

By email: employmentwhitepaper@treasury.gov.au

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Australian Academy of Science submission on the Employment White Paper

The Australian Academy of Science welcomes the opportunity to comment on the Employment White Paper.

Australia's workforce, and our population, will increasingly need Science, Technology, Engineering and Mathematics (STEM) skills. A person receiving a STEM education doesn't just learn technical skills, they learn about the process of inquiry and discovery, gain skills in analysis, comprehension and problem solving, as well as being given time to be curious about our world and the problems it faces.

STEM education also goes beyond meeting workforce needs. It is about the nature of our country. Australians are faced daily with having to make choices from amongst the options that science can provide them. Having insight into how science works, for example, or what 'probability' means will dampen the influence of the peddlers of misinformation, and lead to a better informed, more rational debate than we usually see.

Strategic investments to secure the STEM skill pipeline, such as those being implemented in peer nations, need to be made urgently to prevent Australia falling behind and facing further skilled worker shortages. The Australian Government should also aspire to create policy settings that allow for an inclusive research system that supports secure career pathways for scientists and attracts home-grown talent to return to Australia.

The Academy recommends the following:

- Actions to improve the performance and teaching of science in primary and secondary education, including reducing the around 40% of secondary maths and 29% science teachers across all sectors (government, independent and Catholic) who are teaching out-of-field in Australian schools
- Redress inequities in undergraduate university funding by revising cluster funding rates for STEM subjects
- Make science a more accessible career and boost participation of under-represented groups by reducing red tape and job insecurity for scientists

[A future-ready STEM-skilled workforce](#)

Developing the relevant skill sets in the workforce depends upon the education system playing a significant role to equip people with the basic skills and enthusiasm to pursue relevant studies.

Realising the Australian Government's ambitions – including the supply of 1.2 million tech workers in Australia by 2030 – requires an increase in the supply of individuals with science, engineering and other technical skills over the next ten years. In other words, when students currently in the school system now enter the workforce.

To build the basis for the required diverse technical skills in the workforce, the Academy asserts that:

1. All students should have access to quality Science, Technology and Mathematics education in all Australian schools.
2. All teachers of Science, Technology and Mathematics need to be adequately prepared for the subjects they need to teach, both in terms of content and pedagogical knowledge.
3. All teachers should have access to fit-for-purpose professional learning and development across the course of their careers.

The [Draft Teacher Workforce Action Plan](#) outlines steps to improve teacher supply. Reducing teacher shortages will reduce 'out-of-field' teaching, but this is not a future problem to mitigate.

The Government should urgently increase investment to support out-of-field teaching in STEM and provide real-time support for teachers to ensure our future workforce who are currently enrolled in Australian schools are receiving a quality STEM education.

Australia needs to increase the quality and resourcing of science, maths, and engineering education from primary school through to university. The 2020 Jobs-Ready legislation package reduced total funding for STEM degrees:

- Funding for science was reduced by 16%
- Funding for engineering as reduced by 16%
- Funding for mathematical sciences was reduced by 17%
- Funding for environmental sciences was reduced by 29%

Other cluster funding changes increased resourcing for non-STEM subjects, creating perverse incentives for universities to enrol students in those disciplines. The [Review of Australia's Higher Education System](#) has identified meeting Australia's skills needs as a key area for the review. Ensuring that cluster funding rates incentivise universities to offer more places in quality STEM courses will assist in meeting Australia's skills needs.

The Academy strongly recommends that the Australian Government revise the cluster funding rates.

Securing the STEM workforce in Australia

Scientists and researchers work in various settings, including in business and as government scientists, academics, technicians, or support staff. Even though there has been an increase in Australia's STEM-qualified labour force, it does not meet demand and difficulties in navigating a challenging research culture and insecure career prospects mean that Australian-trained early and mid-career researchers (EMCRs) seeking career stability are looking at permanent international positions or leaving their science careers entirely.

While science is a global enterprise and an international experience is highly valued, our policy settings are not optimal for attracting Australians home later in their careers. Compounding this has been low grant success rates from the main research funding agencies – the Australian Research Council and the National Health and Medical Research Council.

There are ways to make the granting agencies less bureaucratic through mandating smaller applications, reducing the amount of superfluous information required, introducing expressions of interest stages and experimenting with grant award innovations.

The system has become too unwieldy, and we need a complete review to better focus science on what it is supposed to do – serve the national interest, support knowledge formation, drive productivity and secure national prosperity.

Science is a global business, and there is a global shortage of a STEM-qualified workforce. Australia has built up a heavy reliance on recruiting and developing international scientific talent. Much of the research workforce in universities is made up of international doctoral students. Australian-trained scientists are highly sought after overseas.

While the recently announced extension to 6 years for the 485 post-study work visa for PhD graduates is welcome, pathways remain opaque to ongoing or permanent residency for these highly sought-after and talented scientists. Backlogs for visas and unnecessarily broad screening of visas has created delays for research projects across the country. These delays are impacting the ability to meet milestones for existing funding and are impacting the completion of projects that are needed for publication, grant applications and graduation of research students.

We need to make doctoral study and post-doctoral employment in Australia more accessible to attract international talent and cement clear pathways to keep these skilled workers in the country.

Boosting participation in research and innovation

Science needs to be more diverse, including better reflecting Aboriginal and Torres Strait Island peoples, as well as the diversity of the Australian community. To address the shortages of STEM-skilled workers, including the shortage of researchers and technicians within the science system, we need to confront barriers to participation for culturally and linguistically diverse people, those with disabilities, older Australians and other underrepresented and marginalised groups. Financial, discriminatory and physical barriers exist in many aspects of the STEM training and employment pathway: from study and higher education to job applications, physical access to facilities, grant applications and research publication.

Australia needs more STEM-skilled workers – and every Australian should have the opportunity to pursue a STEM career.

The under-representation of women in STEM is widely recognised. The gender pay gap, calculated as the difference in male and female average weekly earnings in science, is now 25 per cent. Developing opportunities for women in STEM has been a significant policy focus in recent years. To date, policy interventions have largely focused on increasing the supply of women into STEM at early career levels – both research and industry. Many of the most intractable disparities are at the mid and senior career levels, however. Addressing this will require structural reform with attention aimed at specific disciplines and the representation of women at more senior levels of the sciences.

The [Women in STEM Decadal Plan](#) offers a vision and opportunities to identify and implement specific actions that must be taken to build the strongest STEM workforce possible to support Australia's prosperity.

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