

**Australian Academy of Science submission on the
*Pathway to Diversity in STEM Review: draft recommendations***

For the Academy of Science, diversity in STEM refers to cultivating talent and promoting the full inclusion of excellence across the social spectrum. This includes not just people from backgrounds that are traditionally involved in STEM but also those underrepresented, including women and girls, First Nations, people from culturally and linguistically diverse (CALD) backgrounds, people with disabilities, LGBTQIA+ people, neurodiverse people, people facing age-based discrimination and people living in regional, rural and remote areas.

In short STEM-qualified Australians should broadly reflect the make-up of the community from which participants are drawn.

[As previously noted](#), efforts to date have focused on gender, though not necessarily systematically. Our experience is therefore more advanced when it comes to efforts to address the participation of women. To draw on and develop all the potential talent, Australia needs to be more ambitious; to develop a broad, targeted, yet systematic effort to redress disparities in STEM across all diversity groups.

STEM is critical to developing Australian scientific capability and capacity and enabling economic growth. Barriers to participation in the STEM sector rob Australian research of talent, creativity, skills, knowledge, perspective and diminish profitability and research outcomes. Australia should not tolerate barriers that are not based on effort, interest or will but on neglect or, worse, plain prejudice. We must be better than that.

We cannot afford not to develop all possible STEM talent. The Review must make recommendations, in the strongest of terms, for:

- the systematic collection of evidence to deepen our understanding of barriers faced by all under-represented groups
- the evaluation of all initiatives to improve diversity across the whole of STEM.

The draft recommendations should be strengthened by:

- providing a more detailed analysis of the options for the new office for diversity in STEM, including structure, location, membership and functions
- linking funding, including procurement, to Science in Australia Gender Equity (SAGE) accreditation
- further efforts to improve the representation and engagement of diversity groups in school curricula, and the media
- making additional recommendations on practical actions by Decadal Plan for Women in STEM Champions, publication and authorship, data and visualisation, STEM teaching, and establishing targets.

Accelerating change

The latest data from the STEM Equity Monitor shows that Australia is failing to develop and retain the STEM talent needed to drive the growing number of industries that rely on a strong STEM workforce. If this is allowed to continue, we will lose out to nations that do make the effort, and we will lose the skills that are critical to meet the challenges we face, boost economic productivity and wellbeing, and remain internationally competitive.

Women are still only 20% of people with STEM qualifications, and girls are half as likely as boys to aspire to a career in STEM. Only 0.5% of First Nations people hold university-level STEM qualifications. Intentions are good, but progress is slow. Much of the data held relates to gender diversity. Meanwhile, we still hold relatively little data on other under-represented groups in STEM.

To bring faster and more effective change, there is a need for greater clarity on what works – and what does not.

Are the draft recommendations the right way to achieve the objectives?

The Academy commends the approach taken by the review panel and the focus on leadership and governance, culture, community attitudes and values, life-long learning, and creating diverse and inclusive workplaces. These pillars directly align with and reinforce the 6 opportunities presented in the [Decadal Plan for Women in STEM](#), which offers pathways to achieve gender equity in STEM by 2030.

The Academy thanks the review panel for acknowledging the benefits and impacts of measures that are a direct response to the recommendations in the Women in STEM Decadal Plan, including:

- the establishment of the [STEM Equity Monitor](#)
- [National Evaluation Guide for STEM equity programs](#) developed by the Women in STEM Ambassador
- [the STEM Equity Evaluation Portal](#) developed by the Women in STEM Ambassador
- the [Implementation guide for workplace gender equity](#) developed by the Women in STEM Ambassador
- the Australian Academy of Technology and Engineering (ATSE)'s [Diversity & Inclusion Toolkit for small and medium enterprises](#) (SMEs).

It is disappointing that the Australian Government-commissioned 10-year direction offered by the [Women in STEM Decadal Plan](#) and its quantifiable impact was not cited in the draft report, particularly as the Decadal Plan remains a source of guidance to STEM stakeholders on how to achieve gender equity, at least until 2030 or until a new strategy is published.

In the spirit of building on success, **the Review Panel should consider providing their assessment of the impact to date of the Decadal Plan**, particularly as we approach its midway point, acknowledging that it focuses on gender equity, not all diversity dimensions, and **to offer recommendations on how to accelerate action across the system so that gender equity is achieved by 2030.**

It is the intention of the Academy formally to evaluate the Women in STEM Decadal Plan in 2024, just as the Academy evaluates all other Decadal Plans we develop as a matter of good practice.

How can the draft recommendations be improved to drive systemic change?

Strengthen the recommendations focusing on governance

Recommendation 1a of the Review proposes a central office and independent council to maintain accountability, oversight, and momentum of diversity in STEM initiatives. The Academy supports this proposal as it builds on the strong foundations and system changes enabled by the Women in STEM Ambassador and her office.

This recommendation would be strengthened with a detailed analysis of the options for this office, including consideration of the benefits and limitations associated with the office's location and governance arrangements and how it engages with other diversity initiatives across government. For example, locating the office in the Department of Prime Minister and Cabinet and potentially extending the remit of the Office for Women to encompass STEM across all diversity dimensions would enable cross-departmental policy coordination, a stated aim of the office.

Membership of the council should be given detailed consideration. While the proposed council should have diverse representation and people with lived experience, the ability of the council to effect change will also require members who are key leaders and influencers in STEM and in government.

Measure the success of initiatives to promote diversity in STEM, bringing together data and establishing new datasets

The Academy recommends empowering the office with data collection and analysis capability. This capacity will allow the office to collect and analyse data on diversity in STEM, collaborate with data custodians and develop new data sets. It will allow the office to develop evidence-based monitoring and accountability frameworks.

Furthermore, research into understanding the barriers faced by underrepresented groups and intersectionality must be within the remit of the office. This will enhance the government's ability to recognise and address

complex, intersectional barriers to diversity at an individual, organisational and system level. It will allow the office to conduct research to inform policy decisions.

The office should also be careful to work with and avoid duplication of effort of existing agencies and organisations, such as the Workplace Gender Equality Agency (WGEA), the Office for Women, and Indigenous STEM organisations.

Careful and thoughtful design will ensure the proposed office and independent council are effective and accountable. This will facilitate the delivery of the Review's objectives and maximise opportunities for success.

[Leverage the government balance sheet and purchasing power](#)

The Academy strongly encourages the inclusion of recommendations that seek to expand Science in Australia Gender Equity (SAGE) across STEM, including tying SAGE accreditation to appropriate funding programs, such as the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) research grants. The program could potentially be expanded to the vocational education and training (VET) sector to expand its impact.

SAGE is one of the few national programs that achieves long-term systemic and cultural change through evaluation.

In order to improve diversity in STEM fields on a large scale and in a timely manner, government funding and procurement can be used as powerful tools for incentivising transformative and systemic improvements. Tools such as the National Evaluation Guide for STEM Gender Equity Programs could be expanded across other diversity measures and used to monitor the impact of diversity programs. **The Academy recommends that an evaluation requirement be embedded into funding sources for diversity initiatives, such as Commonwealth grant schemes and industry grants.**

[Representation, engagement and visibility](#)

Role models are important. Students benefit from seeing people they relate to in positions of influence: 'I can do it, too.'

STEM students from some diverse backgrounds struggle to develop connections and identities connected with science.

The proposed advertising campaign (Recommendation 4a) must go beyond a marketing initiative and be evidence-based, sustained and targeted. It should address key points in the STEM pipeline and key influencers of people's study and career choices and operate on a decadal-scale timeline to generate real impact.

As identified in the Women in STEM Decadal Plan, efforts must be made to engage STEM professionals from diverse backgrounds in outreach and media activities (recommendation 4b). For example, the Decadal Plan reports that time constraints hinder journalists from finding new media talent, compromising diversity in the media and that organisations have difficulty in identifying diverse board directors.

The [STEM Women platform](#), developed by the Academy, was a direct response to these challenges. The online searchable platform makes visible and discoverable the plethora of talented women in STEM across Australia, many identifying with more than one form of diversity. The initiative was [formally evaluated](#). In the first year, there were 43,191 users. A survey of users showed that 75% of respondents successfully connected with a woman in STEM after finding out about them on STEM Women.

Based on its success, [STEM Women Asia](#) was developed, and in November 2022, the [STEM Women Global Network](#) was launched, making discoverable women in STEM anywhere in the world. The global expansion of STEM Women was made possible because this effective tool was recognised and supported by the InterAcademy Partnership, a network of learned academies across the globe. When further resources are available, the Academy will consolidate the Australian, Asian and global platforms.

[Data-driven improvement](#)

The review panel has sought data-driven case studies that show real impact. The Academy offers three:

1. **The Academy recommends the review panel consult myriad practical and effective examples of actions taken by the [Decadal Plan for Women in STEM Champions](#).** These champions – across industry, the higher education sector and the community sector - have aligned their equity initiatives

to the 6 opportunities in the Decadal Plan for Women in STEM and documented the impact they have had. Their actions are practical and may offer guidance to others.

2. For better or worse, the track record of researchers in Australia and therefore their ability to attain research funding, is primarily determined through peer-reviewed publication. Publication authorship can often be determined subjectively, leaving it vulnerable to unfair representation of researcher contribution.

The Academy recommends an authorship methodology developed by Professor Christine Beveridge FAA that creates an objective system for the assignment of authorship order.

This means that age, personality, experience, bias and other factors do not drive authorship order. Importantly, junior researchers and those from under-represented groups, who may not be as visible and vocal, are not disadvantaged in this process. A publication outlining this methodology is provided at Attachment 1. If published in the final review report, the Academy requests that this methodology be attributed to [Professor Christine Beveridge](#) FAA and further information [can be requested of her](#).

3. Tools like the [STEM Equity Monitor](#) provide valuable data to inform decision-making. **The Academy recommends that STEM Equity Monitor and similar tools be expanded to give the nation a comprehensive picture of diversity in STEM in Australia and track progress.**

Progress cannot be made without accountability. **To enhance accountability and ensure measurable progress, the Academy recommends tangible objectives and targets to be included within each recommendation in the Review's final report.**

The Academy welcomes further engagement with the review panel to discuss any of the issues raised in this submission.

To discuss or clarify any aspect of this submission, please contact Anna-Maria Arabia, Chief Executive at Annamaria.arabia@science.org.au