

**Australian Academy of Science submission to Jobs and Skills Australia's  
*Generative Artificial Intelligence Capacity Study***

The rapid uptake of artificial intelligence (AI) tools—including generative artificial intelligence (Gen AI)—by Australia's scientific workforce is disrupting and transforming the practice of science. Sovereign AI capability and workforce development are critical to ensure that Australia has the domestic ability to seize the opportunities presented by AI, manage the adoption of AI in our national interest and meet escalating global demand for AI talent.

The Academy recommends that:

- Australia uplifts AI capability across the scientific workforce. An investment plan to build national capability across the science system, including in fundamental AI science, is required.
- Training is needed to ensure that Australia's scientific workforce possesses the necessary skills and knowledge to responsibly use Gen AI tools.
- The government and research sector should jointly lead the development of clear, evidence-informed guidelines that address the opportunities and manage the risks AI brings to the science sector.

**Australia must uplift data literacy and AI understanding across the scientific workforce**

The rapid uptake of AI is transforming the practice of science, and AI tools are expected to become essential to most scientific fields in the near future. Australia needs to prepare its scientific workforce for the ways that Gen AI tools will change scientific practice and support the responsible adoption of AI tools.

Demand for AI capability is anticipated to increase over the next five years, and there is high competition for local and international talent. Australia needs a future-proof national plan and investment strategy to build sovereign AI capability, including scaling up investment in fundamental AI science.

Gen AI has the potential to speed up the publication process and increase research productivity. Barriers to adopting AI include insufficient data literacy, understanding of AI, and expertise in applying these tools effectively. Generative AI generates novel content (e.g. text, images, video) in response to a user prompt. Key skillsets that need to be developed include strategic and knowledge-based prompt generation, understanding the fundamentals of AI application in research, and data literacy.

Australia's scientific workforce needs to be supported not just to use Gen AI tools but also to identify, comprehend, and manage the potential risks and research integrity challenges associated with using AI to conduct science. This includes the generation and use of biased or false data in studies, plagiarism, impacts on the quality of scholarly publications, and scientific norms such as replicable research.

Gen AI tools have limitations and biases. AI has been shown to have inbuilt biases against women, and to exhibit results which reflect and reinforce racial stereotypes due to a lack of diversity in training data and models on which these tools are based. Most Gen AI tools used in Australia are based on large language models from the United States. These systems are trained on data that does not reflect Australia's cultural diversity. Users need to be aware that Gen AI outputs may not be suited to the Australian context.

Training should be provided to upskill Australia's scientific workforce, to ensure that researchers can use these tools effectively and responsibly. Data literacy is an in-demand skill that can be built starting at a school level and extending to the tertiary level, with appropriate professional development and training for educators.

### Australia needs guidelines on the acceptable use of AI in research

AI offers opportunities to Australia's scientific workforce, but without guidance on how researchers should use AI tools, there is risk of intentional and unintentional misuse. These risks could lead to fraudulent and manipulated data being published in peer-reviewed journals. There have already been instances of AI-generated papers being published without applying proper and effective guidelines.

One of the criteria used to assess applications for research funding is publications and citation metrics. GenAI could enable proliferation of publications, leading to inflated citation metrics, which could compromise the allocation of research funding. To mitigate these risks and ensure that AI is used responsibly and ethically, there is an urgent need for guidelines on the use of AI for the research sector.

The Australian Government, in partnership with the research sector, should lead the development of clear, evidence-informed guidelines that address the opportunities and manage the risks AI brings to the science sector.

Clear guidance that outlines the acceptable and effective use of AI tools, developed directly with Australian researchers, will minimise risk and ensure that Australian science can benefit from AI without compromising the role of expertise, human judgement and the peer review process.

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