



Online submission

23 September 2026

**Australian Academy of Science submission to the
*Joint Select Committee on Artificial Intelligence***

To seize the opportunities presented by artificial intelligence (AI), and manage the risks, Australia must make strategic investments to build sovereign AI capability.

This includes the computing infrastructure, scientific knowledge, foundational data assets and skilled workforce required to participate in AI research and development to boost economic productivity and innovation. A report by the Academy of Technological Sciences and Engineering estimated that between A\$160 billion to A\$235 billion could be added to Australia's economy if strategic initiatives to capture the AI opportunity are implemented.¹

There has been a significant lack of public investment in AI research in Australia, compared to other jurisdictions. The United Kingdom announced a [£1.1 billion](#) plan to build domestic AI computing capacity earlier this year. The Singapore government will invest over [AU\\$1.13 billion](#) in public AI research through 2030.

Australia faces an escalating risk by relying on offshore AI capability. Sovereign AI capability is critical to ensure that Australia has the domestic ability to manage the development, regulation, and adoption of AI in our national interest. Sole dependency on AI technologies developed elsewhere compromises Australia's resilience and limits the new economic value Australia could capture from AI innovation.

In June, Australian researchers and companies lost access to the world's most advanced AI models when the United States imposed export controls restricting their use to US nationals. This left Australia without access to frontier AI capability. That occasion was brief, but it is difficult to predict the duration of the next one.

No other country will solve Australia's challenges for us. Uniquely Australian challenges need solutions developed here. Australia can build our own specialised AI models to fight our bushfires, improve health outcomes and protect the Great Barrier Reef. Strong sovereign AI capability is essential for Australia's defence innovation, national security and intelligence.

Summary of recommendations

The Academy makes the following recommendations to enable Australian AI sovereignty:

1. Australia must invest in national AI capability to build resilience and shape development and adoption of AI technologies, as other countries have done.
2. Government is already acting to support uptake of AI in business but has not extended this focus to the research sector. The Office for AI, National AI Centre and the Department of Industry, Science and Resources Technology and Digital Policy division should support national coordination of uptake of AI in research as a priority.
3. The Australian Government should develop a 10-year national high-performance computing strategy and investment plan to secure computing capability for AI and data-intensive research. The Academy proposes an investment of \$200 million per year over 10 years to support sector planning, upgrade facilities, and coordinate investment in Tier-0 (regional) capability.
4. The 2026 National Research Infrastructure Roadmap should include planning for AI and high-performance computing needs, particularly GPUs.
5. Australia needs to ensure diversification of onshore large-scale computing infrastructure and partnerships with other nations to secure access to frontier models and high-performance computing amid geopolitical uncertainty.

¹ Australian Academy of Technological Sciences and Engineering (2025), *Unleashing growth: Australia's AI investment blueprint*. atse.org.au/news/seizing-australia-s-235-billion-ai-opportunity/

6. The Australian Government should invest in addressing Australia's AI skills gap by implementing measures to uplift AI literacy within Australia's research workforce.
7. Government should retain visibility over what research data types are stored by commercial data centres, with agreements guaranteeing safe data stewardship and appropriate custodianship, rights and control over research data.
8. Data centre and AI developers should be required to contribute to trusted public data and knowledge infrastructure, including scientific data repositories, metadata standards, provenance mechanisms and long-term stewardship of publicly accessible information resources that underpin AI development and scientific discovery.
9. Investment is required to support open science practices that enable high-quality, well-governed, well-described and fit-for-purpose data for developing AI systems and AI-driven research, including curation of nationally significant datasets such as Australia's research collections.
10. The Australian Government should implement robust mechanisms to ensure scientific outputs (e.g. research publications and data) are appropriately attributed.
11. Australia's data centre expectations and AI standards must be made enforceable through transparent assessment criteria such as measurable reporting obligations, independent assurance, and clear consequences for misaligned actions.

AI is transforming scientific discovery and research productivity

ToR (c): the opportunities of AI to drive research and innovation

The rapid uptake of AI by Australia's scientific workforce is transforming the practice of science and has the potential to accelerate discovery and innovation. The Academy's series, [*Is Australian science ready for AI?*](#) explores how AI will reshape the policies, institutions, legal frameworks, funding models and cultural norms that underpin our national science ecosystem.²

AI tools are already enhancing efficiency and productivity in scientific research. For example, AI tools can assist with summarising literature and can perform data acquisition and analysis. While generative AI can supercharge manuscript preparation, it can also overwhelm publishers and competitive grant schemes with submissions, putting additional strain on the peer-review system.

These tools can also pose risks for scientific integrity, such as using large language models to produce research papers or theses, and fraudulently presenting outputs as the author's work, or AI "hallucinations" that produce convincing but false findings.

AI research assistants capable of operating under the direction of human researchers are now emerging in practice, indicating a transformative shift in the landscape of scientific inquiry. If AI tools will change the tasks traditionally performed by scientists, careful forethought and planning is required to determine which roles should remain human-led, how AI tools can perform and support research tasks, and which tasks can be handled by AI systems either independently or with minimal human intervention.

The Australian science system must be agile and proactive, prepared to capitalise on AI's potential but also to anticipate and mitigate risk. Responsible and transparent use of AI in science is important to extend trust in scientists to the AI systems they employ.

Recommendation 2: Government is already acting to support uptake of AI in business but has not extended this focus to the research sector. The Office for AI, National AI Centre and the Department of Industry, Science and Resources Technology and Digital Policy division should support national coordination of uptake of AI in research as a priority.

² Australian Academy of Science (2025) 'Is Australian science ready for AI?' <https://science.org.au/our-work/resources-reports/reports-publications/australian-science-ready-ai>

Strategic, long-term investment in AI capability and high-performance computing is essential for AI development and data-intensive research

ToR (e): the opportunities for Australian sovereign AI capability

Australia needs to secure the high-performance computing capability needed to enable sovereign AI capability. Access to high-performance computing and data (HPCD) and software is a critical enabler for developing and adopting AI tools and underpins advances in AI and science. Without sufficient onshore HPCD capabilities and infrastructure, Australia's AI capability will be dependent on other nations, hindering scientific progress and our ability to tailor AI tools to Australian specific challenges

As AI becomes embedded in scientific workflows, it accelerates discovery but shifts bottlenecks toward verification, simulation, and data handling. Researchers wanting to train large AI models will need access to graphics processing units (GPUs).

Australia's national (Tier-1) HPC facilities (NCI and Pawsey) need to be upgraded and expanded to ensure they are equipped to meet the growing demands of data-intensive research needs. NCI plays a role in securely hosting sensitive Australian datasets (such as health data) on sovereign infrastructure to ensure research data stays protected. Both NCI and Pawsey host and train complex scientific AI models, such as predicting medical outcomes in Intensive Care Units, automatically processing massive astronomical imaging datasets, and modelling extreme weather events and bushfire trajectories.

Dedicated investment is needed to scale up GPU capacity for AI-driven research. Both of Australia's Tier-1 facilities are oversubscribed and demand is anticipated to increase. The Academy proposes an investment of \$200 million per year over 10 years to support sector planning, upgrade facilities, and coordinate investment in Tier-0 capability. The government must commit to a long-term, coordinated investment in computing infrastructure that keeps pace with research needs, underpinning national productivity and innovation capability. The current National Research Infrastructure Roadmap should also consider AI and HPCD needs.

In addition to sovereign AI capability, Australia needs to ensure diversification of our onshore large-scale compute. These are currently mostly US owned, and subject to export controls and other ways that access could be retracted or altered over time in a way that would be beyond Australian control. This dependency on the US leaves Australia vulnerable.

Australia must diversify our partnerships with other nations to ensure we maintain access to frontier models, and access to high-performance computing, regardless of geopolitical shifts.

Recommendation 3: The Australian Government should develop a 10-year national high-performance computing strategy and investment plan to secure computing capability for AI and data-intensive research. The Academy proposes an investment of \$200 million per year over 10 years to support sector planning, upgrade facilities, and coordinate investment in Tier-0 (regional) capability.

Recommendation 4: The 2026 National Research Infrastructure Roadmap should include planning for AI and high-performance computing needs, including GPUs.

Recommendation 5: Australia needs to ensure diversification of onshore large-scale computing infrastructure and partnerships with other nations to secure access to frontier models and high-performance computing amid geopolitical uncertainty.

Australia's AI skills gap needs to be addressed

ToR (g): the workforce and skills implications of AI

Australia's ability to lift productivity and realise the benefits of emerging technologies depends on the availability of a capable, adaptable and trained workforce.

The adoption of AI is currently impeded due to a shortage of AI skills in the Australian workforce and insufficient understanding of AI across sectors. According to analysis by the Tech Council of Australia, employment in the AI workforce is projected to increase from 33,000 to 200,000 people, with supply unlikely

to grow as fast as demand.³ Specific skill sets that may be needed include understanding the fundamentals of AI development and deployment, current AI applications in research processes, effective prompt generation, responsible data stewardship processes and procedures, ability to critique and assess the accuracy of outputs, and the ethical use of AI.

Australia needs to develop the national AI talent pipeline, and also needs to support AI training for researchers to improve AI literacy and skills across the existing research workforce.

The findings of Academy report *Australian Science, Australia's Future: Science 2035* indicate gaps in Australia's education and workforce for both data science and AI capability.⁴ Data science expertise is required to manage, secure, and use Australian and international data across diverse applications. AI will be used to support research in multiple science fields, leading to high demand for scientists with AI skills.

The Academy has published a series of discussion papers titled '*Is Australian science ready for AI?*' that explore the preparedness of the Australian science sector for AI advances.⁵ Areas of priority include building Australia's sovereign AI capability by addressing Australia's skills gap. There is a growing need to equip researchers with AI skills, suggesting the value of integrating these capabilities into research training programs.

Uplifting researcher AI literacy could be achieved through education initiatives or funding for programs that support Australia's scientific workforce. This may be through:

- Development of teaching resources (e.g. the [Australian Academy of Science's education resources](#) and the [Australian Academy of Technological Sciences and Engineering STELR program](#))
- Support for workforce, diversity and equity programs (e.g. [Science & Technology Australia's Superstars of STEM program](#) – this could be targeted towards supporting researchers working in computing and/or AI)
- Scholarships and cadetships
- Partnerships with organisations
- Funding industry PhDs, and
- Data literacy programs for researchers.

These could be delivered in partnership with the National AI Centre or Office of AI to target the areas of greatest need.

Recommendation 6: The Australian Government should invest in addressing Australia's AI skills gap by implementing measures to uplift AI literacy within Australia's research workforce.

Strengthening data sovereignty in the era of AI and data centres

ToR (f): the importance of data sovereignty

Data sovereignty depends on maintaining effective control over who can access, process, combine, disclose and reuse the data, including its use for AI model training, fine-tuning and inference. Onshore storage alone may not provide sovereignty if these governance and control arrangements are weak.

Large-scale AI systems rely on compute, energy and physical data centres, but they also require access to high-quality, curated, publicly accessible datasets, metadata standards, domain knowledge and long-term data stewardship. Many of these information resources are produced and maintained through publicly funded science and research infrastructure. To make these resources usable while protecting research interests,

³ Tech Council of Australia (2024). Meeting the AI Skills Boom, <https://techcouncil.com.au/wp-content/uploads/Meeting-the-AI-Skills-Boom-2024.pdf>

⁴ Australian Academy of Science (2025). *Australian science, Australia's future: Science 2035*. <https://doi.org/10.82202/fph6-zg12>

⁵ Australian Academy of Science (2025). *Is Australian science ready for AI?* <https://science.org.au/our-work/resources-reports/reports-publications/australian-science-ready-ai>

investment is also needed in privacy-preserving and secure data-sharing infrastructure, identity and access controls, provenance, and auditable governance.

National security and data sovereignty are essential considerations. Some research data may have high confidentiality or present national security issues if able to be combined with other datasets (e.g. genomic data). The government should be able to maintain visibility of what public data are stored by commercial providers and contracts must guarantee safe data stewardship and appropriate custodianship, rights and control over research data.

This must also include Indigenous Data Sovereignty: the right of Indigenous Peoples to govern the collection, ownership, access, use, sharing and stewardship of data that relate to them, their communities, lands, waters, resources and knowledges. Government and commercial arrangements for AI infrastructure should therefore uphold Indigenous data governance authority. The CARE principles provide a framework for researchers engaging with Indigenous Knowledges and should be applied alongside Indigenous law, protocols and community-defined governance. For AI systems, this includes attention to provenance and metadata so that relationships between data, Indigenous Peoples and Country are visible and can inform appropriate access, reuse and decision-making.

Where AI developers benefit from publicly funded data and knowledge resources, policy settings for AI and data centres should ensure that they contribute to the long-term sustaining of those resources, including through support for data repositories, provenance, attribution, licensing, and responsible access frameworks.

Recommendation 7: Government should retain visibility over what research data types are stored by commercial data centres, with agreements guaranteeing safe data stewardship and appropriate custodianship, rights and control over research data.

Recommendation 8: Data centre and AI developers should be required to contribute to trusted public data and knowledge infrastructure, including scientific data repositories, metadata standards, provenance mechanisms and long-term stewardship of publicly accessible information resources that underpin AI development and scientific discovery.

Effective data stewardship is essential to maximise the value of datasets for research

ToR (f): the importance of data sovereignty

AI research and development heavily relies on open science practices because the sharing of datasets is essential to train AI models and enable large-scale data analysis. Ensuring that data used to train AI models is accessible, interoperable, and reproducible, and maintaining integrity of datasets, remain significant challenges, particularly as research has become increasingly data-intensive.

High-quality, well-governed, well-described and fit-for-purpose data is fundamental to developing AI systems, and to maintaining, evaluating and improving them over time. Continued investment in FAIR data, provenance, domain expertise and appropriate access mechanisms is therefore foundational for AI in research. Barriers remain, including inadequate resourcing for data custodians, which impacts the availability of valuable public data for research.⁶

To maximise the value of data for scientific discovery, including AI-driven research, Australia needs coordinated investment in digitisation of nationally-significant datasets, such as Australia's research collections. Biological collections and those managed by the galleries, libraries, archives and museum (GLAM) sector are a vital resource for research, but many remain inaccessible due to fragmented and unsustainable digitisation efforts.

Consistent data standards across research, government and industry, aligned with international frameworks such as the UNESCO Recommendation on Open Science, would strengthen Australia's research competitiveness and support collaboration on global challenges.

⁶ Australian Academy of Science, 2023, *Data for the People: Digital Government Meets Open Science for Grand Challenges*

Recommendation 9: Investment is required to support open science practices that enable high-quality, well-governed, well-described and fit-for-purpose data for developing AI systems and AI-driven research, including curation of nationally significant datasets such as Australia’s research collections.

Scientific data should be appropriately attributed when used in AI applications

ToR (j) the interaction of AI with existing intellectual property and copyright laws

The Terms of Reference consider intellectual property and copyright laws in relation to Australian creative, cultural and media content in the training of AI models, but the Committee should also consider ownership of and use of scientific publications and research datasets.

As AI development drives demand for large-scale training datasets, scientific publishers are exploring licensing arrangements and commercial models that provide developers of large language models access to research content. The scientific data used to train AI models are often not adequately attributed to their original sources. This undermines researchers’ ability to trace the provenance of outputs (e.g., when AI produces potential hallucinations), but it also deprives data originators of appropriate credit.

Robust mechanisms are needed to preserve attribution and provenance when research data are used in AI systems. Existing initiatives linking DOIs to datasets, software and analyses provide a useful foundation. Importantly, open-access deposition should not diminish the ability of data originators to receive appropriate recognition for subsequent use of their work.

Recommendation 10: The Australian Government should implement robust mechanisms to ensure scientific outputs (e.g. research publications and data) are appropriately attributed.

Strong data centre expectations should help mitigate negative impacts of data centres

ToR (i): the adequacy of Australia’s existing laws and regulatory frameworks

Data centres have the potential for significant negative environmental and climate implications. The Academy welcomes National Cabinet’s agreement on 26 August 2026 that the Australian Government’s Expectations of data centres and AI infrastructure developers will be mandatory. To be effective, these standards should be implemented through transparent assessment criteria such as measurable reporting obligations, independent assurance, and clear consequences for misaligned actions.

Recommendation 11: Australia’s data centre expectations and AI standards must be made enforceable through transparent assessment criteria such as measurable reporting obligations, independent assurance, and clear consequences for misaligned actions.

To discuss or clarify any aspect of this submission, please contact Lauren Sullivan, Science Policy and Advice Manager at [REDACTED]

Appendix: Definitions⁷

Artificial Intelligence (AI): A collection of interrelated technologies used for problem solving and to complete tasks that would otherwise require human intelligence.

Data Centres: Data centres are physical facilities that provide the power, cooling, connectivity and physical infrastructure needed to house both data storage and computing equipment, depending on the clients of the data centre. This infrastructure can support a broad range of digital services, such as cloud storage, online banking and artificial intelligence tools.

Generative AI: A type of AI model that can generate content such as text, images, audio and code, in response to user prompts. Whereas conventional AI has been largely analytic, generative AI takes its name from its capacity to generate content, as varied as text, image, music and computing code, in response to a user prompt. For example, conventional AI can be used to analyse features of a legal contract, such as to identify whether the contract deals with intellectual property or privacy. By contrast, generative AI can be used to generate (i.e. draft) a legal contract to cover those issues.

Machine learning (ML): The development of models that can autonomously ‘learn’ from datasets and from inputs continuously.

Model finetuning: After pre-training on general data, models are finetuned for a specific application that builds on the general abilities learned in pre-training, such as helpfully and safely answering user queries (large language models, LLMs), or generating novel images from descriptions (multimodal foundation models, MFMs). Developing these models requires more human intervention. Fine-tuning relies on human judgement; it involves the use of static datasets (**supervised learning**) or interactive feedback from humans or other automated tools (**reinforcement learning**). Fine-tuning is critical to make LLMs or MFMs safer and more useful, e.g., ChatGPT was fine-tuned to become a dialog agent that can answer queries in a prompt-response format and follow instructions.

Tiers of HPCD facilities:

- Tier-0 (international or multinational facilities)
- Tier-1 (national facilities)
- Tier-2 (institution-based facilities).⁸

⁷ Definitions have been sourced from: Bell, G., Burgess, J., Thomas, J., and Sadiq, S. (2023, March 24). *Rapid Response Information Report: Generative AI - language models (LLMs) and multimodal foundation models (MFMs)*. Australian Council of Learned Academies.

⁸ Australian Academy of Science. (2024). *The future computing needs of the Australian science sector*. <https://science.org.au/our-work/resources-reports/reports-publications/future-computing-needs-australian-science-sector>