ENABLED BY NCRIS National Research Infrastructure for Australia An Australian Government Initiative

Research Infrastructure Specialist Position Paper

Background

The National Research Infrastructure system, embodied as a broad set of Commonwealth investments through NCRIS, is a systemic enabler of the nation's innovation system and should be considered a national asset.

The NCRIS collectively represents a cutting edge and high-capacity technology base for the nation, however the strategic value of the research infrastructure system is primarily achieved by a critical network of scientific and technical leadership and expert personnel. This cohort is now over 1,800[1] people strong and serves as a significant national asset in its own right.

As a critical national resource, NCRIS is dedicated to underpinning science and research across the spectrum of fundamental inquisition to applied impact, translation and commercialisation, and in fact has often driven this transition together with collaborators and customers. The NCRIS user base, which is largely dependent upon scientific leadership and guidance of the NRI workforce for getting the most out of the infrastructure, is now 65,000 Australian researchers and 12,000 international researchers per annum[2].

The critical role of the national research infrastructure expert workforce has been appropriately acknowledged in the 2021 NRI Roadmap[3] together with the need for the system to better recognise the important function of those research infrastructure specialists, in order to continue to attract, retain and reward the talent required to maximise our national system.

Highly skilled, NCRIS Research Infrastructure Specialists are predominantly located within the university system. This means that under the institution's Enterprise Agreement they are either classified as a Professional or an Academic staff member. While these jobs roles are

[1] https://www.dese.gov.au/national-research-infrastructure/resources/nri-census-2017-18-report-snapshot
[2] https://www.dese.gov.au/national-research-infrastructure/resources/nri-census-2017-18-report-snapshot
[3] https://www.dese.gov.au/national-research-infrastructure/2021-national-research-infrastructure-roadmap

appropriate for some staff within the NRI system, neither of these classifications suit the key role of Research Infrastructure Specialist (RIS). The nature of RIS job roles and responsibilities, which may not well correlate to the performance measures applied in the University Professional and Academic streams, means there is risk of failure to recognise and reward RIS staff and provide development opportunities.

The health of the NRI workforce requires a mix of academic, professional and specialist staff. In order to develop and maintain the specialist cohort, which is a vital part of the RI landscape, a solution to this issue is needed. A method is needed to enable continual recognition and reward for RIS staff as they develop and take on new responsibilities and relinquish the requirement to meet traditional Academic KPIs or redefine their position descriptions, in the case of professional classification.

This position paper outlines the opportunities and challenges in recognising research infrastructure specialists and considers options to reflect the importance bestowed upon the expertise from the 2021 Roadmap (and which has been long understood by existing National Research Infrastructure entities). Improving the career pathway opportunities for Research Infrastructure Specialists can also contribute broader benefits to specialist support staff across the university sector. In addition, these issues may be similar in other organisations such as PFRAs (publicly funded research agencies) and a similar approach may be of benefit in these situations.

Our Position

The position of the NCRIS community is that we need to support the development and implementation of a new, simple, and fit-for-purpose classification for RI specialist roles in higher education at all levels, such as by creating a new job family specifically for these roles, separate from academic and administrative job families. This classification system should be based, similar to the current academic scales, on an ability to be promoted without the need for a job reclassification or a substantial change in core duties. The KPIs for promotion should be tailored to the specific responsibilities and development pathways for RI specialists.

Supporting arguments

In addressing this opportunity to make a change that both recognises and develops a critical research resource within Australia, there are a number of prevailing current views that need to be countered.

- There is a perception that this type of role can be covered sufficiently by the current two classifications available (Professional and Academic) and that a third stream would be a complicated solution that would benefit a small cohort of the workers.
- In addition, the fact that this lack of reward and recognition may lead to higher staff turnover and difficulties in recruiting the right people for these roles have been seen as standard working practices for this sector.

- The mobility of the research workforce is lauded as a key benefit to working in this industry.
- There are currently many different types of specialists involved in supporting research and, to date, the current system has been able to carry many of them.

While the above arguments have been used, they do not allow for the special nature of the Research Infrastructure Specialist and the amount of value they provide to the research industry. Professional staff levels do not recognise or reward the development and retention of specialist expertise and scientific knowledge in RI staff. Facilities are forced to change job descriptions and reclassify roles in order to recognise expert staff who are continually developing and providing more services to their community. Although complexity and direct reports are frequently used measures for other professional roles, specialised skills, scientific leadership and expertise do not readily map onto the current professional scales.

In contrast, the academic system, which does allow for promotion of individuals, has sets of KPI that are not appropriate. The KPIs can drive behaviours that lead to practices that are at odds with the overall NRI agenda. In short, the goal of these RI Specialists should be the furthering of other people's research rather than their own, but the Academic stream KPIs are structured to focus on the individual's own research record.

The implementation of a solution to this issue need not be complicated and some institutions have already made some steps in this direction that can be used as way-finders by the sector. And while the RIS cohort may seem small, it supports an annual client base of 65,000 which compared to the annual 81,000 PYE[4] in the Higher Education research sector, reported by the ABS[5], its impact becomes apparent.

A healthy research workforce can be supported through the movement of qualified people between institutions. This is not so simple when it comes to staffing NRI facilities. The amount of expertise required to support instruments, train others and push the boundaries of current practice is substantial, and typically resides within a few individuals that cannot be replaced easily. Replacing 10 years of experience with 1 year reduces the quality and impact that RI can have. The provision of highly trained workers into the national workforce is a goal of NRI, however the facilities must be able to compete and provide attractive options for those experts that wish to stay in the system.

Many RI facilities also spend numerous years training staff to become proficient in the operation of very specialised equipment. Loss of experienced staff also diminishes potential for efficiency gains that come with expertise and time in a program. While research academics tend to move many times in their careers, the much smaller cohort of experienced RI workers are rarer in many cases. Their loss cannot be easily filled and attracting overseas or domestic talent to these roles can be difficult without clear career progression available.

[4] Person Years of Effort
[5] https://www.abs.gov.au/statistics/industry/technology-and-innovation/research-and-experimental-development-higher-education-organisations-australia/2020

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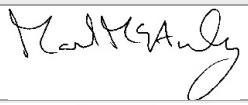
Astronomy Australia Ltd (AAL)	Mark McAuly, CEO	
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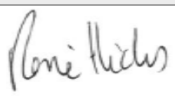
Australian Research Data Commons (ARDC)	Rosie Hicks, CEO	
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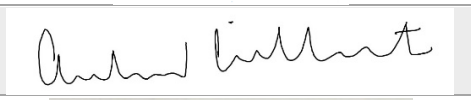
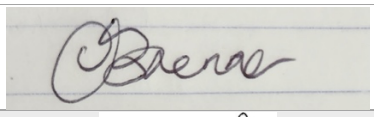
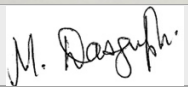
Bioplatforms Australia (BPA)	Andrew Gilbert	
Centre for Accelerator Science (CAS)	Ceri Brenner, Leader ANSTO Centre for Accelerator Science	
Heavy Ion Accelerator (HIA)	Mahananda Dasgupta, Scientific Director	
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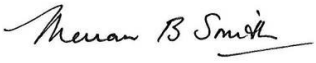
Population Health Research Network (PHRN)	Dr Merran Smith, Chief Executive	
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Appendices

Appendix 1: Relevant case studies from Australia

Case Study 1: Queensland University Technology – Research Infrastructure Specialists

At the Queensland University of Technology, the distinct roles and responsibilities of RI Specialists have been recognised and an attempt has been made to allow for career progression similar to typical academic staff. At this institution, these staff are designated as Research Infrastructure Specialists (RIS) and they are employed on the Academic Scale, as per the Enterprise Agreement. The position descriptions for these roles stress the need to facilitate research at the institution through their instrument specific domain knowledge and recognises the training and maintenance that is an essential part of the role. There is also an expectation that RIS staff will undertake some method development, particularly at the higher levels. At higher levels, RIS staff are expected to take leading roles in producing instrument specific grant applications and also in representing the University on matters pertaining to their speciality.

As these positions are on the Academic scale, there exists the possibility for promotion without the need for changes to the EB. In order to judge RIS promotion applicants fairly, the promotion process has been modified in several ways. Applicants can opt to focus on only two of the three selection categories (Teaching and Learning, Research and Research Training, Service and Engagement) and applicants have so far focussed on the latter two categories and ignored the traditional undergraduate-focussed Teaching and Learning. Training and maintenance responsibilities are also recognised through the impact that the RIS staff member has in facilitating high quality research.

The recognition of core research staff has been promising, and although this system is still relatively new, it appears to be working. There have been some staff who have been successfully promoted across lower academic levels (e.g., B to C), but it hasn't yet been tested for promotions to professorial levels (D and E). There appears to be a generally widespread acceptance of the different nature of these positions, and that these differences need to be accommodated in the promotion process, for the benefit of the applicants and the University.

Case Study: The University of Melbourne – Academic Specialist

At The University of Melbourne, staff are recognised across three academic domains: Teaching and Learning, Research and Research Training, and Leadership and Service. Additionally, academic staff are employed under four work focus categorisations: Teaching and Research, Research Focused, Teaching Specialist and Academic Specialist. This provides a great deal of flexibility for staff that specialise in domains outside of the traditional 'Teaching and Research' or 'Research Focused' positions. An example of this is the 'Academic Specialists' who are experts in the varied fields of Research Infrastructure. These Academics are expected to maintain activity within the Leadership and Service, and Research and Research Training domain with a focus on supporting research infrastructure. This activity can include managing instruments, mentoring staff, supervising research

students, attending conferences, participating in collaborative partnerships relating to their area of expertise, etc.

Academic (and Teaching) Specialists are renumerated and promoted through the same process as Teaching and Research, and Research Focused academics. With the 'Academic Specialist' category relatively mature at The University of Melbourne, academics have been promoted across all levels, including E (Professor), participate in all areas of the academy and can be found in positions including Research Infrastructure Specialists, Research Software Engineers, Clinics Trial Managers, Statisticians, etc.

Case Study 2: NCRIS Career Development Opportunities

There are career development opportunities provided by NCRIS projects to compensate for RI specialists' ineligibility for travel support and/or lack of grants funds. For example, since 2019, Microscopy Australia has conducted a Staff Shadowing program, that allows staff to visit a leading national or international laboratory to observe best practice, increase their skills and learn about facility operations. Although international shadowing visits were interrupted by recent travel restrictions, domestic exchanges have been possible. The hands-on experience provided by this program has been incredibly valuable to the staff who have returned with knowledge, ideas and skills that they would not have acquired at their home facility.

ANFF also provides support for staff development through 3 schemes.

- Staff Travel Scheme which facilitates internode travel and interaction to develop national skill sets
- The Frater Awards which are professional development awards that can be used in a variety of ways to support the growth of team members;
- The Expert Working Group program, which is a national initiative linking experts across the ANFF Nodes to build communities of practice in particular expertise sets.

These provide opportunities for the staff but in many cases the facilities lack the ability to reward and promote these staff who use these schemes to develop and gain further skills.

Appendix 2: International models

Internationally, there have been two main approaches to support RI specialists. This has focused on career development fellowships and advocacy and awareness raising.

Fellowships (e.g., ARISE, EMBL; MicroFellows, Harvard; CZI Imaging Fellows)

These fellowship offers employment for ~three years, working on method and technology development, career support and professional training opportunities. They are similar to an academic fellowship but support the development of technical skills in RI. However, they also expect that at the end of the fellowship the fellow would move on to another role.

- https://www.embl.org/about/info/arise/
- https://microfellows.hms.harvard.edu
- https://chanzuckerberg.com/science/programs-resources/imaging/

Advocacy (e.g., Talent commission; Technician Commitment, Imaging Scientist)

These initiatives have focussed on raising awareness of the skilled research infrastructure and support staff that are critical in the innovation and research ecosystems. The following UK approaches could provide useful resources for a similar campaign in Australia, including author / acknowledgement guidelines.

- https://www.mitalent.ac.uk/theTALENTcommission
- http://www.imagingscientist.com
- https://www.technicians.org.uk/technician-commitment
- https://www.rms.org.uk/library/core-facilities-publication-policy.html.

In particular the Technician Commitment has four pillars to help promote technical expertise

1. **Visibility**: Ensure that all technicians within the organisation are identifiable and that the contribution of technicians is visible within and beyond the institution.
2. **Recognition**: Support technicians to gain recognition through professional registration and external awards schemes.
3. **Career Development**: Enable career progression opportunities for technicians through the provision of clear, documented career pathways.
4. **Sustainability**: Ensure the future sustainability of technical skills across the organisation and that technical expertise is fully utilised.

A recent Nature[6] career feature addresses this issue. In the context of the clear recognition of the importance of this part of the workforce in the new NRI Roadmap and the need to do better in terms of recognition and career paths, this paper provides some international views on this topic. It certainly demonstrates that Australia is not unique in not addressing this important issue well.

[6] https://www.nature.com/articles/d41586-022-01617-y

Case Study: CNRS (France):

CNRS funds researchers across French research institutes and universities. It is a competitive, public system that provides tenured positions for outstanding researchers. However, in recognition of the important nature of research infrastructure specialists, CNRS also funds “engineers” -- which includes technical, software and scientific specialists that support research. The career advancement of these engineers is done through annual supervisor evaluation of their performance. For more information see here:

- https://www.cnrs.fr/en/node/6614

Appendix 3: Indicative KPI

The NCRIS group have suggested the follow items as potential KPIs that could be used to develop the job family for Research Infrastructure Specialists. How these are implemented may be different depending on local conditions but they may provide some initial guidance.

- Equipment Commissioning and Equipment Upgrading
  - The level of interaction of the RIS with the development, design, procurement and commissioning of new equipment. This may also be similar to upgrades needed to maintain the relevancy of the tool.
  - The level of involvement in attracting investment for infrastructure.
- Equipment development
  - The level of development of new tools and research infrastructure.
- Equipment maintenance
  - The level at which the equipment needs daily, weekly or monthly maintenance
- Equipment operation
  - The equipment can be operated at various levels including basic, advanced and pushing the boundaries of current process.
  - RIS may also be needed on a regular basis to develop process and procedures de novo.
- Training
  - The level at which the expert is expected to train others. This again can be basic, advanced and leading edge. However, the ability to tailor the training to suit the needs of the individual researcher or user is important. The RIS should be able to give the user as much or as little training to achieve their desired outcome.
  - RIS may also be needed to provide content for workshops or online training systems or undergraduate programs.
- Operations
  - This will include the development and management of systems to track usage, and collect various data sets to provide evidence of the impact of RI.
- Written expertise
  - This will include a vast variety of documents from Standard Operating Procedure, budget plans, client reports, case studies, training materials, technical notes, external presentations, governmental reports and grant input.
- Data Management
  - RIS may be required to develop data management plans for large data sets that are developed by clients.
- Project consultancy
  - Many RIS provide input into research methodology for user projects. This can take many forms and possibly meet the criteria of authorship. However, removing the requirement for authorship for RIS ensures that this expertise is provided more freely.
  - They can also provide input into the processes and alternatives that may not be apparently to a non-expert in that particular field.

    - The RIS may also need to do a lot of desk research to ensure that they have enough knowledge to support clients. The level of which this research can be done affects the level of service they can provide.
- Project management
    - In many cases, RIS provide project management for user projects within the facility. The time and skill level needed can escalate quickly when working on multi centre projects or with industry clients with challenging time frames.
- Representation of RI
    - RIS are asked to represent NRI in many forums such as conferences as exhibitors or speakers, or to various stakeholders such as State and Federal Governments, industry bodies
- External stakeholder management
    - Many RIS have a key role in the interaction with key suppliers of RI. This relationship can bring many benefits such as extra training, demonstration equipment, and better response rates for equipment issues.