

Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The [2021 Roadmap](#) used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

Q22.

Food and Beverage

Q23.
Medical Products

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

Q27.
Environment and Climate

Q28.
Frontier Technologies and Modern Manufacturing

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.

Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

Q31.

Supporting healthy and thriving communities

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Q33.

Protecting and restoring Australia's environment

Q34.

Building a secure and resilient nation

Mathematical sciences are deeply rooted in modern advances and are central to a secure and resilient nation. Sovereign mathematical sciences capability is essential to tackle challenges at their deepest level, such as in robust AI, cybersecurity, defence, climate resilience, and public health. Highly abstract mathematics is key to safeguard sensitive information in cryptography and data encryption, and drives many modern technological advances. Advanced statistical methodology sits at the heart of AI and machine learning, and statistical analysis is central to effective management of risk. Mathematical optimisation and predictive modelling support critical infrastructure, from energy grids to financial markets, and are essential to mitigate disruptions caused by economic shocks and natural disasters. In the environmental and health sectors, mathematical sciences enable rigorous data analysis, effective disaster response, epidemic management, and climate resilience, ensuring preparedness for future challenges. Beyond immediate applications, the progression of mathematical sciences research is vital for fostering the next generation of innovators and readiness for yet unforeseen challenges and opportunities. Advanced mathematical sciences research drives real progress. To ensure Australia remains secure and resilient, adequate investment in mathematical sciences is imperative. Australia currently lacks investment in a national mathematical sciences research institute, which is the critical infrastructure needed for the mathematical sciences and to meet the growing demands and complexities of national research priorities. Sustained investment in mathematical sciences research strengthens the nation's overall research capacity, and equips Australia with sovereign capability to address complex issues such as digital technology, energy efficiency and precision medicine, securing long-term prosperity. A robust foundation in mathematical research will also enhance Australia's global competitiveness, promote international collaboration, and create high-skilled jobs. We strongly recommend the NRI to prioritise and include investment in mathematical sciences research infrastructure as a critical component of National Research Infrastructure within the roadmap. Infrastructure in the form of a national residential research institute is essential to effectively address future priorities and maintain Australia's competitive edge in key scientific and technological areas.

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.

If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

Mathematical research is a cornerstone of Australia's scientific capabilities and a key driver of national research priorities. Unlike applied fields that focus on addressing specific challenges, mathematics provides the essential theoretical foundations and methodologies that unlock breakthroughs across all scientific domains. A strong mathematical foundation is essential for Australia to navigate uncertainties, safeguard its future, and maintain its global competitiveness in an increasingly complex world. A National Priority - The Urgent Need for Investment in Mathematical Sciences Infrastructure Investment in research infrastructure is vital across all scientific disciplines, and the mathematical sciences are no exception. Dedicated infrastructure in the form of a national residential research institute for mathematical sciences provides the most effective environment to develop expertise, tools, and collaborative networks necessary to address emerging threats, drive innovation, and support informed decision-making across critical sectors. This aligns with the NCRIS objective to strengthen Australia's research capabilities and ensures that mathematical sciences are well-supported to tackle rising challenges. Proposed Infrastructure – A Residential National Research Institute for Mathematical Sciences Whereas laboratory-based sciences often require large pieces of equipment, research in the mathematical sciences primarily relies on deep collaborative interactions, typically conducted in person and in front of black or whiteboards. Residential research institutes are globally recognised to be the key research enabler for foundational fields like mathematics. A residential mathematical sciences research institute is essential national infrastructure similar to the Australian Synchrotron, the National Computational Infrastructure facility, and the Square Kilometre Array radio telescope. The value and effectiveness of mathematical sciences research institutes have been recognised by nearly every industrialised nation. Globally, most developed countries established significant national infrastructure for mathematical sciences with strong government backing. The Isaac Newton Institute for Mathematical Sciences in Cambridge, UK, is a prime example of a world-class mathematical sciences research institute, and so are the Simons Laufer Mathematical Sciences Institute and the Institute for Pure and Applied Mathematics in the USA. By contrast, Australia is more than twenty years behind in this regard. In 2020, the UK announced a £60 million annual boost for mathematical sciences infrastructure, significantly enhancing the activities of three leading mathematical institutes. Similarly, the USA established the Institute for Mathematical and Statistical Innovation in 2020 to foster innovation across the mathematical disciplines. This century has also seen a new wave of institutes established across the region to address pressing ecological and economic challenges. Brazil has the Instituto Nacional de Matemática Pura e Aplicada (IMPA), and China launched the Shanghai Institute for Mathematics and Interdisciplinary Sciences in early 2024, complementing the Beijing Institute of Mathematical Sciences and Applications founded in 2021. Despite its foundational role in key scientific and industrial advancements, dedicated government funding mechanisms to support research infrastructure for the mathematical sciences in Australia remain absent. More recently, ATSE's Pre-Budget Submission 2025-26 reinforced this need, recommending that a national mathematics research institute be included in NCRIS funding to strengthen Australia's research capabilities and align with national priorities. As Australia's collaborative research-intensive residential institute for mathematical sciences, MATRIX is uniquely positioned to address this infrastructure gap and tackle critical mathematical challenges of both national and global significance. Operating on a lean budget for nearly ten years, MATRIX has been supported by five leading Australian universities (University of Melbourne, Monash University, University of Queensland, Australian National University and University of New South Wales) and the USA-based Simons Foundation. However, it has yet to receive sustained national infrastructure funding. Despite this, MATRIX has achieved impressive results. As of the end of 2024, it has delivered 88 programs, bringing together 1,900 scientists from 47 countries, advancing knowledge across a broad spectrum of mathematical sciences disciplines. MATRIX furthermore provides additional opportunities and support for caregivers and facilitates deep interaction between established and early career researchers. Since its inception in 2015, MATRIX has forged strong international partnerships with leading institutes in Germany, Japan, Canada, USA, and South Korea. Impacted Research Communities - Extensive Benefits for the Broader Scientific Landscape Investment in national infrastructure for mathematical sciences will create a national focus of international calibre and elevate Australia's global standing in scientific research. A dedicated national institute will create a crucial link between academia, industry, and government, fostering a skilled workforce and driving high-impact research with long-term benefits. Investing in national infrastructure for mathematical sciences will grow the national knowledge base and help build sustainable industries. Additionally, it will foster the development of skilled talent, boost innovation, and create a collaborative environment that enables the exploration of emerging fields, from artificial intelligence and data science to quantum computing. The returns from this investment will far outweigh its initial cost.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the [2021 Roadmap](#) related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

☐ Yes

☐ No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

This question was not displayed to the respondent.

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

MATRIX strongly supports the development of a robust National Research Infrastructure (NRI) strategy that acknowledges the vital role of mathematical sciences in driving innovation and tackling national challenges. As outlined in our responses, dedicated funding for a national research institute in mathematical sciences would enhance Australia's global competitiveness, foster cross-sector collaborations, and support a highly skilled workforce essential for advancing emerging technologies and innovation. Australia lags behind many comparable nations in making this crucial investment - this must change. Establishing dedicated infrastructure for mathematical sciences is a strategic, forward-looking investment that will deliver long-term national benefits. The rate of return on investment in the mathematical sciences is now many times higher than in other STEM disciplines. The Strategic Examination of R&D discussion paper, Department of Industry, Science and Resources, 2025, <https://consult.industry.gov.au/strategic-examination-rd-discussion-paper>, underscores that Australian still invests very little in fundamental R&D. We recommend the NRI advisory group to consider the following reports, which highlight the national need for investment in mathematical sciences and expose the current funding gap in this critical field in Australia: - Decadal Plan for the Mathematical Sciences (2016–2025) – Australian Academy of Science and the Australian Mathematical Sciences Institute: <https://www.science.org.au/support/analysis/decadal-plans-science/decadal-plan-mathematical-sciences-australia-2016-2025> - ATSE 2025-26 Pre-budget Submission (Jan 2025): <https://www.atse.org.au/media/iproffw0/atse-sub-250129-pre-budget-submission-v3.pdf> - AMSI-MATRIX Report on Research Investment and Expenditure (May 2024): <https://amsi.org.au/wp-content/uploads/2024/05/amsi-matrix-research-funding-report-may-2024.pdf> - Call to Action Based on AMSI-MATRIX Findings (August 2024): <https://www.matrix-inst.org.au/call-to-action/> MATRIX welcomes further engagement in the roadmap process and is keen to contribute expertise from the mathematical sciences community to help shape a forward-thinking, impactful NRI strategy.