

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

Numerous emerging research directions and disciplines - particularly in the realm of quantum materials and technology, environmental statistics and forecasting, cryptographic, and cyber security research, and artificial intelligence/neural networks/large-language models - that are critical to building a resilient nation are all underpinned by mathematics and statistics - the mathematical sciences. The research infrastructure required in the mathematical sciences is a national residential research institute – like the Mathematisches Forschungsinstitute Oberwolfach (Germany), the Banff International Research Station (Canada/China/India/Mexico/Spain), the Isaac Newton Institute (England), the Centre de Recerca Matemàtica (Spain), the International Centre for Mathematical Sciences (Scotland), and the Simons Laufer Mathematical Sciences Institute and the Institute for Pure and Applied Mathematics (USA). That is, “relational” or “social” infrastructure – infrastructure that enables interaction between researchers in disciplines like the mathematical sciences where co-location and sustained (multiple weeks) concentrated collaborative research time among experts is the fundamental research need. To date, NCRIS has delivered no infrastructure funding for the mathematical sciences (<https://www.matrix-inst.org.au/call-to-action/>). The Australian Mathematical Society recommends that the NRI prioritise investment in research infrastructure in the mathematical sciences in the Roadmap. Specifically, we recommend significant investment in the MATRIX Institute ([matrix-inst.org.au](https://www.matrix-inst.org.au)) as an Australian residential research facility.

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.

The mathematical sciences provide the fundamental theoretical underpinnings of paradigm-changing breakthroughs across all areas of science and technology. Hence a vibrant and healthy research capacity in the mathematical sciences is vital to Australia's ability to respond to emerging and unforeseeable scientific and technological challenges. Like all major areas of research endeavour, the mathematical sciences need suitable research infrastructure. For the mathematical sciences specifically, the needed infrastructure is a national residential research facility. Such facilities are recognised internationally as the optimal way to achieve significant progress and breakthroughs in mathematical research challenges. They therefore align with NCRIS' remit to strengthen Australia's research capabilities and readiness to address future research challenges. We recommend that NRI invest in new capability via an Australian national residential research facility, by investing in the MATRIX Institute. Such facilities host groups of Australian and international researchers with complementary and deeply specialised expertise to collaborate intensively and uninterruptedly for multiple-week periods on important mathematical research challenges. Experts collaborate in person at whiteboards/blackboards in multiple-hour blocks and in small groups whose composition evolves dynamically in response to the mathematical complications encountered, sharing, developing, revising and perfecting ideas. This can only be achieved effectively in an in-person dedicated research environment shared for a protracted period of time. The value and effect of such a "Think-chrotron" facility in the mathematical sciences is similar to that of the The National Computational Infrastructure facility or the Square Kilometre Array in other disciplines. The MATRIX institute, based in Creswick near Melbourne, is the only such residential research institute in Australia. However, MATRIX is entirely reliant on consortium funding from the larger Australian universities and funding from the Simons Foundation (USA), and has been operating (remarkably effectively) on a subsistence budget for many years. There is currently no national funding available for such infrastructure via NCRIS. Consequently, MATRIX lacks both funding stability and sufficient resources to support sovereign capacity in Australia in this critical research area. The Australian Mathematical Society recommends that the NRI Roadmap include significant investment (on the order of \$10M) in the MATRIX facility over the next five years. This would provide capability for MATRIX to increase the scale of its operations and its ability to coordinate programs addressing major research problems, running a year-round schedule of research programs. It could also improve links between academia and industry in the mathematical sciences, build the national knowledge base and R&D capacity, and promote training and development of skilled talent.

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:

- ☐ I did not know about it
- ☐ Other facilities suit my needs better
- ☐ I would like to, but cannot get access due to geographical location
- ☐ I would like to, but believed that access was only available to academic researchers
- ☐ I am not aware of any capability that meets my needs
- ☒ Other (please specify)

The AustMS is not an industry-based 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.

Many countries with comparable research capability to Australia have developed national residential research facilities in the mathematical sciences. These focal points attract significant research expertise and boost research training in the host nations, and deliver substantially enhanced capacity in the mathematical sciences. This has significant long-term economic benefits. Australia is currently behind the game in this arena, but the NRI Roadmap represents a unique opportunity to establish a competitive facility at MATRIX and attendant benefits in Australia.