Australian Government

TRUSTING AUSTRALIA'S ABILITY:

REVIEW OF THE AUSTRALIAN RESEARCH COUNCIL ACT 2001

FINAL REPORT

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Disclaimer

As this is an independent review, the Final Report does not necessarily reflect the views of the Australian Government. This document must be attributed as: *Trusting Australia's Ability: Review of the Australian Research Council Act 2001*.

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Executive Summary

Trusting Australia's Ability: Review of the Australian Research Council Act (2001)[1] (the Review) is the first comprehensive review of the ARC since it was established in 2001 as an independent statutory agency following the Knowledge and Innovation Reforms (1999).[2] The ensuing Backing Australia's Ability initiative in 2001 doubled the funding available for the ARC and laid the foundation for many successful research outcomes in the Australian University sector today. The 2003 review of the Knowledge and Innovation Reforms[3] initiated the research quality agenda, which ultimately became Excellence in Research for Australia (ERA). The first full round of ERA in 2010 followed more than 6 years of detailed consultation to arrive at the final framework. The influence of the quality and excellence agenda was evident well before the final evaluation. This is but one example of the impact that the ARC has had on Australian universities, the report provides examples of others.

In undertaking this review, we have consulted widely across government, with universities and peak bodies, and individuals involved in supporting the work of the ARC or who have benefited from the grants received from the ARC to conduct ground-breaking research. The Panel provides in this review some examples of how university research has yielded technology and policy innovation that is now so well accepted it is easy to take these for granted, without understanding the origins and the role of basic research as a source of new knowledge. The ARC has been a leadership incubator within the higher education sector; supported the technology underpinning solar cells and quantum computing; collaborated to bring the internet to Australia; and aided our understanding of both the distant and more recent past, to name just a few benefits. The ARC has helped to attract and retain thousands of outstanding academics and led changes to policy and practice within and outside our universities.

A strong theme underpinning all those consultations has been a high level of respect and historical goodwill towards the ARC itself and the work it does to support the university and broader research sector. That trust has been built on:

- A distinctive combination of academic and research expertise which is not available in other areas of government.
- Peer review and research excellence being the paramount consideration in grant approvals.
- Transparent, merit-based assessments free of conflict of interest, underpinned by a strong research integrity and ethical framework which minimises inherent biases.
- Regular engagement and consultation by the ARC with leading researchers and institutions.
- Transparency and Parliamentary oversight of the ARC and the respective Ministers responsible for the ARC over that time.

These and other factors are important to ensure that the ARC is a trusted agency for the delivery of the Commonwealth's investment in research, particularly in its capacity as the prime source of government investment in pure basic and strategic basic research. The Case Studies also demonstrate the importance of trusting the nation's best researchers with funding portfolios over sufficient time periods to pursue new knowledge and ideas without always having an obvious or immediate application in sight from the outset.

Assessment of the best possible ideas and the individuals who can explore them requires trust in a funding agency underpinned by competitive projects subject to a system of peer review. Expert and peer review, however imperfect, has repeatedly been demonstrated to be the best system to identify talent and foster new opportunities.

[1] *Australian Research Council Act 2001* (Cth)
[2] The Hon. Dr D. A. Kemp MP, Minister for Education, Training and Youth Affairs. (1999). *Knowledge and Innovation: A policy statement on research and research training*.
[3] Australian Government Department of Education, Science and Training. (2003). *Evaluation of Knowledge and Innovation Reforms Consultation Report* prepared by the External Reference Group.

The level of trust in the ARC by the responsible Minister has varied over the past 20 years and has been dramatically eroded by Ministerial interventions on a least 5 separate occasions over that period, most recently in 2021. The negative consequences of the perception of arbitrary intervention have been significant both within Australia and with our international partners.

A strong theme underpinning the recommendations here is the need for the Minister to exercise proper and necessary oversight of the Guidelines and levels of funding available under the National Competitive Grants Program (NCGP). The ARC Chief Executive Officer (CEO) should have the capability and expertise to oversee the administration of the grants program. Individual grants under the NCGP should not require approvals by the Minister, but recommendations and approvals should be made by those best placed to judge the intrinsic merit of the proposals. There should be appropriate checks and balances and the Minister should retain the means to intervene in the extraordinary circumstance of a potential threat to national security. Where the Minister does exercise directions in relation to the NCGP, these would require transparency and Parliamentary oversight.

The Minister should have wider discretion to direct funding outside the NCGP, to advance the Government's strategic research objectives. To give clarity to the distinction between the NCGP and other ARC programs and activities, the Panel has recommended the NCGP be administered via the ARC Research Endowment Account (as is the case for the National Health and Medical Research Council (NHMRC) with its Medical Research Endowment Account) and that the special conditions around grant approvals only apply to the NCGP. This allows flexible or different arrangements to apply to non-NCGP Programs the ARC may administer for government purposes now and into the future.

The Panel has made 10 detailed recommendations which aim to enhance the trust in the ARC by the government and the research community. These include:

1. Clarifying the purpose of the ARC to give a legislative basis for funding basic, strategic basic and applied research via the National Competitive Grants Program (NCGP), and to manage expectations of stakeholders by defining the scope of the NCGP by its historical purpose, i.e. of providing funding to universities and their partners in all areas except clinical health, medical and dental research. We also recommend the NCGP fund research that may have a positive impact on Indigenous Knowledge systems and Peoples.
2. Giving a legislative basis and clarity to the role of the ARC in underpinning and shaping the national research landscape over and above the impact of the administration of the NCGP.
3. Giving further clarity and insight to the role and impact of the ARC in relation to supporting academic careers.
4. Advancing the support for Indigenous Australian academics through better consultation and additional fellowships. Separately the Panel also heard the need to facilitate the engagement of Indigenous community organisations as partners with universities in ARC Linkage programs.
5. Aligning administration of the NCGP to comparable research agencies within Australia and internationally and in accordance with Commonwealth Guidelines for Grant Administration.
6. Strengthening the governance by establishing an ARC Board with responsibilities for appointment of the ARC CEO, the College of Experts and approvals of individual grants awarded under the NCGP in addition to supporting other functions of the Agency.
7. Recommending new arrangements for the appointment and conditions of the CEO.
8. Encouraging the CEO and other academic experts within the ARC to consult more directly with stakeholders, especially in relation to the impact of changes to grant guidelines.
9. Reducing the legislative burden by simplifying the appropriation and indexation of funding, and adopting more streamlined processes including two-stage application processes where possible.
10. Acknowledging that the Excellence in Research for Australia (ERA) and Engagement and Impact (EI) initiatives have played a valuable and important role in raising the quality and relevance of research in Australian universities. These considerations have reaffirmed the important role the ARC should continue to play in evaluating excellence, impact and research capability within Australian universities but we recognise those resources could be more effectively redeployed and utilised to guide the current and future design of the NCGP and the identification of future research priorities.

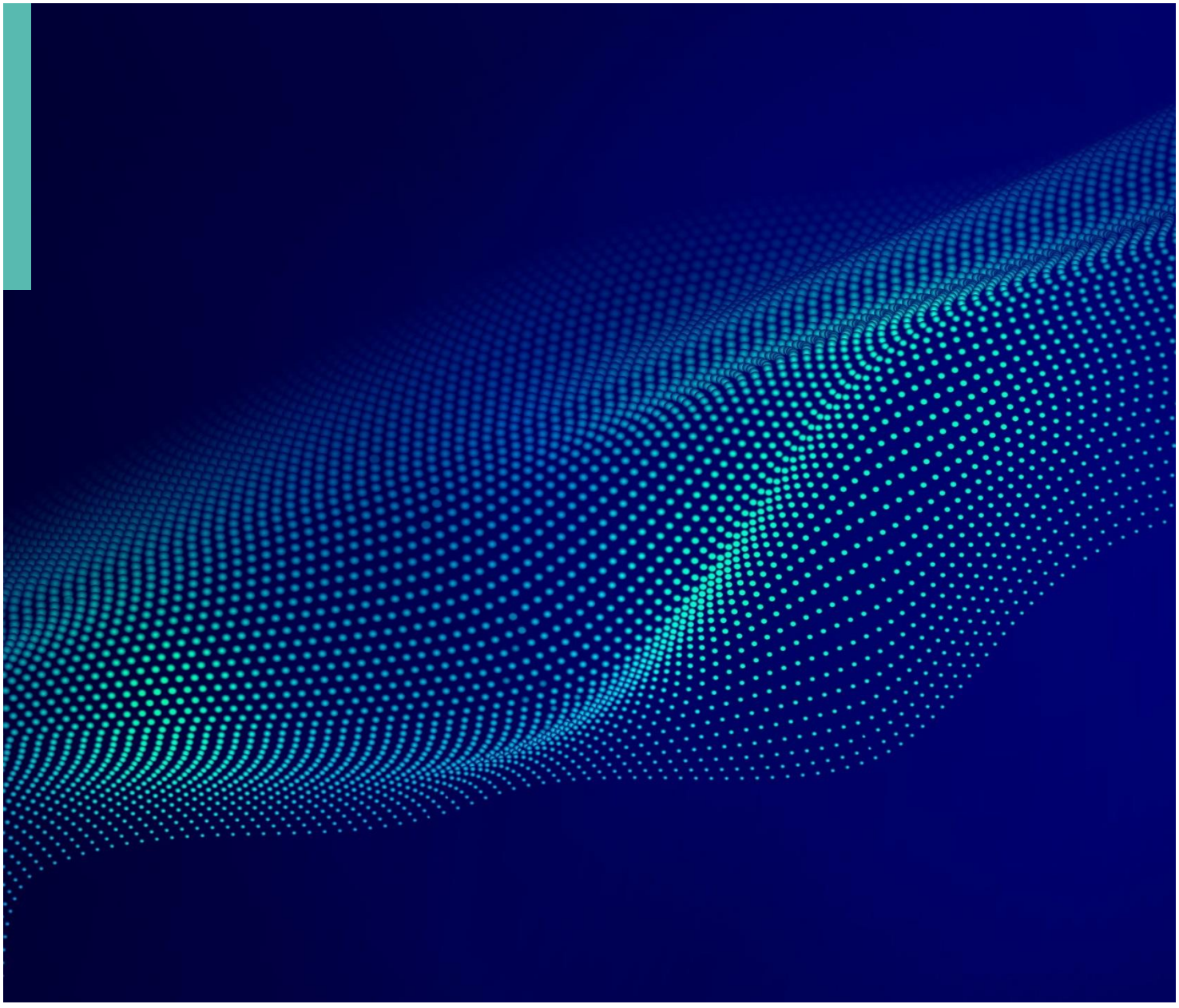
For the ARC to succeed in its critical mission, acknowledging the immense diversity among the ARC's stakeholders is crucial as it will reveal new avenues for collaboration and growth. To effectively navigate this complex landscape and address the needs of its diverse stakeholders, the ARC must develop and implement strategies at the legislative, strategic, and operational levels. The Panel's recommendations aim to ensure the ARC's ongoing relevance, effectiveness, and impact in supporting world-class research and innovation for the betterment of Australian society.

Unsurprisingly, the Panel has received extensive and detailed feedback from a wide range of individuals and stakeholders in relation to both the activities of the ARC and research in Australian universities more generally. The submissions we received, which will be published along with this report, include valuable advice and suggestions outside the scope of this review. Also outside the scope of the review is the extent to which some of the challenges being experienced by the ARC and universities are a consequence of the diminishing levels of indirect costs and the processes by which indirect costs are allocated through the Department of Education's Research Support Program, for ARC and other competitive grant funding. The public submissions and our report will similarly be available to the Universities Accord panel.

A number of the ideas proposed in submissions and in focus groups would require new policy and funding proposals. These are a matter for government outside the scope of this review. We are confident, however, that adoption of the recommendations herein will strengthen the trust in the ARC by government and different stakeholders, and vice versa, which in turn may provide conditions for building a case for further investment in the ARC which will be of benefit to the entire Australian community.

The terms of reference for this Review are set out in Appendix A. The Background to the Panel, and those supporting the Panel in the Review process are outlined in Appendix B.

1. ROLE AND PURPOSE OF THE ARC



TOR 1. Role and Purpose of the ARC

Consider whether the role and purpose of the ARC as set out in the legislation remains relevant, including consideration of the contribution the ARC can make to identifying reforms to its programs to actively shape the research landscape in Australia and better align with comparable research agencies.

1.1. The role and purpose of the ARC in the legislation

The Australian Research Council was established in 1988 initially as one of four councils under the *Employment, Education and Training Act 1988* and later as a statutory agency governed by the *Australian Research Council Act 2001* (ARC Act). The funding allocated in 1988 included that previously administered by the Australian Research Grants Committee combined with additional funding known as "the clawback" from university operating grants to the Research Council.[4] Funds to support other aspects of research in universities were added subsequently either through new funding (e.g. for infrastructure to support the newly formed Unified National System) or incorporation of programs from other areas of government (such as Key Centres). The establishment of the ARC as an agency in 2001 followed the Knowledge and Innovation Reforms (1999)[5] and later saw doubling of ARC funding as part of the Backing Australia's Ability strategy.[6] That involved an additional clawback of funding from the ANU Institute of Advanced Studies (IAS) in return for access to competitive ARC funding from which the IAS was previously excluded.

From 1988 onwards the ARC had the capacity and remit to advise on research policy, capability, and evaluation. The extent to which the ARC sought to determine research priorities both structural (e.g. through the introduction of schemes to attract and retain talent, and programs to engage industry and university researchers) or in discipline-specific research, has varied over the ensuing 35 years. Many distinctive aspects of the Australian research landscape can be attributed to the long-standing influence and policy direction of the ARC. Notable examples include Australia's collaborative approach to shared infrastructure which included the initial funding of the backbone of University data communications through the Australian Academic Research Network (AARNet) as outlined in Case Study 1;[7] the concept of assessing research careers in relation to the length of actual career opportunity (including interruptions, known as ROPE);[8] and the recognition of non-traditional research outputs (NTROs) especially in the creative and performing arts in universities.[9] Examples of outcomes resulting from the ARC setting priorities are demonstrated by the Case Studies in Solar (7) and Quantum Computing (8).

[4] D. Aitkin. (2017). *Critical Mass: How the Commonwealth got into funding research in universities*, p.161.
[5] The Hon. Dr D. A. Kemp MP, Minister for Education, Training and Youth Affairs. (1999). Knowledge and Innovation: A policy statement on research and research training.
[6] Australia Government, Department of Industry, Science and Resources. (2000). *Backing Australia's ability: an innovation action plan for the future.* http://hdl.voced.edu.au/10707/84282
[7] D. Aitkin. (2017). *Critical Mass: How the Commonwealth got into funding research in universities*, p.85.
[8] The Australian Research Council introduced the Research Opportunity and Performance Evidence (ROPE) criterion to the majority of the NCGP schemes in 2011 to support researchers who have experienced career interruptions. Australian Research Council. (N/a). *Research Opportunity and Performance Evidence (ROPE) Statement.* https://www.arc.gov.au/about-arc/program-policies/research-opportunity-and-performance-evidence-rope-statement.
[9] Jenny Wilson. (2017). *Artists in the University: Positioning Artistic Research in Higher Education*. Springer. p.48.

The benefits of the ARC being a statutory agency have been considerable in terms of both the administration and continuity of funding (especially for basic research) since 2001. The ARC has been able to utilise academic expertise in assessment and evaluation, and for much of that time has enjoyed a high degree of trust and confidence from government, universities, and other stakeholders. The skills and tenacity required by the successive CEOs of the ARC– including the efforts of the late Professor Don Aitkin, to first establish the ARC in 1988, and then of Professor Vicki Sara, to lead the creation of the statutory agency in 2001 and secure the continuity of funding – should be applauded.

The change to a statutory agency in 2001, however, resulted in some of the flexibility and responsibilities that had been part of the 1988 configuration of the ARC either being relinquished in the transition or not fully captured within the legislation and subsequently forgone or subsumed by other government programs.[10] For example, prior to 2001 the ARC administered an Institutional Grants program that included collaborative infrastructure grants and block funding to universities for schemes such as ARC Small Grants. The ARC had responsibility for a range of international activities which were either incorporated into the National Collaborative Research Infrastructure Strategy or discontinued. In some cases, it was because of the constraints of the 2001 ARC legislation; in other cases, the ARC culture of supporting investigator-led proposals and competitive peer review prevailed above other priorities.[11]

We are not suggesting a need to address those historical differences, but the Panel's recommendations have been shaped by the overwhelming sentiment that reforms to the ARC legislation must enshrine the importance of academic expertise, peer review, and transparent, fair, and competitive assessments free of both the perception and capacity for political interference. Trust in the ARC by all parties is essential for it to fulfil its purpose: we emphasise this with the title of the Panel's report: Trusting Australia's Ability.

The Panel's recommendations seek to reinforce the trust in the ARC, alongside provisions that enable the ARC to utilise its considerable expertise to better serve the whole of government now and into the future with more agility and flexibility.

More explicitly we are recommending arrangements for the NCGP that address the widespread concerns regarding potential interference in investigator-initiated proposals, whilst retaining capacity for the ARC to administer other programs on behalf of the whole-of-government via different approval processes should the government choose to do so.

> **"…the Act [should] be largely focused on empowering decision making by the ARC under broad direction of the Government via the Minister."**
>
> Australasian Research Management Society

[10] A further challenge was the resourcing of the Agency initially did not cover the corporate costs of administering an agency, and subsequent efficiency dividients. Some of this was addressed later either by specific measures or through the increased scale following the incorporation of the ERA team.

[11] Aitkin describes this tension in his account of the establishment of the ARC as being the tension between the culture of the Australian Research Grants Committee and the new research council which aimed to have a more encompassing role in shaping research policy as it impacted on universities. That tension was still evident to one of us (MMS) in some sections of the ARC in 2008 when the proposal for the ARC to take over the then Research Quality Framework was first mooted. D. Aitkin. (2017). *Critical Mass: How the Commonwealth got into funding research in universities.*

Case Study 1 - From the Illawarra to the Internet

Aussie researchers pioneered the critical link that powers the internet

For all our absolute dependency on the internet today, few Australians realise the extent to which work at the University of Wollongong in the 1980s contributed to TCP/IP, the critical protocols that enable accurate communication between computers and underpin the entire internet.

A group of far-sighted scientists at University of Wollongong – encouraged by Vice-Chancellor Ken McKinnon, who harboured a vision for an open network that anyone with a computer could connect to – invented a set of brilliant comms protocols that would eventually go on to rule the world: or at least the internet. Through a company they'd established in Silicon Valley, The Wollongong Group – which had been selling Unix-based software – the team released commercial versions of TCP/IP, the Transmission Control Protocol / Internet Protocol that helps machines to speak to one another – a kind of Babelfish for computers.

Tim Berners-Lee, the inventor of the World Wide Web, had noticed that a serious communication barrier was threating the future of science at his workplace, CERN (*Conseil Européen pour la Recherche Nucléaire*), later home to the Large Hadron Collider. He had to keep track of the vast assemblage of disparate computer programs and experiments generated by CERN's 10,000 personnel, but they had formed into warring factions. Some of CERN's physicists preferred Digital's VAX/VMS operating system with its DECnet communications protocols, while others favoured the rival operating system, Unix, which used TCP/IP. Every time a new experiment started there would be battles between the camps over whether to use VAX/VMS and DecNet, or Unix and TCP/IP.

'I was beginning to favour TCP/IP myself,' Berners-Lee later recounted in his book *Weaving the Web*, 'because TCP was beginning to become available for the VMS too. It didn't initially come from Digital, but from Wollongong University in Australia.' Because it could speak to both systems, TCP/IP won out, becoming the standard. 'Finally, there was a way for both contenders to communicate with each other, by picking up a piece of TCP/IP software from Wollongong'.

Convinced of TCP/IP's utility, Berners-Lee added the crucial bridging code to his Remote Procedure Call program, which he used to communicate between all the different CERN computers and networks. He then created an addressing system for it that identified all the parts of the remote service, which ultimately evolved into the World Wide Web – the overlay that 'civilises' the internet's messy pipes and cables – and secured TCP/IP's critical role in the modern global communications architecture.

Meanwhile, back in Australia, Ken McKinnon was hard at work building a coalition of university and CSIRO champions for the establishment of a network in Australia that could not only join research institutions to one another but also to their research partners around the world. The ARC backed the collaboration between the Australian Vice-Chancellors' Committee (the forerunner to Universities Australia) and the CSIRO, committing $1.77m to establish the Australian Academic and Research Network (AARNet). The network soon expanded outside academia to business and the public, to become our national internet system. This little-known ARC-funded collaboration brought the internet to Australia, and Australia to the world, changing all Australians' lives forever.

Case Study 2 - The nation's research leadership incubator

ARC experience prepares researchers for university and scientific leadership

Dozens of Australian research and university leaders first benefitted from their 'hothouse' experience at the Australian Research Council, and its predecessor, the Australian Research Grants Committee (ARGC, 1964-1988).

From its forerunners two generations ago right up until today, the ARC has been an intensive training college and finishing school for future Australian university, research and science leaders. The flow-on effect of their intensive learning experiences is enormous, across universities, industry, government organisations and beyond.

Researchers cut their teeth on various ARGC and ARC committees – learning about values and norms in disciplines remote from their own, identifying gaps and opportunities for collaboration, making agonising but necessary funding decisions in the absence of enough money for all the worthwhile projects, reading across domains adjacent and sometimes not so adjacent to their own – acquiring the knowledge, skills, networks and respect necessary to lead the Australian research enterprise for the rest of their careers.

Vice-Chancellors who had earlier experience on ARC committees include:

- Don Aitkin (University of Canberra, 1991-2002)
- Mary O'Kane (University of Adelaide, 1996-2001)
- Ross Milbourne (University of Technology, Sydney, 2002-2014)
- Debbie Terry (Curtin University, 2014-2020; University of Queensland, since 2020)
- Peter Sheehan (Australian Catholic University, 1998-2008).

Many of the researchers who served on ARGC and ARC committees went further, taking executive roles within the ARC itself – as CEOs or Executive Directors – before going back out to the sector as university leaders:

- Vicki Sara (CEO 2001-2004) became Chancellor of UTS (2005-2016);
- Peter Høj (CEO 2004-2007) became Vice-Chancellor of the University of South Australia (2007-2012), University of Queensland Q (2012-2020) then Adelaide (since 2021);
- Margaret Sheil (CEO 2007-2012) became Provost of the University of Melbourne (2012-2017) then Vice-Chancellor of QUT (since 2018);
- Aiden Byrne (CEO 2012-2016) became Provost of University of Queensland (since 2016).

The ARC has always welcomed onto its panels research-engaged industry leaders, whose insights are invaluable for connecting university research to industry activity. Some of those industry committee members continued that trajectory and ended up moving into the university sector themselves, after exposure through the ARC: IBM research director Glenn Wightwick served as DVC (Enterprise) at UTS; and Len Sciacca, former chief partnerships and engagement for Defence Science and Technology Group, became an Enterprise Professor at Melbourne. In the other direction, Professor Robert Clark, Centre of Excellence Director in Quantum Science, became Australia's Chief Defence Scientists and Professor Tanya Monro – ARC Georgina Sweet Laureate Fellow, photonics expert and DVC (Research and Innovation) at UniSA – followed a similar path and is the current Chief Defence Scientist.

1.2. Proposed changes to the role and purpose of the ARC as described in the legislation

The role and historical purpose of the ARC is not evident from the ARC Act itself, which in turn has created unrealistic expectations or requests for the ARC to play a role or provide funding for research that has not been the historical remint.

Section 3(a) of the ARC Act currently stipulates that the purpose of the ARC is:

> **"the making of high-quality recommendations to the Minister in relation to which research programs should receive financial assistance.**
>
> **the administration of the regimes of financial assistance; and**
>
> **the provision of high-quality advice to the Minister about matters related to research."**[12]

The purpose defined by the ARC in the ARC Strategy 2022-2025 is, "to help shape the Australian research system for the benefit of the nation by enabling world-leading research, fostering research quality, translation and impact, and safeguarding research integrity."[13]

Throughout the Panel's consultation, there was strong support for the ARC Act being amended to provide clarity of purpose and to define the responsibilities of all parties in relation to decision making.

Submissions and consultations reiterated the role of the ARC as the guardian of basic, or fundamental 'blue-sky' research in Australia. Feedback suggested the ARC had an enduring role to provide grant funding for that very best, curiosity-driven research to ensure that Australia remained a home and a safe-haven for intellectual curiosity and academic freedom. The Panel has selected and described through a range of Case Studies, how important this research can be in yielding understanding, invention, and innovation long after the initial discoveries were proposed and described.

The ARC's capacity to provide Australian governments, industry and academia with quality peer review services is a sovereign public asset to be protected. The ARC's peer review mechanisms and services stand to be enhanced as competition within the global knowledge economy intensifies. The ARC has the capacity to convene and curate expert and peer review and is well placed to undertake these types of evaluation activities for the whole of government without the need to develop new capability and without conducting extensive simultaneous sector-wide rounds. In interviews, the ARC's Research Grant Services (RGS) clients advised they placed great value on the ARC's peer review process, and its coordination of, and access to the ARC College of Experts. The ARC could use this evaluation expertise to undertake purposeful reviews on particular themes (e.g. research relating to Indigenous Australians, research undertaken by Indigenous Australians, and/or research co-designed and undertaken in partnership with Indigenous organisations), specific disciplines or cross cutting priorities (e.g. researcher careers and evaluation). The ARC could also evaluate the outcomes of ARC grant funding at appropriate time scales not just immediately following completion of each project.

[12] The *Australian Research Council Act 2001* (Cth)

[13] Australian Research Council. (2002). *The ARC Strategy 2022-2025*. https://www.arc.gov.au/about/our-organisation/reporting/arc-strategy.

To improve clarity the Panel proposes to activate the ARC Research Endowment Account[14] to provide a transparent allocation and approval mechanism for funds awarded within the NCGP, while retaining the capacity for the ARC to evolve and include other functions. Recommendation 1 provides for a legislative basis for the NCGP leaving the flexibility in design and approval mechanisms should the government request the ARC to administer programs outside the NCGP.

The ARC has used a provision for *Special Research Initiatives* to implement such programs, but these have sometimes required complex administrative arrangements.[15] Some examples include:

- contributions to international consortia such as the European Molecular Biology Laboratory;[16]
- grants to the Learned Academies either directly or through the Australian Council of Learned Academies (ACOLA);[17]
- Centres of Excellence co-funded with other government agencies:
  - National ICT Australia (NICTA) (initially with the Department of Communications, Information Technology and the Arts in 2001),[18]
  - the Australian Centre for Plant Functional Genomics (with the Grains Research and Development Corporation and the South Australian Government), and
  - the Bionic Vision Initiative (an outcome of the 2020 Summit); and
- the continuation of access for university researchers to major infrastructure such as the Australian Synchrotron (2012-15).[19]

More recently, the ARC has expanded its role by providing research grants administration and peer review to other government agencies.[20] This development has been a welcome response to broader government requirements for basic or applied research in particular areas of interest.

> **"The ARC should be encouraged and have the ability to identify, in consultation with universities and government, areas of thematic priority and specific funding dedicated to such programs."**
>
> Australian Centre for Excellence in Antarctic Science

[14] The proposed use of the ARC Research Endowment Account aligns with the National Health and Medical Research Council Medical Research Endowment Account.
[15] Australian Research Council. (N/A). *Special Research initiatives*. https://www.arc.gov.au/funding-research/funding-schemes/linkage-program/special-research-initiatives.
[16] EMBL Australian. (N/A). *What is EMBL Australia?*. https://www.emblaustralia.org/about/what-embl-australia/
[17] https://www.arc.gov.au/news-publications/media/media-releases/research-help-secure-australias-future
[18] Department of Communications, Information Technology and the Arts Report 2002-03. https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22publications%2Ftabledpapers%2F21587%22
[19] Monash University. 4 July 2012. *Breakthroughs to continue at synchrotron*. https://www.monash.edu/news/articles/breakthroughs-to-continue-at-synchrotron.
[20] Australian Research Council. (2022). *Research Grants Services*. https://www.researchgrants.gov.au/.

Recommendation 1: The Purpose of the National Competitive Grants Program (NCGP)

We recommend that the ARC Act be amended to give a stronger legislative basis for the purpose of the ARC and clearer scope for the National Competitive Grants Program (NCGP) by specifying that:

- the ARC provides funding through NCGP to support research in Australian universities and their partners;
- the NCGP supports pure basic, strategic basic and applied research, but not experimental development;[21]
- the NCGP supports collaborative research that expands Indigenous knowledge systems and provides economic, commercial, environmental, social and/or cultural benefits for Australia;
- the NCGP supports research in all academic disciplines except clinical health and medical and dental research;[22] and
- the NCGP supports universities to attract and retain academic researchers in response to changing needs and priorities.

[21] as defined by the Australian Bureau of Statistics (ABS). Australian Bureau of Statistics. (2008). *Australian and New Zealand Standard Research Classification (ANZSRC). https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-researchclassification-anzsrc/latest-release*

[22] which fall within the remit of the National Health and Medical Research Council (NHMRC) and Medical Research Future Fund (MRFF).

Case Study 3 – Bananas saved from wipeout

Critical world food crop safeguarded and strengthened with ARC-funded research

James Dale and Robert Harding of QUT began following their scientific instincts with ARC support about twenty years ago, exploring the genetics of plant resistance to a variety of assailants. While they were targeting diseases of agricultural importance, they were not leaping ahead to application too early. At first they were feeling their way in the dark, testing novel strategies of gene manipulation to see if they could generate resistance to disease in plants.

Taking the lessons learned from ARC-funded work on plant geminiviruses and nanoviruses, they applied their gene strategy to fungal diseases in bananas, again with ARC support through a Discovery grant. When this fundamental research hit pay dirt, they joined forces with banana growers to win an ARC Linkage grant targeting the fungus that causes the disease Fusarium wilt, also known as Panama Disease.

A century ago, by far the dominant variety of banana in global trade was the Gros Michel, a cultivar valued for its resilience in transit. Other varieties were grown locally around the world, but if it was plantation grown and shipped across oceans, there was a good chance it was a Gros Michel. Harry Belafonte was loading up Gros Michels until daylight come in the 1950s. But soon the global commercial crop was virtually wiped out by Panama Disease, recalling instead the song 'Yes! We Have No Bananas' – a 1920s Broadway showtune inspired by banana shortages during an earlier outbreak of Panama Disease.

Fortunately the Cavendish cultivar was not susceptible to Panama Disease at the time, and the export business pivoted to the fruit we are all familiar with. The Cavendish took off and grew to dominate global trade, with an annual export market value of more than $29 billion a year: the $1.1 billion Australian banana industry alone generates 10,000 full-time equivalent jobs. More importantly, bananas are a critical staple food for 400 million people worldwide, some very heavily dependent on the crop for nutrition, especially in Africa.

The trouble is, Panama Disease is now targeting the Cavendish, through a strain known as Tropical Race 4 (TR4). It has already decimated crops in Asia, Africa and the Northern Territory, and is finding a foothold in Queensland and South America.

That's where Dale and Harding's ARC-funded research comes in. Using techniques developed in their blue-sky discovery research, the team have found a way to genetically manipulate the Cavendish crop to be resistant to TR4. The pathway from discovery to utilisation – from testing an idea to saving a vital agricultural crop – was supported by the ARC, from curiosity-driven basic research to application. With additional support from the Cooperative Research Centres Program and industry, the resistant line, QCAV-4, is now ready for regulatory approval.

Another strand of Dale's research has led to the production of a 'golden' banana enriched with beta carotene that the body converts into vitamin A. Deficiency in this essential micronutrient leads to death and blindness in 1 million children under five years of age each year, and also hampers immunity and brain development. Dale's golden banana is current being tested in Uganda, with the goal of releasing it to smallholder farmers to grow themselves.

Case Study 4 – Mighty Medicare's humble uni origins

'What if' questions at University of Melbourne led to Australia's iconic Medicare

Australia's universal health care system – today regarded as one of the nation's greatest policy achievements – had its origins in the blue-sky, curiosity-driven research of two health economists at the University of Melbourne, driven by the unfairness and inefficiency of the Australian health care system to devise a way to expand access and improve health outcomes.

In 1968 John Deeble, dubbed 'the father of Medicare', and colleague Dr Dick Scotton wrote the original proposal for Medibank, 'A Scheme of Universal Health Insurance', after several years of research at the University's Institute of Applied Economic Research (IAER). Known today as the Melbourne Institute, IAER is also the birthplace of the Henderson Poverty Line.

Scotton acknowledges that their proposal was 'widely regarded as very radical at the time yet bears an uncanny resemblance to the present structure of Medicare and the associated arrangements covering public hospital services'.

Despite how hot this topic was politically, both at the time and subsequently, their work was markedly non-partisan. Indeed, Scotton credits the Nimmo Enquiry into Health Insurance, commissioned by the Gorton Government, and then Opposition leader Gough Whitlam's 'public formulation' for his Alternative National Health Programme, as 'instrumental in bringing health insurance policy to the forefront of national political policy issues.'

The proposal originated in work Deeble did as Assistant Manager at the Peter MacCallum Institute, where he was in charge of finances. Troubled by 'seeing people refused cancer treatment because they could not afford it', Deeble attained a research position at the University to study hospital costs and health financing, working to find a better way.

Deeble joined Scotton at the IAER in 1965 where they assembled the first set of Australian health spending statistics. This research triggered 'skepticism about the inequity of the then voluntary system of private health insurance'. They found the system produced uneven access and costs, with the burden borne largely by those who could least afford it.

Against this background, the pair developed the concept of a compulsory public national health insurance scheme 'based on the principles of universal coverage, equity of access and payment according to means through the taxation system'. The idea was taken up by Labor, and became a centrepiece of 'The Program', Whitlam's platform for the 1972 election.

After a rocky start – a 1974 double dissolution election under the Whitlam Government to initiate it, followed by progressive dismantlement and privatisation under the Fraser Government from 1975, then full restoration as Medicare in 1984 under the Hawke Government – universal health care is now a cherished and entrenched component of the Australian social fabric.

While not directly funded by the ARC, the pioneering work of Deeble and Scotton aligns with the kind of university research that the ARC is built to support, which can have significant impacts on society and policy.

Case Study 5 - The high stakes of high energy physics

Australian physicists at the forefront of discovery of what makes the universe tick

Millennia of global scientific discoveries have given humanity a fair idea of how the world works on approximately our own scale, but to figure out how the building blocks of our world work – or even what they are – we needed to invent a whole new science. One major strand of this new empirical physics involves smashing sub-atomic particles together at colossal speed and energy and watching what happens. From this creative destruction scientists are making discoveries as disparate as what, exactly, makes matter heavy, and why there is more matter in the universe than its dark twin, antimatter.

Then there are the practical benefits of this fundamental science, and Australia's involvement in it. Much of our national capacity to handle our prospective nuclear submarine program, for instance, is attributable to ARC support for high energy physics over decades. The ARC has invested tens of millions of dollars through Linkage Infrastructure, Equipment and Facilities (LIEF) grants, Discovery Projects, Linkage Projects, Laureate Future Fellowships – and the Centre of Excellence in Particle Physics at the Tera-Scale (CoEPP).

CoEPP was established in 2011 with a $25m ARC grant over seven years, and led by Geoffrey Taylor of the University of Melbourne. During its lifetime CoEPP contributed substantially to one of the most exciting (and certainly most expensive) international scientific experiments of recent years, the search for the Higgs boson using the world's largest atom-smashing machine, CERN's Large Hadron Collider.

The Higgs boson was a theoretical prediction of the Standard Model of particle physics, explaining how some particles are endowed with mass. The ATLAS experiment was designed and run by leading scientists – including Australia's ARC-funded physicists – to observe the Higgs boson. Despite the ridiculous degree of difficulty, they succeeded, confirming that portion of the Standard Model and producing the first complete explanation for the existence of mass. People won Nobel Prizes, and the most advanced physics captured the imagination of the entire world.

Back home, though, the CoEPP was unable to renew its Centre funding, despite its contribution to the leading edge of fundamental physics. This was not due to hostility or indifference – on the contrary, the achievement was widely celebrated – but to the poor fit between the work of the high energy physicists and the Centre model, which was heavy on administration that far outweighed the science itself. The group needed a light touch model – streamlined and agile – focused more on clarity of purpose and freedom of vision and less on bureaucracy and risk aversion.

This was not an unfamiliar problem – before and after the Centre years, the ground-breaking work of these teams has been funded not as a function of ARC grant design but almost in spite of it, by working around the system. The ARC had to evolve some flexibility in the form of multi-year LIEF grants to keep the lights on for these globally respected scientists.

The problem is by no means unique to high energy physics, nor even to science: it is an issue right across the sector. Alignment of funding models to fit the research, rather than distortion of the research to fit the funding models, will produce a much better return on Australia's investment in internationally competitive research.

1.3. Reforms to actively shape the Australian research landscape

The ARC shapes the Australian research landscape primarily through its two main funding programs, Discovery and Linkage.[23] These programs help maintain a healthy research ecosystem that provides Australia with sovereign capability to advance knowledge and harness emerging research to address national priorities. Through this work, the ARC helps Australia maintain its international standing as a significant contributor to the knowledge, skills and innovation required for an advanced democracy.

> **"There is scope to amend the Act to better define the position and role of the ARC by including objects that reference the Agency's proactive role in shaping the research landscape. This would reframe the mission of the ARC from a granting agency that funds research to an agency that invests in research and creates public value."**
>
> University of Queensland

Over the life of the ARC, the funding programs have evolved and there have been changes made to its application requirements to address potential biases, simplify researcher effort, or clarify eligibility. Other examples of the ARC actively shaping the research landscape include encouraging researchers to use Open Researcher and Contributor ID (ORCID) information to reduce the effort of compiling publication lists (2018);[24] engagement with current and on-going debate around the shift towards open access, open data and open science; and consideration of the Declaration on Research Assessment (DORA)[25] and related initiatives on the future of research evaluation and impact assessments.

The ARC has collaborated with other agencies in the development and renewal of research integrity norms and expectations, including:

- the *Australian Code for the Responsible Conduct of Research* (2018);[26]
- participation in the development of the *National Principles of Intellectual Property Management for Publicly Funded Research* (2013);[27]
- sector leadership on the ethics of research on humans, including the development and renewal of the *National Statement on Ethical Conduct in Human Research* (2007, 2018);[28]

[23] Discovery Grants intend to support fundamental research, it includes Discovery Projects, Discover Indigenous Scheme, Discovery Early Career Researcher Award, Future Fellowships and Australian Laureate Fellowships. Linkage Grants support research collaboration and includes funding for Industrial Transformation Hubs, Industrial Transformation Training Centres, Linkages Projects, ARC Centres of Excellence, Linkage Infrastructural, Equipment and Facilities (LIEF) and Special Research Initiatives (SRI). Australian Research Council. (2020). *An overview of ARC grant opportunities.* https://www.arc.gov.au/overview-arc-grant-opportunities

[24] Australian Research Council. (2018). *ORCID integration into RMS*. https://www.arc.gov.au/news-publications/media/feature-articles/orcid-integration-rms.

[25] DORA. (N/A). *Declaration on Research Assessment (DORA)*. https://sfdora.org/.

[26] National Health and Medical Research Council. (2018). *Australian Code for Responsible Conduct of Research*. https://www.nhmrc.gov.au/guidelines/publications/r41

[27] National Health and Medical Research Council. (2021). *National principles of IP management for publicly funded research.* https://www.nhmrc.gov.au/about-us/resources/national-principles-ip-management-publicly-funded-research

[28] National Health and Medical Research Council. (2007, updated 2018). *National Statement on Ethical Conduct in Human Research.* https://www.nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018

- endorsement and promulgation of standards of conduct when working with Australian Aboriginal and Torres Strait Islander peoples, including:
  - the *AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research 2020* (AIATSIS),[29]
  - the *Ethical Conduct in Research with Aboriginal and Torres Strait Islander Peoples and Communities: Guidelines for Researchers and Stakeholders* (NHMRC),[30] and
  - the *Indigenous Protocols for Producing Indigenous Australian Music, Writing, Visual Arts, Media Arts and Performing Arts* (Australia Council);[31]
- collaboration in the renewal and endorsement of the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes* (NHMRC) (8th edition, 2013);[32] and
- endorsement of the *National Principles of Child Safe Organisations* (Australian Human Rights Commission).[33]

It is anticipated that the ARC will, in collaboration with the sector, continue to initiate work on emerging issues affecting research and the wider academic environment. For example, the role, regulation and implications of the use of artificial intelligence in the conduct of research, particularly since the advent of highly accessible tools like ChatGPT, GPT4, AlphaFold and Snowflake.

The ARC has the expertise necessary to be an active contributor to these kinds of initiatives within Australia and internationally. It should be encouraged to deepen, renew, and expand its in-house expertise and continue to convene relevant expertise from within the sector. The ARC also benefits from engagement with international agencies to learn from and translate international best practice where practical.

Recommendation 2: The National Research Landscape

We recommend that the ARC Act be amended to provide a legislative basis for those functions through which the ARC actively shapes the research landscape over and above the impact from the NCGP.

These include:
- evaluation of the excellence, quality, and impact of research in Australian universities;
- evaluation of the depth and capability of researchers in Australian universities, within and across disciplines;
- promoting and upholding research integrity;
- promoting ethical conduct of research;
- promoting accessibility of publications and research data;
- promoting excellence, equity, and diversity in Australian universities;
- supporting significant, long term research collaborations; and
- partnering with other Government agencies that use ARC systems and processes to deliver peer-reviewed and other research grant programs.

[29] Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). (2020). *AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research.* https://aiatsis.gov.au/sites/default/files/2020-10/aiatsis-code-ethics.pdf
[30] National Health and Medical Research Council. (2018). *Ethical conduct in research with Aboriginal and Torres Strait Islander Peoples and communities.* https://www.nhmrc.gov.au/about-us/resources/ethical-conduct-research-aboriginal-and-torres-strait-islander-peoples-and-communities
[31] Australia Council. (2007). *Protocols for Producing Indigenous Australian Music; Writing; Visual Arts; Media Arts; and Performing Arts.* https://www.lawinsider.com/clause/protocols-for-producing-indigenous-australian-music-writing-visual-arts-media-arts-and-performing-arts
[32] National Health and Medical Research Council. (2013). *Australian code for the care and use of animals for scientific purposes*. https://www.nhmrc.gov.au/about-us/publications/australian-code-care-and-use-animals-scientific-purposes
[33] Australian Human Rights Commission (2018). *National Principles of Child Safe Organisations.* https://childsafe.humanrights.gov.au/sites/default/files/2019-02 /National_Principles_for_Child_Safe_Organisations2019.pdf

> **"The shift of ARC in terms of emphasis of purpose from a source of research funding to a system influencer, if not driver, necessitates a new relationship with the researcher community. It is important that a culture of 'Our ARC' be actively pursued."**
>
> Curtin University

Many respondents noted that direct engagement with the sector by ARC leadership has progressively diminished over time. Constraints on both resources and travel have resulted in the ARC consulting more frequently via institutional channels[34] rather than directly with researchers affected by any new developments. There is an early opportunity for the ARC to reverse that trend and re-build trust and confidence with the research community through enhanced communication and testing of proposed changes to research schemes. The ARC should also harness the collective experience of those who have served on the ARC College of Experts,[35] across other areas of government and in universities to advance these renewal processes in response to new and emerging trends.

> **"Visits from ARC Executive Directors to different universities is a good mechanism but it appears that more resourcing is needed in that space to ensure more widespread availability of Executive Directors.''**
>
> University of New England

We have received other suggestions through the submissions of how the ARC could develop and target new programs to address identified gaps in the research landscape and to support areas that do not fit neatly into the current Discovery or Linkage programs. The submissions also outline processes that could be considered by the ARC in undertaking a Policy Review. [36] As an example, outlined in section 3 there is the overwhelming support for a two-stage funding proposal application process to reduce the overall burden on all involved, and the Panel understands the ARC will consider this in the Discovery Program Process Review currently underway.

[34] The ARC relies on the grants administration provided by university research offices to manage inquiries from applicants and to communicate changes via a network of these grants administrators. This is an important source of communication and feedback on issues, but it should not be the only channel; site visits and discussions with discipline and other leaders often provides valuable and quite different perspectives to those administering grants within an institution.

[35] The ARC engages an ARC College of Experts to play a key role in identifying research excellence. Its members are experts of international standing drawn from the Australian research community. Australian Research Council. (2023). *ARC College of Experts.* https://www.arc.gov.au/about/our-organisation/committees/arc-college-experts.

[36] The ARC will work with the Department of Education to undertake a policy review of ARC programs to determine program needs following this Review of the ARC legislation. Australian Research Council. (2022). *Statement of Expectations 2022.* https://www.arc.gov.au/about-arc/our-organisation/statement-expectations-2022

> "The ARC Act does not outline the purpose and strategic objectives for each ARC funding scheme. These schemes have all been designed to support specific areas of the research community, often in very specific ways. However, some schemes have evolved over time, with some of their original intent becoming diluted, lost or forgotten.
>
> There is a gap in the current ARC documentation – somewhere between the ARC Act and scheme Funding Rules – where the purpose and goals of its funded schemes should be clearly articulated and documented. Without this important record, the purpose can become lost, leaving schemes vulnerable to changes and iterations that can undermine the original intent.
>
> The specific goals and intent of each funding scheme should be clearly articulated in a transparent and robust strategy document."
>
> Science and Technology Australia

Notwithstanding that, we have included in this section below a relatively small number of compelling or urgent considerations that should be achievable within current resources. In forming these recommendations, the tremendously positive impact of the introduction of Australian Laureate Fellowships for women that included a specific mentoring component are particularly instructive here (see 1.3.2 below and Case Study 6).

1.3.1. Review of the Fellowship Program and Assessment Criteria

There is a widespread concern from sector stakeholders about the increasingly poor prospects of securing ARC funding for early career researchers (ECRs). To some extent this can be attributed to factors external to the ARC (overall levels of funding, pressure on budgets within universities, etc.) but irrespective of overall funding levels, several decisions by the ARC in recent years have compounded the problem.

The first was a decision to increase the emphasis on the investigator record ("investigator or capability") criterion to 50% of the assessment weighting, for reasons that appear to have been aimed at standardising the funding rules and weightings across different schemes.[37]

A similar problem is being experienced by mid-career researchers (MCRs) within the Future Fellowships scheme, with full professors (level E)[38] eligible to apply. Genuine mid-career researchers are generally less competitive by comparison for a greater proportion of that funding.

> "The importance of research track record (or Investigator/Capability) is now inversely related to career stage."
>
> Innovative Research Universities

[37] DECRA success rates have been relatively stable over the last ten years of data, with a peak in 2022. The 2012 inaugural DECRA round weighed more heavily towards project quality (quality 50%) to 2023 (project quality and innovation 25%). The selection criteria for candidate capability increased weighting from 30% in 2012, 35% in 2015, 40% in 2019, to 50% in 2023 (ARC Data provided Jan 2023). The length of time from award of PhD was extended during the pandemic with the best of intentions but a consequence, for example, was that DECRAs have been awarded to Associate Professors, a mid-career position.

[38] The Research Whisperer. (2015). *Research academics in Australian universities.* https://researchwhisperer.org/2015/04/07/australian-researchers/.

The way in which the ARC has shifted the balance of criteria (project versus investigator record) and expanded eligibility does not appear to have used the level of analysis and consultation that informed the initial introduction of the tailored Discovery Early Career Researcher Award (DECRA)[39] and Future Fellowship schemes.

The weighting is very important because innovation in project design is less dependent on the opportunities available to early career researchers which in turn is dependent on both the gender and opportunities of the applicants. Expressed differently, the DORA Initiative[40] notes that funding agencies should:

> **"be explicit about the criteria used in evaluating the scientific productivity of grant applicants and clearly highlight, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published."**

The DORA advice applies equally to the research proposal being more important than the other information used in the assessment including researcher records and university research. Thus, as part of the Panel's recommendation below we suggest the ARC address the assessment criteria for early career researchers by reviewing the weighting criteria for investigators and research projects and reviewing any additional eligibility criteria that may inadvertently disadvantage early career researchers whilst fulfilling another purpose. We recommend this be done prior to opening any further fellowship rounds.

It is not surprising that the shift to increasing the weighting for research record followed some loss of experience in academic leadership within the ARC so that the strategic insights required to guide such changes were seemingly absent. This is but one example which on the surface may have aimed to make assessments fairer and more transparent e.g. (by increasing emphasis of investigator record) but in fact has the opposite effect because it assumes the "concept of merit" is unbiased and aligned with innate ability and creativity.[41]

Given the ARC has robust processes for managing conflicts of interest, ensuring the input of high calibre experts and allowing them to exercise judgement in a transparent way remains the best system for the results of grant assessment to be truly merit based.

In addition to the differences in weighting of the record of investigators, many respondents reported that the ROPE had been expanded so much that it no longer fulfilled its original purpose, which was essentially to encourage reviewers to consider valid career interruptions or career changes; and to understand the nature of variations between outputs in different disciplines and circumstances. A positive aspect of ROPE is that the concept of assessing careers relative to opportunity is now well established amongst Australian universities. On the negative side, some groups (e.g. academics with a disability) felt that it may further entrench disadvantage by calling into question their capacity to successfully prosecute their research. Others reported that asking them to recount difficult life experiences was a source of further distress. There should be opportunities to simplify ROPE and address these concerns in the current ARC Policy Review.

[39] Australian Government Australian Research Council, Discovery Early Career Researcher Award (DECRA). https://www.arc.gov.au/funding-research/funding-schemes/discovery-program/discovery-early-career-researcher-award-decra.
[40] DORA. (N/A). *Declaration on Research Assessment (DORA)*. https://sfdora.org/.
[41] Hatch, A and R. Schmidt. (2020) *Rethinking Research Assessment: Unintended Cognitive and System Biases*. DORA. https://sfdora.org/resource/rethinking-research-assessment-unintended-cognitive-and-systems-biases/.

Recommendation 3: Fellowships and Academic Careers

We recommend that:

i. the ARC Act be amended to include within the scope that the ARC assists Australian universities to attract and retain talented academics;
ii. the ARC reviews and consults on the purpose and effectiveness Fellowships at different stages of academics' career including clarifying the different responsibilities of the ARC and universities;
iii. notwithstanding (ii), the ARC give priority to reviewing the support and assessment criteria for early career fellowships prior to any further rounds; and
iv. the ARC review and simplifies the criteria used to assess research opportunities in respect to academic careers.

1.3.2. Advancing Indigenous Australians

Aboriginal and Torres Strait Islander researchers presented a strong case for targeted ARC fellowships as a means of boosting researcher capacity in a critically important area. Previously, arguments have been made that there are too few eligible candidates to justify a Discovery Indigenous DECRA program. However, the number of research doctoral awards completed by Indigenous Australian candidates rose from 9 in 2002 to 53 in 2021, with a total of around 600 doctoral qualifications attained during this time.[42]

The Georgina Sweet and Kathleen Fitzpatrick Australian Laureate Fellowships are awarded to outstanding women researchers in science and technology (Georgina Sweet Australian Laureate Fellowship) and the humanities, arts and social sciences (Kathleen Fitzpatrick Australian Laureate Fellowship).[43] They provide an additional $20,000 per annum for the five years of the fellowship for these Laureate Fellows to "promote and support women in research." To date the named Laureate Fellows have supported hundreds of early career women researchers and supported networks of researchers whose career paths have been interrupted by caring responsibilities. An Australian Laureate Fellowship (Indigenous) would provide similar opportunities through additional funds to promote and support the career paths of Indigenous researchers.

In 2017 the ARC commissioned Wells Advisory to evaluate ARC support for Aboriginal and Torres Strait Islander researchers and research involving Indigenous Australians. Many recommendations from the 2017 review have not been adopted. The Panel considers the issues raised in that report are still significant to the academic career progression of Aboriginal and Torres Strait Islander researchers, including:

- the high proportion of women,
- the higher age at which Indigenous candidates commence doctoral research,
- the very high proportion of Aboriginal and Torres Strait Islander academics in fixed term rather than continuing roles, and
- and their further concentration in teaching-focussed roles.

The relatively small size of the cohort of qualified Aboriginal and Torres Strait Islander reviewers requires the ARC to pay even closer attention to Conflicts of Interest and "request not to assess"[44] processes for Discovery Indigenous proposals and any new specific programs for Aboriginal and Torres Strait Islanders.

[42] Australian Government Department of Education Selected Higher Education Statistics-student data.
[43] Australian Research Council. (N/A). Kathleen Fitzpatrick and Georgina Sweet Australian Laureate Fellows. https://www.arc.gov.au/funding-research/funding-schemes/discovery-program/australian-laureate-fellowships/kathleen-fitzpatrick-and-georgina-sweet-australian-laureate-fellows
[44] The ARC relies on impartial and independent peer review in the assessments of applications. Individuals applying for ARC funding can nominate persons whom they do not wish to assess an application by completing and submitting a Request Not to Assess to the ARC through their Research Office. https://www.arc.gov.au/funding-research/apply-funding/grant-application/request-not-assess.

Recommendation 4: Advancing Indigenous Australians

We recommend that:

i. the ARC establishes a Designated Committee for engagement and consultation with Indigenous Australian academics and their research partners.
ii. the ARC develops as a high priority within the NCGP Discovery Fellowships for Aboriginal and Torres Strait Islander academics across the full career spectrum.
iii. the ARC enhances opportunities within the NCGP for Indigenous Australian community organisations to participate as partners with universities in ARC Linkage Programs.
iv. the ARC introduce two named Fellowships for leading Indigenous Researchers in the ARC Australian Laureate Fellow Scheme, modelled on and adapted from the Georgina Sweet and Kathleen Fitzpatrick Australian Laureate Fellowships.

Work to enhance the Discovery Indigenous Fellowships should be undertaken in consultation with Aboriginal and Torres Strait Islander researchers and have as a guiding principle that these grants should be led by Indigenous Australian researchers.

There was also considerable support for embedding support of Indigenous Knowledges in the purpose of the NCGP.[45] Separately, we heard of some of the difficulties of Indigenous community organisations having trouble with the administrative burden associated with participation as partners in the ARC Linkage Program.

We also note in Recommendation 10 the need to ensure that the evaluation of Aboriginal and Torres Strait Islander Research and capability should be a high priority for a new program of evaluation activities to replace Excellence in Research for Australia (ERA).[46]

Overall, the Panel's engagement with Aboriginal and Torres Strait Islander academics raised a number of issues that could have been addressed more easily and with more currency if there had been a formal consultation committee within the ARC structure for Indigenous Australians. Hence we recommend the Board establish a Designated Committee to ensure regular and more purposeful consultation.

[45] Seven submissions explicitly called for the Act to be revised to recognise the need to expand Indigenous knowledge systems, and recognise traditional knowledge owners or define ARC's role supporting Aboriginal and Torres Strait Islander researcher capacity and opportunity.
[46] Australian Research Council. (2022). *Innovate Reconciliation Action Plan May 2022 to April 2024*. https://www.arc.gov.au/sites/default/files/2022-08/Australian%20Research%20Council%20Innovate%20RAP.pdf.

Case Study 6 – ARC Named Laureate Fellowships shape a generation

The Georgina Sweet and Kathleen Fitzpatrick Australian Laureate Fellows nurture and propel talented women researchers

In 2010, the ARC introduced the Kathleen Fitzpatrick and Georgina Sweet Australian Laureate Fellowships in recognition of the profound contributions of these researchers to their fields, and to advancing women, including in research. The Fellowships are available to women Australian Laureate Fellows, and include additional funding of $20,000 per year, over 5 years, to support and promote women in research.

The Kathleen Fitzpatrick Australian Laureate Fellowship is available to an outstanding Australian Laureate Fellow from the humanities, arts and social science disciplines. The Georgina Sweet Australian Laureate Fellowship is available to an outstanding Australian Laureate Fellow from the science and technology disciplines. The types of activities supported through this additional funding ranged from the seed funding for the Science in Australia Gender Equity (SAGE) initiatives, to scholarships, awards, writing fellowships, residential programs, high school enrichment programs, and publication workshops. The fellows leveraged resources from universities and professional networks and designed activities that would have the most impact in their particular discipline.

Given that the original concept for the Laureat Fellows was to identify leading researchers who had the capacity to develop the next generation, this extension to formalise and provide funding for theses kind of activities was repaid many times over compared to the relatively modest investment of $200 K pa.

Case Study 7 – Aussie sunshine for a brighter future

ARC-funded photovoltaic research vital to the global effort to protect our climate

Research credited with improving the quality of life for billions of people worldwide was strategically funded by the Australian Research Council two decades ago, when the ARC saw an opportunity to lead the world in photovoltaic technology that would soon become a household name.

The ARC had been funding various teams to do world-leading research into photovoltaics for over a decade when it ran an evaluation exercise, utilising its exceptional research intelligence and analysis capability, that identified the possibility of a step-change in research if those efforts could be brought together into a single world-beating force. The 2003 ARC Centre of Excellence in Advanced Silicon Photovoltaics and Photonics was born, headed by Professor Martin Green, 'the father of photovoltaics'.

Australian photovoltaic researchers have received support from the ARC through a variety of programs, including Federation Fellowships, Centres of Excellence, Discovery grants, Linkage grants and LIEF grants. This ARC funding has enabled researchers to produce a remarkable succession of innovations that have put climate-friendly, renewable energy choices into the hands of homeowners and businesses. Additionally, the funding has allowed for the pursuit of spin-off innovations arising from fundamental science.

In bestowing the Millennium Technology Prize on Green in 2022, the Chair of the Technical Academy of Finland, Professor Minna Palmroth, said: 'Professor Green's innovation has already significantly improved the quality of life for billions of people worldwide and will continue to do so. It promotes environmentally sustainable development, from national power grids to private homes.'

Green's research group's contributions to photovoltaics are high profile, including the record for silicon solar cell efficiency for 30 of the last 39 years. The Passivated Emitter Rear Contact (PERC) solar cell invented by Green in 1983, and continually refined by his group, accounted for 91 per cent of worldwide silicon solar module production in 2021. They've achieved world-beating efficiency, including a silicon cell able to convert 20 per cent of the sunlight in outer space to electricity, confirmed by NASA during high-altitude aircraft testing.

This laboratory has also produced a generation of highly trained researchers whose expertise proved critical to transitioning the fabrication industry from high-cost centres of manufacturing to lower cost centres. This shift is credited with the dramatic reduction in fabrication expenses, enabling a step-change in production volume, which in turn has positioned photovoltaics as one of the lowest cost options for the future of electricity generation.

Renewable energy is among the primary mitigation strategies to counter global greenhouse warming, with 'solar photovoltaics' being a formal and priority technology in the latest UN Intergovernmental Panel on Climate Change report.

Global research and development of photovoltaics – launched in Australia thanks to the ARC – has plunged the unit cost of photovoltaics, driving rapid uptake. For the first time, rooftop solar supplied more electricity to Australia last summer than legacy brown coal.

Case Study 8 – Australia, quantum's early bird

ARC backing puts Australia at the forefront of global quantum computing revolution

Computers that are more powerful than anything even conceivable using conventional binary processing are poised to usher in a technological revolution unprecedented in human history in the next few years—and Australian researchers are at the leading edge, with the unstinting support of the ARC.

Horizon scanning at the ARC twenty years ago that deployed its exceptional research intelligence and analytical capability identified an Australian competitive advantage in a field on the cusp of international breakthrough science: quantum computing. The quantum computer is expected to usher in a whole new era in computing, even more dramatic than the integrated circuit revolution in conventional computing over 50 years ago.

Various approaches seek to harness individual atoms and subatomic particles to handle calculations, work currently done by transistors in conventional computing. Unlike the chips in our computers, phones and electronic devices, which rely on classical physics, quantum computers can take advantage of the unique properties of quantum physics – a weird world of probability, superposition and wave-particle duality. By building an electronic device on an atomic scale with information encoded in the spin of a single electron, the hope is not only that computational power and speed will scale enormously, but that whole new dimensions of computational methods will become available, creating capabilities not yet even conceived of.

The ARC was an early supporter of the Australian quantum computing effort, establishing a Special Research Centre in late 2000. Buoyed by promising early results and with the global race well underway, and drawing on the expert of its peer reviewers and research leaders, the ARC converted that collaboration into the 2003 ARC Centre of Excellence for Quantum Computing, headed first by Professor Robert Clark (later the Chief Defece Scientist), a Federation Fellow and later by Professor Michelle Simmons of UNSW, with eight nodes at leading universities and the Department of Defence.

Simmons is one of the world leaders in the field. Twice an ARC Federation Fellow, then an ARC Australian Laureate Fellow and Director of the ARC Centre of Excellence for Quantum Computation & Communication Technology (a successor to the 2003 CoE), she is leading the world in the development of a prototype quantum computer in silicon.

The ARC is supporting other Centres of Excellence in the domain – the CoEs for Engineered Quantum Systems, Exciton Science and Future Low-Energy Electronics Technologies – and has backed numerous Discovery, Linkage and Linkage Infrastructure, Equipment and Facilities (LIEF) grants in quantum computing.

Australia's Chief Scientist, Dr Cathy Foley, described Australia as 'quantum's early bird', and we have not squandered that lead. With ARC support, Australian quantum computing researchers have made world-leading theoretical breakthroughs, pioneered revolutionary techniques in fabrication, and developed spin-off applications such as the atomic scale magnetic resonance imaging (MRI) machine. Australia's research environment has reflected – and indeed at times led – the global progression from fundamental science to applications and outcomes for quantum science.

1.4. Better alignment with comparable research agencies

1.4.1. Alignment of Approval Mechanisms

> "It is in the national interest to have a strong, independent research granting agency."
>
> Universities Australia

When announcing this Review at the *Australian Financial Review* Higher Education Summit on 30 August 2022, Minister Clare emphasised the importance of the ARC enjoying the trust of the research sector.[47] There are many dimensions to this, and the related concept of confidence, but a prominent example is the erosion of trust relating to a series of Ministerial interventions into the grant approval process over the life of the ARC Act.

In response to the request that we consider alignment with comparable research agencies both within Australia and internationally, the Panel advises that the global gold standard is that assessments of individual proposals must be based on expert review free of political interference. For example, the European Research Council (ERC) is composed of an independent Scientific Council, its governing body consisting of distinguished researchers, and an Executive Agency, in charge of implementation.[48] This is enshrined in legislation in the United Kingdom[49] and is the practice in all leading research agencies around the world, as Western Sydney University points out:

> "Such a practice will bring the ARC into alignment with peak research funding bodies, including the European Research Council, the Economic and Social Research Council (UK), the British Academy, the National Research Council of Canada, the Austrian Research Promotion Agency, the Netherlands Organisation for Scientific Research, the Icelandic Centre for Research, the Singapore Agency for Science, Technology and Research, the German Research Foundation and the National Research Foundation of South Africa."
>
> Western Sydney University

Since at least 2001, there have been a series of Ministerial intervention in the ARC grants process, with approval withheld from applications recommended by the CEO for funding following the extensive competitive and rigorous peer review process. Interventions were made by at least four Ministers on at least six occasions.

[47] The Hon. J. Clare, MP. (2022). *The Australian Financial Review Higher Education Summit - Keynote Speech.* https://ministers.education.gov.au/clare/australian-financial-review-higher-education-summit-keynote-speech
[48] European Research Council. (N/A). *ERC at a glance.* https://erc.europa.eu/about-erc/erc-glance
[49] Higher Education and Research Act 2017 (legislation.gov.uk)

These were: Ministers Nelson (2005, 2006)[50], Birmingham (2017, 2018)[51], Tehan (2020)[52] and Acting Minister Robert (2021)[53].

Apart from the interventions of Minister Tehan, which were for national security concerns, the recommended funding proposals were rejected reportedly on the grounds of poor value for money.[54] At face value, the rationale of these interventions amounts to a lack of trust in the peer review process on the part of the Minister of the day, given extensive processes involve consideration of national benefit and value for money, alongside matters of academic excellence, the strength of the project, and its likelihood of success.

The lack of confidence by the relevant Ministers in the ARC in turn creates a spiral that reflects on trust in the ARC itself by other stakeholders. Applying for an ARC grant is a career-defining, labour-intensive process with a success rate of around 20 per cent, and these arbitrary interventions have been a widespread source of despair, particularly acute in the humanities in which the majority of the cancelled projects were focused.

Loss of trust in the process also affected morale on the College of Experts (some members resigned in response to the last incident)[55] and among the community of peer reviewers nationally and internationally, who contribute many hours of expert and serious-minded effort to a detailed and elaborate process. Repeated interventions have also put at risk this largely voluntary contribution of labour which builds trust in the integrity of the peer review processes.

> **"We join the vast majority of researchers in calling for removal of the Ministerial veto from the Act. Research funding decisions are out-sourced to the ARC and no individual can possibly be sufficiently knowledgeable to overrule that process. This would put us in step with the rest of the international research sector."**
>
> Astronomical Society of Australia

> **"By politically interfering in the grant approval process and attempting to direct research towards short-term gain, perhaps for political purposes, it's hard to judge what scientific advances and economic benefits might be lost to Australia."**
>
> Australian Association of von Humboldt Fellows and Australian Association of University Professors

[50] The Hon. Dr. Brendan Nelson AO reportedly declined three ARC recommended grants in 2004 and declined seven in 2005. Official Committee Hansard Transcript (Wednesday, 15 February 2006). *Additional Estimates 2005-06*. pg. 19. https://www.aph.gov.au/Parliamentary_Business/Senate_estimates/eetctte/estimates/add0506/index.

[51] The Hon. Simon Birmingham MP declined six Discovery Early Career Researcher Awards in 2017 and two Future Fellowships in 2018. Official Committee Hansard Transcript (Thursday, 25 October 2018*). 2018-2019 Supplementary budget estimates*. https://www.aph.gov.au/Parliamentary_Business/Senate_estimates/ee/2018-19_Supplementary_Budget_estimates.

[52] The Hon. Dan Tehan MP declined five on the grounds of national security. Official Committee Hansard Transcript (Friday, 4 June 2021). *2021-22 Budget estimates*. pg. 14. https://www.aph.gov.au/Parliamentary_Business/Hansard.

[53] The Hon. Stuart Robert MP declined six grants. Official Committee Hansard Transcript (Thursday, 17 February 2022). *2021-2022 Additional estimates*. pg. 71. https://www.aph.gov.au/Parliamentary_Business/Hansard.

[54] Then Senator the Hon Amanda Stoker Assistant Minister to the Attorney-General, Assistant Minister for Women, Assistant Minister for Industrial Relations is quoted in https://www.aph.gov.au/Parliamentary_Business/Hansard/Estimates_Transcript_Schedule.

See also Liam Mannix. Sydney Morning Herald. *'Desperate, despondent, ignored': Australian science at crisis point*. 20 March 2022. Retrieved from: https://www.smh.com.au/national/desperate-despondent-ignored-australian-science-at-crisis-point-20220310-p5a3g2.html

[55] https://theconversation.com/why-we-resigned-from-the-arc-college-of-experts-after-minister-vetoed-research-grants-175925

> "In some respects, the bureaucratic veto is as much to be feared as a political veto."
>
> Australian Academy of Science

> "One way of restoring trust in the ARC would be to focus the role of the minister in the grant approval process to approval of program scope and criteria, with the ARC tasked with assessing research applications and approving individual grants in accordance with the broader principles agreed with the Government."
>
> National Tertiary Education Union

> "the Act should be amended to consolidate the pre-eminence of academic judgement in the allocation of funding. This should centre around a process of peer-review and through oversight of the ARC board."
>
> Deans of Arts, Social Sciences and Humanities

In every iteration, Ministerial interventions have drawn international attention,[56] and placed at threat the capacity of Australian researchers to form research links with international university and industry collaborators.[57] The practice of over-riding expert advice is anathema to world's best practice, and objections have been raised by foreign governments, comparable research agencies, international learned academies, scientific and academic societies, and in the pages of the world's leading scientific journals.

[56] For example see Inquiry submissions Australian Political Studies Association, Submission 26, pp. 2–3; Professor Brian Schmidt, Vice-Chancellor, Australian National University, Proof Committee Hansard, 9 March 2022, pp. 24, 28–29; University of Tasmania, Submission 52, p. 3; Dr Thomas Nicholls, Submission 5, p. 1. Australian Research Council Amendment (Ensuring Research Independence) Bill 2018 (aph.gov.au)

[57] *Nature* Editorial. (2022). "*Australia must abolish law that allows politicians to veto research grants*". https://www.nature.com/articles/d41586-022-01200-5.

Recommendation 5: Alignment with Comparable Research Agencies

We recommend that the ARC Research Endowment Account be utilised to administer the NCGP with the following provisions:

i. a legislated purpose directs the Account to be used to make grants supporting basic, strategic basic and applied research across all areas of activity in Australian universities excluding clinical health, medicine, and dentistry.

ii. that grants comply with Guidelines and total funding recommended by the CEO and approved by the Minister in compliance with the provisions and requirements of the Commonwealth Grant Rules and Guidelines 2017.

iii. grants recommended by the CEO may be approved by the Board when:

- the requirements under (i) and (ii) have been met;
- the recommendations have been informed by appropriate expert and peer review; and
- the recommendations demonstrate the potential outcomes of the proposed research to the Australian community which may include enhanced research capability and advancement an academic discipline to the benefit of the Australian community.

iv. the obligations of the ARC (i.e. Board and CEO) in relation to national security and NCGP are transparent; and that provision is made over and above these so the Minister may direct the CEO to not fund or to recover funds from grants made under the NCGP if the Minister were to become aware of national security concerns in relation to the grant or proposal. In the event of such a direction, the Minister must notify Parliament, stating the reasons for the direction; and/or report to the Parliamentary Joint Committee on Intelligence and Security or its successor where the security concern precludes the Minister reporting the detail of such a direction to Parliament.

The Board will also be better placed than either the CEO or the Minister to scrutinise the provisions around national benefit and the extent to which proposals address the" national interest." We have not detailed here the feedback in relation to the application of the National Interest Test but recommend the ARC review approval processes once the Board is established to ensure that any new approval processes do not reactivate concerns about the way in which it was administered previously.

The rationale for the remainder of the provisions in relation to national security is detailed further below. The provision of a two-stage approval process (i.e. CEO recommends to a Board who have broad disciplinary experience) is similar to the NHMRC where grants are recommended to the Research Committee before advising the applicants and the Minister. To our knowledge the Minister for Health has never vetoed a grant recommended by the NHMRC Research Committee.

1.4.2. Role of Eligible Organisations

Australia's research sector has an excellent reputation for the quality of its outcomes and the integrity with which research is conducted; and the ARC has a well-deserved reputation for the quality of its administration and accounting of the grant programs in accordance with the Commonwealth grant guidelines. Eligible organisations are obliged through funding agreements to enable the ARC to recover funds for ethical or financial irregularities. The capacity of the ARC is based on the model of providing funding through Eligible Organisations (i.e. universities) rather than directly to potentially thousands of individuals or smaller organisations without the capacity to ensure a rigorous compliance regime. Eligible organisations must comply with:

- the *Australian Code of Conduct for Responsible Research, National Statement on Ethical Conduct in Human Research, and Australian Code for the Care and Use of Animals for Scientific Purposes*, [58]
- the *AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research*,[59]
- financial obligations, audited accounts and financial statements,
- *Guidelines to Counter Foreign Interference in the Australian University Sector*,[60]
- the *Security of Critical Infrastructure Act 2018*,[61]
- the *Defence Trade Controls Act 2012*[62] and
- a range of other government guidelines regulators including TEQSA.

1.4.3. National Security Issues

In 2020, 18 recommended funding proposals were referred to security agencies owing to national security concerns, with the Minister reserving his decision: 13 were eventually approved and 5 rejected. The actual process by which the assessment of security issues was made and the grounds for these grants being rejected was not clear in every case, inviting speculation that this was potentially another form of political interference rather than the proper exercise of ministerial oversight of national security. More recently, the ARC has increased its expertise and engagement with relevant government agencies in relation to national security issues. The government has also recently noted that the University Foreign Interference Taskforce Guidelines provide appropriate means for addressing foreign interference.[63]

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[58] Australian Government National Health and Medical Research Council. (2018). *Australian Code for the Responsible Conduct of Research.* https://www.nhmrc.gov.au/about-us/publications/australian-code-responsible-conduct-research-2018.
Australian Government National Health and Medical Research Council. (2018). *National Statement on Ethical Conduct in Human Research (2007) - Updated 2018.* https://www.nhmrc.gov.au/about-us/publications/national-statement-ethical-conduct-human-research-2007-updated-2018.
Australian Government National Health and Medical Research Council. (2013). *Australian code for the care and use of animals for scientific purposes*. https://www.nhmrc.gov.au/about-us/publications/australian-code-care-and-use-animals-scientific-purposes.

[59] Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). (2020). *AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research*. https://aiatsis.gov.au/sites/default/files/2022-02/aiatsis-code-ethics-jan22.pdf.

[60] University Foreign Interference Taskforce (UFIT). (2021). *Guidelines to Counter Foreign Interference in the Australian University Sector*. https://www.education.gov.au/guidelines-counter-foreign-interference-australian-university-sector/resources/guidelines-counter-foreign-interference-australian-university-sector.

[61] *Security of Critical Infrastructure Act 2018.* (Cth)

[62] *Defence Trade Controls Act 2012.* (Cth)

[63] Australian Government Department of Home Affairs. (2023). *Government response to the Parliamentary Joint Committee on Intelligence and Security report: Inquiry into national security risks affecting the Australian higher education and research sector*. https://www.homeaffairs.gov.au/reports-and-publications/reviews-and-inquiries/inquiries/government-response-national-security-risk-affecting-higher-education-research-sector.

The ARC, CEO and Board have on-going obligations in respect to national security but in rare cases the Minister may be made aware of concerns with a sufficient urgency or high-level of secrecy that cannot be shared with the Board, CEO, or university. Hence it is prudent that the legislation contemplates a scenario for the Minister to exercise power in relation to national security concerns either for an application for funding or for a previously awarded grant, that is *at any stage* of the grant lifecycle. Further, we recommend that there be oversight by the Parliamentary Joint Committee on Intelligence and Security[64] or its successor of such a direction, separate to the current general provision requiring the reasons for such a direction to be tabled in Parliament, to ensure that any such necessary decision has appropriate scrutiny.

Generally, an eligible organisation and the ARC will respond in such a way that there should be no need for a Minister to intervene. This is the case at present when research misconduct (including misrepresenting research records or preliminary results) or financial irregularities are detected. An administering organisation has obligations to report to the ARC and return funding where this has occurred.

> **"Any ministerial deviations from advice received from the ARC, following peer review processes, should require a detailed rationale that is made publicly available. This should detail the way in which the proposed proposal exhibited significant procedural concerns or similar or had content which was deemed to be clearly in conflict with the national interest. Ideally this rationale should be subject to review by and advice from the ARC before the decisions are finalised, again suggesting the ARC should have a higher level of in-house expertise to ensure the Minister is properly advised."**
>
> University of Adelaide

1.4.4. Australia's Research Integrity Framework

The ARC's role in promoting and maintaining research integrity in Australia was not agreed by the Australian Government until after the ARC was established in 2001 and has continued to expand since the ARC co-authored the first Code in 2007. This role is not reflected in the current ARC Act.

The research integrity framework in Australia is underpinned by the *Australian Code for the Responsible Conduct of Research* (2018) (the Code),[65] and supporting guides, including the *Guide to managing and investigating potential breaches of the Australian Code for the Responsible Conduct of Research* (2018).[66] The Code is co-authored by the ARC, NHMRC, and Universities Australia.

Under the Code, institutions are responsible for managing research integrity concerns, including investigating, and putting in place any remedial actions, which could include actions on a researcher found to have breached the Code.

The NHMRC is responsible for health and medical research and the ARC is responsible for all other research disciplines. The research integrity framework is largely self-regulated within the context of a national framework. The Code articulates the broad principles that characterise an honest, ethical, and conscientious research culture. It establishes a framework for responsible research conduct that provides a foundation for high-quality research, credibility, and community trust in the research endeavour.

[64] The Parliamentary Joint Committee on Intelligence and Security is a statutory joint committee established by the *Intelligence Services Act 2001*.

[65] Australian Government National Health and Medical Research Council. (2018). *Australian code for the Responsible Conduct of Research*. https://www.nhmrc.gov.au/about-us/publications/australian-code-responsible-conduct-research-2018. Both the Code and the Investigation Guide are issued under section 7(1)(a) of the NHMRC Act..

[66] Australian Government National Health and Medical Research Council. (2018). *Guide to Managing and Investigating Potential Breaches of the Australian Code for the Responsible Conduct of Research*. https://www.nhmrc.gov.au/sites/default/files/documents/reports/guide-managing-investigating-potential-breaches.pdf.

The primary responsibility for ensuring the integrity of research lies with individual researchers and institutions. [67] The Code sets out principles and responsibilities that both researchers and institutions are expected to follow when conducting research. To be eligible to receive ARC funding, it is a requirement that institutions comply with the Code. In addition to the Code, the ARC Research Integrity Policy (the policy), first published in 2015, aims to promote and support research integrity and safeguard confidence in the value of publicly funded research. The policy outlines the ARC's role in research integrity, including supporting the ARC's grant processes, and the possible consequences for research institutions and individuals if appropriate standards are not maintained.

The Code, its guides and the ARC policy are designed to create and promote a collaborative approach to research integrity where researchers and institutions are invested in creating a culture of excellence. The current research integrity framework ensures Australia produces high quality, credible and trustworthy research. NHMRC and the ARC established the Australian Research Integrity Committee (ARIC) to review institutional processes used to manage and investigate potential breaches of the Code. ARIC assists with ensuring that institutions follow proper processes in investigating potential breaches of the Code.

The ARC and the NHMRC jointly administer ARIC to:

- review the processes by which an institution that is eligible to receive funding from the ARC and/or the NHMRC has managed and/or investigated a potential breach of the Code;
- provide findings and, where relevant, recommendations to the CEO of the ARC and/or the CEO of the NHMRC; and
- publish de-identified information on its activities at least annually.[68]

The ARC has its own internal Research Integrity Review Committee (RIRC). Under the ARC's Research Integrity policy, this committee may recommend consequential actions if it considers that the integrity of the ARC's peer review processes, grant selection processes, funding recommendations and/or research outcomes have been compromised. We also note that careful attention should be paid to requests not to assess within different subgroups of the academic community which are either relatively small or prone to conflict for historical and disciplinary reasons.

Institutions that conduct research and employ researchers – universities, medical research institutes and other institutions – have a central role in the promotion of research integrity. Institutions are responsible under the Code, and as specified in ARC and NHMRC funding/grant agreements, for investigating any concerns and complaints related to research for which they are responsible and for taking any disciplinary and corrective actions. This reflects the fact that researchers are employed by these institutions, and it is through the employment relationship that researchers' practices and behaviour can be directly managed. For example, institutions enforce employment codes of conduct and under these have a range of measures available to them, such as counselling, fines, demotion, and termination of employment. In the main, Australian researchers and universities actively manage their roles and responsibilities under the framework and support its veracity. However, there are limited instances where some researchers and universities do not respond effectively or continue undesirable behaviours. The lack of legislative underpinning does present issues on these occasions.

The inclusion of research integrity functions in the ARC Act would demonstrate the ARC's integral role in this area and provide a robust platform to ensure ARC funded research is conducted to meet the highest community and sector expectations and standards. Further legislative underpinning of the ARC's research integrity functions would provide greater clarification regarding potential administration issues and sanctions, which would assist in providing transparency for all involved.

[67] Australian Research Council, Policy and Strategy Branch. (2021). *Research Integrity Policy*. https://www.arc.gov.au/sites/default/files/2022-06/ARC%20Research%20Integrity%20Policy.pdf. National Health and Medical Research Council. (2019).
NHMRC Research Integrity and Misconduct Policy. https://www.nhmrc.gov.au/about-us/resources/nhmrc-research-integrity-and-misconduct-policy.

[68] The latest figures are at the Australian Research Integrity Committee (ARIC). *Annual Report to the Sector, 2021-22*. https://www.arc.gov.au/sites/default/files/2022-11/ARIC%20Annual%20Report%20to%20Sector%20FY%202021-22.pdf.

In recommendation 2 we have made provision for the purpose of the ARC to include promoting and upholding research integrity as per the recommendation from ARIC. We note that this does not mean the ARC has an exclusive role in relation to research integrity or that some of the role of ARC and ARIC may not be incorporated into, or support, other arrangements that have a broader remit at some point in the future.

1.4.5. Financial Oversight of Grants, Pre and Post Award Funding

The ARC has well-developed processes that operate alongside the audit and oversight functions of eligible organisations. We received a number of suggestions in submissions that could improve clarity of responsibilities and ease the burden on both university administrators and the ARC itself. Some argued that the ARC has become increasingly risk averse in relation to overseeing the nature of the expenditure on individual grants while at the same time reducing the overall proportion of the cost of research (both the direct and indirect costs). The feedback is that the level of resources and time that is involved in scrutiny and detailed examination of proposed expenditure (including by the College of Experts) is disproportionate to the evaluation of outcomes and becoming more so. For example,

> "The overall culture of the ARC is very risk adverse. For example, it approves funding for a specific project, contracts the research institution to deliver that project, but still has to approve changes made to the project. A higher, more strategic level of oversight, with responsibility for project delivery against the intent of the project placed in the hands of the research institution, would be a more efficient approach requiring less effort from all concerned."
>
> University of Adelaide

> "The length of ARC applications is prohibitive and creates unnecessary burden and duplication of effort. UOW would advocate for a ground-up review and redesign of ARC application forms and processes, which have evolved organically and with little thought for the holistic impacts of local changes over many years."
>
> University of Wollongong

Case Study 9 – ARC-funded history enlivens our dark convict past

Research helps turn Australia's convict heritage from shame to understanding

Over the 80 years between 1788 and 1868, about 165,000 convict men and women and children, mostly from working class backgrounds, were transported to Australia from British and Irish ports in 825 convict vessels.

A succession of ARC-supported projects has explored every element of the convict experience – including the physical effects of convict labour, the impact of penal reforms on the diet and health of convicts on land and sea, the propensity to re-offend, colonial activism and the effects of solitary confinement – contributing to a better understanding of the building blocks of modern Australia, every one doused in convicts' sweat and blood.

An estimated 20 per cent of today's Australians descended from these forced migrants and exiles. Well into the twentieth century, the idea of a national 'birth-stain' persisted, characterised by 'hostility to, embarrassment about or rejection of a country's convict past'.

But shame and silence began to be replaced by a fascination and 'upsurge in the popularity of family history' following the Bicentenary of European settlement in 1988. Thanks to the painstaking work of Australian historians, Australians are now increasingly informed about how the convicts – including the ancestors of many of us – built the roads, harbours, and public buildings, cleared the land to establish agriculture, husbanded cattle and sheep stock, and made tools, barrels, boats and ships to support the establishment of settler Australia.

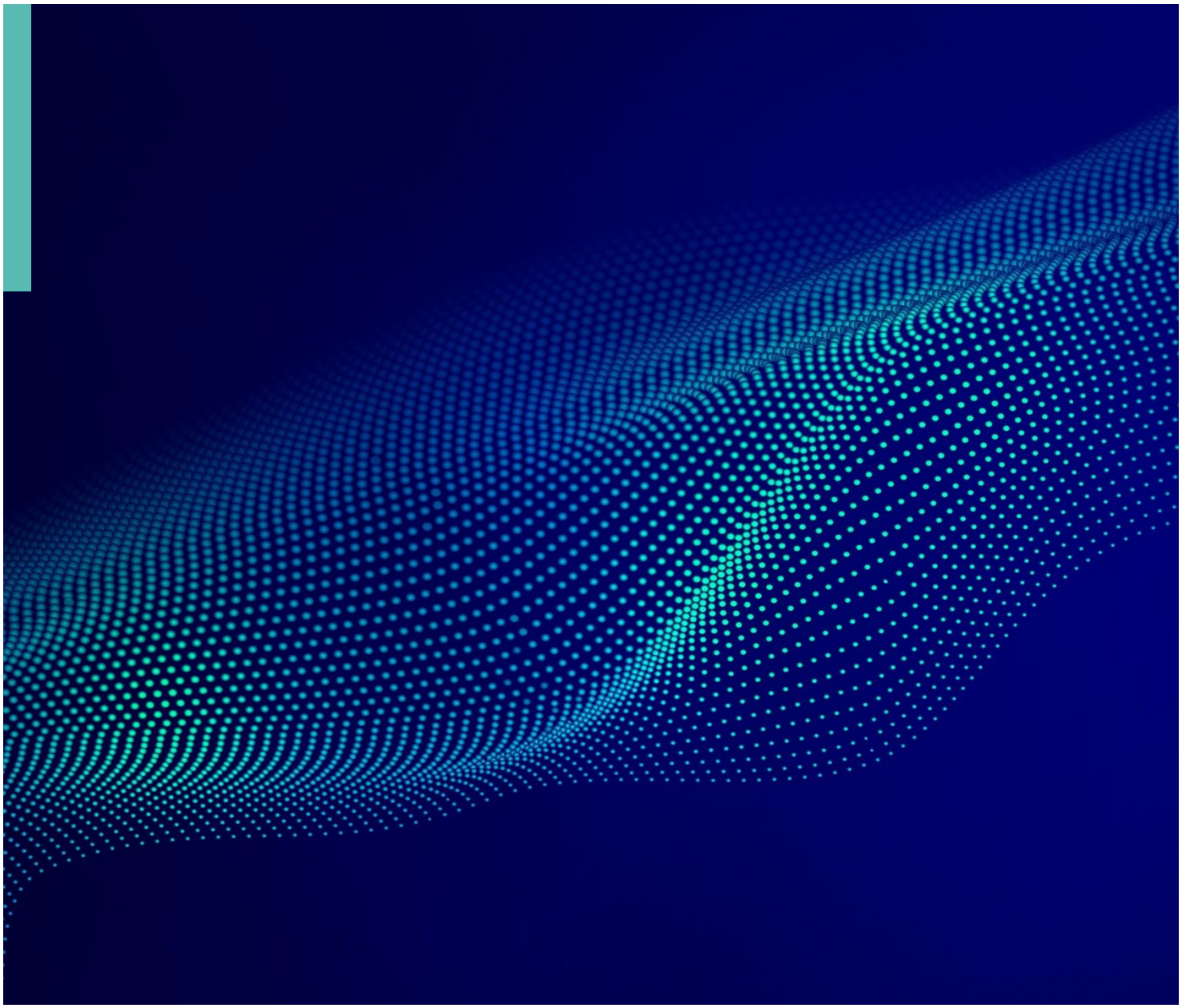
We don't have to rely on their thumbprints in the bricks of heritage buildings to inform our understanding – there is a rich font of historical research, overwhelmingly funded by the ARC over decades, to educate us, ranging from the systemic to the specific, with the fruits of this expertise expressed in a wide variety of formats including books, exhibitions, television programs and UNESCO applications for world heritage listing.

ARC-funded research has meticulously documented the key elements of the early convict system, a tiered structure that put convicts into either private assignment, public works or punitive labour in chain gangs and penal stations, before transitioning to regulated forms of parole and pardon – or to further servitude in penal hellholes for those who reoffended while under sentence in the new colony.

Other ARC projects have traced the trajectories of Tasmanian convicts and their descendants, especially the original 'Diggers' who served in the First Australian Imperial Force during World War One; and overturned the myth of Eora First Peoples' displacement from early Sydney, demonstrating that Sydney was 'a shared and contested place' even as involuntary convict labour literally built the colonial settlement from the ground up.

ARC-funded research helped provide the rigour, authenticity, and integrity to achieve the 2010 UNESCO World Heritage Australian Convict Sites listing for 11 key sites, which UNESCO says represent 'the best surviving examples of large-scale convict transportation and the colonial expansion of European powers through the presence and labour of convicts.'

2. GOVERNANCE



TOR 2. Governance

Consider the ARC governance model and management functions and structures to ensure they are contemporary, fit for purpose and meet the needs of stakeholders.

2.1. Current governance arrangements

The ARC Advisory Committee was established in 2022 as a Designated Committee (under Part 4 of the ARC Act)[69] to replace the Advisory Council which had been in place since 2008. The original ARC Act in 2001 established a Board that oversaw the ARC and reported to the Minister and oversaw the appointment and management of the CEO. The Board was abolished in 2006[70] and thereafter the CEO was appointed by, and reported directly to, the Minister.

The Panel sought feedback on how the ARC Act could be amended to strengthen governance, including the re-establishment of the Board of the ARC, with contemporary modifications to the 2001 design.[71]

The College of Experts was previously a Designated Committee with appointments made by the Minister under Part 4 of the ARC Act.[72] This practice was changed in around 2011 to reduce the administrative burden of individual submissions to the Minister when College members resigned or were no longer available. It has been argued that the streamlined processes diminished the standing of the College and the oversight of their quality and relevance of the qualifications.

2.2. Recommended governance model

In response to the discussion paper there was strong support for establishing an ARC Board with functions that will enable the contemporary administration of the Agency and ensure continuity of purpose, quality assurance and academic expertise.

> "some of the communication and policy challenges in recent years may have been avoided if a board was present."
>
> Universities Australia

[69] *Australian Research Council Act 2001.* (Cth). Part 4.
[70] The ARC Advisory Board was abolished in 2006 by then Minister for Education Brendan Nelson on the grounds that it was "inconsistent with the executive management model" of the Review of the Corporate Governance of Statutory Authorities and Office Holders, by John Uhrig. Quoted in FASTS critical of ARC board sacking (labonline.com.au) Urhig review available at ParlInfo - The Uhrig Review and the future of statutory authorities. (aph.gov.au)
[71] Of the 112 submissions that explicitly addressed the question of whether or not to establish a board 87.5% were in favour, 8.9% were opposed and 3.6% were undecided.
[72] *Australian Research Council Act 2001.* (Cth). Part 4.

"the ARC currently does not have the formal governance and advice structures properly to support the CEO"

Group of Eight

"The Act should include provisions for appointments to the Board that minimise the possibility of appointments on the basis of political favour, with fixed terms, clear criteria for removal and *pro tem*[pore]appointments, and some guidance on the characteristics required for appointment to the Board. This might include a provision for the Minister with responsibility for the ARC to seek advice from other Ministers and from higher education and research peak bodies on Board appointments."

Charles Sturt University

"The Act should specify that the [Board] members have expertise across a range of different fields of research … No positions should be reserved for interest groups."

Australian Academy of Science

"The ARC Board should be provided with the means and resources to regularly consult with Australian research community groups."

Royal Australian Chemical Institute

Recommendation 6: ARC Board

We recommend that:

i. the ARC Act be amended to enable the establishment of an ARC Board with the following functions:

- to appoint a Chief Executive Officer (CEO).
- to provide advice to the CEO and the Minister on priorities, policies and strategies.
- to approve the appointment of the College of Experts.
- to establish and appoint members to other such committees as it deems beneficial for the effective functioning of the ARC;
- to approve recommendations for funding within the National Competitive Grants Program; and
- to undertake any other functions as requested by the Minister.

ii. the Board be appointed by the Minister and comprise:

- a Chair, who is a prominent Australian, held in high regard by the universities and their partners in the research community.
- up to six other members with a combination of skills, experience, and perspectives relevant to the functions of the ARC across the spectrum of ARC disciplines, Aboriginal and Torres Strait Islander leadership, research administration and evaluation, and university industry partners.

iii. the ARC CEO and Secretary of the Department (or delegate) would attend Board meetings to ensure coordination and communication with appropriate separation of advice to and from the Board and to the Minister.

The overriding consideration is the establishment of the Board with the powers and functions above, not simply an enhanced advisory body. The Board would necessarily become the accountable authority for administration of the Agency under the terms of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) with responsibilities for the proper functioning of the Agency.

The Panel considered a variety of models from the Australian Curriculum and Assessment Authority (ACARA) through to the need for a Commonwealth Commission as is the case for TEQSA. By specifying at the outset, the need for, and the role and functions of the Board, the criteria and expertise of the members required is more evident and justifies the incremental cost and complexity of its establishment. The NHMRC has a Council rather than a Board but it also has a very different range of functions to the ARC, including in relation to formulating clinical guidance and standards in relation to health and medicine, and other statutory obligations. Hence the NHMRC Council has ex-officio Members from the Commonwealth, States and Territories.

The ARC's purpose has some small overlap with some activities of the NHMRC and CSIRO, but each has a role in supporting the national research effort (See Case Study 10 on Wi-Fi). The NHMRC and CSIRO have specific roles in the application, translation and transfer of research and technology, while the ARC supports basic and applied research across all disciplines. The ARC is responsible to the Commonwealth Minister for Education, the NHMRC is responsible to the Commonwealth Minister for Health and the CSIRO is responsible to the Minister for Industry and Science. The NHMRC supports the distribution of the Medical Research Future Fund (MRFF) through its grants assessment and selection processes.

The function we propose here for the Board requires members with broad expertise across the spectrum of ARC-funded disciplines and collaborating organisations, including sufficient senior management and governance experience to fulfill that role.

2.3. Appointment of the Chief Executive Officer

The Panel recommends that the appointment of the ARC CEO be a function of the Board. Since the ARC is a statutory agency (ARC Act, section 41), it is the provisions of the ARC Act that govern the appointment of the CEO, not the provisions of the *Public Service Act 1999* regarding heads of executive agencies (PSA, section 67). The Board appointment of the CEO would be subject to the usual process of executive government approval including those entailed in the Cabinet Handbook, subsection 115 (b). We would anticipate that the provisions relating to the appointment of the CEO would also require consultation with the relevant Minister and comply with the provisions and determinations of the Remuneration Tribunal.

> **"The ARC CEO's experience and profile should reflect the ambitions we have for the ARC itself"**
>
> Australian Academy of the Humanities

> **"….the CEO should be required to have a strong track record in both research and research management, not simply for the Minister to consider these and then discount research track record as at present."**
>
> University of New South Wales

The rationale for the Board appointment is that the Board will be more familiar with the needs of the organisation at any given point in time. The Board is more likely to have detailed knowledge of potential applicants and their reputation and likely trajectory. A board should also be able to plan the succession and transition with more purpose thereby avoiding where possible lengthy breaks between CEOs (as has been the case on several occasion over the past 20 years).

Recommendation 7: Appointment of the Chief Executive Officer

We recommend that:

i. The ARC legislation be amended to reflect that the ARC Chief Executive Officer (CEO) be appointed by the Board after consultation with the Minister in accordance with other Government requirements for the appointment of statutory office holders.

ii. The Board must have regard to the research experience and standing in a relevant academic discipline in addition to a record in management when making such an appointment.

iii. The CEO's terms of the appointment be aligned to those of the CSIRO CEO.

2.4. Other management functions

The ARC Act in section 3(a) specifies that the advice of the ARC to the Minister is to be of high quality. While *high quality* is not defined it is implicit and established by practice that the advice is over and above that which can be sourced from within other parts of the Minister's portfolio or the public service more generally. The ARC Act is silent on the question of how the necessary expertise is to be secured, except in section 34 (2) in relation to the research record of the CEO.

The ARC appoints Executive Directors who are academic discipline leaders with research experience, hold the high regard of their respective research communities, and have credibility with relevant stakeholder communities. More recently the ARC has appointed a Chief Research Officer. The incorporation of direct expertise within the Agency has allowed the ARC to retain currency of disciplinary practice and industry needs pertinent to research funding, conduct and evaluation, across its fields of research.

> "To ensure peer review is focused and efficient, the Act should also specify that the ARC maintain academic expertise selected based on excellence across the breadth of relevant disciplines."
>
> La Trobe University

> "The CEO of the ARC and the Executive Directors should all be required by the *ARC Act* to have a senior academic background and an esteemed profile as a researcher. … To maintain currency of expertise, the *ARC Act* should impose term limits of five years on key roles."
>
> University of Melbourne

The ARC also uses the profound and extensive expertise of its College of Experts, from which are drawn Selection Advisory Committee members who assure the quality of the recommendations for funding. Appointment to the College of Experts is a prestigious recognition of the experience, acumen and standing of the members. In the focus groups held with College of Experts we heard a number of suggestions for improvements and we recommend the ARC particularly seek the advice of current and former members of the College in undertaking their process review. A strong theme was the desire for more discussion and debate, before, during and after meetings in consultation with the Executive Directors. The majority also felt that despite the convenience of online, the face-to-face selection meetings were more informed when developing their funding recommendations with confidence that all aspects, including complex interactions between reviewers with different paradigms had been considered.

> "[*The College of Experts should*] consist of appropriately qualified researchers of high standing, representing relevant fields of research, contain a balance of gender and career progression, and be appointed by the Board following a transparent application process."
>
> Australian Catholic University

We did not seek explicit feedback on the management functions of the ARC apart from the question of expertise. We note that the capacity to attract the expertise depends on a range of factors and that the ARC has recently recruited additional academic expertise.

> "Overall, the ARC's longstanding practice of appointing Executive Directors (EDs) with high standing in the research community has worked well. Codifying these positions in the ARC Act would avoid the situation where ED roles become vacant and are not filled. We welcome the appointment of new EDs for the Social, Behavioural and Economic Sciences and for the Humanities and Creative Arts. These roles had been vacant for some time, leading to an erosion of engagement, and trust, with the sector. … The appointment of a strong group of accomplished researcher leaders across the disciplines for fixed terms serves to strengthen the ARC's capacity for providing high quality advice, as well as its standing with the research community. It also helps to provide opportunities for senior academics to bring their knowledge of research and the higher education sector to the work of the ARC, and vice-versa, when they return to roles in universities or elsewhere. The value of these positions, if they are utilised to provide strategic engagement, policy advice and to channel expertise from the sector to the ARC, cannot be overstated."
>
> University of Sydney

Recommendation 8: Management and Consultation

We recommend that:

i. the ARC CEO and the Secretary of the Department of Education review arrangements to achieve a balance of the senior academic expertise required by the ARC, vis-a-vis the Senior Executive Service (SES) appointments within the constraints of the ARC Departmental funding.

ii. the ARC CEO and Academic Executive Directors be expected to engage in broad and direct consultation with the academic and research community; university research administrators; other government departments; and key stakeholders, when evaluating and adapting grant programs to ensure the original purpose remains relevant and that any changes are made with full consideration of the consequences.

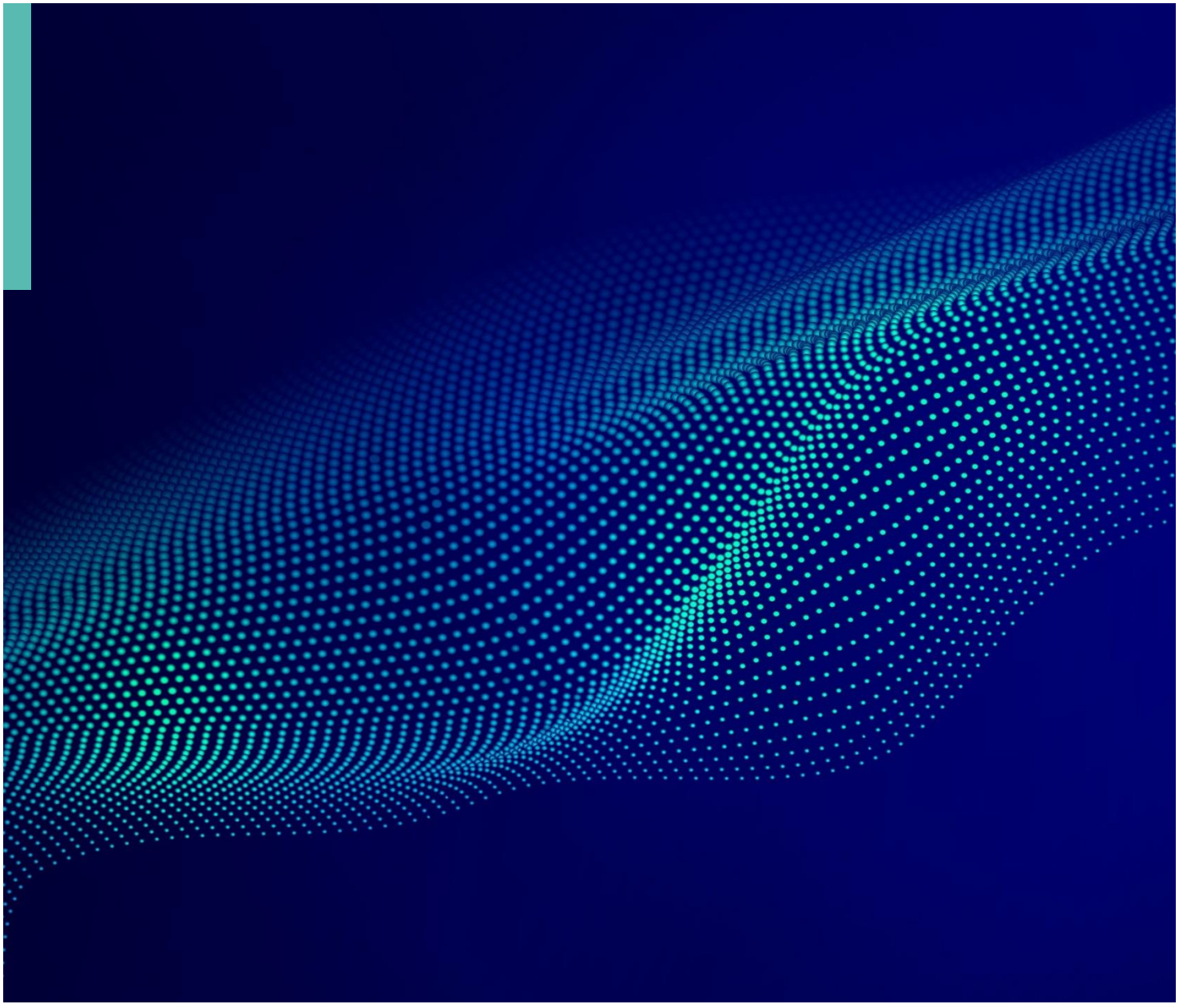
2.5. The needs of stakeholders

The ARC operates within an intricate, multidimensional, and diverse landscape, characterised by both distinct and overlapping research domains. This environment necessitates that the ARC addresses the unique needs, expectations, and aspirations of a wide range of stakeholders, including early and mid-career researchers, established academics, and professionals from STEM, HASS, and other disciplines. As a pivotal leader in the Australian research sector, the ARC must remain agile and adaptive, fulfilling various roles, such as a responsible grant funder, administrator, customer, or vendor, while staying true to its legislated roles and its core vision and mission.

The ARC has recently taken significant steps to align its activities with many of the suggestions we have received, and recommendations presented here, and this proactive approach is to be commended. Furthermore, the ARC has recently adopted improved practices in a number of areas, demonstrating their commitment to addressing the needs of researchers and communities of practice. It is essential to recognise and applaud the ARC's efforts in implementing these changes.

However, there are still areas where the ARC has not acted or has not been resourced to do so. In these cases, it is crucial for the ARC to take a proactive leadership role, engaging in deep consultation with communities of practice and researchers to foster policy innovation that advocates for the resourcing and prioritisation of these important initiatives. By doing so, the ARC can further strengthen its commitment to supporting research and ensuring the inclusion and success of researchers in the Australian research landscape in a timely, fair and effective manner.

3. GLOBALLY COMPETITIVE RESEARCH



TOR 3. Globally Competitive Research

Consider opportunities to improve the legislation to better facilitate globally competitive research and partnerships, reduce unnecessary administrative and legislative burden and increase agility.

3.1. Facilitating globally competitive research across the full spectrum from basic to applied research

The critical role the ARC plays in supporting Discovery research (i.e. investigator-led research) cannot be overstated. In 2021-22, for example, the funding in the ARC Discovery Program was $490 million out of the total Australian Government investment in research and development of $11.83 billion – or a little over 4 per cent. In submissions and consultations, we heard repeatedly about how vital that role in basic research can be in seeding future applications and commercial developments that could not be anticipated at the time of initial application (see Case Study 4, above).

> "The single most important function of the ARC is supporting fundamental research across the disciplines. This is the ARC's unique role in the system, no other agency performs this function."
>
> Australian Academy of the Humanities

> "it is government responsibility to fund the 'patient' capital that leads to discovery"
>
> Australian Academy of Science

> "it is the ARC Discovery program that has the most unique impact on Australia's research system."
>
> Innovative Research Universities

> "There is no individual or organisation that can predict where the biggest impact from research and innovation will come from."
>
> Australian Academy of Health and Medical Sciences

> "The very nature of fundamental research is that its impact can be hard to predict both in terms of scope and time frame."
>
> Royal Australian Chemical Institute

> "the biggest seismic breakthroughs in science and research have historically come from discovery or blue-sky research, not from translational or applied research."
>
> Science and Technology Australia

> "the ARC is the only significant source of funding for fundamental research in Australia."
>
> Australian Mathematical Sciences Institute, Australian Mathematical Society and Statistical Society of Australia

The distinction between *Discovery* and *Linkage* is not a simple division between basic and applied research but rather distinguishes between Discovery programs that are investigator-led (in the form of projects and fellowships) and Linkage programs that involved partnerships and collaborations between universities, industry, or government and other end users.

There are many examples of investigator-led Discovery proposals which would fit the definition of applied research and equally programs in Linkage that have resulted in some of the most successful examples of basic research yielding outcomes in the long term that could not have been anticipated at the time of the initial funding (see Case Study 10).

Linkage was from the outset not intended as a code for *Industry* or applied research, but it has over time been often mis-interpreted that way. A more recent (from around 2015 onwards), narrower interpretation appears to have had greatest impact on the Centres of Excellence Program, evident in the guidelines and in accounts of applicants and reviewers placing greater weight on numbers of end-users and commercial outcomes rather than the need to build capability through long-term funding. The tilt towards a more applied agenda in the Centres of Excellence Program is arguably unnecessary given the existing emphasis of the Industrial Training Centres and Hubs and the recent additional funding for Industry Fellowships, which should meet that need.

> "the role of a national funding agency such as the ARC is precisely to strongly support discovery-driven research because individual entities in the public and private sector cannot warrant the high risk nor guarantee whole-of-society benefit associated to such research."
>
> Mathematical Research Institute MATRIX

> "without the fundamental research being performed, there is no applied research or application down the track. Further, justifying basic research in terms of later applications is short-sighted and simply impossible for some of the more revolutionary research: even at the time, later applications could not be foreseen"
>
> Astronomical Society of Australia

> "The ARC is the only funding body for blue skies non-medical research in Australia. As such Discovery style research must be protected from erosion and short term transfer to linkage programs."
>
> Australian Centre for Excellence in Antarctic Science

The ARC Act has a series of provisions (e.g. section 50) to ensure a "balance" between Discovery and Linkage research that are not always effective, have been subject to mis-interpretation and add to the complexity of designing a balanced suite of Programs and Schemes.[73] We recommend that the ARC Act be simplified to remove the provisions from legislation that relate to the split between Discovery and Linkage but the commitment to funding basic research should be incorporated into the purposes of the ARC Act along with an explicit statement about the value such investigator-led basic research affords in underpinning the remainder of the research ecosystem.

[73] These appear to be framed to limit the ARC from expending on Discovery research when additional funding was provided in 2001 as part of the Backing Australia's Ability reforms in 2002-2001 but this has been superseded by other developments and adds further complexity to the management of the NCGP.

Case Study 10 – The Australian origins of global Wi-Fi

Every time you use Wi-Fi, you can thank Macquarie University and CSIRO

Thirty years ago, the leafy north-west suburbs of Sydney played host to creative scientists who developed and commercialised the wireless communications technology that now permeates contemporary life globally, used in 18 billion devices worldwide from mobile phones, tablets and laptops to home entertainment, security and mobile search.

Based on a chain of insights from expertise in mathematics, radioastronomy and electrical engineering, the revolution in mobile computing came out of a highly collaborative, multi-disciplinary approach to solving a profoundly stubborn engineering problem.

Communications companies the world over had been struggling to connect multiple devices wirelessly, but had been defeated by the problem of reverberation, echoes and fades, as radio waves bounced around the local environment distorting the signal.

Macquarie University's Professor David Skellern, an expert in electronics, and scientists at CSIRO started talking about their approaches to the problem, and soon joined forces to apply for a grant to establish a Cooperative Research Centre in Local Environment Communications Technology. They missed out on the CRC grant, but the application process accelerated their thinking about interference in wireless communication.

While searching for radio waves from black holes, CSIRO radioastronomer Dr John O'Sullivan discovered how to minimise the interference caused by radio waves bouncing off various structures – and in the process invented a way to format radio signals so they could transmit data at high speed. The method relied upon complex mathematics known as 'fast Fourier transforms', combined with a deep expertise in how radio waves behaved in complex settings.

With CSIRO's financial backing, and with Skellern joined at Macquarie University by Professor Neil Weste, the team worked up an innovative radio-transmitting microchip using the patented signalling format. It promised to be small, reliable and economical enough to be viable for rollout in ordinary handheld and computing devices – a potential global market of billions of devices. The teams at Macquarie University and the CSIRO formed a joint company, Radiata, which went on to commercialise the radiofrequency-based microchip based on CSIRO's wireless local area network (WLAN) patent. The IP eventually yielded Australia hundreds of millions of dollars.

This highly applied and lucrative outcome came from a potent collaboration between university fundamental research in frontier electronics and curiosity-driven radioastronomy at the CSIRO. As then ARC CEO, Professor Vikki Sara, told the House of Representatives in 2002,

"David Skellern and Neil Weste were the founders of Radiata that was sold to Cisco. It is that kind of retrospective analysis of important outcomes for economic future which makes me totally convinced that we have got to support that blue-sky research."

3.2. Reducing Legislative Burden

The Panel's recommendations to reduce Legislative burden may not be of particular interest to individual researchers, however, the Panel describes a series of recommendations here to provide a rationale for the specific arrangements that we recommend for the NCGP and the approval of funding within that program. The principle is to reduce the administrative burden but increase the clarity of the decision-making processes, aligned to the expertise of those making the decisions and the obligations of the Minister and the Agency to meet all relevant legislation and the Commonwealth Grant Guidelines.

3.2.1. Special Appropriation vs Annual Appropriation

All Commonwealth agencies (including ARC, NHMRC and other non-corporate funding entities) are subjected to the Federal budget process. It is through the Budget process the government gains parliamentary authority to expend relevant money through the passage of the annual appropriation acts and other legislation with established special appropriations.[74]

At present, the ARC Act must be amended each year through a Bill introduced into the Parliament because it contains a capped special appropriation. This dictates that the funding caps be updated annually to include indexation and insert new funding caps for later years to reflect the forward estimates in the Portfolio Budget Statement (PBS) and any new commitments for programs. The use of a special appropriation from 2001-2007 aligned with appropriation for the *Higher Education Support Act 2003* (HESA). The link to HESA was broken when the ARC moved from the Education portfolio in 2007 thereafter requiring separate arrangements. The HESA subsequently was amended to include a method to calculate the indexation, but the ARC Act has not similarly been revised.[75]

Annual Appropriations in the Budget process allow opportunities to increase funding or add new schemes through new budget measures. Arrangements for indexation and adjustment of dollars to reflect the real value in programs that extend over multiple years (as is the case with the National Competitive Grants Scheme) do not require a special appropriation. Amendment bills are not only an administrative burden, but the timing of the annual Bill can complicate management of the NCGP, especially in election years when the parliamentary calendar may be disrupted.

For the NHMRC, funding through Annual Appropriation is credited to the Medical Research Endowment Account. Endowment accounts can operate somewhat like a trust where unspent funds are carried over [76] and remain unspent. This has been particularly useful to the NHMRC when dealing with unexpected delays with grant announcements.[77]

The ARC Act already has provision for a Research Endowment account. The ARC Research Endowment Account allows the ARC to receive donations and bequests from the community and holds money for jointly funded projects (e.g. contributions from CSIRO towards joint research grants). It has never had a dedicated appropriation from Government. The purpose of the ARC Research Endowment Account could be revised in the ARC Act to expand its use, including for specific purposes.

We anticipate that removal of the special appropriation and the funding caps may raise concerns about the stability of the ARC funding amongst those who have perceived the cap to be an important safeguard. For these and the reasons outlined below in relation to approvals for individual grants, we recommend that the change to the means of appropriation also include the activation of the ARC Research Endowment Account to align with the

[74] Australian Government Department of Finance. (2021). *The Budget Process.* https://www.finance.gov.au/government/federal-budget/budget-process.
[75] Australian Government Department of Finance. (2022). *Guide to Appropriations* (RMG 100). https://www.finance.gov.au/publications/resource-management-guides/guide-appropriations-rmg-100.
[76] Australian Government. *Budget Paper No. 4, October 2022-23*. https://budget.gov.au/2022-23-october/content/bp4/index.htm.
[77] Funds not expended by the ARC at the end of the financial year are returned to the Official Public Account (OPA), while unspent NHMRC funds remain in the Medical Research Endowment Account.

arrangements that apply to the NHMRC and facilitate implementation of different approval processes for the NCGP.

3.2.2. Special Provisions That Should Apply to the ARC Research Endowment Account

As highlighted in Recommendation 6; the activation of the ARC Research Endowment Account should also include a definition of its purpose and will allow the ARC Act to specify the approval mechanisms for the NCGP separate to the other functions of the Agency. This will allow the ARC to administer other programs through their other Accounts with more flexibility and so provide for greater agility and flexibility into the future.

These provisions are most relevant to the stakeholders and reflect the feedback we have received during the process balancing the need for Ministerial oversight of the overall grant program and the eligibility for grants. The CEO manages the initiation of grant programs, the preparation of grant guidelines and the processes for reviewing proposals and recommendations for funding. The Board approves individual grant proposals but has obligations to ensure that the process of review is appropriately informed and rigorous and that the potential benefits of the research are articulated clearly.

The Board is also better placed than either the CEO or the Minister to scrutinise the provisions around national benefit and the extent to which proposals address the "national interest." We note that the expertise we recommend for the Board includes comparable expertise to that of the NHMRC Research Committee, only relevant to the ARC disciplines.

There will be other provisions that need to be included in the ARC Act regarding the Endowment account in respect to variations, conditions under which grants might be revoked and reporting to the Minister and Parliament and various legislative timetables. These will necessarily follow from careful consideration of the current provisions and further advice from the Department of Finance.

Case Study 11 – Facing up to our bloody history of violence against Australia's First Peoples

Historians document frontier violence to enable truth-telling and healing

As Australia prepares to vote on the creation of the Voice, the ARC is funding important work advancing another key component of the Uluru Statement from the Heart, Makarrata – the process of coming together and facing the wrongs of the past, named from the Yolngu language.

Apart from warm, open hearts, there is no better aid to truth-telling than cold, hard evidence, like the comprehensive map of colonial frontier massacres in Australia from 1788 to 1930 hosted by the Centre for 21st Century Humanities at the University of Newcastle. Supported by an ARC Discovery grant, the online resource was the product of a rigorous five-year investigation of frontier violence and Indigenous resistance led by Lyndall Ryan.

The team scoured the primary and secondary sources, including state and magistrates' inquiries and their correspondence with each other, colonial and state archives, newspaper accounts, oral history from all sides and archaeological history. Only firmly documented and verified sites were registered, inevitably eliding many massacres that were covered up or have been lost to the documentary record. The project defined a massacre as the 'indiscriminate killing of five or six undefended people in one operation.'

During the so-called history wars of the 1990s – when there was heated debate about the extent, motivations, participants and casualties of frontier massacres, and even whether they'd actually occurred – only about 75 incidents had been identified by historians, linguists and anthropologists with some degree of confidence. By 2003, the figure was around 100.

Ryan's ARC project commenced in 2014, and by the time Stage 1 was launched in July 2017, the team had identified 172 sites in Eastern Australia of massacres that took place from 1788 up to 1872. Stage 2 launched in July 2018, with 250 sites across Central and Eastern Australia to 1930, and won the 2018 Geo Cart Award for the best new digital map. Stage 3, launched in November 2019, in collaboration with *The Guardian*, included 311 frontier massacres across the entire continent of Australia from 1778 to 1930. That version won the 2019 Walkley Award for best coverage of Indigenous Affairs. Stage 4 was released in March 2022 and includes 421 verified massacre sites. The map is widely used today in primary and secondary schools and universities across Australia. That's a spectacular return on an investment of $300,000 from a single ARC Discovery Grant.

Another ARC Discovery grant funded last year aims to build on the rigorous data so painstakingly gathered, to identify the historical factors that incited frontier violence, quantify the legacy on communities today and conduct fieldwork to understand how historical trauma is transmitted across generations. The team – led by Julie Moschion and Cain Polidano of the University of Melbourne and including the indefatigable Lyndall Ryan – aims to build new knowledge about the circumstances of settlement, the impacts that frontier violence continues to have today and the role of truth-telling in healing.

At this pivotal moment in our nation's history, hard evidence and open honesty are our most valuable tools in seeking dialogue, reconciliation, and justice. The ARC-backed map is an excellent resource to help steer us toward healing, together.

Case Study 12 – Changing the World Bank, changing the world

How fundamental social science research in Australia changed a global institution

Curious about the forces that shape societies and drive behaviours, ANU researchers Robert Goodin and Geoffrey Brennan were supported by a 2006 ARC Discovery project to explore issues around Norms, Reasons and Values in democracy, terrorism, historical injustice and sexuality – in other words, the factors that drive real human behaviour, on the ground.

The research produced a number of practical suggestions about how norms might be better understood and influenced. Their work led to the book *Explaining Norms* by Brennan, Lina Eriksson, Goodin and Nicholas Southwood (OUP, 2013) which offers a sophisticated account of norms: what they are; how and why they emerge, persist and change, and how they work.

This work drew the attention of global policymakers, leading to the authors being commissioned to develop a background paper summarising their findings for the World Bank's annual flagship publication. The World Bank is a global partnership of 189 member countries that provides financial assistance, through bank loans and grants, and supports 12,000 projects to end extreme poverty and promote shared prosperity.

In response to the invitation, Eriksson wrote the background paper 'Social Norms Theory and Development Economics' that became a World Bank Policy Research Working Paper, and in turn formed the basis of Chapter 2, 'Mind, Society and Behaviour', of the *World Development Report 2015*. Her account of the team's work fundamentally changed how the World Bank sees its role – and, more importantly, how it sees the communities it serves.

That 2015 Report recommended the introduction of 'behavioural insights' into the World Bank's machinery, drawing on sociology, psychology and anthropology, based on the philosophical underpinnings laid out by the Australian research team in their 2013 book. To manifest this new commitment the World Bank launched a new Global INsights Initiative (GINI) to implement the findings of the 2015 World Development Report, and established a Mind, Behavior and Development Unit (eMBeD), whose charge is 'to use behavioral sciences to reduce global poverty and enhance equity'.

Since eMBeD's formal inception, the team has been involved in more than 100 projects in over 70 countries. The unit promotes the systematic use of behaviourally informed tools in development policies and projects and helps institutionalise the use of behavioural science in development organisations and governments.

This expanded field of view – informed by evidence-based theoretical insights developed in Australia with the support of the ARC – helps this important global institution take into account powerful human and social factors well beyond the narrow confines of strictly economic motivations, helping communities achieve real and lasting change on the basis of an empirical understanding of how people think and behave.

3.3. Reducing administrative burden

We received a wide variety of suggestions in relation to reducing the administrative burden of grant applications, post award management of grants and in relation to ERA and EI. We also envisage that some of the Legislative changes proposed can further assist by clarifying streamlining, approvals and decision-making processes. In section 4 we address the burden of the ERA exercise which has been estimated to consume >40,000 hours at a cost of $2 million for one University alone.

> "At the University of Sydney for example, participating in each ERA exercise consumes more than 40,000 hours of staff time and costs the University well in excess of $2 million in salaries alone. The full economic and opportunity cost of participation is much higher than this, however, as time spent by our researchers and staff meeting the requirements that arise from ERA participation is time that cannot be dedicated to our teaching, research, and its translation for societal benefit."
>
> University of Sydney

As noted above the Panel heard a great deal about the administrative burden arising from the well-intentioned introduction of the Research Opportunity and Performance Evidence (ROPE) statements in 2009.[78] These were part of a series of reforms aimed at addressing the gender differences in ARC outcomes between levels and disciplines.[79] Over time ROPE has evolved to be considerably more comprehensive and complex than originally intended and many have argued that it has lost some of the impact of the initial purpose. Indeed, the Panel is aware of speculation that, owing to its volume and repetitious nature, some assessors consider the ROPE statement only briefly, undermining the entire point of the statement and placing at risk the grant opportunities of people with legitimate interruptions.

> "The ROPE, while well intentioned, in trying to normalise against opportunity, has clearly not worked and best practice review is required. The proposal for our Centre was 1389 pages long – of course nobody would have read it in full."
>
> Australian Centre for Excellence in Antarctic Science

Many stakeholders expressed an interest in this review further addressing the issue of gender equity/differences in grant outcomes, especially given the strong stance the NHMRC has taken in this respect.[80]

From the 223 submissions 154 (69%) of responses suggested improvements to ARC processes. The majority of these do not require changes to the legislation and so are not the subject of further specific recommendations here.

[78] ARC Fellows and Centre Managers as well as Early and Mid Career researchers all mentioned the need to simplify the ROPE in Focus groups. Suggestions included shortening the statement, and removing the set criteria, allowing individuals to complete how they best saw fit. Aboriginal and Torres Strait Islander researchers sought specific changes to improve cultural sensitivity, for example.
[79] Australian Research Council (2010), *ARC Discovery Program Consultation Paper.* https://apo.org.au/sites/default/files/resource-files/2010-11/apo-nid23237.pdf
[80] National Health and Medical Research Council. (2018). *NHMRC's Gender Equality Strategy 2018-2021.* https://www.nhmrc.gov.au/sites/default/files/documents/Gender-Equality-Strategy-2018-2021.pdf

Recommendation 9: Reduction of Legislative and Administrative Burden

We recommend that:

i. the Special Appropriation for the National Competitive Grants Program (NCGP) within the ARC Act be replaced with a provision for annual appropriation into the ARC Research Endowment Account including an agreed formula for indexation of new grants and those that extend over multiple years;

ii. the ARC Act be simplified to remove the provisions from legislation that relate to the split between Discovery and Linkage and that the commitment to funding pure basic, strategic basic and applied research be incorporated into the purposes of the NCGP Program in the ARC Act; and

iii. guidelines for the NCGP be simplified and streamlined to reflect international best practice with consideration of reducing the administrative burden on academic and research organisations through, for example, a two-step application process for rapid initial assessment of expressions of interest and eligibility criteria.

College of Experts members and researchers who had held Fellowships at different career stages noted that the current annual application process put significant pressure on researchers (especially early and mid-career researchers) to complete detailed grant applications with little likelihood of success, with a very long lead time for a decision, and without gaining meaningful feedback on their efforts.

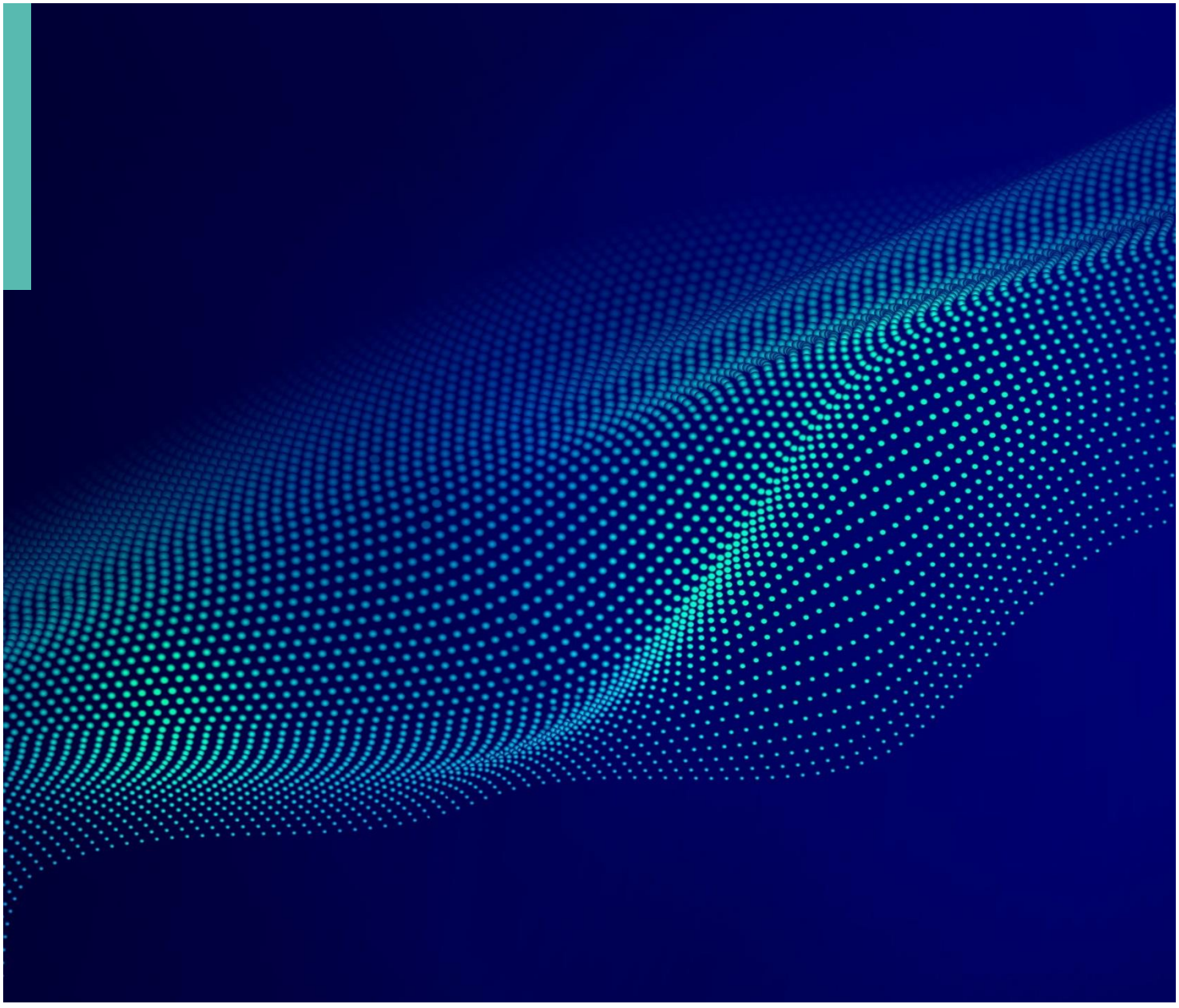
Stakeholders supported development of a two-stage applications process, and pointed to a number of international funding agencies, including the NZ Marsden fund as providing good examples of processes with short expression of interest or preliminary applications (2-5 pages) which could be considered quickly and with a relatively low (~10%) rate of approval to develop a full proposal, where those that got through to the full proposal stage would have a much higher rate of success (~50%). A simplified peer review process for the EOI or preliminary application stage would still be able to provide meaningful feedback to applicants but provide them with ample time to refine their research proposal before the next round. This would reduce the burden on researchers and assessors, while allowing the SAC to focus its efforts on the quality and significance of research proposals. Where full proposals were not successful, it would be possible to provide more detailed feedback to applicants who had made it through the EOI stage.

Consideration should also be given to reducing the details required of Partner Investigators (PIs), especially international collaborators, in grant applications. Many stakeholders claimed that they felt the application process discouraged international collaboration, rather than supported Australia's ambitions for global research collaboration.

A final consideration was the suggestion to separate details about budgets from the evaluation of whether a proposal should be funded, so as to focus the Selection Advisory Committees on the degree to which a proposal meets the selection criteria and whether the project is feasible within the budget allocated, with the expectation that where a proposal is approved for funding, Chief Investigators (CIs) will be required to provide a statement on how the project will be managed within the allocated budget.
Stakeholders indicated that significant time and energy was spent on managing post-award processes involving CIs, PIs, research offices and the ARC. Stakeholders questioned whether the requirements, for example to seek formal ARC approval for minor changes to personnel or to record movement of CIs between universities, merited the effort required. It also appears that the ARC's capacity to provide timely responses to reported changes is overwhelmed. The ARC should consider developing a risk-based approach to reporting and accountability of administering organisations and researchers in managing post-award arrangements.

NCGP grants are awarded to Australian Universities which are also subject to State and Territory Audit requirements and TEQSA registration. The ARC should consider whether some reporting and accountability could be best monitored through TEQSA institutional arrangements and audit processes and which post-award processes require specific reporting to, review by, and approval of the ARC.

4. FUNCTIONS OF THE ARC



TOR 4. Functions of the ARC

Consider how the legislation could be revised to reflect the breadth of functions of the ARC and its evolution, including the measurement of the impact and excellence of Australian research and advise on contemporary best practice for modernising and leveraging these measures.

4.1. Breadth of functions of the ARC and its evolution

As detailed elsewhere in the submissions we recommend the ARC Act be amended to both include the breadth of current functions and to anticipate future policy developments.

4.2. Excellence and impact

ERA was implemented by the ARC from early 2008 replacing the Research Quality Framework which had been developed by the Department of Education over the preceding 5-year period. The case for introducing a measure to help drive improvements in research quality was part of a series of reforms that including additional investment in Australia's research capacity under a package known as Backing Australia's Ability (and its successor Backing Australia's Future) and as one of the recommendations of the 2003-4 review of the 1999 Knowledge and Innovation Reforms.

The logic and intent of introducing a research quality framework was twofold. First, there was evidence that the Knowledge and Innovation reforms that assigned funding for total publication counts of each university were encouraging some perverse behaviours encouraging academics to publish more papers in lower quality journals with a faster turnaround. The second was that for the increased investment arising from Backing Australia's Ability, the government needed greater assurance around the quality of the research being funded in the Australian research ecosystem.[81]

The ARC has conducted one ERA trial (2009), four full ERA rounds (2010, 2012, 2015, 2018) and one EI round (2018). The information derived from the early ERA rounds was useful for governments and universities in understanding and demonstrating areas of research excellence across the entire Australian university sector. ERA has evolved, with numerous refinements, including a reform proposal developed in early 2022. The Minister directed the ARC to pause preparations for an ERA round in 2023 and to explore options to streamline the exercise. At the same time, he tasked this Panel to provide advice on "the measurement of the impact and excellence of Australian research".[82]

[81] In the earlier iterations of ERA serious consideration was given to including the Publicly Funded Research Agencies in the same form of quality assessment.
[82] Appendix A - Terms of Reference

There is no doubt that ERA has been tremendously effective in shifting the focus of Australian research from an emphasis on quantity to quality of outputs, particularly in its early iterations, but it can be argued that ERA has achieved its initial purpose and that the time and resources involved may be better re-directed to other evaluation needs. [83] It could be further argued that the shift in behaviour pre-dated the formal ERA evaluation but rather the effects were evident earlier because of the extensive engagement with the sector in developing ERA and its putative predecessor the Research Quality Framework.[84]

Engagement and Impact (EI) has a narrow reference window for research to application, relative to the typically longer periods observed in the real-world history of research and innovation as shown by the Case Studies included in this report. There are also concerns about the rigour of EI case studies, which also risk privileging style and particular kinds of research outcomes, especially were they to be linked to government funding.

It is yet to be determined whether a metrics-based approach can resolve the latter issue across the breadth of disciplines the exercise needed to cover; and indeed whether such a metrics-based impact exercise accelerate inequalities between individuals and across different disciplines; so we are explicitly not recommending ERA and EI be replaced by a so-called light touch metrics-based exercise. [85]

Both systems are inherently retrospective, when Australia's research sector and the broader national innovation system are well equipped to pivot to a prospective paradigm. Both ERA and EI are also framed around the performance of individual institutions and drive institutional comparisons and competition in ways that often lead to counter-productive duplication of expertise.

A further consideration is that as the gap between government funding of research and research funded in universities has grown; the influence of government policy initiatives on the behaviour of individuals and strategies of institutions has diminished. This is because the influence of international ranking exercises (THE, AWRU and QS) on international student demand (and hence the capacity of universities to invest in research) has assumed much greater importance than the government policy settings.

The Tertiary Education Quality and Standards Agency (TEQSA) refers to ERA (among other measures) to make assessments against the world class benchmark in Part B1.2, Criteria for 'Australian University' Category in the Higher Education Standards Framework (Threshold Standards) 2021 (HES Framework)[86] and could arrange to utilise ARC expertise for additional assessments as required.

The Panel expressed a proposition in the Consultation Paper that the Excellence in Research for Australia (ERA) and Engagement and Impact (EI) initiatives have largely fulfilled their purpose of demonstrating and enhancing the excellence and impact of research undertaken in Australian universities.

[83] 154 (69%) submissions responded on the future of ERA and EI. 55% of respondents to that question (38% of all respondents) considered ERA and EI had outlived their usefulness citing administrative burden, cost, and universities 'gaming' as the main reasons. 49 explicitly called for their discontinuation.

[84] Expert Advisory Group for the RQF (2005). *Research Quality Framework: Assessing the quality and impact of research in Australia*. https://www.business.unsw.edu.au/research-site/societyofheterodoxeconomists-site/Documents/Research%20Quality%20Framework%20-%20Preferred%20Model.pdf

[85] While 22 submissions called for a data-driven methods, others warned against using only citation metrics, as they considered this would especially disadvantage humanities and social science subjects disproportionately. When asked directly 12% of total submissions agreed that a data-based assessment would be helpful in evaluating Australian research outcomes.

[86] Tertiary Education Quality and Standards Agency. (2021). *Higher Education Standards Framework (Threshold Standards) 2021*. https://www.teqsa.gov.au/how-we-regulate/higher-education-standards-framework-2021.

The consequent recommendation that ERA/EI should be halted has been strongly supported by the feedback, with 69 per cent of respondents tendering an opinion on the proposition and 55 per cent agreeing that they have served their purpose and should be halted.[83] Through consultations, the Panel observed that, to the extent there were concerns or equivocations about retiring ERA and EI, many stemmed from an apprehension about what might replace them, rather than the ongoing value of the exercise itself. Universities and other participants were clear in the advice that the effort to complete ERA and EI assessments outweighed the benefit they offered. The consultation process established widespread support for a streamlined, more efficient approach to excellence which would enable universities and other providers to be assessed in relation to the requirements of TEQSA and research standards. [87]

By way of example, for TEQSA, an average of six universities per year seek their seven-yearly re-registration and each could address the threshold requirement by presenting a portfolio of research within three to six domains for quality assessment (plus several more to ensure appropriate comparison). Adding at least three domains each for an estimate of two to five new aspirants to university status per year, would produce an evaluation round of approximately 60 units of evaluation (UoEs) per annum, compared to the 2,603 UoEs assessed in the 2018 round. Such an assessment burden would be a tiny fraction of that borne in a full ERA round, on the parts of both the ARC and the institutions, while enjoying the same level of rigour. The assessment could be extended to include assessment of engagement and impact portfolios to complement the quality assessments.

While there several groups proposed that ERA be replaced by an exclusively data-driven or equivalent metric exercise to reduce the burden and complexity, it is not evident whether these proponents contemplated the need to having an ERA and EI exercise at all.

Regional Universities were particularly concerned about the link between ERA and the somewhat arbitrary notion of "world standard" and the research quality requirements in the HES Framework. This follows from their appropriate strategies to engage local industry and communities in applied research that can be of direct benefit to the region or that community, but which may not result in a publication in an international journal. The same can be argued for industry-engaged research and research in disciplines with a strong Australian focus.

Further questions were raised regarding the new Australian and New Zealand Standard Research Classifications Field of Research code 45 (Indigenous Studies).[88] Indigenous Australian stakeholders noted that ERA 2023 would have been the first round to use this new FoR code.[89] The FoR 45 code was established for "Indigenous Studies". The ARC implemented the 20 new Fields of Research (FoR) for Indigenous Studies across the NCGP.[90] In 2020, researchers were encouraged to update their FoR codes. Submissions acknowledged the amount of effort put into the Indigenous Studies Research Codes in preparation for ERA2023 which was held and recommended acknowledging research activity in this area. Embedding Indigenous methodologies in data driven approaches is difficult but needs to be addressed.[91]

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[87] TEQSA requires each established university to demonstrate research above the threshold standard in 50% (or at least 3, whichever is less) of the Fields of Education in which it offers courses: ASCED specifies 12 broad Fields of Education, hence 3-6 Fields for assessment. The HES Framework part B1.2 has two quality benchmarks - world standard and national standing. Universities need to meet just one to comply, i.e. those universities that don't meet world standing may well meet national standing benchmark.
Tertiary Education Quality and Standards Agency. (2023). *Guidance note: Research requirements for Australian universities.* https://www.teqsa.gov.au/guides-resourses/resources/guidance-notes/guidance-note-research-requirements-australian-universities

[88] Australian Government. Australian Bureau of Statistics. (2020). Field of Research (FOR) classification. https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-research-classification-anzsrc/latest-release.

[89] Australian Government. Australian Research Council. *Why are the Indigenous Studies codes important for ERA 2023*?. https://www.arc.gov.au/sites/default/files/2022-07/Fact%20sheet%20-%20Why%20Indigenous%20studies%20is%20important%20for%20ERA%202023%20%281%29.pdf.

[90] Australian Government. Australian Research Council. (2023). *Quick Guide to Assigning FoR Codes to ERA 2023 Research Outputs—45 Indigenous studies.* https://www.arc.gov.au/sites/default/files/2022-07/quick_guide-assigning_indigenous_studies_for_codes_to_era_outputs.pdf
ERA 2023 Benchmarking and Rating Scale, WSU Indigenous Professoriate Response. Gawaian Bodkin-Andrews, Michelle Trudgett, Susan Page, Auntie Kerrie Doyle, and Corrinne Sullivan.

[91] Hayward A, Sjoblom E, Sinclair S, Cidro J. A New Era of Indigenous Research: Community-based Indigenous Research Ethics Protocols in Canada. *Journal of Empirical Research on Human Research Ethics*. 2021;16(4):403-417. doi:10.1177/15562646211023705

While concerns have been raised about how universities were undertaking the task of both coding Indigenous Studies research and splitting the weighting of research across codes, the pause on ERA has left some Indigenous Australian researchers concerned that there is no sector-wide mechanism that establishes how much research of direct relevance to Aboriginal and Torres Strait Islander communities is undertaken in Australia. However, the Panel notes that it would be possible for the ARC to undertake a specific review of Indigenous Australian research capability across the Australian higher education sector without tying it to a comprehensive research quality evaluation like ERA or EI.

> "ERA and EI have become exercises through which the sector is speaking largely to itself.
>
> Demonstrating the quality and value of investment in university research to government central agencies was one objective of the ERA exercise when first established. However, the trends in funding amounts administered by the ARC suggest that this goal has not been successful, even though successive ERA rounds have confirmed the high calibre of research conducted in many fields in Australian universities. … The ERA rankings and scorings seem to be of little interest to anyone outside the university sector and are not well understood internationally. … Continuing an expensive and time-consuming evaluation process that does not show value in a meaningful way to taxpayers or other stakeholders seems a waste of resources that could better be applied to funding and translating research."
>
> The University of Sydney

The feedback on ERA and EI in the consultation was both extensive and consistent. We believe each of these concerns can be addressed by repurposing the considerable expertise within the ARC. The ARC is equipped with a rigorous, world-class evaluation capability that could be utilised in a variety of different ways to the benefit of the whole of government and the national research enterprise. For example, it could inform national research capability mapping (particularly gaps), the evaluation of ARC grant outcomes, and the assessment of the performance of institutions with respect to the research quality threshold standard required for TEQSA registration or re-registration as an Australian university.

Excellence in Research for Australia (ERA) and the related Engagement and Impact Assessment (EI) have been carried out by the ARC under the authority of Ministerial direction – there is no explicit mention of quality and impact assessment in the ARC Act but as noted above including evaluation within the scope of the ARC Act will reinforce the importance of retaining an academically-informed evaluation capability.

> "We think there is merit, in place of ERA, of a 'State of the Research Sector' approach. As a retrospective assessment the ERA is not necessarily a good indicator of strengths at the time of assessment or of future performance. The ARC could continue to collect data annually and … produce a 'State of the Research Sector' report which would provide evidence of value to the Minister and the sector – for workforce development, capability assessment, and strategic planning. A thorough report would include indicators on gender equity, workforce diversity, and research environments."
>
> Australian Academy of the Humanities

"The ARC should apply its existing capabilities in evaluation to the development of a new national program to evaluate the long-term benefits arising from government investment in university research. The ARC could play a valuable leading role across the system, creating a community of practice, helping to develop capabilities within universities and developing an evaluative framework that includes economic impacts as well as broader public good impacts."

Innovative Research Universities

"A better demonstration of the use of public funds [than the NIT] is promoting and celebrating the outcomes of ARC funded research, particularly the long-funded Centres of Excellence. This would require administrative work on behalf of the ARC, but a showcase to the public of projects that were funded 5, 10, 15 and 20 years ago and the benefits they have delivered to society could increase the support for publicly funded research in Australia."

James Cook University

"For the ARC to drive the strategic importance of Australia's research, there are opportunities to develop a specific program of work with which the ARC evaluates the outcomes of its grants to demonstrate value and excellence of ARC-funded research. This program of work also establishes the environment to increase and expand best practice across domains, while meeting the needs of government stakeholders and informing policy."

Regional Universities Network

Recommendation 10: Evaluation of Excellence and Impact

We recommend that:

i. the role of the ARC in relation to evaluation of excellence, impact and research capability within Australian universities be re-affirmed by inclusion in the ARC Act.

ii. the Excellence in Research for Australia (ERA) and Engagement and Impact (EI) exercises be discontinued.

iii. the resourcing for evaluations be maintained so the ARC retains and internally recognised expert evaluation capability.

iv. the ARC collaborates with TEQSA to develop assessment processes that enable TEQSA to draw on the expertise of the ARC to make decisions on the extent to which current and future higher education providers meet research provider standards;

v. the ARC develops a framework for regular evaluation and reporting on the outcomes of the NCGP program over a timeframe that allows the full impact of research funding to be assessed and the public benefit explained; and

vi. the ARC develops a program to evaluate current and future research capabilities within Australian universities, giving priority in the first instance to the capability of Aboriginal and Torres Strait Islander researchers and research that impacts on Indigenous Australians.

We do not recommend that ERA and EI be replaced by a metrics-based exercise because of the evidence that such metrics can be biased or inherently flawed in the absence of expert review and interpretation.

Case Study 13 - WHO saved millions from COVID

ARC ensured that deep expertise was at the ready when the world really needed it

Over a quarter of century of ARC-funded university research into clear air, particulates and aerosols – and her scientific clout with the World Health Organisation (WHO) – equipped Distinguished Professor Lidia Morawska to make a crucial and timely intervention that supercharged the global fight against the COVID-19 pandemic, potentially saving many millions of lives.

The Polish-Australian physicist established the Environmental Aerosol Laboratory at QUT in 1992, later the International Laboratory for Air Quality and Health when it became a WHO collaborating centre in 2002. Over three decades her team has conducted research into an astonishing range of topics in air quality and human health, including bushfires, office printer emissions, motor vehicle fuels, high voltage power lines, greenhouse gases, urban planning, building standards and engineered nanoparticles – much of it funded by the ARC, alongside the NHMRC, the WHO, state and federal governments, and the private sector.

Eerily prescient, in retrospect, was a thread of ARC-funded work arising from Morawska's interest in the original SARS outbreak in 2003, when she realised to her 'absolute amazement that there was barely any science at all.' She won a succession of ARC grants to study mechanisms of virus transport in indoor environments, particularly aerosols. At the time, the conventional view was that viruses were transmitted primarily in heavy droplets and via surfaces, not wafted on air currents crossing entire rooms. Little did we know.

Twenty years on, untold numbers of people on earth have every reason to be grateful for Morawska's scientific curiosity and stubborn loyalty to hard empirical evidence over received wisdom – and for the ARC's willingness to support excellence in curiosity-driven research wherever it is found, even in defiance of orthodoxy.

Soon after declaring the pandemic in March 2020, the WHO issued a now-infamous tweet, 'FACT: #COVID19 is Not airborne', in an effort to counter alleged 'misinformation' circulating on social media. In those early days we all became experts at hand-washing; we wet-wiped everything; we stood 1.5m apart to let gravity claim those pesky droplets. But Morawska knew for a fact – from the empirical research she'd conducted with the support of the ARC, *inter alia* – that the virus was also carried much further on aerosols, especially indoors. Without public health measures that targeted airborne circulation, she knew the pandemic's toll would be far greater that it should be.

Morawska swung into action, publishing impassioned calls to action supported by her evidence in outlets ranging from scientific journals to newspapers; directly lobbying state and federal health ministers; and calling her scientific network into action. With co-author Donald Milton, she published an open letter to world health authorities, backed by 237 other scientists.

The call to arms worked. The WHO altered its advice, and nations implemented safeguards that took into account the new parameters. There is no way to know how many lives were saved, but Morawska's work has since been recognised 'as one of four critical elements in fighting the pandemic' and she was named among TIME's 100 most influential people in the world in 2021. Morawska is now an ARC Laureate Fellow and leads further related research funded through an ARC Linkage grant and an ARC Training Centre.

Case Study 14 - Archaeology illuminates Australian deep history

ARC-backed discoveries drive rethink about human migration, climate and megafauna

Sophisticated dating techniques and archaeological methods have revealed that Indigenous ancestors first inhabited Australia an astonishing 65,000 years ago. The finding has challenged prevailing assumptions on modern humans' departure from Africa, the nature of their migration, and the fate of Australian ancient megafauna.

ARC-funded investigations over the past two decades – which also led to the discovery of an ancient cousin of humans, *Homo floresiensis*, on Indonesia's island of Flores – have transformed the scientific and public understanding of global human evolution and expanded our knowledge of Australia's rich ancient history.

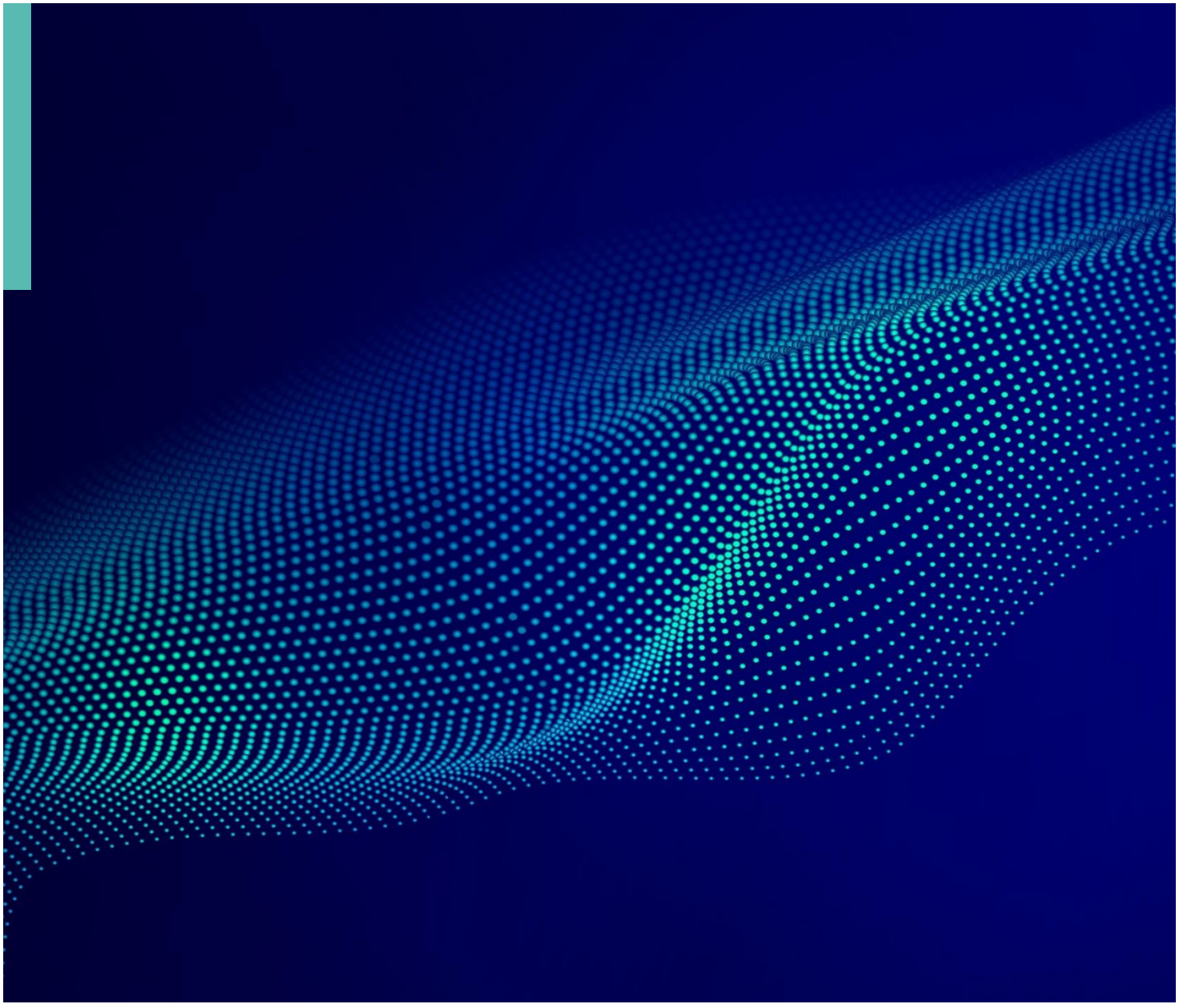
With the agreement of the Mirrar people of Arnhem Land, researchers were able to further excavate the Madjedbebe site at Jabiluka, where they found 'three distinct pulses of occupation' of an ancient campsite under a sandstone rock shelter. ARC Future Fellow Chris Clarkson and the team found three tranches of axes perfectly preserved against the back wall of the shelter aged 10,000 years, 35-40,000 years, and a whopping 65,000 years – the world's oldest known ground-edge stone axe heads. ARC Future Fellow Zenobia Jacobs dated them using optically stimulated luminescence (OSL), which estimates the elapsed time since materials such as sand grains were last exposed to sunlight.

The implications of the find are profoundly reshaping scientific understanding in all sorts of ways. To begin with, these first migrators had to sail a minimum of 90 kilometres across open seas to reach Kakadu, confirming that Indigenous ancestors undertook the first major maritime migration in the world. Another shake-up is the challenge to the theory that ancient humans drove Australian megafauna into extinction by over-hunting.

A succession of ARC-funded studies into megafauna extinctions have used increasingly advanced climate reconstruction, OSL, advanced maths mapping tools and Uranium-series dating to better understand the dynamic interactions of megafauna, climatic change, and human occupation. Megafauna such as six-metre-long goannas and kangaroos twice as tall as humans were the largest land animals to inhabit Australia since the age of the dinosaurs. Some research credited the megafauna extinction to sudden (and therefore highly stressful) climate change before humans arrived; other research showed a small overlap, driving suspicion that over-hunting was the culprit. A combination of further megafauna dating, and the 65,000-year result now suggests that humans and megafauna coexisted for tens of thousands of years. Competition for scarce resources in a stressed climate notwithstanding, the inference of this long period of co-existence is that it is unlikely Indigenous ancestors alone harried megafauna into extinction.

ARC-backed research into early migration of *Homo sapiens* from Asia to Australia led to one of the most spectacular scientific finds of the 20th century – the discovery in 2003 of the skeletal remains of a new ancient relative of humans in a cave on the Indonesian island of Flores by the late Mike Morwood and his team, *Homo floresiensis*. Subsequent ARC-funded studies refine, expand, and contest the meaning of the findings, with the body of floresiensis research continuing to transform scientific and public understanding of human evolution.

APPENDICES



Appendix A. Terms of Reference

In a review of the Australian Research Council Act 2001, consider:

1. whether the role and purpose of the ARC as set out in the legislation remains relevant, including consideration of the contribution the ARC can make to identifying reforms to its programs to actively shape the research landscape in Australia and better align with comparable research agencies;
2. the ARC governance model and management functions and structures to ensure they are contemporary, fit for purpose, and meet the needs of stakeholders;
3. opportunities to improve the legislation to better facilitate globally competitive research and partnerships, reduce unnecessary administrative and legislative burden and increase agility; and
4. how the legislation could be revised to reflect the breadth of functions of the ARC and its evolution, including the measurement of the impact and excellence of Australian research and advise on contemporary best practice for modernising and leveraging these measures.

Appendix B. Review Process

On 30 August 2022, the Hon Jason Clare MP, Minister for Education, announced an independent review of the ARC Act to consider the role and purpose of the ARC within the Australian research system so it can meet current and future needs and maintain the trust of the research sector.

The Minister for Education appointed Professor Margaret Sheil AO, Professor Susan Dodds and Professor Mark Hutchinson to manage the ARC Review. The Panel released a discussion paper, received submissions, engaged focus groups and brought together their collective experience with the ARC and research more generally. Relevant experience is outlined below.

Panel Members

Chair: Professor Margaret Sheil, AO

Vice Chancellor and President, Queensland University of Technology (QUT)
Deputy Chair, Universities Australia
Chair, Queensland Museum Network
Fellow, Australian Academy of Science
Fellow, Australian Academy of Technology and Engineering
Fellow, Royal Australian Chemical Institute
Fellow, Australian and New Zealand Society for Mass Spectrometry
Fellow, Queensland Academy of Arts and Sciences
Emeritus Professor, University of Wollongong.

Previous:
Provost, University of Melbourne, 2012-2017
CEO, Australian Research Council, 2007-2012
Deputy Vice Chancellor (Research), University of Wollongong 2002-2007
Director, Australian Nuclear Science and Technology Organisation
Director, Australian Academy of Technological Sciences and Engineering
Advisory Board, Australian Space Agency
Advisory Board, CSIRO, Science and Industry Endowment Fund
Cooperative Research Centres Committee
National Research Infrastructure Committee
Prime Ministers Science, Engineering and Innovation Council
Director, International Mass Spectrometry Foundation

ARC Learned Academy Special Project Grant
LA170100023 — Australian Academy of Technological Sciences and Engineering
Decadal plan for technology research in Australia.
Recipient of a series of grants from the ARC Project, Discovery, Linkage and Linkage Infrastructure and Equipment Funding Schemes from 1990-2007.

As CEO of the ARC Professor Sheil led development and implementation of Excellence in Research for Australia (ERA) together with the, then Executive General Manager, Ms Leanne Harvey, now Vice President (Administration) at QUT. Ms Harvey was responsible for the research quality agenda from the time of the review of the Knowledge and Innovation reforms in 2003 through to the putative Research Quality Framework and transitioned her team into the ARC as part of the Machinery of Government change in 2008. Professor Sheil also oversaw development and implementation with Executive Directors including Professor Andrew Wells on the Future Fellowship Schemes, Australian Laureate Fellows, the Discovery Early Career Awards, the Discovery Indigenous Scheme, the Industrial Transformation Training Centres and the Industrial Transformation Training Scheme.

She also led a range of gender initiatives and with Andrew Wells the introduction of the Research Opportunity and Performance Evidence (ROPE); she has a long-standing interest in the question of how metrics reinforce gender biases.

Panellist: Professor Susan Dodds, FAHA

Senior Deputy Vice-Chancellor, La Trobe University
Chair, Universities Australia Deputy Vice-Chancellors Research Committee
Member ARC Advisory Committee

Previous:
Dean of Arts and Social Sciences, UNSW 2016-2019
Deputy Provost, University of Tasmania 2013-2016
Dean of Arts, University of Tasmania 2009-2016

ARC funding received:

- 2018-2021 ARC Linkage Project LP170100300 Navigating an uncertain antimicrobial future: A sociological study
- 2014-2021 ARC Centre of Excellence CE140100012 Australian Centre for Electromaterials Science (ACES).
- 2005-2014 ARC Centre of Excellence CE0561616. Australian Centre for Electromaterials Science (ACES).
- 2011-2013 ARC DP11012272 Vulnerability, Autonomy and Justice.
- 2005-2008 ARCDP0556068 Big-Picture Bioethics: policy-making and liberal democracy.
- 1998-1999 ARC Large Grant. Citizenship and Reproductive Control–The ambiguous status of women in ethical and political debate.

Board positions and appointments

- Intersect Australia LTD. Appointed ordinary member of the Board of Directors, 2021-
- Australian ORCID. Australian ORCID Steering Committee. (UA DVCR representative) 2023.
- ORCID Consortium Governance Committee. (UA DVCR representative) 2021-2022.
- Australasian Association of Philosophy (AAP). Chair, AAP Board 2015-2017, 2017-2020; President 2007-2008
- Australasian Council of Deans of Arts, Social Sciences and Humanities (DASSH). President 2015- 2017; Vice President, 2013-2015, Member of DASSH Board Executive 2012-2017.
- National Health and Medical Research Council (NHMRC), Australian Health Ethics Committee (AHEC), Appointed member with experience in social science research, 2012-2015
- Gene Technology Ethics and Community Consultative Committee (GTECC), Member – AHEC member in common. March 2013-2015.
- National Enabling Technologies Strategy Stakeholder Advisory Council, Chair 2012. Department of Industry, Innovation, Science, Research and Tertiary Education. Appointed as Invited member (ethicist) 2010-2012.

Susan Dodds' partner, Dr Andrew Wells, was an Executive Director in the ARC 2009-2013, and later a consultant for Wells Advisory.

Panellist: Professor Mark Hutchinson

Professor of Biomedicine at the University of Adelaide, South Australia
Member ARC CEO Advisory Committee

- Director of the Australian Research Council Centre of Excellence for Nanoscale BioPhotonics (CE140100003)
- Australian Research Council Future Fellow (FT180100565)
- President of Science and Technology Australia
- Board member of the Psychoneuroimmunology Research Society, USA
- Co-chair of the Safeguarding Australia through Biotechnology Response and Engagement (SABRE) Alliance.
- Chair of the Australian Pain Solutions Research Alliance
- Chair of the Davies Livestock Research Centre Advisory Council
- Chair of the STEM career pathways review, Office of the Chief Scientist
- Patron of the University of Adelaide's Science Alumni Network
- Founding member of the Executive of The Animal Welfare Collaborative (TAWC)
- Founding member of the DSTG CBRN STaR Shot OSAC advisory council
- Brain, Behavior & Immunity Associate Editor, Elsevier

ARC funding received:

- CE140100003 Australian Research Council Centre of Excellence for Nanoscale BioPhotonics
- FT180100565 Measuring pain in livestock: mechanisms, objective biomarkers and treatments
- LE190100130 Volumetric imaging facility: observing the cell in its native environment
- LE180100136 Large-volume, multi-use micro-computed tomography
- LP160100562 Understanding gender differences in pain: Cellular therapies for animal pain
- LE150100177 National Live Cell Scanning Platform for Nanoparticle Tracking
- LE130100115 Confocal microscope for high-resolution microtopographic analysis of surfaces in historical, forensic and polymer sciences
- DP110100297 Toll Like Receptor signalling as a mediator of sex differences in pain, opioid and alcohol action

Other funding received:

- National Health and Medical Research Council
- Meat and Livestock Australia
- Livestock SA
- Australian Pork Limited
- South Australian Government Premiers Research Innovation Fund
- National Breast Cancer Foundation of Australia
- Congressionally Directed Medical Research Program, USA
- National Institutes of Health, USA
- United States Department of Agriculture, USA
- Food and Drug Administration, USA
- Air Force Office of Scientific Research, USA
- Defence Science Technology Group Australia, Australia Defence Force
- Regeneus Pty Ltd, Australia
- Alyra Biotech Pty Ltd, Australia
- Biointervene, USA
- Lateral Pty Ltd, Australia
- Novartis Pty Ltd, Australia
- Bionomics Pty Ltd, Australia
- Covidien, USA
- Medicinova, USA
- Avigen, USA
- Novimmune Pty Ltd, Australia
- Opsona, Ireland
- Sequirus Pty Ltd, Australia
- Phebra Pty Ltd, Australia
- Abbott, USA
- Pfizer, USA
- Olympus Australia Pty Ltd, Australia
- Heraus, Germany
- Availer Pty Ltd, Australia
- Tarac Pty Ltd, Australia
- MEQ Probe Pty Ltd, Australia
- Specchange Pty Ltd, Australia
- DairyX Pty Ltd, Australia
- Xalud, USA
- Numnuts Pty Ltd, Australia
- Leidos Australia Pty Ltd, Australia
- Noi Group Pty Ltd, Australia
- EPE Pty Ltd, Australia

Mark Hutchinson's partner A/Prof Amanda Hutchinson is a Clinical Psychologist, lecturer and researcher at the University of South Australia.

Support

Dr John Byron

Principal Policy Adviser, Queensland University of Technology (QUT)
Fellow, Queensland Academy of Arts and Sciences

Previous:

- Ministerial adviser responsible for the ARC (2010-11, 2013) Senator the Hon Kim Carr, Minister for Innovation, Industry, Science and Research (and Minister for Higher Education in 2013)
- Executive Director, Australian Academy of the Humanities (2003-10)
- Dean of Research and Graduate Studies, Faculty of Humanities, Curtin University
- Senior Project Officer, Australian Qualifications Framework Advisory Board
- President, Council of Australian Postgraduate Associations

ARC funding received:

- 2007 LS0700002 $118,220 Scoping study to determine the nature of research methodologies and infrastructure requirements in the humanities, to enable greater achievement and efficiency in Australian humanities research.
- 2008 LS0800002 $58,140 An Analysis of Retention Strategies and Technology Enhanced Learning in 'Beginners' Languages Other than English (LOTE) at Australian Universities.
- 2008 LS0800005 $136,883 Understanding the Formation of Attitudes to Nuclear Power in Australia.
- 2008 LS0800001 $110,288 The Humanities in Australia Today: an appraisal of current activity and likely trends in teaching, learning and research across the humanities in Australia.
- 2010 LS1000002 $230,293 Humanities connections: new activities to support professional development, closer collaboration, improved research application outcomes, and policy research in the humanities.

Relevant board positions and appointments: *Current*

- Independent board member, Australian Earth-System Simulator National Research Infrastructure

Relevant board positions and appointments: *Previous*

- ARC ERA Indicators Development Group Humanities Subcommittee
- Cooperative Research Centres Committee
- Australian e-Research Infrastructure Council
- Book Industry Collaborative Council
- Department of Human Services Research Advisory Group
- Museum of Australian Democracy at Old Parliament House Advisory Council
- Council for the Humanities, Arts and Social Sciences
- Sydney University Press Advisory Board
- Monash University Publishing Advisory Committee
- National Scholarly Communications Forum
- Honorary Fellow, Centre of the Study of Higher Education, University of Melbourne
- Adjunct Research Fellow, Humanities Research Centre, ANU
- Association for Medical Humanities
- ANU Centre for Research on Language Change

Other relationships of significance

Associate Professor Julienne van Loon (partner) – non/fictionLab, RMIT.
Professor Mark Byron (brother) – Department of English, University of Sydney.

Dr Natalie Jones-Jayasinghe

PhD, BSc (Hons) University of Melbourne
Senior Strategic Research Advisor, Queensland University of Technology (QUT)

ARC funding received:

- 2014-2021 ARC Centre of Excellence CE140100036 Convergent Bio-Nano Science and Technology (CBNS)

Other relationships of significance

Mr Sach Jayasinghe (partner) – CEO, Queensland Cyber Infrastructure Foundation (QCIF).

Secretariat

A secretariat from the Australian Government Department of Education supported the activities of the Review.

Case Studies

Written by Dr Guy Healy (QUT) and edited by Dr John Byron (QUT).

Appendix C. List of Public Submissions

Public consultation

On 9 November 2022, the ARC Review Panel released a consultation paper[92] and invited public submissions. Submissions closed on 14 December 2022.

The public submission process was open to all interested parties. A total of 223 submissions were received, listed below based on the time of submission. Those individuals and organisations which gave permission to be published, and have met the department's accessibility requirements, are available at the Department of Education website.

No.	Submitter	No.	Submitter
1	Gabriel Rau	**31**	Confidential 9
2	Giuseppe C. Tettamanzi	**32**	Confidential 10
3	Roy McBurney	**33**	Anonymous 12
4	Anonymous 1	**34**	Confidential 11
5	Igor Bray	**35**	Alistair Paterson
6	Abel Santos	**36**	Anonymous 13
7	Anonymous 2	**37**	Confidential 12
8	Confidential 1	**38**	David Stern
9	Roderick Laird	**39**	Dr Ann Sardesai
10	Anonymous 3	**40**	Bart Anderson
11	Confidential 2	**41**	Anonymous 14
12	Confidential 3	**42**	Confidential 13
13	Confidential 4	**43**	Anonymous 15
14	Confidential 5	**44**	Alistair McCulloch
15	Anonymous 4	**45**	Anonymous 16
16	Confidential 6	**46**	Anonymous 17
17	Anonymous 5	**47**	Paul Babie
18	Anonymous 6	**48**	Rob Sheehan
19	Thomas Stace	**49**	Anonymous 18
20	Confidential 7	**50**	Anonymous 19
21	Dr Kathryn Kelly	**51**	Confidential 14
22	Confidential 8	**52**	Confidential 15
23	David Lupton	**53**	Anonymous 20
24	Anonymous 7	**54**	Anonymous 21
25	Professor Fleur Johns FASSA	**55**	Confidential 16
26	Prof David Wood	**56**	Anonymous 22
27	Anonymous 8	**57**	Confidential 17
28	Anonymous 9	**58**	Confidential 18
29	Anonymous 10	**59**	Confidential 19
30	Anonymous 11	**60**	Dr Evan Smith

[92] Australian Government Department of Education. (2022). *Review of the ARC Consultation Paper*. https://www.education.gov.au/higher-education-reviews-and-consultations/resources/review-arc-consultation-paper.

No.	Submitter
61	Anonymous 23
62	Anonymous 24
63	Anonymous 25
64	Confidential 20
65	Anonymous 26
66	Joshua Cinner
67	International Australian Studies Association
68	Confidential 21
69	Bond University
70	Anonymous 27
71	Council of Australian Law Deans
72	Anonymous 28
73	Confidential 22
74	Anonymous 29
75	Anonymous 30
76	Australian Catholic University
77	Confidential 23
78	Australian Council of Deans and Directors of Creative Arts in consultation with Australian Council of University Art and Design Schools and Australasian Association of Writing Programs
79	Confidential 24
80	Ned Rossiter
81	Confidential 25
82	Cruxes Innovation
83	Anonymous 31
84	Anonymous 32
85	Australian Academy of Technological Sciences and Engineering
86	Chris McNeill
87	Confidential 26
88	Kathy Bowrey
89	Anonymous 33
90	Monash University
91	Confidential 27
92	Confidential 28
93	Susan Baker
94	Australian Historical Association
95	Knowledge Commercialisation Australasia
96	Anonymous 34
97	Confidential 29
98	Anonymous 35
99	Walter and Eliza Hall Institute of Medical Research
100	Charles Darwin University
101	Australian Mathematical Sciences Institute, Australian Mathematical Society and Statistical Society of Australia
102	Alison Downham Moore
103	Network of Leaders of Interdisciplinary and Transdisciplinary Research Organisations in the Oceania region
104	Australian Centre for Excellence in Antarctic Science
105	Australian Association of von Humboldt Fellows and the Australian Association of University Professors
106	Confidential 30
107	Anonymous 36
108	Adrian Collins
109	Confidential 31
110	Mathematical Research Institute MATRIX
111	Simone Ciampi
112	Australian Academy of Health and Medical Sciences
113	Southern Cross University
114	Research Australia
115	Confidential 32
116	Anonymous 37
117	Australasian Association of Philosophy and Australasian Society for Continental Philosophy
118	Anonymous 38
119	Anonymous 39
120	Anonymous 40
121	Flinders University
122	Royal Australian Chemical Institute
123	Group of Eight
124	University of Queensland
125	University of Tasmania
126	Universities Australia
127	Australasian Research Management Society
128	Academy of the Social Sciences in Australia
129	Australian Research Data Commons
130	Confidential 33
131	Australasian Council of Deans of Arts, Social Sciences and Humanities
132	University of Divinity
133	Elsevier
134	University of Notre Dame Australia
135	Anonymous 41
136	Benjamin Pope
137	Anonymous 42
138	University of Adelaide
139	Association of Australian Medical Research Institutes
140	RMIT University

No.	Submitter	No.	Submitter
141	Adrian Barnett	**183**	Australian Business Deans Council
142	Macquarie University	**184**	National Advocates for Arts Education
143	Australian University Heads of English	**185**	Anonymous 47
144	Astronomical Society of Australia	**186**	Analysis & Policy Observatory
145	Peter Woelert	**187**	Anonymous 48
146	Edward Doddridge	**188**	Gwilym Croucher
147	Amanda Harris	**189**	University of New England
148	Australia and New Zealand Association for Medieval and Early Modern Studies	**190**	Anonymous 49
149	University of Canberra	**191**	Australian Academy of the Humanities
150	Confidential 34	**192**	Confidential 40
151	Anonymous 43	**193**	University of Sydney
152	Council for the Humanities, Arts and Social Sciences	**194**	Anna Hickey-Moody
153	Senator Mehreen Faruqi	**195**	University of Southern Queensland
154	Curtin University	**196**	Catherine Renshaw
155	Confidential 35	**197**	Confidential 41
156	James Cook University	**198**	Gernot Heiser
157	Australian Institute for Machine Learning	**199**	Confidential 42
158	University of the Sunshine Coast	**200**	Australian Technology Network of Universities
159	Confidential 36	**201**	UNSW Sydney
160	Science & Technology Australia	**202**	Anonymous 50
161	Brian Yates	**203**	Confidential 43
162	Anonymous 44	**204**	Confidential 44
163	ARC Centre of Excellence in Exciton Science	**205**	Confidential 45
164	Australian National Fabrication Facility	**206**	Faculty of Education, Southern Cross University
165	National Tertiary Education Union	**207**	Confidential 46
166	Regional Universities Network	**208**	Confidential 47
167	National Association for the Visual Arts	**209**	Australian Council of Deans of Science
168	Griffith University	**210**	Anonymous 51
169	Australasian Association of Digital Humanities	**211**	Anonymous 52
170	Confidential 37	**212**	Anonymous 53
171	Open Access Australasia	**213**	Confidential 48
172	Anonymous 45	**214**	Confidential 49
173	La Trobe University	**215**	Cooperative Research Australia
174	University of Wollongong	**216**	Dr Harry Rolf
175	Australian Institute of Physics	**217**	Dr Phil Dooley
176	Confidential 38	**218**	University of Melbourne
177	Charles Sturt University	**219**	Confidential 50
178	Western Sydney University	**220**	Council of Australian Postgraduate Associations
179	Confidential 39	**221**	Australian Academy of Science
180	Matt Wand	**222**	Australian Academy of Science Early & Mid Career Researchers Forum
181	Innovative Research Universities	**223**	Confidential 51
182	Anonymous 46		

Appendix D. List of Consulted Stakeholders

Stakeholders consulted as part of this Review are listed by type and in alphabetical order by name.

Individuals
Chris Anderson, Policy Director, AAS
Professor Warwick Anderson, former CEO, National Health and Medical Research Council (NHMRC)
Dr Alison Barnes, President, NTEU
Professor Jean-Pierre Bourguignon, former President, European Research Council (ERC)
Hon Kim Carr, former Minister for Innovation, Industry, Science and Research
Professor Ian Chubb, Policy Secretary, Australian Academy of Science (AAS) and former Chief Scientist
Professor Peter Coaldrake, Chief Commissioner, Tertiary Education Quality and Standards Agency (TEQSA)
Associate Professor Gwilym Croucher, Centre for the Study of Higher Education (CSHE), University of Melbourne (UoM)
Dr Cathy Foley, Chief Scientist
Professor Peter Høj, University of Adelaide VC and former CEO, Australian Research Council (ARC)
Dr Nathan Hollier, CEO and Publisher, Melbourne University Publishing
Dr Anne Kelso, CEO, NHMRC
Conor King, former Executive Director, Innovative Research Universities (IRU)
Dr Terri Macdonald, Policy Director, National Tertiary Education Union (NTEU)
Clare McLaughlin, General Manager, National Health and Medical Research Council (NHMRC)
Professor Andrew Norton, Professor of Higher Education Policy, Australian National University (ANU)
Professor Mary O'Kane, Chair of the Australian Universities Accord Panel
Tim Payne, Higher Education Policy Director, University of Sydney (USYD)
Errol Phua, President, Council of Australian Postgraduate Associations (CAPA)
Dr Kendra Sharp, National Science Foundation (NSF)
Dr Jack Steele, Director Science Impact and Policy, Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Professor David Sweeney, former Chair, Research England

Professor Graeme Turner, former President, Australian Academy of the Humanities (AAH)
Professor James Wilsdon, University College London (UCL)
Judi Zielke, CEO, Australian Research Council (ARC)

Industry
Advanced Manufacturing Growth Centre (AMGC), Focus Group
Cicada Innovations, Focus Group
Cruxes Innovation, Focus Group
MCi Carbon, Focus Group
Systems Innovation, Focus Group

Government
AgriFutures Australia
Attorney-General's Department
Australian Nuclear Science and Technology Organisation (ANSTO)
Australian Research Council (ARC) Advisory Committee
Australian Research Council (ARC) Centre of Excellence Directors and equivalent, Focus Group
Australian Research Council (ARC) College of Experts, Focus Group
Australian Research Council (ARC) Discovery Early Career Researcher Awards, Focus Group
Australian Research Council (ARC) Future Fellows, Focus Group
Australian Research Council (ARC) Laureate Fellows, Focus Group
Australian Research Integrity Committee (ARIC)
Australian Space Agency (ASA)
Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Defence Science and Technology Group (DSTG)
Department of Agriculture, Fisheries and Forestry
Department of Education (International and Higher Education)
Department of Employment and Workplace Relations (DEWR)

Department of Finance
Department of Health and Aged Care
Department of Home Affairs
Department of Industry, Science and Resources (DISR)
Department of Infrastructure, Transport, Regional Development, Communications and the Arts
Department of Social Services (DSS) Grants Hub
National Health and Medical Research Council (NHMRC)
Office of National Intelligence (ONI)
Research Grants Services (RGS) Clients

Networks and Alliances
Aboriginal and Torres Strait Islander Mathematics Alliance (ATSIMA)
Association for Interdisciplinary Meta-Research and Open Science (AIMOS)
Australian National Fabrication Facility (ANFF), Focus Group
Centre for Global Food and Resources (GFAR), Focus Group
Mathematical Research Institute (MATRIX)
National Indigenous STEM Professional Network (NISTEMPN)
Traditional Knowledge owners and Indigenous researchers

Peak Bodies
Academy of Technological Sciences and Engineering (ATSE)
Academy of the Social Sciences in Australia (ASSA)
Analysis and Policy Observatory (APO), Focus Group
Australasian Council of Deans of Arts, Social Sciences and Humanities (DASSH)
Australasian Research Management Society (ARMS), Focus Group
Australian Academy of Health and Medical Sciences (AAHMS)
Australian Academy of Science (AAS)
Australian Academy of the Humanities (AAH)
Australian Industry Group (Ai Group), Focus Group

Australian Technology Network of Universities (ATN)

Cooperative Research Australia (CRA), Focus Group

Elsevier, Focus Group

Group of Eight (Go8)

Innovative Research Universities (IRU)

Knowledge Commercialisation Australasia Ltd, Focus Group

Master Builders Australia, Focus Group

Melbourne University Publishing

National Tertiary Education Union (NTEU)

NITRO-Oceania Executive, Focus group

Open Access Australasia, Focus Group

Regional Universities Network (RUN)

Royal Australian Chemical Institute (RACI)

Science and Technology Australia (STA)

Tertiary Education Quality and Standards Agency (TEQSA)

Universities Australia (UA)

Student Associations

Council of Australian Postgraduate Associations (CAPA)

National Union of Students (NUS)

Appendix E. List of Case Studies

Title
1. From the Illawarra to the Internet
2. The nation's research leadership incubator
3. Bananas saved from wipeout
4. Mighty Medicare's humble uni origins
5. The high stakes of high energy physics
6. ARC Named Laureate Fellowships shape a generation
7. Aussie sunshine for a brighter future
8. Australia, quantum's early bird
9. ARC-funded history enlivens our dark convict past
10. The Australian origins of global Wi-Fi
11. Facing up to our bloody history of violence against Australia's First Peoples
12. Changing the World Bank, changing the world
13. WHO saved millions from COVID
14. Archaeology illuminates Australian deep history