

SCIENCE & TECHNOLOGY AUSTRALIA

2024–25 PRE-BUDGET SUBMISSION

25 JANUARY 2024

Science & Technology Australia thanks the Treasury for the opportunity to offer input on priorities for the 2024–25 Federal Budget.

Science & Technology Australia is the peak body for the nation's science and technology sectors, representing 139 member organisations and more than 115,000 scientists and technologists. We connect science and technology with governments, business and the community to advance science's role in solving some of humanity's greatest challenges.

FUTURE PROOF AUSTRALIA'S ECONOMY THROUGH SCIENCE AND TECHNOLOGY

This Budget will mark the halfway point of the 2020s. This has been a decade marked by uncertainty and crisis, as the world navigated a global pandemic and an increasingly fraught geopolitical environment. Economic pressures are biting at both a national and individual level and the impact of climate change is increasingly hitting home.

As Treasurer [Jim Chalmers noted just days ago](#) 'We can't be complacent about the conditions we confront now. Our job in Australia is to make this not a lost decade, but a defining decade, to modernise our economy and maximise our advantages.'

At a time of acute cost-of-living challenges, Australians also need to think about bushfire-proofing or flood-proofing our homes and livelihoods, how to keep our cities liveable over the coming decades and how to meet our essential energy needs while decarbonising the economy. We need to keep our data safe from cyber-attacks and threats. We need to navigate – and keep our children safe – in an increasingly complex digital environment, replete with mis- and dis-information. We must meet the health and wellbeing needs of a growing – and aging – population. And in a context of increasing geopolitical complexity and national security concerns, we must also boost Australian industry and build sovereign capability in advanced technologies and advanced manufacturing. Each of these complex challenges can only be solved if we have world-leading research breakthroughs that guide our nation's policy choices and diversify our economy, and a vibrant research and innovation sector to generate new solutions.

To steer us safely through the coming decades, the Australian Government must urgently build a strong economy and society and that is resilient to these challenges. It must start that work in this Federal Budget – by launching a bold escalation of investments in Australia's research and development (R&D).

Ours is an era of unprecedented rapid advances in scientific discovery and technological progress. Game-changing technologies are already right in our midst, and we must capitalise on the opportunities they create. If we don't, our economic competitors will cut our lunch. These advances will grow Australia's economy and guide the nation through the coming challenges.

To safeguard our standard of living, Australia must boost productivity. An essential driver of productivity is innovation. Without innovation to power new industries, products and jobs,

Australia will lose its prosperity and competitiveness in an ever-more competitive global race for jobs and investment. We won't be able to diversify our economy or move up the value chain. Australia will be less resilient to global economic currents – and simply less prosperous – than it should be. That means fewer Australian jobs – and lower wages.

Innovation is powered by research and development (R&D). If we don't dramatically start to escalate our national R&D investment, Australia's economy will be smaller, and we'll have less capacity to grow Australian industry, a less healthy population, fewer new technologies to respond to climate change, bushfires, floods and droughts, fewer clean energy advances and less opportunity to capitalise on technological breakthroughs.

Australia's current research and development investment is just [1.68% of GDP](#). We're R&D laggards compared to [global leaders](#) – Israel (5.56%), South Korea (4.93%) and the US (3.46%) – and the OECD average of 2.72%.

Deeper investment in R&D will generate the innovation we urgently need to diversify our economy. In 2021, [more than half our exports](#) were iron ore and concentrates, coal and petroleum gases. This leaves us exposed to fluctuations in global commodity prices and in a much more vulnerable position than other rich nations.

[The Atlas of Economic Complexity](#) from Harvard University, ranks Australia 93rd of 133 countries, and we're going backwards: we've fallen 12 places in the past 10 years. We are now just behind Uganda – even though our GDP per capita is [68 times bigger than Uganda's](#).

The Atlas shows countries whose exports are more complex have stronger economic growth. And it sounds warning alarm for Australia – which '[has not yet started the traditional process of structural transformation](#)' to develop higher value industries and diversified exports.

Our urgent task is to build a stronger, more resilient Australia. Just as science shielded the Australian economy during the COVID pandemic, it is crucial to shepherd us through our biggest challenges today and tomorrow. Research and development spurs productivity and economic growth. It will equip the nation – and its decision-makers – to navigate the challenges of the coming decades.

We cannot await the next global crisis and hope that science can save us again if we don't double down on our investments in it. We must be proactive to future-proof our nation. We must invest urgently to boost our R&D heft to safeguard Australia's outlook.

Science and technology are central to our daily lives – and crucial to future-proofing our economy and navigating the challenges of the future.

We would be delighted to discuss these matters with you further. Please do not hesitate to be in contact if we can assist with any additional information.

Professor Sharath Sriram
President
Science & Technology Australia

Misha Schubert
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SCIENCE & TECHNOLOGY AUSTRALIA RECOMMENDATIONS

1. The Government should deliver its promise to boost Australia's R&D investment to 3% of GDP by 2035, adopt an interim target of 2.4% by 2030. The Government should set out an investment plan to achieve this goal, guided by a swift review of the R&D system. This must start with a major R&D investment uplift in this Budget.
2. The Government should establish a bold new Science and Technology Future Fund to generate a stronger pipeline of bold new science and technology breakthroughs to future-proof our economy and strengthen national resilience.
3. Boost funding in the ARC and NHMRC annual research grant budgets to generate more bold breakthroughs, keep pace with global competitors, and propel research translation and commercialisation. Funding boosts could be structured as targeted Fellowships to support diversity or encourage Australian researchers to return from overseas.
4. The Australian Government should boost R&D investment by lifting Research Block Grants to universities. An uplift to the Research Support Program could be tied to reforms to tackle chronic job insecurity in research careers with a requirement to hire on longer employment contracts tied to grant lengths. An uplift to the Research Training Program would enable a much-needed lift to the minimum PhD stipend.
5. The Australian Government should safeguard funding for university research commercialisation – and deepen that investment over time.
6. Create Australia's first generation of scientist-entrepreneurs at scale by funding Science & Technology Australia's Bench-to-Boardroom program.
7. Renew a ten-year investment commitment to Australia's large-scale research infrastructure in NCRIS and lift base funding for each NCRIS facility to combine support for operational and capital expenditure.
8. Develop a dedicated research infrastructure workforce plan to secure the highly specialised talent essential to maintaining Australia's research infrastructure.
9. Ensure efficient administration processes for NCRIS funding to deliver the certainty NCRIS facilities need for planning and workforce retention. Funding agreements should be renewed at least two years from the end of their funding contracts.
10. The Government should emphasise the importance of the newly refreshed National Science and Research Priorities through dedicated new funding streams to support research under each of the priorities.
11. Deliver a stronger return on Australia's R&D investment through enhanced coordination of Government funding schemes across the R&D system. Increased visibility and connection across schemes could be achieved through:
 - joint Board appointments
 - shared grant administration processes
 - targeted reporting requirements
 - targeted sequential grant rounds aimed to progress successful projects through the pipeline/across schemes.



12. To enable Australia’s researchers to devote their time to what they do best – world-class research in the nation’s interest – R&D grant programs should be designed and administered with maximum efficiency to deliver certainty of timelines and minimise administrative burden on researchers.
13. To support broader diversity across the STEM sector, the Australian Government should:
 - establish a new Diversity in STEM Council
 - model the impact of a Workforce Diversity Tax Incentive to drive systemic shifts in workplace practices and cultures so diverse talent can pursue and thrive in STEM careers
 - broaden the Workplace Gender Equality Agency's remit to collect data from employers on broader workforce diversity
 - publish a national strategy that articulates the urgent imperative and rationale to strengthen diversity in STEM and set out a plan – with targets – to deepen diversity, equity and inclusion in STEM.
14. The Australian Government should double investment in the successful Superstars of STEM program to scale its media outreach, and generate more stories in the Australian media featuring diverse STEM experts.
15. The Australian Government should provide ongoing funding for the National Indigenous STEM Professionals Network to support Aboriginal and Torres Strait Islander people’s participation in STEM.
16. The Australian Government should support Aboriginal and Torres Strait Islander people to access and succeed in university research through:
 - requiring universities to develop relationships with Indigenous communities to develop programs in Indigenous-led, community-driven research where the benefits of the research flow back to community
 - creating dedicated ARC and NHMRC funding streams to forge meaningful relationships with First Nations communities, promote Indigenous-led and community-driven research, protect Indigenous intellectual property and develop potential business/employment opportunities on Country to strengthen Country
 - creating STEM careers that support the values of First Nations Communities and work towards a sustainable future for all Australians.
17. Australia’s migration intake planning should acknowledge the critical contributions of Australia’s migrant STEM workforce, particularly in the context of current and future gaps in Australia’s STEM workforce.
18. The Australian Government should support programs that have a proven track record in supporting migrants and people from diverse backgrounds gain work experience and employment in the Australian STEM industry.
19. Elevate and invest in Indigenous knowledge, including Aboriginal and Torres Strait Islander peoples’ perspectives on science, technology and innovation. This should be reflected as a dedicated priority in Australia’s refreshed National Science and Research Priorities – and embraced across all areas of Government policy.
20. The Australian Government hasten the transition to a net-zero economy through strategic planning and that includes deep investment in clean energy technologies R&D.



- 21. The Australian Government should implement a targeted boost to climate science research. This would help build the understanding of our climate systems needed to build resilience to ongoing climate change and safeguard our future.**
- 22. To capitalise on early Australian leadership in quantum tech and AI, and avoid the sovereign risk in being reliant on other countries for these and other critical emerging technologies, the Australian Government should deepen investment in critical emerging technologies, including quantum and AI.**
- 23. To maximise the economic benefits of Australian R&D breakthroughs, the Australian Government should support development of sovereign advanced manufacturing capability.**
- 24. To ensure the long-term health and wellbeing of all Australians, the Australian Government should deepen investment in medical research and innovation across the spectrum of discovery medical research through to translation and clinical trial stages.**



2024–25 SCIENCE AND TECHNOLOGY BUDGET PRIORITIES

SET A PATH TOWARDS 3% OF GDP INVESTMENT IN R&D

To ensure our nation's success we must capitalise on a vision to make Australia a STEM superpower. The first step is to increase investment in research and development (R&D). The Australian Government made a commitment to increase R&D investment sector to 3% of GDP. This is warmly welcomed as Australia should be ambitious about lifting our R&D investment. The Government must now set a plan to reach this goal, drawing in the combined efforts of the different parts of the R&D sector.

Recent data indicates that Australia's current overall R&D spend is just [1.68% of our GDP](#). This is not only [significantly lower than our international competitors](#) including the US, Japan, Germany and Korea, but shows we are going backwards – our 2019–20 investment was 1.8% of GDP.

Government investment in R&D as a percentage of GDP is at its lowest level in four decades – and sits at [just 0.49%](#). While Government cannot reach a target of 3% of GDP alone, it must lead the way and incentivise greater investment from the business sector.

R&D investment is an effective investment in our future, with significant long-term benefits:

- Every \$1 invested in Australian research under the ARC National Competitive Grants Program from 2001–2021 [returned \\$3.32 in economic gains](#). This includes a \$184.3 billion increase in economic output, a \$152.5 billion increase in real income for Australians and 6570 FTE jobs per year.
- [CSIRO research](#) found every \$1 Australia invests in R&D generates \$3.50 for the economy, with a 10% annual return on investment from R&D.
- [Deloitte modelling](#) conducted for Universities Australia finds each \$1 invested in university research grew Australia's GDP by \$5 over the past 30 years – and estimates a 1% permanent increase in investment in university research and development can generate an annual \$2.4 billion increase in GDP.

Australian business agrees. The Business Council of Australia's [Seize the Moment](#) report says '9 in 10 Australians agree that spending on research and development is vital to give us a competitive edge'. The BCA advocates an injection of funding into the ARC to "increase resources for **basic research**" along with continued funding for university–industry collaboration.

With the right planning, consultation and coordination, the Government can deliver on its promise to jump start a new era of sound, future-proofing investment into the R&D sector.

Science & Technology Australia Recommendation:

1. **The Government should deliver its promise to boost Australia's R&D investment to 3% of GDP by 2035, adopt an interim target of 2.4% by 2030. The Government should set out an investment plan to achieve this goal, guided by a swift review of the R&D system. This must start with a major R&D investment uplift in this Budget.**

Science & Technology Australia proposes an array of options to boost Australia's R&D effort.

Establish a Science and Technology Future Fund

Just as the Medical Research Future Fund (MRFF) has been a game-changer for Australian medical research, a new Science and Technology Future Fund would supercharge Australian R&D in every other critical field of science and technology.



With cumulative investment each year towards a bold capitalisation target, a Science and Technology Future Fund's investment earnings would then be used to invest in, and boost, research in priority areas identified in Australia's newly refreshed National Science and Research Priorities. These soon-to-be-announced priorities are the result of an extensive consultation process that has distilled the most urgent and complex challenges the nation needs to solve. The Science and Technology Future Fund would serve the needs and wellbeing of all Australians. It should be subject to strong and transparent governance arrangements and overseen by its own board.

A Science & Technology Future Fund would be transformative for Australia's ability to generate more bold breakthroughs to drive Australian economic growth and wellbeing.

Investing at the earliest stages of innovation and with an express mission to make bold new discoveries, it would unleash a new era of major science breakthroughs to feed into our nation's commercialisation schemes – Australia's Economic Accelerator, the Industry Growth Fund, Clean Energy Finance Corporation and the National Reconstruction Fund. The National Reconstruction Fund's role is to fix broken supply chains and strengthen advanced manufacturing, modernise our economy, and support future Australian industries and jobs. But to achieve those goals, it needs a wider pipeline of new discoveries that will feed into it. The Australian Research Council and the National Health and Medical Research Council - the existing agencies that fund discovery research – are limited in their budget scale and hugely oversubscribed. Within its current budget, the ARC can only fund 1 in 5 of the excellent research submitted. This is a vast lost opportunity for Australia.

The Australian Government created the MRFF in 2015 and [built a \\$20 billion dollar pool of capital by 2020](#). The Future Fund Board oversees the fund's investments, with a mandate to produce an [average return of at least 1.5–2% a year](#), over a rolling 10-year period.

Even while the capital pool was being built, the MRFF disbursed funding from 2017 onwards. When it reached its \$20 billion investment goal in 2020, the MRFF disbursed [nearly \\$600 million in funding](#) for critical medical research initiatives. It can now disburse up to \$650 million in funding a year – nearly doubling the Government's total funding for medical research in Australia.

Establishing a similar scheme based on this prudent and proven model to support breakthrough research in science would be a gamechanger for our country. It would strengthen Australia's long-term sustainability – and boost science funding immediately – to reverse a four-decade low point in Government investment in R&D relative to the size of our economy.

Science & Technology Australia Recommendation:

- 2. The Government should establish a bold new Science and Technology Future Fund to generate a stronger pipeline of bold new science and technology breakthroughs to future-proof our economy and strengthen national resilience.**

Invest in discovery research – boost the ARC and NHMRC funding budgets

As part of the promise for greater funding investment into R&D, there should be a significant boost to funding for discovery research through the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC). Boosting support for discovery research would enable our best and brightest minds to develop new innovation to fuel the innovation pipeline as they are translated into new products, jobs and to fuel our economy.

Boosting Australia's discovery research effort is critical in this era of increasing global competition and geopolitical complexity, as rising superpowers – and competitors – are investing at scale in their pipelines of breakthroughs to seize economic opportunities first and lock up revenue streams, jobs and proprietary technologies.



To simultaneously support the Australian research workforce and deepen investment in the nation's discovery research capability, ARC and NHMRC funding boosts could be structured as targeted Fellowships to support diversity and encourage Australian researchers to return from overseas.

Science & Technology Australia Recommendation:

- 3. Boost funding in the ARC and NHMRC annual research grant budgets to generate more bold breakthroughs, keep pace with global competitors, and propel research translation and commercialisation. Funding boosts could be structured as targeted Fellowships to support diversity or encourage Australian researchers to return from overseas.**

Invest in university research – University Research Block Grants

University Research Block Grants – the Research Support Program (RSP) and Research Training Program (RTP) – are critical in enabling universities to maintain a world-class research capability. Research income gained through competitive grant schemes does not cover the full cost of research – in most cases, there are specific costs (e.g. essential capital, equipment and staffing costs) that competitive grants explicitly do not cover. As such, universities must make up the shortfall through other sources, including research block grants. Universities are responsible for a big share of Australia's research – and do by far the bulk of the heavy lifting for crucial discovery research. Increasing Research Block Grants would be an effective boost to universities' capability to maintain their research effort.

This could be done through a boost to the RSP, which is intended to cover the indirect costs of research projects. A bold boost to the RSP could be linked to new incentives to secure Australia's research talent, such as offering longer-term (5–7 year) contracts to project staff.

The RTP supports Australia's PhD students. A boost to this program could fund an increase in the minimum PhD stipend. This would tackle the urgent cost-of-living challenges of Australia's PhD scholars and help to secure the future of Australia's research workforce.

Science & Technology Australia Recommendation:

- 4. The Australian Government should boost R&D investment by lifting Research Block Grants to universities. An uplift to the Research Support Program could be tied to reforms to tackle chronic job insecurity in research careers with a requirement to hire on longer employment contracts tied to grant lengths. An uplift to the Research Training Program would enable a much-needed lift to the minimum PhD stipend.**

Research commercialisation

Protect current investments in research commercialisation

Investments must be made across the full lifecycle of research from discovery research to research translation. The Cooperative Research Centres (CRC) Program has been hugely successful in nurturing university-industry collaboration for more than three decades. Independent evaluations have confirmed the CRC program is a stellar Australian success story – it is pivotal in Australia's R&D system. A strong commitment to consistency in policy, funding cycles and the rules of this scheme is crucial to retain industry confidence to participate.

It is a powerful example of how policy and funding certainty over decades delivers strong returns on government investments. The CRC Program supports work over medium- to long-term timeframes of up to 10 years. The Cooperative Research Centres Projects (CRC-P) Program has run since 2016 and supports industry-led collaborations over timeframes of up to 3 years. This program has



delivered strong returns and should be maintained with the certainty and sustained investment that has led to the broader CRC Program's success. **Strong commitments to adhere to a fixed timetable for CRC-P grants rounds, and efficient decision-making with timely notifications, are crucial.**

The Australian Economic Accelerator (AEA) program – implemented with strong bipartisan support in 2022 – funds a crucial stage in the pipeline: turning world-leading research into new products, jobs and services for Australia.

The \$46.2 million cut to the Australia's Economic Accelerator funding announced in the [Mid-Year Fiscal and Economic Outlook](#) is a step in completely the wrong direction. This cut to a new and high profile funding program undermines the sector's confidence and chips away at the funding available to support our nation's R&D – at a time when we need to be investing more, not less. Eroding funding for research commercialisation also damages industry confidence and jeopardises potentially lucrative research commercialisation partnerships and opportunities – opportunities that fuel Australia's economic productivity.

Science & Technology Australia Recommendation:

- 5. The Australian Government should safeguard funding for university research commercialisation – and deepen that investment over time.**

Bench to Boardroom Program

Alongside the investment needed to deliver on research commercialisation, there needs to be greater end-to-end investment in the research workforce to facilitate translation from discovery to high-impact products and services. We need to train a generation of scientist-entrepreneurs to help them navigate the very different landscapes of research, industry and government as they progress their ideas from the laboratory bench to the boardroom. These talented individuals would then become the Chief Technology/Scientific/Medical Officers of future Australian companies – companies that would ideally placed for impact in the economy, [given founder-led companies have a greater chance of success.](#)

Science & Technology Australia's 'Bench-to-Boardroom' program will leverage STA member and industry expertise to deliver a bespoke commercialisation training program that will upskill the next generation of scientist entrepreneurs.

Science & Technology Australia Recommendation:

- 6. Create Australia's first generation of scientist-entrepreneurs at scale by funding Science & Technology Australia's Bench-to-Boardroom program.**

Research infrastructure

Without solid research infrastructure, research will stall – it is essential for both discovery research breakthroughs and advancing science commercialisation. Australia's National Collaborative Research Infrastructure Strategy (NCRIS) supports [26 facilities and projects](#) across the country that are essential to Australia's research effort.

NCRIS is a success story with many examples of high quality, world-leading research taking place across the entire research sector. NCRIS [delivers \\$7.50 for every dollar of spending](#) – investment in Australia's research capability returns strong dividends for the nation. Yet, the scheme desperately needs funding security and certainty.



Science & Technology Australia recommendation:

- 7. Renew a ten-year investment commitment to Australia’s large-scale research infrastructure in NCRIS and lift base funding for each NCRIS facility to combine support for operational and capital expenditure.**

Equally important as investment into research infrastructure is investing in the highly specialised workforce needed to run these high-tech facilities. Australia must urgently develop a dedicated research infrastructure workforce plan to retain our highly specialised research infrastructure workforce – or risk losing crucial talent to our competitors overseas.

Science & Technology Australia recommendation:

- 8. Develop a dedicated research infrastructure workforce plan to secure the highly specialised talent essential to maintaining Australia’s research infrastructure.**

Shortcomings in the existing administrative processes are causing unnecessary delays that jeopardise NCRIS projects’ and facilities’ certainty – and their capacity to support Australia’s research success. The current 5-year roadmaps for national research infrastructure set out the NCRIS strategic direction. These are complemented by investment plans released every two to three years, which in turn are enacted through the NCRIS guidelines.

Lags in developing investment plans and guidelines inflict delays in delivering the high-level funding commitments critical to ensure each NCRIS facility’s future. Without stronger funding certainty, facilities cannot secure staff nor commit to essential equipment upgrades.

Planning and administration of NCRIS funding rounds should be streamlined to be more responsive to project needs. This will better support long-term certainty for ongoing operational funding, upgrades and procurement and help secure the highly specialised staff our national research infrastructure requires.

Science & Technology Australia Recommendation:

- 9. Ensure efficient administration processes for NCRIS funding to deliver the certainty NCRIS facilities need for planning and workforce retention. Funding agreements should be renewed at least two years from the end of their funding contracts.**

Dedicated funding for the refreshed National Science and Research Priorities

Research funding should effectively support – but not rigidly tied to in its entirety – other Government strategies and initiatives. The most significant of these will be the refreshed National Science and Research Priorities. The broad consultation, led by Australia’s Chief Scientist delivered a crystallisation of the most important science and research issues not just for the research sector, but for the nation.

The importance of these refreshed priorities should be reflected across the Government’s other policy settings – including dedicated streams of **new** funding to support work towards these areas of national importance.

Science & Technology Australia Recommendation:

- 10. The Government should emphasise the importance of the newly refreshed National Science and Research Priorities through dedicated new funding streams to support research under each of the priorities.**



A Parliament more engaged with and informed by science

Given the critical need to spur economic growth through R&D and innovation in the decades to come, it is crucial that the Australian Parliament, its members and staff be informed by evidence and expert advice. Navigating the complexities of emerging technologies can only be done by a Parliament informed by science and backed by a strong STEM R&D sector.

Science & Technology Australia's annual flagship event, Science Meets Parliament, brings Australia's STEM sector and Parliamentarians together to build the relationships and understandings essential to effective policy development and decision making.

For more than two decades, Science Meets Parliament has been bringing Australia's best STEM talent to showcase their work to Parliamentarians and train them in the skills and knowledge needed to engage effectively with policymakers.

The Australian Government has been a strong supporter of this event throughout this time with the Department of Industry Science and Resources as the foundation sponsor.

Science Meets Parliament is essential. It has led to well-informed policy change to the benefit of the Australian STEM sector – spanning both research and industry – supported the growth of Australia's STEM leadership and facilitated the funding and support for important areas of research.

Science & Technology Australia deeply appreciates the Government's four-year funding commitment announced in the 2023–24 Federal Budget to Science Meets Parliament.

STRENGTHEN AUSTRALIA'S R&D SECTOR

There are also several budget-neutral measures that could significantly strengthen Australia's university research and broader R&D sectors.

Stronger coordination of Australia's research architecture

Australia's research funding system is complex and piecemeal. Stronger coordination across all government research initiatives and schemes – from discovery research, through to application, translation (including scaling and manufacturing) through to commercialisation and registration – would maximise the effectiveness of Australia's R&D effort.

The Government administers several funding schemes that support research in Australia, primarily across the federal portfolios of Education, Industry, Science and Resources and Health. These schemes are administered through several different agencies and departments:

- The Australian Research Council (Discovery Program; Linkage Program; ARC Industry Fellowships)
- The National Health and Medical Research Council (Ideas Grants; Development Grants)
- The Department of Education (Australia's Economic Accelerator; National Collaborative Research Infrastructure Strategy)
- The Department of Industry, Science and Resources (Industry Growth Program; CRC Program; CRC-P Program)
- CSIRO (CSIRO Future Science Platforms; CSIRO Missions)
- The Department of Health (MRFF; clinical trials)

This range of schemes provides support across the entire research pipeline from discovery through to translation and commercialisation. However, there is a high level of disconnect between these various programs that means research impact is not maximised. Despite efforts to develop a more cohesive



approach, administration of these schemes remains largely siloed within the different government departments and agencies. There is currently no streamlined pathway for successful ideas and projects to progress through the various stages in an efficient way.

Improved coordination and connection between these schemes would be a budget-neutral way to deliver a better return on government R&D investment, as well as improved translation, commercialisation and impact. This could be done through joint Board appointments, targeted reporting or shared grant administration processes, and/or targeted sequential grant rounds to transition research across the various schemes.

Science & Technology Australia Recommendation:

11. Deliver a stronger return on Australia’s R&D investment through enhanced coordination of Government funding schemes across the R&D system. Increased visibility and connection across schemes could be achieved through:

- joint Board appointments
- shared grant administration processes
- targeted reporting requirements
- targeted sequential grant rounds aimed to progress successful projects through the pipeline/across schemes.

Security for Australia’s research workforce

Australia’s research workforce needs stability and certainty to do their critical work for the nation. Funding conditions should be added to competitive grants requiring that people employed under those grants have contracts for the full length of the grant, or a minimum of three years.

Funding boosts to the ARC, NHMRC and research block grants should also be tied to offering onger fellowships or research contracts.

Stronger security for Australia’s PhD students could also be delivered through mandating an increase to the minimum stipend amount, though an increase in RTP funding (see above).

Science & Technology Australia notes the work the ARC has already done to lift efficiency in grant processes and reduce delays in notifications for researchers awaiting grant outcomes. This includes introducing a [2-step Expression of Interest process](#) for the Discovery Program in 2025, with the goal to reduce the amount of time researchers spend on grants that may ultimately be unsuccessful. Introducing a streamlined EOI process as the first stage of the grant process will see only applicants with a high chance of success being asked to submit a full grant proposal – collectively saving the sector hours and hours of time that is much better spent doing research.

Science & Technology Australia Recommendation:

12. To enable Australia’s researchers to devote their time to what they do best – world-class research in the nation’s interest – R&D grant programs should be designed and administered with maximum efficiency to deliver certainty of timelines and minimise administrative burden on researchers.

Improve diversity across Australia’s R&D sector

Australia’s science and technology sector and our R&D effort more broadly can only benefit from a wider diversity of ideas, experiences and perspectives. Science & Technology Australia notes the



good progress that has been made to improve gender equity across the sector – but there is still much more to do.

Advancing equity and inclusion will not only nurture our existing STEM workforce, but help meet skills shortages and recruitment gaps, and grow the talent pipeline. As the sector awaits the final report from the Pathways to Diversity in STEM review, there are several investments that could help the government speed up progress towards improved diversity across the sector. These are comprehensively explored in [Science & Technology Australia's response to the Panel's draft recommendations](#), with critical recommendations listed below.

Science & Technology Australia Recommendation:

13. To support broader diversity across the STEM sector, the Australian Government should:

- **establish a new Diversity in STEM Council**
- **model the impact of a Workforce Diversity Tax Incentive to drive systemic shifts in workplace practices and cultures so diverse talent can pursue and thrive in STEM careers**
- **broaden the Workplace Gender Equality Agency's remit to collect data from employers on broader workforce diversity**
- **publish a national strategy that articulates the urgent imperative and rationale to strengthen diversity in STEM and set out a plan – with targets – to deepen diversity, equity and inclusion in STEM.**

Constant progress towards gender equity

Science & Technology Australia's Superstars of STEM is a foundation stone in Australia's efforts to improve STEM workforce diversity. The program supports gender equity in the sector by providing opportunities for women and non-binary scientists to learn advanced communication skills and to influence and inspire the next generation of STEM scientists through the media and in schools.

Since 2017, Superstars of STEM has created 210 diverse, visible, powerful role models of women and non-binary leaders in STEM who appear regularly in the Australian media, on stage and on screen. It has generated more than 7,000 media appearances by diverse role models in STEM, reached a global audience of 83 million and social media audiences of 5.2 million, and demystified STEM careers for more than 67,000 Australian kids at 487 schools. The program has vast reach across Australia, showcasing women and non-binary role models with successful STEM careers to school children, their parents, teachers and other influencers of career choices.

Science & Technology Australia Recommendation:

- 14. The Australian Government should double investment in the successful Superstars of STEM program to scale its media outreach, and generate more stories in the Australian media featuring diverse STEM experts.**

Supporting Aboriginal and Torres Strait Islander researchers in STEM

Diversity in the Australian STEM workforce extends beyond gender equity. There is deep STEM expertise in the Aboriginal and Torres Strait Islander knowledge systems and thousands of generations of observation of this continent. Australia hasn't yet accepted let alone drawn on this expertise deeply, particularly in our national and state policy approaches and methodologies in fire, land, water, mathematics, astronomy, and ecology. This is Australia's loss.

Despite this expertise, Aboriginal and Torres Strait Islander people remain seriously under-represented in formal STEM study and STEM professional careers. [Only 1 in every 200 Indigenous Australians has a STEM qualification – compared to 1 in 20 non-Indigenous Australians](#). They are not encouraged nor supported to full extent to undertake and thrive in STEM fields, this is evident in the



national science policy statements and priorities, institutions and academies. As a nation, we would benefit strongly from deepening Indigenous participation in STEM and drawing more deeply on Indigenous knowledge.

The past years have seen concerted efforts across the sector to establish the [National Indigenous STEM Professionals Network](#). This Indigenous-led and Indigenous-run network will provide invaluable support and peer mentorship to Indigenous STEM researchers and should be supported to reach its ambitions. To fulfill this goal, the Network needs ongoing funding for administration and executive support.

Science & Technology Australia's [submissions to the Australian Universities Accord](#) process also included recommendations to improve Aboriginal and Torres Strait Islander people's access to and success in university research.

Science & Technology Australia Recommendation:

- 15. The Australian Government should provide ongoing funding for the National Indigenous STEM Professionals Network to support Aboriginal and Torres Strait Islander people's participation in STEM.**
- 16. The Australian Government should support Aboriginal and Torres Strait Islander people to access and succeed in university research through:**
 - **requiring universities to develop relationships with Indigenous communities to develop programs in Indigenous-led, community-driven research where the benefits of the research flow back to community**
 - **creating dedicated ARC and NHMRC funding streams to forge meaningful relationships with First Nations communities, promote Indigenous-led and community-driven research, protect Indigenous intellectual property and develop potential business/employment opportunities on Country to strengthen Country**
 - **creating STEM careers that support the values of First Nations Communities and work towards a sustainable future for all Australians.**

Australia's migrant STEM workforce

A large part of Australia's STEM workforce was not born in Australia – [migrants account for 56% of our university-qualified and 26% of our VET-qualified STEM workforce](#). Migrant STEM professionals bring a diversity of experience and wealth of expertise to our nation's research effort. They also play a critical role in filling skills shortages in Australia.

Despite this, there are still barriers to inclusion across the STEM sector. The Government should support efforts to improve migrant experiences in Australia, particularly those that help migrants gain work experience in Australia and navigate recruitment processes.

Science & Technology Australia Recommendation:

- 17. Australia's migration intake planning should acknowledge the critical contributions of Australia's migrant STEM workforce, particularly in the context of current and future gaps in Australia's STEM workforce.**
- 18. The Australian Government should support programs that have a proven track record in supporting migrants and people from diverse backgrounds gain work experience and employment in the Australian STEM industry.**



SECURING A RESILIENT AND STRONG AUSTRALIA

Indigenous Knowledge

Following the disappointing result of the 2023 referendum on an Aboriginal and Torres Strait Islander Voice to Parliament, Science & Technology Australia committed to redoubling its efforts to support the work of our Indigenous members and Indigenous STEM.

Now more than ever, it is crucial that we come together across the country, as a nation, to embrace and acknowledge the vast wealth of wisdom and scientific knowledge held by our country's Aboriginal and Torres Strait Islander people.

Australia is home to the oldest continuous living cultures on the planet. This inspiring fact is unique and is key to Australia's national identity. Aboriginal and Torres Strait Islander people and communities hold deep knowledge of this continent – vast scientific, technological, maths and engineering knowledge embedded in languages and cultures and the deep knowledge systems of Country. Indigenous STEM knowledge is the long and impressive first chapter of Australia's contemporary STEM knowledge base.

It our privilege to live in a country with such a deep history and knowledge.

In the consultation process led by Australia's Chief Scientist to refresh Australia's National Science and Research Priorities, Science & Technology Australia strongly advocated for including Indigenous knowledge as a dedicated priority, in addition to interweaving it through all the other priorities.

This would strongly signal to the research community and the nation that this is core work for Australia – and central to our national science, technology and research ambitions. It would also be a powerful signal to Australia's research funding agencies to invest in Indigenous people and perspectives in research, science, technology and innovation.

This crucial signal can help to unleash a transformative moment for Australian STEM – and start a deeper investment in supporting more Indigenous people and priorities into our national science and research effort. It would be a powerful legacy for all generations of Australians to come.

Science & Technology Australia Recommendation:

- 19. Elevate and invest in Indigenous knowledge, including Aboriginal and Torres Strait Islander peoples' perspectives on science, technology and innovation. This should be reflected as a dedicated priority in Australia's refreshed National Science and Research Priorities – and embraced across all areas of Government policy.**

Spurring the transition to net zero

In the shadow of the COP 28 summit – and after yet another summer of extreme weather and natural disasters – Australia must be a leader on reducing greenhouse gas emissions. Our commitment to reducing greenhouse gas emissions by 43% by 2030 and to 'net zero' emissions by 2050 must be considered a floor, rather than a ceiling. In a stark warning, the [2023 Intergovernmental Panel on Climate Change stated](#) that even if nations meet their set goals on greenhouse gas reductions, it is likely that global warming will exceed the 1.5°C limit of the 2015 Paris agreement. Natural disasters already cost the Australian economy [\\$38 billion a year and are projected to increase to at least \\$73 billion based on low emissions projections in 2060](#). This is a future that we simply cannot afford to realise – environmentally or economically. We must do more to attain net zero as soon as possible.

The Australian Government must support this goal through an innovative mix of clever policy and strategic investment. Implementation of the [Powering Australia](#) policy will be critical to ensure the



Australian Government, industry and the community work together to support Australia's transition to net zero. Existing policy measures such as the Patent Box scheme for clean technologies and funding agencies supporting renewable energy development – [ARENA](#), the [Clean Energy Finance Corporation](#) – should be retained and augmented in coming years.

This is also where Australia must back in our innovative STEM sector to develop the solutions and innovations that will forge the way to net zero. Clever investment throughout the STEM research pipeline will be needed. For example, to develop the batteries that will power the future we need discovery research in elemental chemistry, followed by its application in developing new battery technologies, prototyping and proof-of-concept development, to the scale up and advanced manufacturing of the batteries themselves.

Strategic approaches to shepherding these innovations through the development process will produce ideal candidates for support from the [National Reconstruction Fund](#) – helping the nation meet the complementary goals of economic development and spurring the energy transition.

This work would operate alongside the Powering Australia policy and its goals to ensure energy security for Australia and build new industries and jobs in renewables and clean energy tech. The Government should ensure all viable options with potential to contribute to a net zero future are rigorously assessed and explored. This will enable the Government to lead the way on the net zero transition for industry to follow.

This work includes [progressing options](#) to accelerate large-scale deployment of renewable energy, enhance storage capacity, and increasing energy efficiency of new and existing buildings. The Government can explore – and support through appropriate grant and commercialisation schemes – new and potentially revolutionary technologies such as the recent discovery of an enzyme by Monash University scientists that can [create electricity from thin air](#).

As Australia transitions to renewables and carbon-neutral options including solar, hydrogen and hydro-energy, we must also put in place operational plans to develop the clean energy workforce. This would build on the Jobs and Skills Australia [Clean Energy Generation study](#) to ensure that skills shortages and workforce gaps are addressed sooner to enable a sustainable transition and economic outcome.

Science & Technology Australia Recommendation:

- 20. The Australian Government hasten the transition to a net-zero economy through strategic planning and that includes deep investment in clean energy technologies R&D.**

Informing climate adaptation and mitigation

Australians are currently living through another summer of extreme weather events – bushfires, cyclones, devastating flooding, heatwaves. We need to build our preparedness to these events – the impacts of climate change are going to continue to wreak havoc on our way of life over the coming decades.

We must deepen climate research capabilities to ensure national preparedness for more frequent and dangerous extreme weather and environmental hazards. We need to enhance our ability to predict and build resilience to escalating storms, heatwaves, floods and bushfires. Our unique biodiversity, our agricultural industries – and the wellbeing of all Australians – depend on it.

To this end, we need to invest more deeply in our climate scientists – those researching our land, water, oceans and atmosphere. We need to constantly improve our understanding of how climate has changed in the past, as well as our ability to model the future changes. Science & Technology Australia advocates for a boost to Commonwealth support for climate science research and the research infrastructure essential to climate science capabilities. This will augment the Government's



commitment to climate action, particularly given our important role as a research leader in our region, and southern hemisphere climate science.

Science & Technology Australia recommendation:

- 21. The Australian Government should implement a targeted boost to climate science research. This would help build the understanding of our climate systems needed to build resilience to ongoing climate change and safeguard our future.**

Building sovereign tech capabilities

Australia needs to develop and maintain sovereign capability in key areas of high-tech development including advanced manufacturing, artificial intelligence (AI) and quantum. These and other advanced technologies will be revolutionary in their significance and will sit alongside the mobile phone in their impact.

AI and other new digital technologies and services are set to deliver [\\$315 billion in gross value for the Australian economy by 2028](#). Quantum, despite its infancy, is expected to add [\\$6 billion and 19400 jobs by 2045](#). With Australia being a recognised leader in both AI and quantum, we need to capitalise on existing foundations and investment opportunities to deliver fundamental change across society including the health, education, environment, national security, energy, infrastructure and mining sectors.

Greater public investment into AI alongside a strong set of governance and ethics frameworks are needed to sustain economic growth and mitigate risks including cybersecurity, privacy issues and the spread of misinformation. Our competitors are outdoing Australia in terms of AI investment with [South Korea spending \\$1.1 billion in 2020](#), [Spain earmarking \\$991 million between 2021-2023](#) and the [US spent 5 billion in 2022](#). In comparison, Australia's AI spending is relatively paltry sitting at [\\$75.7 million for the 2023-24 budget](#).

Australia cannot afford to be left behind in such a transformative sector – unless we invest in developing our own sovereign capability we will be consigned to importing solutions and technologies from other countries – solutions that may not be best for our country.

Australia must harness the augmented potential of combining AI, quantum technology and conventional computing. These technologies have the potential for unmatched capabilities that resonate across existing sectors and lead to new and uncharted industries.

Along with this imperative to deepen Australia's capability in emerging technologies, it is vital to work towards a future where what is discovered in Australia is made in Australia. Australia has a strong track record in breakthrough research across critical areas, including developing med-tech devices and the green energy tech needed for the net-zero energy transition. Yet, all too often breakthrough discoveries are commercialised or produced offshore. Building our advanced manufacturing capabilities is a crucial part of improving our economic complexity and ensuring future economic productivity. While every capability need not be at mass production scales, we need to ensure we can do advanced prototyping, pilot production, and high-value small-volume manufacture to cater sustainably to local market.

Science & Technology Australia Recommendation:

- 22. To capitalise on early Australian leadership in quantum tech and AI, and avoid the sovereign risk in being reliant on other countries for these and other critical emerging technologies, the Australian Government should deepen investment in critical emerging technologies, including quantum and AI.**



- 23. To maximise the economic benefits of Australian R&D breakthroughs, the Australian Government should support development of sovereign advanced manufacturing capability.**

Health and wellbeing

Australia has world-leading capabilities in health and medical research, with unique strengths in several areas, including discovery medical science, cell and gene therapies, clinical trials and convergent neurosciences. We have people working at the front line on antimicrobial resistance – a huge looming global challenge not just for Australian population health but also our agricultural sector.

Australia also has an urgent need to cement our sovereign capability in medical manufacturing. This spans drug and vaccine production, medical equipment and devices, and specialised treatments at the very forefront of medical capabilities that will transform the delivery of personalised medicine.

Clever and strategic investment with a strong focus on building medical research capabilities to inform a whole-of-lifetime approach to proactively manage the health and wellbeing of Australians would also deliver strong savings to the nation and the Budget by slowing rising costs in healthcare, disability and aged care.

Science & Technology Australia Recommendation:

- 24. To ensure the long-term health and wellbeing of all Australians, the Australian Government should deepen investment in medical research and innovation across the spectrum of discovery medical research through to translation and clinical trial stages.**

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