

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

Emerging research needs: rapid and in situ elemental analysis

Q22.

Food and Beverage

Q23.

Medical Products

Ongoing need for NMR facilities (low, medium, high and ultra high field, also solid state) to support chemical synthesis, sample and materials analysis, biomolecular NMR, fragment-based drug discovery, discovery and development of new therapeutics. Cost of maintaining Magnetic Resonance capabilities across Australia is rising - need coordination, national network to coordinate access and upgrades. Magnetic Resonance Spectroscopy (NMR and EPR) is essential for chemical and biological research and manufacture. Need for access to high-throughput facilities for disease-relevant 3D organoid models for drug screening, e.g. using well validated, reproducible iPSC-derived models. These require very significant investment for purchase and installation but equally critical, ongoing support in the form of highly skilled staff to maintain/upgrade the facilities, enable training and access to the shared facilities. Ongoing costs for maintenance of robot-controlled cell culture and high-content imaging systems require national investment at the NCRIS level. Potential for TIA to provide access grants for users.

Q24.

Defence

Q25.

Recycling and Clean Energy

Q26.

Space

Q27.

Environment and Climate

Q28.

Frontier Technologies and Modern Manufacturing

Facilities for physical properties characterisation, solution and solid-state NMR, electron paramagnetic resonance spectroscopy, X-ray and electron diffraction. All needed for development of new materials to support recycling the transition to net zero. Magnetic resonance (MR) is a crucial technology and a foundation of molecular, biomolecular, chemical and materials analysis with applications across quantum computing, chemical synthesis, environmental monitoring, natural product discovery, drug discovery and development, forensic and health studies.

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

Scientific analysis using vibrational spectroscopy is crucial for enriched understanding, management, conservation and engagement with Cultural Heritage.

Q33.

Protecting and restoring Australia’s environment

Q34.

Building a secure and resilient nation

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.

Magnetic Resonance (NMR and EPR spectroscopy) is an essential tool for the chemical, physical and biological sciences. It is critical for scientific research and for manufacturing. Across Australia, existing MR infrastructure is fragmented and aging and urgently needs to be maintained and upgraded in a coordinated way to improve capabilities. New instruments offer additional sensitivity and functionality but have smaller environmental footprints and reduced operating costs with advances in magnet design. Specifically, helium use is much reduced with new designs. Renewal of the national MR capability now lies outside the scope of ARC LIEF and similar schemes because of the very high cost to upgrade existing workhorse instruments or purchase of cutting-edge new instruments. Yet, these instruments remain essential for Australia to remain competitive across quantum computing, chemical synthesis, environmental monitoring and drug discovery. Investing in a national MR network will bring substantial economic benefits, by enabling innovation in pharmaceuticals, agriculture, and renewable energy, a nationally funded and coordinated network of magnetic resonance capability will create jobs and enhance productivity. Investment in MR will underpin progress in with many of the national research priorities, and contribute to the economic development of Australia. The ability to maintain, upgrade, and leverage existing MR infrastructure, provide access to researchers across the country, maximise return on investment and safeguard continued capability will ensure that Australia's research community can continue to produce world-leading scientific and/or manufacturing outcomes.

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) interacted 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.

Q39.

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

- ☒ For expertise or advice
- ☐ Access to research resources or products
- ☒ Access to equipment for research
- ☐ Access to equipment for operational reasons
- ☐ Help in translating research
- ☐ Access to data
- ☐ Support for clinical trials
- ☐ Other (please specify)

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.

I would like to strongly advocate for the establishment of a New National Collaborative Research Infrastructure Strategy Capability (NCRIS) for Magnetic Resonance (MR). There is a clear gap in national support for what is a foundational technology that underpins research and translational development across the physical, chemical, biological and biomedical sciences. It rivals microscopy in its scope, complexity (low-to-ultrahigh field, solution, solid state, imaging, in situ, imaging) and critical importance to diverse disciplines. With rising infrastructure costs, Australia cannot afford to lose its capabilities in MR. It needs a national approach. The MR community has developed a plan for a national network.

Q49.

4.2 Optional Document Attachment.

Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.