

Charles Darwin University
Submission to Australia's draft
National Science and Research
Priorities

September 2023



Table of Contents

Australia's most connected university	3
Summary of submission and recommendations	3
1. Specific challenges facing the country	4
2. Focus on First Nations Knowledge	5
3. Critical research paths	6
4. Mechanisms to support implementation of Priorities	7
5. Science systems	8
Conclusion	8

Australia's most connected university

Charles Darwin University's vision is to be Australia's most connected university by being courageous and making a difference in the Northern Territory (NT), Australia and beyond.

Charles Darwin University (CDU) is a dual sector university with around 7,500 higher education and 3,000 vocational full time equivalent students. Around seven per cent of higher education and twenty-five per cent of vocational education students are First Nations students. Being a dual sector university allows CDU to meet the needs of Territorians in campuses in Darwin, Alice Springs, Palmerston, and Katherine and in study centres in Nhulunbuy and Tennant Creek. CDU has a proud history of delivering in some of the NT's most remote locations.

At the heart of CDU's vision is our commitment to engage First Nations students and support their attainment of vocational and higher education. The NT spans approximately one sixth of Australia's landmass and yet is home to just one per cent of the population, of whom thirty per cent are First Nations peoples.

CDU has established itself as an exciting and progressive research-intensive university with a regional focus that prioritises the complex issues facing northern Australia and the Asia-Pacific. Research Institutes at CDU, including the Research Institute for the Environment and Livelihoods, the Menzies School of Health Research, the Northern Institute, the Energy and Resources Institute, and their collaborative research networks, provide a strategic framework for research engagement.

CDU consistently produces world-class research in areas of critical importance to northern Australia. The Times Higher Education World University Rankings list CDU within the top 400 universities internationally, with CDU ranked at 348 of 1,799 universities. The Times Higher Education Impact Rankings, which assess universities against the United Nations' Sustainable Development Goals, saw CDU ranked within the top 200 participating universities in the world. The Shanghai Academic Rankings in 2023 saw CDU placed in the top 700 universities in the world – a leap from the top 900 in 2022.

Summary of submission and recommendations

In line with Australia's Draft National Science and Research Priorities, this submission focuses on the key consultation questions to present CDU's expertise within the unique research environment of the NT.

Recommendations

CDU recommends that:

1. Research priorities underpin national security, including defence priorities as they become available, and are articulated directly in Australia's National Science and Research Priorities or implementation documentation.
2. Australia's National Science and Research Priorities clearly articulate the important role of the Humanities, Arts and Social Sciences in scientific research.
3. First Nations knowledge be authentically recognised in Australia's National Science and Research Priorities.
4. Research relating to First Nations people and communities is, as a fundamental principle, both co-designed and leaves communities better off.
5. Australia's National Science and Research Priorities acknowledge the underpinning research systems in Australia and the necessity of secure funding settings into the future that properly address differentiated costs of place-based research.
6. The National Science Statement, along with the National Science and Research Priorities, be contextualised in a coherent roadmap of current reforms.

1. Specific challenges facing the country

National Security and Sovereign Capability

The future of research will underpin national security, including defence priorities. Under the AUKUS pact, Australian universities will lead scientific research to support priorities such as the development of nuclear-powered submarines. Universities play a key role in supporting defence to achieve its broader research aims, which are currently being revised by the Defence Science and Technology Group.

Alongside research, national security provides an important context for lifting higher education and vocational training aspirations in science and technology, but also across all fields more broadly. For example, to support AUKUS the Commonwealth has announced 4,000 new funded graduate positions to develop the specialist workforce needed for the new submarines. The Nuclear-Powered Submarine Task Force has advised academia that most specialists will be needed in mechanical, electrical, and chemical engineering, materials science, and supporting trades. AUKUS provides a once-in-a-century nation building project with local workforce development opportunities.

More broadly, much of CDU's research on the 10-year horizon will be directed at or support matters of national security and sovereignty, especially in northern Australia, relating to climate security, biosecurity, digital transformation, advanced manufacturing, automation, artificial intelligence and cyber-security. Other universities will have complementary focuses. To capture this, either directly or through implementation material, CDU recommends national security and sovereign capability be given a stronger emphasis within Australia's National Science and Research Priorities.

Recommendation 1

Research priorities underpin national security, including defence priorities as they become available, and are articulated directly in Australia's National Science and Research Priorities or implementation documentation.

The role of HASS

Social research is critical to scientific discovery and research in several ways. CDU acknowledges the role of the Humanities, Arts, and Social Sciences in the development of social license to operate and undertake research; in ensuring that any scientific research properly accounts for social and cultural impacts; and importantly, in supporting research translation for end-users. CDU recommends the Australia's National Science and Research Priorities clearly articulate the important role of HASS disciplines in scientific research.

Case Study: Improving cervical cancer screening rates

Despite Australia being a global leader in cervical cancer prevention, offering routine Cervical Screening Tests to women aged 25-74 years and vaccination against human papillomavirus (HPV) to adolescents, Aboriginal and Torres Strait Islander women experience a higher burden of cervical cancer compared with other Australian women. This in part is due to the lower participation in cervical screening.

Dr Lisa Whop, from the Menzies School of Health Research, and her team hit the road to yarn with Aboriginal and Torres Strait Islander women about cervical cancer. They talked with 80 women – 50 who had participated in screening in the past five years and 30 who had not – and 12 health professionals.

The interviews highlighted the fundamental need for trust and control over decision-making by Aboriginal and Torres Strait Islander women to partake in cervical screening. In recognising this, the team were able to map the process of cervical screening and explore ways to increase screening uptake by this demographic.

Recommendation 2

Australia's National Science and Research Priorities clearly articulate the important role of the Humanities, Arts and Social Sciences in scientific research.

2. Focus on First Nations Knowledge

CDU hosted a roundtable with the Chief Scientist, Dr Cathy Foley in March 2023 in Darwin on the important topic of First Nations knowledge and knowledge systems.

First Nations knowledge remains a largely ignored resource for addressing some of the most pressing national and global challenges. The unique philosophical and epistemological underpinnings of First Nations knowledges are increasingly recognised as both a source of tension and an immense opportunity for science and research. First Nations people must be front and centre in these conversations. CDU supports Australia's National Science and Research Priorities in asserting First Nations knowledge is essential, enabling and enriching to all priorities.

Case Study: The Molly Wardaguga Centre

The Molly Wardaguga Research Centre is leading the way in maternity care outcomes for First Nations women in regional and remote communities through culturally sensitive care. The Centre was established in 2019 in honour of a Burarra Elder and midwife who worked extensively to improve health outcomes, with a vision of returning birthing services to First Nations communities and control. The research centre has grown significantly and has conducted more than twenty research studies on maternity care.

Building on twenty-five years of health services research, Centre co-directors, CDU Professor of Indigenous Health, Yvette Roe, a proud Njikenawurru woman, and Professor of Midwifery, Sue Kildea, run the Birthing on Country program. As a demonstration of its impact, the Birthing on Country program has seen a thirty-eight per cent reduction in pre-term birth and neonatal nursery admissions. With support from both the Australian and NT Governments the research team is now expanding the service to East Arnhem with a pilot maternity clinic in a region with one of the highest proportions of pre-term births in Australia.

CDU is a leader in working with First Nations knowledges. Currently, we have around \$15 million of active externally funded research projects in the NT that partner with First Nations peoples. This equates to around ten per cent of our current active projects. However, many research projects particularly within health, education, and environment, also involve informal partnerships in remote communities. As the university 'for' the Territory, we are ideally placed to engage deeply and genuinely with First Nations peoples, and to take seriously the potential of First Nations knowledge for future research in Australia.

Recommendation 3

First Nations knowledge be authentically recognised in Australia's National Science and Research Priorities.

A key feature of effective engagement with First Nations people is the principle of genuine co-design, paying equal respect, and recognising the validity of both First Nations and western knowledge and contribution to build community rapport and reciprocity. Co-design leads to a higher likelihood of research being implemented, or informing practice, which in turn is likely to lead to better economic, social and health outcomes in communities.

Research impact should be inclusively defined to properly recognise the engagement of First Nations people and prioritise the benefits they and their communities derive from research. There has been an ongoing history of non-Indigenous researchers undertaking research projects about First Nations people, culture, and land. While such projects can be of academic import, many have been characterized by an absence of long-term impact for First Nations people. The principle of co-design is essential to ensuring research leaves communities better off. Collaboration, relationships, and trust are crucial to this process.

CDU is of the opinion, supported by our experience, that building and maintaining local 'place based' research capacity and capability, where academics and researchers live in the community, delivers real, meaningful research outcomes and impact.

Case Study: Fire management

Landscape management is an area where tens-of-thousands of years of First Nations knowledge has been embraced by western science. For around twenty years, CDU researchers have mapped fires in northern Australia's tropical savannas and rangelands. Scientific innovations in mapping techniques and carbon accounting methodologies have revolutionised fire management in northern Australia and provided enormous economic benefit to remote communities. First Nations rangers provide high levels of expertise to inform and implement controlled burning of savannas and rangelands in the early dry season. High-resolution burnt area maps are generated and produced on North Australia and Rangelands Fire Information Service to improve planning and operational risk assessments for bushfires.

A commercial spin-off from this work has been the development of a 'carbon credit' industry for First Nations enterprises and communities in northern Australia based on cultural landscape burning practices.

Recommendation 4

Research relating to First Nations people and communities is, as a fundamental principle, both co-designed and leaves communities better off.

3. Critical research paths

The priorities proposed in this draft define a set of broad aspirational objectives and aims that require the careful definition of critical research paths to provide a focused set of targeted research priorities. Therefore, defining these paths will be critical to encapsulating the nation's research requirements over the coming decade.

Additional critical research paths that could be considered are detailed below by Priority.

Priority One: Ensuring a net zero future and protecting Australia's biodiversity

- Technological and environmental solutions for the protection and remediation of landscapes affected by human activities such as mining, fracking, exploration and minerals processing; and
- Developing solutions to detect and monitor biosecurity threats to habitat and fauna.

Priority 2: Supporting healthy and thriving communities

- Closing the Gap solutions to achieve equality for Aboriginal & Torres Strait Islander people in health and life expectancy, especially through community capacity building.
- Technological solutions for the provision of services, assistive tools and diagnostics related to aged care, people with disabilities, and people living in regional and remote communities.

Priority 3: Enabling a productive and innovative economy

- Supporting the transitioning of Australian businesses towards high-growth industries with increased R&D inputs, skilled workers and sovereign supply chains;
- Supporting a move to more innovative industries through digital transformation that can keep pace with technological advancements (e.g. automation, robotics, AI); and
- Ensuring Australia builds future research capabilities and expertise to support the realignment and future requirements of Australia's defence, security and safeguard priorities.

4. Mechanisms to support implementation of Priorities

CDU expects many of the mechanisms that underpin implementation of the Priorities are being addressed through the Universities Accord, and the implementation of the Review of the Australian Research Council Act.

Research Impact

CDU supports reporting mechanisms that allow the alignment of research to the Science Priorities, but more importantly to measure the impact of research.

To establish and maintain research with impact, CDU supports better measurement of impact particularly relating to cultural, economic, educational, environmental, health, political, social and technological issues. Noting that successful research translation often also indicates greater engagement with research partners and end-user collaboration, improved measures of impact could be achieved by greater engagement with such partners and end-users. Impact measurement should also include foundational research, which presently only accounts for around nine per cent of all Australian research.

Foundational Research

CDU is cautious, however, that the implementation of Science Priorities does not overly constrain foundational, or 'blue-sky' research that underpins new discoveries. It is critical to ensure Australia's scientific community retains the freedom and provision of resources to pursue foundational research.

Security of Funding

Though not directly in the remit of the Australia's National Science and Research Priorities, CDU argues that the cost basis of research needs to be properly funded, and that the decline in public funding for research be arrested.

While place-based research is so critical to our sovereign capacity – including in northern Australia, for biosecurity, food security, water security, energy security and national security – there is insufficient cost differentiation for place-based research. Research undertaken outside the major metropolitan cities is at

risk from higher costs – from the procurement of goods and services to the need to compete for a limited pool of labour.

CDU has argued through our submission to the Australian Universities Accord that the Research Support Program increasingly does not cover the systemic costs of research not supported directly through competitive and other grants.

In coming years Australia’s Economic Accelerator and the National Reconstruction Fund are both likely to play a key role in translational research. It will be important to make sure research funds are accessible to all institutions, including removing the regulatory burden on applications and introducing more stage-gated opportunities. In practical terms, this includes processes like expressions of interest with lower thresholds than full applications at early stages. This will allow research funds to be more readily accessed by smaller institutions, and in the case of incubators, small and medium enterprise.

Recommendation 5

Australia’s National Science and Research Priorities acknowledge the underpinning research systems in Australia and the necessity of secure funding settings into the future that properly address differentiated costs of place-based research.

5. Science systems

A renewed National Science Statement provides an opportunity to articulate the National Science Priorities and build collaboration and strength in Australia’s scientific systems. CDU would like to see greater connection between the various government reforms underway, listed on p.20 of Australia’s Draft National Science and Research Priorities, to provide a more coherent roadmap.

Science systems in northern Australia

In northern Australia, there is a great opportunity to strengthen scientific cohesion and investment, including by drawing on First Nations knowledge systems, as outlined above, but also leading the nation in decarbonisation and building national resilience. To support this CDU proposes the development of stronger northern Australian scientific leadership across jurisdictions, including through the Chief Scientists’ Forum, but also through a northern Australian science advisory body, and staff by senior personnel, to enable a stronger voice for the region in national science decisions.

As part of, or indeed separate to, such an advisory body CDU recommends the appointment of an NT Chief Scientist to support development of national science infrastructure, envisaged by the National Science Statement and the National Science and Research Priorities.

Recommendation 6

The National Science Statement, along with Australia’s National Science and Research Priorities, be contextualised in a coherent roadmap of current reforms.

Conclusion

CDU embraces the vitality and resilience of the Northern Territory, which is the focus of the nation’s most ambitious plans for future development – to unlock the vast potential of Northern Australia. We look forward to supporting the implementation of the National Science and Research Priorities in Northern Australia.