



Australian Research Data Commons

eResearch Skilled Workforce Summit

29-30 July 2019, New Law Building, The University of Sydney, Sydney

(Program version 3.0, last updated October 2019)

NOTE ON PROGRAM Version 3: Where they are available, presentations can be found by clicking their abstract title in the [Abstracts](#) section of this document.

Day 1: Monday 29 July: New Law Building, The University of Sydney

Time	Agenda item	Speaker/Facilitator
9.30	Registration opens, coffee and tea on arrival <i>Registration in main foyer, New Law Building</i>	
10.00	Acknowledgement of Country, welcome and introduction to the Summit <i>Lecture Theatre 024 & Seminar Room 340</i>	Rosie Hicks, CEO, ARDC
10.15	Keynote Presentation: Research skills for a data-rich digital world <i>Lecture Theatre 024 & Seminar Room 340</i>	Linda O'Brien, Pro Vice Chancellor and Head of Logan Campus, Griffith University
11.00	Icebreaker <i>Lecture Theatre 024 & Seminar Room 340</i>	Keith Russell, Engagements Manager, ARDC
11.10	ARDC's coordination and coherence role and approaches to collaboration <i>Lecture Theatre 024 & Seminar Room 340</i>	Michelle Barker, Director of Skilled Workforce and Partnerships, ARDC. Natasha Simons, Associate Director Skilled Workforce, ARDC.

12.00	Lunch	
1.00	Roles and skills for research support professionals and researchers: international perspectives	Hilary Hanahoe, Secretary General, Research Data Alliance. Sarah Jones, Associate Director, Digital Curation Centre (UK). Hugh Shanahan, Reader in Bioinformatics, Department of Computer Science at Royal Holloway, University of London
2:30	Afternoon tea	
3.00	Discussion groups focusing on key priorities for national coordination of a digitally skilled research workforce	<p>Rooms and facilitators:</p> <p>Lecture Theatre 024: David Groenewegen, Director, Research, Monash University Library</p> <p>Seminar Room 340: Carina Kemp, Director, eResearch, AARNet</p> <p>Seminar Room 342: Tim Rawling, CEO, AuScope</p> <p>Seminar Room 343: Ann Backhaus, Education and Training Manager, Pawsey Supercomputing Centre</p> <p>Seminar Room 346: Christopher McAvaney, Services Manager, eResearch, Deakin University</p> <p>Collaborative document for input from remote participants</p>
4:15	Feedback from discussion groups <i>Lecture Theatre 024 & Seminar Room 340</i>	Krisztian Baranyai, Policy Analyst, Universities Australia
4:45	Summary and preparation for Day Two <i>Lecture Theatre 024 & Seminar Room 340</i>	Michelle Barker, Director of Skilled Workforce and Partnerships, ARDC
5.00	Close: Want to continue discussions? We recommend The Rose Hotel, 52-54 Cleveland Street, Chippendale (<i>10 minutes walk from the summit venue</i>)	

Day 2: Tuesday 30 July: New Law Building, The University of Sydney

The Australian eResearch Skilled Workforce Summit is designed to bring our community together to tackle some key questions. After the presentations in each of the non-Interest Group sessions on Tuesday facilitators will encourage discussion of three key questions:

- What are the key challenges and opportunities in this area? Which of these are the top priorities to address and why?
- What are some concrete ways to address these in the next 1-3 years? This could include community development, policy change, delivery of skills and training, development of curriculum and/or standards etc.
- Which stakeholders could lead/partner in national-scale collaborations in this area?

Session titles below link to collaborative documents for documenting this discussion and sharing ideas. Please contribute to these documents (direct URLs will also be shared during the session), as your comments will inform the feedback opportunity at the close of the Summit.

Note that all papers will be 15 minutes, plus 5 minutes questions, while lightning talks will be 3 minutes. Movement between sessions is welcome.

8.30	Coffee and tea on arrival			
9.00	<p>Session 1: Collaboration and Communities <i>Lecture Theatre 024</i></p>	<p>Session 2: eResearch capability building <i>Seminar Room 342</i></p>	<p>Session 3: Discipline communities <i>Seminar Room 343</i></p>	<p>Session 4: Institutional approaches <i>Seminar Room 346</i></p>
	<p>Interest Group: Communities of Practice for Trainers <i>Mark Crowe Paula Martinez Darya Vanichkina</i></p>	<p>Facilitator: Sarah Nisbet, Platforms and Engagement Manager, Bioplatforms Australia</p> <p>Raising eResearch Capability in New Zealand <i>Megan Guidry</i></p> <p>Research Software Engineers: Results of the 2018 Survey <i>Nicholas May</i></p> <p>Revamping the Nectar Research Cloud Training <i>Jo Morris</i></p> <p>Lightning talks:</p>	<p>Interest Group: What is this HASS research capability? Less wondering and more Wonderland. <i>Ingrid Mason Marco Fahmi Tyne Daile Sumner Sara King</i></p>	<p>Facilitator: Paul Wong, Senior Data Management Specialist, ARDC</p> <p>Data Fluency: Building data skills in a sustainable way <i>David Groenewegen</i></p> <p>Managing the Fork in the Road: Skilled Research Workforce Summit <i>Belinda Weaver</i></p> <p>Lightning talks: Hacky Hour at Sydney University <i>Nathaniel Butterworth</i></p>

		<p>Intersect’s sustainable model of researcher training and support <i>Anastasios Papaioannou</i></p> <p>Developing Digital Preservation Skills through the AusPreserves community of practice <i>Peter Neish</i></p> <p>The Carpentries as a method for skilling up Data Stewards <i>Liz Stokes</i></p>		<p>Community driven digital hub enhances development, delivery and sharing of end to end analytics solutions and digital skills training via on demand and scalable cloud computing <i>Roberto Barrero</i></p> <p>Digital research skills for doctoral candidates: needs, diagnostics, diversity. <i>Cameron McLean</i></p>
10.30	Morning Tea			
11.00	<p>Session 5: Collaboration and communities <i>Seminar Room 340</i></p>	<p>Session 6: eResearch capability building <i>Seminar Room 342</i></p>	<p>Session 7: Discipline communities <i>Seminar Room 343</i></p>	<p>Session 8: Institutional approaches <i>Seminar Room 346</i></p>
	<p>Interest Group: The Carpentries and building a skilled workforce in AU/NZ <i>Megan Guidry Brian Ballsun-Stanton Paula Andrea Martinez Matthias Liffers Odette Subijano Grant Hose</i></p>	<p>Interest Group: Coordinating efforts to map collective impact <i>Ingrid Mason Carina Kemp Frankie Stevens Sara King</i></p>	<p>Facilitator: Jeff Christiansen, Assoc Director Projects and Engagements, Australian BioCommons</p> <p>ecoEd: innovation in training, outreach and engagement leveraging Australia’s EcoScience infrastructures <i>Chantal Huijbers</i></p> <p>Meeting the FAIR data skills challenge in the Geosciences <i>Lesley Wyborn</i></p> <p>Lightning talks: Repositories for Australian research data, PARADISEC and</p>	<p>Facilitator: Andrew Turpin, Senior Academic Convenor Petascale Campus Initiative, University of Melbourne</p> <p>How to run a cost-effective researcher training service <i>Tyne Daile Sumner</i></p> <p>Using RISE, the Research Infrastructure Self Evaluation Framework, as a framework to map and benchmark organisational research data management maturity nationally and internationally</p>

			<p>data management planning <i>Amanda Harris</i></p> <p>Top 10 FAIR Data & Software Things <i>Natasha Simons</i></p>	<p><i>Keith Russell</i></p> <p>Mapping Environments : Skilled Research Workforce Summit <i>Malcolm Wolski</i></p> <p>Lightning talks: eResearch: Services and Capabilities <i>Nicholas May</i></p> <p>Opportunities from the Integration of Simulation Science and Data Science <i>Stephen Edwards</i></p>
12.30	Lunch			
1.30	<p>Session 9: Unconference <i>Seminar Room 340</i></p>	<p>Session 10: eResearch capability building <i>Seminar Room 342</i></p>	<p>Session 11: Discipline communities <i>Seminar Room 343</i></p>	<p>Session 12: Institutional approaches <i>Seminar Room 346</i></p>
	<p>Facilitated by proposer: Summit attendees will have an opportunity to propose an alternative session, suggestions will be voted on and chosen session proceeds in this timeslot.</p>	<p>Facilitator: Shawn Ross, Director of Data Science and eResearch, Macquarie University</p> <p>Meeting skills demands at different levels of data stewardship <i>Liz Stokes</i></p> <p>Network know-how: A place for “infrastructure literacy” in eResearch capability building <i>Sara King</i></p> <p>The HPC Certification Forum and AU/NZ Contributions <i>Lev Lafayette</i></p>	<p>Facilitator: Chantal Huijbers, Training and Engagement Manager, Griffith University</p> <p>Hybrid Training: a new model of bioinformatics training delivery <i>Christina Hall</i></p> <p>Implementing school-based support infrastructure for digital humanities research at UQ: The Language Technology and Data Analysis Laboratory (LADAL) <i>Michael Haugh</i></p> <p>Leverage ADACS to support astronomy</p>	<p>Interest Group: For Researchers by Researchers: A National Digital Skills Training Model for 2020 and Beyond <i>Tyne Daile Sumner</i> <i>David F. Flanders</i> <i>Sonia Ramza</i> <i>Meirian Lovelace-Tozer</i></p>

		<p>Lightning talks: ResBazzing around the nation <i>Matthias Liffers</i></p> <p>International trends in developing digital skills for the research workforce <i>Michelle Barker</i></p> <p>Data Skills for Data Professionals <i>Andrew Smailes</i></p>	<p>digitally skilled workforce development <i>Robert Shen</i></p> <p>Lightning talks: Humanities and Arts research support through DARIAH: Lessons from DARIAH Beyond Europe <i>Alexis Tindall</i></p> <p>Promote FAIR as international best practice <i>Paula Martinez</i></p>	
3.00	<p><i>Lecture Theatre 024</i> Summary of feedback from streamed sessions, and opportunities for post-Summit collaboration Michelle Barker, Director of Skilled Workforce and Partnerships, ARDC</p>			
3.30	<p>Close</p>			

Abstracts

Monday 29 July

Research skills for a data-rich digital world

Linda O'Brien, Pro Vice Chancellor at Griffith University, Head of Logan Campus and University Librarian.

In 2005 I wrote “Whether it’s e-research in Australia, cyberinfrastructure in the United States or e-science in the United Kingdom, a transformation is clearly occurring in research practice, a transformation that will have a profound impact on the roles of information professionals within higher education.”¹ By 2010 I noted that it was unlikely that researchers neither understood what infrastructure service options exist nor would they have the skills to manage their research data “to provide long-term value to the scholars of the future. It is pointless to assume that that this will be resolved through researcher training. Researchers are motivated neither to understand the evolving national research information infrastructure framework nor to become experts in information/IT, and these issues do not constitute a good use of researcher time and expertise.”²

In 2019 have my views changed? Were they valid? Are they still valid? How has the world changed? How has research changed?

The EU Science Hub recently published a piece³ on the profound structural transformation in labour markets throughout the world. They note that “digital skills and non-cognitive skills such as entrepreneurship, active citizenship, creativity and socio-emotional skills are increasingly necessary to thrive in the new world of work”, yet there is a shortage of these skills. They specifically note the profound shortage in both basic and advanced digital skills, and have set a goal to use €9.2 billion to reinforce Europe’s capacities in high-performance computing, artificial intelligence and cybersecurity.

In a world where every industry, government department and agency is seeking advanced digital skills how might we develop and retain a digitally skilled research workforce? How can we capitalise on Australia’s investment in the Australian research data commons to maintain and improve Australia’s research position?

ARDC’s coordination and coherence role and approaches to collaboration

Michelle Barker, Director, Skilled Workforce and Partnerships, ARDC, and Natasha Simons, Associate Director, Skilled Workforce, ARDC.

¹ O'Brien, L “E-research: an imperative for strengthening institutional partnerships”, Educause Review Nov/Dec 2005 pp.65-76. https://research-repository.griffith.edu.au/bitstream/handle/10072/35021/65594_1.pdf?sequence=1

² O'Brien, L “Innovation and information infrastructure: making sound investments for e-research” ECAR Bulletin 22, 2010 <https://experts.griffith.edu.au/publication/n43da916b98b0fe548894786ca86b05d9>

³ The changing world of work and skills in the digital age, EU Science Hub, 1 May 2019 <https://ec.europa.eu/jrc/en/news/changing-world-work-and-skills-digital-age>

ARDC is a transformational, sector-wide initiative, working with sector, government, and industry partners to build a coherent national and collaborative research data commons. ARDC's skilled workforce program supports ARDC's programs in data and services, software and platforms, and storage and compute, to ensure the existence of the digitally skilled research workforce needed to maximise these eInfrastructure investments. The 2018 ARDC strategy consultation identified skilled workforce as the most significant issue for the sector, and called for ARDC to lead national coordination of digital training for researchers, in addition to ARDC's existing national leadership with research support professionals (including Data Stewards and Research Software Engineers) and Train the Trainer initiatives. Michelle and Natasha will outline ARDC's role in this sector, based on analysis of the complex digital training landscape that exists in the Australian research sector.

Roles and skills for research support professionals and researchers: international perspectives

Hilary Hanahoe, Secretary General, Research Data Alliance, Sarah Jones, Associate Director, Digital Curation Centre (UK), Hugh Shanahan, Reader in Bioinformatics, Department of Computer Science at Royal Holloway, University of London

There are a range of international initiatives focussed on identifying and developing skills for eResearch professionals and researchers. In this session, an international panel will share their perspectives on workforce development including the different roles and skills required, communities of practice, training delivery and opportunities for collaboration to solve common challenges. Speakers include Sarah Jones (Digital Curation Centre, UK), Hugh Shanahan (Royal Holloway, UK) and Hilary Hanahoe (Research Data Alliance).

Discussion groups focusing on key priorities for national coordination of a digitally skilled research workforce

Five discussion groups focusing on key priorities for national coordination of a digitally skilled research workforce. All groups focus on these questions:

- How could national coordination be improved for the development and delivery of national digital skills training in research data management, software design and utilisation, high performance computing, cloud or related digital infrastructure training programs for researchers and/or research support professionals (such as Data Stewards and Research Software Engineers)?
- What policy innovation examples or opportunities are relevant to the development of a digitally skilled workforce (eg changes to funding recognition and organisational employment policy regarding career paths for research support professionals)?
- What is needed to build the case for the importance of developing a digitally skilled workforce, to gain support from key stakeholders?
- What are the key challenges and opportunities for eResearch support professionals (e.g. professional support and recognition, skills development needs)?
- How can eResearch support professionals better help, support and enable researchers and research communities to do data intensive research?

Tuesday 30 July

Session 1: Collaboration and communities

Interest Group: Communities of Practice for Trainers

Mark Crowe, QCIF, Paula Martinez, National Imaging Facility, University of Queensland, Darya Vanichkina, Sydney Informatics Hub, University of Sydney

The purpose of this Interest Group is to explore potential options for national collaboration in the area of digital skills training.

Digital skills are increasingly necessary for researchers of every discipline, not just the data-intensive disciplines such as astronomy, imaging, and genomics. The secure and proper storage of research data, the effective use of collaborative tools, reproducible analysis techniques, and even appropriate use of spreadsheets are core skills now required by all researchers.

Organisations involved in skill-building recognise similar demands and challenges in training, including:

- Identifying digital skills topics of current and emerging importance to researchers in all disciplines
- Connecting a network of trainers and working to establish a range of training delivery methods to equitably support researchers distributed across organisations
- Sustainably funding the high investment required for ongoing development of new training content and maintenance of existing material

This Interest Group will bring together people from a number of organisations who are involved in a wide variety of eResearch training communities. It will introduce, and seek community feedback on, the potential development of a national digital skills training collaboration to improve the consistency and accessibility of digital skills training available to Australian researchers.

Note: This IG session is a combination of three IG submissions on communities of trainers. The presenters would like to thank and acknowledge the contributions from Jonathan Arthur, Ann Backhaus, Tyne Sumner, Chantal Huijbers, Gareth Price, Xavier Goldie and Natasha Simons.

Session 2: eResearch Capability Building

[Raising eResearch Capability in New Zealand](#)

Megan Guidry, Training Coordinator, New Zealand eScience Infrastructure; Fabiana Kubke, Senior lecturer of Neuroscience University of Auckland; Georgina Rae, Engagement Manager at New Zealand eScience Infrastructure; Nick Jones, Director of New Zealand eScience Infrastructure.

New Zealand eScience Infrastructure (NeSI) provides expertise and capability to researchers conducting computation and data intensive research in New Zealand. Within the training sector, our core purpose is to raise the computational capability of New Zealand research and, in turn, shrink the existing eResearch skills gap.

In this presentation, we will discuss our training efforts so far (both in terms of delivering training, but also cultivating the New Zealand training community) and reflect on the scale of the opportunity/challenge that we face. This will include a brief overview of the [Kubke Report - Growing researchers computational skills to meet future needs](#) - which reviewed NeSI's training activity and considered current size and demand for a digitally skilled workforce. Additionally, we will discuss NeSI's position around collaboration, specifically, how we look to leverage a community of practice and partnering organizations when developing and delivering training.

Ultimately, training needs to be useful and relevant to those who need it. NeSI strives to be agile in its approach to training delivery and this presentation will conclude by noting what we are doing today to ensure our efforts are measurable, scalable, and community focused.

Research Software Engineers: Results of the 2018 Survey

Nicholas May, RMIT University; Nooriyah Poonawala Lohani, Research Communities Adviser, New Zealand eScience Infrastructure; Manodeep Sinha, Senior Research Software Scientist, Swinburne University of Technology.

Last year, the RSE-AUNZ association participated in the international survey organized by the Software Sustainability Institute (Olivier Phillippe and Simon Hettrick, <http://doi.org/10.5281/zenodo.2585783>). The goal of this survey was to understand the RSE community across ten major subjects, such as: demographics, employment, tools, publications, etc. The base questions had to be tailored so that we could capture data appropriate to the Australian context, and the survey was publicized via various channels. Ninety-nine of the survey participants were from Australia.

In this talk, we will present the results of the survey from the Australian perspective, including: where and how academics and professionals came to research software engineering, what they do as RSEs, and what they would like to improve.

[Revamping the Nectar Research Cloud Training](#)

Jo Morris, User Support Manager, Nectar Research Cloud, Australian Research Data Commons

This presentation details how ARDC is working with its partners to develop an improved approach to providing Nectar Research Cloud training.

[Intersect's sustainable model of researcher training and support](#)

Weisi Chen, Intersect Australia Ltd; Aidan Wilson, University of Technology Sydney; Anastasios Papaioannou, Australian Catholic University

Since the inception of Intersect's researcher training program in 2012, we have delivered more than 1,000 courses to more than 11,000 researchers at our 12 member universities, continuing a pattern of year-on-year growth. As we deliver more training to more researchers every year, our data show that delivery quality has not only remained high, but grown. Training is provided to researchers at Intersect's member universities, fully subsidised by the universities' subscription fees, meaning that researchers can participate in quality, face-to-face, technical training at no cost to the researcher. The training program is just one pillar of a concerted effort to provide research support. This is most effectively accomplished as part of Intersect's membership model, which generally includes an eResearch Analyst (eRA): a resource that is located on-site at the university. Possessing an extensive research background, as well as a deep technical understanding of research data, tools,

and technologies, the eRA helps researchers enhance their skills and find solutions for their research challenges and questions.

eRAs are often heavily engaged in the delivery of training, and it is usually through training and the eRA that researchers discover support services that the University and Intersect provide. Administering or delivering training, and researcher support, account for more than 80% of the eRA's time on campus for the university.

In this presentation, we discuss and share our experience of building a sustainable, effective, long-term, holistic support strategy, which involves eRAs and trainers with expertise in specific eResearch technologies, to bridge the gap between researchers' skills and the digital technologies available for their use. We will present our findings on Intersect's researcher training program and research support model based on the course registration and attendance metrics, responses of our training course evaluation survey, and eRA activity records.

[Developing Digital Preservation Skills through the AusPreserves community of practice](#)

Matthew Burgess, Carey Garvie, Lachlan Glanville, Valerie Love, Peter Neish, Jaye Weatherburn, University of Melbourne

Digital preservation skills are needed to steward the increasing amount of data being generated by Australian researchers. From an initial idea developed during the Mozilla Global Carpentry sprint in 2018, the first iteration of Digital Preservation Carpentry was taught and validated at the International Digital Curation Conference in Melbourne, February 2019. The success of this pilot has led to the further development and refinement of the course with the aim of a second iteration being ready for World Digital Preservation Day in November. This talk highlights how the AusPreserves community of practice has come together to collaborate on a Digital Preservation Essentials training course for the Australian digital preservation community.

The Carpentries as a method for skilling up Data Stewards

Liz Stokes, Senior Research Data Specialist, ARDC

The Carpentries provide lessons and workshops that are useful for people working in data stewardship positions such library and information related roles. They create on-ramp to empower this community to use software and data in their own work as well as be advocates for and train others in efficient, effective and reproducible data and software practices.

Session 3: Discipline Communities

Interest Group: What is this HASS research capability? Less wondering and more Wonderland.

Ingrid Mason, Deployment Strategist, AARNet, Marco Fahmi, Manager, Digital Humanities & Social Sciences, University of Queensland, Dr Tyne Sumner, Research Fellow, University of Melbourne, Dr Sara King, eResearch Analyst, AARNet

Rather than be left wondering about what, how and where researchers are working under the umbrella of HASS, it's time to have a wide-ranging conversation about assumptions, requirements, expertise, resources, interests

and opportunities available to support capability building for HASS researchers keen to explore using data, tools and national research infrastructures, in their research practice.

How do we as a community grapple with the range of new knowledge and skill development in HASS as separate and interdisciplinary fields of research using markedly different research practices? How do we support researchers already working traditionally and keen to explore digital research methods, and those that are increasingly building data and technology driven and intensive practices into their research? Where do we prioritise our efforts, and why? What strategic partnerships do we need to build so we can collaborate, and be resourceful? What options are there for HASS researchers to begin extending their knowledge and skills using data and technologies in the cloud (rather than commence this journey wrestling with the well-known constraints of using their desktops and tackling software management)?

This interest group is intended for the community to: (1) share their work (2) capture and map their contributions in HASS capability building, (3) identify key opportunities to work collaboratively, and (4) identify gaps, and areas for further work. The overall aim being for the community to be in a better position to understand and support HASS researcher uptake of digital research methods and data and tools, virtual research environments, platforms and research cloud services.

Session 4: Institutional Approaches

[Data Fluency: Building data skills in a sustainable way](#)

David Groenewegen, Director, Research, Monash University Library; Linda Kalejs, Manager, Peninsula Library, Monash University; Sonika Tyagi, Bioinformatics Lab Head - School of Biological Sciences & Research Affiliate - Monash eResearch Centre, Monash University

Researchers in all disciplines are creating, navigating, analysing and visualising increasingly diverse and large data sets, and are seeking to up-skill in new tools and methods to help manipulate their data. However, training and support networks in the use of these tools have not always been available at scale. Skill development programs that target a diverse research community across both HASS and STEM offer significant opportunities for Graduate Researchers and ECRs to network, share experiences and learn collaboratively. However, they present a number of administrative and organisational challenges.

Monash University's Data Fluency program is a multidisciplinary collaboration led by the University Library in collaboration with the Bioinformatics Platform and eResearch, directly addressing the University's AI and Data Science focus. The program is responsible for the provision of a range of workshops that focus on developing researchers' skills in using, exploring, interpreting and visualising data in a meaningful way and in effectively communicating research and ideas. Alongside the workshops, the program aims to build community and continue to develop skills through opportunities to engage in informal 1:1 drop-ins, seminars and networking opportunities. The workshops and drop-ins work hand in hand to provide the necessary training and continual support while learning new tools and solving problems; as well as learning through teaching and sharing expertise once the skills move beyond a foundational level. Graduate Research students, professional staff and ECRs learn from each other and share their knowledge and approaches across disciplinary areas.

This paper will discuss the origins of the program, its current operating model, and some suggested ways that it could interact with the sector more broadly.

[Managing the Fork in the Road: Skilled Research Workforce Summit](#)

Belinda Weaver, Griffith University

Researchers inevitably divide into those who have adequate tools to perform their research, and those who don't. Many researchers already work within a well-trodden skills framework. Whether they choose NVivo, Excel, SPSS, a virtual lab, or GIS, many can use established tools. What they may need is advice and support around Which tool? What research method? For researchers who hope to be at the head of their fields, the right tools for the research questions they want to answer may not yet exist. Accordingly, they need to be able to develop such tools themselves, or at least speak the right language to communicate their needs to someone who can. To do that means having sound working knowledge of the possibilities computational methods can deliver.

Beyond running familiar programs, many researchers have no real idea of what a computer can actually do, and how research problems can be broken down into components a computer can tackle. Computational thinking teaches problem formulation and breakdown, the use of algorithms, data analysis, software testing, and debugging, all of which are crucial for research reproducibility.

If it takes a village to raise a child, it takes a community to embed a skill. There are a number of existing communities such as Software Carpentry instructors, the emerging Research Software Engineers community, the people supporting the multiple Hacky Hours at Australian institutions, the communities who deliver annual Research Bazaar events, data stewards at various repositories and institutional data stores, postgraduate support networks such as COMBINE in bioinformatics – all of these could all be leveraged to help researchers embed the computational thinking skills essential for a skilled research workforce to develop and grow.

[Hacky Hour at Sydney University](#)

Nathaniel Butterworth, Sydney Informatics Hub, University of Sydney

Hacky Hour is a regular meet-up where researchers can congregate to collaborate and get research help in a social environment. Experts in various fields from the Sydney Informatics Hub and other departments around the University share their time to advise on problems related to coding, data analytics, or digital tools. We use Hacky Hour to engage with the coordination of digital skills at the University, foster the growing digital culture and digital demand, and connect researchers with the tools spread throughout the complex digital ecosystem. Hacky Hour has been successfully replicated at other universities such as UTS, Melbourne, Griffith University and The University of British Columbia.

[Community driven digital hub enhances development, delivery and sharing of end to end analytics solutions and digital skills training via on demand and scalable cloud computing](#)

Roberto A. Barrero, H MacIntosh, C Windell, L Christian, Matthew I. Bellgard, eResearch Office, Queensland University of Technology

New sequencing technology platforms have accelerated the velocity and volume of data being generated for a broad range of life sciences domains. The major bottle neck facing the community is the ability and capacity to analyse the data in a timely manner using best practices and internationally harmonised standards. Close engagement of domain experts is essential to contribute optimised end-to-end analytical solutions to process diverse data types from -omics to digital images. Building, optimising, sharing and repurposing custom analytical

pipelines improve research outcomes and build sustainable collaborations and partnerships. These eResearch solutions and strategies can be also used for training. In this lightning talk, we describe digital platform built using a user-friendly, user-managed, scalable and robust cloud computing backend. This resource allows users to access reusable analytical packages to ensure reproducibility and an array of compute nodes on demand for the scalable and timely analysis of population scale data studies.

[Digital research skills for doctoral candidates: needs, diagnostics, diversity.](#)

Dr Cameron McLean, Centre for eResearch, University of Auckland

This talk will present key insights from multiple workshops, needs analyses, and scoping exercises undertaken at the University of Auckland relating to digital research skills for doctoral candidates. We will outline the idea of a student digital capability diagnostic tool, and highlight an understanding of digital research skills and tools beyond STEM subject areas that employ more hermeneutical, interpretive, creative, or diverse methodologies and theoretical frameworks. It is anticipated the high-level view presented will spark further ideas and discussion throughout the summit.

Session 5: Collaboration and Communities

Interest Group: The Carpentries and building a skilled workforce in AU/NZ

Megan Guidry, Brian Ballsun-Stanton, Paula Andrea Martinez, Matthias Liffers, Odette Subijano, Grant Hose, and other panel members

This panel will explore questions of how The Carpentries (Software Carpentry, Data Carpentry, and Library Carpentry) trains and supports digitally skilled researchers and research support professionals in Australia and New Zealand. Members of this panel include folk from institutions who have made The Carpentries a significant part of their researcher training capabilities, those who develop lessons for The Carpentries, and those who “train the trainer” and help to build the community of instructors.

This panel will invite presenters to:

1. Reflect on The Carpentries experience, both of themselves and their institutions;
2. Discuss pain points and places where we can improve The Carpentries experience to better fit the needs of digitally skilled researchers and support professionals;
3. To explore our victories of community building; and
4. Invite planning for future scaling and impact-driven outcomes.

We also have allocated significant time for audience discussion, so that audience members who are interested in The Carpentries can use this forum as a way to explore and unpack their questions in the context of folk who have already deployed carpentries training programmes at their institutions.

Our panelists will also explore the pragmatic role of The Carpentries as a starting point for and a contributing factor within community building, acting as a bridge between unknown-unknowns (those researchers/staff who have no useful idea of where to start with computational thinking) to known-unknowns, allowing researchers to understand where they need to start and the basic language around digitally enabled research. We invite those interested in exploring how The Carpentries can contribute to a national community of digitally skilled people to attend this panel.

Session 6: eResearch Capability Building

Interest Group: Coordinating efforts to map collective impact

Ingrid Mason, Deployment Strategist, AARNet; Dr Carina Kemp, eResearch Director, AARNet; Dr Frankie Stevens, Research Engagement Strategist, AARNet; Dr Sara King, eResearch Analyst, AARNet.

As a community we share an interest in researcher and research support knowledge and skills development, we also share challenges of working with different research domains and communities, operating at different levels of capability in using data and technology in their research, with limited resources, coordinating our work together, and (critically) articulating the value of capability building and its impact to decision-makers and funders.

AARNet, as part of the Digital Data and eResearch Platforms group, has partnered with the ARDC, to contribute training expertise, content and effort, to aid with improving “infrastructure literacy” (network know-how, data handling) in the research community and is drawing upon the expertise within the ARDC Skilled Workforce program and their coordination of community events. It is a win-win situation. Where and how else is that happening, and how can we show our efforts have made a difference?

This interest group is intended for the community to: (1) share their work (2) map their contribution in a national ecosystem of capability building, (3) identify key transformations, and (4) identify gaps and areas for further work; for the community to have collective impact.

Session 7: Discipline Communities

[ecoEd: innovation in training, outreach and engagement leveraging Australia's EcoScience infrastructures](#)

Chantal Huijbers, Training and Engagement Manager, Griffith University

One of the most important aspects of enabling easy access to data and analytical tools is providing relevant training and support to ensure sensible use of this data and appropriate evaluation of research outcomes. Within the EcoSciences domain, a suite of digital infrastructures such as the Atlas of Living Australia, the Terrestrial Ecosystem Research Network and the Biodiversity and Climate Change Virtual Laboratory have been developed to enhance our understanding of the natural world and making forward projections into novel conditions. To provide users with a holistic approach to environmental spatial data discovery and analysis, these infrastructures have joined forces to deliver an exciting and innovative training program called *ecoEd*.

ecoEd provides cohesive training and skill development to university lecturers, researchers and industry professionals. Each of the *ecoEd* partners have developed ready-to-use training materials that can immediately be used to deliver lectures and workshops showcasing how scientific concepts can be tested in real-world applications. The program also delivers training to *ecoEd* Champions and provides them with the resources and knowledge required so that they can confidently re-deliver the lectures and workshops in their own institutions. As such, *ecoEd* is increasing the capacity of Australia's environmental science community to advance science and deliver outcomes that underpin the sustainable use of our ecosystems using the latest advances in digital technologies.

In this presentation, I will present *ecoEd* as an exemplar model for digital skills training and incorporation of NCRIS-developed expertise and capabilities into Australia's higher education and research sector. I will share our learnings and challenges in developing the program and the outcomes and future opportunities of the program.

Meeting the FAIR data skills challenge in the Geosciences

Lesley Wyborn, Adjunct Fellow, Australian National University

Awareness of the FAIR principles is rapidly growing in the Geosciences, mainly driven by the AGU-led Enabling FAIR data project (Stall et al. 2019). World-wide, more than 100 repositories, communities, societies, institutions, infrastructures, individuals and publishers have signed up to a Commitment Statement, which specifies that any data, software and samples referenced in Earth and environmental science journal articles have persistent identifiers and need to be stored in trustworthy repositories: supplements are no longer accepted.

At the researcher level in the Australian geoscience community, many do not have the skills needed to meet these requirements. There are a lot of EXCEL-lent scientists, highly skilled in .csv files, but sharing of data is mainly between colleagues. The burning question is how to accelerate geoscience researchers in obtaining the skills required for FAIR?

To meet the 'Findable' and 'Accessible' of FAIR, the Australian Research Data Commons (ARDC) has produced online training guides and self-help web pages to assist researchers in using identifiers to cite data, samples and software. Additional resources are also available internationally through the Earth Science Information Partners Data Management Training Clearing House which provides a registry for online learning resources on research data management.

The 'Interoperability' and 'Reuse' principles of FAIR are much harder. For some domains, international geoscience societies/unions have the required standards (e.g., seismology has the International Federation of Digital Seismograph Network), but many do not (e.g., geochemistry). This creates the question as to whether we also need to consider developing the highly specialised skills required to contribute to international standards developments in formats, vocabularies and ontologies. Until the "I" and "R" standards are there for all domains, it will be hard to advance Australian Geoscience data into being fully FAIR.

Stall et al., 2019. Making Scientific Data FAIR Nature 570, 27-29, doi: 10.1038/d41586-019-01720-7

[Repositories for Australian research data, PARADISEC and data management planning](#)

Amanda Harris, PARADISEC, University of Sydney

Research data generated by academic researchers in the humanities is usually retained within university data storage for the period of the research project (often 3-5 years), and for a handful of years afterwards. But much of the data generated during these kinds of projects, especially data documenting cultural heritage, should be retained into perpetuity, and should be accessible to source communities and other researchers. Data management in the humanities needs long-term repositories like PARADISEC (Pacific and Regional Archive for Digital Sources in Endangered Cultures). These repositories need to be woven into a national data fabric. This presentation will outline PARADISEC's approach to long term sustainability, discoverability and training in research data management practices.

[Top 10 FAIR Data & Software Things](#)

Natasha Simons, Associate Director, Skilled Workforce, Australian Research Data Commons

The [Top 10 FAIR Data & Software Global Sprint](#) was held online over the course of two-days (29- 30 November 2018), where participants from around the world were invited to develop brief guides (stand alone, self paced training materials), called “Things” that can be used by the research community to understand FAIR in different contexts but also as starting points for conversations around FAIR.

In addition to the organisers, ARDC and Library Carpentry, we were joined by the [Research Data Alliance](#) [Libraries for Research Data Interest Group](#) in collaboration with [FOSTER Open Science](#), [OpenAire](#), [RDA Europe](#), [Data Management Training Clearinghouse](#), [California Digital Library](#), [Dryad](#), [AARNet](#), [Center for Digital Scholarship at the Leiden University](#), and [DANS](#). Anyone could join the Sprint and roughly 25 groups/individuals participated from The Netherlands, Germany, Australia, United States, Hungary, Norway, Italy, and Belgium.

Session 8: Institutional Approaches

[How to run a cost-effective researcher training service](#)

Dr Tyne Daile Sumner, Research Fellow & Digital Skills Training Consultant, Research Platform Services, University of Melbourne; Dr Christina Tuke Flanders, Psychologist, Educator & Digital Skills Training Consultant (Research Platform Services, the University of Melbourne); Sonia Ramza, Product & Marketing Manager (Research Platform Services, the University of Melbourne)

Research Platform Services at the University of Melbourne currently provides digital tools training and community building for over 1,600+ Graduate Researchers per year. Our model is built upon the pedagogical principles of: (i) ‘for researchers by researchers’, (ii) blended community learning (face-to-face and digital communities), and (iii) helping researchers to ‘work smarter, not harder.’ A key component of our model is the annual Research Bazaar Conference, now in its 6th year as a global community with over 17 participating universities worldwide. The Research Bazaar Conference (#ResBaz) is a grassroots effort to assist Graduate Researchers and postdocs in keeping up to speed with the everchanging digital tools and data landscape. This presentation will cover: (a) how the University of Melbourne has made an IT department one of the most sociable learning places on campus, (b) the #ResBaz model (c) how to establish a vibrant Graduate Researcher community. In addition to canvassing Graduate Researcher case studies, pedagogical methods and approaches, and our community-building and marketing program, this talk will also explore some of the underlying data that supports our successful skills, training and community program. For example, we will explain how we have adopted agile working methods across our PhD/MA trainer cohort to facilitate a digital research tools training service for all faculties at The University of Melbourne. The presentation will also explore the scope and breadth of our training model, which caters for a wide range of researchers from across The University of Melbourne. Finally, we will describe the Research Platform Services community-building model, including how to scale the coordination and delivery of Graduate Researcher training, how to run effective ‘meet-ups’ and ideas and strategy for developing events that promote fun and effective learning.

[Using RISE, the Research Infrastructure Self Evaluation Framework, as a framework to map and benchmark organisational research data management maturity nationally and internationally](#)

Keith Russell, Manager, Engagements, Australian Research Data Commons

The [Research Infrastructure Self Evaluation](#) (RISE) model has been developed in the UK by the Digital Curation Centre. It breaks down the different levels of maturity of various services for research data management and sharing and helps the institution self identify which level of maturity they are at. It can also be a helpful framework to identify potential next steps and areas of priority. The RISE model has been applied tested in the UK and in Europe by a range of universities. Recently it has also been translated for the Australian context and tested by the ARDC.

In this presentation we will raise the opportunities the tool has to offer, including how training and support can be embedded in a larger organisational RDM capability. We will discuss how it can form a useful coherent approach across institutions to think about research data management. The tool provides the potential of sharing scores for benchmarking on RDM services between research organisations nationally and internationally. This presentation would be of interest of those engaged with research data management and support across the institution, including data stewards, data librarians and those working in IT, research office and other areas delivering and designing research data management services.

[Mapping Environments : Skilled Research Workforce Summit](#)

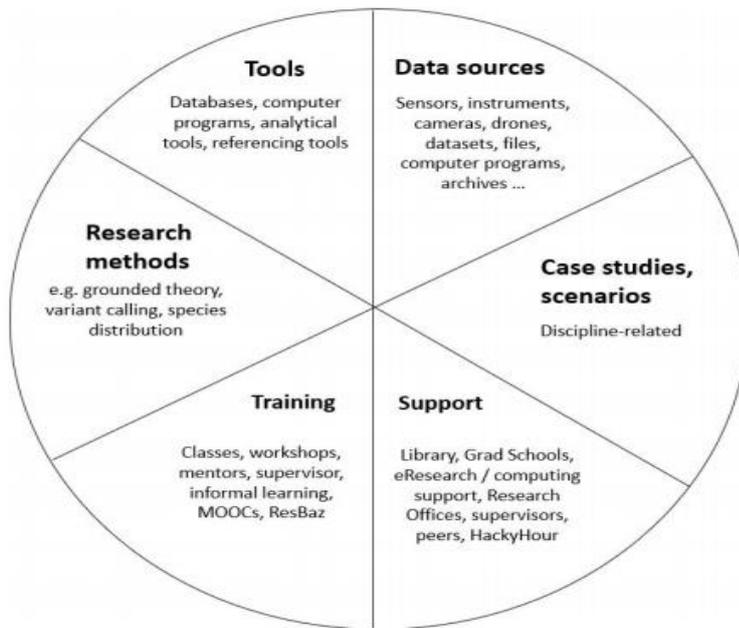
Belinda Weaver, Malcolm Wolski, Griffith University

Research support is currently too undifferentiated. To adequately plan a skilled workforce, disciplinary differences must be taken into account, and research support must be **discipline-relevant**. We propose mapping discipline-specific research environments across the board to identify gaps in skills and support.

Researchers face a **forked path** - those for whom existing research tools are available and adequate, and those for whom the right tools for the research questions they want to answer may not yet exist, and therefore must be created from scratch. These groups have wildly differing needs for support and training.

Therefore we propose:

1. First map the research environments in which research is to be carried out
2. Identify skill needs and gaps based on the forked path
3. Identify what roles are needed to do what where



Mapped environments (necessarily highly iterative) will identify the most common tools in the discipline, the likely data sources, the kinds of research methods most commonly used, provide some scenarios and case studies so that researchers understand the range of research being done, and also highlight the different training and support on offer.

They can help identify skill and support gaps. A research software engineer is more likely to be able to assist someone pulling in sensor data from traffic cameras or ocean buoys, whereas a statistician could advise on survey analysis in the social sciences, and a librarian could advise on metadata to describe images being stored in a repository.

ARDC could coordinate the mapping of discipline-specific needs by gathering information on methods and scenarios and case studies. Institutions could cooperate to provide information about data sources, tools, training, and support. Once the mapping is done, the assignment of roles with the right skills can occur, and gaps identified.

This proposal is to facilitate a discussion amongst interested participants on mapping these environments and responsibilities.

[eResearch: Services and Capabilities](#)

Nicholas May, Software Developer (Research Data), RMIT University

At eResearch Australasia 2018, we ran a Birds of a Feather (BoF) session called 'Roles for eResearch'. The goal was to use the proliferation of position titles, collected by various organizations, to identify the scope and structure of roles that provide support to researchers in the form of digitally-focussed services. In this talk, I will briefly describe the services and present the aggregate capabilities that were identified in the BoF. This set of draft capabilities could form the basis of further analysis, refinement, and collaboration by the eResearch community.

Opportunities from the Integration of Simulation Science and Data Science

Stephen Edwards, AVF Research

The 1990s history of productive interaction between health/ medicine and ICT to create the field of health and medical informatics can act as a useful role model and source of guidelines for future evolution of well-integrated forms of application of informatics in other STEM domains, including physics (informatics of physics, computational physics etc.), chemistry, earth sciences, astronomy and non-ICT engineering disciplines.

Against this context, considerable attention has been placed recently on convergence between modelling and data - where simulation science meets data science. The area enjoys a high research intensity and brings with it new challenges for eResearch, including many skills development challenges. A good overview of the challenges may be found in the proceedings of a workshop held in Washington D.C. on 10 May 2018 convened by the US National Academies of Sciences, Engineering and Medicine [1].

In short, simulation science involves a pyramid of activity at the apex of which lie the extremes of high-performance “compute”. The culture of simulation science is strongly influenced by that apex. By contrast, the culture of data science is strongly influenced by the world of databases and networking, with a contrasting set of skills and priorities.

Between these two contrasting cultures lies an imperative to achieve successful convergence. Theories, models and hypotheses are of limited value without supporting evidence - evidence that derives from experience systematised. Streams of experience may generate ever bigger data flows (natural or digital), yet natural and artificial intelligence - established skills and knowledge coexisting with newer theories, models and hypotheses - are essential for culling out relevance and value from data streams, The maturation of health and (bio)medical informatics has also been extended to take on board bioinformatics - development prompted in part by rapid advances in recent times in genomics.

Reference [1]: "Opportunities from the Integration of Simulation Science and Data Science: Proceedings of a Workshop", US National Academies of Sciences, Engineering and Medicine, <http://nap.edu/25199>.

Session 10: eResearch Capability Building

Meeting skills demands at different levels of data stewardship

Liz Stokes, Senior Research Data Specialist, ARDC

As research data management services evolve across the research sector, data stewardship is itself emerging as a signifier of maturity (Cox et al 2017), and unfolding as a multilayered engagement which incorporates data governance, research integrity, repository management, training and advocacy of good data practices as well as technical solutions for the sharing and interoperation of data services globally.

For organisations, the scope can increase exponentially, incorporating large scale technical infrastructure, faculty level administrative processes and a multiplicity of roles of people who manage diverse data assets, from research management intelligence to repositories of research data and other primary materials which underpin research. In order to meet the different skill demands across functional requirements of good data stewardship, establishing core competencies and supporting community development can help organisations identify their skill gaps. There are opportunities to use skills training to foster communities of practice which can have far

greater impact than the sum of their parts. Pursuing this strategy could strengthen collaborative engagement of a national research data commons to sustain and transform the research sector.

Network know-how: A place for “infrastructure literacy” in eResearch capability building

Dr Sara King, eResearch Analyst, AARNet, Ingrid Mason, Deployment Strategist, AARNet, Dr Frankie Stevens, Research Engagement Strategist, AARNet

In 2016 AARNet began developing introductory learning resources targeted at research support and eResearch professionals on network know-how and data handling by delivering institutional and sector workshops as part of its eResearch engagement activities. We phrased this as “infrastructure literacy” based on other literacies that have been key to advancing research, such as digital, technical, computer, and data literacies. It became clear that there was a gap in knowledge and ability within the higher education sector, and that AARNet had a role play in filling that gap, but also that we needed to partner with others to increase our outreach. In 2018 we partnered with the Australian Research Data Commons, and in 2019 we have partnered with CAUL and CAVAL, as key steps to work on how to scale and where to focus our energy. We are now aiming our efforts on translating the complexities of the national research infrastructure and services we provide by developing learning resources that are readily reusable. Our aim is to improve the community’s capacity to use national research infrastructure and for their workflows to be efficient. This presentation is on what “infrastructure literacy” is and why building this type of literacy into eResearch training will enable better research and data curation.

The HPC Certification Forum and AU/NZ Contributions

Lev Lafayette, University of Melbourne; Ann Backhaus, Pawsey Supercomputing Centre; Roger Edberg, Australian National University

High Performance Computing (HPC) is the most effective method to process increasingly large and complex datasets, making them increasingly critical for research organisations. Researchers wanting to use HPC resources start with low levels of skills in using those systems. Despite this situation, educational programmes coming out of well-informed user needs analysis and/or a widely acknowledged set of required skills, capabilities and knowledge are rare. As a result, the training of researchers typically left to individual HPC sites, such as the Pawsey Supercomputing Centre, National Compute Infrastructure Australia, and the University of Melbourne. With different sites providing their own training with varied content and delivery there is a lack of consistency in skills and knowledge among HPC users, despite the fact that there is a recognised high level of homogeneity in HPC skills (e.g., UNIX-like environments, cluster architecture, job submission principles, parallel programming techniques).

One group trying to address this challenge on an international level is the International HPC Certification Forum (“the Forum”). The Forum was established by a global collection of individuals committed to identifying competency areas, skills and measurable outcomes per identified HPC user roles. The Forum plans to provide examination and certification of users in fine-grained competencies. The Forum has purposefully not taken ownership for training content, separating the definition of skills and certificates from education content and delivery, but allows for the option of delivery agents to be recognized as including examinable content. Australia has been involved from the start of this effort toward a global curriculum with two members of the governing Board.

For Australia and New Zealand HPC educators and trainers in the HPC environment there is a desire for a collaborative development of course content. This is a rational allocation of scarce temporal and financial

resources. This has generated ongoing interest in establishing collaboration among HPC educators to develop a programme suitable for Forum Certification. With a lead from the Pawsey Supercomputing Centre, the University of Melbourne, Adelaide University, and NCI, national coordination of HPC educators in Australia and New Zealand are developing a repository of knowledge for content, delivery, and assessment, with the objective of increasing regional research output.

ResBazing around the nation

Matthias Liffers, Research Software Skills Specialist

ResBaz – the Research Bazaar – is a festival of training and networking for research students. Since its beginning at the University of Melbourne, it has spread to Brisbane, Perth and Sydney and taken on local flavours. What opportunities does it provide for eResearch trainers to engage with the skilled workforce?

[International trends in developing digital skills for the research workforce](#)

Michelle Barker, Australian Research Data Commons

The OECD Global Science Forum [Expert Group on Digital Skills for Data-Intensive Science](#) is analysing practices for building digital research skills across different communities and countries. This talk will present work being undertaken by the Expert Group that could assist Australia's strategic planning by:

- understanding the different types of drivers for digital skills programs
- identifying the broader enablers that facilitate the development of a skilled workforce, such as career paths and recognition for different types of research outputs, inclusion of digital expertise in research teams, funder mandates to recognize the importance of digital professionals etc
- discovering what types of actions, mandates and/or incentives which have led to improvements in digital skills development for data intensive research at scale
- considering how future changes in research culture may affect skills needs.

Data Skills for Data Professionals

Andrew Smailes, President, DAMA Australia

Governments and universities all around Australia and the world are now encouraging researchers to manage their data better so others can reuse it. However, there is almost no academic or other formal training on how data is managed. Most people come to work with data from a variety of different perspectives leading to a misunderstanding of what skills are needed.

Data must be designed and managed as a persistent, shared resource if it is to achieve the functionality and utility to respond to evolving information needs. To date, research data is largely collected via individual and project-based approaches limiting its reuse for other innovative research. The focus needs to be on ensuring quality data to support cross-disciplinary analysis.

DAMA is an international professional association for data management. It has developed the Data Management Body of Knowledge (DMBOK), the Certified Data Management Professional (CDMP) program and coordinates training and regular events around Australia.

Session 11: Discipline Communities

[Hybrid Training: a new model of bioinformatics training delivery](#)

Dr Christina Hall, Training Coordinator, EMBL-ABR & Australian Bioinformatics Commons; Assoc Prof Andrew Lonie, EMBL-ABR; Dr Jeff Christiansen, EMBL-ABR

The urgent need for improving the digital and bioinformatics skills of biologists is not a new challenge, nor is it a uniquely Australian problem. The growing demand for training in a wide range of specialist topics lends itself to a collaborative and coordinated approach to reaching dispersed and sometimes isolated Australian researchers.

EMBL Australia Bioinformatics Resource (EMBL-ABR) is a geographically distributed network of organisations undertaking bioinformatics support around Australia. To service widely dispersed researchers with urgent needs for bioinformatics skills we developed a novel training delivery methodology. Multiple simultaneous training events combined an expert Lead Trainer delivering a presentation online with a hands-on interactive practical session supported by trained local Facilitators. The 'hybrid training model' combines the advantages of webinar presentations with some valuable components of in-person group training.

The hybrid training model provides an efficient way to reach many venues simultaneously and is easily extensible to new sites. The events are particularly valued by regional locations that may not otherwise have access to the depth and breadth of expertise offered by national events, and usually hosted in capital cities. This methodology fosters the development of a national community of people interested in bioinformatics training and helps to elevate the profile of trainers. The recording of each event's presentations, cameras and links to materials allows for continued use by participants, and the content is also made available for self-guided use by others.

There has been widespread interest from international and local colleagues who are implementing the hybrid training methodology into their own training activities. EMBL-ABR is currently transitioning to become part of the Australia Bioinformatics Commons (BioCommons). Hybrid training will be adopted as an important part of the BioCommons workforce transition program and will be used to extend training to new researchers and networks.

[Implementing school-based support infrastructure for digital humanities research at UQ: The Language Technology and Data Analysis Laboratory \(LADAL\)](#)

Martin Schweinberger and Michael Haugh, The University of Queensland

This presentation introduces the Language Technology and Data Analysis Laboratory (LADAL), and discusses the implications of our experiences to date in establishing it for broader efforts to develop researcher capacity in the digital humanities.

The LADAL is school-based support infrastructure for digital humanities researchers. It aims to assist staff and postgraduate students within the UQ School of Languages and Cultures to learn how to use data analytics, digital research tools, and other forms of technology to enhance their existing research programs, as well as offer pathways to new research possibilities. It complements the more generic resources and training in digital humanities methods offered by libraries (e.g. the Digital Scholars Hub at UQ) with the more specialised training/support in particular digital research methods and technologies that are required by researchers working on specific languages and cultures.

The LADAL consists of a specialist computing lab for language-based computational and experimental work (the Computational and Experimental Workshop) and an online virtual lab. With respect to web-based materials, the LADAL website (<https://slcladal.github.io/index.html>) offers self-guided study materials and hands-on tutorials on topics relating to digital tools, computational methods for data extraction and processing, data visualization, statistical analyses of language data, and provides links to further resources and short descriptions of digital tools relevant for digital HASS research.

In addition, the LADAL offers face-to-face consultations and specialized workshops. UQ researchers are encouraged to contact LADAL staff for advice and guidance on matters relating to digital research tools, data visualization, various statistical procedures, and text analytics.

Staff feedback during face-to-face consultations and workshop attendance confirms there is substantial demand for the kind of digital humanities infrastructure offered by LADAL. It also suggests that support and training for researchers in the digital humanities should be conceptualised on a continuum from more generic through to more localised support.

[Leverage ADACS to support astronomy digitally skilled workforce development](#)

Robert Shen, Astronomy Australia

The second Decadal Plan for Australian Astronomy “Australia in the era of global astronomy 2016-2025” identified five equally-weighted science priorities, including “world-class high performance computing (HPC) and software capability for large theoretical simulations, and resources to enable processing and delivery of large data sets from these facilities”. To better address this priority, [Astronomy Australia Limited](#) (AAL) established the [Astronomy Data and Computing Services](#) (ADACS) to provide astronomy-oriented data and computing services for the Australian astronomy community.

ADACS was officially launched in early 2017, to provide astronomy-focused training, support and expertise; to allow astronomers to maximise the scientific return from data and computing infrastructure. At present, ADACS has two nodes (Melbourne and Perth node) and deliver the following three key service components:

1. Training, which aims to provide expert training and support in software development, data management and HPC. For the last 30 months, ADACS has delivered a set of astronomy-oriented face-to-face training events, national roadshows, online events (webinars, eLearnings at ADACS learning management system) and astronomy data hackathon events.
2. National support, which aims to empower Australian-based astronomers to advance their research by providing astronomy oriented national support. The key service here is scientific computing and software development, which aims to embed data and computing experts in the astronomy research team(s) to solve their data and computing challenges. The tasks ranged from cleaning up astronomy data, to simplifying access to HPC, optimising data pipelines or other activities specified by astronomers.
3. Access to national resources, which aims to ensure the sufficient storage and computing resources are available to Australian-based astronomers. Over the next two years, more storage and HPC resources will be made available to the Australian astronomy community via ADACS.

This talk will go through how ADACS could support astronomy digitally skilled workforce development in details.

[Humanities and Arts research support through DARIAH: Lessons from DARIAH Beyond Europe](#)

Alexis Tindall, Australian Research Data Commons

Our increasing interest in supporting digital and data-driven humanities, arts and social sciences research in Australia should be informed by learning from relevant models of support internationally and in other disciplines. The [DARIAH Beyond Europe](#) event, supported by ARDC and held in conjunction with the Australian Academy of Humanities [Humanities Arts Culture Data Summit](#), helped build relationships with [DARIAH](#) and [DARIAH Working Groups](#), and gave insight into their model of supporting arts and humanities research.

This lightning talk will explore the DARIAH model of delivering research support, and flag opportunities for Australian researchers and research support community to connect with our European counterparts.

[Promote FAIR as international best practice](#)

Dr Paula Andrea Martinez, Characterisation Training Coordinator, National Image Facility

The FAIR Guiding Principles are a worldwide recognised framework for thinking about sharing digital research outputs in a way that enables their maximum use and reuse. FAIR stands for findable, accessible, interoperable and reusable. This Lightning talk shares the approach and the motivation behind the process of developing materials to promote FAIR as international best practice. Here two documents currently being written will be presented 1) 10 FAIR things for imaging and 2) Towards FAIR principles for research software. The target audience for each of these documents is researchers/professionals and research software engineers.

Session 12: Institutional Approaches

[Interest Group: For Researchers by Researchers: A National Digital Skills Training Model for 2020 and Beyond](#)

Dr Tyne Daile Sumner, Research Fellow, Consultant, & Research Community Coordinator David F. Flanders: Research Community Manager, Research Platform Services; Sonia Ramza: Product and Marketing Manager, Research Platform Services; Meirian Lovelace-Tozer, Research Community Coordinator, Research Platform Services, The University of Melbourne

The aim of this session is to consolidate the conversation, collaboration and commitment achieved across the many interrelated groups at the Skilled Workforce Summit to consider the best model for the national rollout of a 'Graduate Researcher Welcome Festival' (i.e. 'ResBaz in a Box') and training program. The session will present detailed knowledge and experience about how to run a successful Research Bazaar Conference and subsequent annual calendar of digital skills training for researchers. We'll propose a structured and achievable approach for the large scale adoption of the Research Platform Services (ResPlat) Graduate Researcher Training model across Australia.

The workshop and collaborative planning session will include:

1. key elements of our 'for researchers by researchers' model
2. how to effectively attract, hire and train the best Graduate Researcher trainers for the job
3. how to maintain a dynamic, collaborative and fulfilled team of trainers
4. how to implement a Learning & Development manager and Product & Marketing manager to guarantee high-quality curriculum, pedagogy, product/s and pastoral care
5. how to establish and scale University-wide community building and Graduate Researcher social network (e.g. Hacky Hours, Meet-ups, social events)
6. how to use ResBaz (Graduate Researcher Welcome Festival) as a catalyst for the year's training and events
7. how this model might be applied to a number of Universities and/or nationally scaled.

Biographies

Brian Ballsun-Stanton, <https://orcid.org/0000-0003-4932-7912>, is Solutions Architect (Digital Humanities) for the Macquarie University Faculty of Arts. Brian is an Instructor and Instructor Trainer for The Carpentries.

Dr Michelle Barker has leadership roles in Australia and internationally in the development of digital infrastructure programs and the digitally skilled workforce needed to increase the impact of research and development investments. She is passionate about building strategic collaborations that enable systemic change, and has a PhD in sociology. She is Chair of the OECD GSF Expert Group on Digital Skills for Data Intensive Research and co-founder of the Research Software Alliance.

A/Prof. **Roberto Barrero** is Senior Bioinformatics Solutions Architect at the eResearch Office, Queensland University of Technology (QUT). He has led the bioinformatics analysis of a range of projects with applications in both the agricultural and biomedical domains. He has formal training in molecular biology and developed bioinformatics skills over 15 years working as part of large international collaboration consortia including Human Invitational Consortium, Rice Annotation Project, Cattle tick Genome Sequencing Consortium and the International Barley Genome Consortium. He has conducted analysis and comparative genomics in crop plants, pathogenic bacteria, viruses, animal genomics and human diseases devising innovative strategies in experimental design, data analyses and design of novel molecular therapies in a range of large genomics initiatives in model and non-model species. At QUT he leads a community driven implementation of a cloud-based bioinformatics hub to facilitate knowledge sharing, research collaborations and education of early career researchers and graduate students.

Nathaniel Butterworth has a PhD in Computational Geophysics and Honours in Astrophysics, he now spend his days working with High Performance Computers around the country and doing data science with researchers through the Sydney Informatics Hub. He is trying his best to build researcher data literacy through regular workshops and fostering a research data community.

Dr. Weisi Chen is currently Intersect's eResearch Analyst for University of Technology Sydney and coordinator of Intersect's training platform. With more than 5 years of eResearch experience, Weisi has expertise in a broad range of eResearch techniques and how eResearch training and the establishment of Hacky Hour can enhance research efficiency by improving researchers' capability of using technologies. He is also involved in day-to-day research support at UTS. Weisi has a PhD in Computer Science and Engineering from the University of New South Wales (UNSW). Weisi has previously worked as an academic and software engineer at UNSW where software architecture for eResearch data analysis was his main research focus, and has also been involved in a number of research projects in various domains.

Dr Stephen Edwards formed [AVF Research](#), a non-profit independent in 1989 with a mandate to develop and apply a portfolio of intellectual capital and intellectual property spun off from institutional research in multisensory data fusion undertaken earlier, in the 1970s and 1980s. The institutional research covered theory and applications in radiology, astronomical imaging and geosensing. After the 1980s, underpinning theory was further developed. At the same time our driving strategic focus shifted towards high-performance computing - particularly GPU technology for scientific and engineering computation - and associated new skills frameworks. Motivation lay with the close connection between so-called "Internet of Things" (key aspects of which encompass model-driven forms of multichannel data fusion) and traditional Computational Inverse Theory. The latter can usefully be regarded as an extendable specialised form of Machine Learning.

David F. Flanders is the Research Community Manager at the University of Melbourne.

Xavier Goldie is the AURIN Outreach Manager.

David Groenewegen <https://orcid.org/0000-0003-2523-1676> is Director, Research at Monash University Library, Australia. He is responsible for Library client services to the science, technology, engineering and medicine disciplines at the University, as well as the contribution the Library makes to the University's research activity. This includes oversight and development of the institutional repositories and Monash University Publishing. He is also the University's research data management strategy lead and has broad oversight of three branch libraries.

Megan Guidry is the Regional Coordinator for the Carpentries in New Zealand and also works as the training coordinator for the New Zealand eScience Infrastructure (NeSI). Her main priority is raising the eResearch capability in New Zealand through training delivery and community building. Megan is the Regional Coordinator for New Zealand for The Carpentries.

Christina Hall is a training and science communication specialist. She worked in science communication roles before and after undertaking a PhD in plant pathology and has been involved in science-based training and outreach for children, museum staff, university students, viticulturists, mushroom enthusiasts and biology researchers. Christina is the Communications Officer and Training Coordinator at Melbourne Bioinformatics and the EMBL-ABR Hub.

Hilary Hanahoe is Secretary General of the Research Data Alliance (RDA). Hilary's responsibilities include leadership of RDA's membership, effective management of the RDA organization and its legal entity (RDA Foundation), engagement with RDA stakeholders and organisations, and sustainable stewardship of the dynamic, active, and high-impact community. She reports to the RDA leadership Council and works closely with all governance boards and members of the RDA community. She is passionate about the work of the Research Data Alliance and its vibrant community. As part of her role, she raises awareness of the RDA activities and outputs, advocates for new members and increased engagement in the Alliance. She is also involved in the financial and organisational sustainability of RDA on an international level.

Amanda Harris is Director of the Sydney Unit of digital archive PARADISEC (Pacific and Regional Archive for Digital Sources in Endangered Cultures) and is a Research Fellow at Sydney Conservatorium of Music, University of Sydney. Amanda's research focuses on music, and cross-cultural Australian histories. Her current research is part of the Australian Research Council Discovery Project 'Reclaiming Performance Under Assimilation in southeast Australia, 1935-75'. She is editor of three books including *Circulating Cultures: Exchanges of Australian Indigenous Music, Dance and Media* (2014) and forthcoming articles will appear in the *International Journal of Digital Curation and Twentieth Century Music* alongside previous work in *Australian Historical Studies*, *History and Anthropology*, *Women's History Review* and *Women and Music*.

Michael Haugh is Professor of Linguistics and Head of the School of Languages and Cultures at the University of Queensland, Australia. His research interests include pragmatics, intercultural communication and the use of spoken corpora, and he is currently co-editor-in-chief of the *Journal of Pragmatics*. He is a leading proponent of the *Australian National Corpus* and the recent establishment of the *Language Technology and Data Analysis Laboratory (LADAL)* at the University of Queensland, and has been successful in obtaining national and international research grants, including an ARC Discovery Project grant focused on Australian and American communication styles and a CCKF research grant focused on Humour in Chinese.

Grant Hose, <https://orcid.org/0000-0003-2106-5543>, coordinates the Master of Research Program for Biological Sciences at Macquarie University. In 2019 he incorporated and led Data Carpentry as part of the Masters coursework program. He brings to the panel perspectives on Data Carpentry as a research training tool.

Dr Chantal Huijbers is the Training and Engagement Manager for digital research infrastructures in the EcoSciences domain. She is based at Griffith University in the eResearch Services team. Her work includes helping build a community and skills base around the ARDC-funded Biodiversity and Climate Change Virtual Laboratory and *ecocloud*, in collaboration with other NCRIS infrastructures such as ALA and TERN. Chantal has a research background in ecology, and uses this to translate the needs of the scientific community to the developers of the platforms. She also manages *ecoEd*, the innovative national training program for digital EcoSciences.

Sarah Jones is the Associate Director of the Digital Curation Centre, a service that supports research data management and open science. She coordinates work on the DCC's Data Management Planning tool - DMPonline - and undertakes research on data policy and FAIR. She provides advisory services, training and consultancy via the DCC and is involved in several European Commission funded projects including, FOSTER+, OpenAIRE, the Research Data Alliance and FAIRsFAIR. Her work in a European context focuses primarily on training, data management planning and network building to facilitate open science. She co-chairs the RDA Active DMP Interest Group and the CODATA Working Group on Research Data Science schools. In a personal capacity, she was rapporteur on the European Commission's FAIR Data Expert Group and a member of the Open Science Transport Research Cloud Expert Group. She is currently an individual expert on the EOSC Executive Board, chairing the FAIR Working Group.

Sara King has extensive experience in researcher engagement and training, with expertise in research data and technologies in HASS research areas.

Lev Lafayette is the Senior HPC Support and Training Officer at the University of Melbourne, where he has been for the past four years, primarily working on the Spartan system and with its almost 2500 users. Prior to that he was at the Victorian Partnership for Advanced Computing for eight years in a similar role. During this time he worked on several HPC systems across Australia, has taught a several thousand postgraduates how to use such systems, written a few books, a bundle of papers, picked up a few degrees, and a few (human) languages along the way.

Matthias Liffers, <https://orcid.org/0000-0002-3639-2080>, is a Carpentries Instructor and a Research Software Skills Specialist with the Australian Research Data Commons. He works on national programs to develop software skills in researchers and research support staff.

Meirian Lovelace-Tozer is a senior community co-ordinator, consultant, researcher and teacher at the University of Melbourne. Her primary areas of interest include data analysis, operations research and statistics. Meirian loves teaching and is enthusiastic about enabling others to benefit from the skills that she teaches!

Paula Andrea Martinez, <https://orcid.org/0000-0002-8990-1985>, works for the National Image Facility (NIF) as Characterisation Training Coordinator. The project involves partners from three Australian National institutions (NIF, Microscopy Australia and ANSTO), 5 Australian Universities (UQ, UoM, Monash, UWA, Sydney Uni and UoW) and ARDC. The project Paula leads is the Characterisation Data Enhanced Virtual Laboratory to promote FAIR. She is an active member of The Carpentries since 2015.

Ingrid Mason is an eResearch specialist with extensive experience in researcher engagement, training, and has expertise in research data and technologies across STEM and HASS research areas.

Nicholas May is a software engineer in the Research Capability unit at RMIT University. He has over thirty years of varied experience within the software engineering profession, across industries and domains, and holds the Certified Professional status with the Australian Computer Society. His current role includes the responsibility for

promoting research data management across the research lifecycle at RMIT University. In addition, he is actively engaged in the broader eResearch community, through faver.edu.au, and as a member of the provisional steering committee of the RSE-AUNZ. <http://orcid.org/0000-0002-1298-1622>

Dr Cameron McLean is the Engagement Lead at the Centre for eResearch, University of Auckland. His background is in Molecular Biology and Computer Science. With a strong focus on researcher enablement, his current work revolves around digital scholarship and helping researchers utilise digital tools in a manner that links with the core values of research and scientific enquiry. <http://orcid.org/0000-0002-9836-3824>

Jo Morris is the User Support Manager of the ARDC's Nectar Research Cloud, responsible for coordinating and leading operational user support activities for the Nectar Research Cloud. Responsibilities include managing the operation of the distributed Help Desk, implementation of the User Support Operational Plan, leading projects that focus on improving cloud services for users and node operators of the Research Cloud, and implementation of business development activities to improve the long term sustainability of running the federated user support service. Jo has an IT background and has worked in the Tertiary Education sector for over 20 years with the last 9 focused on supporting research.

Peter Neish is the Research Data Curator, Digital Scholarship at the University of Melbourne. He works across the University in partnership with researchers on a wide range of data management projects. He has interests in data management training, planning and open science. Peter has previously worked at the Victorian Parliamentary Library and the Royal Botanic Gardens Victoria, using his background as a researcher and computer scientist to make databases and information more open, standards-based and linked. He has contributed to national and international data initiatives and transfer standards.

Linda O'Brien is Pro Vice Chancellor at Griffith University, Head of Logan Campus and University Librarian. With a background as an educator, Linda has served on various bodies from CAUL and CAUDIT to ORCID. She is a well known figure in the Australian eResearch community and is passionate about skills development.

Anastasios Papaioannou holds a BSc in Physics and MSc in Computational Physics. He also holds a PhD in Computational Biophysics/Medical Physics from the University of Sydney, with his research focus mainly being on computational physics applied in medicine and biology. He has over 5 years of experience as an academic tutor and eResearch training Instructor, helping researchers enhance their skills and find solutions for their research challenges. With over 7 years of experience in research, Anastasios was an active member of the International and European Biophysics society, participated and presented his work in several international and local conferences. As Intersect Research Data Scientist, he has led and been involved in various national and state level projects. Possessing an extensive research background and a deep technical understanding and expertise on research data, data analytics, and programming, Anastasios develops and implements solutions to increase research productivity.

Gareth Price is Service Manager of Galaxy Australia and Head of the Computational Biology team at QFAB. At QFAB Gareth helps translate researcher's biological queries into the systemic informatics language required for analysis. Gareth's view is that biological research, clinical research, and healthcare are at their best when coupled with the most accurate, highest throughput and innovative technology and analysis. He uses this view to motivate the use of innovation to reduce the time between data generation and data interpretation and has taken this philosophy into the role of Program Manager for Galaxy Australia, to run and help promote this important Australian resource to all life science researchers. On behalf of the Galaxy Australia team Gareth was very proud to receive this year three Australian Information Industry Association Queensland iAwards; the Infrastructure and Platforms Innovation of the Year award, the Community Services Markets award and the Queensland Premier's iAward for Public Sector Innovation.

Sonia Ramza manages the team of Graduate Research Community Coordinators at Research Platform Services at the University of Melbourne. She uses Agile methodologies to ensure the core training remits are achieved efficiently and effectively. Additionally, she works to raise awareness of the training service on campus and is the event manager for ResBaz at the University of Melbourne.

Keith Russell is Engagements manager at the Australian Research Data Commons, engaging with research organisations and research infrastructure organisations around Australia. In this role he has worked on establishing projects and engagements with a range of organisations, working on policies and the human and technical infrastructure required to make research data and tools more Findable, Accessible, Interoperable and Reusable (FAIR) and to prepare the researchers and their organisations to benefit from a data intensive future.

Dr. Martin Schweinberger is currently a postdoctoral Research Fellow in Language Technologies at the University of Queensland, Australia. After obtaining his PhD in English linguistics from Universität Hamburg, Germany, Martin worked as research assistant, lecturer, and interim professor for English linguistics at several German universities. Before joining the University of Queensland, Martin was part of the Language Technology Group at the Computer Science department of Universität Hamburg. Martin has specialized in computational approaches to analysing language data with a particular focus on corpus linguistics and quantitative analyses. In his current role, Martin is one of the leading proponents of the Language Technology and Data Analysis Laboratory (LADAL) at the University of Queensland.

Hugh Shanahan's research is in Computational Biology, focussing on transcriptomics and metagenomics combined with a deep background in Computational and Theoretical Physics. He completed his PhD in 1994 in Lattice QCD and completed postdocs in Glasgow, Cambridge and Tsukuba before moving into Bioinformatics in 1999. In 2005 he joined the department of Computer Science at Royal Holloway, University of London where he is now Reader.

Since 2015 he been a co-chair of the CODATA-RDA schools in Research Data Science that has delivered training in Data Science methods for researchers to students from approximately 40 countries. He is a member of the FAIRsFAIR consortium which is focussed on the development of an overall knowledge infrastructure on academic quality data management, procedures, standards, metrics and related matters, based on the FAIR principles.

Robert Shen holds a PhD in Information Technology (2006) from the University of Sydney and joined the Astronomy Australia Ltd team in September 2016 as Senior Program Manager. He has previously worked at Australian National Data Service (ANDS) as a senior research analyst for 7.5 years and the University of Melbourne as a research fellow for 3 years.

Natasha Simons is Associate Director, Skilled Workforce, for the Australian Research Data Commons. With a background in libraries, IT and eResearch, Natasha has a history of developing policy, technical infrastructure and skills to support research. She works with a variety of people and groups to improve data management skills, platforms, policies and practices. Based at The University of Queensland in Brisbane, Australia, Natasha is co-chair of the Research Data Alliance Interest Group on Data Policy Standardisation and Implementation and Deputy Chair of the Australian ORCID Advisory Group.

Andrew Smailes is currently the President of DAMA Australia, an association providing a forum for the exchange of information relating to information resource management and to discuss challenges, ideas, experiences, resources and questions. He has over 30 years' experience working in many facets of Government data management, analytics and ICT design, delivery and support. During this time the management of data provided to and by researchers has been a recurring them.

Frankie Stevens has extensive experience in researcher engagement and training, with expertise in research data and technologies in STEM research areas.

Liz Stokes joined the ARDC to socialise better data management practices among researchers, librarians and other research-facing professional staff. Her international collaborations include coordinating a data management planning interest group (Australia and beyond), member of the Library Carpentry Advisory Group and the JISC Research Data Management Toolkit Working Group.

Odette Subijano, <https://orcid.org/0000-0001-6031-1079>, is a Project Manager working University leading outreach and training activities promoting digital skills among researchers on behalf of Data Science and eResearch team at Macquarie University. Odette has organised twelve Carpentries workshops at Macquarie University and Research Bazaars.

Tyne Daile Sumner is a Research Fellow at the University of Melbourne, Deputy Project Manager of the Humanities, Arts and Social Sciences Data Enhanced Virtual Laboratory (HASS DeVL) and a consultant at The University of Melbourne in the areas of digital, data and skills training. Tyne works with a diverse group of Graduate Researchers at Research Platform Services at the University of Melbourne to deliver a successful training program for 1,600+ researchers annually in tools such as R, Python, Omeka, MATLAB, 3D Printing and NLTK. Her work on the HASS DEVL project involves building a community of practice around data-driven research in HASS, running the Digital HASS Champions Program, and facilitating the creation of an online environment of data, tools and services for the National HASS landscape. Her research focus is on the relationship between Literature, surveillance and big data.

Alexis Tindall is part of the Australian Research Data Commons' Skilled Workforce team, with a particular interest in supporting and enabling humanities, arts and social sciences research. She has extensive project management experience in diverse environments. Before joining the eResearch support community, she worked in natural history and social history museums, and is passionate about digitisation and improving digital access to the nation's treasured collections.

Darya Vanichkina is a data scientist with a biology background and experience in big data, machine learning, and statistics. She is a Software and Data Carpentry instructor, maintainer, contributor and mentor, passionate about using evidence-based teaching practices to develop courses around quantitative skills, programming and reproducible research methodologies for researchers and non-technical audiences. Darya holds a PhD in Bioinformatics and Genomics from the University of Queensland, and is a Specialist Biochemist with a major in Molecular Biology. At the University of Sydney, Darya works across the different faculties to develop and deliver data science focussed discipline-specific training, as well as carrying out analytics project work.

Belinda Weaver manages an academic engagement team within Library and Learning Services at Griffith Library. Previously she worked in a community building role with The Carpentries, and before that as a team leader in research cloud provision with the Queensland Cyber Infrastructure Foundation. She worked for The University of Queensland Library for more than 15 years in a range of different roles, including repository manager, and left there to work with the AustLit project. She is a certified Software Carpentry instructor and instructor trainer. She is about to submit her MPhil thesis at The University of Queensland. She tweets as @cloudaus.

Aidan Wilson is Intersect's eResearch Analyst for the Australian Catholic University, and coordinator of Intersect's training activities. Aidan's research background is in documentary linguistics, concentrating on the syntax and morphology of Australia's Aboriginal languages. He has also been actively involved in research support, and worked as a data manager for PARADISEC, an archive of Pacific and regional digital ethnographical data, including linguistic and ethnomusicological recordings. In his time at Intersect, Aidan has been involved in a

number of engineering and data science projects, including secure data movement for health and medical, and imaging datasets, and genome sequencing as-a-service.

Malcolm Wolski is Director, eResearch Services, Griffith University. His team manages a broad range of eresearch support services including discipline repositories, high performance computing, research specific applications, eplatform development and training services.

Lesley Wyborn is an Adjunct Fellow at the National Computational Infrastructure at ANU and works part time for ARDC. She previously had 42 years' experience in scientific research and in geoscientific data management in Geoscience Australia from 1972 to 2014. Her main interests are developing international standards that support the integration of Earth science datasets into transdisciplinary research projects. She is currently Chair of the Australian Academy of Science 'National Data in Science Committee' and is on the AGU Data Management Board. She was awarded the Australian Government Public Service Medal in 2014, the 2015 Geological Society of America Career Achievement Award in Geoinformatics and the 2019 US Earth Science Information Partners Martha Maiden Award.