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

The development of alternative proteins, such as plant-based, cultured meat, and insect-based proteins, is gaining momentum. This shift is driven by the need for sustainable and ethical food sources. Advanced bioreactors, fermentation facilities, and high-throughput screening platforms for protein synthesis and optimization are essential. Investment in genomics, proteomics, and metabolomics platforms will enable detailed analysis and optimization of these new protein sources. Ensuring food safety and traceability is becoming increasingly important. This includes the development of rapid detection methods for contaminants and pathogens. State-of-the-art laboratories equipped with next-generation sequencing (NGS) and bioinformatics tools for pathogen detection and traceability systems are crucial. Investment in bioinformatics infrastructure is critical to manage and analyze the vast amounts of data generated, ensuring accurate and timely identification of food safety issues. The trend towards personalized nutrition is on the rise. Functional foods that provide health benefits beyond basic nutrition are also gaining popularity. Facilities for genomics, proteomics, and metabolomics research to understand individual nutritional needs are necessary. Advanced bioinformatics platforms to analyze and interpret large datasets are critical. Synthetic biology offers the potential to engineer microorganisms and plants to produce novel food ingredients, enhance nutritional content, and improve crop resilience. Investment in synthetic biology infrastructure, including gene synthesis and editing tools, is essential. Facilities that support the design, build, test, and learn cycle of synthetic biology will enable the rapid development and scaling of innovative food solutions. While mass spectrometry (MS) has been a cornerstone of 'omics research, the rapid advancements in MS technology mean that older instruments may soon become obsolete. Modern MS instruments offer higher sensitivity, resolution, and throughput, which are essential for the detailed analysis required in proteomics and metabolomics. Continued investment in cutting-edge MS technology is necessary to keep pace with the growing demands of 'omics research.

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

The development of personalized medicine is rapidly advancing, driven by genomic sequencing and artificial intelligence (AI). These technologies enable highly tailored treatments based on individual genetic profiles, lifestyle, and environment. Critical infrastructure requirements include advanced genomics, proteomics, and metabolomics platforms to analyze and interpret complex biological data. Bioinformatics tools are essential for managing and analyzing large datasets, facilitating the identification of biomarkers and the development of targeted therapies. Investment in these areas will support the creation of personalized treatment plans, improving patient outcomes and reducing healthcare costs. AI and machine learning are revolutionizing biomedical research by accelerating the drug discovery process and uncovering new insights into disease mechanisms. These technologies require robust bioinformatics infrastructure to handle the vast amounts of data generated and advanced computational platforms to develop and refine AI algorithms. Investment in genomics, proteomics, and metabolomics platforms is essential to support the integration of AI into biomedical research, enabling the identification of novel drug targets and the development of more effective treatments. Current national infrastructure requirements that may become obsolete include outdated mass spectrometry instrumentation. older mass spectrometry instruments may soon become obsolete due to rapid advancements in technology. Modern mass spectrometry instruments offer higher sensitivity, resolution, and throughput, which are essential for the detailed analysis required in 'omics research. Continued investment in cutting-edge mass spectrometry technology is necessary to keep pace with the growing demands of biomedical research.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

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.

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.

Molecular life science and omics research is critical to meet

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.