emcrforum

THE VOICE OF AUSTRALIA'S FUTURE SCIENTIFIC LEADERS

Australian Academy of Science

Kick-starting Collaboration

The research landscape

A guide for EMCRs to research outside universities and industry

Research outside universities and industry can seem overlooked at times. The university sector confers PhDs, and is still viewed by many as the primary home of scientific research. While increasing attention is paid to science done outside of universities, it is often framed in terms of private industry: biotech and agritech, start-ups and spin-offs, and commercialisation and innovation in small, medium and large enterprises. What about research that happens outside of these sectors?

Who is this guide for?

This guide is an introductory explainer to the research landscape outside the walls of universities and for-profit organisations. It is for early- and mid-career researchers (EMCRs) wishing to better understand, collaborate with, or seek employment within the sector.

The research sector outside universities and industry is diverse

This sector encompasses, but is not restricted to, major publicly funded research agencies, independent medical research institutes, cooperative research centres and government departments. Indeed, it is easier to define this sector by what it is not, than what it is. While sometimes university affiliated, this research is not university based, nor is it conducted by private or for-profit organisations.

Despite their differences and diversity, researchers in this sector share much in common with their counterparts in industry and universities. After all, they have obtained their PhD via a university affiliation and they frequently collaborate and consult with both universities and industry. Together this places them in a uniquely interconnected position in the Australian research landscape. They too conduct research of clear strategic significance and juggle their research duties with a host of other tasks, such as publishing in high impact journals, obtaining funding and managing clients and stakeholders.

Kick-starting collaboration is about demystifying what happens in universities, industry and other sectors, and why. It is about stimulating cultural change to support collaboration. The EMCR Forum aims to create a better mutual understanding and synergy across different sectors and a better understanding by early- and mid-career researchers (EMCRs) of potential career paths.

AUSTRALIAN RESEARCH OUTSIDE UNIVERSITY AND INDUSTRY

Entity	Examples	Purpose	Collaborations and links
Publicly funded research agency (PFRA)	CSIRO; Defence Science and Technology Group; Australian Nuclear Science and Technology Organisation, Australian Institute of Marine Science	Research in priority areas, often in areas of public good that are unmet by the private sector. May play important roles in training and service delivery.	Collaborates with universities and industry. Consults for government and the private sector. Helps to bridge the gap between science and policy.
Independent research institute (IRI)	Walter and Eliza Hall Institute for Medical Research; Translational Research Institute; Australian Wine Research Institute	Independent research in a specific area, most often medical and health research.	University teaching and research relationships. Mix of basic and translational research e.g. through collaboration with medical practitioners
Cooperative research centre (CRC)	Bushfire and Natural Hazards CRC (2013–2021); CRC for Low Carbon Living (2013–2019)	Defined-term entities providing research and evidence to underpin the performance of their sector.	Formal partnership between industry and universities; may also involve PFRAs, IRIs, and government departments and agencies.
Government department	Department of Agriculture and Water Resources; Department of Health; Department of the Environment and Energy	Frequently targeted to departmental and governmental priorities.	Collaborates with and contracts out work to universities, PFRAs and the private sector. Key part of science–policy cycle.

RESEARCH OUTSIDE UNIVERSITIES AND INDUSTRY

The drivers in this sector vary with the organisation, but common themes include:

- Research grant funding
- Provision of public goods
- Whether science is basic or applied
- Publications
- Independent but keen collaborators
- Responding to changing priorities

WHAT NEXT?

- Read other discussion papers in this series to learn more
- Check out the EMCR Forum's Big ideas to spark collaboration on our website, as well as a broad range of case studies, reports and resources
- Join the EMCR Forum and get in touch to tell your story, make suggestions or ask for help
- Talk to friends or colleagues doing science outside your sector
- Join the conversation on Twitter using #kickstartcollab

Case Studies

Dr Mark Bradbury—Improving food safety

Dr Mark Bradbury is a postdoctoral research associate in the ARC Industrial Transformation Training Centre for Food Safety in the Fresh Produce Industry. The Australian fresh produce export industry is worth more than $2 billion per year. Committing to improving food safety through research outcomes is essential to ensure public health, market access and consumer trust in Australian-grown fresh produce.

The centre conducts industry-focused research and provides training to the next generation of industry-ready food safety researchers. With 21 industry partners in three countries, the centre works to understand the priorities and challenges facing the fresh produce industry. All PhD projects at the centre are designed with industry partners and include integrated industry placements aimed at producing graduates capable of moving into research roles in industry, government or academia.

Prior to joining the centre, Mark worked as a research microbiologist with CSIRO Food Safety and Stability Group and completed his PhD in 2014. Making the decision to move from an indefinite position to an academic contract position was difficult. However, the opportunity to be part of a new centre, work with a cohort of PhD candidates in food safety and move outside of his comfort zone convinced him it was the right choice.

Like many EMCRs, Mark has found that working with industry partners comes with competing demands to keep the balance between scientific interests and commercial priorities. He advises that projects should be defined as collaborative endeavours between partners and not be simply transactional in nature. Many researchers find that the most significant advances often occur on the back of a multitude of failed experiments. Scientists need to ensure their industry partners are aware that they are investing in the research—not the outcome. This is easier said than done, especially in a funding-constrained environment, however in Mark's experience fostering an honest and open relationship while delivering results generates trust. This in turn can lead to the ability to influence project directions and expand to more exploratory research.

Another challenge Mark observed in returning to an academic environment is around the definition of research outputs. He thinks that translation of research findings to industry settings is very satisfying. However, finding ways to capture this effort as a research metric remains challenging. Mark feels this will be even more of a challenge for international researchers working in Australia, as any metrics that are developed need to be consistent with global standards. One of his priorities is to consider incorporation of publishable components in every industry-driven project.

Dr Josh Hixson—Finding solutions for wine industry waste

The Australian Wine Research Institute (AWRI) focuses on research outcomes for the wine industry, be they fundamental science problems or practical solutions-based work. The AWRI is largely funded through wine industry levies and matching government funding, administered through the industry research and development corporation, Wine Australia.

The majority of AWRI's researchers have come through traditional university pathways (PhD, post-doc, researcher or similar). Dr Josh Hixson arrived at the AWRI straight out of his PhD four years ago. Researchers at the institute are evaluated on some of the same indices as traditional academic researchers such as publications, citations and grants, but most important are the impacts of their outputs, as their research questions are driven by wine industry problems. As a point of difference to university-based researchers, they can't directly access ARC funding.

Josh has been working on externally funded grants from the Australian Government Department of Agriculture and Water Resources to find solutions for wine industry wastes.

This includes collaborating with the wine and livestock industries to better utilise wine industry wastes as a cattle feed. He has worked alongside wineries and grape waste processing facilities to sample or source product and with the livestock industry to understand the barriers that need to be overcome to enable grape waste to be accessed as a feed supplement.

Dr Robyn Hall—Helping control the wild rabbit population

Dr Robyn Hall is a research scientist at CSIRO studying innovative and applied solutions to help manage wild rabbit populations, one of Australia' most invasive vertebrate pests. Robyn works on rabbit caliciviruses in their context as biological control agents of wild rabbits. The benefits of biological control of wild rabbits has been estimated at $70 billion over the last 60 years, and biocontrol agents are essential for minimising the impacts of rabbits on agriculture and the environment.

Robyn's work was largely funded by the Invasive Animals Cooperative Research Centre (IACRC) which has now evolved into the Centre for Invasive Species Solutions. The centre is Australia's largest integrated invasive animal research and management collaboration, with 27 participating organisations including research institutes such as CSIRO and universities, state and federal government departments, and industry stakeholders such as Meat & Livestock Australia and Australian Wool Innovation Ltd.

Robyn started out as a veterinarian in private practice before completing a PhD in veterinary virology. These skills equipped her to tackle the applied problem of invasive vertebrate pest management and to communicate effectively with industry stakeholders, predominantly beef and sheep producers. Through her time at CSIRO and with the IACRC, Robyn has developed strong collaborations with industry and members of the public interested in wild rabbit control. She has also been able to pursue cutting-edge science on rabbit caliciviruses, knowing that her research will have direct environmental, economic and social benefits for end users.

Although scientific excellence, innovation, and peer-reviewed publications are important for building a track record at CSIRO, researchers are strongly encouraged to demonstrate the national impacts of their research and to conduct research aligned with CSIRO's research priorities. There is a strong focus on delivering value to customers and on working collaboratively with other research partners.

Get in contact with the EMCR Forum

The EMCR Forum is the voice of Australia's early- and mid-career researchers (EMCRs), championing improvement in the national research environment through advocacy.

Connect

Email: emcr@science.org.au
Web: www.science.org.au/emcr-forum
Twitter: @EMCRForum

Visit www.science.org.au/kick-starting-collaboration to find out more about this project.

Become a member

Add your voice to EMCRs around the country and help create change.

www.science.org.au/emcr-membership-registration

The EMCR Forum will keep you updated on the work we are doing and how you can contribute, as well as informing you about opportunities for professional development, networking, funding and awards. Membership is free.

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