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### **Australian Academy of Science submission to the 2026 National Research Infrastructure Roadmap**

Australia's national research infrastructure (NRI) portfolio provides the capabilities that enable fundamental research. This research generates the knowledge that underpins innovation and the development of products, services, and policy. It is essential to our ability to address complex challenges, including decarbonisation, responding to natural disasters, food security, pandemic preparedness, and improving human health.

The 2026 National Research Infrastructure Roadmap (the Roadmap) must set an ambitious and future-proof trajectory to meet the challenges of the next decade and beyond, with awareness of the international landscape.

The Roadmap should avoid the tendency to only uplift research infrastructure that can be directly mapped to government priorities, instead ensuring it strategically supports Australia's long-term fundamental research effort that leads to new discoveries.

The Australian Academy of Science (the Academy) recommends:

- The 2026 NRI Roadmap must reflect the different parts of the research infrastructure system and provide a means for landmark investments into international-scale research infrastructure that is beyond the funding envelope of NCRIS.
- The Australian Government commits to strategic long-term planning and targeted investment of up to \$200 million annually over 10 years in next-generation high-performance computing and data (HPCD) infrastructure, including a pathway to exascale computing, to secure Australia's sovereign capability.
- The NRI Roadmap and workforce strategy must focus on establishing career pathways for NRI professionals and addressing skills needs.
- Establishing a nationally coordinated program to uplift Australia's research collections.

### **A national research infrastructure roadmap that encompasses international, national, and institutional infrastructure needs**

Australia needs to shift its approach to research infrastructure.

National research infrastructure policy has been primarily focussed on research infrastructure funded within NCRIS and that fits within a two-tiered system of infrastructure – national and institutional. This lens is inadequate to prepare for the evolving nature of technologies and demand for capabilities such as HPCD. It does not account for the shifts in the scale of infrastructure required to support research and innovation by industry into the future, such as the shift to exascale computing, which means that individual nations may not be able to fund and host necessary facilities independently.

The 2026 NRI Roadmap must articulate a strategic approach encompassing all of Australia's essential research infrastructure and sovereign capability – not just that which is within the remit of NCRIS.

Australia cannot afford an opportunistic, just-in-time approach to such research infrastructure. Instead, it must be forward-thinking, intentional, and strategic to secure the capabilities delivered by research infrastructure.

The Roadmap should include Australia's strategy to secure and build capability in the following four tiers of science infrastructure to better reflect the entire infrastructure system:

1. **Very Large "Landmark" Research Infrastructure:** This type of infrastructure encompasses large, internationally funded infrastructure that may or may not be operated on Australian soil. Examples of

infrastructure of this scale include the Square Kilometre Array (SKA), the Large Hadron Collider at CERN, and the European Southern Observatory (ESO). Australia must form strategic, pragmatic partnerships to share infrastructure, establish redundancy, and participate in international science endeavours. This necessitates a science diplomacy approach to research infrastructure, especially to navigate an increasingly contested world.

2. **National Agency Infrastructure:** Research infrastructure housed within and fully funded through Government agencies and available for public and private use. Examples include the Department of Defence's high-performance computing capability, the OPAL reactor hosted by the Australian Nuclear Science and Technology Organisation (ANSTO), the Australian Centre for Disease Preparedness, and the Marine National Facility.
3. **National Collaborative Infrastructure:** Research infrastructure that is nationally significant to the research community, government, and the private sector (on a user pay basis). Such infrastructure is funded through NCRIS or the MRFF Infrastructure Fund.
4. **Institutional Research Infrastructure:** University-level infrastructure, funded through Australian Research Council grants and university funds.

The role that the private sector should play in Australia's future national research infrastructure system and ways to foster research-industry collaboration should also be considered in the Roadmap, including how NCRIS can develop the means to ensure greater collaboration between funded infrastructures.

**The 2026 NRI Roadmap must reflect the different parts of the research infrastructure system and provide a means for landmark investments into international-scale research infrastructure beyond the funding envelope of NCRIS.**

### Bringing Australia's supercomputing up to speed

Sovereign high-performance computing and data (HPCD) capability is critical for Australia's competitiveness in science and technology and plays a vital role in Australians' everyday lives. Advanced economies invest in HPCD to gain and maintain industrial competitiveness and scientific leadership, ensure national security, accelerate digital transformation, and ensure the capacity to participate in the artificial intelligence and machine learning revolution.

The demands of modern science are growing and evolving. Data-intensive applications in genomics, climate modelling, and precision agriculture require faster, more scalable systems to process the massive datasets and run high-resolution simulations.

Australia's existing supercomputers are oversubscribed and will not last beyond the decade. The notional allocation of \$100 million to the delivery of HPCD capability presented in the Draft Final National Digital Research Infrastructure (NDRI) Investment Plan is insufficient to maintain Australia's current HPCD capabilities, let alone prepare it to meet the evolving needs of Australia's research and innovation sector.

Australia has no plan for the next generation of supercomputing or to replace the computing infrastructure we currently rely on.

Without a national strategy to acquire and sustain next-generation HPCD for our science sector, Australia risks falling behind on global advancements, limiting our ability to innovate and tackle emerging societal challenges and putting our future prosperity and security at risk.

The 2026 NRI Roadmap should outline how this long-term strategy will be achieved. The Academy proposes an investment of \$200 million annually over 10 years to secure, coordinate, and expand Australia's HPCD capabilities.

This investment would support sector coordination and planning, deliver upgrades to Australia's current Tier-1 and Tier-2 facilities, enable the co-location of data and compute resources, and drive coordination and co-

investment in an exascale (Tier-0) facility. Further information can be found in the Academy's factsheet: [Bringing Australia's supercomputing up to speed](#).<sup>1</sup>

**The Academy calls for ambitious, strategic long-term planning and targeted investment of \$200 million annually over the next 10 years in next-generation HPCD infrastructure, including exascale computing, to secure Australia's sovereign capability.**

*Fostering and securing career pathways for NRI staff will enable the effective use of NRI*

Building and maintaining a skilled NRI workforce requires sustained investment in education and training, clear career pathways, and the ability to attract and retain expertise.

Career pathway issues highlighted in the 2021 NRI Roadmap, previous Academy reports, and the recent NDRI Investment Plan consultation persist. NRI professionals maintain and optimise research infrastructure, enable coordination and partnerships, and contribute to successful research projects, however, are not rewarded through academic career pathways.

Suggestions to attract and retain the NRI workforce suggested in the other NRI consultations, such as developing a Technician Commitment in Australia and fellowship schemes for NRI staff, are valuable starting points. Such programs must be well-designed, adequately funded and of sufficient scale to address Australia's critical skills shortages and build a sustainable and future-proof training pipeline.

Investment is required throughout the training pipeline to upskill Australia's workforce in the current and future capabilities required to operate, manage, and harness cutting-edge NDRI. Capacity building in areas such as AI, data science and engineering and skills to work across scientific disciplines are essential as research becomes increasingly data-intensive.

**The NRI Roadmap and workforce strategy must focus on establishing career pathways for NRI professionals and addressing skills needs.**

### *Maintaining nationally significant research collections*

Research collections, including biological collections and those managed by the galleries, libraries, archives and museum (GLAM) sector, contain physical and digital assets and metadata vital to Australia's research endeavour. Yet these national collections are disconnected, hard for researchers to access, and increasingly under threat from ad hoc decisions by institutions and state governments.

A nationally coordinated approach to uplift Australia's research collections could enhance users' experience and ensure ongoing maintenance and enhancement. It would enable improvements to discoverability, accessibility, and interoperability and enhance collaboration throughout the research collections system and comply with the FAIR (Findable, Accessible, Interoperable, Reusable) principles. Targeted investments in new technologies, national standards, and digital curation would better mobilise Australia's collections-based data.

**The 2026 NRI Roadmap should uplift Australia's research collections by establishing a nationally coordinated program to better maintain and mobilise collections-based data.**

To discuss or clarify any aspect of this submission, please contact Mr Chris Anderson, Director Policy and International, at [Chris.Anderson@science.org.au](mailto:Chris.Anderson@science.org.au).

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<sup>1</sup> Australian Academy of Science (2025) 'Bringing Australia's supercomputing up to speed', <https://www.science.org.au/files/userfiles/support/documents/bringing-australias-supercomputing-up-to-speed-fact-sheet.pdf>