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

Australia has a huge deposit of magnesite. Magnesium is another metal that Australia can do well.

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

Australia needs to invest more in frontier technologies and advanced manufacturing. Many of the other themes are related, directly or indirectly, to how well Australia can do in this theme.

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

Emerging research directions: biodegradable implants for better quality of life. There is a lack of infrastructure and major-funds supporting this multidiscipline research area.

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.

Microscopy Australia directly supports the Challenge areas identified in the 2021 Roadmap, the National Science and Research Priorities and 'Future Made in Australia' outcomes. • Microscopy Australia's NCRIS-enabled instruments and staff supported $1B of ARC/ NHMRC grants over the last five years (NB: based on funding acknowledgments and an under-estimation of total impact of microscopy on Australian research). • 25% of Australia's top 100 cited papers relied on microscopy [2023 SciVal data] • 42% of the research that has relied on Microscopy Australia for critical results is published in the top 10% of ranked journals [2023 SciVal data]. The 2021 Roadmap survey identified microscopy in the top 4 capabilities necessary for planned future use, but it was critically underfunded in NCRIS 2023. Microscopy Australia received just $12M of the total $650M uplift from NCRIS in 2023 (four-year timeframe). This is compounded by significant underfunding in electron microscopy with just $11M in ARC funding through LIEF (over four years). If the lack of investment continues, sovereign capabilities are at risk, and the potential impact for translation and prosperity won't be realised. With the 2026 Roadmap, there is also now an opportunity to bring additional nationally important microscopy facilities into Microscopy Australia to unlock more world-leading facilities through our open access arrangements for research and development. Microscopy Australia regularly assesses the future research needs that rely on microscopy, alongside the emerging technologies that will support them. From consultations in 2024, we identified important areas needing future investment: 1. Analysis of beam-sensitive materials and difficult-to-detect light elements for projects in: • energy generation and storage • advanced alloys • semi- and super-conductors • quantum and optical devices 2. Increased capability to enable correlative and multimodal microscopy solutions for more complete, multiscale and integrated data from samples across the discipline spectrum, especially in the biomedical sciences. New developments in more integrated systems would enhance our ability to capture these types of data, and then to provide support for analysis of these complex data sets. 3. More of the important every-day-use microscopes and staff are needed to enable an increased national focus on translation of academic research into useful products through spin-out companies and licensing agreements. There have recently been situations where spin-outs with microscopy needs have been turned away from our facilities based solely on instrument and staff capacity. Only more instruments and skilled staff can resolve this block and enable us to facilitate increased translation outcomes. 4. Long-term skilled workforce – training and engagement for the future. Our highly skilled and experienced staff are the cornerstone of our capability. Without them, researchers would not be able to acquire the quality of data they require. Building that experience starts with a scientifically literate society and children that see science as a viable career choice. It continues through a commitment to meaningful platform scientist career pathways and ongoing professional development opportunities.

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)

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.

Microscopy is a cornerstone of diverse scientific disciplines—including medical, soft matter, plant, materials, agricultural, and geological sciences—providing the cutting-edge capabilities needed to drive Australia's future research and industry advancements. A substantial and urgent expansion of advanced microscopy infrastructure is required nationwide. Sustained long-term investment (10+ years) in national research infrastructure, such as Microscopy Australia, is essential. A continuous and ongoing funding framework would ensure unwavering support for Australian researchers at all levels, from emerging early-career scientists to those leading national flagship research programs, including MRFFs, CRCs, ARC Centres of Excellence, Laureates, and NHMRC Investigator Fellowships. Any disruption or stagnation in funding would have profound consequences for Australia's scientific progress and global competitiveness. I am a professor at Monash University specializing in materials science and engineering. Access to Microscopy Australia's instruments, along with the expertise that comes with them, is essential to my research. My group relies on these resources to analyse the microstructures of our lightweight alloys, designed for energy-efficient and environmentally friendly applications, as well as our biodegradable alloys for implants that enhance quality of life. Looking ahead, microscopy will remain indispensable as we continue advancing these two fields, which are critically important to Australia's economy, environment, and healthcare. It has already facilitated the development of several commercialized patents and led to groundbreaking discoveries published in Science and Nature. I strongly urge that Microscopy Australia be recognised as the essential foundation of scientific infrastructure that it truly is and that the 2026 Roadmap prioritises the urgent need for increased funding to safeguard and advance research excellence for both emerging and established Australian researchers.