomass fermentation. However, the limited availability of CROs, CMOs and fermenter capacity across all stages of development remains a challenge. To address this gap, there is a case for creating modular fermentation facilities, together with ready access to downstream processing technologies, to bridge the gap between laboratory-based systems for R&D and large scale production facilities. These would connect with existing NRI capabilities (cf IDEA Bio, Metabolomics Australia) to enable monitoring and evaluation of fermentation processes and products. In addition, brownfield development and retrofitting existing equipment have the potential to reduce up-front capital expenditure by more than 70 percent and significantly shorten construction lead times. In this context, it's worth noting that a large volume of fermentation capacity across Australian wineries is currently underutilised, proving an opportunity for developing diversified fermentation infrastructure and capability.

Capability 2
Nuclear magnetic resonance spectroscopy network (68, 71, 98, 128, 238) Australia's scientific landscape lacks a unified national capability for Nuclear Magnetic Resonance (NMR), a cornerstone of modern research. NMR unlocks molecular insights critical to chemistry, materials science, and biomedicine—from imaging and phenotyping of complex systems to the characterisation of biomacromolecules in solution, drug design and renewable materials. A national NMR network (perhaps developed as a hub and spokes model similar to Metabolomics Australia or Microscopy Australia) would support advances in many nationally critical areas of research including biomedical, environmental, agri-biotech, and traceability and authenticity of materials. Primary focus of a nationally organised NMR capability would be to facilitate access to high-field instruments and dedicated staff for pulse sequence development; to support development and uptake of emerging approaches and technologies for characterisation of solids, macromolecules and complex mixtures; and to foster cross-disciplinary breakthroughs through creating multi-disciplinary teams with deep domain expertise in physics, chemistry and structural biology. Such NMR-NRI capability would be designed to augment and complement the existing (limited) NMR infrastructure available through the National Imaging Facility and Metabolomics Australia. Notably, the objective of such NMR spectroscopy network would not be to replace ageing research infrastructure already in place for institutional research support.

Capability 3
Artificial Intelligence: AI-enhanced data systems and research ecosystem (51, 79, 89, 96, 126, 169, 176, 219, 263, 276, 283) Artificial Intelligence, in the form of machine learning and generative AI, offers transformative improvements and novel insights from increasingly complex, multi-modal and scaled data, across a broad range of applications, domains and fields. The prospect of improved analytics combined with a vastly improved ability to describe, relate, compare and re-use the enormous holdings of life science, environmental, and societal data will result in significant productivity enhancements and turn-around-times through automation of data handling and recalling knowledge from prior experiments and the vast scientific literature. The mid- to long-term benefits from AI deployment beyond productivity enhancement include deep learning through re-discovery of existing data sets; functional annotation of large, potentially multiplexed datasets; and predictive modelling of complex biological, environmental and social systems.   Notably, opportunities from AI development and deployment are not limited to life sciences, environmental and biomedical research, but also encompass the humanities and social sciences. What is common across all domains is the need for advanced, integrated cybersecurity approaches, to ensure that AI-built knowledge bases can be independently verified and retain their trustworthiness.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
We have no additional suggestions for priority NRI investments at this stage.

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Mon, Dec 8, 2025, 04:07 PM Australian Eastern Daylight Time
[ID: sbm39927460d3cc363a0a2ad]

Title
Dr

First Name
Michael

Last Name
Banazis

Organisation
Western Australian Department of Energy and Economic Diversification

In what capacity are you responding?
A representative of an organisation or group

Capability 1
200_Roadmap Survey_ Sydney Informatics Hub, Core Research Facility, Office of PVC-RI, The University of Sydney

Capability 2
140_Roadmap Survey_ Geoscience Australia

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Human and non-human biobanking infrastructure
Multiple responses to the initial 2026 NRI Roadmap Consultation Survey are relevant, including in terms of infrastructure, but all appear to be restricted to human biospecimens. Therefore, a 'new' response was submitted.
Lots of small biobanks create inconsistency and reduce ability for broad access and use of samples. A national approach to biobanking would support better integration of current collections (including databases, i.e. digital biobanking) and allow more comprehensive research studies (including multi-omics and imaging analysis of samples along the lines of the UK Biobank) and clinical trials.
The above suggestion aligns with Action 3.6 of the Action Plan of WA's 10-year Science and Technology Plan (Physical and digital infrastructure Strategic Action Area).

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Mon, Dec 8, 2025, 04:06 PM Australian Eastern Daylight Time
[ID: sbm399272e09ee1968fa05e4]

Title
Prof

First Name
Richard

Last Name
McDermid

Organisation
Astronomical Society of Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Astronomy research priorities are fully described by the community's 2026-2035 Astronomy Decadal Plan, published by the Australian Academy of Science's National Committee for Astronomy. This is a comprehensive 10-year plan describing the broad needs of astronomy research, including NRI needs, and the role of astronomy research in growing the STEM workforce and powering research translation. Aligned capabilities are explicitly or implicitly referenced in multiple survey responses, including: #026, #089, #130, #168, #191, #268, #270, #275, #279, and #283. Prompted by this feedback, we strongly support alignment of NRI with the astronomy Decadal Plan needs, which provides an even broader community consensus on major investment needs for national astrophysics research.

Capability 2
#259 refers to potential dedicated instrumentation investment in astronomy, which is a key part of the Astronomy Decadal Plan. This connects with other astronomy instrumentation-related suggestions (e.g. #267, #279, #280). While not addressing Q35 explicitly, the submission from #273 provides a complete submission around astronomical instrumentation, which aligns with the overall need for either dedicated NRI or otherwise resourced instrumentation investment in astronomy.

Capability 3
Enhanced data and software capabilities for astronomy (with potential cross-over to other research areas) are mentioned by multiple respondents (#191, #263, #283). This could take the form of a distributed yet centrally coordinated data platform, starting with astronomy and extensible to other domains. This is more than just data centres. It would provide federated catalogue, metadata and provenance services; FAIR/CARE compliance. server-side reproducible science workflows, and scalable query capabilities. A crucial

component is the associated infrastructure workforce, comprising research software engineers and data engineers embedded with the platform.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Reflecting the needs above, and those articulated in the astronomy Decadal Plan, new or enhanced NRI investment/capabilities in supporting Australian astronomy's national observatory infrastructure (e.g. a gravitational wave observatory), astronomy- and space-related instrumentation, large-scale research data capabilities, and high-performance computing needs are essential for maintaining our global impact in this cutting-edge physical science research. We strongly support alignment of NRI investment with the astronomy Decadal Plan.

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Mon, Dec 8, 2025, 04:02 PM Australian Eastern Daylight Time
[ID: sbm39926f9294cc1e4748597]

Title
Dr

First Name
Wayne

Last Name
Ng

Organisation
Victorian Cancer Biobank Consortium

In what capacity are you responding?
A representative of an organisation or group

Capability 1
202 Victorian Cancer Biobank, biobanking as critical research for health and medical research require long term investment and national coordination to maximise the potential of biosamples and associated data through access and sharing to advance scientific research.

Capability 2
59 Phenomics Australia, biobanking as critical research for health and medical research require long term investment and national coordination to maximise the potential of biosamples and associated data through access and sharing to advance scientific research.

Capability 3
189 Australian Biospecimen Network Association, biobanking as critical research for health and medical research require long term investment and national coordination to maximise the potential of biosamples and associated data through access and sharing to advance scientific research.

224

Mon, Dec 8, 2025, 04:00 PM Australian Eastern Daylight Time
[ID: sbm399137434dccd866a3d5c]

Title
Dr

First Name
Luke

Last Name
Hendrickson

Organisation
Australian Bureau of Statistics

In what capacity are you responding?
A representative of an organisation or group

Capability 1
185_Roadmap Survey_ Institute for Social Science Research

Capability 2
051_Roadmap Survey_ Phenomics Australia

Capability 3
116_Roadmap Survey_ Atlas of Living Australia

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
ABS integrated data infrastructure is a critical and unique part of the integrated data ecosystem, providing a platform for safe access to government administrative data enriched through linkage that covers all Australians, households, communities and Australian businesses over the last 20 years. According to the Australian Centre for Evaluation, integrated data is a powerful tool for impact evaluation. ABS integrated infrastructure enables researchers to analyse millions of de-identified records over time, uncovering the social, cultural, developmental, and environmental drivers of individual and community health and wellbeing, and identifying scalable improvements. An emerging priority for NCRIS investment should therefore be the development of ABS integrated data infrastructure to:

- Build the capability of the research workforce to work with integrated data infrastructure and design communities of practice that support collaboration around this infrastructure.

- Remove financial obstacles for researchers, targeting early career researchers and strategic policy areas such as Closing the Gap, social determinants of healthcare and disease, preventative health, aged care, disability, housing affordability and labour productivity.

This investment will help Australia unlock the full value of its data, improve public services, and support world-class research. It will also attract global talent and train the next generation of researchers. This is a unique opportunity for supported researchers to bring a national scale to their quantitative research.

The ABS DataLab already supports machine learning to manage big integrated data. Investment paves the way for the establishment of AI support services in the DataLab. The service will help new researchers easily find pre-existing work to save time and effort, and to bring researchers together over an open science platform.

ABS integrated data infrastructure already operates at the international scale and is discoverable through the ABS and other websites. Approved researchers can access remotely through cloud services. Investment in this infrastructure delivers on the Australian Government Data and Digital Strategy's 2030 Vision by optimising the user experience, reducing costs and enabling easier access to Australian Government data. This investment will prioritise early- to mid-career researcher access; foster multi-disciplinary collaboration between the university research sector and government; and prioritise high priority policy research, particularly impact evaluation. ABS integrated data infrastructure supports all research disciplines.

The ABS has recently opened the ABS Datalab to international organisations and researchers from other countries. High profile researchers from the University of Chicago, Erasmus University Rotterdam, Massachusetts Institute of Technology, New York University, London School of Economics and the Organisation for Economic Cooperation and Development currently use the rich integrated data infrastructure available. International researchers are hampered by a lack of understanding of specific Australian contexts and limited by the metadata available in the DataLab. Through collaboration and open science, this program will advance international engagement and strengthen international research on local issues using local data.

Investment over 2028-2032 is required to:

1. Fill key data gaps in the life course of Australians and Australian communities through ABS integrated data infrastructure. This includes developing a capability to merge qualitative data resources with the quantitative to support multi-disciplinary and collaborative research.

2. Provision affordable access to integrated data infrastructure that builds social scientists' capability to connect their research to current policy issues through collaboration and connected government administrative data at the person- and community-level.

3. Develop AI capabilities within the secure ABS environment to support the productive use of the infrastructure, including merging digitised qualitative data on Australian stories with quantitative analysis of Australian demographics and social trends.

4. Offer a range of infrastructure access arrangements that meet both baseline privacy and ethics requirements as well as supporting broader non-academic community access.

223

Mon, Dec 8, 2025, 03:30 PM Australian Eastern Daylight Time
[ID: sbm3992520404e102ba14a8d]

Title
Prof

First Name
Janeen

Last Name
Baxter

Organisation
ARC Centre of Excellence for Children and Families over the Life Course

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
A specific Social Sciences Research Infrastructure that is separate to the Australian Research Data Commons (ARDC) and more like the Population Health Research Network.

This would act in support of the ASSA Decadal Plan 2024-33 and provide the Australian Social Sciences with a platform to do better science by accessing more and better research data under better governed and curated data sources for ethically approved research purposes. It would also help the social sciences move further towards the standard of research and evaluation we see in the health sciences. In Australia, medical research and social sciences research are separated by structural funding barriers (NHMRC and MRFF vs ARC). Medical trials are conducted under standards of governance and rigour beyond what most social science projects can aspire to. It's time for the social sciences to step up to better standards of research.

219

Mon, Dec 8, 2025, 03:11 PM Australian Eastern Daylight Time
[ID: sbm399240c2b2e106923210d]

Title
Prof

First Name
Christopher

Last Name
Armstrong

Organisation
University of New England

In what capacity are you responding?
An individual

Capability 1
224 University of New England

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
UNE proposes ASPIRE – National Airborne Hyperspectral and LiDAR Research Facility as a new NCRIS capability. ASPIRE addresses a critical national gap in high signal to noise airborne hyperspectral, LiDAR and thermal observations that bridge UAV and satellite scales and support calibration and validation of upcoming global hyperspectral satellites (e.g. Carbon Mapper, Tanager 1, NASA SBG). As an open, multi-user NCRIS facility, ASPIRE would integrate field and greenhouse hyperspectral systems (UNE) with airborne and satellite data and feed AI enhanced Earth system models (including CLIMA like approaches). In the short term (0–2 years), ASPIRE will leverage an initial NASA led campaign with NASA JPL and CSIRO and establish calibration/validation sites. Over the medium term (2–5 years), ASPIRE would mature into Australia's peak hyperspectral imaging body, supporting research, government and industry across climate, carbon, agriculture, biosecurity and water, and enabling Indigenous led monitoring of food bowls and other biocultural landscapes for long term benefit sharing.

217

Mon, Dec 8, 2025, 02:54 PM Australian Eastern Daylight Time
[ID: sbm3991171cf5e581238031a]

Title
A/Prof

First Name
Christopher

Last Name
Marquis

Organisation
University of NSW

In what capacity are you responding?
An individual

Capability 1
099 IdeaBio

Capability 2
277 Cellular Agriculture

Capability 3
282 Ryall et al

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Biomanufacturing capacity is growing in Australia, however there are gaps. At the small scale, accessible infrastructure for recombinant products manufacture exists at UNSW (Recombinant Products Facility), UQ (NBF, PEF, IdeaBio), CSIRO. Options for pilot to manufacturing scale are more limited. Accessible production capacity in the range of 100-1000L remains a gap, particularly for production in the non-therapeutic space (biomass, enzyme etc). Also, the skilled workforce to operate and run such facilities (both GMP and non-GMP operations).

216

Mon, Dec 8, 2025, 02:51 PM Australian Eastern Daylight Time
[ID: sbm3991de5a00e58eeea07ea]

Title
Prof

First Name
Melanie

Last Name
Swalwell

Organisation
The Australian Emulation Network

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Repeated from Q11: It's pleasing to see that the submission from the Australian Creative
Histories and Futures highlighted the Australian Emulation Network (which they regard as
"impressive"), noting that if it were supported by significant national research
infrastructure it could become so much more [211_Roadmap Survey_Australian Creative
Histories and Futures]. The AusEAASI network will need to transition from LIEF grant
funding in 2027. With appropriate support, it could scale up to service all universities,
research organisations, and the GLAM sector.

215

Mon, Dec 8, 2025, 02:48 PM Australian Eastern Daylight Time
[ID: sbm398fca2558f052661b15a]

Title
Prof

First Name
Marcia

Last Name
Langton

Organisation
The University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
ID 35 - 255: Indigenous Research Data Commons Rationale: Rationale: This capability is crucial for supporting and elevating Aboriginal and Torres Strait Islander knowledge systems, and aligns directly with Australia's National Science and Research Priorities. The proposed infrastructure would provide a secure, culturally appropriate platform for managing and sharing Indigenous data, implementing both FAIR and CARE principles. It would enable Indigenous-led research, support Indigenous Governance, and facilitate the integration of Indigenous knowledge with other research domains. This commons could significantly enhance research translation and policy development in areas such as land management, health, and cultural preservation.proposal for an Indigenous Research Data Commons; Rationale Proposed infrastructure capability: Aboriginal and Torres Strait Islander Research Data Commons (ATSIRDC) Indigenous research data is located across all academic disciplines, including health and medicine, environmental science and ecology, social sciences, law and policy, arts and humanities, education and technology and innovation. Given its breadth, it is inherently interdisciplinary and intersects with all research communities across Australia. A new National Research Infrastructure (NRI) capability focusing on scaling up the Indigenous Data Network's ARDC HASS&I 'Improving Indigenous Research Capabilities (IIRC)' project is critical for recognising, securely storing and effectively and appropriately utilising the wealth of Aboriginal and Torres Strait Islander data for research, policy-making, and cultural preservation. Led by Distinguished Professor Marcia Langton, a descendant of the Yiman and Bidjara nations, The IIRC project is a critical initiative aiming to build the capacity of Indigenous research data communities by developing and improving access to secure, culturally appropriate data management tools and platforms that enable more effective management, sharing and protection of Indigenous data in alignment with Indigenous data governance principles. The project has made significant advances to foster collaboration between Indigenous communities, researchers and other Indigenous data custodians, providing essential training, resources, and tools to strengthen Indigenous participation in research. Despite its achievements,

the IIRC project lacks the scale and investment required to address the extensive needs of Indigenous data communities across Australia. To support Indigenous data governance, protect cultural heritage, and integrate Indigenous knowledge into research, significant investment in long-term research infrastructure is required. This includes dedicated resources for managing, protecting, and sharing Indigenous data to facilitate large-scale research, policy development, and community-driven initiatives. Such investment is essential to meet growing demands for digital infrastructure, data security, cultural protocols, and supporting Aboriginal and Torres Strait Islander communities to maintain control over their knowledge. To appropriately scale the IIRC project to a new NRI capability would require four years, enabling collaboration across disciplines and Indigenous data communities, testing and iterative development. This timeframe would support the development and implementation of a data commons that is robust, secure and capable of embedding Indigenous data governance whilst promoting Aboriginal and Torres Strait Islander self-determination and cultural integrity. Professor Langton and the Indigenous Data Network would be pleased to elaborate on our survey responses and offer further advice to the Department of Education. ID 35-12: Translational Research Infrastructure Network

Capability 2
ID 35-13: National Biobanking Infrastructure for Infectious Diseases; Rationale: A coordinated national biobanking infrastructure would enable large-scale collection and sharing of biological samples and associated data across research disciplines. This could accelerate discoveries in managing infectious diseases on a population wide scale and also have beneficial effects on health outcomes by providing researchers access to high-quality, well-characterised samples. The existing fragmented biobanking landscape limits sample sharing and collaboration. A national infrastructure could implement standardised protocols, improve sample quality and accessibility, and facilitate participation in international consortia.

Capability 3
ID 35-7: Integrated Earth System Modelling Infrastructure   Rationale: Rationale: An integrated earth system modelling infrastructure presents significant opportunities for incorporating Indigenous ecological knowledge into environmental research and management. This capability could support research that combines traditional knowledge with modern scientific approaches in areas such as climate change adaptation, land and water management, and biodiversity conservation. By ensuring Indigenous involvement in its development and use, this infrastructure could facilitate a more holistic understanding of Australia's ecosystems and support more effective, culturally appropriate environmental policies.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

214

Mon, Dec 8, 2025, 02:38 PM Australian Eastern Daylight Time
[ID: sbm399222e7fce577fa5e340]

Title
Ms

First Name
Julie

Last Name
Rothacker

Organisation
ACU

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Biometric Laboratories

Capability 2
8.   Uplifting digital Humanities and Social Sciences capabilities

Capability 3
A collaborative, AI-enhanced research ecosystem that advances Australian life-science across disciplines, from healthcare to biodiversity, ecology, and agriculture, enabling researchers to address complex challenges and contribute to societal and environmental wellbeing. Bioplatforms

212

Mon, Dec 8, 2025, 02:26 PM Australian Eastern Daylight Time
[ID: sbm3991b0a4cbe5f9b022797]

Title
Mr

First Name
Heath

Last Name
Marks

Organisation
Australian Access Federation

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Response 255: Indigenous Data Network - Aboriginal and Torres Strait Islander Research Data Commons (ATSIRDC). Rationale: This proposal exemplifies genuine collaboration and Indigenous data sovereignty. Led by Distinguished Professor Marcia Langton, it prioritises co-design with Indigenous communities, researchers, and data custodians to create culturally appropriate infrastructure for managing, protecting, and sharing Indigenous data. The proposal spans all research disciplines—including health, environmental science, social sciences, law, HASS, education, and technology—demonstrating true cross-sector reach. Critically, it embeds Indigenous data governance principles and self-determination, requiring four years of collaborative development and iterative co-design. This infrastructure addresses the urgent need for secure, culturally appropriate frameworks that enable Indigenous communities to maintain control over their knowledge while supporting research, policy-making, and cultural preservation. The trust and identity requirements for this capability are foundational—requiring authentication and authorisation frameworks that respect Indigenous protocols and enable appropriate access controls across institutions.

Capability 2
Response 195: Population Health Research Network - Australian Biobank and Integrated Clinical Data Rationale: This proposal demonstrates comprehensive federated architecture for sensitive health data across multiple jurisdictions and institutional types. The Australian Biobank would integrate genomics, imaging, clinical, and population data whilst incorporating existing NCRIS capabilities and institutional infrastructure. Significantly, the proposal emphasises "good governance including strong stakeholder engagement" as critical to success, with privacy-preserving approaches to data linkage across all Australian jurisdictions. The infrastructure supports researchers investigating common health conditions, rare diseases, precision medicine, infectious diseases, and population health— engaging academia, health services, government agencies, and the medical products

sector. The PHRN's existing state and territory data linkage infrastructure provides proven foundations for scaling. This capability requires robust trust frameworks to enable researchers to access linked clinical data across institutional and jurisdictional boundaries whilst maintaining privacy, consent, and ethical governance—precisely the authentication and authorisation infrastructure that underpins secure, federated research collaboration.

Capability 3

Response 208: Social Science Research Infrastructure Network (SSRIN) - Data Discovery, Integration and Policy Evaluation Infrastructure Rationale: This proposal addresses critical cross-sector collaboration needs for HASS data, emphasising improved discoverability and usability of public sector social science data. The infrastructure facilitates data integration across government agencies, academia, and private business, supporting evidence-informed policy decisions and program evaluation. Importantly, SSRIN proposes capability-building programs for researchers across domains and multidisciplinary projects, fostering "collaborative community connecting researchers" with shared best practices. The proposal explicitly addresses real-time data integration and data-sharing agreements across sectors and jurisdictions—essential for government investment decisions. Working in collaboration with the Australian Bureau of Statistics, SSRIN demonstrates partnership between research infrastructure and government statistical agencies. This infrastructure enables researchers to access integrated administrative data for policy evaluation whilst maintaining appropriate privacy protections—requiring sophisticated identity and access management frameworks that enable role-based access, time-limited credentials, and audit trails across organisational boundaries.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

There is a need for NCRIS to continually respond to global technological and societal shifts for cyber security and trusted identity access.

For researchers, the models enabling trusted access (T&I) to research infrastructure is changing rapidly. Globally, governments are investing in the implementation of new privacy and digital identity legislation to protect citizens and enable cross sector collaboration with government.

Current technology and infrastructure approaches risk becoming obsolete, leaving Australia's NDRI isolated if it fails to keep pace with global standards and innovation in areas such as AI and emerging quantum computing. Achieving alignment will require sustained collaboration with international partners, industry, and government to develop new standards and technologies over time.

Without appropriate investment there is a risk that global research collaboration and interoperability will be negatively affected. New models need to align with the evolution of T&I where NDRI will enable the researcher to be more in control of their own identity (e.g. research passports, digital wallets, privacy preserving credential management) rather than relying on the organisation they are associated with. Investment in responding to these emerging technological and societal shifts will ensure that our research and enabling infrastructure access methods remain globally aligned.

Investment to build and maintain partnerships with industry and government and participate with national digital identity efforts (such as the Australian Government Digital ID System (AGDIS), Verifiable Credentials) and global working groups focused on next generation T&I technologies, frameworks and standards.

Critical prototyping, incubation and flagship programs of work need to be undertaken with stakeholders to co-design new technologies and standards and ensure that they are fit for purpose for the Australian context.

Significant engineering and policy work needs to be undertaken to augment the current T&I frameworks and to build upon and support the services delivered to NCRIS to ensure that the current T&I assets do not become obsolete.

210

Mon, Dec 8, 2025, 02:19 PM Australian Eastern Daylight Time
[ID: sbm3992119adee1d90ac0ea1]

Title
Prof

First Name
Pascal

Last Name
Perez

Organisation
AURIN

In what capacity are you responding?
A representative of an organisation or group

Capability 1
#94 - AUCRI - Australian Urban Climate Research Infrastructure. Establishing a crucial
National Digital Research Infrastructure (NDRI) to inform evidence-based urban policies
and interventions aimed at future proofing urban and infrastructure systems against
climate change. AUCRI will position Australia as an international scientific leader in the
field and optimise our investment in climate adaptation in Australian cities. AUCRI will
federate five NCRIS facilities (AURIN, ACCESS-NRI, TERN, PHRN and ARDC), two ARC
Centres of Excellence (Climate Extremes and Weather of the 21th Century) and two
publicly funded research agencies (CSIRO and BoM). AUCRI will need to integrate Tier 1,
Tier 2 and Cloud computing capabilities. AUCRI will address emerging research directions
associated with Challenge #2, #5, #6 and #7, as well as NSRP #1, #2 and #5.

Capability 2
#94 - AUMRI - Australian Urban Mobility Research Infrastructure. become a global leader in
automated and zero or low-emission transport, freight and logistics sector by harnessing
emerging technologies at scale and harmonising data sharing between jurisdictions, as
well as academic, public and private sectors. AUMRI will advance critical technologies
such as artificial intelligence (AI) and robotics to allow us to transition to net zero in
environmentally responsible ways. AURIN will partner with the National Transport
Research Organisation (NTRO) and RACE 2030 CRC to implement a network of Smart
Mobility Living Labs (SMLLs), in partnership with public and private sectors, and a National
Data Exchange (AUM-DX) that will act as long-term technology testbeds.

Capability 3
#55 - COASTRI - Coastal Australia Research Infrastructure. Over 50% of Australians live
within 7km of the coast, relying on coastal areas for lifestyle, culture, and livelihoods.
Coastal regions are also a focal point of climate change impacts where compounding

effects of sea level rise, human-induced habitat loss and ecosystem damage are felt. There is a need for a national, coordinated, cohesive Coastal Research Infrastructure (CoastRI) to support research to understand and predict coastal change. CoastRI is designed to inform planning and decision-making by governments, industries, and others to increase the resilience of our society to future change. There is a need for developing a coherent, safe and collaborative data exchange (COAST-DX) that informs human activities occurring in or having impact on coastal environments, such as key urban, population and economic dynamics, including land use planning, industry operations and infrastructure services.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

206

Mon, Dec 8, 2025, 12:46 PM Australian Eastern Daylight Time
[ID: sbm3991bc01abe1e43ff91b9]

Title
Prof

First Name
Michelle

Last Name
Watt

Organisation
The Univerity of Melbourne - Plants for Space Centre of Exccellence

In what capacity are you responding?
A representative of an organisation or group

Capability 1

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Enhanced Role of Ultra-High-Field MRI in Plant Research

Ultra-High-Field (UHF) MRI (7T) provides a unique insight into the inner life of plants, enabling Australia to build a globally distinctive plant imaging capability that directly supports the Plants for Space (P4S) mission and the National Imaging Facility (NIF) agenda in advanced phenotyping and sustainable agriculture. The high-resolution capability of 7T MRI can fundamentally transform how root systems, water transport, and metabolism are quantified in different substrates and controlled-environment settings on Earth and in space-simulated systems. Main applications of UHF MRI include:

- Root phenotyping: Traditional root studies rely on destructive excavation methods that provide only snapshots of root architecture and miss critical dynamic interactions with soil. UHF MRI enables non-invasive, three-dimensional visualisation of root systems in natural soil substrates at very high resolutions with high Signal to Noise Ratio (SNR) for fine roots, allowing researchers to track root growth, branching patterns, responses to environmental stresses and also creating mathematical/numerical models for digital plant phenotyping.

- Quantifying water transport: UHF MRI can non-invasively quantify xylem and phloem flow and water distribution in living plants. This capability can demonstrate how plants allocate water resources under different environmental conditions.

- Mapping metabolites: UHF MRI and MR spectroscopy enable non-invasive mapping of metabolite distribution and accumulation in plants, providing critical insights for bioresource production and food security applications. This capability is particularly valuable for the P4S mission to create "complete nutrition" plants and on-demand bioresource production systems. The high resolution images of UHF MRI can be used to 1- track the spatial distribution of nutrients (proteins, lipids, etc), 2- monitor dynamic changes in metabolite concentrations during plant development and stress responses and 3- localise the engineered compounds in modified plants designed for pharmaceutical production and delivery required in the Plants for Space project.

The UHF MRI capability would position Australia as a global leader in plant imaging technology, with direct applications to national priorities in agricultural innovation, food security, and sustainable resource management. This infrastructure would generate economic returns through improved crop varieties, new plant-based products, and enhanced agricultural resilience to climate change.

Connection to Plant for Space Centre of Excellence

The ARC Centre of Excellence in Plants for Space (P4S) is a 7-year initiative aiming to enable space habitation and develop technologies for on-Earth sustainability. P4S explicitly identifies the need for advanced imaging technologies to achieving its goals. P4S Program 3 (Processes) focuses on creating "Digital Twins" of plant production systems, emphasising the national goal for digital phenotyping infrastructure. Another key P4S objective is to redesign root systems to reduce energy waste and increase harvest index. This requires non-destructive root phenotyping capabilities that ultra-high field MRI (UHF MRI) can provide. Real-time tracking of water movement in living plants through UHF MRI is equally crucial for advancing root phenotyping science.

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Department of Education

205

Mon, Dec 8, 2025, 12:38 PM Australian Eastern Daylight Time
[ID: sbm3990946b81f094c008450]

Title
Ms

First Name
Julie

Last Name
Ellmers

Organisation
Australian Museum Research Institute

In what capacity are you responding?
A representative of an organisation or group

Capability 1
214_Roadmap Survey_South Australian Museum

Capability 2
116_Roadmap Survey_Atlas of Living Australia

204

Mon, Dec 8, 2025, 12:32 PM Australian Eastern Daylight Time
[ID: sbm3991af4195cc4edae88a8]

Title
Mr

First Name
Chung-Han

Last Name
Tsai

Organisation
Australian National University

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposal for a National Research Instrument Robotics, Automation & Edge Computing Capability (NRIR)
(A cross-cutting capability to modernise, harmonise, and future-proof Australia's research instruments)
Identified Need
Across the National Research Infrastructure (NRI), modern research instruments increasingly depend on automated workflow engines, robotic subsystems, advanced sensors, and real-time on-instrument computing. These components collectively determine precision, throughput, reproducibility, safety, and the ability to perform adaptive, AI-enabled experimentation.

However, Australia currently has no coordinated national capability to support, maintain, upgrade, or standardise these instrument, robotic, sensor, and automation subsystems. Individual NRI facilities and projects manage these systems independently, resulting in duplicated engineering effort, inconsistent safety and interoperability practices, difficulty integrating emerging AI capabilities, and escalating lifecycle costs.

The purpose of NRIR is not to create a robotics research program. Rather, it is to strengthen the automation, robotic control systems, sensor integration, and edge computing frameworks that universally underpin existing NRI instruments and research platforms.

Current State

2026 National Research Infrastructure (NRI) Roadmap Issues Paper Consultation
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1. Instrument robotics, automation, and advanced sensors are now ubiquitous across NRI projects and facilities.
Virtually every major NRI instrument incorporates some combination of robotics and advanced sensing across domains including materials, fabrication, genomics, systems biology, scattering instruments, environmental and marine sensing, and engineering testbeds.

These advanced sensors routinely require robotic positioning, automated calibration, adaptive sampling, and real-time computational support. Sensors are no longer passive devices—they are robotically actuated, automation-driven, and computationally intensive systems.

2. Edge computing is now essential for real-time instrument and sensor operation
Edge computing with advanced AI enables low-latency robotic actuation, anomaly detection, adaptive sampling, sensor fusion, and real-time experiment steering.

3. Supercomputing is essential for model training, simulation, and optimisation
National HPC facilities support large-scale AI model training, digital twins, simulation-informed experiment design, and multi-instrument optimisation loops.

4. Vendor ecosystems remain fragmented
Most instrument and sensor vendors use proprietary control systems, limiting interoperability.

5. Workforce capability is the major national bottleneck
No national framework exists to train or retain hybrid-skilled staff in robotics, sensors, automation, AI, and edge/HPC workflows while retaining current existing NRI workforce.

Proposed Capability: National Research Instrument Robotics, Automation, Advanced Sensors & Edge Computing Capability (NRIR)
1. National Research Instrument Robotics Technical Service
A shared engineering workforce supporting robotic subsystem upgrades, sensor automation, predictive maintenance, safety frameworks, and AI-ready automation pipelines.

2. National Research Instrument Edge Computing Enablement with HPC/Supercomputing Integration
Provides the immediacy needed for robotics and sensor control; HPC/Supercomputers provide scale for AI training and simulation. Includes standardised hardware, safe AI control frameworks, model deployment pipelines, and unified telemetry schemas.

3. National Research Interoperability & Automation Standards (with industry partners)
Establish open robotics and sensor APIs, instrument control open APIs, harmonised telemetry schemas, automation interfaces, and procurement guidelines prioritising openness.

4. National Research Instrument Robotics, Sensors & Edge/HPC Workforce Rotation Program
A national initiative enabling workforce rotation across facilities, skill development, and long-term retention.

5. Distributed NRIR Program Embedded in Existing NRI Facilities

2026 National Research Infrastructure (NRI) Roadmap Issues Paper Consultation
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Ensures relevance, minimal duplication, strong collaboration, and national consistency.

Medium-Term Goals & Timeframe
By 2026 Roadmap release: Recognition of robotics, sensors, automation, and edge/HPC/supercomputers as cross-cutting capabilities.
Within 2–3 years: Deployment of pilot edges, launch workforce program, publish national standards; initiation of vendor negotiations
Within 5 years: National adoption of interoperable, AI-enabled automation frameworks.

Impacted Research Communities
Advanced manufacturing, materials, systems biology, genomics, analytical sciences, environmental sensing, engineering, advanced microscopy, AI, modelling, and multi-modal automation workflows.

Conclusion
Modern research instruments—across every NRI domain—are increasingly defined by the automated, robotic and AI-enabled systems that operate them, and by the advanced sensors that require precise instrument control, automated calibration and operation, adaptive sampling, and real-time computational support.

Without coordinated national investment, data infrastructure, AI sovereign compute, full AI-enabled automation, multi-sensor integration, data fusion as well as NRI facilities' collaborations will remain inconsistent, costly, and vulnerable to vendor lock-in and workforce shortages. Strengthening these subsystems by generic research instrument robotics with high abstraction directly improves reliability, reduces downtime, enhances sensor performance, and extends the life of major instruments.

The proposed National Research Instrument Robotics, Automation, Advanced Sensors & Edge Computing Capability (NRIR) provides a structured national approach to sustaining and modernising these systems, enabling interoperability, real-time AI-driven control, workforce development, and national standards.

Cross-NRI facility collaboration ultimately depends on robust, modern, interoperable automation controls, robotics and sensors within the national research instruments along with supercomputing, cloud computing, edge computing, data infrastructure and domain-specific knowledge and workforce.

Strengthening research instrument robotics, automation, and advanced sensing is essential to ensuring Australia's national research infrastructure remains globally competitive, resilient, and capable of delivering the next generation of scientific discovery.

203

Mon, Dec 8, 2025, 12:29 PM Australian Eastern Daylight Time
[ID: sbm3991368327cc65c7cda5c]

Title
Mrs

First Name
Emily

Last Name
Duggan

Organisation
Translational Research Institute

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
There is a growing need for national capability in advanced translational animal models, including humanised mice and gnotobiotic systems, to support high-quality biomedical research while reducing overall animal use. These models enable controlled microbiome studies, offer a more accurate representation of the human immune system and improve experimental reproducibility, resulting in more clinically relevant data. Yet such capabilities are rare, expensive and difficult for Australian researchers to access, limiting national availability and competitiveness.

Enabling a coordinated, well-resourced national capability would provide reliable access to specialised models, expertise and infrastructure, allowing researchers to generate stronger, more predictive evidence with fewer animals and better support translational research.

202

Mon, Dec 8, 2025, 12:26 PM Australian Eastern Daylight Time
[ID: sbm3991a9a801e5a8d6cc3dc]

Title
Dr

First Name
Mike

Last Name
Hodda

Organisation
Reference Collections Strategy Implementation Working Group of The Subcommittee for Plant Health Diagnostics (SPHD)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051+ others (79, 86, 184) biobanking of all types is really important

Capability 2
147 + others (209, 214, 222 (part) and 225) physical collection infrastructure is needed to underpin muchy other research, particularly in biology

Capability 3
179 + others (218) imaging infrastructure needed for much different biological research

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
An additional priority suggestion is for species discrimination and collection vouchering capability. Such a capability is needed to provide appropriate substantiation for international trade and effectively deal with the vast amounts of material collected for example in biosecurity surveillance. We need not only infrastructure to store biological material, but also to effectively classify it into known and unknown species in a way that is scientifically justifiable. The medium term goals would be to upgrade collection capabilities to appropriately handle and archive the large amounts of material (biosecurity surveillance, e-DNA, image recognition systems etc). Impacted research communities include biosecurity, biodiversity, biodiscovery, pest management, conservation, new crop protection methods, and crop breeding, plus others. Solid, verifiable and justifiable

evidence is required as a basis for most biological research. Timeframe for establishment is 5 years.

199

Mon, Dec 8, 2025, 11:58 AM Australian Eastern Daylight Time
[ID: sbm398909815c8051a41eccf]

Title
A/Prof

First Name
Maggie

Last Name
Nolan

Organisation
AustLit

In what capacity are you responding?
A representative of an organisation or group

Capability 1
AustLit - submission 233. This is the oldest piece of humanities digital research infrastructure in the country. It is mature with a stable data model. It has a large user base and multiple partnerships. With NRI investment, it could be enhanced and made more widely accessible.

Capability 2
To Be continued Database - submission 1. TBC uses Trove to find newspaper fiction and opens up important lines of research inquiry.

Capability 3
Paradesic - submission 7 - hugely important language data

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Mon, Dec 8, 2025, 11:55 AM Australian Eastern Daylight Time
[ID: sbm39913672e3cc976b3c560]

Title
Prof

First Name
Melodie

Last Name
McGeoch

Organisation
Monash University

In what capacity are you responding?
An individual

Capability 1
147_Roadmap Survey_ Mark Adams

Capability 2
091_ Roadmap Survey_ Centre for Ecosystem Science, UNSW Sydney

Capability 3
140_Roadmap Survey_ Geoscience Australia

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Effective disaster response relies on forecasting that integrates information across physical and living environments. For example, flood mitigation, fire management, pest management, biosecurity, emerging infectious diseases of plants and animals, including agriculture and affecting human health, all rely on biodiversity information. The Atlas of Living Australia, IMOS and Bioplatforms Australia all provide foundational information that enables Australia to capitalise on rapid technological advances that now mean we can produce more powerful, more information-rich, and more certain predictions at finer scales.
To benefit from this potential, these historically world-leading infrastructures need to be supported to evolve further to integrate diverse and complex data, drawing on and further developing current data models and standards that enable a powerful degree of interoperability across dimensions of biodiversity (from genomes to ecosystems) and with physical data. Rapid progress has been made in this area internationally, with Australia

playing a significant role. From an efficiency perspective, these infrastructures have the foundation and the expertise to build the needed step change.

Additional investment in these infrastructures is needed, effectively capitalising on the groundwork over several decades, to take advantage of these developments, along with HPC, AI, and remote sensing, in Australia's interest. This capability is essential to ensure quality of life for future generations, and to meet national policy objectives as well as international commitments, such as those of the Convention on Biological Diversity.

As the research community in Australia and internationally moves towards realising the potential of predictive models that draw on the latest technology and that require data integration across climate and biodiversity, including agriculture, up-to-date infrastructure that supports data streams for biodiversity will be essential. Without this, our science and ability to deliver national benefit are falling behind. Investment in and collaboration between biodiversity infrastructures is critical.

197

Mon, Dec 8, 2025, 11:54 AM Australian Eastern Daylight Time
[ID: sbm39918c2590cc1a759c232]

Title
Mr

First Name
Anthony

Last Name
Whalen

Organisation
National Research Collections Australia, CSIRO

In what capacity are you responding?
A representative of an organisation or group

Capability 1
214 - South Australian Museum - National Approach to Biological Collections. Multiple responses in the preliminary 2026 Roadmap Survey conducted earlier this year, including responses 214 (from South Australian Museum), 147 (from Mark Adams) and 179 (from the National Imaging Facility Museums Special Interest Group) have highlighted the importance of mobilising the discoverability of Australia's biological collections. CSIRO's National Research Collections Australia strongly supports this vision and the inclusion of a National Approach to Biological Collections in the 2026 NRI Roadmap. We provide a rationale for our view below, demonstrating through three key infrastructure-enabled examples: Access to biological collections will keep Australia safe Making collections accessible through digitisation The data provided by Australia's biological collections plays an important role across government, industry, and research. As recent work demonstrates (Forbes et al., 2025), natural history collections are uniquely positioned to bridge temporal scales and provide baseline data that spans decades to centuries, making them essential for understanding long-term environmental change and species responses. Much recent effort has been invested in integrating knowledge about the physical specimens held in each collection with -omics data, such as genomics, transcriptomics, and metabolomics alongside environmental metadata and high-resolution imaging to create digital research objects that are fundamental to contemporary research and land management. These integrated datasets enable researchers and land managers to address critical questions about species adaptation, ecosystem function, and conservation priorities, whilst providing government with evidence-based advice on biodiversity conservation, biosecurity threats, and climate change responses. The sector's current digital infrastructure requires additional investment to support growing industry demand and to ensure it can underpin environmental assessment, biosecurity identification, and emergency preparedness across multiple government agencies. Advances in larger biological collections across the country have seen significant progress in digital transformation, demonstrating the potential of integrated collections-based research

infrastructure (e.g., through a centralised data management platform and mobilisation of specimen data, public access to images and genomics information). Building on these foundations, the sector is well-positioned to develop and roll out nationally automated curation systems, digital location services, cross-collection data standards, and machine learning applications for digital trait extraction that will further enhance collections' research capabilities. There is a particular opportunity to support the adoption of these technologies and related infrastructure in smaller collections that service important parts of Australia. "Collections within collections" – 'omic futures In addition to the significant contributions around biodiversity characterisation and enabling data accessibility discussed above, biological collections are an evolving and appreciating asset that provides unique insight and impact to broader research sectors for the benefit of the Australian people. Historical collections provide critical baselines for understanding modern diseases, environmental stressors, and human adaptation. For example, complex diseases driven by gene-environment interactions impose a heavy burden on human and animal health. Addressing these challenges requires innovative research. Using preserved biological material, the emerging field of historical epigenomics links genotypes with phenotypes, yielding valuable insights into genome regulation and elucidating how stressors and contaminants cause gene regulation to malfunction and manifest disease. Importantly, historical specimens in research collections are often the only source of impact-free baseline material to accurately quantify the impact of ubiquitous bioaccumulating contaminants (e.g. PFAS, microplastics, DDT, etc). In such cases, modern samples are unable to provide appropriate contaminant-free controls. Biological collections also have a significant role to play in generating the input data required for pandemic preparedness efforts. Global health authorities named emerging zoonotic disease (pathogens capable of moving from animals to people) as the greatest public health challenge of the 21st Century (World Health Organization, 2020). Most emerging human pathogens are zoonotic, with viral spillover increasing in frequency and severity. Robust predictive models need comprehensive and accurate viral occurrence data spanning space, time, and host taxonomy, but rapidly generating viral occurrence data at scale remains difficult. New molecular technology now allows us to fully explore not only the animal specimens held in biological collections but the microbiome and pathogen load that are co-preserved within these collections, which will rapidly accelerate pathogen discovery in our region. It is therefore essential to support and maintain biological collections as a piece of national research infrastructure that provides benefits for the economic viability of bio-enabled industries, the health of the Australian people, and the biodiversity of our unique endemic ecosystems which are a source of national pride and fundamental to our sense of well-being as Australians. Collections needed for rapid, accurate detection of biosecurity threats Biological collections are also essential foundations for biosecurity and trade. The nature of biosecurity means that they are national and international in geographic scale, covering most types of organisms, and delivering to many different uses and users, via many mechanisms. The unpredictable nature of biosecurity means a national approach is required to support biological collection infrastructure: anything can turn up on any of our shores or in trade pathways, as has been historically demonstrated. Hence the many national strategies and plans identifying collections as national research infrastructure (including the National Biosecurity Strategy (DAFF, 2022), National Plant Health Diagnostic Strategy (PHA, 2021), National Plant Pest Reference Collections Strategy (PHA, 2021) and DAFF Biosecurity 2030 Roadmap (). Biological collections are vital to biosecurity, supporting stakeholders in multiple ways including: •   Accurate identification: Provide verified specimens or genetic material to confirm whether interceptions are exotic or native, and assess their biosecurity risk. •   Data for decision-making: Supply collection records, locations, and host information for area freedom claims, risk analysis, and incursion management. •

Diagnostic development: Offer material and expertise for creating diagnostic methods and protocols, including National Diagnostic Protocols. •	Training resources: Provide specimens and expert support for training diagnosticians, surveillance officers, and researchers. • Taxonomic research: Enable studies to determine if local finds match exotic species, assess threats, and develop distinguishing features. •

Quality assurance: Supply identified cultures and specimens for proficiency testing and commercial applications. •	Secure repository: Act as a trusted archive for voucher specimens and genetic material to meet international obligations and allow future verification. The diversity of organisms and the need for specimens from many exotic locations require a well-connected network of biosecurity collections. Adding local specimens for comparison means this network must be extensive and include biodiversity (non-biosecurity focused) collections. The strategies above reflect this need, along with digital infrastructure to link collections and provide easy access. Because verified specimens of exotic biosecurity organisms are scarce, separate biological collections across Australian jurisdictions collaborate to ensure material is available, especially during suspected incursions when rapid delimitation surveys are critical. There are many recent examples demonstrating how collections work nationally to enhance biosecurity outcomes, including: 1. Historic material from collections across Australia confirmed that the detection of the High Priority Pest Root-knot Nematode (Meloidogyne enterolobii) was a very recent introduction to the country. 2. The biological collections sector worked together, nationally and internationally, to enhance diagnostics and local expertise, enabling accurate distinction between the Khapra Beetle (Trogoderma granarium), Australia's #2 National Priority Plant Pest, and similar non-threatening local species. 3.

Using both historic and recent material, collections supported a rapid, evidence-based response proving that the Karnal Bunt fungus (Tilletia indica) is absent from Australia, providing protection certainty to least 45 grain export markets. A well-supported national approach to biological collections will make successes like these examples routine and drive continuous improvement in biosecurity management. In summary, CSIRO's National Research Collections Australia has been the beneficiary of significant Australian Government investment in recent years, most recently with the construction and operationalisation of the new purpose-built National Research Collections Australia facility, Diversity, in Canberra. CSIRO also works closely with other NCRIS-funded facilities, such as the Atlas of Living Australia, Integrated Marine Observing Systems and Bioplatforms Australia, each in different ways helping with digitisation, 'omics and biosecurity.   Research collections are a hidden powerhouse, supporting everything from tracking pest incursions to discovering new species and understanding the genetic diversity of Australia's native ecosystems. Further investment in a national and coordinated approach to our biological collections is vital and will inform Australia's biosecurity actions, climate resilience strategies, and land management activities in the years to come, benefitting all Australians.   References DAFF. (2022, August). National Biosecurity Strategy. Department of Agriculture, Fisheries and Forestry. https://www.biosecurity.gov.au/about/national-biosecurity-committee/nbs DAFF. (2024, October). Biosecurity 2030 Roadmap. Department of Agriculture, Fisheries and Forestry. https://www.agriculture.gov.au/biosecurity-trade/policy/biosecurity-2030-roadmap Forbes, O., Thrall, P. H., Young, A. G., & Ong, C. S. (2025). Natural history collections at the crossroads: Shifting priorities and data-driven opportunities. Ecology Letters. https://doi.org/10.1111/ele.70188 Forbes, O., Young, A. G., & Thrall, P. H. (2025). Global sampling decline erodes science potential of natural history collections. Nature Communications, 16, 9255. https://doi.org/10.1038/s41467-025-64303-3 Holleley, C. E., & Hahn, E. E. (2025a). Reframing formalin: A molecular opportunity enabling historical epigenomics and retrospective gene expression studies. Molecular Ecology Resources. https://doi.org/10.1111/1755-0998.14065 Holleley, C. E., & Hahn, E. E. (2025b). The rise

of historical epigenomics and temporal analysis of gene regulation. Genome Biology, 26(1), 326. https://doi.org/10.1186/s13059-025-03799-w Plant Health Australia. (2018). National Plant Pest Reference Collections Strategy 2018. https://www.plantbiosecuritydiagnostics.net.au/resources/plant-pest-reference-collections-strategy Plant Health Australia. (2021). National Plant Biosecurity Diagnostic Strategy 2021–2031. https://www.planthealthaustralia.com.au/our-work/identify-and-detect/diagnostics/national-plant-biosecurity-diagnostic-strategy Porter, A. F., Holleley, C. E., Donato, C., Hahn, E. E., Smith, I., Haff, T., Wilson, C. A., & Alexander, M. R. (2025). Releasing RNA from formalin: Novel 20th century rotavirus alphagastroenteritidis strains identified in Australian microbat voucher specimens. bioRxiv. https://doi.org/10.1101/2025.09.07.674729

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

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Mon, Dec 8, 2025, 11:53 AM Australian Eastern Daylight Time
[ID: sbm39918b6d7fe1988ece71e]

Title
Dr

First Name
Deborah

Last Name
Barkauskas

Organisation
Garvan Institute of Medical Research

In what capacity are you responding?
An individual

Capability 1
184_ Roadmap Survey_ Australasian Biospecimen Network Association (ABNA), as the national Biobanking assosication, I attended the recent conference in 2025, and they understand the breadth of infrastructure needed for a national biobanking NRI.

Capability 2
086_Roadmap Survey_ Phenomics Australia Biobanks are vital infrastructure for Australia's medical research effort. Phenomics aligns closely to what Garvan is trying to achieve with samples, patient data and genomics data linked and interoperable.

Capability 3
202_Roadmap Survey_ Victorian Cancer Biobank Consortium. The Victorian biobank consortium already partner with Garvan researchers

192

Mon, Dec 8, 2025, 11:44 AM Australian Eastern Daylight Time
[ID: sbm3991835109e1f22c2f818]

Title
Prof

First Name
Simon

Last Name
Ringer

Organisation
The University of Sydney

In what capacity are you responding?
A representative of an organisation or group

Capability 1
ID 200 Compute Infrastructure

Capability 2
ID218 Microscopy Infrastructure (and, more generally, distributed facilities like NIF)

Capability 3
ID154 Environmental monitoring infrastructure

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
A nationally coordinated Advanced Materials and Manufacturing Research Infrastructure Network – Advanced Manufacturing and Materials Australia (AMMA)
(A new proposal not explicitly captured in the Q35 submissions.)
As a comprehensive, multidisciplinary university with research strengths spanning STEM, health and medical sciences, the humanities and social sciences, creative disciplines, and professional practice, the University of Sydney recognises that national research infrastructure underpins the full breadth of Australia's research and innovation system. Across all domains, demand for sophisticated facilities, advanced digital capability, and highly skilled technical staff is rising rapidly. Meanwhile, Australia's economic partners and strategic competitors are making major new investments in research infrastructure as a deliberate strategy to drive national competitiveness, technological sovereignty, and economic complexity.

In this context, there is a clear need for a significant uplift in national research infrastructure funding and coordinated support, enabling Australia to keep pace with international developments and to ensure that our researchers and industries have access to world-class capabilities. Multiple areas across the research ecosystem require strengthening — from environmental monitoring and biomedical platforms to data-intensive science, advanced characterisation, and translational manufacturing. Against this backdrop, the following proposition is offered as one example of strategic infrastructure that could materially advance national priorities.

Australia has long recognised that while it possesses world-class mineral resources, it captures only a fraction of the global value chain. For decades, numerous reviews have identified the same opportunity: Australia exports raw minerals and then imports high-value manufactured products derived from those very materials. With the acceleration of global demand for critical minerals, battery materials, green metals, and low-emissions manufacturing, this "forever challenge" has taken on new urgency.

The National Science and Research Priorities (2024) explicitly highlight priorities such as "thriving communities" "build a secure and resilient nation" and "transitioning to a net-zero future", all of which rely on domestic capability in advanced materials and manufacturing. Likewise, the Critical Technologies in the National Interest list identifies advanced manufacturing, materials technologies, AI-enabled design, and critical mineral processing and refinement as strategic domains for national resilience and sovereign capability. The Australian government policy and industrial strategy, formally legislated through the Future Made in Australia Act 2024 also seeks to address these issues.

The AMMA Green Paper (2025) underscores the strategic opportunity: Australia now has the technological and industrial conditions to capture more value from its mineral endowment — but doing so requires coordinated national research infrastructure, not isolated local investments.

Australia currently lacks a coherent, mid-TRL infrastructure layer that can bridge the gap between discovery research and industrial-scale manufacturing, prototyping, certification, and deployment. This gap slows commercialisation, constrains sovereign capability, and weakens our strategic position in global clean-energy and critical-technology supply chains.

A distributed national facility would address this structural deficiency.

Proposed Capability Description

A distributed, hub-and-spoke national network providing coordinated access to:

• Advanced manufacturing platforms (additive manufacturing, composites, powder metallurgy, thin films, advanced casting/forging, hybrid manufacturing) capable of pilot and near-industrial-scale production.
• Critical minerals and green-metals processing research facilities—enabling materials refinement, alloy development, battery precursor synthesis, and low-emissions metallurgical processes linked to decarbonisation and sovereign capability.
• Integrated access to characterisation and testing research facilities for performance validation, materials qualification, reliability testing, and certification-aligned workflows.
• Digital design and simulation infrastructure, including materials informatics, digital twins, process modelling, and data standards enabling traceability across the materials/manufacturing value chain.
• Structured industry access pathways, contracting templates, regulatory navigation, and translational expertise.
• National workforce development, spanning technical, scientific, engineering, and translational specialists for research and industry.

Medium-Term Goals (5–10 years)

• Establish a national mid-TRL manufacturing and materials research network providing pilot-scale capability to industry and researchers.
• Enable Australia to move up the value chain in critical minerals by supporting downstream refining, processing, alloy development, and advanced material production.
• Support the emerging green-metals industry, aligning with national decarbonisation priorities and global market demand for low-emissions materials.
• Reduce sovereign risk by strengthening domestic capability in critical technologies and advanced manufacturing.
• Build a pipeline of skilled Australian workers fluent in next-generation manufacturing, advanced materials, and digital workflows.

Research Communities and Sectors Impacted

Critical minerals and resources sector, Green metals and low-emissions steel/aluminium production, Clean energy technologies (batteries, hydrogen, renewables), Defence, aerospace, and critical technologies, Biomedical devices and MedTech, Advanced manufacturing SMEs and high-value manufacturing firms, Environmental and circular-economy research communities

Timeframe for Establishment

• Years 1–2: National scoping, stakeholder engagement (industry, government, research organisations), mapping of existing capabilities, and development of governance and funding models.
• Years 3–5: Construction and build-out across selected nodes; recruitment; deployment of core equipment; initiation of pilot-scale manufacturing services; launch of a national access platform.
• Years 5–10: Full operational maturity, integration with national supply chains, sustained industry engagement, and iterative scaling aligned with national missions and Critical Technologies priorities.

Why This Should Be Considered in the 2026 NRI Roadmap

• It directly advances multiple National Science and Research Priorities, including net-zero transition, sovereign capability, regional development, and expanding Australia's economic complexity.
• It strengthens Australia's position in Critical Technologies, particularly advanced manufacturing, materials technologies, AI-enabled design, and critical-mineral processing.
• It addresses a long-standing structural gap that has historically prevented Australia from capturing greater value from its mineral resources.
• It enhances national resilience, supports economic transformation, and aligns with the Future Made in Australia agenda. It complements — rather than duplicates — existing NCRIS investments by providing the mid-TRL translational bridge needed for national competitiveness.

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Mon, Dec 8, 2025, 11:42 AM Australian Eastern Daylight Time
[ID: sbm399181b0e6cc91d7d78f6]

Title
Prof

First Name
Neena

Last Name
Mitter

Organisation
Charles Sturt University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
176 - • Human–AI interaction capabilities – infrastructure for studying how humans and AI systems actually work together in practice (across education, health, public sector, agriculture etc.), not just investing in AI capability in isolation. This includes data, testbeds and longitudinal studies of real-world human–AI workflows.

Capability 2
183 - • Assessment transformation in the AI age – proposals that experimentally address assessment, credentialling and academic integrity under conditions of ubiquitous generative AI, with particular attention to diverse and non-traditional learners. CSU's regional and distance-education focus makes us a natural testbed here.

Capability 3
Several - •   Institutional AI transformation – capabilities for studying how universities and other institutions reorganise governance, curriculum, student support and professional practice under AI-saturated conditions, especially in regional and online settings.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
1. Reframing AI as infrastructure

Recent digital inclusion work suggests that, among people who are online, remote Australians are proportionally more likely than metropolitan users to rely on chatbots, including for social connection.

This points to the need to treat AI as social infrastructure, not just productivity infrastructure, with public, trusted, well-governed AI services (information, navigation, low-intensity support) that are not solely dependent on commercial platforms and subscription models.

It also argues for regionally distributed AI nodes and data hubs, with compute, data and experimentation capability located in or anchored to regional universities, research stations and health services, rather than concentrated only in major-city supercomputing centres.

2. Assessment and Learning Infrastructure for the AI Age

Need

• Current assessment and credential systems were not designed for ubiquitous access to powerful AI. Detection-based approaches are already failing; the risk is a credibility crisis for credentials and for public trust in higher education.
• Regional and distance-education institutions serving mature-age, first-in-family and working-professional students are at the sharp end of this problem, because AI is both an accessibility tool and a potential shortcut for our cohorts.

Proposed capability

A national research-infrastructure platform for:

• designing and trialling process-visible, trust-based assessment models (e.g. portfolios, dialogic and iterative work, verified process data) rather than "AI detection theatre";
• systematically studying what makes learning worthwhile when high-level assistance can be "rented by the hour";
• understanding when AI functions as an assistive technology that widens participation, and when it undermines learning and capability development;
• developing shared data standards and tools for mapping educational outcomes to human-flourishing dimensions (engagement, autonomy, meaning, accomplishment), not just grades and completion rates.

Medium-term goals (2–4 years)

• A suite of tested, implementation-ready assessment models and toolkits that maintain educational integrity while recognising legitimate AI use.
• An evidence base to support regulatory and professional-body decisions on AI and assessment (especially in professions with strong public-trust obligations).

Communities served

All education sectors; professional and regulatory bodies; employers concerned about credential reliability; EdTech and AI providers seeking responsible integration.

3. Human–AI Flourishing Research Infrastructure

Need

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Australia is deploying AI at speed, but with limited infrastructure for understanding impacts on human capability development, meaning-making and social cohesion. Existing digital and AI investments focus on capability and competitiveness, not on human flourishing.

Proposed capability

A cross-sector research infrastructure that:
• adapts and localises emerging "flourishing with AI" benchmarks for the Australian context;
• develops shared metrics and datasets for evaluating AI systems and deployments against wellbeing dimensions (engagement, autonomy, meaning, accomplishment, relationships);
• supports longitudinal studies of how AI changes skill acquisition, professional formation and community life;
• investigates when AI removes unjust barriers (e.g. accessibility, language, distance) and when it removes productive "friction" that is necessary for learning and development.

Medium-term goals (2–3 years)

• Embed human-flourishing metrics into AI procurement, evaluation and governance processes across sectors.
• Provide practical guidance and decision-support tools so that public and private organisations can choose AI deployments that build, rather than hollow out, human capability.

Communities served

Education, healthcare, public sector, regional development, knowledge-work industries, and any sector undertaking large-scale AI transformation.
Regional universities are uniquely positioned to study real-world AI integration (not just traditional/elite university contexts).

190

Mon, Dec 8, 2025, 11:38 AM Australian Eastern Daylight Time
[ID: sbm39917d5b57e5cbf48ec6c]

Title
Prof

First Name
Sharon

Last Name
Goldfeld

Organisation
Murdoch Children's Research Institute

In what capacity are you responding?
A representative of an organisation or group

Capability 1
286 Murdoch Children's Research Institute – Generation Australia. This NRI capability is unique in Australia and has national and international significance. Generation Australia is the only national platform that can deliver faster child and parent research at scale for equitable preventive health and a healthier Australia with a global competitive advantage.

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Mon, Dec 8, 2025, 11:31 AM Australian Eastern Daylight Time
[ID: sbm397d1f74f081103d31e33]

Title
A/Prof

First Name
Melanie

Last Name
Rug

Organisation
Centre for Advanced Microscopy-ANU

In what capacity are you responding?
A representative of an organisation or group

Capability 1
218 – Microscopy Australia

Capability 2
198 – Felipe Kremer

Capability 3
061 – AusBIAS and LMA

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The Centre for Advanced Microscopy was pleased to see so many suggestions in the paper that identify microscopy as a critical national research infrastructure that requires enhancement, reinforcing the responses to the 2021 NRI Survey. Microscopy is an essential enabling research infrastructure, that requires increased investment due to the growing future demand by the Australian research and innovation community.
Our facility and network of facilities supports this view and would like to stress the urgency for enhanced future investment in microscopy and microanalysis capabilities. This is critical for nationally significant challenges, like net zero technologies, thriving healthy communities, productive agriculture, critical minerals and a circular economy.

We would like to note that Microscopy Australia received less than 2% of the NCRIS 2023 round but still supported >200 direct industry clients (across manufacturing, resources, biomedical) and raised $1.5B by just 35 start-ups/spin-outs enabled by the partner

organisations over the last 10 years. We suggest that much broader impacts would be possible through enhanced resourcing!

Australia's overall investment in R&D is only 1.68 % of gross domestic product which is below the average of 2.7 % among OECD nations. Our priority must be to change the perception that support of R&D is a welcome tax incentive rather than an essential pillar of progress in our society.

188

Mon, Dec 8, 2025, 11:31 AM Australian Eastern Daylight Time
[ID: sbm399177758be17ce51a318]

Title
Prof

First Name
Michael

Last Name
Haugh

Organisation
Language Data Commons of Australia (LDaCA)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
167: Language Data Commons of Australia (LDaCA). The Language Data Commons of Australia (LDaCA) is an integrated national infrastructure for analysing spoken, written, signed and multimodal text collections at scale in order to open up the social and economic possibilities of Australia's rich linguistic and cultural heritage for impactful research with significant benefits to the nation. LDaCA is making available valuable collections of national significance more findable, accessible, interoperable and reusable (FAIR) while adhering to CARE principles; developing the computational infrastructure and tools required to analyse language collections at scale; and increasing the awareness and capabilities of researchers in applying digital methods to language and text data.

Capability 2
255 Indigenous Data Network (IDN). It is imperative to invest in infrastructure to support Aboriginal and Torres Strait Islander researchers and communities to maximise their use and repurposing of Indigenous data assets held in Australia and internationally. The Improving Indigenous Research Capabilities (IIRC) project has laid the foundation for a national integrated approach for supporting Indigenous researchers and communities that can consolidated through expanded investment.

187

Mon, Dec 8, 2025, 11:25 AM Australian Eastern Daylight Time
[ID: sbm399171bf4accf9bb10033]

Title
Dr

First Name
Nian

Last Name
Jiang

Organisation
Astralis

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National Digital Research Infrastructure Integration and Coordination (Derived from Survey responses relating to AI capability, data platforms, storage, digital consolidation and HPC — e.g., Response IDs: 35-139, 35-140, 35-223, 35-228, 35-229)

Capability 2
National Engineering Capability for System Design, Prototyping and Integration to translate scientific capability into operational national assets (Derived from responses relating to instrumentation, prototyping, testbeds and engineering support — e.g., Response IDs: 35-181, 35-197, 35-199)

Capability 3
n/a

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The published Survey responses contain many valuable suggestions; however, most focus on lower-TRL needs or discipline-specific infrastructure gaps. While these are important, several proposals can be extended beyond their originating disciplines to form system-level NRI capabilities that would benefit the entire research ecosystem and significantly strengthen national research translation performance.
Astralis proposes the following enhanced capabilities, each drawn from themes present in the published responses and expanded to the NRI scale. Relevant response IDs are referenced where applicable.

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1. National Digital Research Infrastructure Integration and Coordination
(Derived from Survey responses relating to AI capability, data platforms, storage, digital consolidation and HPC — e.g., Response IDs: 35-139, 35-140, 35-223, 35-228, 35-229)
Need:
Survey responses highlight gaps in AI compute, secure data storage, and fragmented HPC access. While often framed within individual domains, these challenges are universal across research and industry sectors. Australia needs a coordinated approach to digital infrastructure rather than incremental, discipline-specific upgrades.
Proposed Capability:
A National Digital Infrastructure Integration Program to align, coordinate and modernise AI, data storage, cloud, and HPC capabilities across sectors.
Medium-term Goals:
• Map existing digital assets across NCRIS, universities, government, and industry.
• Develop a national roadmap to upgrade AI compute, storage and HPC capacity to meet future research and industry demand.
• Ensure interoperability, portability and common access standards across all NRI digital assets.
• Support the integration of sovereign AI capability with sector-specific data and compute needs.
Timeframe: 1–2 years to scope, coordinate and produce the national upgrade roadmap.

2. National Engineering Capability for System Design, Prototyping and Integration to translate scientific capability into operational national assets
(Derived from responses relating to instrumentation, prototyping, testbeds and engineering support — e.g., Response IDs: 35-181, 35-197, 35-199)
Need:
Survey responses identify gaps in engineering and prototyping, but often in a discipline-bound context. Yet, engineering capability — design, systems integration, prototyping, testing — is fundamental to all translational pathways and is a known bottleneck in Valley of Death in the Technology Readiness Level framework.
Proposed Capability:
A National Engineering and Integration Capability embedded within NRI to support system design, prototyping, testing, and integration for research infrastructures and emerging technologies.
Medium-term Goals:
• Secure dedicated funding for NRI technical and engineering workforces.
• Develop and implement an Engineering Capability Strategy for NRI, including:
• national skills needs mapping
• career recognition and accreditation frameworks for the NRI technical workforce
• Establish shared prototyping and system-integration facilities accessible across sectors.
Timeframe: 1–2 years to define workforce strategy, funding frameworks and implementation plan.
Impact Across Research Communities
These three enhanced capabilities — digital coordination, engineering integration, and cross-sector translation platforms — are not discipline-specific. They would uplift most research communities, delivering particular benefit to areas where translation potential is high but current capability gaps constrain national impact. Collectively, they would substantially enhance Australia's research translation performance, reduce systemic friction, and strengthen sovereign capability across sectors.

186

Mon, Dec 8, 2025, 11:23 AM Australian Eastern Daylight Time
[ID: sbm399136e2b1e140a7d663d]

Title
A/Prof

First Name
Melanie

Last Name
Rug

Organisation
Australian Microscopy and Microanalysis Society

In what capacity are you responding?
A representative of an organisation or group

Capability 1
218 – Microscopy Australia

Capability 2
061 – AusBIAS and LMA

Capability 3
036 – James Springfield

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The Australian Microscopy and Microanalysis Society was pleased to see so many suggestions to Q35 that identify microscopy as a critical national research infrastructure that requires enhancement. Our nearly 600 members support this view, and the urgency for enhanced future investment in microscopy and microanalysis capabilities.
These 2026 suggestions echo and reinforce the responses to the 2021 NRI Survey. Microscopy is an essential underpinning research infrastructure, that requires increased investment due to the growing future demand by the Australian research and innovation community.
Enhanced microscopy infrastructure, in capability and capacity, will be required to meet the increasing demand and maintain microscopy infrastructure at the cutting edge to meet the needs of Australian researchers across discipline boundaries. This is critical for nationally significant challenges, like net zero technologies, thriving healthy communities, productive agriculture, critical minerals and a circular economy.

Our overall investment in R&D is only 1.68 per cent of gross domestic product which is below the average of 2.7 percent among OECD nations. Our priority has to be to change the perception that support of R&D is a welcome tax incentive rather than an essential pillar of progress in our society.

2026 National Research Infrastructure (NRI) Roadmap Issues Paper Consultation
Issues Paper Consultation Survey
Department of Education

185

Mon, Dec 8, 2025, 11:23 AM Australian Eastern Daylight Time
[ID: sbm399170315ee119491fd00]

Title
Mr

First Name
Dale

Last Name
Holland

Organisation
The Australian National University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National approach to cultural collections (e.g. 210, 211, 214, 222, 225)

Capability 2
AI infrastructure for humanities (1, 210, 211, 222)

Capability 3
National Space Qualification Network (280, 281, 267, 222)

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Please see prior ANU survey response 222 identifying 9 key areas for uplift.

2026 National Research Infrastructure (NRI) Roadmap Issues Paper Consultation
Issues Paper Consultation Survey
Department of Education

184

Mon, Dec 8, 2025, 11:16 AM Australian Eastern Daylight Time
[ID: sbm399168a9b1e57492267b5]

Title
A/Prof

First Name
Ron

Last Name
Hackney

Organisation
Australian and New Zealand International Scientific Drilling Consortium (an AuScope project)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Earth System Modelling Infrastructure Response numbers: 33 IMOS, 94 AURIN, 103 Vincent, 113 Schofield, 140 Geoscience Australia, 154 TERN, 160 Watson, 161 APPN, 190 Glover, 212 ANZIC, 217 SCIRO, 222 ANU, 227 Keywood, 283 CSIRO. This suggested new NRI is identified in the Issues Paper as one that is broadly supported by the community (as evidenced by the number of survey responses that link to this new NRI). There are many aspects to this proposed new NRI that are of benefit to Australian researchers, industry and community. For example: * NRI for atmospheric science (which is not included in any current NRI and thus represents a critical gap in climate understanding) * NRI linked to Earth Observation technologies, which are nowadays an essential RI that makes a major contribution to understanding the Earth system * Coastal Research Infrastructure, planning for which is well advanced * A fleet of autonomous and semi-autonomous vehicles for ocean mapping and monitoring to be deployed from Australia's (ideally expanded and modernised) blue water and coastal research vessel fleet

Capability 2
Residential National Research Institute for Mathematical Science Response numbers: 67 Praeger, 96 MATRIX, 100 Australian Mathematical Society, 101 Sims, 105 WIMSIG, 126 Pretorius, 164 AMSI, 266 UQ As another broadly support new NRI concept, this residential mathematical institute appears to be a viable option to support NRI developments that rely on mathematical skills, expertise and capability. A mathematically focussed NRI would perhaps also help alleviate the challenges faced by NRI facilities – and industry and universities more broadly – in securing a workforce with adequate mathematical skills.

Capability 3

NRI for Sub-surface Sampling (Australian New Zealand International Scientific Drilling Consortium, an AuScope Project) Response number: 212 ANZIC Australian researchers have access to international sub-surface sampling RI through membership in international scientific drilling programs such as the International Ocean Drilling Program (IODP[3]) and the International Continental Scientific Drilling Program (ICDP). Whilst current funding for this NRI allocated through AuScope is sufficient to maintain annual memberships in these programs, there is a need to enhance this NRI capability through increasing the longevity of that funding. Longer-term funding certainty would better align this NRI opportunity with the long lead times for scientific drilling initiatives, which are up to 5–10 years. Longer-term funding also supports the NRI workforce by giving scientists the certainty that they can remain involved in these long-term projects without the fear that Australia's membership contributions – and consequently Australian involvement – will have to end before projects come to fruition. The long lead times and extended pathway to impact also mean that increased longevity in support also improves opportunities for effective research translation.

183

Mon, Dec 8, 2025, 11:07 AM Australian Eastern Daylight Time
[ID: sbm3991613a7de541176e92f]

Title
Ms

First Name
Toni

Last Name
Moate

Organisation
Marine National Facility - CSIRO

In what capacity are you responding?
A representative of an organisation or group

Capability 1
We reaffirm the critical need for a nationally integrated vision for future marine research infrastructure (submissions 217 – CSIRO, with linkages to 033 – IMOS, 212 – ANZIC and 222 – ANU). This vision should cohesively connect existing platforms across the Research Infrastructure landscape – including a framework for undertaking science on Sea Country, an expanded bluewater and coastal research vessel fleet, in-situ marine observing systems, and remote sensing capabilities – with emerging technologies such as autonomous platforms and advanced AI/ML solutions. The integration of these emerging technologies into current infrastructure offerings is essential to expand Australia's capacity for ocean and atmospheric observation and knowledge generation. Such advancements will underpin evidence-based decision-making for climate adaptation, mitigation, and resilience – key priorities identified in the Australian Government's National Adaptation Plan (2025) and related initiatives.

Capability 2
Multiple submissions also (submissions 027 Oliver Berry, 079 – Bioplatforms Australia, 116 – Atlas of Living Australia) advocate for DNA data infrastructure because genomics technologies are transforming how Australia conducts environmental monitoring. Building this infrastructure would support national priorities: protecting and restoring Australia's environment through rapid biodiversity assessment and building a secure and resilient nation via biosecurity surveillance. With technology ready, existing industry, philanthropic and government support, plus strong NCRIS foundations (Atlas of Living Australia, Bioplatforms Australia), Australia is ready to maximise the power of genomics for agriculture, fisheries, conservation, and invasive species management.

Capability 3

Decarbonisation of research vessels will be increasingly important over the next decade as the International Maritime Organisation looks to enforce new rules that incentivises the industry to meet global net-zero ambitions. Marine vessels exist in a hard to abate sector, though technological advancements are occurring in many areas. Research Vessel operators (including within the Southern Coastal Research Vessel Fleet, Australian Institute of Marine Science, the Marine National Facility and the Australian Antarctic Division) will need to embrace new technologies that address carbon emission reduction. The pace of that change will be heavily dependent on infrastructure funding. With support and investment, the research vessel fleet could help lead the way for broader industry adoption. Investment would also likely follow a pathway of starting with smaller infrastructure and taking learnings from key development projects into larger investments. A cohesive roadmap for uptake in technologies across the fleet would be needed to guide this investment. Carbon Abatement of existing vessels can come about through more efficient operation of vessels (optimisation of steaming speed and vessel configuration), more sophisticated route planning (to take advantage of forecast favourable winds and currents), and reduced use of large vessels where smaller and especially autonomous vessels can suffice. All of these are ripe for development with investment in the medium term.   (134 – Clare Murphy supports the need to better measure and monitor emissions)

181

Mon, Dec 8, 2025, 10:39 AM Australian Eastern Daylight Time
[ID: sbm398da85188f03df1b7905]

Title
Prof

First Name
Alastair

Last Name
Stewart

Organisation
ARC Industry training Centre for Micropysiological Systems Technology

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Novel Approach Methodologies (NAM)n drug development
Immediate implementation
medium term goals
- establish a comprehensive suite of capabilities in technology development to support innovation for NAMs
-establish a comprehensive suite of qualified NAM assays to on-shore preclinical drug development capability
-establish a curriculum for technology and assay developers and for users of NAMs and NAM-derived data
- provide accessible natioanl NAM infrastructure that is compliant with requirements of international regulator agencies (FDA, NMPA, EMA...)

180

Mon, Dec 8, 2025, 10:36 AM Australian Eastern Daylight Time
[ID: sbm3991453864cc4e7706f33]

Title
Prof

First Name
Jenny

Last Name
Fisher

Organisation
James Cook University

In what capacity are you responding?
An individual

Capability 1
New NRI: An integrated atmospheric composition observing network. Links the following:Melita Keywood - 227; Robyn Schofield - 113; Max Desservettaz – 133; Andrew Kleckociuk – 157; David Etheridge - 226; Zoe Loh - 143

Capability 2
Clare Murphy - 134

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
New NRI: An integrated atmospheric composition observing network.

Need:
Atmospheric composition fundamentally drives climate, represents our greatest environmental health risk factor, and contributes to bidioversity loss and ecosystem health. Observations require traceability to national and international calibration and data delivery standards to be useful. There is an urgent need within our modelling communities to provide quality assured, accessible atmospheric composition data in representative environments across Australia.

Capability:
This pilot Atmospheric Composition Observing Network NRI will bring together environmental and public health regulators, CSIRO, ANSTO, BoM, MNF, ACCESS-NRI, NCI, industry, and university sectors to provide an united and efficient capability of atmospheric composition observations. Spanning indoor air, outdoor air pollution,

contaminants and greenhouse gases, the fate and impact of emissions will be observed. This will provide valuable data to track, identify co-benefits and/or trade-offs, and report on progress towards net zero, climate change, stratospheric ozone protection and human and environmental health targets required by national legislation and international conventions, including the Montreal Protocol on stratospheric ozone depleting substances, the Minamata Convention on mercury, the Paris Agreement on greenhouse gases, the Stockholm Convention on persistent organic pollutants (including PFAS), and other emerging areas of interest to UN Environment Programme (plastics, biodiversity-pollution linkages) and the World Health Organisation (outdoor and indoor air, essential climate variables).

Medium-term goals:
- Stock-take of existing observational programs, and best practice national and international reporting
- Documentation of traceability, calibration and development of SOPs for all instruments and climate variables being observed in programs
- Creation of a national database for Atmospheric Composition, leveraging expertise for metadata, open data, and international reporting

Impacted research communities:
- Health, climate, agricultural, pollution, waste, biodiversity and industry research sectors will benefit. Environmental regulators (state and federal), CSIRO, ANSTO, BoM, MNF, ACCESS-NRI, NCI, industry, and university sectors

Timeframe for establishment:
Year 1 - begin stocktake and establishment of governance board and structures.
Years 2-3 - establish pilot team (4-5 people) to deliver the medium term goal of documentation, calibrations, processes and database establishment. Identification of gaps in network and preparing to fill gaps
Years 2-5 - strengthening of network through deployment of common resources to existing atmospheric composition sites for observables of highest value. Creation of a 5-15 year resourcing plan and national atmospheric composition technical support hub.

179

Mon, Dec 8, 2025, 10:30 AM Australian Eastern Daylight Time
[ID: sbm39913f1a31ccd6b84653c]

Title
Dr

First Name
Judith

Last Name
Bishop

Organisation
La Trobe University - School of Humanities and Social Sciences

In what capacity are you responding?
An individual

Capability 1
167_Roadmap Survey_ Language Data Commons of Australia (LDaCA).pdf "To develop an integrated national infrastructure for analysing spoken, written, signed and multimodal text collections at scale in order to open up the social and economic possibilities of Australia's rich linguistic and cultural heritage for impactful research with significant benefits to the nation. [...] Developing a national data portal for accessing and repurposing language and text data of significance to researchers and communities, both that is held in GLAM institutions, including libraries, archives and museums, as well as language and text collections held in other distributed archival repositories. [...] AI-Enabled Text Data Capture and Research Workflows" AND: 210_Roadmap Survey_Australian Academy of the Humanities.pdf "Culturally appropriate AI and ML tools developed for automated cataloguing and indexing for audio, video and visual media. • Language processing tools ... including AI and NLP technologies" [...] There are very significant skills gap in EMCRs and MCRs' capacity to make full use of RDI already developed, also more generally in computational humanities. This reflects the piecemeal and fragmentary development of RI across HASS through ad hoc project funding without ongoing programmatic support or strategic framing. New AI infrastructure investment is needed" Justification: The capacity for HASS researchers to interact with Australia's rich linguistic and cultural heritage at scale in ways that language recognition and processing technologies can enable is vital to the future of the Humanities. The research infrastructure currently available is inadequate to enable the complex processing of multiple HASS data sources and to make possible unprecedented research discoveries through a combination of distant (semi-automated) and close readings of source texts.   However, equally important is the development of infrastructure to support the massive task of digitisation and metadata labelling of data sources. Funding community-based digitisation labs could be one route to consider for this. Recognition and processing technologies are useless if the data to be analysed with them is unavailable, not digitised, or cannot easily be discovered because appropriate metadata is lacking. HASS researchers need to have the capability to co-develop, together

with computational colleagues, the small, specialised, privacy-, data- and intellectual property-preserving language and vision models they will need to support their research into the future in ways that do not require that they contribute to the success of international foundational model developers.

Capability 2

233_Roadmap Survey_ AustLit%2C at the University of Queensland.pdf: "As a piece of national digital research infrastructure, AustLit is particularly supportive of the development and application of digital and data technologies, but these also require cultural research grounded in humanities research practice to ensure wholistic development of technologies. [...] The potential of AI-enhanced data enrichment to improve the quality of records is promising and this work is beginning... [...] At the moment, AustLit has no capacity to even begin to explore this potential. [...] Moreover, the capacity to analyse the data demands increased training of future generations across both the humanities and the digital world. While funding agencies create pressure to continually innovate (and AustLit is committed to such innovation) the capacity to build new features and capabilities to enable innovation and expansion is not possible without the assurance of long-term maintenance and operational costs, the provision of additional funding, and the increase of skills development across the humanities." Justification: There are initiatives underway to support these kinds of goals in relation to the performing and visual arts and language data through the ARDC and LDaCA, however, literary scholars and creative writing scholars and digital humanities scholars are not well-included in the current performing and visual arts-focused initiatives and their inclusion should be addressed through support for the further development of AustLit in the ways outlined above (e.g. data enrichment semi-automated by AI, linkage of data sources, e.g. using semantic AI and knowledge graph technologies). For creative writing researcher-practitioners, the ability to discover literary and historical works of interest and to explore influences between writers, and between writers and practitioners of other artforms, could be greatly strengthened by developing a living knowledge graph that would be extended and enhanced over time as new works and new influences appear. A knowledge graph infrastructure would enable rich semantic queries that respond to creative writing research-practitioners' interests, such as the intersections of artistic influences, style, genre, identity, and subject matter in the production of new works.

Capability 3

 Knowledge graph development infrastructure would also connect with: 208_Roadmap Survey_ Social Science Research infrastructure Network (SSRIN).pdf and specifically, data discovery and integration capabilities: "Data discovery in a world full of data [...]There is therefore a strong case for investing in technology that enables researchers across multiple disciplinary areas to explore the existence, availability, and characteristics of existing data in real time. [...] Data integration is still a very under-researched field. It poses methodological issues that are often not well understood by social researchers. Data linkage agencies are commonly constrained in understanding the limitations of their work due to their unfamiliarity with some of the source data. Further national investments in data integration are urgently needed to: a) Support better research into, and communication of the quality issues associated with data integration processes, especially repercussions for population representation and uncertainty in estimates." In general, research infrastructure that supports the partial automation of linked cultural data attributes and data sources in the form of knowledge graphs or similar would be a highly valuable addition to literary, linguistic and cultural scholarship. Such an infrastructure could have further applications in discovering, consolidating and connecting language

resources relevant to public communications in a given language, resources which are currently scattered across the internet or in archives and impossible to consolidate without immense manual effort (this is also relevant to Capability 1 above)

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Support the development of interdisciplinary skills and collaborations between HASS, computational/digital humanities, and computational science/AI, focused on prototyping and building new customised AI tools, and provide the infrastructure that enables this prototyping and sandboxing in a secure environment.

Entrepreneurial STEM or Business researchers can often access this kind of app or tool prototyping capability but it's almost unheard-of for HASS researchers to do so. Yet this severely constrains who develops tools, for what purposes, and what audiences. The tools that HASS researchers could collaborate on building could include, say, secure automated speech recognition tools in collaboration with Indigenous community organisations (on the model of Te Hiku Media in NZ). These are the kinds of projects which young people could also be involved in supporting.

The lived-experience and community-led orientations of many HASS researchers would bring to life very different and impactful tools and systems from those currently being imagined – tools and systems aimed at solving real problems from the ground up, not, as happens far too often in technology development, problems that are imagined by technologists without lived experience of the issues they are trying to solve.

178

Mon, Dec 8, 2025, 10:26 AM Australian Eastern Daylight Time
[ID: sbm39913b9869cc85c02017d]

Title
Dr

First Name
Gillian

Last Name
Brown

Organisation
Council Heads of Australasian Herbaria

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Response 214 - South Australian Museum: The Council of Heads of Australasian Herbaria, advised by Australia's biological collections community, industry and education partners, support a national approach to managing, resourcing, and governing biological collections to strategically enhance Australia's research capacity. An integrated national infrastructure would target critical data and infrastructure gaps; enhancing interoperability among biodiversity data and resources that are required to address key national and global challenges. Biological collections deliver baseline physical and data infrastructure that support Australian and international research, environmental management, policymaking, and industry. Users of biological data expect rapid access to integrated data to drive transformative research. Strategic alignment of Australia's biodiversity resources is needed to enable streamlined access to the diverse data types (e.g., molecular sequence data, species images, trait data, bioacoustics data, eDNA reference libraries, tissue samples), which are currently siloed in distinct national repositories. Alignment of data sources with the innovative technologies and tools (e.g., AI technologies, biosecurity surveillance methods) for their analyses will align collections to emerging research, policy, and management needs.   The capability and coordination gaps that exist across the collections sector, which are highlighted by survey respondents, undermine the provision of a world-class Australian biological collections system. Australia is one of only 17 mega-diverse countries in the world, with a rich and unique biodiversity. Currently only about 30% of Australian non-marine species have been scientifically described. Lack of a comprehensive inventory of our native species undermines Australian government commitments to achieving zero extinctions within the next decade. A coordinated approach, incorporating significant investment in taxonomy infrastructure, training, and workforce development, coupled with sustained national funding for digitisation and integrated biological collections data infrastructure is required. Survey respondents note that "current infrastructure—aging physical storage facilities, fragmented data systems, and insufficient workforce capacity—is inadequate for

addressing the rapid environmental changes driven by climate change". Research and industry users require a streamlined, end-to-end, single access point interface to achieve translational research; incompatibility among state, national, territorial and university collections, currently impedes the efficient access to and use of sought after biological data underpinning research into climate change, environmental assessment and conservation, natural resource management (from forestry to fisheries), health, and biosecurity. A national approach would parallel international trends, for example, the European Union's Distributed System of Scientific Collections (https://www.dissco.eu/), the largest global formal agreement between natural history museums, botanic gardens, and collection-holding universities. The iDigBio (https://www.idigbio.org/) program in the United States delivers a similar ambition focusing on digitisation and data infrastructure.

Capability 2
Response 147 – Mark Adams

Capability 3
Response 179 – National Imaging Facility Museums Special Interest Group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Need:
The Council of Heads of Australasian Herbaria, advised by Australia's biological collections community, end users, and research infrastructure partners, consider that a step change in the national approach to collections is needed. That step change would be achieved by the development of a Distributed National Biological Collection (DNBC) with nodes in each state and territory and leadership by a national coordinating body, to ensure a national approach addresses priority research, collections development drivers, and ICIP principles. Australia's biological collections sector is well governed and coordinated, with significant existing NCRIS capability. Investment, in the form of creation of a distributed national collection would enable streamlined processes, a strategic national approach to improved access, management and discovery of collections, and a shared resource approach to new technologies such as environmental DNA, advanced imaging, bioacoustics, and virtual specimens.

Capability:
Australia's biological collections are a remarkable national asset; however, their full benefit is not realised due to a lack of national coordination and access to skills, technology and infrastructure. Accelerating discovery and access to Australia's biological collections presents a decadal opportunity to transform science across a range of disciplines and will enable integration of emerging transformational technologies - a national DNA sequence library, national advanced imaging store, artificial intelligence to extend physical collection specimen discovery, and will align collections to emerging research, policy, and management needs. The transformation will enable Australia's biological collections system to support future science, inform decision-making, and partner with global programs and will impact environmental monitoring, genomics, health, biosecurity, and agriculture.

Medium-term goals:

Extensive national stakeholder consultation advocated for a step change in the national approach to collections. Needs for biological collections include: 1. a national coordinating body to ensure a national approach addresses priority research and collections development drivers—a national approach to Indigenous Cultural and Intellectual Property (ICIP) principles, 2. Mobilisation of collections-based data, targeting investment in new technologies, developing national standards, and improving digital curation; 3. Digital infrastructure, data access and integration - A common, standards-based 'digital extended specimen' approach to digital documentation, facilitating global access to Australian collections data, 4. Emerging transformational technologies - A national DNA sequence library, national advanced imaging store, and artificial intelligence to extend physical collection specimen discovery and align collections to emerging research, policy, and management needs, 5. skills and workforce development - Fostering a highly trained workforce with diverse expertise in collections development and management, digitisation, genomics, taxonomy and biobanking.

Impacted research communities: Biological collections (including palaeontological collections) are a key piece of research infrastructure for Australia. The uses of biological collections are varied and changing as technology advances, social, environmental, and economic needs evolve. Industry demand for collections-derived biodiversity data continues to grow; an analysis by the Atlas of Living Australia revealed that industry use has increased 55% over the past 5 years. Over 2,400 public servants across 200 agencies use collections data at local, state and Australian government level. Biological collections contribute prominently to environmental, biomedical, agricultural, conservation, education, and biosecurity research. Access to biodiversity data for terrestrial and marine taxa is essential for environment and climate research, underpins predictions for future changes, and supports Australia's adaptation strategy. Australia requires a national approach to managing, resourcing, and governing biological collections but currently has a primarily state-based and funded set of independent institutions.

A DNBC would improve discoverability and access to biological collections for researchers in universities, government, and industry, enable new technologies such as genomics and machine learning, and ensure a shared resource approach to new technologies such as environmental DNA, advanced imaging, bioacoustics, and virtual specimens. Australia's biological collections provide fundamental infrastructure underpinning research into climate change, environmental assessment and conservation, natural resource management (from forestry to fisheries), health, and biosecurity. Collections are intimately linked to Indigenous Data Sovereignty and Caring for Country.

Timeframe:
A consortium of Collections and NCRIS partners, with an interest in collections, have developed a proposal for a Distributed National Biological Collection (DNBC), supported by a five-year resourcing summary to establish the national and distributed infrastructure, partnerships, technological advances, and workforce to establish this distributed collection. Over this time, anticipated transformations would include provision of the national and state infrastructure to support an integrated system for biological collections data including data and resource management, storage, and provision of extended specimen data via a single access point and including a nationally coordinated skilled workforce.

The value proposition for national biological collections is multifaceted and encompasses scientific, conservation, biosecurity, educational, cultural, and economic benefits. The recently completed cost-benefit analysis of a mission to discover and document Australia's

species Deloitte Access Economics (2021) estimates national benefits ranging between $3.7 to $28.9 billion in one generation. Adopting a national approach to Australia's biological collections would be central to delivering these benefits.

177

Mon, Dec 8, 2025, 10:22 AM Australian Eastern Daylight Time
[ID: sbm3991384dd5e58028804c5]

Title
A/Prof

First Name
Roger

Last Name
Osborne

Organisation
Association for the Study of Australian Literature

In what capacity are you responding?
A representative of an organisation or group

Capability 1
001_Roadmap Survey_Katherine Bode

Capability 2
233_Roadmap Survey_ AustLit, at the University of Queensland

176

Mon, Dec 8, 2025, 10:10 AM Australian Eastern Daylight Time
[ID: sbm3972646aefcbbc4e2b08d]

Title
Prof

First Name
Daniel

Last Name
Angus

Organisation
ARC Centre of Excellence for Automated Decision Making & Society

In what capacity are you responding?
A representative of an organisation or group

Capability 1
#223 - An expanded Australian Internet Observatory. Australia's digital transformation is moving faster than our research infrastructure, reshaping everyday life through algorithmic systems that determine what we see, what we access, and how opportunities are distributed. The ARC Centre of Excellence for Automated Decision-Making and Society (ADM+S) identified early that Australia lacked any national capability to observe, measure and interrogate these systems in real time. The Australian Internet Observatory (AIO) was created to fill this gap because nothing like it existed. But the pace and complexity of automation now demand that AIO be expanded into a core national asset. Strengthening AIO is essential if Australia is to understand and respond to the digital conditions shaping society. Rather than investing further in traditional, static, and retrospective HASS infrastructure, the priority must be building capabilities that let us open up, audit and interpret the algorithmic and AI-driven systems governing contemporary life. This includes large-scale observability tools, advanced analytics, and new visualisation and simulation environments, including those that integrate generative AI technologies. These capabilities allow researchers to detect emerging risks, understand opaque systems, and produce actionable evidence for regulators, industry and communities. An expanded AIO will deliver national benefit by enabling research that keeps pace with rapidly evolving technologies and their social impacts. It will equip Australian researchers to respond to threats and challenges, from misinformation to automated discrimination, while also informing new pathways, alternatives and innovations that support a healthy digital society. By connecting across NRIs and building collaborative, interoperable tools, AIO positions Australia as a leader in understanding and shaping the algorithmically mediated world we now inhabit.

175

Mon, Dec 8, 2025, 10:04 AM Australian Eastern Daylight Time
[ID: sbm399126fb91e52e229ab14]

Title
Dr

First Name
Tom

Last Name
McGoram

Organisation
Heavy Ion Accelerators

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Regarding specific NRI referenced in the published survey responses (Question 5), HIA supports the National Space Test Facility (NSTF, Mt Stromlo, ANU) as a high priority for NCRIS funding, through appropriate subcontracting arrangements with an existing NCRIS provider. NSTF is a unique, national level facility with a high domestic and international profile, and provides critical expertise and capabilities for Australia's space sector. It is a vital element of the existing National Space Qualification Network (NSQN) and without NSTF, the space industry would have to seek access overseas, bringing with it delays, cost and uncertainty. Sustainable operations and ongoing enhancements at NSTF are essential for the Australian space sector and by extension, a broad range of remote sensing and earth observation capabilities vital for monitoring of Australia's climate and environment, agriculture, and maritime environment/coastlines.

173

Mon, Dec 8, 2025, 09:49 AM Australian Eastern Daylight Time
[ID: sbm39911a1ff7e15a45fd1fb]

Title
Mr

First Name
Anupam

Last Name
Pilli

Organisation
The Australian National University Institute for Space

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National Space Qualification Capability (Survey responses #45, #77, #238, #261) Rationale: Addresses a clearly identified national gap in coordinated environmental and radiation testing; reduces reliance on US/EU facilities; enables sovereign mission assurance for space, defence, and advanced manufacturing.

Capability 2
2. High-Energy Radiation Effects Testing for Semiconductors (Survey responses #115, #190, #261) Rationale: Essential for qualifying frontier electronics to JEDEC/ECSS standards; critical for space, defence, and AI-edge devices; current domestic capability is insufficient, creating costly offshore bottlenecks.

Capability 3
3. National EMI/EMC + Large-Format Environmental Test Infrastructure (Survey responses #77, #146, #192) Rationale: Industry signalled strong demand for EMI/EMC, vibration, and thermal-vacuum capacity; upgrades are needed to meet qualification requirements for larger payloads and accelerate translation in advanced manufacturing and space sectors.

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Mon, Dec 8, 2025, 09:34 AM Australian Eastern Daylight Time
[ID: sbm39910c60c1e11e10b2b57]

Title
Dr

First Name
Xiujuan

Last Name
Yang

Organisation
Adelaide University

In what capacity are you responding?
An individual

Capability 1
218 – Microscopy Australia

Capability 2
061 – AusBIAS and LMA

Capability 3
036 – James Springfield

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Microscopy Australia was pleased to see so many suggestions to Q35 that clearly identify microscopy as a national capability that requires enhancement. These 2026 suggestions echo and reinforce the responses to the 2021 NRI Survey. Microscopy is an essential underpinning research infrastructure, that requires future increased investment, due to the increasingly growing future demand by the Australian research and innovation community. This is clearly seen in the published Survey responses where there are numerous mentions of microscopy or microscopy 'imaging' techniques, such as 'live cell imaging' and 'super-res imaging'. Enhanced microscopy infrastructure, in capability and capacity, will be required to meet the increasing demand and maintain microscopy infrastructure at the cutting edge to meet the needs of Australian researchers across discipline boundaries. This is critical for nationally significant challenges, like net zero technologies, thriving healthy communities, productive agriculture, critical minerals and a circular economy.

169

Mon, Dec 8, 2025, 08:55 AM Australian Eastern Daylight Time
[ID: sbm3990e87efacccc0aad251]

Title
Prof

First Name
Coral

Last Name
Warr

Organisation
La Trobe University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
097 La Trobe Institute for Sustainable Agriculture & Food, La Trobe University Food security is a critical issue and there is a growing requirement for a sovereign capability in food innovation to value-add to our agricultural exports and improve the nutritional security and health and wellbeing of the Australian population.

Capability 2
079 Bioplatforms Australia With growing volumes of data being produced by new 'omics technologies, there is a growing need for a collaborative, AI-enhanced research ecosystem for life sciences. This will accelerate data modelling to provide greater insights and address complex health and environmental challenges.

Capability 3
161 Australian Plant Phenomics Network APPN is a critical capability to enable innovation that addresses global challenges including food security, the challenge of climate change to our agricultural sector, and environmental protection.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
New capability in Food Science
La Trobe University strongly supports the separate submission made by the La Trobe Institute for Sustainable Agriculture and Food, which is reiterated here.
Australia's food manufacturing sector had a gross value of production in 2023 of $125B and employed 200,000 people, representing 24% of all manufacturing jobs in Australia. Food

security is a complex challenge requiring coordinated alignment and prioritisation of public and private policies, actions and investments (including infrastructure). It should not simply be viewed through the lens of agricultural output but also nutritional security (ensuring nutritious and equitably distributed food for a healthy population) and sovereign security (maintaining a resilient supply chain with sufficient capacity to feed our people during natural disasters). For example, during COVID-19, Australia had only 5 days of fresh food and 14 days of non-perishable food on supermarket shelves.

Despite its national significance, Australia faces a pressing capability gap in advanced food- processing technologies that constrains research, innovation, competitiveness and regional economic growth. Small and medium sized food manufacturers (the vast majority of Australia's food sector) lack affordable, shared access to small (bench)- and pre-pilot scale processing for the proof-of-concept testing, analysis and validation needed to translate innovative ideas into commercially viable products. Research providers similarly lack the latest state-of-the-art bench to pre-pilot scale processing technologies to conduct translational research and to train a skilled workforce for this critical sector. These capability shortfalls span emerging platform technologies such as precision and solid-state fermentation, green extraction methods, modern separation and fractionation, advanced drying and preservation processes to extend shelf life, green packaging solutions, low sugar and healthy-fat formulation, and whole-food processing approaches. It also includes gaps in testing infrastructure for food digestibility, substantiation of health benefits, and regulatory compliance.

At present innovators are forced to test and scale in expensive private facilities or overseas. Australia urgently needs a national, networked capability to lower entry barriers, strengthen industry-research collaboration, de-risk adoption of new technologies, and create high value jobs. Australia should therefore establish and network small- to pre-pilot scale food processing hubs nationwide within the next three to five years. These hubs should be supported by targeted NCRIS investment and designed to provide subsidised access, technical expertise, training, and regulatory testing for food manufacturers, especially SMEs. The hubs will enable rapid validation and adoption of innovative, sustainable food processing technologies, strengthen industry-research collaboration, and enhance workforce skills. By 2028, this network will position Australia as a leader in advanced food manufacturing, improve food security, and create high-value jobs.

Key Justification:

• Need: Australia's food manufacturing sector is critical for economic growth, food security, and job creation, but faces major capability gaps in adopting advanced, sustainable processing technologies.

• Capability: These hubs should provide subsidised access, technical support, training, and regulatory testing, enabling manufacturers—especially SMEs—to validate and implement innovative solutions.

• Medium-term Goals: By 2028, the hubs will foster industry-research collaboration, accelerate technology adoption, and enhance workforce skills, positioning Australia as a leader in sustainable food manufacturing.

• Impacted Research Communities: The initiative will benefit food scientists, engineers, nutritional researchers, regulatory experts, and SMEs, strengthening translational research and sector competitiveness.

• Timeframe: The network should be established and operational within three to five years to address urgent capability gaps and support national priorities.

Enhanced capability in AI

AI is reshaping many research fields, including medical research. Rather than establishing new capability, AI programs should be integrated into existing NCRIS capabilities, leveraging established infrastructure and governance.

168

Mon, Dec 8, 2025, 08:50 AM Australian Eastern Daylight Time
[ID: sbm3990e4457ee562298dc0b]

Title
Dr

First Name
Lisa

Last Name
Yen

Organisation
Microscopy Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
218 – Microscopy Australia

Capability 2
061 – AusBIAS and LMA

Capability 3
036 – James Springfield

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Microscopy Australia was pleased to see so many suggestions to Q35 that clearly identify microscopy as a national capability that requires enhancement. These 2026 suggestions echo and reinforce the responses to the 2021 NRI Survey. Microscopy is an essential underpinning research infrastructure, that requires increased investment due to the growing future demand by the Australian research and innovation community. This is clearly seen in the published Survey responses where there are numerous mentions of microscopy or microscopy 'imaging' techniques, such as 'live cell imaging' and 'super-res imaging'.

Enhanced microscopy infrastructure, in capability and capacity, will be required to meet the increasing demand and maintain microscopy infrastructure at the cutting edge to meet the needs of Australian researchers across discipline boundaries. This is critical for

nationally significant challenges, like net zero technologies, thriving healthy communities, productive agriculture, critical minerals and a circular economy.

Broader impacts are possible through enhanced resourcing, noting that Microscopy Australia received less than 2% of the NCRIS 2023 round:
- >4,000 researchers supported across 33 (of 41) two-digit FoR codes p.a.
- >1,300 publications, double the OECD percentage in top 10% journal percentiles (SNIP) p.a.
- >200 direct industry clients (manufacturing, resources, biomedical) p.a.
- $1.5B raised by just 35 start-ups/spin-outs enabled by Microscopy Australia (over 10 years)
- through just 9 partner organisations.

Microscopy Enables Key National Strategies
· Australia's National Science and Research Priorities
· Research Translation and Commercialisation Agenda
· National Reconstruction Fund Priorities
· Future Made in Australia
· National Research Infrastructure Roadmap 2021 (2026 in development)
· Australia's Critical Technologies Statement
· Australia's Critical Minerals Strategy 2023-2030
· Net Zero Plan (in development)
· National Battery Strategy
· National Waste Policy Action Plan
· Defence Industry Development Strategy
· National Quantum Strategy
· National Hydrogen Strategy
· Powering Australia Plan
· First Nations Clean Energy Strategy

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Mon, Dec 8, 2025, 04:17 AM Australian Eastern Daylight Time
[ID: sbm398ef443d9f07b3c19411]

Title
Dr

First Name
Beryl

Last Name
Morris

Organisation
TERN Australia

In what capacity are you responding?
An individual

Capability 1
Integrated Atmospheric Composition and Greenhouse Gas Monitoring Infrastructure. Melita Keywood - 227; Robyn Schofield - 113; Max Desservettaz – 133; Andrew Kleckociuk – 157; David Etheridge - 226; Zoe Loh - 143; Clare Murphy - 134. Australia currently lacks nationally coordinated infrastructure for measuring essential atmospheric climate variables that underpin climate adaptation, emissions verification, and air quality management. This represents a critical gap in our ability to meet Paris Agreement commitments and verify progress toward Net Zero by 2050. The atmospheric science community has demonstrated unprecedented consensus over 5+ years, with detailed proposals involving CSIRO, Bureau of Meteorology, universities, AAD, and ANSTO. An attempted NCRIS proposal through AuScope in 2019/20, while unsuccessful, demonstrated the maturity of planning. The community has continued coordination through initiatives like AUSTRAL (Australia's Urban Supersite neTwork for Research on Air quaLity) and contributions to the Decadal Plan for Earth System Science 2024-2033. Critical capabilities required: Spatially distributed observing stations covering Australia's main ecosystem types and emission regions, positioned to enable atmospheric modelling for continental and regional-scale greenhouse gas flux estimation at monthly and annual resolution Comprehensive gas monitoring: Priority focus on CO_2 and methane (addressing Australia's Global Methane Pledge commitments), with capability for N_2O, air quality pollutants (NOx, SO_2, NH_3), and other climatically-relevant species Central calibration and standards facility: Essential for ensuring measurement interoperability across networks and international comparability. Currently, Australia lacks this fundamental capability despite CSIRO, BoM, and universities conducting fragmented monitoring Enhanced Southern Ocean and tropical observations: Including upgrade of RSV Nuyina for long-term atmospheric measurements over Southern Ocean (critical for understanding climate impacts on Australia's water and food security), and establishment of long-term monitoring in Australia's western tropical region (e.g., Darwin/Gunn Point or Western Australia) to monitor northern hemisphere pollutant transport and verify Australia's emission

inventories Data management and computational infrastructure: Integrated systems linking observations to atmospheric inverse modelling, emission verification, and climate projection capabilities Why this requires NRI-level investment: Current emission estimation uncertainties often exceed the reductions expected from mitigation strategies being trialled. For methane specifically, inventory methods underestimate cattle emissions by at least 33%, wastewater treatment plant emissions by 50%, whilst over-estimating landfill emissions by 30%. At current carbon prices ($35/tonne), this uncertainty represents enormous financial risk to Australian businesses and undermines the credibility of carbon markets and abatement schemes. This exemplifies the public good nature of research infrastructure requiring government investment. Benefits accrue across climate science, agricultural sector emissions management, carbon market integrity, air quality management, and Australia's international climate credibility—yet no single commercial entity will fund operations because competitive advantage is not excludable. Alignment with national priorities: Climate policy credibility: Enables verification of Australia's emissions reporting and mitigation effectiveness Economic opportunity: Supports emerging carbon markets and agricultural emissions reduction innovation Health and wellbeing: Underpins air quality monitoring essential for population health International obligations: Addresses requirements under Paris Agreement and Global Methane Pledge Research excellence: Positions Australia as Southern Hemisphere leader in atmospheric composition research Relationship to TERN's capabilities: TERN's flux tower network, soil monitoring infrastructure, and ecosystem measurement capabilities provide essential terrestrial components of a comprehensive atmospheric observatory. The proposed atmospheric network would integrate with and leverage TERN's existing infrastructure, creating synergies between land surface and atmospheric observations essential for robust emissions attribution and ecosystem-atmosphere exchange understanding. Strategic investment in both TERN's terrestrial monitoring enhancement (greenhouse gas flux measurements, soil biogeochemistry) and the atmospheric composition network would create an integrated national capability exceeding the sum of parts—enabling Australia to credibly verify emissions, understand ecosystem-atmosphere feedbacks under climate change, and provide the observational foundation essential for climate adaptation and mitigation. Community readiness and timeframe: The community has demonstrated exceptional readiness with existing network design (Ziehn et al. 2016), available commercial instrumentation, established international protocols, and multi-institutional coordination. Initial stations could be operational within 2-3 years, with full continental-scale network achieved within 5-7 years depending on resourcing..

Capability 2
Expanded Earth Observation Calibration/Validation. Geoscience Australia - 140;AURIN – 94; APPN - 161; SARDI - 072. Satellite Earth observation increasingly underpins environmental monitoring, agricultural management, disaster response, and natural resource planning. However, confident application of these data requires robust ground-truthing infrastructure validated for Australian conditions. Additionally, observational data alone increasingly proves insufficient—users require predictive, scenario-modelling capabilities enabling proactive decision-making. Enhancing Australia's Earth observation validation infrastructure ensures satellite data reliability for practical applications. Extending this through digital twin ecosystems combining real-time monitoring, AI-driven predictive analytics, and decision-support interfaces would create transformational translation capability. Land managers could simulate management interventions virtually before implementation; emergency services could predict fire or flood behaviour with greater confidence; agricultural industries could optimise resource use through validated

forecasts. These capabilities leverage substantial existing investment in TERN's monitoring network whilst deliberately building practical translation pathways—a key Roadmap priority. They position Australia as a trusted provider of Southern Hemisphere validation data for international missions whilst serving domestic needs.

Capability 3
AI Models and Digital Twins - Sharon AI- 153; BPA- 079; Geoscience Australia - 140; TERN-154; Cloud Business Transformation - 156; Curtin Uni-191; Sydney Informatics Hub - 200. International developments in geospatial AI (NASA/IBM Prithvi, European initiatives) demonstrate the transformational potential of foundation models for environmental monitoring and analysis. Without Australian investment, the nation risks technological dependence on foreign models not optimised for our landscapes, governance arrangements, or strategic priorities. A Geospatial Foundation Model development of Australia's first dedicated geospatial foundation model addresses this sovereign capability gap. Extensions supporting multi-modal data integration, continual pre-training, and open-source accessibility would create infrastructure serving diverse applications from biodiversity monitoring through precision agriculture to disaster response. The model's open-source, nationally-hosted nature ensures accessibility for SMEs and researchers whilst maintaining data sovereignty. This investment exemplifies strategic foresight—positioning Australia to harness AI's potential for environmental management whilst avoiding technological dependence. It aligns with Critical Technology Framework priorities and demonstrates research infrastructure evolving to leverage emerging technological capabilities. Cross-cutting observation: These three priorities are highly complementary, collectively creating an enhanced national environmental monitoring, prediction, and decision-support capability. Greenhouse gas monitoring provides essential emissions data; Earth observation and digital twins enable predictive management; geospatial AI accelerates analysis and application development. Together they exemplify research infrastructure designed for translation and impact from inception whilst maintaining research excellence. They also reflect TERN's strategic positioning: leveraging substantial existing infrastructure investment whilst addressing critical capability gaps, building translation pathways deliberately, and ensuring Australia maintains sovereign capability in environmental intelligence essential to national prosperity and sustainability.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National Environmental Intelligence Platform: integrating TERN's observational infrastructure with operational prediction systems
Need
Several submissions mentioned prediction (072, 079, 103, 140, 154, 156, 191, 200) - Australia's environmental management, agricultural productivity, and climate adaptation planning increasingly require seamless integration between research-quality observational data and operational prediction systems. Currently, these capabilities exist in separate organisational and technological silos—research infrastructure organisations like TERN provide high-quality environmental observations; operational agencies (Bureau of Meteorology, state water and agriculture departments) provide forecasts and predictions; but systematic integration enabling observational data to continuously improve prediction systems, and predictions to guide adaptive observation strategies, remains immature.

This gap results in:

- prediction systems not leveraging best available observational data for initialisation and validation
- observational investments not optimally targeted to reduce prediction uncertainties
- researchers and end-users accessing different, potentially inconsistent data and forecast products
- missed opportunities for research innovations to rapidly improve operational capabilities

Community demand for integration: TERN's 2025 national survey of ecosystem researchers' future research intentions and need for NRI confirms this infrastructure gap as a critical priority. When asked about barriers to impact, respondents identified three interconnected challenges:

Translation gaps (79 mentions): Australia lacks mechanisms to weave observational data into narratives and core indicators that decision-makers can use repeatedly

Strategic data gaps (51 mentions): the missing pieces prevent telling coherent, nationally persuasive stories—not because Australia lacks data, but because critical validation, geographical, and thematic blind spots undermine confidence

Policy misalignment (44 mentions): even robust data often goes unused because policy frameworks don't recognise, require, or reward environmental evidence

Most tellingly, respondents described feeling the sector is "doing more and more, yet moving no closer to impact," with one noting Australia lacks "a unifying theory of change"— a shared understanding of how evidence travels into policy, investment, and practice. The Environmental Intelligence Platform directly addresses this by creating the coherent pathway from observation through prediction to decision that the community identifies as missing.

Proposed capability

Develop a National Environmental Intelligence Platform creating systematic integration between environmental monitoring infrastructures (TERN, IMOS, the proposed new atmospheric observatory, etc) and operational environmental prediction systems, creating an enhanced national environmental monitoring, prediction, and decision-support capability. Greenhouse gas monitoring provides essential emissions data; Earth observation and digital twins enable predictive management; geospatial AI accelerates analysis and application development. Integrating and optimising capabilities that are already funded by NCRIS/NRI exemplifies research infrastructure designed for translation and impact from inception whilst maintaining research excellence.

Key components include:

1. Data integration infrastructure. Standardised, automated pipelines enabling real-time flow of observational data (e.g., soil moisture, vegetation condition, carbon flux, meteorological variables) into operational forecast models

2. Prediction validation framework. Systematic comparison of operational forecasts against 'ground-truth observations', identifying prediction skill, biases, and uncertainty characteristics across diverse Australian ocean, natural, managed, urban and coastal environments

3. Adaptive observation strategy tools. Decision-support systems identifying where and when additional observations would most effectively reduce forecast uncertainties, optimising observational infrastructure investments

4. Research-to-operations pathways. Structured mechanisms enabling research innovations (improved process understanding, new sensors, AI/ML techniques) developed using existing NCRIS infrastructure to transition rapidly into operational systems

5. Unified data and forecast access. Single national portal providing researchers, industries, and government users with seamless access to both observational data and predictions, with transparent uncertainty quantification
6. Multi-scale integration. Architecture accommodating point observations, regional monitoring, and continental-scale patterns, linking these to forecast systems operating at corresponding scales

Medium-term goals
* Demonstrably improve operational environmental forecast skill through better observational data integration (quantified through validation metrics)
* Reduce time lag between research innovations and operational implementation from years to months
* Provide Australian industries with world-leading environmental intelligence supporting climate adaptation and risk management
* Position Australia as international exemplar of research infrastructure-operational system integration
* Enable more strategic, efficient allocation of observational infrastructure investments guided by prediction uncertainty reduction

Impacted research communities
* Environmental and climate science researchers requiring both observations and predictions
* Agricultural scientists developing climate adaptation strategies
* Hydrologists and water resource managers
* Biodiversity and ecosystem researchers
* Disaster risk and emergency management researchers
* Earth system modellers seeking validation data

Industry and Government users
* Agricultural sector (seasonal forecasting, climate risk management)
* Water utilities and irrigation managers
* Emergency services (fire, flood, heatwave prediction)
* Environmental consultancies
* Insurance and financial services assessing climate risks
* Conservation and natural resource management agencies

Timeframe
Phase 1 (2026-2028). Proof-of-concept integration for priority variables (soil moisture, vegetation condition) with operational agricultural and water forecasting systems; establish governance and technical protocols
Phase 2 (2028-2031). expand integration across additional variables and prediction systems; implement adaptive observation strategies; develop unified access platform
Phase 3 (2031+). fully operational national capability with continuous improvement cycles

Strategic rationale
This capability addresses the Roadmap's emphasis on research translation, industry engagement, and practical impact whilst leveraging substantial existing investments in NCRIS' observational infrastructure and operational prediction systems. It exemplifies how strategic integration can create value exceeding the sum of component parts. Importantly, this infrastructure embodies the public good argument central to NRI definition (Q1). No single industry or research organisation can justify the investment, yet benefits accrue across agricultural productivity, water security, disaster resilience, and

climate adaptation—all critical national priorities. Only coordinated government investment can deliver this integrating capability.

The platform would position Australia as an international leader in research infrastructure-operational system integration, addressing a challenge many countries recognise but few have solved systematically. It demonstrates how research infrastructure can evolve beyond data provision to become integral to national environmental intelligence capability supporting both research excellence and practical decision-making.

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Mon, Dec 8, 2025, 01:07 AM Australian Eastern Daylight Time
[ID: sbm398f3bd937a6b79f69d8f]

Title
Dr

First Name
Nicholas

Last Name
Condon

Organisation
The University of Queensland

In what capacity are you responding?
An individual

Capability 1
011_Roadmap Survey_ Tim McCubbin

Capability 2
036_Roadmap Survey_ James Springfield

Capability 3
218_Roadmap Survey_Microscopy Australia

164

Sun, Dec 7, 2025, 11:41 PM Australian Eastern Daylight Time
[ID: sbm398e90209751585595b03]

Title
Prof

First Name
Roslyn

Last Name
Francis

Organisation
Australasian Radiopharmaceutical Trials Network

In what capacity are you responding?
A representative of an organisation or group

Capability 1
159: National Imaging Facility – Translational research infrastructure: recommendation to include biomedical imaging, radiochemistry, advanced molecular imaging techniques (total body PET).

Capability 2
118 (S Miekle) : Biobanking infrastructure – recommendation to include biomedical imaging in a biobanking infrastructure, including developing imaging repositories/biobanks linked to clinical data and to inform AI development.

Capability 3
192 - ARTnet (as per prior submission)

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National imaging research infrastructure initiatives
-Imaging is integral in the translational pipeline in biomedical innovation from discovery to clinical implementation. In the development of diagnostics, therapeutics and medical technologies, imaging provides the evidence required to demonstrate mechanism of action, optimise dosing, and assess therapeutic responses.
- initiatives to support and further develop national research imaging infrastructure include
i) Enabling an imaging translation pipeline from innovation/discovery to clinical application

ii) Facilitation of standardisation / harmonisation programs of imaging in clinical trials to ensure high quality research and attract and grow translational research opportunities
iii) National infrastructure to support clinical trials including imaging biorepositories / integration of imaging data with clinical outcomes / imaging analytics and AI initiatives
iv) investment in key critical infrastructure /new technologies (eg: total body PET) that provide greater access and may accelerate research opportunities including in preventative health, rare diseases, 'in need' populations (eg: paediatric) and for our ageing population.
- These initiatives will ensure there is infrastructure to ensure timely translation from discovery to validation and then to implementation, aiming to improve health outcomes.

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Department of Education

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Sun, Dec 7, 2025, 10:32 PM Australian Eastern Daylight Time
[ID: sbm398ea9b0b1a60df4b6d38]

Title
Mr

First Name
Mark

Last Name
Stickells

Organisation
Pawsey Supercomputing Research Centre (Pawsey) and the National Compute
Infrastructure (NCI) through Prof Andrew Rohl

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Thank you for the opportunity to provide input to the NCRIS survey. Pawsey and NCI
welcomes this process and strongly supports the development of a coherent national view
of future research infrastructure needs. We wish to emphasise the critical timing of
investment decisions in 2026 for Australia's Tier-1 HPC and data infrastructure. Both
Pawsey and NCI have essential systems (across HPC and/or data infrastructure) that will
reach end-of-life in this period and first year of the new Roadmap, and without timely and
planned Commonwealth investment, facilities will begin shutdown and decommissioning
with consequential impacts on national research capability, industry partnerships, and
Australia's sovereign compute and data capacity. Thousands of researchers and key
research domains with interdependent infrastructures (particularly advanced
instrumentation, environment and radioastronomy) will be impacted. The attachment to
our survey supports national planning and a framework for investment required to
maintain continuity of service, support rapidly growing demand, and ensure Australia
retains a competitive and secure national HPC and data platform. We appreciate NCRIS's
essential role and look forward to continued collaboration as national priorities and
investment pathways are refined. CAPABILITY ID AND NAME: 263_Roadmap Survey_Pawsey
Supercomputing Research Centre (Pawsey) As outlined in Pawsey's response to the 2026
NRI Roadmap Consultation Survey (submission #263), high precision, high performance
computing is essential for key national capabilities across Defence, Heavy Industry,
Quantum, Sovereign Government Needs (including modelling critical infrastructure,
climate and health events), Science and Innovation (including materials, chemicals, fluid
dynamics, biology, genomics and drug development). High precision high performance
computing needs cannot be substituted by other investments in sovereign data centres or
sovereign AI training centres, as they are fundamentally different infrastructures. At the
scale needed by the nation there is commercial market failure to provide HPC capability
at scale, and at an acceptable price point. As such, a coordinated, national approach to

HPC is required to meet this need. An outline of Australia's high performance computing strategy is attached for reference, with the Australian HPC strategy to be finalised and circulated in early 2026. The need for this capability is echoed in a number of submissions, such as that from 079_Roadmap Survey_Bioplatforms Australia and 090_Roadmap Survey_Jason Evans.

161

Sun, Dec 7, 2025, 09:48 PM Australian Eastern Daylight Time
[ID: sbm398e8628bff06300fd5a4]

Title
Dr

First Name
Tom

Last Name
May

Organisation
Taxonomy Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
A Distributed National Biological Collection (DNBC) is a key capability in relation to Australian research infrastructure   Taxonomy Australia <https://www.taxonomyaustralia.org.au/> is the peak body that has carriage of Discovering Biodiversity: A decadal plan for taxonomy and biosystematics in Australia and New Zealand 2018–2027 <https://www.science.org.au/support/analysis/decadal-plans-science/discovering-biodiversity-decadal-plan-taxonomy>, a plan prepared under the auspices of the Australian Academy of Science.   Taxonomy Australia advocates for an ambitious plan to fully document the biota of Australia in a generation in order to effectively support biosecurity, biodiscovery, conservation and environmental management across all groups of animals, fungi and plants. Australia has mega-diverse biodiversity with many unique species and only 30% of our biodiversity has been identified and described from an estimated total in the order of three quarters of a million species. Taxonomy Australia represents in the order of 1,000 researchers in taxonomy and biosystematics (including technical and collections support staff) across multiple research institutions in Australia, in museums and herbaria and in universities. In the 2021 National Research Infrastructure Roadmap, the Department of Education flagged a National Approach to Collections as an important area of investment, but investment has not yet been forthcoming – in contrast to the situation in North America and Europe where investment in similar infrastructure is well underway.   This National Approach to Collections can be characterised as the Distributed National Biological Collection (DNBC). In relation to submissions to the 2026 NRI Roadmap survey, we note that a number of submissions emphasised the critical importance of the DNBC. Specific responses in the 2026 NRI Roadmap survey that raised the importance of the DNBC were: (1) Response 214 – from South Australian Museum – recommending a "dedicated National Collections Infrastructure Program"; (2) Response 147 – from Mark Adams – including among the nine recommendations, to: "Provide support for Natural History Museums & Herbaria across all areas underpinning biodiversity discovery"; and "Facilitate the networking of all Natural

History Museums & Herbaria to minimise duplication of collection and taxonomic effort …"; and (3) Response 179 – from National Imaging Facility Museums Special Interest Group – pointing out that "museums and natural history collections, which are our primary repositories of biodiversity information, will play a key role supporting biodiversity monitoring and efforts to retain ecosystem services in the face of accelerating global climate change and environmental degradation". Biological collections are physical collections of specimens of biological origin such as pressed plant specimens, dried fungi or pinned insects, including also cryopreserved material and DNA samples. Biological specimens can be accompanied by considerable metadata on the organism itself and its place of collection and environment. The numerous individual biological collections across Australia are managed by institutions such as museums and herbaria that most often have a mandate to retain and care for specimens in perpetuity. Individual collections have differing rates of progress in making data available and differing capacities to close gaps. The DNBC will improve access and discoverability to biological collections, many of which remain un-databased (in relation to collection metadata), un-digitised (in relation to imaging) and/or un-sequenced (in relation to DNA sequences and genomes). The DNBC will enable transformations to the way that collections are developed, managed, coordinated, and made visible, that will provide streamlined processes and enhanced support to end-users across research, industry and the general public. In building the DNBC, transformations are required in: (1) Leadership, to provide national coordination to align with research priorities and management needs; and in regard to Indigenous Cultural and Intellectual Property (ICIP) principles, (2) Digitisation, storage and management in order to mobilise collections-based data; (3) Data integration, by using standards-based approaches global access to Australian collections data will be facilitated; (4) Application of emerging transformational technologies. There are opportunities to immediately take up emerging transformational technologies, such as to create a national DNA sequence library and to implement a national advanced imaging store; and across application of environmental DNA, bioacoustics and virtual specimens; and (5) Skills and workforce development. It is vital to foster a highly trained workforce with diverse expertise in collections management, digitisation, genomics, taxonomy and biobanking, and across emerging technologies such as robotics and AI. Enhancing the "integration, coordination and profile of the biodiversity collections in Australia ..." is one of the key strategic actions in the Decadal plan for taxonomy and biosystematics. Implementation of and adequate ongoing support for the DNBC remains a key driver in accelerating progress on documenting Australia's biota and consolidating knowledge on existing species. In relation to the benefits of comprehensively documenting Australia's biota, for which the DNBC is critical infrastructure, a Cost-benefit analysis of a mission to discover and document Australia's species, prepared by Deloitte Access Economics in 2021, concluded that every $1 invested in discovering all remaining Australian species will bring up to $35 of economic benefits to the nation <https://www.science.org.au/news-and-events/news-and-media-releases/mission-map-australias-biodiversity>. The more than 70 million scientific specimens already held in museums and herbaria in every Australian state and territory is already valued at $7 billion in terms of replacement cost alone, although of course many of the specimens (such as of extinct animals) are irreplaceable. Biological collections provide value across a wide spectrum of research fields as well as more broadly to industry, the environment, and human health. This value, as enumerated below, will be enhanced by the DNBC. Biological collections underpin research across multiple research areas, including (1) environmental research where collections are routinely critical to studies of biodiversity, evolution and ecology; (2) biomedical research that investigates newly emerging disease vectors and host shifts and understands disease evolution; and (3) agricultural research that enhances crop yields, develops innovative plant varieties, and identifies and lead to improved control of pests and diseases. Biological collections are

critical to conservation planning, especially for management of rare and endangered species, prediction of climate change responses and monitoring success of management changes over time. Biological collections contribute to education and outreach by providing learning opportunities for students and the public related to biodiversity, evolution, and other foundational biological concepts.   Biological collections are the foundation for strong biosecurity and successful quarantine. Collections are high-quality reference repositories of information that helps identify pests and disease, underpins market access and trade outcomes, and informs decision-making processes during emergency responses to incursions of exotic pests and disease.   Biological collections are the essential raw material for research and development for industry in the areas of novel pharmaceuticals and treatments, bioengineering and biomimicry. Biological collections have a role in creating a shared understanding of Caring for Country, through partnerships with First Nations Peoples about Traditional Ecological Knowledge. The DNBC will provide data and resources that support existing national research infrastructure such as the Atlas of Living Australia, Bioplatforms Australia, the Terrestrial Ecosystem Research Network, the National Imaging Facility, and Microscopy Australia. Nevertheless, the DNBC is a required addition to these initiatives in order to streamline processes, provide a strategic national approach to improved access and discovery of collections, and implement a shared resource approach to new and emerging technologies.

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Sun, Dec 7, 2025, 07:23 PM Australian Eastern Daylight Time
[ID: sbm398e0183e751ea6b08ed2]

Title
Dr

First Name
Louise

Last Name
Ludlow

Organisation
Australasian Biospecimen Network Association (ABNA)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
#184 – Australian Biospecimen Network Association (ABNA)

Capability 2
#202 – Victorian Cancer Biobank. Without ongoing and meaningful funding, the entire cancer research infrastructure and ecosystem will be reduced.

Capability 3
#230 – Busselton Health Study. Without stable funding, a biobank does not just "slow down", it degrades, along with an entire ecosystem of potential discoveries, legacy and trust built over decades.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Priority: A National Biobank Coordination & Discovery Platform as outlined in the CSIRO "Valuation of increased coordination in Australian biobanking".
Need: Australian biobanks are fragmented and under-utilised; coordination unlocks national value.
Capability: Federated discovery system, common standards, shared governance and Indigenous data controls.
Goals: Full catalogue of collections, standardised operations, faster national access.
Impact: Researchers, clinicians, industry, and Indigenous communities.

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Issues Paper Consultation Survey
Department of Education

158

Sun, Dec 7, 2025, 07:03 PM Australian Eastern Daylight Time
[ID: sbm398deed948518d4fe8bf4]

Title
A/Prof

First Name
Jennie

Last Name
Hui

Organisation
Busselton Population Medical Research Institute Inc

In what capacity are you responding?
An individual

Capability 1
#230 Busselton Health Study Without stable funding, a biobank does not just "slow down",
it degrades, along with an entire ecosystem of potential discoveries, legacy and trust built
over decades.

Capability 2
#184 Australasian Biospecimen Network Association. Biobanks must be integrated with
advanced data management platforms that allow for big data analysis, genomic
sequencing, and longitudinal data tracking.

Capability 3
#195 Population Health Research Network. Important to have a platform to support data
discovery, access and advanced analytics for genomics and other omics.

157

Sun, Dec 7, 2025, 06:55 PM Australian Eastern Daylight Time
[ID: sbm398de79a7d51500e5acc6]

Title
Prof

First Name
Alan

Last Name
James

Organisation
The Busselton Population Medical Research Institute

In what capacity are you responding?
A representative of an organisation or group

Capability 1
#184 Australian Biospecimen Network Association (ABNA). There are numerous invaluable biospecimen collections in Australia which are associated with extensive phenotypic data. These are in urgent need of systematic support and preservation.

Capability 2
#195 Population Health Research Network (PHRN). The many population health studies in Australia need to be networked usefully to maximise their application to health research.

Capability 3
#230 Busselton Health Study. Longitudinal population health studies represent irreplacable Australian research enabling platforms.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
N/A

156

Sun, Dec 7, 2025, 05:24 PM Australian Eastern Daylight Time
[ID: sbm398d948feda617e0fb91e]

Title
A/Prof

First Name
Branka

Last Name
Miljevic

In what capacity are you responding?
An individual

Capability 1
New NRI: An integrated atmospheric composition observing network. Robyn Schofield - 113; Max Desservettaz – 133; Andrew Kleckociuk – 157; David Etheridge - 226; Melita Keywood - 227

Capability 2
New NRI: AURIN – 94: 1) Advanced Earth observation systems, including new-generation satellites and drone-based remote sensing technologies, for real-time monitoring and 2) National Air and Water Quality Monitoring Network

155

Sun, Dec 7, 2025, 05:21 PM Australian Eastern Daylight Time
[ID: sbm398d913dc0f004ca459dc]

Title
Dr

First Name
Kieran

Last Name
O'Brien

Organisation
Siemens Healthcare Pty Ltd

In what capacity are you responding?
An individual

Capability 1
159 National Imaging Facility

Capability 2
079 Bioplaftorms Australia

Capability 3
156 Cloud Business Transformation

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The NCRIS needs to include in its strategy the upgrading and expansion of the National Imaging Facilities current Ultra-high Field systems to support support basic science and clinical trials but also to potentially contribute data to Biobanks that are relevant for the future.

Australia has numerous biobanks/or longitudinal studies that are occurring in isolation across the country. The establishment of an Australian-wide Biobank has been explicitly requested by numerous submissions (013, 051, 058, 086, 118, 169, 178, 184, 194, 195, 201, 202, 209, 228, 230, 286) and each desire to emulate other global biobank initiatives such as the UK Biobank [1]. The UK Biobank includes Imaging data, Biomarker data, Genetic data, Healthcare records, Questionnaire data, Physical measurements, Demographic and lifestyle data, Environmental data from 500,000 participants. It has become a valuable

data source that is empowering both UK and world discoveries in health and medical research. It has become a valuable and rich national long term strategic asset.

The Victorian Cancer Biobank estimates that their own biobank is projected to have a return on investment of $1.59aud for each $1aud invested. The nationwide capability of the NRI means that if it decides to establish a singular or a network of biobanks, it should be able to take advantage of economies at scale benefiting further any return on investment.

The NRI is also already uniquely positioned with current infrastructure to begin establishing an Australian wide bio bank that could challenge the UK biobank in terms of scale and depth. To be relevant and make a difference to current biobanks like the UK, an Australian Biobank must not only match the Genetic, Blood Biomarkers, and Non-invasive imaging (spectroscopy) data available but take advantages of the current technologies and trends available today.

The National Imaging facility is one such NRI facility which can be utilized but requires significant prioritization. Currently the National Imaging Facility has state of the art Photon Counting CT, Total Body PET scanners and associated radio chemistry facilities, Clinical High Field - High gradient Magnetic Resonance Imaging scanners and an Ultra-Low Field MRI network across Australia; however to differentiate itself from other biobank initiatives and maintain its basic science capability, the National Imaging Facility needs significant investment in its Whole Body Ultra-High Field (7T) Magnetic Resonance Imaging Scanners. Furthermore to capitalize on Artificial intelligence, those in the industry also know that any AI algorithm will only ever be good as the data that goes into the model. This has been true since the Garbage in Garbage out phrase was first coined in 1957 [2] and is still relevant today. This means that an imaging biobank should aim to encompass and capture data of the the highest quality to best understand how our body changes both functionally and structurally over time.

Ultra-high Field (7T) Magnetic Resonance field strength has already been proven as an essential tool for Australia's Cognitive Neurosciences (submission 058) and Organization of Human Brain Mapping (submission 228) communities work to understand how different aspects of the brain works and ages. Whole body Ultra-high Field (7T) strength has advanced significantly the National Imaging Facilities initial investment in 2013/2014, it has since with both hardware, software enhanced with AI mastered many of the physical challenges it faced to its routine use and has now become clinically approved for use in humans. This means that research studies are not only increasing our understanding of how the body works and ages but it is being translated into tangible clinical outcomes translated back to High Field MRI, such as the update to the McDonald Criteria for Multiple Sclerosis . Ultra-high Field (7T) Magnetic Resonance imaging is uniquely positioned to provides complimentary means to probe non-invasively both the macro/micro structural or functional data with unique contrasts in volunteer populations. Adding this data to a large scale biobank would be complimentary and unique to any clinical data also collected.

The National Imaging Facility should be funded to upgrade and expand its Ultra-High Field (7T) Magnetic Resonance Imaging capability to ensure a broad base of imaging equipment is available to Australians for both basic science, clinical translation and establishing world beating biobanks. This would ensure that the data from the National Imaging Facility instrumentation is of sufficient quality to be exploited by AI now and into the future.

[1] Sourced from https://www.ukbiobank.ac.uk/about-us/

[2] "Work With New Electronic 'Brains' Opens Field For Army Math Experts". The Hammond Times. November 10, 1957. p. 65.

154

Sun, Dec 7, 2025, 03:24 PM Australian Eastern Daylight Time
[ID: sbm398d2652075171501e502]

Title
Prof

First Name
Wojtek

Last Name
Goscinski

Organisation
National Imaging Facility

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
— Enhanced Role of Biomedical Imaging —

An enhanced national imaging capability is essential to support a robust translation pipeline that helps pharmaceuticals, biologics and medical technologies progress efficiently from discovery to market. Imaging provides the evidence base needed to demonstrate mechanism of action, optimise dosing, and assess therapeutic response across the development lifecycle. It is also fundamentally complementary to genomics, enabling the multimodal biomarker development and phenotyping required for precision medicine.

Imaging plays a foundational role across Australia's medical product sector, enabling the validation of medical devices, optimisation of digital health technologies, and the development of advanced therapeutic platforms. It is especially critical for the emerging field of theranostics, where imaging guides both diagnosis and personalised treatment.

In neuroscience, state-of-the-art imaging supports fundamental discovery and translational research into neurological and mental health conditions, providing insights that cannot be obtained through any other modality. With an ageing population and rising neurological disease burden, the importance of imaging will only increase, supporting faster interventions, improved monitoring, and the development of next-generation neurotechnologies.

Beyond health, imaging is a critical enabling technology for Australia's productivity, with applications in mineral characterisation, materials science, agriculture, and environmental monitoring.

Enhancing national imaging infrastructure will directly accelerate innovation, improve health outcomes, and expand Australia's role in global medical technology development.

— Sustaining Ultra-High-Field Magnetic Resonance Imaging for Translational Neuroscience —

Australia's only two ultra-high-field human MRI scanners—both originally NCRIS-funded—are now more than 10 years old and at end of life. Replacement them, and building on their success, is essential to maintain national capability in neuroscience, clinical translation, and medical innovation. Without renewed investment, Australia will lose critical capacity in brain research, neurological disease modelling, imaging-driven AI development, and clinical trial readiness.

Ultra-high-field MRI underpins:
- Mental health: mapping brain networks involved in depression, anxiety, PTSD and addiction.
- Neurology: enabling research on areas such as epilepsy and motor neuron disease.
- Fundamental neuroscience: supporting connectomics, the fine-scale mapping of brain connectivity that drives advances in cognition research, neurotechnology and diagnostic AI.

Impact example: NIF supported Synchron, the Australian brain–computer interface company, through early-stage access to its 7T MRI. Synchron has since raised AUD $305M Series D funding and received $54M from the National Reconstruction Fund, demonstrating how cutting-edge imaging directly supports sovereign medical technology development.

— Clinical Integration of Research Infrastructure —

The draft National Health and Medical Research Strategy calls for research infrastructure to be embedded in clinical environments.

NIF aims to maintain an appropriate balance between university-based and clinically embedded human imaging facilities, ensuring that its national instrument portfolio supports a full translation pipeline—from discovery to clinical application. As clinical integration expands, sustaining this balance will require strengthening both capability and capacity across the network.

For imaging, clinical embedding is essential to increase translation because:
1. It is the only way to image Australia's sickest patients, including those in intensive care, acute neurology and oncology who cannot access research-only facilities.
2. It accelerates translation by enabling real-time clinical feedback, validation of imaging biomarkers, and seamless integration into diagnostic and treatment pathways.
3. It directly supports clinical trials by providing consistent imaging infrastructure for endpoints, biomarker validation and patient access, making trials faster, more reliable and more attractive to global sponsors.

NIF has begun this work through partnerships with major hospitals, but expanding clinical integration will require targeted support for specialised equipment, skilled staffing, governance arrangements and digital connectivity. A more clinically embedded imaging network will enhance advanced clinical trials, precision diagnosis, imaging-guided therapies and stronger clinician–researcher collaboration.

— Artificial Intelligence —

AI is reshaping medical research, with foundation models—large, general-purpose AI systems—becoming critical infrastructure. These models are:
- High-value: requiring coordinated compute, data and expertise.
- Equitable: enabling broad access to advanced analytics.
- Reusable: supporting multiple downstream applications.
- Scalable: across imaging, life sciences and clinical domains.
- Sovereign: ensuring Australian data and health priorities shape Australian models.

NIF advocates for AI programs integrated within existing NCRIS capabilities, leveraging established infrastructure and governance.

Integrating AI within NIF will strengthen national leadership in imaging science, data-driven medicine and responsible AI development.

Medium-Term Goals (3–5 years)
- Establish secure, ethical environments for training Australian imaging foundation models.
- Ensure interoperability with national platforms, including the Australian Digital Health Agency.
- Build an AI-ready imaging workforce.
- Demonstrate AI-enabled advances in early detection, treatment planning and drug development.

Impacted Communities: health and medical researchers, imaging and data scientists, clinicians, clinical trials, biotech/medtech, digital health, and regulators.

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Sun, Dec 7, 2025, 10:20 AM Australian Eastern Daylight Time
[ID: sbm398c1064965170f3eef56]

Title
Dr

First Name
Scientific Services

Last Name
at QIMR Berghofer

Organisation
QIMR Berghofer

In what capacity are you responding?
A representative of an organisation or group

Capability 1
202 – Victorian Cancer Biobank Consortium. Establishing a National Agency for Biobanking Coordination to facilitate standardisation, visibility, and cross-institutional collaboration for biobanking infrastructure has the potential to unify important or valuable biological material to enhance the speed, power, and integrity of medical research; and prevent re-sampling or oversampling of the population.

Capability 2
111_Roadmap Survey_ University of Sydney. Establishing a National Multi-Omics & AI-Driven Translational Research Infrastructure (NMO-TRI). Multi-omics is growing in demand, complexity, and technology, but also on outcomes for translation. A national initiative to drive this sector would allow it to grow faster and deliver real outcomes faster. However it does need to involve a cross-state response.

Capability 3
174_Roadmap Survey_ EMBL Australia. Developing a highly skilled NRI workforce that is globally connected and supported by robust career recognition and accreditation frameworks is essential to grow the sector and produce better long term sustainability and outcomes.

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Sat, Dec 6, 2025, 07:38 PM Australian Eastern Daylight Time
[ID: sbm3988e87ee350e3b8a9029]

Title
Dr

First Name
Manodeep

Last Name
Sinha

Organisation
RSE-AUNZ

In what capacity are you responding?
A representative of an organisation or group

Capability 1
207 RSE-AUNZ / 127 Rowland Research Software NRI

Capability 2
191 national research software centers

Capability 3
153 A "Software Sustainability Institute"

149

Sat, Dec 6, 2025, 02:16 PM Australian Eastern Daylight Time
[ID: sbm3987c15f4550a58897c39]

Title
Prof

First Name
Nicole

Last Name
Pratt

Organisation
University of South Australia

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Harmonised data for a learning health system

The need: Australia collects a vast array of health data that is captured at point of care (e.g. electronic health records, allied health functional assessments), medicines dispensing records (e.g. pharmaceutical benefits scheme) as well as through the administration of health care (e.g. Medicare Benefits Scheme claims data). These data, however, remain siloed and not harmonised in a way that allows complex, efficient research and policy questions to be asked of the data across all aspects of the health care continuum. While bespoke data delivery and custom analytics can solve individual research challenges, these solutions are highly resource intensive and do not scale for fast automation and repeated queries. Additionally, this approach leads to significant research "waste" from duplicated effort and inconsistent approaches.

Proposed Enhanced Capabilities to be delivered through the Australian Research Data Commons:

CAPABILITY #1: Comprehensive Australian health data standardisation for research.

This activity would standardise key data sources that are representative of the full patient journey within the Australian health care system (e.g. primary care, tertiary care, and aged care) to an internationally recognised and supported data standardisation framework; the OMOP common data model to enable their interoperability for research. This capability would leverage and build upon data standardisation activities currently being undertaken by the ARDC's Australian Health Data Evidence Network (AHDEN)

initiative which is currently focusing on hospital based electronic medical records but is readily capable of standardising health care data from multiple sources.

CAPABILITY #2: Development of real-world data infrastructure to support rapid generation of real world evidence for health translation.

Capability #2 would leverage Capability #1 and its parallel data standardisation work to support the following activities and end-users: health technology industry (e.g. med-tech, pharmaceutical and life sciences industries); health systems policy (State and Commonwealth Health Departments), regulatory evidence collation (e.g. Therapeutic Goods Administration, Australian Commission on Safety and Quality in Health care) and health technology assessment agencies (PBAC and MSAC).

The new infrastructure required to support this capability includes, but is not limited to: (1) Optimised governance frameworks that support rapid evidence generation and timely characterisation studies for regulatory decision making; (2) Data provider certification to contribute to regulatory-grade evidence generation; (3) Sustainable business model development for data access and asset maintenance (4) Data sharing capability/secure data access across multiple sectors (industry, academia, government); (5) Standardisation of analytic tools for transparent and reproducible studies.

What will the new capabilities enable?:
By investing up front in the standardisation of the data to the common data model (where concepts are consistently coded in the same way) and stored in a harmonised structure, the benefits of standardised and repeatable analytics across separate data sources can then be realised, including:
● Rapid and efficient assessment – enabling earlier detection of health issues and evaluation of treatment effectiveness.
● Robust evidence generation using best practice analytics – supplementing clinical trials and better supporting healthcare guidelines and policy decisions.
● Improved health equity – identifying gaps in care and ensuring diverse populations are represented.
● Global collaboration – allowing Australia to contribute to (and lead) international studies at scale whilst keeping data secure.
● Research and analytics sustainability - scaling Australia's research capability by an industrial rather than cottage industry approach to data delivery and data analytics. This will develop the analytics workforce that will be critical for research sustainability and advantage and enables research co-design between clinicians, researchers, consumers and policy makers.
Medium-term goals:
- Expand data partner network to include key Australian primary care and aged care data sets translated to the OMOP common data model to improve representativeness and data volume, particularly when studying rare diseases and infrequent events
- Operationalise governance framework and data access model that supports the execution of standardised characterisation studies by government, academic and industry partners that keep data at their source to enhance privacy and data security
- Increase the number of Australian non-interventional (observational) studies using real world evidence designed to address local regulatory questions (targets to be determined)
- Deliver demonstrable public health impact and rapid analytics infrastructure that safeguards against emerging public health threats

Impacted research communities: The following communities would all be able to leverage the development of this broad serving infrastructure: population and public health, epidemiology, government health policy evaluation, clinical research, allied health research, health systems research, health economics, social sciences, biological and life sciences, biotechnology and pharmaceutical industries.

Timeframe of investment: 2028-2032

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Fri, Dec 5, 2025, 05:07 PM Australian Eastern Daylight Time
[ID: sbm398336db57e6c0ddb4fe3]

Title
Mr

First Name
Ralph

Last Name
Marszalek

Organisation
The University of Queensland

In what capacity are you responding?
A representative of an organisation or group

Capability 1
UQ supports a comprehensive range of research activities; however, we wish to highlight one area that was also referenced in the 'New Capabilities' section of the earlier UQ submission to the NCRIS roadmap. This relates to the MATRIX research facility case study that was presented there and a number of submissions from national groups as well as individuals in the current process; for example, Submissions #096, #100, #101, #164, and #165. NCRIS has an admirable history of reacting to the needs of the research community in order to ensure infrastructure suitable to a wide range of disciplines is in scope. However, the specific research infrastructure of a national residential mathematics research institute has up until now been out of scope. Such institutes are key components of national research strategies for a number of leading OECD countries. As a residential mathematics research facility, MATRIX fosters world-class mathematics research and collaboration, significantly impacting national priorities such as 'Building a Secure and Resilient Nation', and would provide the ideal starting point for such infrastructure. MATRIX serves as a facilitator and incubator for emerging fields, including AI, cybersecurity, forecasting (weather, finance, epidemics, natural disasters), optimisation, space research, and quantum research. Without reliable long-term investment led by the Federal Government, Australia risks falling behind other countries with established and growing investments in mathematics research infrastructure of a similar structure, such as the United States, China, the UK, Germany, Canada, and Japan.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Further to our response to Item 13, UQ is also supportive of a broad, considered, and comprehensive uplift against a range of research infrastructure capabilities.

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Across all disciplines and fields, UQ is one of the nation's top research-intensive universities. The University sees enormous opportunity to connect the strengths and leadership of our multidisciplinary excellence to deliver mission-driven research that is aligned with government, industry, and social and community priorities. And contributing to the development of the 2026 National Research Infrastructure Roadmap is a key enabler of this core mission.

UQ manages 70 world-class research facilities and services, 13 internal collaborative research platforms, 22 capabilities across 17 NCRIS facilities, and over $300 million in research infrastructure. It is this access to highly skilled and experienced staff, advanced equipment, and expertly-crated facilities and systems available through our multi-million dollar research infrastructure portfolio that allows our researchers to consistently deliver some of the nation's most transformative, impactful and ground-breaking research outcomes.

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Fri, Dec 5, 2025, 04:59 PM Australian Eastern Daylight Time
[ID: sbm398330b328e6155558489]

Title
Dr

First Name
Chris

Last Name
Hatherly

Organisation
Academy of the Social Sciences in Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
[189] ARIESS – Australian Research Infrastructure Ecosystem for the Social Sciences:
Coordinated ecosystem connecting 800+ capabilities.

Capability 2
[255] Aboriginal and Torres Strait Islander Research Data Commons (ATSIRDC): Dedicated,
culturally governed infrastructure for Aboriginal and Torres Strait Islander data.

Capability 3
[208] Continued investment in integrated data: discoverability, access and usability

146

Fri, Dec 5, 2025, 04:52 PM Australian Eastern Daylight Time
[ID: sbm398329e070806c00062d7]

Title
Dr

First Name
Jane

Last Name
Fitzpatrick

Organisation
Australian National Fabrication Facility Ltd

In what capacity are you responding?
A representative of an organisation or group

Capability 1
The time required to download and collate the answers to Q35 of the survey from 288 submissions is beyond our resources.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Our NRI system needs a secure level of baseline operational funding to keep the doors open. This funding is supported by large amounts of in-kind from our stakeholders and ensures that the facilities remain open-access with the right expertise available. A further tranche of funding is required to maintain our current NRI system at a level where it remains relevant and provides the standard of infrastructure that ensures Australia can compete with its peers. NRI will always need investment and the NCRIS system is well placed to steward those investments to address the goals of Australia. Adding new NRI into the system needs a concurrent boost in the baseline funding for NCRIS.
We should also define what we mean by 'new NRI' and understand the difference between 'new NRI' and 'new to NCRIS NRI'. We need to consider the existing capability in Australia that is not easy to find or access because it is not in the NCRIS world. Providing NCRIS support to bring these existing capabilities into the 'light' is money well spent rather than trying to re-establish the same capability inside the system. This method also has the potential benefit of having existing expertise available.
In addition, we need to consider whether a capability needs to be a completely new NCRIS Project, a collaboration between existing Providers or a new Activity within an existing Provider. The benefits of the strong collaborative and governance culture of the existing Projects add a large amount of value to any new NRI capability.
One example that could be used to discuss this is the National Space Qualification Network/National Space Test Facility. This could be delivered through a joint

collaboration with AAL, ANFF and HIA – provided there was sufficient resourcing, or indeed it could be housed in one of the Projects while leveraging the capacity of the others.
Some high level suggestions are listed below
▪ Co-location space where start-ups or industry can base staff. They would utilise the existing NRI and augment with company specific requirements that enable leveraging of both.
▪ Access to a CAD software cost sharing model, where research or early-stage entities can share the cost of extremely expensive design tools needed to manufacture semi-conductor based chips.
▪ Providing a facility providing testing of components and devices for space deployment to an international standard.
▪ Creating facilities that provide support for numerous parts of the discovery to product pipeline, such as the FORGE concept at Flinders University. Incorporating, discovery, early-stage innovation support, product pathway development, first run manufacturing, and regulatory and quality assurance education.
▪ Providing more capabilities to incorporate invented technologies into the final package that is needed for pre-market testing and the associated testing facilities.

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Fri, Dec 5, 2025, 03:35 PM Australian Eastern Daylight Time
[ID: sbm3982e3666a50d97ac5c10]

Title
A/Prof

First Name
James

Last Name
Riches

Organisation
Queensland University of Technology

In what capacity are you responding?
An individual

Capability 1
218 - Microscopy Australia

Capability 2
061 - AusBIAS and LMA

Capability 3
198 - Felipe Kremer

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Fri, Dec 5, 2025, 02:50 PM Australian Eastern Daylight Time
[ID: sbm3981f31cd0e67e95889dc]

Title
Dr

First Name
Alexander

Last Name
Cooke

Organisation
Astronomy Australia Ltd

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Before adding in 'new RI', we think it is important for the Roadmap to give careful consideration about the balance of identifying 'new Research Infrastructure' and the risk of diluting or fragmenting the national research infrastructure (NRI) ecosystem.

The NRI Roadmap should also be clear about whether it is talking about new RI as Priorities, Capabilities, NCRIS Projects, or whether it is expecting these to be incorporated as new Activities within existing projects. Incorporating a new capability into an existing NCRIS Project could reduce the overheads and increase the benefit from economies of scale by being delivered within an organisation that has tried and tested governance, processes and accountability.

For example, a new capability could be integrated into the work of one or more relevant existing delivery partners without diluting effort but also without leading to fragmentation.

To take some examples, the proposal for a National Space Test Facility (063-NSQN; 267-Advanced Navigation; 280-ANU; 281 – Deloitte) could be delivered through a joint collaboration with AAL, ANFF and HIA – provided there was sufficient resourcing. This proposal has been made to AAL in previous NCRIS cycles but not been possible due to a lack of resourcing.

There are similar calls in the consultation for increasing support for infrastructure in space astrophysics (026 – Glazebrook), which AAL is now scoping through its Space Science Leads

Committee, because space astronomy is identified as a theme in the Astronomy Decadal Plan. However resourcing challenges remain.

Existing support for data and computing services could be expanded to national-scale, building on facilities like ADACS delivered by AAL, without diluting the existing project suite (207-RSE-AUNZ).

We also note proposals for support for capability in gravitational wave detection (279: OzGrav). Since this submission was made, AAL has agreed to an investment in this area as a result of the findings of a feasibility study to establish a gravitational wave observatory, demonstrating AAL's capacity to scale to accommodate new activities with minimal additional overhead.

In terms of enhanced capability, as one of AAL's primary purposes is to advance the goals of the Astronomy Decadal Plan which underpins the priorities of over 1000 astronomy professionals, we would refer to the priorities articulated therein. The most critical of these is access to and membership of international astronomy collaborations over the next 10 years, including access to large optical telescopes such as those offered through the European Southern Observatory (ESO) and Giant Magellan Telescope Organisation (GMTO). Other areas identified in the Decadal Plan include Gravitational Wave Detectors, the Vera C. Rubin Observatory, and the Cherenkov Telescope Array Observatory. Each of these could be delivered by AAL should sufficient resourcing be made available.

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Fri, Dec 5, 2025, 02:48 PM Australian Eastern Daylight Time
[ID: sbm3982b8b8a3e68b43e908b]

Title
Ms

First Name
Molly

Last Name
Ireland

Organisation
CSIRO

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Biodiversity Data Infrastructure Enhanced biodiversity data infrastructure is critical to address accelerating environmental challenges, meet national and global obligations, and support evidence-based decision-making. Emerging technologies such as environmental DNA, acoustic sensors, and genomics, alongside Indigenous-led monitoring, are generating vast, complex datasets that require modern, secure, and interoperable systems for integration and analysis. Building this infrastructure would enable analytics-ready data for conservation planning, compliance with frameworks like the Kunming–Montreal Global Biodiversity Framework, and foster innovation through AI/ML applications.   These priorities are embedded in Australia's National Science and Research Priorities, the Strategy for Nature, and the National Biosecurity Strategy. Industry sectors, such as environmental consulting, also depend on trusted biodiversity data for impact assessments and ongoing monitoring. Australia is well positioned to lead in this space, with strong NCRIS foundations like the Atlas of Living Australia and Bioplatforms Australia and enables genomics to advance agriculture, fisheries, conservation, and invasive species management. References: 27, 79, 116, 147, 214 National Approach to Biological Collections Since investment in this sector was identified as a priority in the 2021 Roadmap, the community has come together to develop a credible plan for realising the opportunity of Biological Collections as National Research Infrastructure. National-level coordination will be critical if the sector is to meet the growing industry demand for collections-derived biodiversity data, and to maximise the value of the fundamental role Australia's biological collections play in climate change research, environmental assessment and conservation, natural research management, health, and biosecurity. Further, investment would also directly address Priorities under the National Science and Research Priorities – Protecting and Restoring Australia's Environment; Building a Secure and Resilient nation; and Elevating Aboriginal and Torres Strait Islander knowledge systems. Reference: 214

Capability 2
National satellite data calibration and validation capabilities Australia is internationally recognised for its satellite earth observation (EO) calibration and validation (cal/val) capabilities which is spread across various organisations, including NCRIS facilities (e.g. TERN, IMOS, AuScope), government agencies (e.g. CSIRO, Geoscience Australia, Bureau of Meteorology) and universities. This infrastructure is critical for the traceability and integrity of scientific outputs that use satellite data and ensuring they are demonstrably trustworthy and robust.   However, levels of support and funding are inconsistent and while some are already supported by NCRIS facilities, many others are subject to much more uncertain and variable annual budget or research grant processes, particularly for infrastructure that does not neatly fit the scope of existing NCRIS facilities in the Ocean, Terrestrial Ecosystem or Minerals domains (e.g. atmospheric, radiometric calibration targets, inland aquatic and coastal). Additionally, there is no central facility for accessing cal/val datasets and expertise/resources across this diversely distributed network, making it difficult for research and industry end users to find and understand. New NRI capability in this area would focus on filling gaps in existing NCRIS support to ground infrastructure and the delivery of centralised free and open access to the datasets and resources across the board to increase impact and utilisation, and connection of distributed NRI investments. References: 113, 134, 140, 160, 172, 239

Capability 3
A National Biobank for Australia Educators and researchers require timely access to human biobank data to advance population health research - a recent Nature publication notes that "for many researchers, biobanks can mean the difference between a successful project and one that stalls for want of crucial data". National or population-based biobanks collect samples and data designed to capture the characteristics of an entire country's population. These biobanks are increasingly recognised as essential infrastructure for accelerating research, informing health policy, and driving scientific discovery. Leading countries (UK: 500,000 participants; US: 524,000; Germany: 205,000) have established large-scale national biobanks. These resources have transformed research, health systems and policy—e.g., enabling new early-detection screening programs in the UK's NHS and improving disease detection and treatment strategies. Without an Australian national biobank, researchers rely on international and discrete local collections, limiting the ability to translate findings into policies, prevention strategies or therapeutics tailored to the Australian population. Australia has multiple biobanks, but they are disease-, tissue-, population-group or location-specific and do not capture Australia's unique genetics or environment at a national scale. A new NCRIS biobank capability or facility could help bring together this separate resources, allowing access to samples and data from across national populations to support health and environment research. Reference: 4, 79, 86, 184

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Consideration could be given to enhance current marine research infrastructure through the integration of current technology. This would connect existing platforms across the Research Infrastructure landscape – including an expanded bluewater and coastal research vessel fleet, in-situ marine observing systems, and remote sensing capabilities – with emerging technologies such as autonomous platforms and advanced AI/ML solutions.

The integration of these technologies into current infrastructure offerings would support the expansion of Australia's capacity for ocean and atmospheric observation and knowledge generation. Such advancements would underpin evidence-based decision-making for climate adaptation, mitigation, and resilience – key priorities identified in the Australian Government's National Adaptation Plan (2025) and related initiatives.

References: 33, 212, 222

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Fri, Dec 5, 2025, 02:47 PM Australian Eastern Daylight Time
[ID: sbm3982b803db50713b345cc]

Title
A/Prof

First Name
Heath

Last Name
Pardoe

Organisation
Florey Institute of Neuroscience and Mental Health

In what capacity are you responding?
An individual

Capability 1
159 National Imaging Facility

Capability 2
118 Steven Meikle

Capability 3
051 Phenomics Australia

139

Fri, Dec 5, 2025, 01:26 PM Australian Eastern Daylight Time
[ID: sbm39822b4e18e6e5d4282a4]

Title
Dr

First Name
Miranda

Last Name
Smith

Organisation
The Peter Doherty Institute for Infection and Immunity

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Biobanking (013, 051, 058, 086, 159, 169, 178, 184, 195, 201, 202, 209, 222 and 230). Of the new capabilities identified in the survey, a key priority from the Doherty Institute perspective is the development of national biobanking capacity. We recognise that there are several components to this, including infrastructure to connect and make existing biobanked resources visible and accessible as well as developing a platform for prospective collection of new samples and data for population-representative cohorts which can then be leveraged for impactful research, along the lines of that achieved by the UK Biobank. It is important that any national biobanking strategy addresses the physical infrastructure, data and quality management systems, staffing and strategy for biobanking. The creation of co-ordinated cohorts, i.e. the strategic collection of biological samples, would become an important national resource as well as the system which enables their collection and distribution. Of note, systems should be enabled to both engage with and protect the interests of specimen donors, and to facilitate tailored access to samples from research, industry and public health collaborators.   In addition to linking the clinical information of biobanked samples in a repository, when available, data from genomic, epigenomic, transcriptomic and epitranscriptomic data should be linked and searchable.

Capability 2
Capability for pre-clinical development (029, 041, 150). The creation of NRI capability for pre-clinical development would add rigor to the pipeline for Phase I clinical trial candidates. This could be achieved through capabilities including patent search and scientific review, collection of essential functional and stability data for potential Phase I candidates and could also involve GMP-like manufacturing facilities which are currently in short supply in Australia. These GMP-like facilities could provide a confidential service where competitive advances could be addressed through rigorous and creative process, manufacturing and formulation developments to improve the mechanism of action. We

note that for both biobanking and pre-clinical development capabilities, there are substantial investments being made in the forthcoming Australian Institute for Infectious Diseases (AIID) in Melbourne, including robotic biobanking facilities and a clean room for small scale GMP manufacture. Both facilities would benefit from being integrated into a broader national infrastructure plan.

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Fri, Dec 5, 2025, 01:10 PM Australian Eastern Daylight Time
[ID: sbm39825e8f3950d1094bd31]

Title
Prof

First Name
Pieter

Last Name
Eichhorn

Organisation
Curtin University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Curtin University was not able to review all the survey responses within the time available. While we are supportive of new research infrastructure, we consider that securing the operational funding required to deliver best practice maintenance and meaningful translation for existing facilities should remain the first priority. Within this context, Curtin wishes to highlight the national importance of a proposed Australian National Institute for e Science as a future NRI capability. International experience (e.g. the Netherlands eScience Centre, the UK Software Sustainability Institute and Germany's FutuRSI) shows that a distributed, nationally coordinated e science platform providing pooled research software engineering and data science expertise is now critical to maximise returns on all other NRI investments. A comparable Australian institute would offer merit allocated access to specialist staff and energy efficient, AI optimised digital infrastructure, underpinning secure, high quality research software and computation across disciplines and ensuring that future NRI is fit for purpose in an era of data intensive, AI enabled research.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Along with the aforementioned National e Science Institute, Curtin University proposes Enhanced Discovery and Preservation of Australian Research Data and Outputs as a priority new NRI capability. This would establish a coordinated, national approach, developed jointly with the ARC and other key partners, to the collection, description, discovery, custodianship and long term preservation of Australian research data and outputs. A multi tenancy service model, allowing institutions to opt in to shared research management systems and/or repository infrastructure (similar to Canada's Scholaris platform), would

reduce duplication of effort, improve FAIR access to data across disciplines and institutions, and maximise the long term return on public investment in research.

136

Fri, Dec 5, 2025, 12:20 PM Australian Eastern Daylight Time
[ID: sbm398231003850a8f169472]

Title
Mr

First Name
Andrew

Last Name
Gilbert

Organisation
Bioplatforms Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
004 – South Australian Genomics Centre

Capability 2
097_La Trobe Institute for Sustainable Agriculture and Food, La Trobe University

Capability 3
111 – University of Sydney

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Bioplatforms reviewed the submissions and identified three broad categories that could be considered for new or enhanced investment. These are outlined below with example survey submissions relating to each listed.

AI and Data Intensive Life Science Capabilities
Multiple submissions call for optimised national computing, storage and AI-ready digital infrastructure to support molecular research. They describe growing and increasingly diverse datasets (e.g. genomics, proteomics, metabolomics, imaging), uneven storage and compute capability across sites, and the lack of shared pipelines for analysing them. They also highlight the need for national standards and integrated workflows so researchers can work across institutions without rebuilding tools and data systems from scratch.

New investment would make it faster and easier to analyse large and complex datasets, improve reliability and reproducibility, and support national and international collaboration. It would enable broad use of AI to speed up discovery, link different types of life science data, find patterns that are hard to detect manually, and answer scientific questions that are currently out of reach because the data or compute needed are too large for individual groups to manage.

Example submissions:
• 004 – South Australian Genomics Centre
• 079 – Bioplatforms Australia
• 122 – Richard Bagnall
• 247 – Himanshu Joshi
• 106 – Ryan Gullock
• 111 – University of Sydney

Synthetic Biology and Pilot-scale Biomanufacturing Infrastructure
Multiple submissions identify a clear lack of national infrastructure to support the scale-up of synthetic biology and precision fermentation from laboratory volumes to mid-scale and commercial-ready production. They describe limited access to pilot facilities, downstream processing capability, bioprocess optimisation environments, and the equipment needed to validate, test and scale engineered strains. Several groups note that without this infrastructure, early-stage innovation must be sent offshore for piloting and manufacturing.

If addressed, this capability would bridge the gap between research and industrial production by providing shared mid-scale facilities, better downstream processing, and environments where companies and researchers can test and optimise engineered cells, fermentation processes and new bioproducts. It would strengthen Australia's growing biomanufacturing sector, support commercialisation, reduce reliance on overseas facilities, and help position Australia as a competitive producer of bio-based materials, foods and industrial products.

Example submissions:
● 066_Esteban Marcellin
● 097_La Trobe Institute for Sustainable Agriculture and Food, La Trobe University
● 099_IDEA bio- AIBN The University of Queensland
● 151_Australian Genome Foundry at Macquarie University
● 152_Briardo Llorente
● 199_The Australian Wine Research Institute
● 253_Bioplatforms Australia Ltd
● 258_Peng group at AIBN
● 277_Cellular Agriculture Australia
● 282_James Ryall

Bioplatforms Australia has engaged an external consultant to properly understand this sector and infrastructure requirements. The analysis is not yet complete, however a brief summary to date is, Australia's biomanufacturing landscape demonstrates strong early-stage innovation, meaningful private capital inflow, and clear geographic clustering around key innovation hubs. Targeted investment in mid-scale infrastructure and downstream processing would bridge the gap between research and development and industrial manufacturing, strengthening Australia's position in global biomanufacturing.

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Precision Medicine and Integrated Multiomics Infrastructure
Multiple submissions call for national infrastructure to link -omics and clinical data in a consistent, usable way. They describe fragmented systems, inconsistent standards, weak clinical–research connections, and limited coordination of biobanks and reference datasets. They also highlight the need to move from isolated cohorts to population-scale resources and to support end-to-end, multi-technology workflows, including spatial omics. While one submission mentions sequencing capacity constraints, the primary gap identified across submissions is national connectivity, harmonisation and interoperability rather than raw sequencing throughput.

Example submissions:
• 004 – South Australian Genomics Centre
• 111 – University of Sydney
• 107 – Jose Antonio Lopez-Escamez
• 118 – Steven Meikle
• 230 – Busselton Population Medical Research Institute
• 105 – Krispin Hajkowicz

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Fri, Dec 5, 2025, 12:10 PM Australian Eastern Daylight Time
[ID: sbm398228310d80ed703cc9b]

Title
Dr

First Name
Andre

Last Name
Zerger

Organisation
Atlas of Living Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
91 University of New South Wales & 132 Queensland University of Technology and James Cook University   Affirms the transformative potential for novel biodiversity monitoring technologies. A robust national biodiversity data infrastructure is essential to enable AI-driven wildlife and ecosystem analyses and manage the growing complexity of biodiversity monitoring. This infrastructure must support the ingestion, harmonisation, and delivery of diverse data streams, including camera trap imagery, acoustic recordings, environmental DNA, and high-resolution remote sensing data from satellites and drones, alongside locally deployed sensors in the landscape. Scalable, secure cloud systems are required to store and provide access to these large datasets, with strong governance and compliance measures for sensitive and Indigenous data. Hardware investment is equally critical, ensuring reliable collection and transmission of data from remote areas through IoT and low-bandwidth solutions. Beyond storage and processing, the infrastructure must deliver analytics-ready outputs aligned with national and global reporting frameworks, enabling communities and governments to access timely biodiversity insights. Complementary investment in local wildlife surveys will fill geographic and taxonomic gaps, ensuring comprehensive datasets for AI models. Finally, partnerships, training, and user-focused platforms will be vital to make these capabilities accessible and impactful across research, policy, and conservation sectors

Capability 2
147 Mark Adams   An enhanced national biodiversity data infrastructure can play a pivotal role in addressing Australia's taxonomic impediment and accelerating species discovery. By serving as the central backbone for data mobilisation, biodiversity data infrastructure can harmonise and publish specimen, tissue, image, genomic, and occurrence data from museums, herbaria, and field surveys, ensuring interoperability through global standards. It can provide secure, scalable storage and programmatic access to analytics-ready datasets, linking vouchers to molecular evidence and taxonomic concepts to support

revisions. Data acquisition dashboards and expedition registries can minimise duplication of effort, while integrated reporting pipelines can track progress against national targets. Enhanced infrastructure should also enable open-access publishing workflows, automated updates to taxonomic backbones, and deliver training programs to build capacity in modern taxonomy, genomics, and AI-driven analysis. By embedding CARE principles for Indigenous data, adopting robust cybersecurity, and aligning outputs with national and global biodiversity frameworks, enhanced infrastructure ensures that investments in taxonomy deliver measurable impact for conservation, policy, and research.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Enhanced NRI capability - Australia urgently needs enhanced and integrated biodiversity data infrastructure to build on the foundations established by initiatives like the Atlas of Living Australia (ALA) and its partners such as TERN, IMOS and BPA because the scale, complexity, and velocity of biodiversity data are growing exponentially. While these platforms have transformed access to species occurrence data and ecological monitoring, they were designed for an era dominated by relatively simple datasets. Today, biodiversity science demands integration of diverse streams—high-resolution imagery, genomic data, environmental DNA, acoustic recordings, and real-time sensor outputs—into interoperable, analytics-ready formats. Without a modernised infrastructure capable of handling these advanced data types, Australia risks falling behind in leveraging AI, machine learning, and predictive modelling to address critical challenges such as species discovery, ecosystem health assessment, and climate resilience. Enhanced infrastructure would enable seamless data flow from field sensors and collections to national and global reporting frameworks, ensuring that decision-makers have timely, high-quality information.

Moreover, the taxonomic impediment—where up to 75% of Australia's biodiversity remains undescribed—underscores the need for a coordinated, technology-enabled approach to accelerate species discovery and documentation. Current systems cannot fully support the integration of molecular datasets, imaging, and voucher metadata at the scale required to resolve complex taxonomic groups. Strengthening national infrastructure would allow museums, herbaria, and research networks to share and harmonise data efficiently, minimise duplication of effort, and link specimens to genomic and ecological context. It would also provide secure governance for sensitive and Indigenous data, adopt global standards for interoperability, and deliver analytics-ready outputs aligned with international biodiversity frameworks. By investing in this next-generation infrastructure, Australia can transform fragmented efforts into a unified, high-impact system that supports research, conservation, and policy.

Impacted Research Communities - Enhanced biodiversity data infrastructure will deliver value across a wide range of research and science areas. It underpins ecology and conservation science by enabling studies on species distributions, habitat connectivity, and ecosystem health. Taxonomists and systematists rely on it for accurate species identification and classification, while genomic and bioinformatics researchers use it to support genome sequencing and evolutionary studies. Climate change scientists leverage these data to model species responses and assess vulnerability under future scenarios. In biosecurity, the infrastructure helps detect invasive species, monitor their spread, and inform rapid response strategies.

Timeframes - This enhancement should occur progressively over the next five years, beginning with immediate investment in modernising existing core infrastructure and data pipelines in the first two years, followed by supporting advanced capabilities such as AI-ready data, genomic data integration, and biodiversity monitoring data from real-time sensor networks in years three to five. A core element of the first two years will better coordinate existing NRI capabilities such as the ALA, TERN, IMOS, BioPlatforms Australia, and related NCRIS programs that can support biodiversity imaging and characterisation, in addition to programs hosted by CSIRO such as National Research Collections Australia, and the National DNA Barcode Library. By the end of this period, Australia should have a fully interoperable, secure, and analytics-ready biodiversity data system aligned to the needs of the EPBC Act reforms and National Science and Research Priorities (Priority 4).

Australian Government Policy Drivers - Enhanced biodiversity data infrastructure is also critical in the context of anticipated reforms to Australia's Environment Protection and Biodiversity Conservation (EPBC) Act, which will introduce National Environmental Standards, enforce tests for unacceptable impacts, and require transparent, data-driven decision-making for environmental approvals. These reforms aim to strengthen protections for threatened species and ecosystems, streamline assessments, and implement a net gain for nature principle. To meet these obligations, regulators, proponents, and communities will need access to high-quality, interoperable biodiversity data at national scale—covering species distributions, ecological condition, and cumulative impacts. Current systems, while transformative, were not designed for the level of precision and timeliness these reforms demand. A modernised infrastructure capable of integrating real-time sensor data, genomic datasets, and remote sensing imagery will ensure that environmental assessments are evidence-based, consistent with national standards, and auditable. Without this capability, the reforms risk being undermined by data gaps, inconsistent methodologies, and delays in approvals, which could compromise conservation outcomes.

Similarly, the National Science and Research Priorities place biodiversity and environmental stewardship at the heart of Australia's research agenda, alongside goals such as transitioning to net zero and elevating Indigenous knowledge systems. Delivering on these priorities requires infrastructure that supports open science, integrates First Nations ecological knowledge under CARE principles, and enables advanced analytics such as AI-driven modelling of species and ecosystems. This capability is currently not in place. Enhanced infrastructure will allow researchers to combine traditional taxonomy with genomics, and ecological monitoring to accelerate species discovery and ecosystem assessment—addressing the taxonomic impediment that limits Australia's ability to manage biodiversity. It will also underpin national reporting obligations under frameworks like the Kunming–Montreal Global Biodiversity Framework and State of Environment reporting. In short, investment in next-generation biodiversity data systems is not optional; it is foundational to achieving Australia's science priorities and meeting the legal, social, and environmental expectations embedded in the EPBC reforms.

134

Fri, Dec 5, 2025, 11:56 AM Australian Eastern Daylight Time
[ID: sbm396f5493c5167e1dc815f]

Title
Dr

First Name
Liisa

Last Name
Hirvonen

Organisation
The University of Western Australia

In what capacity are you responding?
An individual

Capability 1
36 - James Springfield

Capability 2
218 - Microscopy Australia

Capability 3
24 - Jian-Feng Nie

133

Fri, Dec 5, 2025, 11:33 AM Australian Eastern Daylight Time
[ID: sbm398206314de66e6752381]

Title
Prof

First Name
Jacek

Last Name
Jasieniak

Organisation
Monash University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Advanced Materials and Manufacturing Australia (Submission 178) The Advanced Materials and Manufacturing Australia (AMMA) initiative recognises that Australia possesses a world-class research base in materials science and advanced manufacturing, but struggles to scale its discoveries into commercial applications and impact. A persistent gap exists at TRL 3–7, where promising research often stalls before reaching proof-of-concept, pilot, or production stages. As a result, Australian breakthroughs are frequently commercialised overseas, diminishing national economic value and strategic capability. The initiative is being developed by some of Australia's leading research organisations in advanced materials and manufacturing, our partners and focus can be viewed at https://ammaust.org.au/.   The Initiative AMMA aims to establish a national network that connects Australia's material and manufacturing capabilities into a coordinated, accessible ecosystem that supports and aligns the priorities of researchers, industry, and government. Importantly, AMMA will provide the forum and mechanism for industry to influence research infrastructure investments and ensure it is better aligned to their needs.   The initiative supports the broader vision for translational NRI outlined in previous responses by providing the connective layer between early-stage discovery and industrial application. By embedding industry-aligned governance, translational expertise, and flexible access models, AMMA will support research that accelerates innovation, strengthens sovereign capability, and positions Australia as a leader in advanced manufacturing and materials development. The AMMA initiative is reflective of similar global efforts, such as the UK's Henry Royce Institute and Germany's Fraunhofer Institutes, which have transformed their respective national innovation systems by coordinating research infrastructure to meet the needs of both researchers and industry. AMMA will provide a similar framework for Australia through coordinated funding and governance structure. AMMA will operate as a hub-and-spoke network of specialised facilities, providing strategically located access to mid-TRL research for scale-up, validation, and real-world testing. It will integrate advanced physical and digital

infrastructure, enabling seamless collaboration between researchers, industry partners, and investors. Under this national umbrella model, AMMA would establish distributed capabilities that build on existing local strengths, such as solar cell translation, battery manufacturing, hydrogen fuel cells, additive manufacturing, and extreme environment materials, along with other emerging energy and advanced manufacturing technologies critical to Australia's sovereign capability. The realisation of these nationally significant capabilities would leverage and complement existing, but distinct, NCRIS facilities through formal collaborative arrangements, including partnerships with NIF, Microscopy Australia, ARDC, and ANFF. AMMA has been designed to complement and enhance existing NCRIS projects (e.g., ANFF, NIF, Microscopy Australia). NCRIS provides an ideal funding framework to support the salaries of highly skilled technical staff required to operate and maintain infrastructure in this field and to support funding for the capital-intensive equipment and consumables that underpin these new technologies, making an NCRIS-supported network particularly attractive.

Capability 2
Integrated multi-omics and precision medicine infrastructure (Submission 178) Australia's ability to lead in next-generation medical discovery depends on building a coordinated national capability in multi-omics, precision medicine, and translational health research infrastructure. This encompasses technologies that enable high-resolution mapping, integration, and interpretation of biological data across genomics, proteomics, metabolomics, and spatial and single-cell transcriptomics. Within this broader framework, advanced spatial transcriptomics represents a transformative advance, allowing researchers to map gene expression within tissue at molecular and spatial resolution. This provides unparalleled insights into biomarker discovery, disease profiling, and personalised therapeutic development. A national integrated capability would: Support coordinated, cross-institutional research across major research institutions. Enable translation from discovery to clinical practice, strengthening partnerships between universities, health services, and industry. Build training and data governance frameworks that ensure ethical and secure use of sensitive health data.

Capability 3
National AI, data & automation integration facility (Submission 178) As AI, data analytics, and automation increasingly underpin modern research, there is a clear need for a dedicated, cross-disciplinary national facility that integrates these technologies across scientific and humanities domains. A National AI, Data & Automation Integration Facility would provide the shared digital backbone required to connect research, clinical, and industrial ecosystems through coordinated data governance, automation, and analytics. The facility would apply AI-driven methods to scientific workflows, instrumentation, and large-scale data and image analysis, improving efficiency, reproducibility, and translation across the NRI network. It would offer shared infrastructure and expertise for applying machine learning and advanced automation to diverse research challenges and key emerging areas, including: Digital biobanking: AI-enabled digital biobanks would integrate genomic, imaging, phenotypic, and health data to power breakthroughs in population health, clinical research, and precision medicine. The facility could coordinate national data standards, secure access frameworks, and analytics pipelines, enabling the interoperability of fragmented collections and providing the digital foundation for a prospective Australian population biobank. National clinical registries: AI and automation could enhance data capture, benchmarking, and analysis within clinical registries, improving real-time monitoring and reducing administrative burden. A national facility would underpin automated data ingestion, quality assurance, and analytics, supporting

better clinical decision-making, policy development, and continuous improvement across the healthcare system. AI-enabled materials science including quantum technologies: There is tremendous opportunity to integrate automation and AI with experimental measurements of all types of materials to enable development of novel technologies that will be critical in facilitating Australia's net zero emissions transition to meet the required target of 70% by 2035. AI-enabled image analysis and diagnostics: The application of AI and automation to image analysis represents a major opportunity to enhance precision, speed, and consistency across a wide range of research, clinical, and industry domains. A national facility could support the development of shared image repositories, federated AI models, and standardised workflows for training, validation, and benchmarking image-based analytical tools. While medical examples, such as integrating AI into skin imaging to support early melanoma detection, demonstrate the potential for improved diagnostic accuracy and more consistent assessments, the same capabilities are equally transformative in non-medical fields. For example, in materials science and manufacturing, AI can streamline microstructural analysis, defect detection, and quality assurance for advanced materials. This facility would complement and connect existing digital research infrastructures, such as the ARDC, NCI and Pawsey, to establish a unified digital ecosystem. It would reinforce Australia's global competitiveness, foster ethical and responsible AI use, and ensure the NRI system remains agile, integrated, and responsive to emerging technological opportunities across all domains of science, health, and the humanities.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
N/A

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Department of Education

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Fri, Dec 5, 2025, 10:36 AM Australian Eastern Daylight Time
[ID: sbm3981d2234f802b17f92f4]

Title
Ms

First Name
Jacinta

Last Name
White

Organisation
CSIRO

In what capacity are you responding?
An individual

Capability 1
#43 Brett Hamilton

Capability 2
#24 Jian-Feng Nie

Capability 3
#213 MCEM

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
My rationale for the selection above is briefly: 1. During covid transmission electron microscopy was key to virus identification, sensor sensitivity (mix of viruses, QC, quantitation) as many facilities were closed, those that were open were essential. 2. Everything written in submission #43 is spot on. All essential for characterisation of polymers, hybrid materials, biomaterials and bio-samples, liquid crystal system and hydrogels (both (somewhat) new areas that must use cryo-conditions for ultrastructure and efficacy). BUT the bottom line here is a recognition that the science sector needs larger funding at a % of GDP. These microscopes start at $1M and go to $10iM-ish with add ons (detectors software, service agreements), also note that they are in constant use. And there is a shortage of trained staff to operate them and to distil the information from the data sets. I do wonder why the government directs school leavers to STEM when the working environment is sooooooo financially tough. It is unfair, unwise and cruel.

129

Fri, Dec 5, 2025, 09:40 AM Australian Eastern Daylight Time
[ID: sbm39819eb87ce62cc06347e]

Title
Ms

First Name
Chloe

Last Name
Cai

Organisation
Advanced Materials and Manufacturing Australia (AMMA)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
181 Gwenaelle Proust

Capability 2
166 RMIT University

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Advanced Materials and Manufacturing Australia (AMMA)
Vision and Rationale

The Advanced Materials and Manufacturing Australia (AMMA) initiative recognises that Australia excels in fundamental materials and manufacturing research but struggles to scale discoveries into commercial applications. This gap leads to offshore commercialisation, undermining sovereign capability and economic growth. AMMA will focus on the mid-TRL gap (TRL 3–7) and connect Australia's distributed capabilities into an accessible, hub-and-spoke network so researchers and industry can book capability through a unified user-access system at standardised rates. AMMA is being developed by some of Australia's leading research organisations in advanced materials and manufacturing, our partners and focus can be viewed at https://ammaust.org.au/

AMMA will be a national research infrastructure network that connects Australia's material and manufacturing capabilities into a coordinated, accessible ecosystem supporting researchers, industry, and government priorities. Importantly, its research infrastructure

investments will be informed and focused on meeting the research needs of industry to help move innovations from discovery to commercialisation.

AMMA reflects similar global efforts, such as the UK's Henry Royce Institute and Germany's Fraunhofer Institutes, which have transformed their respective national innovation systems by coordinating research infrastructure to meet the needs of both researchers and industry. AMMA will provide a similar framework for Australia by enabling research translation, industry partnerships, and sovereign capability through coordinated funding and governance.

AMMA is designed to complement and enhance existing National Collaborative Research Infrastructure Strategy (NCRIS) projects (e.g., ANFF, NIF, Microscopy Australia). NCRIS provides an ideal funding framework to support the salaries of highly skilled technical staff required to operate and maintain infrastructure in this field and to support funding for the capital-intensive equipment and consumables that underpin these new technologies, making an NCRIS-supported network particularly attractive.

Strategic Objectives

AMMA will provide a co-ordinated approach to establish a national network of strategically located facilities that:

1. Addresses key national challenges in advanced materials and manufacturing.
2. Consolidate existing infrastructure, coordinate future investments that capitalise on areas of strength and match industry needs.
3. Provide open access to cutting-edge manufacturing and processing equipment, digital workflows, and advanced characterisation tools.
4. Bridge the research gap between discovery and deployment.
5. Streamline industry collaboration, testing, and adoption.
6. Support training, skills development, and workforce pipelines to advance Australia's advanced materials and manufacturing expertise.
7. Complement and extend existing Government investments.
8. Foster cross-institutional and international collaborations, leveraging shared infrastructure and expertise.
9. Strengthen industry engagement to facilitate technology translation and commercialisation.

Medium-term goals (3–5 years)

1. Operate a unified national access model across participating nodes.
2. Stand-up pilot/qualification testbeds for priority process families with embedded QA/standards.
3. Deliver co-designed, co-funded projects within priority sectors.
4. Increase utilisation of existing NCRIS assets by integrating them into translational workflows in this new NCRIS facility.
5. Establish training pathways to build the technical workforce for AM and advanced materials.

Benefits

AMMA will ensure that our advanced material and manufacturing research infrastructure underpins both excellent research and how Australian industry can capitalise on that

excellence. It will provide the industry-aligned governance mechanism for collaboration on infrastructure investment between academia and industry to maximise the benefit to Australia. By focusing on the translation path, AMMA will also increase the returns on past investment in other infrastructure such as ANFF, NIF, and Microscopy Australia. AMMA will also bridge Australian research with other Government priorities and initiatives to amplify their impact, such as:

#National Reconstruction Fund
#Future Made in Australia Plan
#Critical Minerals Strategy (2023–2030)
#Critical Technologies List
#National Science and Research Priorities

Translation and Industry

AMMA's core focus is to support excellent research that accelerates translation across TRL 3–7 by providing pilot-scale environments, scale-up infrastructure, and full-scale validation and qualification. This includes digital quality assurance and traceability systems, and relevant accreditations (e.g., ISO, NATA) where required. In doing so, AMMA bridges fundamental research to industrial application by shortening time-to-market, lowering risk and cost for partners, and offering streamlined, single-entry access for firms, including SMEs.

AMMA will support co-designed and co-funded projects with priority sectors such as aerospace and defence, MedTech and biomedical, energy and clean technologies, resources and mining, and transport. These collaborations will leverage shared testbeds and qualification pathways, closely aligned with existing NCRIS nodes. Initial engagement will focus on proof-of-concept and pilot qualification stages, underpinned by clear milestones and consistent data standards. Operating through a hub-and-spoke model, AMMA ensures national reach while capitalising on local expertise and infrastructure strengths.

Establishment timeframe

Initiation and planning: 6 months
Phase-in of national access model and first pilot testbeds: 6 months
Full operational capability across priority process families and sectors: one year

128

Fri, Dec 5, 2025, 09:39 AM Australian Eastern Daylight Time
[ID: sbm39819d7979e62fb03bec2]

Title
Ms

First Name
Louise

Last Name
Soroka

Organisation
Geoscience Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
140 – Geoscience Australia.   Environmental Prediction and Forecasting capability will be critical to underpinning the RD&I required to ensure Australia can face the urgent and interlinked economic, environmental and societal challenges including climate adaptation, agricultural productivity, and biodiversity loss – while also capitalising on the economic opportunities, and opportunities to take a global market-leading role in provision of value-added products and services that every other nation will also required to engage with these challenges. Current capabilities focus on understanding what the Earth was and is, not in supporting understanding of how it could and will change – which is key to informed evidence-based informed decision making by businesses, governments and communities. Landsat Next will extend a global Earth observation record spanning over fifty years. In 2024, Australia joined the U.S. as a core partner in this flagship satellite program, securing free, prioritised access to critical data for environmental, economic, and social decision-making. This collaboration supports climate resilience, agricultural productivity, and disaster management while driving innovation through AI-enabled analytics. Australia will contribute upgraded ground station capability at Alice Springs, advanced data processing and quality assurance, and new research to harness Landsat Next's enhanced imaging. Inclusion in the 2026 NRI Roadmap ensures national leadership in Earth observation and long-term benefits for Australia.

Capability 2
283 – CSIRO.   National satellite data calibration and validation capabilities. Increased use of Earth observation data will be a critical enabler of action on topics of national importance (see above, ID 140). Strong efforts have been made in increasing availability and access to the data itself, including through previous NCRIS investments (NCI, ANDS, etc) and Government investments in operational capabilities in organisations like Geoscience Australia and the Bureau.   Technologies such as AI offer great potential to extract ever greater value from this data, as well as to make the data more accessible to

use by more of the RD&I sector. However, our investment in capabilities to manage the associated risks must keep pace – including those risks around scientific integrity and information consumer confusion identified in the National Science Statement.   AI and other tools significantly increase the risk that greater numbers of misleading and damaging scientific and information products will be generated more quickly, and that their generation and dissemination will outpace the sector's capacity to engage with the issue. Investment in suitable calibration/validation (cal/val) infrastructure (beyond a central facility for accessing all cal/val datasets and expertise) will underpin quality assurance across current, new, emerging and novel observational data sources. Processes for the integration, validation and analysis of data from across those sensors will be key to managing AI risk – and getting the most out of the data/technology while keeping Australians safe.

Capability 3

225 – Collections as National Infrastructure Network.   This proposal aligns somewhat with the idea pitched below (Q14) to improve capacity and coordination of collections of Earth Materials. The Collections mentioned in proposal 225 are broader than Earth Materials, and include human and cultural collections. However, Earth Materials collections could form a part of this 'Collections as National Infrastructure Network'. I note there are also several other proposals that emphasise the value of 'Collections' of various sorts, and the need to fund their curation, uplift and accessibility.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

1. A national Earth Materials repository and research collection

Samples of Earth Materials (soils, sediments, rocks) are collected by a range of government agencies, universities and industries. Some of these institutions retain samples for future use, others do not. In many cases, existing repositories face space pressures causing sub-sets of collections to be discarded to make space. Examples include university geoscience departments when long-term academics retire and their research collections are often at risk of being lost, degraded or discarded. As multiple land-use pressures increase in the future, and as requirements to meet land access and sampling regulations increase, existing collections of Earth Materials increase in value.

A national 'collection' of Earth Materials could improve access to well-curated physical samples, enabling a wide range of research, and avoiding the need for unnecessary duplication of sampling.

Such a national Earth Materials collection would most practically be distributed amongst existing facilities or 'nodes', with expanded capacity, and improved and coordinated metadata and accessibility. Ideally, sample metadata should be (as far as possible) linked to existing research data from those samples.

Note that this proposal aligns with parts of proposals 214, 222 and 225. This proposal is also analogous and complementary to proposal 116 (which focusses on Collections of biological material, rather than Earth Materials).

2. Inclusion of AusSeaBed

The national collaborative AusSeabed initiative is central to the Australian marine information ecosystem. Seabed data is essential for marine safety, sustainable development, and environmental protection. When seabed data is openly available, it can inform decisions across science, policy, conservation, and management.

AusSeabed provides digital research infrastructure to facilitate national coordination of seabed mapping activities; guide the sector towards quality standards, consistency and interoperability; and increase the coverage, accessibility and usability of seabed data across Australia. It consists of a federated data platform, coordination tools, and guidance to advance Australia's seabed mapping efforts.

AusSeabed plays a key role in harmonising data standards and data sharing, ensuring Australian seabed data can be easily contributed to global initiatives such as the Nippon Foundation-GEBCO Seabed 2030 Project. AusSeabed's mission aligns with and actively supports the UN Sustainable Development Goal 14 - a commitment to conserve and sustainably use the ocean, seas and marine resources for sustainable development.

AusSeabed was established in 2018 as a bottom-up driven initiative, with the Australian seabed mapping community recognising the need and benefits of working together. The initiative has demonstrated the value of national coordination and leadership, but lacks a sustainable footing and fit-for-purpose operating model. AusSeabed requires both recognition and long-term investment to achieve its mission. This will ensure it can evolve into a mature national research infrastructure that maximises opportunities for end-user benefits.

Inclusion in the 2026 NRI Roadmap will ensure national leadership in seabed mapping and long-term.

127

Thu, Dec 4, 2025, 07:25 PM Australian Eastern Daylight Time
[ID: sbm397e8fc6db814b4e540f9]

Title
Prof

First Name
Ricardo

Last Name
Ruiz Baier

Organisation
MoCaO (Mathematics of Computation and Optimisation)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
096_Roadmap Survey_MATRIX. These suggestions point to the necessity of a residential research institute in mathematics. This fills the current gap in resources for mathematical sciences in Australia. A sustained investment in this field will place us as a major focus of international collaboration.

Capability 2
100_Roadmap Survey_The Australian Mathematical Society

Capability 3
101_Roadmap Survey_Aidan Sims

126

Thu, Dec 4, 2025, 05:51 PM Australian Eastern Daylight Time
[ID: sbm397e39754e819ca9e45bf]

Title
Dr

First Name
Gerardo Luis

Last Name
Dimaguila

Organisation

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Future investment to support the national harmonisation of health data for analytics using common data models. Additionally, investment in developing Australian health synthetic datasets for sovereign AI development.

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Thu, Dec 4, 2025, 04:30 PM Australian Eastern Daylight Time
[ID: sbm397def758f81209358393]

Title
Dr

First Name
Felicity

Last Name
Flack

Organisation
Population Health Research Network

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051 Need for new biobanking infrastructure (Phenomics Australia) 058 Digital biobanking (Australasian Cognitive Neuroscience Society) 159 Digital Biobanking (NIF) 195 Biobanking (PHRN) 286 Cohorts (Gen V) National Biobanking Infrastructure Supported by submissions (051, 058, 159, 195, 286) A national approach to biobanking has been consistently recognized as a priority in every previous National Research Infrastructure (NRI) Roadmap, yet no investment has been made to date.   Establishing a national biobanking infrastructure is critical to support Australia's research ecosystem.   This infrastructure should: •   Define biobanks broadly to include longitudinal cohort studies. • Integrate digital and data infrastructure for discovery, interoperability and secure data sharing. •   Provide robust systems for storage, management, and equitable access to biospecimens. •   Support linkage to administrative datasets Such an initiative would enable high-quality, large-scale research, improve reproducibility, and accelerate discoveries in health, genomics, and precision medicine.

Capability 2
195 Integrated Clinical Data (PHRN) 051 Need for new biobanking infrastructure (Phenomics Australia) Infrastructure to support the use, access and linkage of Electronic Health Records (EHR) Supported by submissions (195, 051, 197) Australia's health system generates vast amounts of digital clinical data through electronic health records (EHRs) in hospitals, primary care, and private practice. Despite significant investment in platforms such as My Health Record and state-based integrated EHR systems, this data remains underutilized for research due to fragmented systems, inconsistent governance, and limited secure access. A coordinated national approach is urgently needed to enable ethical, efficient, and privacy-preserving re-use of EHR data for public-good research and innovation. This capability would: • Transform fragmented EHR data into a research-ready resource through harmonization and interoperability. •   Establish governance frameworks for consent, privacy, and ethics to ensure community trust. •   Provide

secure, cloud-based environments for analysis of de-identified data without data leaving the system. • Support advanced analytics, AI-driven health research, and precision medicine. • Build workforce capability in digital health and data science. By leveraging existing NCRIS investments such as the Population Health Research Network (PHRN), a national federated, standards-based infrastructure that accelerates clinically relevant research and improves health outcomes nationally could be developed.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Need: Australia needs an interoperable national data linkage spine to enable efficient and secure integration of Commonwealth and state/territory data in a way that minimizes privacy risks. This capability is essential for research translation, policy development, and industry innovation, while minimizing the need to share overt personal identifiers.

Capability: The National Master Linkage Key (NMLK) provides a foundational linkage spine that supports distributed linkage across jurisdictions. It enables interoperability between major linked data assets such as the ABS Person-Level Integrated Data Asset (PLIDA), National Health Data Hub (NHDH) and state and territory-based data linkage units. Key principles include privacy by design, minimising personal data sharing, "share once, use many" pipelines, and efficient, fit-for-purpose methodologies.

Existing Investment: The Population Health Research Network (PHRN) has championed and invested in this approach since 2016–17 through NCRIS-funded pilot projects, working closely with ABS and AIHW to ensure alignment with national initiatives. This proposal builds on that foundation to deliver a production-ready capability.

Medium-Term Goals: Complete integration, streamline governance, enable tiered data access, and support cross-jurisdictional linkage for national research priorities.

Impacted Research Communities: Health, disability, social policy, education, and industry sectors requiring linked administrative and survey data.

Timeframe: Establishment within 3–5 years, leveraging existing pilots and partnerships.

124

Thu, Dec 4, 2025, 04:29 PM Australian Eastern Daylight Time
[ID: sbm397def151f95da3caaf8d]

Title
Ms

First Name
Annette

Last Name
Wittmann

Organisation
EMBL Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
174_AusRISE by EMBL Australia.pdf

122

Thu, Dec 4, 2025, 03:02 PM Australian Eastern Daylight Time
[ID: sbm396e4ae605224424c4aef]

Title
Prof

First Name
Janet

Last Name
McCalman

Organisation
University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
189 ASSA Roadmap ARCHERDigitisation and linkage of historical births, deaths and marriages records as set out in the Academy of Social Science Australia's Decadal Plan for Social Science Research Infrastructure 2024-2033 (see Response 189) are very important.

120

Thu, Dec 4, 2025, 01:50 PM Australian Eastern Daylight Time
[ID: sbm397d5da32699f95714685]

Title
Mr

First Name
Ezra

Last Name
Fass

Organisation
Royal Children's Hospital / MCRI

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposal for: Harmonised data for a learning health system

Australia collects rich clinical and administrative health data, but these remain siloed and inconsistently structured. As a result, cross-system research is slow, expensive, and often duplicated, limiting timely insights for policy and practice.

Proposed ARDC capabilities
1) National health data standardisation
Translate key datasets across primary, tertiary, and aged care into the OMOP common data model, extending current AHDEN work and creating an interoperable foundation for research. This approach has been effectively implemented across Europe (with the EHDEN initiative) leading to a robust network of harmonised and easily analysed health datasets.

2) Real-world data infrastructure
Use standardised data to support rapid, reproducible evidence generation for industry, government, regulators, and HTA agencies through:

- Streamlined governance for timely regulatory-grade studies
- Certification of high-quality data providers
- Sustainable data-access and maintenance models
- Secure cross-sector data sharing
- Standardised analytic tools

These will Facilitate:

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- Faster detection of health issues and assessment of interventions
- Stronger, more consistent evidence for policy and guidelines
- Better identification of inequities and gaps in care
- Participation in global studies while keeping data secure
- Scalable, sustainable research and analytics workflows

Medium-term goals:
- Expand OMOP-standardised primary and aged care datasets
- Operationalise governance and access frameworks
- Increase observational studies addressing regulatory needs
- Deliver measurable public-health impact and rapid-response analytics

Impacted communities:
Public health, policy evaluation, clinical and allied health research, health systems and economics, social sciences, life sciences, biotech, and pharma.

Timeframe: 2028–2032

119

Thu, Dec 4, 2025, 01:46 PM Australian Eastern Daylight Time
[ID: sbm397d59dbba99256c42aab]

Title
Prof

First Name
Clare

Last Name
Murphy

Organisation
University of Wollongong

In what capacity are you responding?
An individual

Capability 1
227 Melita Keywood

Capability 2
143 Zoe Loh

Capability 3
113 Robyn Schofield

118

Thu, Dec 4, 2025, 12:28 PM Australian Eastern Daylight Time
[ID: sbm397d11e27599585149734]

Title
Other: "-"

First Name
Anthony

Last Name
Pisani

Organisation
School of Mathematics, Monash University

In what capacity are you responding?
An individual

Capability 1
The MATRIX mathematics residential research institute (responses 035, 057, 067, 096, 100, 101, 126, 164, 165); facilities for close collaboration and free thinking form the foundations of effective mathematical research, yet no such facility is yet recognised as national research infrastructure in Australia, as many responses have highlighted.

Capability 2
The changes listed in response 153; software is become a critical aspect of contemporary research in many fields, yet is still too often not managed sufficiently to ensure work remains reliable and reproducible into the future.

117

Thu, Dec 4, 2025, 11:43 AM Australian Eastern Daylight Time
[ID: sbm397ce8df6e998dff2a643]

Title
Dr

First Name
Tara

Last Name
Martin

Organisation
Tasmanian Department of State Growth

In what capacity are you responding?
A representative of an organisation or group

Capability 1
1.   A new research-led agenda, bringing together Indigenous knowledge, sciences and humanities. This summarises the points I've been making above. (response #210).

116

Thu, Dec 4, 2025, 11:25 AM Australian Eastern Daylight Time
[ID: sbm397cd8bed8953348ddf10]

Title
Dr

First Name
Michelle

Last Name
Heupel

Organisation
Integrated Marine Observing System

In what capacity are you responding?
A representative of an organisation or group

Capability 1
The establishment of a cohesive, national coastal research infrastructure is a high priority for helping Australia cope with impending climate change impacts in the areas that hold most of our population and infrastructure. Billions of dollars of assets, critical infrastructure, and critical ecosystems are at risk of coastal change. There is a widely recognised need for national-scale, multi-disciplinary coastal observing to inform planning and mitigation of coastal change as evidenced through multiple survey submissions supporting the need for coastal research infrastructure including #33, 55, 140, 160, 212, 217, 222.   However, establishing this capability in Australia does not require a new NRI, it can be achieved through funded integration and collaboration of existing NCRIS capabilities and other national institutes (e.g. Geoscience Australia). The pending CoastRI proposal to NCRIS lays out a pathway for filling this national gap while also underpinning national priorities such as the draft Sustainable Ocean Plan, National Climate Adaptation Plan, draft National Marine Science Strategy, naval operations, shipping and ports operations, as well as protection of significant assets such as airports and urban centres.

Capability 2
Australia's Blue Economy is currently valued at over $220B per annum with this number continually increasing. Many of our future energy investments (e.g. offshore wind) and climate mitigation plans (marine carbon dioxide removal) require ocean data. While we have capacity to inform these efforts via the Integrated Marine Observing System, Australia hosts the world' third largest ocean territory and needs more data to underpin national-scale development and mitigation decisions. Industry and Blue Economy expansion relies on ocean data to inform locations for operations, impacts of operations, efficiency of operations, levels and timing of investment, and more. For example, ocean conditions and currents are fundamental to optimising shipping routes to reduce fuel usage/cost, reduce CO_2 emissions, and increase safety. Ocean data are also critical to underpinning environmental intelligence, search and rescue, and Australia's maritime

security as well as supporting our weather and climate modelling and forecasting. As such, ocean data have numerous applications and support a range of decision-making. These data are applicable at national, regional and global scales. The need for increased ocean data has been noted in multiple roadmap submissions including: #27, 33, 55, 212, 215, 217. As noted in submissions, advances in this area should consider development and deployment of novel technologies including expanded sampling; autonomous systems and vehicles; near real-time monitoring capabilities; increased access to on-shelf and open ocean research vessels; enhanced machine learning and AI capability for processing data and identifying near real-time changes in ecosystems; and improved links to regional partners and related programs that can help expand the amount of data/information available for all.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

The development and establishment of any new NRI should be completed following the approach employed for coastal observing. First, determining the gap and need for NRI; second, determining if the capability to meet this need already exists and can be leveraged to achieve the aim rather than establishing new or competing entities; third facilitating collaboration and coordination to meet the national need. If the need can't be met within existing NRI capabilities the next question is whether an existing capability could be expanded to include this aspect. This approach strengthens the existing capability and avoids duplication or fracturing of efforts.

The approaches above should facilitate a cost-effective NRI by minimising overlap and duplication, minimising administrative and operating costs, and reducing the cost and time lag associated with establishing a new capability. Holding 'agility funds' to support existing NRI collaboration or expansion could be a fast and effective way to grow and enhance NRI capability and ensuring new capabilities are only established when essential.

115

Thu, Dec 4, 2025, 09:29 AM Australian Eastern Daylight Time
[ID: sbm397c6dd2e195d3774a130]

Title
Dr

First Name
Alec

Last Name
Jamieson

Organisation
The University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
159 National Imaging Facility. I represent the Melbourne Ultra High-Field Functional Imaging Network, a collaborative initiative dedicated to advancing best-practice standards in ultra-high-field neuroimaging. Our membership spans over 70 researchers across the full academic pipeline, from PhD candidates to senior professors. Our research depends on ultra-high-field MRI, of which only two such scanners exist in Australia. Both were installed over a decade ago, through earlier NCRIS funding, and are now nearing end-of-life. Replacing these systems is essential to maintain Australia's leadership in neuroscience, clinical translation, and medical innovation. The research conducted through our ultra-high field 7T MRI is central to knowledge gains across a range of areas including: Basic neuroscience: enabling the resolution required for connectomics and fine-scale mapping of brain circuitry, supporting progress in cognitive science, neurotechnology, and imaging-driven AI tools.   Mental health: revealing detailed network architecture underlying depression, anxiety, PTSD, addiction, and related conditions.   Neurology: advancing research into epilepsy, motor neurone disease, and neurodegenerative disorders.

114

Thu, Dec 4, 2025, 04:02 AM Australian Eastern Daylight Time
[ID: sbm397b428cb099d2fcc66bd]

Title
Prof

First Name
Aidan

Last Name
Sims

Organisation
Australian Mathematical Society

In what capacity are you responding?
A representative of an organisation or group

Capability 1
035 David Wood; 067; Cheryl Praeger; 096 MATRIX; 100 Australian Mathematical Society;
101 Aidan Sims; 126 Jan Praetorius; 164 Australian Mathematical Sciences Institute; 266
The University of Queensland

113

Wed, Dec 3, 2025, 06:25 PM Australian Eastern Daylight Time
[ID: sbm39792905569936aa08e5b]

Title
Mr

First Name
Stephen

Last Name
Forbes

Organisation
Council of Australasian Museum Directors

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Q13a Response 214 South Australian Museum: Museum-based natural science collections, in Australia, are professionally curated, legislatively mandated repositories of zoological, paleontological and geoscience specimens held in perpetuity for the benefit of the Australian people. Together these collections represent the most comprehensive taxonomic record of Australia's biodiversity and how it is changing over time. Investment in these collections as national research infrastructure directly advances the National Science and Research Priorities - Protecting and Restoring Australia's Environment, Building a Secure and Resilient Nation, and Elevating Aboriginal and Torres Strait Islander Knowledge Systems. Museum biological specimens, with associated spatial and temporal data, are authenticated, authoritative records of occurrence. In conjunction with historic museum field notes, and photographs, associated other valuable information such as genomic, phenotypic and environmental data layers add to existing identification, location and collection metadata data, such as genomics, pathogens, habitat etc, such that specimens are seen as critical in providing baselines against which to measure pointers to environmental change across geological and human time. The demand for biological collection data is growing as their scientific value is increasingly recognised in documenting declines in populations (like that of insect populations) and the impact of catastrophic climate events such as the 2019-2020 "Black Summer" bushfires. Currently the major biological collection repositories in Australia (not including herbaria) are held within State museums and the CSIRO National wildlife collections. They contribute over 6.2 million specimen records to the Atlas of Living Australia (ALA). Between 2023 to 2025 there has been more than 230 million specimen record downloads, illustrating a huge demand for this data. Significant data, however, remains hidden within state collections due to the lack of resources to digitise and make accesible. The ALA supports programs across a wide range of sectors, including government, industry, natural resource management, biosecurity, First Peoples, education and academic research. The ALA recently recorded significant increase of business data users from 2021-2025, showing a

55 % increase since 2016-2020. Natural History collections supports scientific research, conservation, biosecurity, education, and cultural programs. As the availability of specimens-data improves, these collections are increasingly seen as globally relevant research infrastructure worthy of investment. Australia museums are well placed to implement transformational change by improving access to collection specimen data which will support response strategies to respond for the most pressing contemporary issues, such as climate change, food security, biodiversity loss, and biosecurity threats. Accelerated species discovery, digitisation, and access, enabled by emerging technologies, such as artificial intelligence, represent a major decadal opportunity to transform research across environmental monitoring, genomics, health, biosecurity, agriculture, and critical minerals, and, through codesign, harnessing traditional ecological knowledge to create a sustainable future. Such investment will modernise Australia's collections system, ensuring they can support future scientific needs and contribute significantly to global programs. Extensive consultation for the 2021 NRI Roadmap highlighted an urgent need for a step change in Australia's collections infrastructure. This need has intensified, with international investment in collections-based research infrastructure. These include iDigBio in the United States, alarge-scale digitisation and data infrastructure for collections, and DiSSCo in Europe, a distributed system uniting museums, botanic gardens, and universities. In Australia, the biological collections sector has developed a coordinated approach with major commitments to existing NCRIS research infrastructure, such as the Atlas of Living Australia, AuScope Earthbank, and Bioplatforms Australia. In response to the 2021 NCRIS Research Infrastructure roadmap, a national workshop was held in 2023, by the Australian biological collections sector, including end users, and research infrastructure partners. This workshop determined five transformational activities, which are also referenced in the submission by the South Australian Museum: 1. Establishment of a national coordinating body to ensure a national approach to address priorities in research and collection development to address critical national gaps in taxonomy, biodiversity documentation and conservation capabilities. 2. Mobilising collections-based data, through digitisation, applications of emerging technologies, improved storage and management to better protect specimens from risks associated with climate change such as increased humidity, heat and extreme weather events (bushfire, floods, etc). 3. Digital infrastructure, data access and integration to create a digital extended specimen approach' within the application of national standards, in line with global standards, and provision of global access. 4. Application of emerging transformational technologies, e.g. Applications of AI, scanning technologies, data storage repositories and molecular technologies. 5. Skills and workforce development. Creating a highly trained workforce, grow expertise in taxonomy, wildlife genomics, and biobanking. The cost-benefit analysis of describing and documenting Australia's biodiversity is estimated by Deloitte Access Economics (2021), to be between $3.7 and $28.9 billion in one generation. Adopting a national approach to Australia's biological collections is central to delivering these benefits.

Capability 2
Q13 B Response 147 – from Mark Adams Australia is recognised as one of only 17 mega biologically diverse countries in the world. Since European settlement Australia's biodiversity has been affected by a wide range of human activities, including land clearing, destruction of habitat through changed land use; e.g. draining wetlands, the introduction of non-endemic species and diseases, the effects of pollution and rapid climate change, the accumulation of pollutants in living organisms, and non-sustainable agricultural and harvesting practices, e.g. overfishing. The growing crisis in biodiversity loss in Australia's extends far beyond extinction of known species; ~75% of species remain

undiscovered or undescribed, leaving most biodiversity effectively 'dark' - unnamed, poorly understood and undocumented. This taxonomic impediment is the country's biggest barrier to effective conservation, environmental management, and sustainable use of biodiversity. While museums contribute significantly to species description and documentation diminishing resources across the sector have seen declining numbers of taxonomists and collection managers. There are limited opportunities in Australia for funding of taxonomic research, with the short-term nature of funding programs making taxonomy a less appealing career choice for biologists. With their large biological collections as research infrastructure, museums are well-placed to train the next generation of taxonomists. This submission by Mark Adams is in line with the Decadal Approach to Australia's Biological Collections report, from the 2023 national workshop on Australia's biological collections, facilitated by the Atlas of Living Australia. Recommended national actions for addressing the taxonomic impediment. 1.   Skills and workforce development: Conduct a contemporary, national assessment of taxonomic workforce capacity. Partner with professional groups (e.g. The Society of Australian Systematic Biologists, and Taxonomy Australia) to build training pathways and mentor new taxonomists. Provide secure, adequate funding for the Australian Biological Resources Study. Longer term funding to provide greater job security for early career taxonomists. 2.   Emerging transformational technologies Development of expertise in the application of genomics and molecular studies as taxonomic tools, and to inform wildlife conservation strategies. The building of genomic libraries such as OzMammal Genome and the National Biodiversity DNA Library rely on access to museum biological specimens. Museums are applying genomic techniques to unravel taxonomies, understand evolutionary pathways, and to support conservation strategies for threatened species. Several Australian museums, partnering with zoos and government conservation agencies, are leading the way in the application of genomics to wildlife conservation. Greater resources will increase capacity, the training of the next generation of scientists, and ensure reduction in species extinction.   Funding support for the establishment and management of Australian wildlife tissue collections as national research infrastructure. The establishment and running of cryobanking facilities are expensive and beyond the budget resources of several museums in Australia. Museums, however, have the expertise in managing collections and in making them accessible, both physically and virtually. As State museums are the legal repositories for wildlife specimens the establishment of state-of the art cryobank facilities will ensure the long-term preservation of specimens for use in emerging molecular science research programs. 3. Sectoral leadership The establishment of some national goals, e.g. a national commitment to describe all Australian vertebrates within the decade. Network museums and herbaria to reduce duplication and improve access to tissue and voucher collections. Many faunal groups span multiple states, making regional silos ineffective for national biodiversity discovery. Digitisation of specimen data will help breakdown these silos.

Capability 3
Q13c Response 179 - Roadmap Survey - National Imaging Facility Museums Special Interest Group Museums are now heavily reliant on 3D imaging technologies (CT, micro-CT, structured light scanning, photogrammetry) for biodiversity documentation, identification, and public access. The growing volume of data is expensive for museums to store creating vast amounts of imaging data that is currently unmanaged, inaccessible, or stored insecurely. Data is often provided to museums on external hard drives, creating inefficient storage, limited access and placing long term security at risk. Museums do not have the data management expertise to keep pace with these rapidly evolving scanning technologies. The priorities outlined in the submission by the National Imaging Facility

Museums Special Interest Group will help address some of these key issues confronting museums. Priorities identified by the National Imaging Facility Museums Special Interest Group: •	National, centrally supported digital storage infrastructure. •	Equitable, distributed data and metadata curation capacity • Strong, supported front-line data management within collections. •	A national copyright and IP policy framework for digital collection assets •	Governance structures to enable equitable access to digital biodiversity data.

112

Wed, Dec 3, 2025, 02:24 PM Australian Eastern Daylight Time
[ID: sbm397856217199ab8358a19]

Title
Prof

First Name
Frank

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Bongiorno

Organisation
Council for the Humanities, Arts and Social Sciences

In what capacity are you responding?
A representative of an organisation or group

Capability 1
210. CHASS endorses the priorities set out in the Australian Academy of Humanities response, viz: 1. Indigenous Research Capability 2. National research collections infrastructure capability 3. Integration and coordination capability across HASS, including workforce development and AI capability

111

Wed, Dec 3, 2025, 01:57 PM Australian Eastern Daylight Time
[ID: sbm39783d862595ce06811cb]

Title
Prof

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Rufus

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Black

Organisation
University of Tasmania

In what capacity are you responding?
A representative of an organisation or group

Capability 1
The following three capabilities stand out as critical for Australia's research and innovation future. They address national priorities in sustainability, health, and industry transformation, while leveraging Australia's unique geographic and scientific strengths. Each capability also supports cross-disciplinary research and translation into practical outcomes. National Ocean Engineering and Technology Research Infrastructure (Response 055) • Why it matters: Australia's marine environment underpins offshore renewables, aquaculture, coastal resilience, and maritime operations. A coordinated capability for large-scale physical modelling, digital twins, sensor and robotics development, and marine technology testing will enable Australia to lead in ocean engineering innovation. •
        Impact: Supports industry growth, environmental sustainability, and national security, while creating opportunities for regional economic development.

Capability 2
National Biobanking and Integrated Multi-Omics Infrastructure (Response 051, with related proposals 118 and 169) •   Why it matters: A nationally integrated biobanking system linking biological samples with genomic, phenotypic, and environmental data is essential for precision medicine, biosecurity, and environmental health research. •   Impact: Provides secure, interoperable platforms that accelerate translation into clinical and commercial applications, while embedding ethical and culturally appropriate governance, including Indigenous data sovereignty.

Capability 3
Environmental Futures Lab: Integrated Prediction and Digital Twin Capability (Response 154) • Why it matters: Advanced environmental modelling and forecasting infrastructure is critical for climate adaptation, biodiversity management, and cumulative impact assessment. •Impact: Combines observations, HPC/AI, and ecosystem simulation to

deliver predictive capability for sustainability and resilience, supporting government, industry, and community decision-making.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National Maritime Research and Training Capability

Name of Capability:
Australian Maritime College (AMC) – National Defence-Aligned Maritime Research & Training Infrastructure

Need
Australia requires sovereign, defence-grade maritime research, testing, and training infrastructure to underpin the design, construction, certification, and through-life support of advanced naval platforms. This capability is essential for delivering speed to capability, ensuring resilience in the national shipbuilding enterprise, and safeguarding Australia's strategic autonomy.

This national-scale infrastructure is pivotal to delivering AUKUS Pillar 1 (nuclear-powered submarines) and Pillar 2 (advanced capabilities). Expanding the Australian Maritime College (AMC) facilities will reinforce Australia's sovereign expertise in engineering, design, testing, and through-life support of submarines, particularly addressing the complex maintenance and sustainment requirements of the Virginia Class submarines to be acquired from the United States.

Further, the infrastructure will provide interoperable test facilities, assurance frameworks, and secure information-sharing environments to accelerate the integration of AUKUS Pillar 2 technologies, including undersea systems, AI and autonomy, advanced cyber, electronic warfare, and quantum technologies. Achieving these sovereign capabilities demands long-term decadal, coordinated national investment and planning, ensuring Australia can meet strategic timelines and maintain technological parity with its AUKUS partners.

Beyond defence imperatives, this capability will advance Australia's leadership in decarbonising maritime operations, transitioning to zero and near-zero carbon fuels, and supporting autonomous and smart naval operations for future fleet concepts.

Research and innovation must be collaborative, yet many maritime research and testing facilities are large, complex, and expensive. Careful national investment decisions are required to ensure facilities and expertise complement each other across the country.

Currently, AMC hosts the nation's only hydrodynamic towing tank (100 metres), Cavitation Research Laboratory (CRL), and Model Test Basin. Between 2019 and 2025, Federal Government investment in the Defence Maritime Innovation and Design Precinct (DMIDP) enhanced these facilities and established new assets such as the Autonomous Maritime Systems Laboratory (AMSL) and the Underwater Collision Research Facility (UCRF). This concentration of hydrodynamic and maritime autonomy research infrastructure supports a critical mass of scientists and engineers in one location while enabling collaboration with other institutions such as those specialising in acoustics and quantum mechanics.

Sustaining and enhancing these facilities is critical to delivering maritime capability for Australia and its allies. Autonomous systems research is particularly challenging to maintain given the rapid pace of development and the high cost of new or replacement platforms, especially subsurface platforms. A national infrastructure sustainment framework for this rapidly evolving capability area should be considered to ensure focused investment delivers contemporary capabilities in the right locations to meet Defence needs. Collaboration between Defence, universities, and industry will be essential.

New Capability
The initial DMIDP concept required the design of two additional facilities that remain unfunded:
• A 200 metre acoustically optimised hydrodynamic towing tank. This facility provides a sovereign defence research capability comparable to allied facilities and would be world leading given there has been no investment in new towing tank infrastructure among our allies for many years.
• A larger Cavitation Research Laboratory (CRL) to support the advancement of submarine and vessel design. This facility represents both a sovereign research and testing capability and a unique and valued capability among AUKUS partners.
These facilities are national-scale infrastructure requiring significant investment, but they are critical to delivering leading-edge defence capability and meeting the research needs of Defence and the maritime industry. Co-location at AMC ensures research skill sets and cross-pollination of ideas are maximised for effectiveness.

Medium-Term Goals
Recommended priorities:
• Elevate AMC platform facilities to formal National Research Infrastructure status (1–2 years)
• Secure funding and commence construction of the 200 metre towing tank (2–4 years)
• Finalise design and secure funding for the expanded CRL (3–5 years)
• Commence CRL construction (5-7 years)
• Enhance autonomous and smart maritime systems for Defence and industry, supported by in-water test and evaluation sites (2–5 years)
• Deliver a national workforce pipeline and establish test, evaluation, and certification frameworks aligned with AUKUS Pillar II (2–5 years)

Impacted Research Communities
Defence science; naval architecture; ocean engineering; autonomous maritime systems; digital modelling; maritime training; offshore renewables; advanced manufacturing SMEs; national observing facilities; logistics operations and planning.

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Wed, Dec 3, 2025, 01:52 PM Australian Eastern Daylight Time
[ID: sbm3978388a2095c264d967e]

Title
Prof

First Name
Grainne

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Moran

Organisation
University of New South Wales

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Quantum Device Testbed A national quantum device testbed network is essential to maintain Australia's competitiveness in quantum technologies. Survey responses emphasise the rapidly growing demand for specialised fabrication, testing and characterisation environments that individual institutions cannot sustain alone. A coordinated testbed capability would accelerate translation from prototype to functional device and reduce duplication of high-cost infrastructure. This new infrastructure would support both fundamental science and industry translation. Responses: 201 (UNSW), 271 (Monash University), 272 (University of Western Australia), 285 (Melbourne Initiative for Quantum Technology, University of Melbourne), 115 (Archer Materials) 149 (The Research & Prototype Foundry at Usyd).

Capability 2
Infrastructure on Australia's East Coast to support preclinical (animal) research (new under Phenomics Australia) The vulnerability of medical research using laboratory animals to supply shortages was highlighted over the past three years during a time of transition of the Western Australia government supported ARC to commercial management. Animal strains and services that were nationally available have been severely limited or not yet fully established during this time, delaying or preventing research outcomes. UNSW recognises the urgent national need to complement and support infrastructure for supply of laboratory animals nationally by expanding capabilities on the east coast. This capability gap was also recognised in the 2021 Roadmap but not taken further. UNSW would support the integration of the Garvan's ABR infrastructure and services under Phenomics Australia and associated networks (Australian Phenome Bank/EMMA) and the expansion of their capabilities into rat models. The ABR MEGA service for genome editing in mice using CRISPR/Cas9 technology has been fulfilling demands for new model creation for clients nationally for many years but requires support to enable researchers to access this technology at accessible pricing. Tissue and mouse sperm biobanking is offered as a

service at ABR and has already built a sizable library of archived mouse strains. The ABR cryostorage facilities and associated skills in embryo handling and IVF make this a nationally valuable resource complementary to other NCRIS funded centres. Responses: •
051_Roadmap Survey_ Phenomics Australia.pdf •   086_Roadmap Survey_ Phenomics Australia.pdf •   169_Roadmap Survey_ Phenomics Australia.pdf •
201_Roadmap Survey_ UNSW Sydney.pdf • 222_ Roadmap Survey_ Australian National University.pdf

Capability 3
Digital Biobanking (new under NIF) A nationally coordinated digital biobanking capability is needed to modernise Australia's management of biospecimens and associated biological data. Survey responses highlighted that current systems are fragmented, inconsistently digitised, and unable to integrate high-value datasets such as omics, clinical information, and imaging-derived phenotypes. This lack of interoperability limits research translation, reduces reproducibility, and slows progress in precision medicine, therapeutic development, and large-cohort studies. A unified digital infrastructure linking specimen metadata, longitudinal data, and multimodal research outputs was identified as essential to support efficient discovery, clinical validation, and population-scale research, ensuring Australia can fully leverage its biological and imaging assets. Responses: •
159_Roadmap Survey_ National Imaging Facility.pdf •   169_Roadmap Survey_ Phenomics Australia.pdf •   184_ Roadmap Survey_ Australasian Biospecimen Network Association (ABNA).pdf •   201_Roadmap Survey_ UNSW Sydney.pdf • 209_Roadmap Survey_ Collections Working Group.pdf •   222_ Roadmap Survey_ Australian National University.pdf

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
1. High Performance Computing and Data

Current investment in Australia's national high-performance computing facilities, including NCI and Pawsey, is no longer adequate to meet research and industry needs. Both centres face mounting pressure from rapidly growing data volumes, escalating demand for GPU-enabled machine learning and AI workloads, and the need to sustain traditional CPU-intensive modelling and simulation. The scale of required upgrades—across compute, storage, networking, and data management—far exceeds current resourcing.
A modern, coordinated national supercomputing and data infrastructure is a foundational requirement for every major discipline of science and innovation. It underpins fields as diverse as climate modelling, advanced materials, biomedical research, genomics, national security, astronomy, engineering, and AI. Without substantial reinvestment and expansion, Australia risks losing critical capability, falling behind international competitors, and being unable to deliver on key national priorities that depend on large-scale computation and data integration. We are prepared to enter into partnerships and to prioritise this initiative for the nation. Investment both with and beyond NCRIS will be required.

2. NRI for Defence Research and Translation.

Post the Defence Trailblazer program, there should be ongoing NRI aligned to AUKUS workloads. National capacity for simulation workloads for defence infrastructure at scale is important.

3. Enhanced National Imaging Capability

An enhanced national imaging capability is essential to support a robust translation pipeline that helps pharmaceuticals, biologics and medical technologies progress efficiently from discovery to market. Imaging provides the evidence base needed to demonstrate mechanism of action, optimise dosing, and assess therapeutic response across the development lifecycle. It is also fundamentally complementary to genomics, enabling the multimodal biomarker development and phenotyping required for precision medicine. Imaging plays a foundational role across Australia's medical product sector, enabling the validation of medical devices, optimisation of digital health technologies, and the development of advanced therapeutic platforms. It is especially critical for the emerging field of theranostics, where imaging guides both diagnosis and personalised treatment.
In neuroscience, state-of-the-art imaging supports fundamental discovery and translational research into neurological and mental health conditions, providing insights that cannot be obtained through any other modality. With an ageing population and rising neurological disease burden, the importance of imaging will only increase, supporting faster interventions, improved monitoring, and the development of next-generation neurotechnologies.
Beyond health, imaging is a critical enabling technology for Australia's productivity, with applications in mineral characterisation, materials science, agriculture, and environmental monitoring.
Enhancing national imaging infrastructure will directly accelerate innovation, improve health outcomes, and expand Australia's role in global medical technology development.

4. Proposed New Capability: Magnetic Resonance Australia – A National NMR Network

Australia's NMR capability is essential across many priority research areas but is currently fragmented, ageing and at risk of substantial decline. More than 100 instruments across universities and CSIRO face a major replacement and maintenance "funding cliff" in the next 3–5 years, compounded by rising helium costs and the absence of any ultra-high-field NMR (≥1 GHz) in Australia.
Magnetic Resonance Australia (MRA) proposes a nationally coordinated NMR network to manage, sustain and strategically invest in this critical capability. The network would link major centres, provide national access to high-end instruments, coordinate upgrades, establish a 1.2 GHz flagship facility, expand specialised techniques, and implement a national helium-recycling program. A shared digital platform would support remote access, data management and integration with broader e-research systems.
A national approach would secure long-term capability, enable industry access, and support research translation across biotechnology, materials, health, agriculture and quantum technologies. It positions Australia to remain competitive internationally while fostering collaboration, innovation and efficient use of resources.

5. Advanced Materials and Manufacturing Australia (AMMA, http://www.ammaust.org.au/) as outlined in responses 178 and 201 to the previous Roadmap survey

Advanced materials and manufacturing capabilities are critical for positioning Australia as a global leader in emerging technology sectors. It highlighted the need for nationally coordinated infrastructure that accelerates the discovery, characterisation and scale-up of

next-generation materials, including those essential for energy storage, quantum technologies, defence, and medical applications. Current capability is fragmented and lacks the integrated facilities required to move innovations efficiently from research through to prototyping and commercial readiness. Establishing a national Advanced Materials and Manufacturing Australia capability would provide end-to-end platforms for materials synthesis, testing, device integration, and advanced fabrication, strengthening sovereign capability, supporting industry partnerships, and ensuring Australia remains competitive in rapidly evolving global supply chains.

6. Distributed network of sensors to monitor (urban) climate and other parameters in cities.

This includes traditional weather stations, solar and infrared radiometers (including spectral radiometers), eddy covariance & flux towers, vertical profilers (e.g., Lidar) and other parameters. Currently, continuously operated weather stations are only managed by the Bureau of Meteorology, predominantly outside of urban areas. Australia is often off the map of international networks of high-end sensing in urban areas.
This includes:
• Urban complexity and modelling gaps: Cities are highly heterogeneous, yet current climate models treat them simplistically. We need infrastructure that supports next-generation urban climate modelling, something we are very behind on as most of our models lack any representation of cities. We need to be integrating high-resolution observations with advanced urban parameterisations to improve projections and inform adaptation strategies.
• Integration with national and global systems: Any new urban observation network should be interoperable with existing NRIs (ACCESS-NRI, TERN, AURIN) and international initiatives. This ensures scalability, harmonisation, and global relevance.
• Data accessibility and co-benefits: Open data protocols will maximise impact across research, policy, and industry. Urban observations are not only vital for climate and energy studies but also for health, transport, and resilience planning.
• Strategic positioning: Australia risks falling behind global efforts in urban climate infrastructure. Establishing this capability within the next five years will position us to lead in urban climate adaptation and net-zero transitions.
These additions reinforce the need for a distributed urban observation network integrated with modelling infrastructure to close critical gaps in Australia's climate research capability. Ideally this should be achieved through an existing NRI.

109

Wed, Dec 3, 2025, 10:31 AM Australian Eastern Daylight Time
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Title
Dr

First Name
Georgina

Last Name
Kennedy

Organisation
SPHERE Cancer Clinical Academic Group

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
As Australia moves toward modernised, data-driven healthcare and research, we lack the semantic infrastructure needed to integrate disparate health data sources, research datasets, and decision-support tools.

Australia currently lacks:

* Nationally coordinated ontology resources aligned to local clinical practice, coding systems, and research needs
* Infrastructure to publish, and maintain these assets in FAIR, computable formats
* Tooling to embed these ontologies directly into analytic workflows and data-processing pipelines
* Governance frameworks that allow sector-wide contributions and transparent decision lineage

We needs a national, shared ontology infrastructure that unifies terminologies, domain models, entity definitions, and decision-relevant context into a consistent semantic layer, designed explicitly to power AI-enabled research and real-world evidence. This would provide a sustainable, coordinated semantic layer for Australian health data research and translation into the clinic.

Key activities should include:

* Alignment of local clinical terminologies (ACHI, MBS/PBS concepts) with international research ontologies

2026 National Research Infrastructure (NRI) Roadmap Issues Paper Consultation
Issues Paper Consultation Survey
Department of Education

* Mapping of high-value locally-relevant research concepts (cancer phenotypes, frailty measures, allied health constructs, care pathways) to computable ontological representations
* Ontology-enabled model development for statistical learning
* Machine-readable schemas to guide LLM inference and grounding
* Rapid-turnaround extraction of structured data from clinical text using small, efficient models that can run within jurisdictional privacy and sovereignty constraints
* A transparent contribution workflow for clinicians, researchers, and data custodians
* Knowledge graph and semantic integration services
* APIs for researchers, health systems, and developers to query entities, relationships, and concept hierarchies
* Semantic ETL pipelines that reduce duplication and reduce error from inconsistent coding
* Tools for automated documentation, reproducibility, and evidence traceability
* Infrastructure to store and expose "decision metadata": the context, ontology version, and data inputs underpinning any AI-generated inference or analytic output

This can enable an ecosystem for research that produces data driven research outputs that are traceable, scalable, and most importantly, can be responsibly and transparently applied in clinical practice.

108

Wed, Dec 3, 2025, 10:28 AM Australian Eastern Daylight Time
[ID: sbm39777d87af95d6f30425d]

Title
A/Prof

First Name
Linda

Last Name
Pfeiffer

Organisation
CQ University - School of Education and Arts

In what capacity are you responding?
A representative of an organisation or group

Capability 1
007: National HASS data curation service needed; storage alone insufficient.

Capability 2
125: Education needs strong input; rapid change; mostly human resources.

Capability 3
139: HASS/Arts/Culture digital infrastructure neglected; need national digital access and archiving.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The listed capabilities are sufficient, provided they incorporate regionality. Ensuring the inclusion of rural and regional researchers, along with their data, is essential.

107

Tue, Dec 2, 2025, 06:04 PM Australian Eastern Daylight Time
[ID: sbm3973f8f892cb649f3e99b]

Title
Dr

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Beth

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Caruana

Organisation
NSW Health Statewide Biobank

In what capacity are you responding?
An individual

Capability 1
184 ABNA

Capability 2
202 Victorian Cancer Biobank

Capability 3
169 Phenomics Australia

106

Tue, Dec 2, 2025, 05:27 PM Australian Eastern Daylight Time
[ID: sbm3973d7488b433b848c2ca]

Title
Dr

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Jeff

Last Name
Christiansen

Organisation
Australian BioCommons

In what capacity are you responding?
A representative of an organisation or group

Capability 1
027_Roadmap Survey_Oliver Berry We support the production of a complete DNA barcode library for Australia's most important species, but also argue that in addition to a short DNA barcode approach, generation of full genomes for these organisms would also be a worthwhile endeavour, as a full genome enables far more downstream applications due to the completeness of the data.   Current investments support modest full genome data generation (<1000 species/year). Automation is crucial for scaling up. Producing 5000 high-quality genomes/year would still take 30 years. With current tech, 250PB storage, $700M sequencing, and 300M CPU hours are needed. This is a 'moonshot' requiring national commitment. Deloitte analysis estimates that for every $1 spent on discovering and documenting Australia's species (including genomics), benefits range from $4 to $35. See: https://www.science.org.au/files/userfiles/support/reports-and-plans/2021/cost-benefit-analysis-of-taxonomy-australias-mission-deloitte-2021.pdf

Capability 2
Digital Biobanking infrastructure 058_Roadmap Survey_Australasian Cognitive Neuroscience Society 118_Roadmap Survey_Steven Meikle 159_Roadmap Survey_National Imaging Facility 178_Roadmap Survey_Monash University National Biobanking infrastructure 013_Roadmap Survey_Miranda Smith 051_Roadmap Survey_Phenomics Australia 169_Roadmap Survey_Phenomics Australia 184_ Roadmap Survey_Australasian Biospecimen Network Association (ABNA) 195_Roadmap Survey_Population Health Research Network 202_Roadmap Survey_Victorian Cancer Biobank Consortium 209_Roadmap Survey_Collections Working Group 222_ Roadmap Survey_Australian National University 230_Roadmap Survey_Busselton Population Medical Research Institute Inc

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability,

the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Significant long term data storage to enable retention of high quality, highly curated, reusable data assets of national importance - ensuring that Australia can maintain sovereign control over these assets.

High-value data of national importance to Australia is often sent offshore. While the model has largely worked well, the very recent and highly publicised uncertainty with respect to government-funded research and the data that arises from that research in some international jurisdictions has highlighted a potential future situation where perhaps Australia may not always be able to rely on international partners to maintain Australian data of this type in the long term. As such the issue is suddenly of high importance.

For genomics data, global models like INSDC (non-human data) and fEGA (human data) exist, enabling control of national data in a global framework. The BioCommons GUARDIANS project is building the foundations for a secure human genomic data repository in Australia, but long-term support for the data storage is unclear. At the moment, there is no clear support model for a national non-human genomic repository which could contain genomic data for Australian relevant organisms (e.g. native, agricultural, invasive).

Establishment of Australian Nodes within such global frameworks would benefit researchers across all of biology. Having data assets in close proximity to available compute is also desirable, especially in the era of AI. The approach would also enable Australia to take a positive leadership role internationally through contributing critical support towards the functions of internationally distributed core global data repositories. We advocate for resources where Australia maintains sovereign control over long-term (multi-decadal) retention of high-quality, reusable data.

Whilst our use case is focussed on omics data, the data storage infrastructure would be applicable to all disciplines requiring the long term retention of high quality, highly curated, reusable data assets of national importance (e.g. HASS datasets as noted in some responses to the survey).

104

Tue, Dec 2, 2025, 12:29 PM Australian Eastern Daylight Time
[ID: sbm3972c63b27166591059df]

Title
Ms

First Name
Kim

Last Name
Mintern-Lane

Organisation
Stawell Underground Physics Laboratory (SUPL)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Stawell Underground Physics Laboratory (073); (130 – Jeremy Mould); (275 – Virginia Kilborn) The Stawell Underground Physics Laboratory is existing infrastructure requiring NCRIS operational support to ensure sustainable access for fundamental nuclear physics research, development of quantum technologies and to support calibration, detector validation, and material screening under ultra-low-background conditions for precision measurement.

Capability 2
Quantum Device Testbed Network (285 – University of Melbourne)   The Stawell Underground Physics Laboratory (SUPL) provides the only environment in Australia capable of low-background, radiation-controlled testing of quantum devices, complementing this network by addressing environmental noise limits. SUPL provides an essential complement to national quantum testbed initiatives by offering shielded, ultra-low-noise conditions ideal for validating quantum and timing sensors. This aligns with the growing recognition of the need for integrated, distributed test environments that link quantum, AI, and navigation infrastructure for sovereign resilience.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Need: Australia lacks a sovereign capability for testing and calibrating ultra-sensitive detectors, quantum sensors, and radiation-mitigation technologies in a controlled, low-background environment.

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Proposed Capability: A distributed facility positioning SUPL (underground low-radiation node) as a secure test node within a national network for resilient sensing and timing systems – supporting technologies essential to secure Positioning, Navigation and Timing (PNT), quantum measurement, and defence resilience.
This aligns with emerging national discussions on developing a connected testbed architecture for sovereign measurement and navigation assurance.

Medium-Term Goals:
• Establish a radon-controlled cleanroom and metrology suite at SUPL (2026–2028);
• Deliver national calibration and precision measurement services for detectors and environmental sensors by 2030.

Impacted Research Communities:
Quantum technology, defence and space systems, environmental monitoring, radiation biology, and mining safety research sectors.

Timeframe: 2027–2032 (leveraging current SUPL infrastructure).

103

Tue, Dec 2, 2025, 11:14 AM Australian Eastern Daylight Time
[ID: sbm397281531343b45484cab]

Title
Dr

First Name
Tony

Last Name
Willis

Organisation
Australian Council of Deans of Science

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National Data and AI Infrastructure Uplift – repositories, compute, enhanced network connectivity, governance, and sovereign AI models.

Capability 2
Distributed Longitudinal Environmental Observation Network – leveraging Australia's continental scale for climate, environmental and ecological monitoring.

Capability 3
National Front Door for Industry Engagement – a unified navigation and triage mechanism for SMEs and industry partners.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Given the importance of communication in persuading industry and the broader, non-research community of the critical value of national research infrastructure, we suggest that infrastructure to support National Science Storytelling would add significant benefit. Such a coordinated national capability for science communication would:
• Strengthen public and political understanding of the NRI system and its intrinsic value in developing our quality of life, health and well-being, and national security
• Enhance industry awareness and uptake
• Provide consistent communication tools across facilities
• Build the social licence required for sustained, long-term investment

• Such a capability would substantially amplify the impact of both existing and future NRI investments.
We are also of the view that either government should increase funding for the NRI system or stop funding for some existing facilities so as to make room for new ones.

101

Mon, Dec 1, 2025, 06:01 PM Australian Eastern Daylight Time
[ID: sbm396ed0576b16ce2ba1504]

Title
Dr

First Name
Olga

Last Name
Shimoni

Organisation
RNA Innovation Foundry at The University of Western Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
high throughput screening (150)

Capability 2
combination of the national centre for medicinal product safety manufacturing (29)

Capability 3
combination of biomanufacturing options (99,151,282)

100

Mon, Dec 1, 2025, 05:59 PM Australian Eastern Daylight Time
[ID: sbm396ecdef181648253b818]

Title
Prof

First Name
Paul

Last Name
Roe

Organisation
James Cook University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
National Compute, AI-Ready Infrastructure, Modelling and Data Integration Submissions
263 Pawsey Supercomputing Centre (and 162 – Australian Academy of Technological
Sciences and Engineering, and numerous others which advocate for compute and data
storage for specific needs.) James Cook University strongly supports the development of
sovereign, AI-ready national compute infrastructure and integrated data platforms. As a
university operating in areas where data-intensive modelling is essential—tropical health,
marine science, biodiversity, environmental hazards, and regional development—JCU
endorses national investment in GPU-dense clusters capable of supporting advanced AI,
machine-learning workflows, and high-resolution simulation. Strengthened national
compute infrastructure would directly support JCU's role in delivering advanced modelling
for cyclones, floods, disease outbreaks and climate adaptation across Northern Australia.

Capability 2
Environmental Monitoring, eDNA, Biodiversity and Collections Digitisation Submissions 197
Australian Research Data Commons (and 027 Oliver Berry; 079 Bioplatforms Australia; 116
Atlas of Living Australia; 179 NIF Museums Special Interest Group; 209 Collections Working
Group; 214 South Australian Museum; 225 Collections as National Infrastructure Network;
224 Bradley Moggridge.) The creation of national infrastructure for environmental
monitoring and eDNA, including a complete Australian DNA barcode library and expanded
digital collections capability to improve biodiversity detection, invasive species
surveillance and environmental health monitoring. This is of particular importance in
Northern Australia, where JCU researchers work across the Great Barrier Reef, rainforest
ecosystems, savannas and freshwater networks—areas where cryptic, endangered and
invasive species require rapid genomic identification. Investment in digitisation and 3D
imaging of biological and cultural collections, along with national standards for curation,
metadata and rights management would unlock the value of museum, herbarium and
ecological datasets, enable integration with NCRIS platforms, and improve Australia's

capacity to monitor environmental change, protect biodiversity and strengthen biosecurity.

Capability 3

Ocean, Marine, Climate & Environmental Modelling Infrastructure Submissions 154 TERN Australia (and 033 Integrated Marine Observing System (IMOS); 055 Ryan Lowe; 080 Jennifer MacLeod; 092 Western Australian Marine Science Institution; 248 Edward Doddridge.) Enhanced national research infrastructure for ocean and marine systems, coastal resilience, and high-resolution climate and environmental modelling. A national approach that links marine observing systems (such as IMOS) with next-generation modelling platforms capable of supporting emergency management, coastal planning, fisheries, defence and environmental restoration would directly strengthen Australia's ability to respond to extreme weather events, manage climate risk, and support sustainable development across tropical and coastal regions.

99

Mon, Dec 1, 2025, 05:26 PM Australian Eastern Daylight Time
[ID: sbm396eb0266116b672c4d40]

Title
Prof

First Name
Simone

Last Name
Warner

Organisation
Agriculture Victoria Research, Agriculture Victoria, Department of Energy, Environment and Climate Action

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Various submissions (e.g. 051, 058, 097) – Biobanking

Capability 2
Various submissions (e.g. 003, 007, 011, 052, 072, 095) - Data and computational demands/AI

Capability 3
Nil comment

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Agriculture Victoria proposes a new priority investment to maintain and enhance the capabilities of the Australian Grains Genebank (AGG) in Horsham, ensuring it continues to operate as a modern, high-impact national innovation asset for the Australian grains industry.

Need:
Australia has limited indigenous genetic diversity for its major grain crops, making secure access to global germplasm essential for sustained crop improvement. The AGG serves as the national centre for plant genetic resources for grain crops and is responsible for acquiring, conserving, characterising and distributing the genetic diversity that underpins the productivity, resilience and long-term sustainability of the Australian grains industry.

The AGG also fills a critical national gap in post-entry quarantine (PEQ) capability with specialised accredited glasshouse infrastructure at Horsham, which is required to safely import most grain crop species. As biosecurity compliance requirements intensify, plant genetic resource import capacity is declining nationally due to escalating costs and fragmented PEQ infrastructure. The AGG now hosts the largest public-good PEQ capability for the grains industry, providing the secure and compliant pathway needed for breeders and researchers to access global biodiversity.

Further, the AGG is foundational to Australia meeting its commitments under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), including compliant international exchange of plant genetic resources.
To maintain this critical national capability and safeguard access to global biodiversity, targeted reinvestment is required.

Capability:
The AGG operates as a national bio-digital resource centre, integrating best-practise conservation with genomic and digital technologies to provide informed and facilitated access to the grain crop biodiversity required for productivity gains and climate resilience.

As custodian of one of the world's largest curated collections of temperate and tropical small-grain crops and their wild relatives, the AGG underpins pre-breeding, breeding and discovery research across Australia. However, like many long-serving research infrastructures, key components of the AGG are aging and require targeted reinvestment to ensure timely asset maintenance and replacement, maintain best-practice conservation systems, and keep pace with advances in bio-digital and bioinformatics technologies.

Modernisation would expand the AGG's digital and bioinformatics capability, enhance the research value of its collections, and ensure continuity of high-quality conservation, PEQ and germplasm distribution services.

Medium-term goals:
Targeted investment over the medium term will ensure the AGG remains a future-ready national capability. Priorities include:
1. Asset maintenance and renewal to ensure long-term operational stability, safeguard the national collection, and maintain capacity to meet research and industry demand.
2. Enhanced bio-digital capability, including expanded genotypic and phenotypic characterisation, improved data integration (including with international genebanks), and user-focused digital tools that unlock the value of plant genetic resources.
3. Strengthened service delivery to support national research and breeding programs developing climate-resilient, high-yielding and high-value crops.
4. Alignment with global best practice in conservation, biosecurity, and digital data management to maintain international confidence and ensure ongoing treaty compliance.

Impacted research communities:
The AGG provides essential capability for:
• public and private plant breeding programs, domestically and internationally
• pre-breeding and discovery researchers across universities, government research agencies and industry bodies
• biosecurity stakeholders relying on trusted and complaint germplasm import pathways
• international partners accessing genetic resources through the ITPGRFA framework

These communities depend on the AGG's continued operation and enhancement to drive innovation and sustain the productivity and resilience of the Australian grains industry.

Timeframe for establishment:
Given the strategic significance and ageing infrastructure of the AGG, renewal and enhancement should commence as soon as possible. A staged modernisation program over the next five years would allow uninterrupted delivery of core services while progressively upgrading physical infrastructure, PEQ capability and digital data systems. In parallel, capability expansion in high-throughput characterisation and advanced bio-digital analysis would position the AGG as a next-generation national bio-digital resource centre.

96

Mon, Dec 1, 2025, 01:21 PM Australian Eastern Daylight Time
[ID: sbm396dcf486622686d9ef7a]

Title
Prof

First Name
Ivan

Last Name
Marusic

Organisation
The University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
1. National Quantum Device Testbed Network (Response numbers: 115, 201, 271, 272, 285) Australia's leadership in quantum technologies has been built on strong NCRIS-enabled capabilities in nanofabrication, quantum device fabrication, microscopy and high-performance computing. However, at this pivotal point for translation and commercialisation, the absence of a national platform for quantum measurement, modelling and device testing poses a significant risk to Australia's competitiveness. A National Quantum Device Testbed Network—strongly supported by the University of Melbourne—would fill this critical gap by providing coordinated access to state-of-the-art quantum characterisation and modelling facilities that complement existing NCRIS platforms such as ANFF, the Heavy Ion Accelerator and Microscopy Australia. The network would provide access to cost-prohibitive infrastructure including cryogenic quantum device measurement platforms, quantum sensing laboratories, confocal systems with interferometry and single-photon detectors, advanced simulation tools and quantum computing resources, alongside expert staff and a dedicated national Training Hub. Through network partnerships with UoM, RMIT, UNSW, USQ, ANU and UWA, the Quantum Device Testbed Network would support research translation, enable quantum start-ups, strengthen sovereign capability and accelerate industry growth. As individual institutions cannot meet these infrastructure demands alone, dedicated NRI investment is essential to maintain international competitiveness and deliver the priority outcomes identified in the NRI Roadmap.

Capability 2
2. National Biobanking Infrastructure (Physical and Digital) (Response numbers: 13, 51, 58, 86, 118, 159, 184, 195, 202, 209, 230) Biobanking—both physical specimen/sample repositories and integrated digital infrastructure—is increasingly critical for biomedical, agricultural, environmental and data-driven research. As highlighted in the Issues Paper and emerging national capability discussions (including work at the Australian Institute for

Infectious Disease), Australia needs scalable, high-quality biobanking systems that support FAIR/CARE-aligned data integration, secure long-term storage, and coordinated access for researchers and industry. A national biobanking capability would streamline access, reduce duplication, support translational and clinical research, and enable advanced analytics (including AI-driven discovery). Digital biobanks encompassing linked omics datasets, imaging, clinical metadata and specimen/sample catalogues would accelerate health and medical innovation, improve reproducibility, and provide the foundation required for next-generation drug discovery and precision therapeutics. Given strong national demand, clear alignment with translational priorities, and increasing reliance on integrated physical–digital biospecimen systems, biobanking infrastructure represents a high-impact urgent priority for inclusion in the 2026 NRI Roadmap.

Capability 3
3. Large-scale Engineering Capabilities (Response numbers 55, 178, 181, 196, 197, 201, and the University of Melbourne response) A national research infrastructure dedicated to large-scale engineering and related enabling fields, such as fluid mechanics, ocean engineering and advanced manufacturing, is essential to strengthening Australia's sovereign defence capability and meeting the ambitions of AUKUS. Advanced hydrodynamic and ocean-engineering facilities—such as large-scale wave basins, flumes, current channels, and high-fidelity modelling platforms—enable the accurate design, testing, and optimisation of complex maritime systems, from submarines and surface vessels to autonomous underwater vehicles and sensing technologies. These capabilities cannot be delivered by scattered or small-scale laboratories; they require coordinated, state-of-the-art national infrastructure that allows Defence, industry, and academia to work together on problems that directly shape naval performance, resilience, and safety. Investing in this national capability would accelerate innovation, reduce reliance on overseas testing environments, and ensure Australia can independently develop and validate the advanced ocean and fluid-dynamic technologies that underpin our strategic maritime security.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

While not a proposal for a new standalone NRI, it is essential that existing NRI capabilities undergo regular, structured reviews of their instrumentation, platforms and service scope, informed by systematic consultation with the research community. These reviews should explicitly ask:
• What capabilities should be added?
• What new instruments or facilities have emerged that are not currently included within any NRI?
• Which institution-funded or ARC-funded assets should be integrated into an existing NRI?
• What should the future priorities be for expansion or retirement of capabilities?

At present, there is no clear mechanism for incorporating newly developed or institution-funded infrastructure into existing NRIs, even when this would significantly enhance national capability. Funding uncertainty and perceived conflicts of interest often impede these decisions.

Two concrete examples from the University of Melbourne illustrate this challenge:

• An electron accelerator with national application potential, which could be integrated into the Heavy Ion Accelerator network.
• The Ian Holmes Imaging Centre, a major advanced imaging facility that could substantially strengthen Microscopy Australia if formally incorporated.

A transparent, nationally coordinated mechanism for reviewing and integrating such capabilities would improve efficiency, reduce duplication, and ensure the NRI system remains responsive to emerging scientific needs.

In addition to the proposals mentioned in response to question 13, we wish to support the importance of a mathematical sciences institute, as called out in the NRI issues paper:
National Mathematical Sciences Research Institute
(Response numbers 35, 57, 67, 96, 100, 101, 126, 164, 165)
Mathematical sciences underpin advancements across cybersecurity, artificial intelligence, climate and environmental modelling, defence analytics, finance, and health. Despite this, Australia lacks a purpose-built national infrastructure supporting mathematical research, placing it decades behind comparator nations. A national institute would strengthen sovereign capability, enhance international competitiveness, and catalyse interdisciplinary discovery by uniting leading researchers within a collaborative environment designed to accelerate both fundamental and translational outcomes.
The success of MATRIX—a residential mathematical research institute in Victoria—demonstrates the transformative value of such a model. In hosting over 100 programs and nearly 3,000 researchers from 49 countries, MATRIX has shown clear demand and global relevance, yet its capacity is constrained by limited resources. Building a national-scale institute aligned with international exemplars (e.g., Isaac Newton Institute, SLMath, IPAM) would expand Australia's research capability, support workforce development, and position the nation to lead in emerging technologies. With a proven track record and strong community support, MATRIX is ideally placed to form the foundation of a flagship national facility.

95

Mon, Dec 1, 2025, 12:23 PM Australian Eastern Daylight Time
[ID: sbm396d9ad72f6b34faff4af]

Title
Mr

First Name
Anthony

Last Name
Curro

Organisation
CRC for Developing NA

In what capacity are you responding?
A representative of an organisation or group

Capability 1
1.   A national Indigenous Research Data Commons (Survey Response 255), supporting culturally governed data, interoperability, consent frameworks and long-term stewardship across multiple disciplines.

Capability 2
2.   A sustainable high-technology research engineering workforce capability (Response 259), ensuring national capacity to operate and innovate advanced instrumentation and analytical systems critical to regional and national industrial transitions.

Capability 3
3.   A pilot-scale gas fermentation test facility (Response 256), supporting Net Zero-aligned biomanufacturing, circular economy models and clean industrial development, highly relevant to northern precincts and emerging industries.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Northern Australia Place-Based Research Translation and Systems Observatory
Northern Australia is where national missions Net Zero, critical minerals, water security, emerging industries, climate adaptation and First Nations economic participation converge. However, there is no integrated research infrastructure that tracks social, environmental, cultural and economic transitions over time across this vast region.
A place-based, distributed research translation and systems observatory, hosted by the CNA, would integrate environmental, economic, social and cultural datasets with decision-

support tools, supported by Indigenous-governed data practices. Medium-term goals include providing stable evidence for regional investment, enabling Indigenous organisations to guide economic and environmental planning, and supporting industry with region-specific insights.
This capability would serve environmental science, digital analytics, humanities, social science, agriculture, aquaculture, energy, and policy communities, and should be established over a five-year staged period with strong regional co-design. It would provide a nationally significant foundation for long-term planning and evidence-based action across northern Australia.

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Mon, Dec 1, 2025, 12:19 PM Australian Eastern Daylight Time
[ID: sbm396d96961c6b43a1e31ed]

Title
Mr

First Name
Nick

Last Name
Jenkins

Organisation
ARDC

In what capacity are you responding?
An individual

Capability 1
191 A distributed National Software Centre to provide merit allocated access to pools of research software engineers

Capability 2
207 a national research software capability

Capability 3
153 A "Software Sustainability Institute"

91

Mon, Dec 1, 2025, 11:53 AM Australian Eastern Daylight Time
[ID: sbm396d7f376122baf039725]

Title
Dr

First Name
Meredith

Last Name
Ross

Organisation
WEHI (Walter and Eliza Hall Institute of Medical Research)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
We regard our prior submission #150 (named National Drug Discovery Centre, WEHI) as an essential inclusion in the 2026 NRI Roadmap.   The NDDC is a critical national asset supporting the translation of sovereign biomedical discoveries into new medicines. It is a unique, multilateral partnership, founded in 2020 with $25M from the Medical Research Future Fund, $40M from WEHI and philanthropy, and infrastructure support from the Victorian Government. NDDC staff work with external researchers to generate unique screening assays to probe a specific disease process or cellular pathway of interest. They then use these assays to perform high-throughput screening (HTS) with large libraries of compounds (> 400,000 compounds currently available). HTS remains the absolute gold standard for generating novel "hits", which are compounds that have high potential to become medicines. The NDDC also offers an affordable, merit-based funding mechanism to support well-rationalised projects, democratising resources that would otherwise be inaccessible to many Australian innovators. Since its founding, the NDDC has delivered 30 medical research projects with >20 national partner organisations across >20 disease areas, including cancer, antibiotic multi-drug resistance, COVID-19, malaria, and immune and inflammatory diseases. In 5 years, a relatively short time for drug discovery, this work has resulted in establishment of three spinout companies and secured over $130 million in external funding – over 90% of this funding has come from venture capital and private sector investment. Without the NDDC, these discovery projects would have stalled due to a lack of affordable access, missing the opportunity to be translated into new medicines. The NDDC is thereby transcending medical disciplines, institutional walls and public/private barriers, to support the entire Australian health and biotech sector.   The NDDC is the only such facility operating in Australia at a scale and capability comparable to leading global pharmaceutical companies. It strengthens our nation's sovereign capability in new medicine development by serving as a vital bridge that enables Australian medical researchers to transform their discoveries into potential new medicines. The NDDC also provides high-value education and job opportunities, ensuring

development and retention of rare talent and sovereign capability in drug discovery and development.   Foundational funding for the NDDC ended in June 2025. Further funding is required to ensure that Australian researchers and small businesses can continue to affordably initiate R&D activities for innovative new medicines. We do not view that substantial government funding is required forever. Our current reality is that the Australian R&D sector has a healthy, nascent start-up culture, but it lacks mid-sized enterprises and is overly reliant on CSL as the sole multi-national pharma company with local R&D. The main goal of the NDDC is to enable researchers and small-scale pharma to become mid-sized pharma, which would be able to access the NDDC at higher rates and support more financial independence. A healthy R&D sector in Australia with fully populated mid-tier must first be built, but we view the NDDC to be an essential capability to help start-ups to access that tier and build our future, higher yield client base.

Capability 2
We regard submission #29 (named UniQuest) as an important addition to the 2026 NRI Roadmap. We agree that Australia has a major gap in its ability to perform high-quality, well-priced i) pre-clinical safety and toxicity testing and ii) chemistry, manufacturing and controls (CMC) profiling of new drugs. Both these activities are typically performed overseas at CROs. This complicates the ability of the sector to develop rich pre-clinical datasets for submission to ethics committees to support clinical trials, which is a strength of Australian research. It also jeopardises IP protections, both the drug itself and the manufacturing processes to support its production, by shifting key steps offshore and impacting our sovereign capability to progress drug discovery programs to the clinic within Australia.   The proposed UniQuest centres would also be highly embedded in/networked with other entities, including: •   Queensland Drug Discovery Alliance (QDDA), which co-ordinates Compounds Australia (Griffith University), the Queensland Emory Drug Discovery Initiative (UniQuest), and the Centre for Integrated Preclinical Drug Development (University of Queensland). Each facility within QDDA has their own area of expertise: drug repository, drug identification, disease model development and drug testing. The proposed centres are very complementary to each of these functions. • MedChem Australia, which is a partnership between Monash Institute of Pharmaceutical Sciences, the University of Sydney and WEHI, supported by Therapeutic Innovation Australia and the Department of Health. MedChem provides critical medicinal chemistry expertise to alter novel drugs and refine their activity within the body. •   The Australian Synchrotron, which among other activities defines atomic structures of new drugs within their target biomolecules. This enables structure-guided design of drugs to refine their activity in the body, making them more potent and more specific. The Synchrotron also has a highly democratised, co-funded access scheme for users. •   The NDDC, as described above in Capability #1 High levels of collaboration and transparency across these entities have meant that the Australian drug discovery sector is extremely well-co-ordinated and aligned. Different entities have different strengths, but all are essential to support the full pre-clinical value chain; initial discovery, testing, refinement, safety, and manufacturing validation of a new drug. Each facility is individually valuable, but their collective value is much greater than the sum of their parts, and their culture of good faith interactions and complementarity should be an example for other sectors.

Capability 3
We regard submission #156 (named Cloud Business Transformation) as an important addition to the 2026 NRI Roadmap. We view access to advanced computing and AI/ML as being integral to managing and effectively mining the extremely rich datasets, such as our drug screening. Indeed, many modern forms of scientific data are large and multi-

dimensional, and (new and existing) large-scale multiomics datasets, necessitating AI/ML-assisted data analysis and ever-increasing compute capacity.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
not answered

89

Mon, Dec 1, 2025, 11:30 AM Australian Eastern Daylight Time
[ID: sbm396d69dc59c4cb8105700]

Title
Dr

First Name
Angela

Last Name
Maharaj

Organisation
Climate science strategy and partnerships section, Department of climate change, energy, the environment and water

In what capacity are you responding?
A representative of an organisation or group

Capability 1
033 – Integrated Marine Observing System (IMOS)

Capability 2
090 – Jason Evans – High-Resolution Climate Projections

Capability 3
109 – Australian Centre for Excellence in Antarctic Science

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

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Mon, Dec 1, 2025, 09:48 AM Australian Eastern Daylight Time
[ID: sbm396d0c8e9d22fc1f44995]

Title
Dr

First Name
Owen

Last Name
Myles

Organisation
Australian Academy of Technological Sciences and Engineering

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
As mentioned in ATSE's initial submission, there is significant need for supercomputing infrastructure in Australia. Current supercomputing infrastructure through the National Computational Infrastructure and the Pawsey Supercomputer Centre are not sufficient to meet future requirements, adapt to changing research environments or manage computing lifespan issues. It is also unclear what supercomputing infrastructure is even available and accessible beyond these two facilities with no ongoing survey and strategy for supercomputing in Australia. Investment in a national capability and strategy will help understand the foundations currently in place while. Infrastructure investment would ideally include both traditional supercomputers (built on CPUs) and AI supercomputing capability (built on GPUs). This technology can help support research in computational sciences (including AI and machine learning), as well as in areas a major national need, like climate modelling and weather projections. ATSE's recent action statement on AI sovereignty proposes a model for a mission-based approach to AI infrastructure investment.

Links
ATSE's AI Action Statement: https://www.atse.org.au/what-we-do/strategic-advice/made-in-australia-our-ai-opportunity/

87

Mon, Dec 1, 2025, 09:08 AM Australian Eastern Daylight Time
[ID: sbm396ce7c13522a99c08227]

Title
Dr

First Name
Bryan

Last Name
Lessard

Organisation
Society of Australian Systematic Biologists

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Response 214 – from South Australian Museum

Capability 2
Response 147 – from Mark Adams

Capability 3
Response 179 – from National Imaging Facility Museums Special Interest Group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National Collections Infrastructure.
Biological collections are foundational to how Australia manages and protects its invaluable biodiversity that support healthy ecosystems, Australian innovation and improved human health. Investment into pivotal National Collections Infrastructure, such as the Distributed National Biological Collection, would directly address Priorities under the National Science and Research Priorities – Protecting and Restoring Australia's Environment; Building a Secure and Resilient nation; and Elevating Aboriginal and Torres Strait Islander knowledge systems.
Establishing national biological collection infrastructure will have immediate benefits to Australia, including:
• Improved understanding, conservation and management of Australia's unique biodiversity (outlined in Response 147 – from Mark Adams). Australia is a globally celebrated megadiverse Country, with an estimated 580,000-680,000 species living in

Australia, however, three-quarters of this biodiversity is yet to be identified to science. Threatened species cannot be assessed and listed as endangered without first being designated a formal scientific name under the current EPBC Act, therefore investment is needed to document, assess and curate specimens for the overwhelming number of unknown Australia species to truly achieve zero new extinctions.

• Unlocking innovative solutions to address current and emerging challenges in Australia, including incursions of new disease or drug discovery, by future proofing biological collections and applying new technologies (outlined in Response 179 – from National Imaging Facility Museums Special Interest Group, and Response 214 – from South Australian Museum), such as digital imaging, AI supported species recognition, genomic sequencing and biomolecule discovery from specimen tissue curated and cared for.

• Support for two-way national science by building capacity in First Nations-led biodiversity research (Response 214 – from South Australian Museum), enriching Cultural and Western knowledge of Australian biodiversity, and securing generational knowledge transfer while protecting Indigenous Cultural Intellectual Property.

• Accelerating job growth by investing in the local workforce to drive species discovery, conservation efforts and technological innovation.

Therefore, we strongly support the urgent need to establish and invest in National Collections Infrastructure, such as the Distributed National Biological Collection, to support Australia's research and innovation system, government, and industry, and allow future generations of Australians to continue to enjoy and respect Australian biodiversity.

86

Mon, Dec 1, 2025, 12:19 AM Australian Eastern Daylight Time
[ID: sbm396b0385d36bb31e7dd09]

Title
Prof

First Name
Leigh

Last Name
Johnston

Organisation
Australian 7T Network

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

7T MRI capability: Australia currently operates only two ultra-high-field (7T) MRI scanners, both co-funded through earlier federal government investments. These systems are now over a decade old and approaching end of life. Without renewed investment, Australia risks losing critical sovereign capacity in brain research, neurological disease modelling, and clinical trial readiness. For example, there is a critical need for high-resolution imaging to identify biomarkers for neurological and neurodegenerative diseases, such as epilepsy, multiple sclerosis (MS), motor neurone disease (MND) and dementia, where a lack of biomarkers currently hinders the development of therapeutic agents. Furthermore, maintaining this capability is essential for the commercial development of medical technologies; the Australian Brain-Computer Interface company Synchron relied on early-stage access to national 7T MRI facilities to validate their technology. An enhanced capability involves the replacement and expansion of Australia's national 7T MRI infrastructure to support advanced imaging. This technology enables unprecedented imaging for neuroscientific questions at a spatial scale unachievable on standard 3T systems, allowing for the non-invasive measurement of cortical layers, columns, and fine-grained functional organisation. This enhanced capability will also integrate with emerging Artificial Intelligence (AI) workflows. UHF MRI provides the high-resolution data necessary to train sovereign foundation models and diagnostic AI tools. It is foundational technology that complements genomics and molecular imaging, enabling the multimodal phenotyping required for precision medicine and the "connectomic" mapping of brain circuitry and correlation with healthy and pathologic behaviour.

Objectives of 7T MRI renewal program

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• Infrastructure Renewal: Establish a renewed national 7T MRI capability with instruments configured for mesoscale anatomical and functional brain imaging.
• Harmonisation: Facilitate multi-site data standards to ensure interoperability and support large-scale population studies.
• Clinical Translation: Support pipelines that bridge basic neuroscience and clinical research, specifically developing laminar-specific biomarkers for psychiatric illness and neurodegenerative changes.
• AI Integration: Establish secure environments for training Australian imaging foundation models and integrate 7T imaging.
• New and developing areas: Renewed 7T capabilities will support new directions, including (1) Deuterium MRI, where a non-radioactive tracer can reveal metabolic pathways in health and disease complementary to PET imaging, (2) mapping of functional and structural brain networks to aid understanding and treatment of neurological disorders and mental health conditions.
Impacted Research Communities
• Neuroscience and Cognitive Science: Researchers studying cortical computations, neuroplasticity, and the "connectome" (fine-scale brain connectivity).
• Mental Health: Groups characterising brain networks involved in conditions such as depression, anxiety, PTSD, psychosis and addiction, where microcircuit characterisation is essential.
• Neurology: Clinicians and researchers treating epilepsy, MND, and multiple sclerosis who require fine-scale markers for early detection and intervention.
• Biotech and MedTech: Companies developing neurotechnologies and AI solutions that require access to high-resolution validation and training data.
• Advanced Manufacturing: Ultra-high field MRI needs complex electronic devices ('RF coils') that can be produced in Australia and strengthen local advanced manufacturing and sovereign capability.
Timeframe
The establishment and replacement of the Australian 7T capability must occur within the next 1–2 years. This timeframe is critical because current instruments are at the end of their life, with service contracts unable to be renewed beyond 2027. Delay risks disrupting significant active research programs and clinical translation opportunities, losing irreplaceable technical expertise, and leaving Australia far behind comparable international facilities.

85

Sun, Nov 30, 2025, 07:09 PM Australian Eastern Daylight Time
[ID: sbm3969e6291affb16052315]

Title
Dr

First Name
Louise

Last Name
Winteringham

In what capacity are you responding?
An individual

Capability 1
169 – Phenomics Australia

Capability 2
197 - ARDC

Capability 3
225 - Collections as National Infrastructure

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Patient derrived organoids for industry and clinical support.
With the launch of the Modernisation Act and the FDA refuting the requirement for animal models in drug development, Australia will need to develop a national framework around generating alternative patient derrived models, including organoids for industry testing and clinical support. The field is currently thriving at the research level but requires national engagement and standards development to ensure Australia will be in the appropriate position to move away from animal models. Of the current NCRIS Facilities, Phenomics Australia are currently in a good position to integrate this priority into their current infrastructure.
Inherent in the development of patient derrived models is the co-development of patient biobanks and integrated data platforms.

83

Sat, Nov 29, 2025, 06:05 PM Australian Eastern Daylight Time
[ID: sbm396375f5554afdc3565fc]

Title
Dr

First Name
Tom

Last Name
Honeyman

Organisation
UNSW, Sydney

In what capacity are you responding?
An individual

Capability 1
A one-year scoping study with a view to establish a national Software Sustainability Institute (modelled on the UK's version) (153, 207, 219, 127) to provide long-term stewardship, coordination and sustainability for research software and to bridge prototype tools into mature community infrastructure, responding to dozens of submissions calling for uplift in software/modelling/AI/ML capability (33, 90, 11, 112, 140, 144, 154, 161, 176, 190, 196, 197, 210, 223, 229, 235, 237, 246, 263, 276, 283, 285) and addressing today's highly distributed, often invisible development and maintenance work through national strategic coordination akin to the ANDS→ARDC uplift in data capability.

Capability 2
A national uplift for method-making disciplines—mathematics, statistics and computational sciences—recognising that their models, algorithms, methods and research-software outputs act as foundational upstream infrastructure for every applied field. Submissions proposing a mathematical sciences residential facility (96, 100, 101, 126, 164, 67, 35) highlight strong community demand, but a capability focused on supporting the development, maturation and translation of methods as – for instance - research software rather than a purely residential model may be a better fit for NCRIS. This could encompass structured time and space for collaborative method development, software translation, and cross-disciplinary engagement, while alternative forms of coordinated national support—outlined in my Q14 response—may offer a sharper, service-oriented approach better aligned with contemporary NRI needs.

Capability 3
A National Research Collections Infrastructure Capability (210, Australian Academy of the Humanities) to address the long-standing absence of cultural collections in NCRIS and to enable nationally coordinated access to materials of cultural significance. Current

collecting institutions are funded through different Commonwealth portfolios than research infrastructure, and meaningful progress will require upstream alignment between these departmental funding streams.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

Australia requires a dedicated capability to support the "method-making" disciplines— mathematics, statistics, computational physics, computer science and engineering—whose theoretical, modelling, machine learning and algorithmic outputs function as upstream research infrastructure and are frequently instantiated as research software. These disciplines generate the computational methods that underpin national capability yet remain structurally under-recognised within NCRIS. Submissions highlight the need for Research Software Engineering capability (207, 191), domain-specific Research Software Engineering support (222, 229) and foundational mathematics capability (96 MATRIX; 100; 101; 126; 164; 67; 35), alongside widespread method-consumption needs for modelling, ML, AI and software across fields (33, 90, 11, 112, 140, 144, 154, 161, 176, 190, 196, 197, 210, 223, 229, 235, 237, 246, 263, 276, 283, 285). Because these communities are not yet a coherent coalition, and many do not recognise that the software they produce constitutes national research infrastructure, a two-year scoping study and national consultation is essential to surface the community, test feasibility, establish governance and explore a STEM-oriented nucleus to bootstrap collegiality.

An additional design option is to narrow the initial scope to servicing NCRIS needs, creating a single service surface for small-scale but critical software uplift that is not currently supported in the NCRIS landscape. Existing NCRIS facilities could draw upon this capability directly, while ARDC-style "project within a project" incubators could support domain-specific software uplift where required. This sharpens scope while still addressing the system-wide gap in how computational methods mature into usable infrastructure. Given that many stakeholders have had limited prior engagement with NCRIS, the capability must also have a strong service orientation, ensuring actionable outputs rather than an extension of upstream theoretical research. International models such as the Netherlands eScience Center and the National Center for Supercomputing Applications (NCSA) provide valuable examples of translational, service-led approaches.

Medium-term goals (5–8 years):
• build coordinated national support for method-making research and its research software outputs;
• provide maturity pathways from prototype algorithms, models and methods into stable community tools and infrastructure;
• develop Research Software Engineering workforce capacity aligned to upstream computational method development;
• deploy infrastructure to surface, track and sustain method-making outputs as NRI assets;
• strengthen translation pathways for methods into applied research, industry, government and society;
• deliver targeted NCRIS-aligned software uplift and ARDC-style domain incubators to support high-impact method translation.

Impacted research communities:
All disciplines that consume computational methods—including health, environment, engineering, social sciences, humanities, AI/ML, climate modelling, finance,

bioinformatics and digital cultural research—benefit from strengthened upstream method-making capability and improved software uplift for NCRIS needs.

Timeframe:
Begin with a two-year scoping and consultation phase in the 2026–2030 Roadmap period, followed by staged establishment over 8–10 years, reflecting the cumulative, cross-cutting and community-building nature of method-making research and the work required to align currently disconnected stakeholders.

80

Fri, Nov 28, 2025, 06:11 PM Australian Eastern Daylight Time
[ID: sbm395f3ba815a967eab5982]

Title
Prof

First Name
Markus

Last Name
Barth

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The Need
Australia currently operates only two ultra-high-field (7T) MRI scanners, both funded through earlier NCRIS investments. These systems are now over a decade old and approaching the end of their service life. Without renewed investment, Australia risks losing critical sovereign capacity in brain research, neurological disease modelling, and clinical trial readiness. For example, There is a critical need for high-resolution imaging to identify biomarkers for neurological and neurodegenerative diseases, such as epilepsy, Multiple Sclerosis (MS), motor neurone disease (MND) and frontotemporal dementia, where a lack of biomarkers currently hinders the development of therapeutic agents. Furthermore, maintaining this capability is essential for the commercial development of medical technologies; for example, the Australian Brain-Computer Interface company Synchron relied on early-stage access to national 7T MRI facilities to validate their technology. An enhanced capability involves the replacement and expansion of Australia's national 7T MRI infrastructure to support advanced imaging. This technology enables unprecedented imaging for neuroscientific questions at a spatial scale unachievable on standard 3T systems, allowing for the non-invasive measurement of cortical layers, columns, and fine-grained functional organisation. This enhanced capability will also integrate with emerging Artificial Intelligence (AI) workflows. UHF MRI provides the high-resolution data necessary to train sovereign foundation models and diagnostic AI tools. It acts as a foundational technology that complements genomics and PET imaging, enabling the multimodal phenotyping required for precision medicine and the "connectomic" mapping of brain circuitry and correlation with healthy and pathologic behaviour.

Medium-Term Goals (3–5 Years)
• Infrastructure Renewal: Establish a renewed national 7T MRI capability with instruments configured for mesoscale anatomical and functional imaging.
• Harmonisation: Facilitate multi-site data standards to ensure interoperability and support large-scale population studies.

• Clinical Translation: Support pipelines that bridge basic neuroscience and clinical research, specifically developing laminar-specific biomarkers for psychiatric illness and neurodegenerative changes.
• AI Integration: Establish secure environments for training Australian imaging foundation models and integrate 7T imaging.
• New and developing areas: The enhanced capabilities will be able to support two new directions. (1) Deuterium MRI, where a non-radioactive tracer can reveal additional metabolic pathways in health and disease complementary to PET imaging (2) mapping of brain networks to help diagnose neurological disorders.
Impacted Research Communities
• Neuroscience and Cognitive Science: Researchers studying cortical computations, neuroplasticity, and the "connectome" (fine-scale brain connectivity).
• Mental Health: Groups characterising brain networks involved in depression, anxiety, PTSD, and addiction, where microcircuit characterisation is essential.
• Neurology: Clinicians and researchers treating epilepsy, MND, and multiple sclerosis who require fine-scale markers for early detection and intervention.
• Biotech and MedTech: Companies developing neurotechnologies and AI that require high-resolution validation and training data.
• Advanced Manufacturing: These scanners need complex electronic devices (so-called RF coils) that can be produced in Australia and strengthen the domestic production in this space.

Timeframe
The establishment and replacement of this capability should occur within the next 1–2 years. This timeframe is critical because current instruments are at the end of their life; delay risks disrupting active research programs, losing essential technical expertise, and leaving Australia behind comparable international facilities.

79

Fri, Nov 28, 2025, 05:10 PM Australian Eastern Daylight Time
[ID: sbm395f2e6aa5fff726ed524]

Title
Other: "Emeritus Professor"

First Name
Gottfried

Last Name
Otting

Organisation
The Australian National University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
068 Joel Mackay

Capability 2
082 Ann Kwan

Capability 3
098 Margaret Sunde

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National NMR Network: Magnetic Resonance Australia. Million dollar investments will be needed in the coming 5 years just to maintain existing capabilities. There is no adequate funding mechanism for this, threatening analytical capabilities in chemical, biological and pharmaceutical research.

78

Fri, Nov 28, 2025, 04:58 PM Australian Eastern Daylight Time
[ID: sbm395f22dbb9a936c06195b]

Title
Prof

First Name
Leigh

Last Name
Johnston

Organisation
University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
159 National Imaging Facility

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
7T MRI in Australia: The access to ultra-high field (7 Tesla or above) MRI scanners in Australia is vital for Australian neuroscience and translational imaging. The two current 7T scanners, at University of Melbourne and University of Queensland, are both over 10 years old and are rapidly approaching end of life and urgent attention is required to support their replacement. The new generation of 7T MRIs are significantly enhanced, and will provide the highest spatial and temporal in vivo imaging of brain structure and function.

The 7T at University of Melbourne supports research across a wide range of areas, including stroke, brain tumours, migraine, MND, dementia & Alzheimer's disease, traumatic brain injury, surgical implants, pain, ME/CFS, POTS, Long COVID, exercise physiology, surgical planning, epilepsy, multiple sclerosis, psychosis, PTSD, visual snow, and a wide variety of other diseases and disorders. Incredible research advances have been made from the presence of a 7T system at UoM, and it is critical that it remain, in order to continue supporting the research base that was carefully constructed over the past decade.

Beyond neuroscience, 7T imaging is being used for plant and soil research, and can play an important role in the understanding of biosciences and agriculture.

Building and upgrading national imaging infrastructure will accelerate innovation, enhance health outcomes, and strengthen Australia's position in global medical technology development.

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77

Fri, Nov 28, 2025, 03:48 PM Australian Eastern Daylight Time
[ID: sbm395ee3812ca9a123e303a]

Title
Dr

First Name
Louise

Last Name
Rabbitt

Organisation
Garvan Institute of Medical Research

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Garvan supports published response number 201 in the 2026 NRI Roadmap Survey submissions, from UNSW Sydney. In their answer to Q.35., UNSW Sydney highlights the vulnerability of medical research to shortages in laboratory animal supply. As a solution, we propose that Australian BioResources – a not-for-profit subsidiary of the Garvan Institute - be enhanced to provide a stable supply chain for locally engineered and bred genetically modified mouse lines (and potentially other species) for Australian biomedical research, as described in our response to Q14 below.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The Challenge
Australia's biomedical research capability faces critical infrastructure gaps in biological models, specifically genetically altered mouse lines. COVID-19 exposed our dependence on international supply chains with shipping delays of 6-12
months threatening time-sensitive research nationwide. Beyond supply security, Australia faces: (1)
genetic drift in valuable mouse research lines, (2) geographic access inequality, (3) translation bottlenecks, and (4) workforce attrition. Without sustained investment, Australia risks falling behind in precision medicine and drug discovery—priority 2 in the National Science Research Priorities.

Proposal for enhanced capability
An enhanced National Bioresource Infrastructure network would address the fragile supply of specialised mouse research models and associated services across Australia. These include:provision of breeding/housing, cryopreservation and reanimation facilities,

advanced genetic engineering capabilities (i.e. CRISPR gene editing), humanised mouse models, phenotyping infrastructure, tissue biobanking, and workforce development programs.

Australian Bioresources (ABR) established in 2008 and located in Moss Vale NSW, is a not-for-profit organisation, owned by the Garvan Institute of Medical Research. 90% of research groups supported by ABR are external to Garvan with only 10% being Garvan based. Already offering the gold standard in mouse breeding and associated services to researchers all over Australia, ABR has the expertise and track record to become the central hub for a national network of similar providers.

As part of ABR's Mouse Engineering at Garvan/ABR (MEGA) service, ABR employs the most experienced and highly skilled mouse genome editing technicians in Australia with an established in-house training program and career progression pathway. Expansion of MEGA would fill the gap in mouse genome editing capability that exists on the eastern seaboard of Australia.

Capital investment and recurrent operational funding support would allow expansion of ABR's capacity and development of the network and distributed access points required. In operation for 17 years now, significant facility refurbishment and replacement of equipment will be needed.

The proposed enhanced National Bioresource Infrastructure network capability will support Australian biomedical, clinical and translational researchers to deliver desired outcomes across NSRP Priority 2: Healthy and Thriving Communities. Priority 5: Secure & resilient nation, would also be supported by providing biomedical sovereignty, an on-shore skills base and career development pathway, reducing reliance on international suppliers and increasing supply chain security- a vulnerability exposed during COVID-19.

Medium Term goals
ABR currently supports 395 research groups annually from 65 research institutions across all Australian States and New Zealand, with a geographic distribution concentrated in NSW, Victoria and QLD (82% combined). An enhanced and expanded ABR would be capable of providing double this level of support and enabling access by a much greater proportion of researchers in other States. This would reduce reliance on international suppliers by half.

Our MEGA service has completed 370 mouse gene editing projects. Clients are 65% Garvan and 35% external research organisations. External demand is growing, with investment and expansion required to extend this state of the art service to more biomedical researchers in every State of Australia and potentially New Zealand.

ABR employs highly specialised technical staff—animal technicians, microinjectionists and veterinarians. We offer career pathways for technical specialists that are otherwise largely unavailable in the academic sector. ABR's established training and career development pathways would be strengthened to support the national research infrastructure workforce.

To expand our MEGA capability ABR would train 2-3 additional specialised microinjectionists for CRISPR gene editing over a period of two years. Approximately 30 other technical staff would be trained during the same period, providing a boost to Australia's NRI workforce.

ABR services will be expanded to include production of mouse tumour models and mice with a humanised immune system. Pharmacokinetic studies for the drug development pipeline, critical for research translation will be performed at ABR. Currently in development for Garvan researchers, these services are often outsourced overseas, but will be scaled up and made available to the Australian biomedical research community. Deeper research-industry collaboration will be fostered accelerating translation from discovery to clinical trials and patient care.

Impacted Communities

• Industry e.g. the pharmaceutical industry
• Biotechnology companies
• Universities
• Biomedical researchers
• Medical Research Institutes
• Regional NSW:ABR is and will become and even more significant employer in the area
• The people of Australia as health and medical discoveries will be enabled and therapeutics developed and taken to market faster.

Time Frame
Years 1-2: capacity expansion, setting up advanced capabilities and services, workforce recruitment and training, establishing and embedding national network
Years 3-5: building works and equipment upgrades to support expanded operations longer term

76

Fri, Nov 28, 2025, 01:09 PM Australian Eastern Daylight Time
[ID: sbm395e51f0c8b3ceec5b763]

Title
Ms

First Name
Lucía

Last Name
Gamarra Cuba

Organisation
ARC Centre of Excellence for the Weather of the 21st Century

In what capacity are you responding?
A representative of an organisation or group

Capability 1
090, 103 - High-performance computing and data. Australia's international leadership in climate research and services relies on a national strategy for High-Performance Computing and Data (HPCD) infrastructure to provide a coordinated and consolidated compute and data environment that ensures the continued productivity, innovation, and effectiveness of Australian scientific research and collaboration. Ensuring the quality of research and services Australia can deliver as a community requires an urgent and significant uplift of the underpinning computational infrastructure with substantial supercomputing and storage capabilities to the levels nations of similar size are already leveraging. Climate intelligence produced by a range of tools from climate models to their applications to prepare for high-impact events and harness weather resources is critical. Australia no longer has access to world-leading tools to produce it due to a lack of world-class computational facilities, complete with the required data storage. This severely limits our ability to climate-proof Australia. The co-location of computing and data storage in the same physical space is vital for both storing large data sets from high-resolution climate models and analysing vast amounts (many petabytes) of observational and model data using AI and other methods. Having National facilities (NCI and Pawsey) that make datasets available to the entire Australian climate community reduces duplication.

Capability 2
090, 103 - Software infrastructure. The ACCESS-NRI plays a pivotal role in weather and climate research and services by providing continuous software infrastructure and support that unifies how models are run, and enabling sharing of outputs across Australia, avoiding duplication of work and resource allocation. This relatively new NCRIS facility has been an enormous success,enabling the acceleration of research and applications across universities (including the 21st Century Weather Center of Excellence) and national agencies, such as CSIRO, the Bureau of Meteorology and the Australian Climate Services.

Yet, its future funding is not secured beyond the immediate future. It is critical to maintain and enhance the ACCESS-NRI by providing a predictable and continuous funding model for its future because the Australian Earth System Model provides critical information on climate futures to help prepare for the Australian climate of the coming decades and beyond.

Capability 3

033, 094, 113, 140, 154, 189, 197, 217 - Data and observations must be part of an integrated system. Observations are key for understanding processes, evaluating models and studying climate change. Critical observations include a wide-range of sources such as in situ monitoring on land and ocean, upper air observations, remotely sensed measurements from satellites and radar, and paleoclimate proxy records spanning millennia, such as tree rings and shrub species, coral records, and ice core records. In particular, the Automatic Weather Station network and streamflow gauges, as well as the observations taken through the TERN, IMOS and AURIN facilities must be maintained to the highest quality to monitor weather changes and their impacts across Australia. These networks should complement existing satellite and radar observations and cover urban, vulnerable, regional, rural and First Nations communities to develop the ability to monitor both chronic climate change and acute, high-impact weather events. Where appropriate and possible, monitoring informed by Indigenous knowledge must be valued. We must also prioritise data rescue efforts. This involves digitising historical documents and measurements to be made accessible to researchers across Australia following the FAIR principles—Findable, Accessible, Interoperable, and Reusable—and First Nations CARE principles—Collective Benefit, Authority to Control, Responsibility, Ethics.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

The Climate and Fluid Physics Laboratory is a unique experimental facility in Australia that enables direct measurements of air, ocean, and ice properties essential to climate modelling and system understanding. This capability enhances Australia's climate, ocean, and weather forecasting. Unlike most research groups worldwide that depend solely on computational modelling, this laboratory combines experimental, computational, and theoretical approaches to study climate science and climate change mitigation, with significant contributions to AI/ML and big data challenges.

The role that laboratory experiments and observations play in underpinning our fundamental understanding of how our climate system works and how climate mitigation strategies might be best employed must be valued and nationally funded.

75

Fri, Nov 28, 2025, 12:52 PM Australian Eastern Daylight Time
[ID: sbm395e41c6755ec154d7fae]

Title
A/Prof

First Name
Kate

Last Name
Michie

Organisation
Australian Structural Biology Computing

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Response 144 AI and high-performance computing for biomolecular science (Australian Structural Biology Computing) Deep-learning workloads for structure prediction, complex modelling, docking and protein design are now core infrastructure, yet Tier-1/2 systems "cannot adequately support even small-scale research," limiting sovereign capability and slowing translation. Prioritising 144 funds GPU-dense compute, fast storage, fair access and training—exactly what labs and companies need to turn sequence and assay data into validated models and designs.

Capability 2
Response 079 An AI platform for life sciences via Australian BioCommons (Bioplatforms Australia). BioCommons proposes a national, user-centred AI platform that converges compute, data and methods, explicitly citing AlphaFold as proof of impact and calling for fit-for-purpose integrated computational environments "this does not currently exist." This directly matches the roadmap's emphasis on curated tools, validated workflows, and broad accessibility beyond specialists.

Capability 3
Response 195 Australian Biobank and integrated clinical data (Population Health Research Network). A federated, on-shore platform linking biobank samples with genomics, imaging and clinical data enables safe validation of models and designs, supports trials and effectiveness studies, and reduces duplication. This "urgent" capability provides the evidence layer that turns structural and design advances into clinical and public-health benefit.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

National deep learning service for structural biology with expert guidance

Since the survey closed, the Australian Structural Biology Deep-Learning Infrastructure Roadmap has been published by a national group of experts, with 13 contributors and endorsed by 40 domain experts across universities, NCRIS facilities and industry; NRI should review and align with its recommendations.

https://zenodo.org/records/15786982

Need
• There is a flood of AI tools and many are not fit for purpose for particular protein classes or questions.
• Misapplied models waste time and money and slow translation.
• Australia needs in-country experts who can guide researchers and firms to the right methods and help validate results.
• This complements Response 144 (compute) by providing the people, workflows and training layer that makes compute useful.

Capability
• A national expert team in protein structure, molecular modelling, docking and protein design.
• A curated catalogue of certified workflows with plain language "when to use" and "when not to use", inputs required, expected accuracy and known failure modes.
• Short consults, a helpdesk and office hours to guide non-specialists.
• Open training materials: step-by-step guides, short videos, reference datasets and worked examples.
• Provenance and validation reports suitable for publication and regulatory use.
• Integration with national computing, the synchrotron, microscopy and data services.
• Alignment with the Australian Structural Biology Roadmap and the Business Council of Australia's call to invest in AI that enables biotechnology.

Medium-term goals (3 to 5 years)
• At least 200 laboratories supported and 1,500 people trained.
• At least 300 audited end-to-end runs per year using certified workflows.
• At least 50 industry or clinical collaborations initiated.
• At least 100 public benchmark datasets and validation reports published.
• Median time from request to first result under two weeks.

Impacted communities
• Health and medical system: hospitals, medical research institutes, clinicians, pathology and public health labs, clinical genomics and imaging groups.
• Medicines R&D and diagnostics: structural biology, medicinal chemistry, pharmacology, toxicology, vaccine and antibody design, gene and cell therapy vector design, assay developers, CROs and CDMOs.
• Biotech and manufacturing: biopharma, biomanufacturing, fermentation and ingredients companies, medtech, reagent suppliers and analytics providers.
• Agriculture and biosecurity: plant and animal science, aquaculture, crop breeding, animal health, biosecurity agencies, agrifood companies.
• Environment and resources: green chemistry and enzyme design, bioremediation, waste and water utilities, materials and minerals processing.

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• Education and workforce: universities, TAFEs and training partners, early-career researchers, research software engineers and data stewards.
• Government and national capability: regulators and standards bodies, defence and national security science agencies, state health departments, and national facilities (supercomputing, data, microscopy, synchrotron, omics).
• Start-ups and SMEs across all these sectors, as well as larger companies that need reliable, affordable access to methods and expertise.

Timeframe
• Start within 12 months.
• Reach full national service within 24 to 36 months.

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73

Fri, Nov 28, 2025, 09:19 AM Australian Eastern Daylight Time
[ID: sbm395d7e870c5e2bdd154e9]

Title
Other: "Coordinated response"

First Name
International Environment, Reef and Ocean Division

Last Name
DCCEEW

Organisation
DCCEEW - International Environment, Reef and Ocean Division

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Multiple survey submissions including; 140_Geoscience Australia; 160_Christopher Watson; 212_Australian and New Zealand International Scientific Drilling Consortium; and 222_Australian National University reinforce the importance of investing in national coastal research infrastructure, including the IMOS CoastRI initiative which DCCEEW strongly supports. Australia's coasts face increasing pressures from marine heatwaves, sea-level rise, coastal inundation and ecosystem decline. Recent events such as the algal bloom in South Australia demonstrate the need for robust, coordinated coastal data to support timely forecasting and response. If funded, CoastRI will deliver national-scale coastal observing and modelling capability, providing the data needed to better understand, predict and respond to emerging coastal risks and opportunities. It will build on IMOS's proven record in delivering national ocean observation infrastructure. As a national initiative, CoastRI will directly support key Australian Government policies and programs—including the National Climate Risk Assessment, National Adaptation Plan, the Sustainable Ocean Plan, the Reef 2050 Plan and the Threatened Species Strategy—and will inform future state-of-the-environment reporting. It aligns with the National Adaptation Plan's emphasis on climate science and data as essential enablers of effective adaptation, and will help deliver the coastal observation capability identified through national consultations. CoastRI's multidisciplinary, collaborative approach will also address priority actions identified in developing the draft Sustainable Ocean Plan, including baseline data collection, mapping, monitoring and strengthened cross-jurisdictional and cross-sectoral coordination.

Capability 2
Multiple survey submissions, including 033_IMOS; 055_Ryan Lowe; and 217_CSIRO, highlight the importance of enhancing Australia's NRI to support our ocean economy and sustainable management of our ocean more broadly, including through: •   Increasing the efficiency of collecting and processing ocean data •   Development of autonomous platforms •

Continued expansion of mobile network and satellite connectivity • Integration of AI and machine learning • Support for research vessels • Adoption of autonomous vessels • Data portals – link the observing network to data portals that can be accessed by multiple users. DCCEEW is supportive of these survey responses and encourages the 2026 NRI Roadmap to also consider alignment with the recommendations of the next National Marine Science Strategy, due to be released in early 2026. DCCEEW also sees strong links between the issues highlighted above and the desired outcomes, and potential actions, articulated in the draft Sustainable Ocean Plan.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

The 2026 NRI Roadmap should consider the number of emerging research directions under the National Research Priority: Protect and Restore Australia's Environment, including:
• National decision support tools that identify and prioritise marine and coastal ecosystems or habitats within regions for restoration, enabling resources to be strategically directed to areas of greatest need or impact.
• Understanding how priority marine ecosystems (coral reefs, seagrasses, and mangroves) respond to warming, acidification, and extreme events at regional scales
- Research into cumulative impacts
- Enhancement of predictive modelling and early warning systems to anticipate ecological tipping points and extreme events to enable earlier, more targeted actions.
• Viable and scalable interventions to address decline in priority marine ecosystems (e.g. assisted evolution, nature-based solutions for coastal protection, etc)
- Increasing scale and driving down cost of restoration methods
• Maturing market-based mechanisms to drive private sector investment into restoration efforts.

Current critical national infrastructure requirements under this Priority include:
• Improved mapping, monitoring and evaluation frameworks
• Expanded fleets of autonomous underwater vehicles for scalable, cost-effective monitoring
• Near-real-time data transmission and AI-enabled analysis
• Industrialisation of the supply chain to support large-scale restoration, including nurseries for thermally tolerant coral propagation, seagrass planting and shellfish reef restoration (currently largely at pilot scale)
• Improved discoverability and inter-operability of key datasets, feeding decision-support tools for rapid, evidence-based, repeatable decision-making. Current single-institution data platforms with limited inter-operability will no longer fit the definition of NRI in 5-10 years, as will stand-alone sensor arrays and fossil-fueled data collection platforms
• Possibly captive breeding facilities for key threatened species
• Test beds for more novel restoration interventions

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72

Thu, Nov 27, 2025, 03:16 PM Australian Eastern Daylight Time
[ID: sbm39599fa8483e73291aa89]

Title
Dr

First Name
Christopher

Last Name
Adda

Organisation
La Trobe University

In what capacity are you responding?
An individual

Capability 1
097 La Trobe Institute for Sustainable Agriculture & Food, LA Trobe University Food security is a critical issue and there is a growing requirement for a sovereign capability in food innovation, ability to value-add to our agricultural exports and improving the health and wellbeing of the Australian population.

Capability 2
195 Population Health Research Network

Capability 3
029 UniQuest Pty Ltd

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Australia should establish and network small- to pre-pilot scale food processing hubs nationwide within the next three to five years. These hubs should be supported by targeted NCRIS investment and designed to provide subsidised access, technical expertise, training, and regulatory testing for food manufacturers, especially small and medium enterprises (SMEs). The hubs will enable rapid validation and adoption of innovative, sustainable food processing technologies, strengthen industry-research collaboration, and enhance workforce skills. By 2028, this network will position Australia as a leader in advanced food manufacturing, improve food security, and create high-value jobs.

Justification:

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• Need: Australia's food manufacturing sector is critical for economic growth, food security, and job creation, but faces capability gaps in adopting advanced, sustainable processing technologies.
• Capability: These hubs should provide subsidised access, technical support, training, and regulatory testing, enabling manufacturers—especially SMEs—to validate and implement innovative solutions.
• Medium-term Goals: By 2028, the hubs will foster industry-research collaboration, accelerate technology adoption, and enhance workforce skills, positioning Australia as a leader in sustainable food manufacturing.
• Impacted Research Communities: The initiative will benefit food scientists, engineers, regulatory experts, and SMEs, strengthening translational research and sector competitiveness.
• Timeframe: The network should be established and operational within three to five years to address urgent capability gaps and support national priorities.

70

Thu, Nov 27, 2025, 01:36 PM Australian Eastern Daylight Time
[ID: sbm3959444d1b0ff1507c636]

Title
Prof

First Name
Michelle

Last Name
Arrow

Organisation
Australian Historical Association

In what capacity are you responding?
A representative of an organisation or group

Capability 1
•   001 – Katherine Bode's suggestion of enhanced AI research capacity in GLAM institutions, specifically libraries. AI is a tool that offers multiple future directions but requires intentional investment to harness its possibilities in the context of GLAM institutions.

Capability 2
•   210 – Australian Academy of the Humanities' suggestion of: o   An Indigenous Research Capability, which presents an opportunity for intentional investment to recognise, store, and ethically using Aboriginal and Torres Strait Islander data for the purposes of research, policy, and cultural preservation while allowing First Nations people and communities to maintain control over their knowledge   o   A National Research Collections Infrastructure, to preserve evidence of Australia's past and enable HASS researchers' access to this evidence to better articulate Australia's national story/stories.
o   A national workforce strategy to build HASS capability, to strengthen investment in people, recognising both that people are an essential component of research infrastructure and that Humanities-trained staff possess specialist skills that deserve and require professional development and ongoing investment

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The AHA reiterates that while new research infrastructure capabilities might be desirable, it remains critical that existing NRI is well-funded and resourced to enable its survival and future growth. Decades of efficiency dividends on our national cultural institutions and more recent cuts to the humanities in our universities have left core humanities NRI

vulnerable. For example, the Australian Dictionary of Biography (the oldest, and largest collaborative research project in the humanities and social sciences in Australia) and the Australian National Dictionary Centre were recently threatened with cuts to their funds and staffing by the ANU. This highlighted the vulnerability of core NRI to the whims of individual universities. We urgently need a national approach to national institutions and national infrastructure.

The AHA proposes the development of a National Humanities Strategy to outline Australia's obligations to record and preserve its history and culture, not only through national cultural institutions but through universities and state GLAM institutions. At least under the present model of university funding, governance and decision-making, universities can no longer be relied upon as stewards of national institutions, culture or NRI. We call on the Commonwealth Government to move as quickly as possible to reform of these now urgent problems by implementing a revised funding regime that better reflects the actual cost of research, and revised governance standards that will produce more informed decision-making, as a matter of urgency. A National Humanities Strategy that outlines universities' obligations where they are in receipt of Commonwealth funding intended to support NRI, such as the National Institutes Grant of the Australian National University, would strengthen Australia's research culture and performance.

65

Wed, Nov 26, 2025, 10:13 AM Australian Eastern Daylight Time
[ID: sbm395363c07d9c3527e7099]

Title
Prof

First Name
Kathryn

Last Name
McGrath

Organisation
The University of Technology Sydney

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
An additional priority for the National Research Infrastructure program should be the explicit recognition and integration of diverse knowledge systems and lived experience into research infrastructure planning. This includes recognising the resources needed to bring together diverse knowledges, including ensuring accessibility, the inclusion of underrepresented voices, and the appropriate compensation and acknowledgment of contributors.

64

Tue, Nov 25, 2025, 05:22 PM Australian Eastern Daylight Time
[ID: sbm394fc5ac0babda6537b60]

Title
Prof

First Name
Tim

Last Name
Marchant

Organisation
Australian Mathematical Sciences Institute

In what capacity are you responding?
A representative of an organisation or group

Capability 1
67, 96, 100, 164: A National Residential Research Institute for the Mathematical Sciences. Despite their fundamental importance, and unlike most advanced economies (including the USA, UK and EU), Australia lacks dedicated national research infrastructure to support mathematical science research. To bridge this gap, AMSI strongly recommends that the 2026 NRI Roadmap include a National Residential Research Institute for the Mathematical Sciences to: support high-impact research, facilitate international collaboration and position Australia as a global leader in the mathematical sciences, develop a highly skilled workforce in emerging fields such as AI, quantum computing, and data science and strengthen Australia's research and innovation ecosystem, ensuring we remain globally competitive in these critical technologies. MATRIX is a residential research institute that serves as a facilitator and incubator for emerging disciplines reliant on mathematical sciences, and is a key hub where academic and industry leaders collaborate to solve complex problems and drive innovation. Many of the published NRI Roadmap survey responses specifically mention MATRIX as a successful example of what is possible: with limited resources, it has hosted over a hundred research programs, engaged 1000's of national and international researchers and built strong global partnerships. This would be a strategic investment with outstanding long-term returns, which will improve Australia's long-term economic competitiveness in emerging new technologies.

63

Tue, Nov 25, 2025, 04:43 PM Australian Eastern Daylight Time
[ID: sbm394fa29c4fabb33225d50]

Title
Dr

First Name
Trevor

Last Name
Steward

Organisation
University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.
Australia has only two operational ultra-high-field MRI scanners, both installed more than
ten years ago through earlier NCRIS investments, and they are now approaching end of
life. Updating this capability is essential to maintain national capacity in neuroscience,
clinical research, and medical innovation.

Access to 7T MRI is critical because it delivers the spatial detail required for fundamental
brain mapping, supports high-precision research in mental health by resolving circuits
implicated in major psychiatric conditions, and drives advances in neurological research
across epilepsy, motor neurone disease, and neurodegenerative disorders.

A strengthened national biomedical imaging capability is essential to an effective
research-to-translation pipeline, allowing pharmaceuticals, biologics, and medical
technologies to move more efficiently from discovery to real-world use by clarifying
mechanisms of action, optimising dosing, and objectively tracking treatment response.
Imaging is a necessary complement to genomics, providing multimodal biomarkers and
deep phenotyping for precision medicine, and it underpins Australia's medical technology
sector by validating device performance, supporting digital health tools, and enabling
advanced therapeutic platforms, where it both detects disease and guides personalised
radiopharmaceutical treatments.

In brain and mental health, state-of-the-art imaging delivers insights that cannot be
obtained otherwise and will become increasingly important as the population ages and
neurological disorders rise, supporting earlier intervention, disease monitoring, and new
neurotechnology development. Beyond health, imaging is a core enabler of national

productivity in areas such as mineral analysis, agriculture, environmental monitoring, and materials science. Targeted investment in building and upgrading national imaging infrastructure will accelerate innovation, improve health outcomes, and secure Australia's role in global medical technology development.

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60

Tue, Nov 25, 2025, 02:30 PM Australian Eastern Daylight Time
[ID: sbm394f28aa2199066df3466]

Title
Dr

First Name
Elena

Last Name
Schaller

Organisation
Animal-Free Science Advocacy

In what capacity are you responding?
A representative of an organisation or group

Capability 1
051_Roadmap Survey_ Phenomics Australia

Capability 2
086_Roadmap Survey_ Phenomics Australia

Capability 3
169_Roadmap Survey_ Phenomics Australia

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
National Centre for Human-Relevant Research Methods (NCHRM)

Need: Australia lacks a coordinated capability to develop, validate and scale non-animal methods (NAMs). Reliance on animal models drives high failure rates, irreproducibility and substantial financial loss. Evidence from CSIRO (Non-animal models 2023) and the WA Parliamentary Inquiry into health and medical research funding (2024) shows that NAMs improve predictive performance for human outcomes in multiple applications and are a strategic priority for Australian research infrastructure. Economic analysis shows organ-on-chip models can reduce costs by up to fifteenfold and halve development time, with liver-on-chip platforms offering more than US$3 billion annually in potential productivity gains (Ewart et al. 2022).

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Capability: A distributed centre focused on organoids, organ-on-chip fabrication, human tissue biobanking, AI-enabled modelling and regulatory science. It would support standards development, NAMs validation and specialised training, and integrate with existing NRIs such as ANFF, ARDC, NCI and Phenomics Australia.

Medium-term goals:
-Validate priority NAMs for toxicology and drug development
-Improve research predictivity and reduce attrition
-Build national datasets to support AI-enabled biology, consistent with the UK Compute Roadmap
-Reduce duplication and cost by shifting reliance from animal-based infrastructure

Impacted communities: Biomedical research groups, pharmaceutical and biotech companies, regulators, clinicians and public health bodies.

Timeframe: Development should begin within 2–3 years to align with rapid global advancements and international planning cycles, including the UKRI Infrastructure Roadmap 2025 and ESFRI Roadmap 2026.

59

Tue, Nov 25, 2025, 12:01 AM Australian Eastern Daylight Time
[ID: sbm394bf4e5ecb79b1d7cde6]

Title
Prof

First Name
Aidan

Last Name
Sims

Organisation
University of New South Wales

In what capacity are you responding?
An individual

Capability 1
Residential Research Facility for mathematics (035 Wood, 067 Praeger, 096 MATRIX, 100 Australian Mathematical Society, 101 Aidan Sims, 126 Jan Pretorius, 164 Australian Mathematical Sciences Institute, 266 University of Queensland): The submissions are exactly on the money, and the consistency of this view across submissions from individuals, learned societies/peak bodies, and universities bear this out. Australia currently has no funded mathematical research infrastructure, and the impact of funding for MATRIX on progress and opportunities for ECRs in the Mathematical Sciences would be immense. It would also deliver substantial benefit to Australia through training, talent attraction, profile, and industry interaction.

Capability 2

Capability 3

58

Mon, Nov 24, 2025, 11:40 PM Australian Eastern Daylight Time
[ID: sbm394bf9f867cafe81b2390]

Title
A/Prof

First Name
Brailey

Last Name
Sims

Organisation
University of Newcastle

In what capacity are you responding?
An individual

Capability 1
Mathematical sciences infrastructure in the form of a dedicated residential facility, following a model used in several other countries. Response # 96, 100 and 101 The Australian mathematical sciences have struggled for decades to maintain their high international profile of success in the absence of an appropriate and adequately supported infrastructure; a dedicated residential facility, such as that provide in many other countries: Canada, France, Germany, Mexico and the UK, to name but a few. In the absence of any government funding the efforts of MATRIX have been an important, but severely hamstrung, contributor to this success. "Team work" in mathematics consists of collaborations mathematical scientists gathering and working together at a blackboard. A dedicated institute providing facilities for conferences, workshops and other specialist groups including provision for accomodating them residentially is proven to be the most effective way of developing the links needed for such collaborations and for facilitating their subsequent fruitfulness. It also provides important developmental opportunities for PhD students and Early Career Researchers. NRI financial support for such an institute would provide a massive boost to the mathematical sciences in Australia. I urge the NRI to embrace this proposal.

57

Mon, Nov 24, 2025, 07:34 PM Australian Eastern Daylight Time
[ID: sbm394b18f288ca48e699a7a]

Title
Mr

First Name
Steven

Last Name
Tingay

Organisation
Murchison Widefield Array

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
We have not had the chance to review all 288 published responses in the time available. Whilst we are supportive of new infrastructure, funding the operational model necessary to deliver best practice maintenance and translation of existing facilities should be prioritised.

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53

Mon, Nov 24, 2025, 01:28 PM Australian Eastern Daylight Time
[ID: sbm3949c9d9c4fb4628ece6c]

Title
Dr

First Name
Thomas

Last Name
Quella

Organisation
The University of Melbourne

In what capacity are you responding?
An individual

Capability 1
096_Roadmap Survey_ MATRIX (It is unclear how I can provide an extended rational in this text field)

Capability 2
100_Roadmap Survey_ The Australian Mathematical Society

Capability 3
164_Roadmap Survey_ Australian Mathematical Sciences Institute

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

50

Mon, Nov 24, 2025, 11:59 AM Australian Eastern Daylight Time
[ID: sbm394977df63fbac4c0f363]

Title
Prof

First Name
Ben

Last Name
Harrison

Organisation
Department of Psychiatry, The University of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
I have reviewed the published survey responses and support NIF's proposed enhancements to biomedical imaging infrastructure. My rationale below is based on direct experience as an active user of the Melbourne 7T MRI facility since 2018.

Priority 1: Sustaining Ultra-High-Field Magnetic Resonance Imaging for Translational Neuroscience
Australia's two ultra-high-field MRI scanners—both NCRIS-funded—are now more than 10 years old and approaching end of life. Replacement is essential to maintain national capability in neuroscience, clinical translation, and medical innovation.
Rationale from user perspective:

As an active user of the University of Melbourne 7T facility since 2018, I can attest that this infrastructure is irreplaceable for our research program examining mood disorders, anxiety, and traumatic stress. Our work relies exclusively on the spatial resolution and signal-to-noise ratio that only ultra-high-field MRI can provide.

This capability has been critical for:

Mental health research: Mapping brain networks involved in depression, anxiety, and PTSD with the detail necessary to understand disease mechanisms and potential therapeutic targets

Neuroscience discovery: Supporting multiple NHMRC and ARC-funded projects and Centres for Research Excellence focused on brain and mental health

Workforce development: Training GR students and early-career researchers in advanced neuroimaging methods
International competitiveness: Enabling Australian researchers to participate in global consortia and collaborate with leading international groups

Without replacement of these aging systems, Australia will lose critical capacity in brain research, neurological disease modelling, imaging-driven AI development, and clinical trial readiness. The Melbourne facility alone supports a substantial user community across multiple institutions, and loss of this capability would severely impact research programs that have been built around access to ultra-high-field imaging.

Priority 2: Clinical Integration of Research Infrastructure

The draft National Health and Medical Research Strategy emphasises embedding research infrastructure in clinical environments. For biomedical imaging, clinical integration is essential to accelerate translation.

Clinical embedding enables:

-Access to patient populations who cannot travel to research-only facilities, including those with acute conditions
-Real-time clinical feedback that accelerates validation of imaging biomarkers
-Seamless integration of advanced imaging into diagnostic and treatment pathways
-Direct support for clinical trials through consistent imaging infrastructure

NIF has begun this work through hospital partnerships, but expanding clinical integration requires targeted support for specialised equipment, skilled staffing, governance arrangements, and digital connectivity.

Priority 3: Artificial Intelligence Infrastructure for Imaging

AI foundation models are becoming critical infrastructure for medical research. These models are high-value, equitable, reusable, scalable, and sovereign—enabling Australian data and health priorities to shape Australian models.

Imaging generates vast datasets that require AI tools for analysis. Foundation models trained on Australian imaging data would:

Support diagnostic AI development
Enable automated image analysis for clinical trials
Provide tools for early detection and treatment planning
Ensure Australian control over how our health data is used

Integration of AI programs within existing NCRIS capabilities like NIF would leverage established infrastructure and governance while strengthening national leadership in data-driven medicine.

41

Fri, Nov 21, 2025, 12:56 PM Australian Eastern Daylight Time
[ID: sbm393a3917387157b62298e]

Title
Prof

First Name
Jeremy

Last Name
Mould

Organisation
Swinburne

In what capacity are you responding?
An individual

Capability 1
Stawell Underground Physics Laboratory

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.

As our capabilities with sensors advances, and as biophysics needs low radiation background environments, a National underground physics lab is a high priority, relatively low operations cost, priority. Now that University research budgets are stressed like never before, it is vital to reduce their infrastructure costs via NCRIS.

40

Fri, Nov 21, 2025, 12:40 PM Australian Eastern Daylight Time
[ID: sbm393a2ac774ce84b63b415]

Title
Dr

First Name
Saraid

Last Name
Billiards

Organisation
Association of Australian Medical Research Institutes (AAMRI)

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Capability 1 – National Biobanking and Data Integration Network (Survey ID: 35-112) A coordinated national network linking biobanks, genomic datasets, and clinical records. Rationale: Essential for translational health research, precision medicine, and preparedness for future pandemics. Enables compatibility and data sharing across institutions.

Capability 2
Capability 2 – Distributed Translational Research Facilities (Survey ID: 35-247) Shared infrastructure supporting scale-up, validation, and early manufacturing of biomedical innovations. Rationale: Bridges the gap between discovery and commercialisation, strengthens collaboration with SMEs and accelerates medical product development.

Capability 3
Capability 3 – National Health and Biomedical Data Commons (Survey ID: 35-198) Secure, privacy-compliant platform integrating health, omics, and population data. Rationale: Builds sovereign data capability and supports AI-enabled research, clinical translation, and health policy decision-making.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposed capability – National Clinical Trials and Translation Infrastructure (NCTTI)

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Need: Australia lacks coordinated national infrastructure for clinical trial design, data integration, and real-time monitoring across sites.

Capability: A federated platform linking trial networks, registries, and biobanks with consistent governance, ethics, and data standards.

Medium-term goals: Streamline national trial approvals, enhance trial participation, and improve translation of research into clinical practice.

Impacted research communities: Medical research institutes, hospitals, universities, health departments, and industry partners.

Timeframe: Establish core platform within 3 years; expand to national coverage by year 5.

36

Thu, Nov 20, 2025, 06:01 PM Australian Eastern Daylight Time
[ID: sbm393629a66a1a0e94e8cf1]

Title
Prof

First Name
Brendan

Last Name
Kennedy

Organisation
The University of Sydney

In what capacity are you responding?
An individual

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Access to large scale international facilities. It is impossible for Australia to build and operate the array of instruments available at international Neutron Scattering, Synchrotron and Free ElectronLaster facilities. Funding travel for reserchers to undertake experiments at such facilities is critical to the optimal; use of our own national facilities. A second guide hall at the OPAL reactor to expand the capability of ACNS to meet its design capability is long overdue.

35

Thu, Nov 20, 2025, 02:42 PM Australian Eastern Daylight Time
[ID: sbm393573ca8628aa3ae6f2f]

Title
Prof

First Name
Mark

Last Name
Paskevicius

Organisation
Curtin University

In what capacity are you responding?
An individual

Capability 1
068_Roadmap Survey_ Joel Mackay NMR

Capability 2
098_Roadmap Survey_ Margaret Sunde NMR

Capability 3
128_Roadmap Survey_ Christopher McErlean NMR

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Name of capability: Magnetic Resonance Australia (National NMR Network).
Summary: A coordinated national network of NMR spectroscopy facilities to serve as a sustainable, cutting-edge research infrastructure for Australia.

31

Wed, Nov 19, 2025, 03:32 PM Australian Eastern Daylight Time
[ID: sbm392fcaee033095fdeb4a3]

Title
Prof

First Name
tony

Last Name
bacic

Organisation
La Trobe Institute for Sustainable Agriculture & Food, La Trobe University

In what capacity are you responding?
A representative of an organisation or group

Capability 1
079 Bioplatforms Australia

Capability 2
161 Australian Plant Phenimics Network

Capability 3
097 La Trobhe Institute for Sustainable Agriculture & Food

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
NCRIS road map to underpin an innovative and globally competitive food manufacturing/processing sector for Australia

Australia's food manufacturing sector gross value of production in 2023 was $125B and employed 200,000 people, representing 24% of all manufacturing jobs in Australia. Food security is a complex challenge requiring coordinated alignment and prioritisation of public and private policies, actions and investments (including infrastructure). It should not simply be viewed through the lens of agricultural output but also nutritional security (ensuring nutritious and equitably distributed food for a healthy population) and sovereign security (maintaining a resilient supply chain with sufficient capacity to feed our people during natural disasters). For example, during COVID-19, Australia had only 5 days of fresh food and 14 days of non-perishable food on supermarket shelves. This highlights that food

security is a function of a viable and adaptable food industry. Adaption is driven by many factors including a competitive and resilient food processing industry.

Despite its national significance, both from an economic and sovereign security perspective, Australia faces a pressing research capability gap in advanced food-processing technologies that constrains research, innovation, competitiveness and regional economic growth. Small and medium sized food manufacturers, who represent the vast majority of Australia's food sector, lack affordable, shared access to small (bench)- and pre-pilot scale processing for proof-of-concept testing, analytical and validation facilities needed to translate innovative ideas into commercially viable products. Research providers similarly lack the latest state-of-the-art bench to pre-pilot scale processing technologies to conduct translational research and to train a skilled workforce for this critical sector. These capability shortfalls span emerging platform technologies such as precision and solid-state fermentation, green extraction methods, modern separation and fractionation, advanced drying and preservation processes to extend shelf life, green packaging solutions, low sugar and healthy-fat formulation, and whole-food processing approaches. It also includes gaps in testing infrastructure for food digestibility, substantiation of health benefits, and regulatory compliance.

Without public investment in distributed, industry-accessible infrastructure coupled with research expertise, innovators are forced to test and scale in expensive private facilities or overseas. This increases R&D costs and slows adoption of sustainable, health-focused and export-oriented food products. Adopting a national, networked capability would lower entry barriers for SMEs, strengthen industry-research collaboration, de-risk adoption of new technologies, and create high-value jobs across metropolitan and regional Australia. In a similar vein to NCRIS' transformative investment in the mid 2000's in "Frontier technologies for building & transforming Australian Industries" (to which I (Bacic) was a contributor), which drove the biotechnology revolution, we believe it is now time to deliver an analogous uplift to the agrifood and nutrition sectors to ensure a vibrant food manufacturing sector adding value to both Australia's agrifood sector and a healthier population. We, therefore, recommend targeted NCRIS support to establish and network small (bench)-to-pre-pilot scale food processing hubs that provide subsidised access, technical support, training and regulatory testing. This will enable Australian food manufacturers to adopt state-of-the-art, innovative and sustainable technologies underpinning a globally competitive sector value-adding to agricultural outputs, food security for the Australian population and jobs in regional Australia.

Professor Tony Bacic
Director, La Trobe Institute for Sustainable Agriculture & Food (LISAF)
Professor Roman Buckow
Director of LISAF's Centre for Food Science

26

Tue, Nov 18, 2025, 09:33 AM Australian Eastern Daylight Time
[ID: sbm392a020bc921759faf5b5]

Title
Prof

First Name
Mehdi

Last Name
Mobli

Organisation
Magnetic Resonance Australia

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Proposed New Capability: A National NMR Network ("Magnetic Resonance Australia")

Name of capability: Magnetic Resonance Australia (National NMR Network).
Summary: A coordinated national network of NMR spectroscopy facilities to serve as a sustainable, cutting-edge research infrastructure for Australia.

Need/Problem: NMR spectroscopy is widely used across disciplines and underpins research in many of Australia's National Science and Research Priorities (biotechnology, advanced materials, environmental science, quantum technology, etc.). However, our NMR infrastructure is currently fragmented and under-resourced at a national level. Over 100 NMR instruments (worth >$200 M) are spread across 22 universities and CSIRO, largely funded by individual grants. This distributed model has led to world-class research outputs, but it now faces critical sustainability challenges. Many instruments are old and approaching end-of-life, with a recent stakeholder analysis revealing a looming "funding cliff" – by 2025–2030, a huge portion of NMR systems will require replacement or upgrades that far exceed usual funding sources. If we do nothing, Australia risks a "nationwide collapse" in NMR capability within the next 3–5 years. Moreover, Australia has no ultra-high-field NMR (≥1 GHz), leaving our researchers trailing their international peers in access to the most sensitive and advanced instrumentation. The helium supply crisis (a 275% price increase since 2017) further threatens operations, as NMR magnets rely on liquid helium and many sites lack recycling capacity. In short, despite NMR's national significance, there is a gap in coordinated support – putting this critical capability at risk and limiting future research and innovation.

Proposed Capability: Magnetic Resonance Australia (MRA) will be a nationally coordinated network of NMR facilities that elevates NMR to a true national research infrastructure. The network will link major NMR centres across Australia, enabling strategic management of existing instruments and joint planning of upgrades and new investments. Under MRA, high-end NMR systems (e.g. 800–1200 MHz spectrometers) at key nodes would be treated as flagship facilities, accessible to researchers nationwide. The network will secure long-term funding for essential maintenance, console replacements and magnet upgrades – coordinating with schemes like ARC LIEF but filling the gaps that individual grants cannot cover. New infrastructure would be developed under MRA, such as establishing a 1.2 GHz NMR facility (to finally equip Australia with ultra-high-field capability), and expanding specialised techniques (solid-state NMR, hyperpolarisation, advanced MRI/MRS for biomedical research, etc.) in line with emerging science needs. A national helium recycling program would be implemented to dramatically cut operating costs and insulate the network from helium shortages. Equally important, MRA will provide a unifying digital platform for data sharing, remote instrument access, and outreach, integrating NMR into Australia's broader e-research infrastructure.

National Significance and Impact: The National NMR Network will transform NMR spectroscopy from a collection of local facilities into a cohesive, world-class capability serving all of Australia. It directly addresses a major infrastructure gap – ensuring that a technology underpinning thousands of publications and discoveries remains available and competitive. By investing an estimated A$100 M over 10 years (roughly $10 M/year), Australia can secure and upgrade its NMR fleet, preventing catastrophic loss of capacity and closing the gap with international competitors. This will benefit a vast research community: chemists, biologists, medical researchers, environmental scientists, materials engineers, and more. It also aligns with national priorities – for instance, supporting drug discovery and biotech (by enabling analysis of molecular structures and metabolites), materials and manufacturing (polymers, batteries, quantum materials characterization), agriculture and food science (quality and traceability via NMR spectroscopy), and even defence and forensics (through advanced analytical chemistry). In all these areas, ready access to state-of-the-art NMR is often the key to innovation.

Crucially, MRA will foster translation and industry engagement. The network will strengthen academia–industry partnerships by making NMR expertise and instruments more accessible to companies. Industry users (pharmaceutical companies, biotech start-ups, mining and materials firms, etc.) will benefit from centralised coordination of access to high-end NMR equipment and expert support, helping them solve R&D problems and develop new products. This could catalyse new collaborations – for example, supporting medicinal chemistry for drug development or quality control in manufacturing – and attract international investment or partnerships in Australian research. By driving innovation in sectors like pharmaceuticals, agriculture, and renewable energy, a national NMR network will create jobs and boost productivity, delivering economic and societal benefits alongside scientific advances. Importantly, the network's collaborative model means breakthroughs in NMR methods (e.g. faster analyses, novel imaging techniques) can be rapidly shared and implemented across the country, accelerating discovery and ensuring Australia stays at the forefront of global research.

Alignment with quantum technologies and critical-tech agendas: NMR is, at its core, a practical quantum technology: it relies on coherent manipulation and readout of nuclear and electronic spin states, and has for decades been a primary training ground in topics that are now central to quantum information science (QIS)—including density-matrix formalisms, product-operator approaches, pulse engineering and coherent control of spins

over a very broad range of magnetic fields. Internationally there is growing recognition of this link, with new initiatives explicitly connecting magnetic resonance and QIS. A coordinated National NMR Network would position Australia to participate in, and help lead, this global trend by mobilising NMR and EPR experts around quantum sensing, spin-based qubits, and quantum-enhanced measurement. In this way, MRA would not only sustain an essential analytical technology, but also serve as a bridge into the broader quantum ecosystem identified in Australia's critical technologies and quantum strategy work.

Governance and Sustainability: We envision MRA being managed by a central steering committee representing major stakeholder institutions and user communities. This body would coordinate investments, instrument deployments, and fair access policies to serve researchers nation-wide. The governance will emphasise transparency and strategic decision-making – identifying where consolidation or expansion of NMR capabilities is most critical. A national approach to operations and maintenance will greatly improve efficiency: for example, bulk procurement of service contracts and consumables, shared technical support staff, and coordinated scheduling to maximise instrument uptime. The long-term sustainability of NMR infrastructure will be front-and-center – with dedicated funding for maintenance/upgrades (beyond short grant cycles) and programs to train and retain the highly skilled technical workforce needed to run these facilities. Environmentally, the emphasis on helium recycling and energy-efficient equipment will contribute to Australia's sustainability goals. In summary, Magnetic Resonance Australia will ensure that NMR spectroscopy, as a vital research infrastructure, is effectively managed, upgraded, and future-proofed for the next decade and beyond. This initiative is critical for maintaining Australia's scientific capabilities and competitiveness in a range of fields, and for translating research into the innovations that will drive our economy and wellbeing in years to come.

24

Mon, Nov 17, 2025, 07:28 PM Australian Eastern Daylight Time
[ID: sbm39270699720238e6fd4e9]

Title
Prof

First Name
Michael

Last Name
Giudici

Organisation
Department of Mathematics and Statistics, The University of Western Australia

In what capacity are you responding?
A representative of an organisation or group

Capability 1
Mathematical progress is often best made by bringing collaborators together for periods of intense research that is not possible through online environments. A dedicated mathematical residential facility as proposed in ID 096_Roadmap_Survey_MATRIX, 067_Roadmap_Survey_Cheryl_Praeger, 100_Roadmap_Survey_The_Australian_Mathematical_Society, and many others, would be an ideal way to make this happen and would enable Australia to have comparable research facilities to those in the UK (The Isaac Newton Institute), Canada (the Banff International Research Station), Germany (Mathematisches Forschungsinstitut Oberwolfach) and others. It would also boost collaboration within Australia and internationally.

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21

Mon, Nov 17, 2025, 03:40 PM Australian Eastern Daylight Time
[ID: sbm3926359a769d1d3f73cb0]

Title
Prof

First Name
Matt

Last Name
King

Organisation
The Australian Centre for Excellence in Antarctic Science

In what capacity are you responding?
A representative of an organisation or group

Capability 1
109 Antarctic observing system and 215 an observing system on the continental shelf of Antarctica - polar regions remain one of the most poorly observed on Earth. Changes in Antarctic impact on Australia through sea level rise, changes in weather and climate, and impacts fisheries. We do not have an early warning system of change in the Antarctic.

Capability 2
212 222 expanded deep-ocean observing - this capability reflects Australia's vast ocean estate and impact of ocean change to our coasts and weather, and that of our Pacific neighbours. Our current ocean assets are insufficient in terms of ships or autonomous capabilities, and there is a disjoint in their coordination (MNF, AAD, IMOS,...).

Capability 3
160 CoastRI - coasts have historically fallen into the crack of hte land and ocean, and yet it is where Ausrtalians live and relax and much of our infrastructure and wealth rests. These are special places, including to Indigenous peoples. We should have capacity to monitor and detect change.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Renewed and enlarged National Computing Infrastructure

19

Sat, Nov 15, 2025, 07:37 PM Australian Eastern Daylight Time
[ID: sbm391cc284bd9ddfa59de22]

Title
Prof

First Name
Cheryl

Last Name
Praeger

Organisation
University of Western Australia

In what capacity are you responding?
An individual

Capability 1
Mathematical Sciences Infrastructure as in 067_Roadmap_Survey_Cheryl_Praeger

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
I wish to emphasise the critical importance of providing NRI access to the Mathematical Sciences - and refer to the submission 067_Roadmap_Survey_CherylPraeger. Need: The mathematical sciences rely on collaborations both nationally and internationally; networks of mathematicians should be regarded as critical National Research Infrastructure; I support a national mathematical sciences research institute providing a dedicated residential facility (there are many successful models internationally) - to enable establishing of strong international mathematical networks; to ensure Australia is at the cutting edge of new technical and theoretical mathematics. Capability: achievements of the existing MATRIX and SMRI Mathematical Research Institutes - established without national funding - demonstrate the capabilities of the Australian mathematical community to initiate a flourishing program (so far on an unsustainable shoe-string budget). Goals: established strong national research groups with global networks in key mathematical areas; strong Australian leaders, and access to students and ECRs to international leaders. Impacted research communities: all Australian mathematicians and scientific collaborators. Timeframe: ongoing.

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18

Thu, Nov 13, 2025, 02:25 PM Australian Eastern Daylight Time
[ID: sbm391157562375f5660dd07]

Title
Prof

First Name
Warwick

Last Name
Tucker

Organisation
The Australian Council of Heads of Mathematical Sciences

In what capacity are you responding?
A representative of an organisation or group

Capability 1
096_RoadmapSurvey_MATRIX

Capability 2
100_RoadmapSurvey_TheAustralianMathematicalSociety.pdf

Capability 3
035_RoadmapSurvey_DavidWood

17

Wed, Nov 12, 2025, 03:00 PM Australian Eastern Daylight Time
[ID: sbm390c51113a3cd06ebd167]

Title
Dr

First Name
Giovanni

Last Name
Di Virgilio

Organisation
NSW DCCEEW

In what capacity are you responding?
An individual

Capability 1
222_Roadmap Survey_ Australian National University

16

Tue, Nov 11, 2025, 09:26 PM Australian Eastern Daylight Time
[ID: sbm39088c650c75a7ff001fa]

Title
Prof

First Name
Andy

Last Name
Hogg

Organisation
ACCESS-NRI

In what capacity are you responding?
A representative of an organisation or group

Capability 1
227 – "A National Atmospheric Composition network" (noted in 2.5.2 under "Earth system modelling infrastructure"; also supported by submission 113, 157). This suggestion highlights the importance of long-term measurements of atmospheric composition, including long and short-lived climate forcers, such as aerosols, greenhouse gases and reactive gases. Currently, NCRIS Projects have some capability in measuring atmospheric fluxes (TERN) and modelling the Earth system (including atmospheric models, via ACCESS-NRI). Meteorological variables are measured by the Bureau of Meteorology and provided to the World Meteorological Organisation, but this there is a clear gap in the case of atmospheric composition. An NCRIS Project focussed on atmospheric composition will sustain the few existing atmospheric composition observation programs that continuously face resourcing challenges, and form a network designed to track changes in the atmosphere as we move towards NetZero, verify emission estimates, inform urban pollution and constrain our Earth system models.

Capability 2
196 – "Joint facilities in aero- and hydro-dynamics" (noted in 2.5.2 under "translational research infrastructure", supported by 55) This suggestion proposes a network of fluid dynamics laboratories to support discovery of fluid processes important for industrial and environmental applications. ACCESS-NRI supports the development of fundamental knowledge in fluid mechanics to inform future climate model development and renewable energy technology, as well as ocean dynamics and ocean engineering applications. Fluid dynamics laboratories are a genuine research infrastructure that underpin a wide range of applications.

Capability 3

109 – "Antarctic observing system" (also supported by 203, 215, 239) Currently, critical Antarctic observations are pieced together from several different agencies and initiatives, and there is danger of a gap developing between the Australian Antarctic Division and the research science community. This suggestion argues that we need more fundamental underpinning infrastructure to inform sea level rise trajectories, and to reduce the uncertainty in Antarctic ice loss. This is a compelling case, but needs to be considered within the wider lens of reforming the Australian Antarctic Science Program.

14

Mon, Nov 10, 2025, 01:20 PM Australian Eastern Daylight Time
[ID: sbm3901a8b390ab2e712dce3]

Title
Prof

First Name
Catherine

Last Name
Greenhill

Organisation
UNSW Sydney

In what capacity are you responding?
An individual

Capability 1
96 MATRIX Mathematical Research Institute

13

Sat, Nov 8, 2025, 12:11 AM Australian Eastern Daylight Time
[ID: sbm38f48a672c8832d7a9565]

Title
Prof

First Name
Jan

Last Name
de Gier

Organisation
MATRIX, The Unviersity of Melbourne

In what capacity are you responding?
A representative of an organisation or group

Capability 1
96, MATRIX

Capability 2
100, Australian Mathematical Society

Capability 3
164, Australian Mathematical Sciences Institute

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.

12

Fri, Nov 7, 2025, 04:16 PM Australian Eastern Daylight Time
[ID: sbm38f2d70b3aca194d21544]

Title
Prof

First Name
David

Last Name
Wood

In what capacity are you responding?
An individual

Capability 1
96 MATRIX

Capability 2
100 MATRIX

Capability 3
164 MATRIX

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that
was not in the Survey responses, please name it here, and briefly describe the need, the capability,
the medium-term goals, impacted research communities, and the timeframe over which its
establishment should occur.
Many survey responses (IDs 12, 35, 67, 101, 126, 165) highlighted the pressing need for a
residential research institute dedicated to the mathematical sciences to be funded under
the NRI scheme.

9

Thu, Nov 6, 2025, 08:06 AM Australian Eastern Daylight Time
[ID: sbm38ebf07751ca113f4acc5]

Title
Mr

First Name
Stuart

Last Name
Milburn

In what capacity are you responding?
An individual

Capability 1
Cross-domain integration infrastructure for humanities and Indigenous knowledge systems
Relevant responses: Australian Academy of the Humanities and university submissions.
Rationale: Investment in digital platforms linking humanities, Indigenous, and scientific
data will strengthen Australia's ability to manage cultural heritage, ethical AI, and social
research. This capability fosters inclusive, multidisciplinary research translation and
ensures culturally informed stewardship of national data assets

Capability 2
Integrated marine and coastal observing systems (IMOS expansion) Relevant responses:
IMOS and related marine science submissions. Rationale: Enhancing IMOS capabilities to
include remote and northern regions, coastal observing, and integration with satellite and
sensor networks will provide critical national data for climate, biodiversity, and resource
management. These improvements directly support Australia's blue economy,
environmental resilience, and disaster preparedness.

Capability 3
National biobanking and biological models infrastructure Relevant responses: Multiple
biosciences submissions referencing national biobank integration. Rationale: A unified
national approach to biobanking and biological models will enable major advances in
health, environmental, and biosecurity research. It underpins cross-disciplinary
collaboration and improves Australia's readiness for future health and ecological
challenges.

8

Wed, Nov 5, 2025, 07:24 PM Australian Eastern Daylight Time
[ID: sbm38e9364f14ca2a6069778]

Title
Dr

First Name
Sahani

Last Name
Pathiraja

Organisation
UNSW Sydney

In what capacity are you responding?
An individual

Capability 1
96, MATRIX. Australia desperately needs a residential research facility that will place
Australian mathematical sciences in an internationally competitive position. The current
institute, MATRIX, is sorely under funded and needs a significant boost of federal funding
to bring it up to the level of other world-class residential research facilities such as ICERM,
the Newton Institute and Oberwolfach. The return on investment is potentially large,
given the modest investment required compared to other large infrastructure investments.

6

Tue, Nov 4, 2025, 05:37 PM Australian Eastern Daylight Time
[ID: sbm38e3aeb8c4ac65ee79940]

Title
Prof

First Name
Sach

Last Name
Jayasinghe

Organisation
QCIF Digital Research

In what capacity are you responding?
A representative of an organisation or group

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Without necessarily canvassing all submissions, we note Australia's dire need for computing that is optimised for local AI models. At the cold-face, QCIF has not been able to pursue certain opportunities, including partnerships with industry due to the lack of AI-factory type dedicated computing. To be clear, QCIF does have access to PAWSEY, UQ Bunya and NCI - these are not AI-factory type GPU grunt required.

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5

Mon, Nov 3, 2025, 04:04 PM Australian Eastern Daylight Time
[ID: sbm38ddd61ca3f9b76568a90]

Title
Prof

First Name
Drew

Last Name
Evans

Organisation
Adelaide University

In what capacity are you responding?
An individual

Capability 1
Clinical trial scale med-tech device manufacturing (137 Australian National Fabrication
Facility Ltd)

Capability 2
Semiconductor & quantum materials facilities for defence, USPL & sovereign alloys (188
The University of Adelaide)

Capability 3
A National Centre for Medicinal Product Manufacturing (029 UniQuest)

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4

Fri, Oct 31, 2025, 06:12 PM Australian Eastern Daylight Time
[ID: sbm38cf347e64f81cebcf422]

Title
Prof

First Name
Victor

Last Name
Calo

Organisation
Curtin University

In what capacity are you responding?
An individual

Capability 1
: This capability is critical because the volume, complexity and centrality of data-intensive research continue to grow across all disciplines. Establishing a national-scale digital and data research commons will enable multiple communities—science, engineering, social science, humanities—to access, share and analyse large datasets with world-class tools, ensuring Australia remains competitive in the global research ecosystem.

Capability 2
"Advanced High Performance Computing (HPC) & AI Infrastructure": The need for next-generation computational and artificial-intelligence infrastructure emerged repeatedly in the survey responses. Given the exponential growth of modelling, simulation and machine-learning research, a major investment in HPC/AI capability provides foundational support for both discovery and translation. This aligns with industry, national security and sovereign-capability objectives.

Capability 3
"National Research Collections Network & Digital Twins": Several responses emphasised the need to modernise, integrate and digitise national research collections (physical specimens, cultural assets, environmental archives). A networked collections and digital-twins capability would unlock value in cross-discipline research, help bridge spatial and regional gaps, and support long-term monitoring and reuse of legacy assets.

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability,

the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
Title: National Network for Advanced Applied Mathematics and Industrial Innovation

Need:
Australia's research and industrial sectors underutilise advanced applied mathematics as a driver of innovation, optimisation, and digital transformation. Critical industries— engineering design, energy, mining, manufacturing, health, and defence—require increasingly sophisticated mathematical modelling, simulation, and data-driven decision tools. However, mathematical expertise and computational modelling capacity remain fragmented across institutions, limiting their translation into industrial impact.

Capability:
This initiative would establish a coordinated national network linking universities, research institutes, and industry partners to advance the application of mathematical science to complex, real-world problems. It would integrate expertise in modelling, optimisation, uncertainty quantification, and data assimilation, supported by access to national computational resources. The network would act as both a collaborative research platform and a training and translation hub, embedding mathematicians directly into industrial innovation pipelines.

Medium-Term Goals:
Within five years, the network will create shared open-source modelling frameworks, host joint academic–industry workshops, and establish targeted fellowships to place applied mathematicians in key sectors. In the longer term, it will form enduring research–industry partnerships that generate predictive tools, optimisation methods, and digital twins supporting Australia's transition to advanced manufacturing, clean energy, and resilient infrastructure.

Impacted Research Communities:
Applied and computational mathematicians, engineers, data scientists, and industrial R&D teams across energy, resources, transport, manufacturing, and defence.

Timeframe:
Planning and stakeholder alignment in 2026–27; establishment of the network and pilot projects by 2028; full national integration with industry partnerships by 2030.

3

Fri, Oct 31, 2025, 01:42 PM Australian Eastern Daylight Time
[ID: sbm38ce3d6100f8d3b86cdcc]

Title
A/Prof

First Name
Vera

Last Name
Roshchina

Organisation
UNSW Sydney

In what capacity are you responding?
An individual

Capability 1
"The MATRIX institute, based in Creswick near Melbourne" (ID: 100_Roadmap Survey_ The Australian Mathematical Society)

Capability 2
"Stably funded residential research facility" (ID: 101_Roadmap Survey_ Aidan Sims)

2

Fri, Oct 31, 2025, 11:45 AM Australian Eastern Daylight Time
[ID: sbm38cdd221bff81abe6d178]

Title
Dr

First Name
Scott

Last Name
Lindstrom

Organisation
Centre for Optimisation and Decision Science, Curtin University

In what capacity are you responding?
An individual

Capability 1
"The MATRIX institute, based in Creswick near Melbourne" (ID: 100_Roadmap Survey_ The Australian Mathematical Society)

Capability 2
"Stably funded residential research facility" (ID: 101_Roadmap Survey_ Aidan Sims)

1

Mon, Oct 27, 2025, 11:39 AM Australian Eastern Daylight Time
[ID: sbm38b933a67166ffe17f291]

Title
A/Prof

First Name
Nick

Last Name
Thieberger

Organisation
UNiversity of Melbourne

In what capacity are you responding?
An individual

Capability 1
007 Thieberger National Humanities Data Curation Service

Capability 2

Q14. If you wish to propose an additional priority suggestion for a new or enhanced capability, that was not in the Survey responses, please name it here, and briefly describe the need, the capability, the medium-term goals, impacted research communities, and the timeframe over which its establishment should occur.
The Pacific and Regional Archive for Digital Sources in Endangered Cultures (PARADISEC), an internationally recognised service for curation of primary records of more than 1,400 languages, building relationships with agencies in the Pacific, curating the outputs of Australian researchers – recordings and texts in these languages that would otherwise be lost. As with most HASS applications, this material has an immediate use for non-specialists as well as specialists, unlike the vastly over-represented STEM applications that have few users.