# Australian Research Council Submission
# 2016 National Research Infrastructure Roadmap
# Capability Issues Paper

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The Australian Research Council (ARC) welcomes the opportunity to provide a submission in response to the 2016 National Research Infrastructure Roadmap Capability Issues Paper. This submission provides information on the ARC's perspective on infrastructure capabilities in relation to data, specifically open access to research data, and on the ARC's support for research infrastructure through the Linkage Infrastructure, Equipment and Facilities (LIEF) scheme.

The ARC is a Commonwealth entity that provides advice to the Government on research matters and administers the National Competitive Grants Programme (NCGP)—a significant component of Australia's investment in research and development—and Excellence in Research for Australia. The ARC's mission is to deliver policy and programmes that advance Australian research and innovation globally and benefit the community. In seeking to achieve its mission, the ARC supports the highest quality fundamental and applied research and research training through national competition across all disciplines.

**Data for Research and Discoverability**

*Question 35:    Is there anything else that needs to be included or considered in the 2016 Roadmap for the Data for Research and Discoverability capability area?*

The ARC broadly agrees with the emerging directions and research infrastructure capabilities identified in the issues paper in relation to Data for Research and Discoverability. In order to better inform new data infrastructure capabilities, the 2016 Roadmap should give appropriate consideration to the Government's agenda in relation to data, including as outlined in the *Australian Government Public Data Policy Statement*, as well as international developments in data management. In doing so the Roadmap should take note of the range of complexities that are involved in supporting open access to research data.

Open access to research data remains a dynamic and rapidly evolving issue. As the issues paper states, there is an increasing trend concerning "the rising dependence of research on digital data at new scales, and a variety of data not previously addressed."[1] In the international research landscape this has led to new models of science and research and the emergence of new fields of study.[2]

International and domestic debate reveals the complexities and challenges involved in supporting open data in light of the many types of data produced and the different standards and approaches

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[1] Australian Government (2016), *2016 National Research Infrastructure Capability Issues Paper*, p. 46.
[2] Borgman, C (2012), 'The Conundrum of Sharing Research Data', *Journal of the American Society for Information Science and Technology*, 63(6): 1059, http://onlinelibrary.wiley.com/doi/10.1002/asi.22634/epdf.

to data management, analysis, storage, archiving, sharing, publication and use between (and within) disciplines—there is no 'one-size-fits-all' approach.[3] Further, when available data are used, there is a lack of common standards and consistency in data citation practices.

Notwithstanding these challenges, there is increasing international support for open data from both research funders and academic publishers (such as Elsevier,[4] Wiley[5] and others). From a funder perspective, this trend is typically underpinned by the objectives of maximising the return on public investment in research and, recognising that the value of research data is not a simple monetary argument,[6] increasing scientific and other research benefits for the research community and the public.

ARC position on open data and data management

The ARC considers that open access to research data provides three types of benefits—societal (informing better social, economic and other outcomes), research (contributing to the growth of science and research) and individual (flowing from the use and citation of researchers' data outputs).

The ARC is committed to maximising these benefits and, since 2007, has encouraged researchers to deposit data arising from ARC funded research projects in publicly accessible repositories. The ARC has not mandated open access to research data.

Since February 2014, the ARC has required researchers to outline how they plan to manage data arising from their research.[7] Effective data management is an important part of ensuring open access to publicly funded research data and helps to outline how data will be collected, formatted, described, stored and shared throughout, and beyond, the project lifecycle.

The ARC's requirement is consistent with the *Australian Code for the Responsible Conduct of Research* (2007), which includes responsibilities for the proper management of research data and primary materials by researchers, and for institutional policies to address data ownership, storage, retention and "appropriate access…by the research community".[8]

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[3] Lämmerhirt, D (2016), *PASTEUR40A Briefing Paper: Disciplinary differences in opening research data*, p. 1, http://www.pasteur4oa.eu/sites/pasteur4oa/files/resource/Brief_Disciplinary%20differences%20in%20opening%20research%20data%20APS_MP_FINAL1.pdf.
[4] See https://www.elsevier.com/about/open-science/research-data.
[5] See http://olabout.wiley.com/WileyCDA/Section/id-828082.html.
[6] Pryor, G (2012) 'Why manage research data?', in Pryor, G (ed.) *Managing research data*, p. 4, see http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.447.9990&rep=rep1&type=pdf.
[7] For additional information see http://www.arc.gov.au/research-data-management.
[8] *Australian Code for the Responsible Conduct of Research* (2007), Section 2.

<u>Research infrastructure to support open access to data</u>

Open access to data arising from publicly funded research should continue to be strongly encouraged. The ARC supports the statement of desirable new capabilities presented in the issues paper, which identifies the need to "create a more integrated, coherent and reliable platform to deal with data-intensive, cross-disciplinary and global collaborative research."[9]

However, the varied nature of research data would need to be recognised and considered closely to inform the establishment of more effective infrastructure and mechanisms for data storage and curation, as well as the development of common or shared data standards and approaches that facilitate data use. As well as being tailored to address the needs of different disciplines (and facilitate use across disciplines), data infrastructure should be sustainable and allow for ongoing developments in research data and data management.

There is increasing recognition that research funders and national infrastructure providers have an obligation to support sustainable research data repositories.[10] Substantial work has been undertaken in this regard, for example in the United Kingdom, with government funding provided to national research data capabilities such as the UK Data Service,[11] Natural Environmental Research Council data centres[12] and Archaeology Data Service.[13] The establishment of similar repositories in Australia could be considered in the development of the 2016 Roadmap.

To inform the 2016 Roadmap, the Government should continue to engage closely with the research sector in considering ways to address the challenges involved in supporting open access to research data, as well as the potential time and costs involved.

**Other comments**

*ARC Linkage Infrastructure, Equipment and Facilities (LIEF) scheme*

It is important to recognise that the ARC also funds research infrastructure that is available for use nationally (not just locally), through the LIEF scheme. The scheme provides funding to eligible organisations on a competitive basis (as with all schemes under the NCGP), for research infrastructure, equipment and facilities.

The scheme aims to encourage higher education institutions to develop collaborative arrangements with other institutions and/or industry, business or other partners to develop and support research infrastructure and enable higher education researchers to participate in large-scale cooperative initiatives using that infrastructure. LIEF funding recipients are required to plan for the use of the proposed infrastructure, equipment or facilities, including arrangements to provide broader access.

Although the LIEF scheme is not as large as some government research infrastructure programmes, the funding provided by the ARC is intended to complement, and avoid duplication of, other expenditure on national research infrastructure and to support areas of existing and/or emerging

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[9] Australian Government (2016), *2016 National Research Infrastructure Capability Issues Paper*, p. 47.
[10] Science International (2015), *Open Data in a Big Data World*, p. 14, http://www.icsu.org/science-international/accord/open-data-in-a-big-data-world-long.
[11] https://www.ukdataservice.ac.uk.
[12] http://www.nerc.ac.uk/research/sites/data.
[13] http://archaeologydataservice.ac.uk.

research strength. In these ways, LIEF makes a significant contribution to the overall range of nationally available infrastructure funded at different scales.

It is important to note that the statement in the issues paper that "the international dimension of research infrastructure is of ever increasing importance."[14] LIEF also fosters international collaboration by supporting national or international cooperative initiatives to share and/or access expensive research infrastructure (for example, by providing funding for subscription or coordinated access fees).

The minimum level of ARC funding provided for a project under LIEF is $150,000 per year, for up to 75 per cent of the total direct costs of the infrastructure, equipment and facilities. The amount of funding typically provided under LIEF over the life of a project is in the range of $400,000 to $500,000. Examples of higher value funding support provided under LIEF include:

- $2.5 million to support the first Australian recipient of a Group Leader position in the European Molecular Biology Laboratory (EMBL), of which Australia is an Associate Member
- $2 million for Australia's membership of the International Ocean Discovery Program (IODP), the world's largest marine geoscience programme
- $1 million for expansion of the Murchison Widefield Array (MWA) in Western Australia to double its number of telescope antennas and quadruple its footprint.

These amounts are considerably lower than the large scale infrastructure funding provided under programmes like the National Collaborative Research Infrastructure Strategy (NCRIS).

The ARC wishes to emphasise the significance of the smaller scale infrastructure support provided under LIEF and to highlight the importance of maintaining the scheme's current funding levels and success rates. The role that LIEF plays should not be subjected to potential downward pressure from future research infrastructure needs that would be more appropriately funded under large programmes such as NCRIS.

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[14] Australian Government (2016), *2016 National Research Infrastructure Capability Issues Paper*, p. 8.