



Australian Government  
Department of Industry,  
Science and Resources

**AusIndustry**  
Cooperative Research  
Centres Program

Annual Report  
2024

**SAAFE CRC**

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**AusIndustry**  
Cooperative Research  
Centres Program

This project received grant funding from the Australian Government through the CRC Program.

# Welcome to the SAAFE CRC Annual Report

## Acknowledgment of Country

SAAFE acknowledges the Traditional Custodians of the lands, seas and waters of this Country, and of all areas in which we live and work across Australia.

We respect Aboriginal and Torres Strait Islander Peoples' deep cultural and spiritual relationship with this land and pay our respects to Elders past and present.

We acknowledge the diversity of Aboriginal peoples and their knowledge systems. We recognise the concept of One Health (which highlights the integrated nature of human, animal, plant and environmental health) is not something new to Aboriginal peoples, and that embracing this knowledge and connection to Country is a vital step in the path to reconciliation.

SAAFE is respectfully committed to a research program underpinned by the core value of Caring for Country.



A message from

**The Hon. Karlene Maywald,  
SAAFE CRC Chair**

The rise of antimicrobial resistance (AMR) poses a profound challenge, threatening the health of humans, animals, plants and environments. It could also reverse decades of medical progress as many lifesaving treatments will no longer work.

To respond to this challenge, SAAFE is continuing to build a strong, connected and collaborative community to develop and implement innovative solutions for tackling AMR because we know that our collective impact is magnified when we join forces.

Given AMR is one of the greatest threats to global health, international collaboration and preparedness to tackle the issue have also taken on unprecedented levels of importance.

In 2024, we saw the strengthening of global collaboration in the fight against AMR with efforts to tackle the issue building significant momentum.

World leaders agreed to decisive action on AMR when they met in New York at the 79th United Nations General Assembly. Member States reaffirmed their commitment to the Global Action Plan on AMR which highlights the importance of a unified, multi-sectoral response to safeguard health systems, ensure food security, and protect global economies.

Leaders approved a political declaration committing to targets and actions that emphasise a One Health approach.

The declaration most importantly focused on implementation. To facilitate this implementation, concerned parties from around the world gathered in Jeddah, Saudi Arabia for the 4th Global High-Level Ministerial Conference on AMR.

Addressing AMR from a holistic, global health perspective, and prioritising innovation, research and development, surveillance, stewardship and capacity building were all emphasised at the meeting.

Importantly, SAAFE's projects with our partners support these international priorities. Examples include the fungicide resistance in grapevine project that will set new standards for disease resistance management, potentially influencing practices across the globe for the wine industry and beyond, while our agribusiness digital transformation project will have far reaching benefits for global AMR surveillance and stewardship.

SAAFE's strategic pillars – Collaboration, Applied Science, and Education and Training also align with the United Nations' focus on a multisectoral response to AMR, and investing in research, innovation and education to tackle the issue.

Our Collaboration pillar is focused on enabling stakeholders across diverse industries to understand the perspectives of other sectors and identify shared challenges and solutions.

The Applied Science pillar emphasises that SAAFE will deliver high quality, collaborative, cross-sectoral, applied research projects that are end-user driven, with a clear pathway to impact, while SAAFE's Education and Training program will develop a cohort of future leaders in both industry and research that understand One Health AMR and how to drive change across complex systems.

While the high-level discussions taking place on an international level are essential in addressing AMR, SAAFE also recognises that a focus on community-driven solutions and people is also imperative.

SAAFE works with many outstanding and dedicated people who comprise our collaborative community. A big thank you to our partners for all your support and for being part of our journey to find solutions to AMR. At SAAFE, our Board and dynamic team are working tirelessly in support of our mission.

**The Hon.  
Karlene Maywald**  
SAAFE CRC Chair



A message from

**Alex Lloyd, SAAFE CRC  
Chief Executive Officer**

I am delighted to present SAAFE's second annual report.

A key highlight from 2024 was the outstanding Welcome to Country delivered by Uncle Mickey O'Brien at SAAFE's second annual AMR Solutions Summit. Uncle Mickey shared the holistic view of environmental health that Aboriginal people have upheld for thousands of years—caring first for the land, then plants, then animals, and finally people. This perspective underscores the importance of a One Health approach to addressing AMR and underlines the value of broad collaboration in tackling the complex challenge of AMR.

The 2024 SAAFE AMR Solutions Summit brought together more than 200 attendees from 11 sectors to exchange experiences through presentations and workshops. The event highlighted the diverse group of stakeholders that must collaborate effectively to sustainably address the complex challenge of AMR.

This year, SAAFE's research program has continued to gain momentum. Together with SAAFE's six University and more than 40 industry partners, we have now committed to invest more than \$27 million of cash and in-kind into our 10 foundational projects, 14 PhD projects, and six Foundation Post-Doctoral Research Fellows to conduct leading research to address AMR over the next few years.

A key focus has been recruiting the right staff to ensure we have the expertise needed to facilitate complex cross-sector collaborations and establish high-impact projects that will advance our mission. The appointment of several key team members has strengthened our research program's momentum and positioned us well for 2025.

I am extremely proud of all that SAAFE has accomplished with the ongoing support and commitment of our partners, and I firmly believe these first two years have laid a strong foundation for the continued collaboration and high-impact research necessary to address AMR and fulfill our mission.

As outlined on page 10, SAAFE's strategy emphasises the importance of cross-sector collaboration in delivering One Health solutions to AMR. It also highlights the need to develop targeted training programs with our stakeholders to build capacity and foster a culture of working together in the future. In 2025, we will begin benchmarking and tracking key metrics to ensure we stay on course to achieve our mission.

The coming year will also see us kick-start the next tranche of projects, with a focus on expanding collaboration—both by linking existing projects with new industries and sectors and by establishing new partnerships that build on the expertise of our foundation projects and research fellows.

None of SAAFE's achievements this year would have been possible without the dedication of our team and the support and collaboration of our industry and academic partners. It is both humbling and inspiring to work alongside you all. I look forward to continuing working with you to deliver SAAFE's vision of protecting Australia's environment, economy, and communities from AMR.

**Alex Lloyd**  
SAAFE CRC  
Chief Executive Officer

# 2024 at a glance

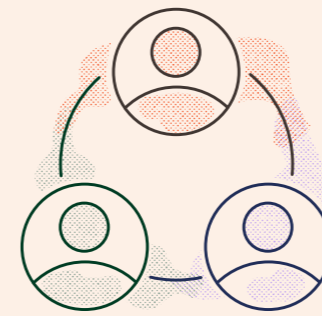
Projects	\$27m		Partners	41		
	Project Value (Cash and In-kind)			SAAFE Partners		
	10			8		
	Projects			Sectors		
		17		13	11	
		Project Partners		Major	Affiliate	
Education and Training	14		SAAFE Summit 2024	204		
	PhD Projects Recommended			Attendees		
	>\$1m			49		
	In Scholarship Funding			Government Representatives		
4		11				
SAAFE Foundation Fellows Appointed		Sectors Represented				

# SAAFE'S Strategy

## SAAFE's Purpose

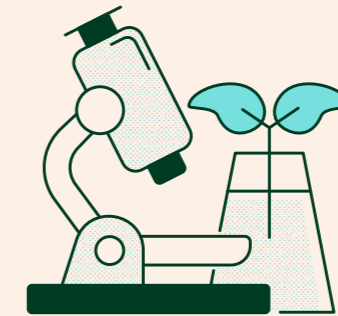
Protecting Australia's environment, economy and communities from antimicrobial resistance.

## SAAFE's Pillars



### Collaboration

SAAFE will help diverse sectors work together to understand each other's perspectives, and to identify shared challenges and solutions to address the global issue of AMR.



### Applied Science

SAAFE will co-design and support high quality, collaborative, cross-sectoral, applied research projects that are end user driven with solutions and tools that are adopted and used in a range of industries.

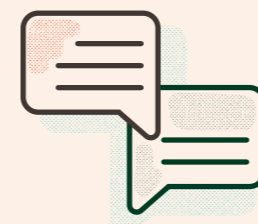


### Education and Training

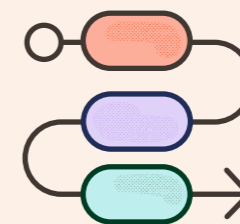
SAAFE will develop a cohort of future leaders in both industry and research that understand One Health AMR and how to drive change across complex systems.

## SAAFE's Enablers

*How we'll get there*



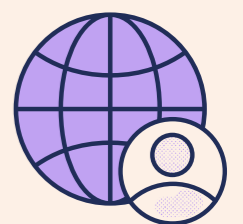
### Communication



### Effective processes



### Governance



### People and culture

# Research Director's Report

Prof Erica Donner  
SAAFE Research Director



Thank you to all those who contributed to designing, contracting and participating in SAAFE's projects and events this past year.

It's my pleasure to present the highlights of our developing research program and reflect on the strong foundations we've created to build on in the years ahead. With a dedicated and growing multi-disciplinary, multi-sectoral researcher and partner base, SAAFE's work is contributing significantly to both national and international research and policy landscapes, and driving forward critical developments to mitigate AMR. Over the past year we've advanced a wide range of core research projects, established and consolidated important partnerships, and engaged broadly to deepen our understanding of the multifaceted AMR challenge.

## Research program development and strategic core projects

In 2024, SAAFE's core research program has taken shape, with a series of strategic partnered projects designed to bridge AMR knowledge gaps and develop and implement impactful solutions. To firmly underpin SAAFE's core Monitoring, Analytics, and Solutions programs, we have adopted a 'seed and grow' approach. Starting with an initial major investment (a core partnered project), subsequent contributions and partnerships strategically leverage and extend core capabilities and workplans. This approach allows us to test, refine, share and embed methods and solutions in a coordinated manner, ensure judicious use of funds and good

return on investment for partners, and grow the scale and impact of the program in a cooperative manner that minimises duplication of effort and speaks to the integrated, multi-sectoral nature of One Health AMR. It also increasingly connects our consortium by linking, as and where appropriate, different research teams and initiatives together.

Some of these key initiatives include a core capability project with the Australian Research Data Commons (ARDC), which is laying the foundations for digital transformation to support antimicrobial stewardship and mitigation across industries, as well as SAAFE's core monitoring and diagnostics program, initiated via a suite of projects including: Water Research Australia's national Water Industry Consortium monitoring project, Wine Australia's fungicide resistance monitoring project, DPIRD WA's apple scab monitoring project, global seafood consortium SeaBOS' aquaculture monitoring project, and a whole suite of aligned PhD projects. SAAFE is also leading the way with innovative AMR risk assessment projects to support decision makers, and developing new solutions to improve agricultural outcomes such as FRDC's trout vaccine project and Calix's alternative therapies project.

## Annual Summit – Thematic Development and Solutions Workshop

SAAFE's 2024 Annual Summit was, without doubt, one of our most exciting activities. Bringing together an outstanding group of speakers, researchers, policymakers, and practitioners from across the nation to explore the complexity of AMR through a cross-sectoral lens, the Summit enabled participants

to discover and experience the multifaceted nature of One Health AMR and consider the path forward to practical and sustainable solutions.

The event emphasised systems-based solutions-oriented thinking, identifying and exploring concrete steps that can be taken to address AMR. In the year ahead, we are committed to building on the momentum generated by the Summit. We plan to hold follow-up workshops and engagement sessions to further explore solutions raised during the event, with a focus on translating these insights into decision-making frameworks and practical, on-the-ground actions for industries and other stakeholders.

## SAAFE consortium building

With co-design and partnered research as key guiding principles, SAAFE is focused on delivering real-world outcomes and impact by providing evidence and tools to help mitigate the AMR crisis both locally and globally. Broadening and deepening our engagement with myriad industry partners, academic institutions, and government bodies continues to be a priority as the SAAFE consortium is instrumental in shaping the direction of our research, providing valuable feedback, and helping us to refine our strategies. As part of our efforts, we are working to foster an environment of collaboration and knowledge exchange, bringing together a wide range of experts and practitioners to collectively address the complex challenges posed by AMR. Project by project, SAAFE's One Health connections are building capacity, both within and outside the consortium.

As SAAFE transitions over the coming year from establishment phase to operational maturity, we'll begin issuing targeted research calls, provide new platforms and opportunities for engagement, and support researchers and other stakeholders to acquire and share new skills, techniques, and approaches. With SAAFE's Research Advisory Committee (RAC), Independent Expert Advisory Committee (IEAC), and Policy and Regulatory Advisory Committee (PRAC) now up and running, we'll work with leading experts and community representatives to form SAAFE's First Nations Advisory Committee (FNAC), Youth Advisory Committee (YAC), and Research Leadership and Review Committee (RLIC).

## External engagement and broader systems support

SAAFE values and plays an active role in external research engagement. Over the past year we have co-hosted an international workshop session on AMR in the water cycle funded by the OECD, and co-hosted sessions and workshops with partners such as the national NHMRC Healthy Environments and Lives Network (HEAL Network), the ARDC, and Water Research Australia. These collaborations enable us to share our findings and outputs with broader systems, fostering a wider understanding of AMR and One Health challenges and solutions.

In addition to developing stronger connections and joint activities with SAAFE's IEAC and other international collaborators, we are also working with regional partners and with intergovernmental agencies such as the FAO, UNEP and the OECD. These partnerships will continue to be a vital part of our strategy, as we seek to influence policy and practice on a global scale. As we prepare to host the 8th Environmental Dimensions of Antimicrobial Resistance (EDAR) Conference in Brisbane in August 2026, we are committed to extending and strengthening these international ties, ensuring our work remains relevant and impactful on the global stage, and our education and training program provides first-class opportunities for developing researchers and practitioners.

## Looking forward

The past year has been one of significant progress and I am grateful for the continued support of our partners, stakeholders and research community. I am eager to continue our work and delighted to be part of the growing team contributing to delivering SAAFE's unique Commonwealth research program.

# Project Case Studies



## Advancing diagnostics for monitoring and management of fungicide resistance in grapevine

### Project partners

Wine Australia, South Australian Research and Development Institute, Curtin University

### The industry problem

Powdery mildew, Botrytis bunch rot, and downy mildew are three significant diseases impacting Australian grapevines, affecting both yield and wine quality. Currently, vineyards rely heavily on fungicides for disease control, but this has led to the emergence of fungicide resistance. Resistance detection currently relies on phenotypic testing, which is laborious, slow and restricts the number of samples processed. While some molecular markers have been identified and tested for resistance, rapid, cost-effective, and high-throughput diagnostics are needed to support timely and informed disease management decisions.

### The solution

This project, which has been underway for a year, builds on an earlier program of work funded by Wine Australia, and focuses on developing advanced diagnostic tools for monitoring fungicide resistance in grapevines. The initiative seeks to enhance both in-field and laboratory-based testing protocols to detect resistance markers more effectively. Alongside these diagnostics, the project also establishes sampling protocols to ensure the timing, location, and size of samples are accurate for reliable results. This will give growers confidence their management regimes are working, as the diagnostics confirm the effectiveness of their disease control strategies. The project will continue to refine and undertake phenotyping protocols for

fungicides which mechanisms of resistance are still unknown. Ultimately, these efforts will enable early detection and facilitate effective disease control, supporting growers to optimise their spray programs and manage resistance.

### The impact

With a more comprehensive understanding of fungicide resistance and the potential to process thousands of samples annually (as opposed to hundreds), the project is expected to revolutionise disease management in vineyards. Faster turnaround times, greater sensitivity, and better data on resistance prevalence will allow growers to tailor their disease control strategies, ultimately preserving the quality and quantity of grape yields. This approach not only mitigates crop losses but also extends the effective lifespan of fungicides, and reduces the costs associated with treatment failures and resistance management.

### What's next?

Building on its progress over the past year, the project is gearing up to integrate its high throughput and in-field testing with strategic capability projects in monitoring and data analysis. The success of this initiative will set new standards for disease resistance management, potentially influencing practices across the wine industry and beyond. As the project continues, new assays and sampling protocols will be refined, offering greater precision in the detection and monitoring of fungicide resistance.

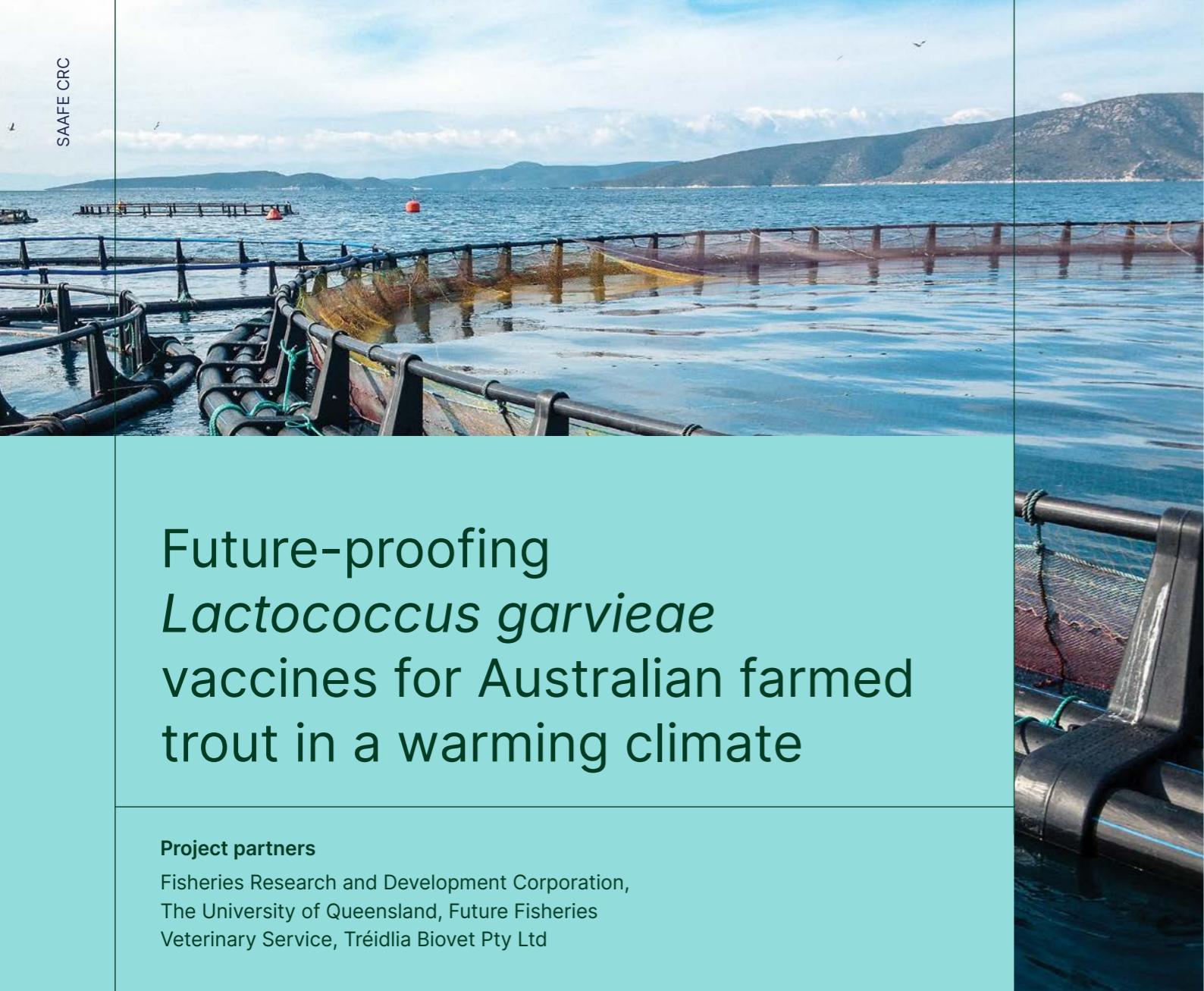
“This project is advancing the use of molecular markers for resistance detection, enabling more accurate monitoring of vineyard health. By optimising low-cost, high-throughput diagnostics, we aim to support effective disease management and sustainable grape production.”

**Dr Mark Sosnowski** Senior Plant Pathologist, South Australian Research and Development Institute

“SAAFE’s work on fungicide resistance provides vital support for the wine industry, particularly as we face increasing challenges with disease pressures and fungicide resistance. This research is crucial for ensuring we meet our vineyard sustainability and production goals.”

**Liz Riley** SAAFE Director and Viticulturist





# Future-proofing *Lactococcus garvieae* vaccines for Australian farmed trout in a warming climate

## Project partners

Fisheries Research and Development Corporation, The University of Queensland, Future Fisheries Veterinary Service, Tréidlia Biovet Pty Ltd

“Over the last few years, *Lactococcus garvieae* has had a huge negative impact on trout production—including many smaller farmers exiting the industry. Financial losses from direct fish mortality and reduced production, as a result of amended husbandry practices, are impacting farm viability.

The pressures brought about on farmers, and farm staff, have been severe as we grapple with the situation. There is a lot of hope and expectation that vaccine production will be the way we resolve this problem. Hopefully, Dr Andy Barnes and his team will create the efficacious vaccine we desperately want to see.”

**Ed Meggitt**  
Farmer, Goulburn River Trout

“Exploration of outbreak epidemiology is continuing to offer refinement and improvements to disease management, including use of the vaccine.”

**Dr Matt Landos**  
Aquatic Vet, Future Fisheries Veterinary Services

“We discovered that the *Lactococcus* we have in Australian trout is quite different from those overseas, highlighting the usefulness of genomics to guide our work. Importantly, the component in the vaccines in Europe, Japan and the USA is not protective in Australia. The good news is that the current vaccines in Australia do provide useful protection in controlled trials, albeit with substantial room for improvement.”

**Prof Andy Barnes**  
Lead Scientist, University of Queensland

## The industry problem

*Lactococcus*, a bacterial disease caused by *Lactococcus garvieae*, occurs during warm summers in Australian trout farms in all states where they are farmed for human consumption, or for restocking recreational fisheries. Lactococcosis has a significant economic impact; for example, in summer 2022-23, two freshwater trout farms affected by the disease experienced estimated losses of biomass, valued at \$140K and \$356K. The primary method of managing *L. garvieae* infections is by treating fish with antibiotics coated onto their feed, under veterinary prescription. Costs associated with antibiotic treatment are estimated to be \$8,000–\$30,000 per year for affected farms. The use of antibiotics means there is a significant risk to the industry that antimicrobial resistance will emerge and impact the effectiveness of treatment.

## The solution

The project will use a combination of genomics, controlled clinical trials and field trials, along with descriptive outbreak epidemiology to optimise vaccination and disease control for farmed trout. It will also provide the necessary tools for ongoing vaccine stewardship beyond the life of the project. As a collaboration between trout farmers through the Fisheries Research and Development Corporation, aquatic veterinarians, vaccine manufacturer Tréidlia Biovet and the University of Queensland (UQ), all stakeholders are fully embedded in the vaccine development process. This transparency of the research and development process provides a sense of project ownership by the end users and will improve adoption of vaccination within the trout industry.

## The impact

The experience of the Atlantic salmon industry suggests that vaccination could reduce antibiotic use by more than 90%. There will also be improvement of farm animal welfare and production through prevention of disease outbreaks, rather than reactive treatment of clinical disease once it has occurred. The outcomes are an improved vaccine with more effective deployment, which will provide better disease management for animal welfare and reduced use of antibiotics to control disease outbreaks over the summer.

## What's next?

In the first 9 months of the project, it has been identified that, as with many of Australia's livestock diseases, the *Lactococcus* bacteria causing disease in trout in Australia are quite different from those found in similarly diseased fish overseas, strengthening the case for local vaccine research, development and manufacture. The first vaccine trials at UQ have indicated that the current available vaccine in Australia is around 50% effective in laboratory disease models, so it is still a good investment to vaccinate stock, but there is room for improvement. The trials also gave critical information on the nature of the protective antigens in the vaccines. In 2025 further rounds of controlled clinical trials will be conducted at UQ, with additional formulations to try to improve the efficacy to >80% following experimental infection.

# Digital transformation to prevent pathogen resistance and improve food security

## Project partners

The University of Queensland,  
Australian Research Data Commons

## The industry problem

AMR is a significant threat to Australian industries (particularly the food and agribusiness, water and waste sectors), potentially impacting agricultural productivity, biosecurity, food and water security and safety, the circular economy, and the international food trade.

While these industries and businesses share similar challenges in managing antimicrobial resistance and use (AMR/U), each has unique circumstances, needs and operational practices, as well as different methods of collecting, using, storing and managing data. This means the AMR/U data may be industry and company specific in the way it is collected and stored which, limits the potential ways the data can be efficiently and effectively used to help manage AMR risks.

## The solution

This project aims to lay the foundation necessary for efficient AMR/U data processing and reporting, which will be vital to safeguarding our food security. This involves developing a governance framework and standardised and controlled terms and vocabularies to enhance the ability of industries to collect, integrate, and utilise AMR/U data.

The following are the key components of the project.

**Data Landscape:** A comprehensive review of the structure of these sectors, current data, and its flow from data generation to regulatory/operational destination. The business analysis of the current AMR/U data systems will provide a clear understanding of the existing data environment.

**Data Code:** A co-designed governance framework in partnership with stakeholders that provides policy, terms and conditions around AMR/U data. Clear policy and protocols will improve data quality, reliability, and foster collaboration between stakeholders. The Code provides guidance to industry members on actions they can take to ensure their AMR/U data is protected when collected for research or production purposes. It will also outline guidelines for data collection and management to ensure consistent data quality across industries.

**Data standardisation / Data dictionary:** Enabling users to collect, store or report data in a common format is the first step to improve the ability for stakeholders to share and collate data sets.

Shared vocabularies and controlled terms for AMR/U are key to facilitating individuals and industries to work together and provide opportunities to further mitigate AMR risks within and across sector data integration.

## The impact

Industry partners will benefit from the standards and compatible data framework, allowing them to generate and utilise data that improves decision making for AMR/U prevention and mitigation.

The Data Code will create the foundation for consistent data governance and accessibility, fostering trust and assurance to enable stakeholders to collaborate within and across sectors.

The project outputs will provide the foundations for industries to develop comprehensive AMR reporting and surveillance systems which will improve the risk assessment, contingency planning, and strengthen industry preparedness for AMR. Data standardisation and consistent formats will enable the development of platforms in the future that will be able to house AMR/U data ingested from multiple sources and sectors. Having compatible data will lay the groundwork to develop analytical and predictive models to help industry members make decisions regarding AMR risks.

## What's next?

Partner workshops and survey tools to develop the SAAFE Data Code and SAAFE Data Landscapes are being organised.

“The project aims to lay the foundations for building data assets that will equip the water sector, horticulture, and agribusiness with the tools they need to make data driven and context aware decisions —protecting Australia’s future against AMR.”

**Noorul Amin**

SAAFE Postdoctoral Research Fellow

# Current Projects

## Development of alternative antimicrobial agents for the treatment of skin conditions to improve animal health and productivity

### Project partners

Calix Ltd and University of South Australia

Animals raised in intensive livestock systems may experience higher rates of disease. Good management practices to prevent disease and the prudent use of antibiotics to treat disease are required to ensure a high standard of animal welfare is maintained. However, the growing concern regarding AMR requires continued efforts to reduce or replace antibiotic use where possible. New antimicrobial alternatives being developed through this Calix and University of South Australia project aims to provide producers with alternatives to antibiotics to manage disease. The project involves evaluating the safety and antimicrobial efficacy of nanostructured magnesium oxide and derivatives and developing products to improve animal health and productivity in intensive livestock systems.

Screening of more than 50 variants of compounds took place in 2024. Two compounds were identified as having improved antimicrobial efficacy compared to relevant controls. Key findings of the project were presented at the Australasian Wound and Tissue Repair Society and Matrix Biology Society for Australia and New Zealand meeting, while a final summary of the compounds' antimicrobial activity will be submitted early in 2025.



The project aims to provide scientifically validated solutions as alternatives to antibiotics and assist animal industries to mitigate AMR risks.

## Improved management of apple scab to reduce pesticide usage and fungicide resistance in Australian orchards

### Project partners

The Department of Primary Industries and Regional Development (WA) and Curtin University

Apple scab, caused by the fungus *Venturia Inaequalis*, is one of the world's most commercially significant apple diseases and a major cause of concern for Australian apple growers.

Research is underway to improve the productivity and profitability of apple orchards affected by this serious disease.

This four-year project lead by DPIRD (WA) in collaboration with Curtin University's Centre for Crop Disease Management (CCDM) will use DNA analysis and new monitoring tools to help Australian apple producers maintain world's best practice by minimising pesticide applications to manage apple scab in their orchards and develop orchard management strategies to reduce fungicide resistance. The research will also help plant breeders identify genetic selections for future tolerant apple varieties.

The prevalence of apple scab and fungicide resistance across Australia is being assessed and verified after sampling packs and a sampling app were developed so apple growers in every state can contribute to the research by providing samples of apple scab infected material for analysis.

Research progress will be shared with growers and industry in future field days and workshops.

## Comprehensive monitoring of AMR in Australia's drinking, waste and recreational waters

### Project partners

The Walter and Eliza Hall Institute of Medical Research, Water Research Australia

This foundational Walter and Eliza Hall Institute and Water Research Australia monitoring project will, in collaboration with the Data Foundations and Risk Assessment project teams, develop and implement tools to identify, quantify and track AMR genes and organisms through the water cycle, including drinking, waste and recreational waters.

The program will collate and develop robust methods to identify AMR genes and organisms, support broad surveillance, and monitor site, geographical, seasonal and event-based variations in AMR levels. It will also provide data to support quantitative microbial risk assessments in water and wastewater, and to assess the capacity and cost-effectiveness of changes to water management to reduce AMR transmission or risk.





## Risk assessment of AMR in the vegetable industry

### Project partners

Hort Innovation Australia, University of South Australia

While antimicrobial and pesticide use is regulated, the links between use and resistance in agricultural settings are not fully understood. The potential overuse or sub-optimal use of chemicals in agriculture have implications for disease, health outcomes, and the environment.

This project with Hort Innovation will investigate the risks and impacts of AMR in the Australian vegetable supply chain, from a production, food security and safety perspective. By analysing practices related to seed, water, soil, pest, and product management, the project will develop risk assessments tailored to levy vegetables, considering various production inputs, growing conditions, environmental factors, and post-harvest management.

The findings will provide valuable insights for Australian vegetable producers, highlighting areas of concern and for potential improvement, and aligning with the Vegetable Strategic Investment Plan 2022-2026 to foster informed practices in the industry.

## Bayesian Network models for effective antimicrobial resistance management in water systems through various customer uses

### Project partners

University of South Australia and Water Research Australia

This project with University of South Australia and Water Research Australia will work in collaboration with the EPA risk project. It will use qualitative and quantitative information to evaluate management options and economic consequences, as well as provide information for best management practices and critical control points in the agribusiness, food and water sectors. The project aims to establish a national community of experts and practitioners who can support SAAFE projects and clarify where and how to cost effectively manage environmental AMR.

## SeaBOS AMR Keystone Project

### Project partners

SeaBOS, University of South Australia, The University of Queensland, The Beijer Institute for Ecological Economics, the Stockholm Resilience Centre, Stockholm University and Chulalongkorn University of Bangkok

Major global seafood producers are increasingly concerned about the risks of AMR in aquaculture. SeaBOS, a consortium of the world's largest seafood companies, is committed to demonstrating and promoting responsible AMR management in seafood production to mitigate risks to human, animal, and environmental health.

This project represents a collaboration between SAAFE, SeaBOS, University of South Australia, the University of Queensland, the Beijer Institute for Ecological Economics, the Stockholm Resilience Centre, Stockholm University, and Chulalongkorn University in Bangkok. The objective is to develop a strategic sampling protocol and methodology tailored to the shrimp industry. This pilot study aims to showcase the ability to detect and assess AMR risks, laying the foundation for a larger industry-funded initiative.

Key achievements to date for the project include the successful development of the sampling protocols and methodologies for shrimp farms which have been successfully standardised and validated through collaboration with all partners. Additionally, the analyses of shrimp hepatopancreas samples have identified key antibiotic-resistant genes (ARGs) and highlighted variations across farms, providing valuable insights into potential sources of resistance.

Work is continuing to extend the analysis of ARGs in hepatopancreas samples utilising advanced sequencing techniques to better understand ARG diversity and correlations with farming practices. While shotgun metagenomic sequencing is being prepared to investigate the full microbial diversity within hepatopancreas tissues, focusing on microbial resistance mechanisms and their ecological roles.

The project will deliver critical data to inform strategies for mitigating AMR in shrimp farming, further strengthening the foundation for sustainable aquaculture practices.



## Applying quantitative microbial risk assessment, epidemiological modelling, and Bayesian Network models to facilitate AMR management in wastewater services, water reuse and biosolids/composts usage

### Project partners

University of South Australia, Environment Protection Authority (SA and Vic), SA Health, The University of Queensland, University of Technology Sydney

Managing environmental AMR is a complex One Health challenge with broad implications and cross-jurisdictional needs.

Therefore, this EPA risk project will address this complexity by identifying system-wide (water and agricultural) AMR hot-spots and, if necessary, recommend management options for the River Torrens, Adelaide's coastal beaches and associated water reuse areas.

This project is supported by two postdoctoral researchers and a Research Fellow. The project builds on collaborative research by University of South Australia and SA Water on treatment effectiveness, sewage leachate, stormwater impact, and growth of bacteria with antibiotic-resistant genes (ARGs) in various sewage, water, soil, sediment, biosolids and manure environments.

# Our Major Partners



## Calix Limited

Calix Limited is an ASX-listed environmental technology company solving global challenges in industrial decarbonisation and sustainability. Calix's patented core platform technology delivers efficient indirect heating of minerals to enable electrification of industries, efficient capture of unavoidable CO<sub>2</sub> emissions, and green industrial processing solutions.

Calix's flash heating approach can also produce unique nanoporous materials with enhanced chemical and/or bioactivity for a range of industrial and environmental applications. Notable products include magnesium hydroxide [Mg(OH)<sub>2</sub>] slurries, used in water and wastewater treatment, aquaculture, and as bioactive agents in agriculture. With demonstrated effectiveness against pathogens and minimal toxicity to beneficial organisms, Calix is developing safe, sustainable and effective agricultural solutions for crop protection and AMR prevention.

Through partnering with SAAFE, Calix aims to collaborate with experts across water treatment, agriculture, horticulture, and veterinary sciences to trial and optimize its bioactive materials. This includes testing and refining modes of action and developing new materials. By combining its non-toxic bioactive materials with existing biocides, Calix seeks to create solutions that slow resistance development. SAAFE provides a strategic opportunity for Calix to advance applications of its core technology across industries impacted by AMR, leveraging a trans-disciplinary research community to bring innovative, effective and sustainable products to market.



## Curtin University

Curtin University, Western Australia's largest and a globally top-ranked institution, stands in the top one percent of universities worldwide. Renowned for its strong industry connections, Curtin excels in balancing demand-driven research that addresses societal challenges with pioneering researcher-led exploration in fields such as agriculture, mining, environmental monitoring, health sciences, and computational science. Highlighting its ongoing leadership in collaborative innovation, the University hosts key initiatives like the newly launched GreenTech Hub—the first ever Trailblazer program for critical minerals—the Western Australia Data Science Innovation Hub (WADSIH) and has active involvement in 13 Cooperative Research Centres (CRCs).

In partnership with SAAFE, Curtin contributes multidisciplinary expertise across critical sectors. The Fungicide Resistance Group at the Centre for Crop and Disease Management aims to reduce reliance on prophylactic fungicides in horticulture, safeguarding long-term fungicide effectiveness. Complementing this, Curtin's water research monitors chemical residues and disinfection byproducts in water systems, supporting the management of AMR risks and developing treatment solutions.

Curtin's collaboration with SAAFE aligns with its strategic priorities in agribusiness, water quality, and sustainable aquatic food production through advanced aquaculture systems. By integrating expertise in fungicide resistance, aquaculture, and water quality, Curtin strengthens national partnerships and reinforces its commitment to addressing complex challenges at the intersection of food production, environmental health, and public well-being.



## The Department of Primary Industries and Regional Development (WA)

The Department of Primary Industries and Regional Development Western Australia (DPIRD) is dedicated to protecting the sustainability of natural resources and driving economic growth, job creation, and regional development of primary industries in Western Australia. Its extensive portfolio includes Research, Development, and Extension activities across agriculture and aquaculture industries, emphasising innovative approaches to support the future of the state's primary industries.

DPIRD plays a key role in SAAFE with a horticulture project that targets apple and pear scab pathogens, collaborating with Curtin University to study fungicide resistance and pathogen diversity across Australian apple growing regions. This work, based at DPIRD's Manjimup Horticulture Research Institute, with the Department's apple breeding program, contributes to the establishment of national culture collections for long-term research into developing genetic resistance to apple scab in future varieties, reducing the need for fungicide application in commercial crops.

DPIRD's work is vital in maintaining WA and Australia's international reputation as a producer of clean, safe, and premium food, contributing more than \$10 billion annually to WA's economy. By finding innovative solutions to fungicide resistance, DPIRD supports sustainable production systems, enabling WA's agricultural and aquaculture industries to meet consumer expectations while expanding domestic and export markets and competitiveness.



## Fisheries Research and Development Corporation

The Fisheries Research and Development Corporation (FRDC) is a statutory authority within the Australian Government's portfolio of Agriculture, Fisheries, and Forestry. Established to plan and invest in fisheries and aquaculture research, development, and extension activities, FRDC's purpose is to invest in people and innovation to ensure healthy aquatic environments for thriving fishing and aquaculture. By collaborating with fishing and aquaculture stakeholders, research institutions, and government agencies, FRDC addresses key challenges and opportunities, ensuring the continued prosperity and environmental stewardship of the nation's aquatic resources.

Australian aquaculture is globally recognised for its minimal antibiotic use and rigorous biosecurity measures. FRDC supports initiatives to ensure AMR remains well managed and the industry's reputation is upheld. Through its investment in SAAFE, FRDC promotes research to safeguard the effectiveness of frontline antibiotics, protect Australia's trading position, and uphold the health and resilience of aquatic environments. These efforts reflect FRDC's proactive commitment to preserving the sustainability and reputation of Australian seafood sectors.



## MGI Tech

MGI, a global leader in life science innovation, operates in more than 100 countries, providing real-time, multi-omics, and the full spectrum of digital equipment and systems spanning sample-to-data workflows, and empowering precision medicine, agriculture, healthcare and various other industries. MGI is one of only a few companies capable of independently developing and mass-producing clinical-grade gene sequencers with varying throughput capacities.

Through its partnership with SAAFE, MGI Australia contributes cutting-edge technologies including its proprietary DNBSEQ sequencing platforms, automated laboratory systems, and bioinformatics solutions to enable precise detection of antimicrobial-resistant species, novel microorganisms, and microbiome species that impact agricultural productivity. By providing end-to-end workflows, scalable processes, and streamlined automation, MGI enhances SAAFE's ability to monitor and address AMR in various ecosystems, such as water, plants, and livestock.

MGI's global reach and commitment to research and development align with SAAFE's goals to develop practical solutions for AMR. MGI's advanced sequencing platforms, technical expertise, and R&D capabilities will facilitate real-time, efficient, scalable workflows for environmental and agricultural AMR monitoring.

The outcomes from this partnership have potential global applications, with MGI well positioned to support the application of solutions developed with SAAFE through its extensive international presence.



## ProAgni

ProAgni is an Australian Ag Bioscience company dedicated to developing innovative solutions to reduce the environmental impact of food production without increasing costs. Founded in 2016 by farmers and scientists, ProAgni tackles critical sustainability issues in the meat and dairy industries, including the overuse of antibiotics in animal production, a major contributor to AMR and methane emissions. The company's flagship innovation, ProTect®, offers antibiotic and ionophore-free livestock feed additives that enhance productivity while lowering emissions, delivering economic, social, and environmental benefits. ProAgni is also advancing probiotic solutions to further promote sustainable, clean production practices.

Through its partnership with SAAFE, ProAgni contributes expertise and support across all research pillars, focusing on developing alternatives to antibiotics, optimising nutrition in animal production, and promoting industry-wide best practices through data, traceability, and guidelines. Drawing from its on-farm experience and science-backed innovations, ProAgni's alignment with SAAFE's goals is reflected in its commitment to commercialising impactful science while upholding social and environmental responsibility.

ProAgni contributes to SAAFE's programs by sharing resources such as trial sites, animals, infrastructure, and a robust network of collaborators and producer partners to facilitate research and communicate findings. Through involvement with SAAFE, ProAgni seeks to accelerate the adoption of transformative innovations in animal production, mitigating AMR risks and advancing its commitment to global sustainability goals and the UN Sustainable Development Goals.



## University of South Australia

The University of South Australia (UniSA) is home to the Future Industries Institute (FII), a hub for more than 200 researchers working across STEM disciplines in a dynamic, interdisciplinary environment. Based at Mawson Lakes, FII houses more than \$80 million of specialised infrastructure, including state-of-the-art laboratories and equipment in purpose-built facilities equipped for advanced molecular microbiology, micropollutant analytical chemistry, and imaging techniques such as super-resolution confocal microscopy and electron microscopy. Researchers across UniSA, including those from the Ehrenberg Bass Institute for Marketing Science, Industrial AI Research Centre, and the Agricultural Machinery Research and Design Centre, contribute additional expertise.

UniSA's commitment to industry-partnered research excellence is demonstrated through its "pathway to impact" model, which ensures research drives real-world industry outcomes. The university has a reputation for excellence in environmental sciences and engineering, as well as its approach to achieving impactful research.

As a SAAFE major partner, UniSA's contributions span all research programs, leveraging

its strengths in environmental monitoring, microbiology, precision agriculture, and wastewater treatment to inform the Monitoring and Solutions programs. UniSA's expertise in analytical and pharmaceutical chemistry enhances AMR mechanisms research, while the Ehrenberg Bass Institute for Marketing Science analyses international market trends and end-user attitudes to support analytics research. The Industrial AI Research Centre contributes data-driven insights through artificial intelligence and machine learning, while experts in economics, behavioural change, and communication from UniSA's broader academic community add value across multiple programs. Contributions also include expertise in consumer behaviour, antibacterial coatings, and AMR communication, led by prominent researchers across diverse fields.

This partnership aligns with UniSA's strategic focus on addressing global challenges, with AMR recognised as a critical health and economic issue requiring One Health solutions. By integrating expertise across disciplines and collaborating with SAAFE, UniSA aims to deliver impactful, internationally significant research outcomes that address AMR across agricultural, environmental, and health sectors.



## The University of Queensland

The University of Queensland (UQ) is a globally renowned institution, consistently ranked among the world's top 50 universities. With an interdisciplinary research community of more than 2,500 researchers across its faculties, institutes, and centres, UQ delivers impactful solutions addressing global challenges. UQ leads in agriculture, environmental studies, and food science, consistently ranking 1st in Australia in these fields. Its expertise spans cutting-edge research in health, technology, and the environment, contributing to UQ's mission to create knowledge leadership for a better world.

Through its partnership with SAAFE, UQ contributes expertise in AMR research across animal industries, aquaculture, horticulture, and environmental monitoring. UQ researchers lead SAAFE'S Solutions Program (A/Prof. Andrew Barnes) and Analytics Program (A/Prof. Ricardo Soares Magalhães), collaborating with industry and government partners to develop and deliver impactful projects. UQ leverages its Digital Health research network, Bribie Island Research Centre, and partnerships with Queensland Health and the Queensland Alliance for Environmental Health Sciences to address AMR challenges with advanced diagnostics, big data integration, and sustainable solutions.

The partnership with SAAFE fosters transdisciplinary collaborations, industry placements, and global engagement for researchers and students while prioritising leadership in AMR research, driving innovation in agriculture, aquaculture, and water management with the unified goal to address critical global challenges.



## University of Technology Sydney

The University of Technology Sydney (UTS) brings together diverse expertise through its Australian Institute for Microbiology and Infection (AIMI) and the Centre for Technology in Water and Wastewater (CTWW), fostering interdisciplinary collaboration to tackle global challenges. AIMI is a leading research institute dedicated to understanding how microbes grow, adapt, and survive, driving advancements in areas such as AMR, food safety, and infectious disease. It integrates discovery-based research with applied solutions, addressing pressing microbial challenges through innovative and multidisciplinary approaches.

CTWW is at the forefront of developing cutting-edge technologies for water and wastewater treatment, focusing on ensuring water security through reuse and desalination, recovering valuable resources, and reducing the carbon footprint of water-intensive processes. Together, these centres link microbial science with sustainable environmental solutions, creating impactful research that addresses critical global health, environmental, and resource management issues.

As a partner to SAAFE, UTS plays a pivotal role in all three research programs, leveraging its expertise in AMR monitoring, analytics, and solutions by contributing cutting-edge research in pathogen identification, resistance evolution, and novel interventions for mitigating AMR risks. The University provides significant in-kind support and ensures access to state-of-the-art facilities, fostering long-term collaborative research to address AMR challenges on a global scale.



## The University of Western Australia

The University of Western Australia (UWA), a member of the prestigious Group of Eight, is a research-intensive institution dedicated to creating innovative solutions and delivering better outcomes for communities in Western Australia, Australia and globally. It holds exceptional standing in agriculture, ranking 9th globally in Agricultural Sciences and 1st in Australia (ARWU 2024). UWA's agricultural research is consistently recognised for its excellence, with the highest national rankings in research quality and impact, underscoring its relevance to industry and end-users.

Through its partnership with SAAFE, UWA contributes expertise across diverse fields, including animal production systems, molecular ecology, soil science, and agricultural economics. This encompasses capabilities in biosolids management, soil remediation, genetic analysis of soil microorganisms, bioeconomic modelling, adoption research and environmental valuation. UWA also provides access to state-of-the-art laboratory facilities and specialised equipment such as soil incubation setups, and genome sequencing tools. Additionally, the University fosters talent development through postgraduate training and undergraduate internships tied to the project's objectives.

Aligned with Australia's priorities in industry, education, and research, UWA sees SAAFE as pivotal to advancing the sustainability and resilience of the food and agribusiness sectors. By driving innovation and developing practical solutions, UWA aims to contribute to transformative outcomes that benefit industries and protect vital ecosystems, reinforcing its commitment to impactful partnerships.



## Water Research Australia

Water Research Australia (WaterRA) is a member-driven, not-for-profit organisation committed to advancing water science to safeguard the sustainability and security of our water resources. As a collaborative hub, WaterRA brings together research groups, regulators, and industry partners to tackle current and emerging water challenges. With a mission to promote healthy communities, ecosystems, and a sustainable planet, WaterRA conducts targeted research to close knowledge gaps, inform decision-making, and strengthen the capacity of the national water industry.

Through its involvement with SAAFE, WaterRA leads a Water Industry Consortium (WIC) to tackle AMR as a critical water quality issue impacting environmental and human health. Working alongside the WIC members who represent the Australian water sector, WaterRA focuses on supporting and shaping research to better understand AMR presence and impact in wastewater, stormwater, and recycled water systems.

WaterRA also acts as a knowledge transfer hub, facilitating collaboration between the water and agricultural sectors while supporting student research through industry scholarships. With access to unparalleled expertise and facilities, including wastewater treatment plants, laboratories, and catchment areas, WaterRA ensures SAAFE benefits from strong industry engagement and practical solutions to AMR challenges.



## Walter and Eliza Hall Institute of Medical Research

The Walter and Eliza Hall Institute of Medical Research (WEHI) is where the world's brightest minds collaborate and innovate to make life-changing scientific discoveries that help people live healthier for longer. The medical research institute has been serving the community for more than 100 years, making transformative discoveries in cancers, infectious and immune diseases, developmental disorders, and healthy ageing. WEHI brings together diverse and creative people with different experience and expertise to solve some of the world's most complex health problems. With partners across science, health, government, industry, and philanthropy, WEHI is committed to long-term discovery, collaboration, and translation.

WEHI leverages its team of leading researchers to drive the SAAFE Monitoring Program, led by Professor Aaron Jex. The program focuses on developing and implementing diagnostic tools to identify AMR pathogens and resistance markers in environmental and animal samples. The team includes researchers specialising in sequencing, CRISPR-based diagnostics, epidemiology, and clinical microbiology, with expertise in infectious disease surveillance, molecular diagnostics, metagenomics, and bioinformatics—ensuring cutting-edge approaches to AMR challenges.

WEHI's scientists develop diagnostic tools, integrate monitoring systems with public health frameworks, and advance point-of-care technologies. This work aligns with WEHI's mission to tackle AMR as a critical global health challenge, integrating a One-Health approach to link clinical, agricultural, veterinary, and environmental sectors. Through this collaboration, WEHI aims to advance AMR research, enhance public health strategies, and reinforce Australia's leadership in addressing this pressing issue.

## Wine Australia

## Wine Australia

Wine Australia is funded through grape-grower, winemaker and exporter levies and user-pays charges, with matching funds from the Australian Government for research and innovation. Established under the Wine Australia Act 2013, it is a Commonwealth Government statutory authority.

Wine Australia invests in Research, Innovation and Adoption; Market Development in international and domestic markets; and Regulatory Services. Among its Research, Innovation, and Adoption priorities, key focus areas are excellence in viticulture, sustainable practices, and the improved management of grapevine fungal diseases—all vital for securing the sector's long-term success.

In partnering with SAAFE, Wine Australia accesses world-leading expertise in AMR research to address the challenge of fungicide resistance in vineyards. Building on prior research conducted with partners such as the Australian Wine Research Institute and the South Australia Research and Development Institute, Wine Australia underpins efforts to develop and implement practical solutions for managing foliar diseases.

This partnership addresses a critical need for the grape and wine industry, as resistance to key fungicides is widespread, undermining disease control efforts. By fostering collaboration between AMR experts and viticultural researchers, the partnership advances shared goals, ensuring sustainable practices and maintaining Australia's competitive edge in the global wine market.



# Education and Training Program

## Year in Review

### In 2024 SAAFE launched its Education and Training Program.

This is an ambitious initiative that aims to develop the next generation of forward-thinking researchers, industry and government leaders who will implement AMR solutions and best practice strategies for mitigation and management.

The program includes support for formal research training and practitioner focused development, and resources designed to provide participants with the skills, knowledge, and experience they need to excel as One Health and AMR leaders.

## Building Program Foundations

A significant focus for the year was creating program infrastructure and resources to ensure the Education and Training Program achieves its ambition in alignment with SAAFE's strategic goals.

### Key program management achievements included:

- Commencement of Education and Training Manager
- Establishment of Education and Training Advisory Committee, with a membership that spans industry, researcher and research education and development perspectives.
- Launch of the SAAFE Scholars Program, including:
  - Calls for PhD proposals
  - Identification of first SAAFE Scholars
  - Development of Scholar participation framework and induction resources, program evaluation plan and contracting model.

# SAAFE Scholars: Investing in Research Training

The year began with the announcement of the SAAFE Scholars Program, designed to build capacity in One Health and AMR research and facilitate industry-research engagement through co-designed PhD projects.

A significant early milestone was our first call for project proposals, which addressed issues spanning all SAAFE sectors. Later proposal calls have seen greater engagement from SAAFE industry and government partners. We are now working with partners to contract these projects and support student recruitment efforts. We are encouraged by the volume and quality of submissions received, which reflects the strong enthusiasm for innovation and collaboration. The selected projects will form the foundation of the first scholar cohort and are anticipated to provide valuable insights and contribute to the broader knowledge base across multiple industry sectors to support informed decision-making and policy development.

Our first Scholars have been identified, and we look forward to introducing them to the SAAFE community in 2025. The coming year will also see the introduction of additional initiatives to drive targeted recruitment through our research partners, and exploration of opportunities to support career capability building within our industry and regulatory partners.



Project title	Project partners
The genetic architecture of fungicide resistance in global populations of the grape pathogen <i>Erysiphe necator</i>	Wine Australia, Curtin University
One Health Approach to Antimicrobial Resistance: Persistence of antibiotics in wastewater, recycled water and receiving environments	Water Research Australia, WaterCorp, Curtin University
Development of QMRA methods for Antimicrobial Resistance	Environment Protection Authority (SA), University of South Australia
Horizontal gene transfer in waterborne bacteria with their protozoan hosts	Environment Protection Authority (SA), University of South Australia
Assessment of Antimicrobial Resistance hotspots and opportunities for mitigation in the urban water cycle	Water Research Australia, The University of Queensland
Developing the tools required for sampling and analysis of chemicals which produce AMR selection pressure across various environmental compartments	Water Research Australia, The University of Queensland
An exploration of microbial gene flow in fish farms	Fisheries Research and Development Corporation, The University of Queensland
Quantifying the cross-sectoral dynamics of Antimicrobial Resistance transfer across the dairy, water, and horticulture nexus	The University of Queensland
SAAFE CRC digital twins for risk assessment modelling	The University of Queensland
Nanoparticle enhanced metagenomics for monitoring of Antimicrobial Resistance in environmental samples	MGI, The University of Queensland
Antimicrobial resistant <i>Escherichia coli</i> in wastewater: A genomic analysis across the treatment train	Sydney Water, University of Technology Sydney
Ozone nanobubbles to control microbial regrowth and Antimicrobial Resistance	Water Research Australia, South East Water, Sydney Water, Sydney Olympic Park Authority, University of Technology Sydney
Fate and behaviour of Antimicrobial Resistance genes during anaerobic digestion and composting of organic waste	Water Research Australia, South East Water, Sydney Olympic Park Authority, University of Technology Sydney
Exploring Antimicrobial Resistance in conventional and biological farming systems	Troforte Innovations, The University of Western Australia

## Postdoctoral Fellows: Advancing Research Capacity

Another significant achievement was the establishment of the SAAFE Foundation Fellow positions across our partner universities.

As part of our commitment to these major partners, Foundation Fellow positions are designed to develop and provide continuity of key research capacity in priority areas for each partner. These positions will contribute to the career development of early and mid-career researchers and build research capacity within SAAFE's research partners.

We are pleased to report that four of the six Foundation Fellows have commenced their positions, with the remaining appointments to be confirmed during 2025.

These researchers are already playing a critical role in advancing ongoing projects, providing fresh perspectives, and contributing to the development of innovative solutions to sector challenges.



**Dr Noorul Amin**  
The University of Queensland

“AMR is big data problem. Every prescription, every test result, every bacterial genome is a piece of a complex puzzle.”

Noorul Amin is a data analytics researcher with a passion for applying advanced computational and statistical techniques to tackle global challenges. With a background in mining and analysing biological data, Noorul has dedicated his work to integrating data analytics with AMR in agribusiness, food production, and environmental systems. His innovative research uses machine learning to harness new and existing datasets, creating decision-making tools to address the growing threat of AMR.

Collaborating with SAAFE aligns perfectly with Noorul's multidisciplinary approach to research. SAAFE's vision of tackling AMR through a One-Health lens resonates with his goal to develop practical solutions for sustainable food systems and environmental resilience. By combining his expertise in data analytics and machine learning, Noorul hopes to contribute to actionable strategies that address the complexities of AMR across sectors.



**Claire Hayward**  
University of South Australia

“Working with SAAFE is an exciting opportunity to bridge research and application, contributing to outcomes that can make a tangible difference in public health and environmental management.”

Claire Hayward's research is rooted in tackling AMR risks and improving public health outcomes. With a recently completed PhD focused on biofilms and the role of plumbing systems in healthcare-associated infections, she has conducted large-scale surveillance of pathogens in drinking water systems, explored the impact of plumbing materials on contamination, and studied bioaerosol generation from handwashing basins. Claire's background as a qualified Environmental Health Officer ensures her research has real-world applications, bridging science and industry to deliver practical solutions.

Currently, Claire is working with SAAFE to develop a Bayesian Network model that supports the management of AMR risks. This innovative tool identifies critical control points in water systems and food production, providing health officials and policymakers with actionable insights. Her research is particularly focused on high-risk environments like areas with agricultural runoff or inadequate waste management, with the goal of delivering strategies to mitigate AMR's spread across sectors.



**Dr Veronica Jarocki**  
University of  
Technology Sydney

“If you don’t understand where the problems are, you can’t begin to address them.”

Veronica Jarocki’s work focuses on microbial genomics, with a background in proteomics and subunit vaccine development. Having worked as a registered nurse for more than 11 years while subsequently pursuing biological and biomedical sciences, Veronica brings a unique lens to the growing issue of AMR.

Through her research, Veronica is keenly focused on identifying AMR hotspots – equipping us with robust information about where resistance occurs and the rate at which it develops. She understands that a pivotal aspect of tackling AMR head on is first understanding where the issue is most concentrated.

Veronica was first exposed to the threats posed by AMR during her PhD. While identifying potential vaccine candidates against a pig pathogen, she became acutely cognisant of AMR’s growing health and economic burden in the animal, environmental and human sectors. Eager to get a better grasp on what is an incredibly complex issue, she subsequently moved into genomics.

Currently with SAAFE, Veronica is working closely with our industry partners to develop PhD programs focused on broadening our understanding of AMR transmission dynamics.



**Dr Zakaria Solaiman**  
The University of  
Western Australia

“AMR is not just a clinical issue—it’s an environmental and agricultural challenge we must tackle together through sustainable practices.”

Zakaria Solaiman is an esteemed soil microbial ecologist with extensive research and teaching experience in Australia, Bangladesh, and Japan. He earned his PhD in Agriculture, specialising in soil health, microbial ecology, and crop production, and has served as an Associate Professor at The University of Western Australia (UWA) since 2000. His research focuses on soil microbial molecular ecology, carbon sequestration, biochar and compost application, symbiosis, and nutrient cycling. In 2024, he was honored with the Australia New Zealand Biochar Industry Group (ANZBIG) Forum Best Researcher Award, recognizing his pioneering contributions to biochar research.

Solaiman is developing projects focused on agricultural systems solutions, which aim to develop sustainable agricultural practices for managing AMR. This work aligns with his passion for advancing environmentally sound solutions that balance agricultural productivity with ecosystem health.

By addressing AMR at its roots in soil and agriculture, Solaiman’s work highlights the interconnectedness of human, animal, and environmental health.



## Looking Ahead

As we look ahead to the coming year, we are excited about the continued growth of the Education and Training Program.

The foundation laid over the past year has set the stage for a dynamic and impactful program, one that will help shape the future of the sector by developing skilled professionals and advancing critical research.

We aim to further accelerate scholar recruitment and build engagement between our Scholars and Foundation Fellows throughout the year, with plans underway to bring the cohort together later in 2025.

With the ongoing support of our partners and stakeholders, we are confident the Education and Training Program will continue to evolve and contribute to a brighter future for the industry.

# AMR Solutions Summit 2024

SAAFEs 2024 From AMR Sources to Solutions Summit saw more than 200 members of our community (across 11 sectors and including more than 40 government representatives) come together to share insights, generate knowledge and understand potential actions that can be taken, and tools that can be used to manage and mitigate AMR in a range of contexts.

The opening session invited participants to rise to the challenge of AMR complexity. Keynote speakers including Dr Jorge Pinto Ferreira from the United Nations Food and Agriculture Organisation, Dr Sarah Britton, Director of One Health at the Australian Centre for Disease Control, and Cara Peek, co-founder of The Cultural Intelligence Project, provided an overview of the importance of AMR, the changing global landscape, the need for SAAFE and other cooperative actors to address AMR at a national level, and the imperative to work together in new and coordinated ways across industries and sectors, both internationally and nationally, and with cultural awareness and sensitivity.

To help facilitate the collaboration, which is integral to SAAFEs approach to tackling AMR, and to show the importance of cross-sectoral, national and international connections when addressing AMR, the Summit featured a Sector Experts AMR snapshot session. Experts across the animal and feed industries, plant industries, human health, fisheries and aquaculture and water sector shared key insights, priorities and achievements in the fight against AMR and discussed the current and potential scale of their sectors AMR challenge, as well as their priorities and hopes for future action.



“The Summit was a fantastic opportunity to connect with individuals working in the AMR space within the wine industry, as well as to learn from other sectors about the key challenges they face and the innovative solutions they are developing. It was a powerful reminder of how interconnected we all are, and that only by working together can we safeguard the health and safety of our people, communities, agriculture, and industries.”

**Robyn Dixon**  
R&I Program Manager at Wine Australia

“For me personally, it’s been fantastic, it’s been exciting and invigorating talking to people who understand system dynamics. Many of the systems I’ve worked in have been very constrained in the way they think about the dynamics of the work that we do, so having a conversation with people who understand that is really enlightening.”

**Professor Keith McNeil**  
Commissioner of the Commission on Excellence and Innovation

“The Summit’s been fantastic. The key takeaways are the ability to be able to do the breakout sessions, working together, and hearing from other people from a broad perspective - it has been valuable.”

**Dr Sarah Britton**  
Director of One Health at The Interim Australian Centre for Disease Control



A highlight of the Summit was the AMR Solutions Workshop where participants identified potential for future action and collaboration across policy, research and industry sectors.

This major cross-sectoral workshop comprised sector-specific and cross-sectoral activities, supporting participants to share and generate knowledge, and identify potential for and barriers to action and collaboration (within and between policy/ research/ industry sectors). Discussions held during the workshop are informing the development of cross-sector resources to help stakeholders meet the recommendations of Australia's OHMAP.

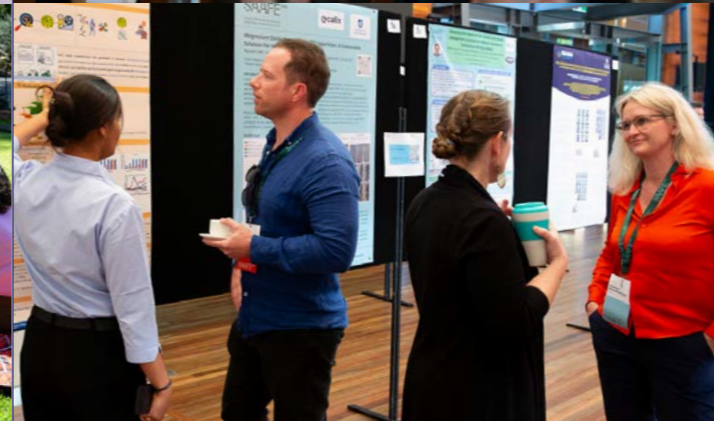
Over dinner, Assoc Prof Priscilla Wehi, co-Director of the New Zealand Te Pnaha Matatini Centre of Excellence for Complex Systems, took guests on a journey into the complex system of Antarctica, sharing fascinating insights into how transdisciplinary research, ethics, and sustainability can inform thinking and actions to mitigate critical global issues.

Day two of the Summit focused on the complexity of One Health, taking participants further into systems thinking approaches, challenges, and benefits. Topics included extreme weather events impacts on food, soil, water security and safety, with speakers sharing lived experience of these impacts on AMR management. Further sessions covered the trade-offs involved in identifying and implementing sustainable One Health approaches and the potential for data and governance structures to drive cross-sectoral approaches to AMR stewardship.

Feedback from Summit attendees highlighted how incredibly valuable it was hearing different AMR perspectives from such a broad range of people and sectors, with participant diversity helping to broaden views and provide new insights and ideas. A key takeaway from the Summit was the more we collaborate, the better off we'll be in developing solutions.

“The Summits been great in terms of my information gain around antimicrobial resistance, plus meeting everybody here who are from different sectors. Veterinarians, plant people, doctors who look after humans, I think its necessary to bring all these sectors together to start some serious conversations.”

**A/Prof Veronica Matthews**  
HEAL Network Co-Lead Aboriginal and Torres Strait Islander Knowledges and NSW Hub Lead; University Centre for Rural Health, University of Sydney



“The Solutions Summit was a terrific demonstration of the power of collaboration. The workshop sessions brought people together with common purpose and intent, and the desire for outcome and solutions was palpable. It felt like a living barometer of the mission of SAAFE.”

**Liz Riley**  
SAAFE Director and Viticultural Consultant, Vitbit Pty Ltd

“Coming together with such a massive brains trust has been eye opening, there’s a lot of people in the room that have components of the solution. You can see people starting to think and how they might start to bring all these ideas together and come up with solutions to the issue.”

**Angela Schuster**  
Director, Schuster Consulting Group



# Advisory Committee Update

SAAFE committees play a crucial role in advising and guiding the research program by supporting the adoption of outcomes, fostering cross-sector collaboration, and ensuring the program's strategic direction, implementation, and impact. To increase collaboration with wider networks, SAAFE established three new committees in 2024 in addition to the Research Advisory Committee, which launched in 2023. The new committees are the Education and Training Advisory Committee, the Policy and Regulatory Advisory Committee, and the International Expert Advisory Committee.

Initial steps toward establishing additional committees were taken in 2024, with the First Nations Advisory Committee and the Youth Advisory Committee expected to be launched in 2025 and 2026, respectively.

## Independent Expert Advisory Committee (IEAC)

The Independent Expert Advisory Committee convened for its inaugural annual meeting in May 2024. The committee comprises globally recognized research leaders with expertise in One Health, AMR, and related fields. It provides independent review and guidance on research activities, advises on strategic direction, and supports collaboration to align research with SAAFE's mission, maintaining the highest standards of independence and integrity.



Distinguished Professor Ed Topp

### Committee members

**Distinguished Professor Ed Topp**  
National Research Institute for Agriculture, Food and Environment, France (Chair)

**Professor Despo Fatta-Kassinou**  
University of Cyprus

**Dr Bart Fraaije**  
Wageningen University & Research

**Professor Heike Schmitt**  
Delft University of Technology

**Professor Tong Zhang**  
University of Hong Kong

**Professor Sabiha Essack**  
University of KwaZulu-Natal

**A/Prof Max Troell**  
Stockholm Resilience Centre

**Professor Thomas Wittum**  
Ohio State University

## Policy and Regulatory Advisory Committee (PRAC)

The Policy and Regulatory Advisory Committee held its first meeting in November 2024. The Committee provides strategic guidance to support SAAFE's research program with a focus on the relevance of research to policy and regulatory development. Its members are a combination of national and state government and regulatory authority representatives hailing from areas of human, animal, plant and environmental health with special interest in AMR. The committee advises SAAFE on achieving research program outcomes, including extension, education, and impact initiatives, while sharing AMR insights, identifying trends, and fostering cross-government opportunities.



Dr David Cunliffe

### Committee members

**Dr David Cunliffe**  
Public Health Division, SA Health (Chair)

**Nanda Altavilla**  
Department of Climate Change, Energy, the Environment and Water (NSW)

**Christina Bareja**  
Interim Australian Centre for Disease Control, Australian Government Department of Health and Aged Care

**Zoe Bartlett**  
Food Standards Australia New Zealand

**Guy Bursle**  
Agvet Chemicals and Forestry Branch, Department of Agriculture, Fisheries and Forestry

**Dr Sam Hamilton**  
Department of Agriculture, Fisheries and Forestry

**Dr Amy Jennison**  
Queensland Health

**Giuseppina Luzzi**  
Food Standards Australia New Zealand

**Emi Schutz**  
Australian Pesticides and Veterinary Medical Authority

**Prof Mark Taylor**  
Environment Protection Authority (VIC)



Dr Barry McGookin

## Research Advisory Committee (RAC)

Formed in 2023, the **Research Advisory Committee** met three times during 2024, including a face-to-face meeting aligned with the SAAFE AMR Solutions Summit in September. Chaired by Dr. Barry McGookin (SAAFE's Food Sector Lead), its members represent key industry sectors. The committee provides high-level guidance to support SAAFE's research program and the adoption of outcomes by industry. It offers recommendations on strategic direction, program delivery, and cross-sector opportunities while contributing to the evaluation of research performance and education initiatives.

### Committee members (2024)

**Dr Barry McGookin**  
Samvinna (Chair)

**Peter Coombe**  
Coombe Consulting

**Robyn Dixon**  
Wine Australia  
(position previously held by Liz Waters)

**Karen Rouse**  
Water Research Australia

**Wayne Hutchinson**  
Fisheries Research and Development Corporation

**Duncan Rowland**  
Stock Feed Manufacturers' Council of Australia

**Bianca Cairns**  
Horticulture Innovation Australia



Dr Tony Peacock

## Education and Training Advisory Committee (ETAC)

The **Education and Training Advisory Committee** provides oversight of the SAAFE Scholars Program, as part of the broader Education and Training program. Chaired by Dr. Tony Peacock (SAAFE Director), its members bring diverse perspectives from industry and research education and development. The committee provides advice on the SAAFE Education and Training Program to ensure effective management of the Scholars Program and inform the design and content of its training and development initiatives. During 2024, the committee met twice, and members also attended the SAAFE AMR Solutions Summit in September, taking the opportunity to meet informally in person.

### Committee members

**Dr Tony Peacock**  
SAAFE Director (Chair)

**Professor Pat Buckley**  
Independent Expert, Research consultant

**Dr Veronica Jarocki**  
Researcher representative, University of Technology Sydney

**Liz Riley**  
SAAFE Director

Initial steps toward establishing additional committees were taken in 2024, with the First Nations Advisory Committee and the Youth Advisory Committee expected to be launched in 2025 and 2026, respectively.



# Our People

## Board Members



### The Hon. Karlene Maywald Chair

A passionate water industry professional whose career has been underpinned by her mission to achieve safe and sustainable water for all, Karlene acutely understands the threat that AMR poses to agriculture, food and the environment.

As the South Australian Water Ambassador and Chair at WaterAid Australia and Cancer Council SA, Karlene has a recognised ability to establish solid relationships with key stakeholders at local, state, national and international levels.

Her time as a Member of Parliament (1997-2010) and a Cabinet Minister in the South Australian government (2004-2010) gave her extensive experience in high-level strategic planning, budget oversight, change management and problem solving across a broad range of high-risk sectors including water security, regional development and science and information.

Karlene has been Director of SA Water and Chair of the National Water Commission among many other high-profile roles.



### Dr Tony Peacock Director

An innovation advocate, as well as a longtime researcher and manager in the pork industry, Tony is well versed in the threat that antimicrobial resistance poses to our food industry and the value of AMR stewardship and solutions.

He has been working with industry for more than 20 years on the responsible use of antibiotics, and chairs the Australasian Pork Research Institute, where reducing the routine use of antibiotics is his top priority. Tony also invested in and previously managed Wintermute Biomedical Pty Ltd and Ten Carbon Chemistry – a medical and an industrial company, respectively, both aimed at reducing AMR.

Formerly CEO of the CRC Association, the Invasive Animals CRC and the Pig R&D Corporation, he has been a researcher at the universities of Sydney, Melbourne and Saskatchewan. Tony chairs the SAAFE Education and Training Committee.



**Liz Riley, Director**

A consulting viticulturist in wine grapes with expertise in agrichemicals, biosecurity, and pests and diseases, Liz’s interest in AMR began in the 90s when she encountered significant resistance problems with botrytisclides, which pushed the crops close to market failure.

This experience brought home the realities of managing agrichemical modes of action to minimise the risk of AMR and spurred her desire to effectively measure resistance levels in the field to support decision making.

Liz was Director of the Australian Wine Research Institute for 12 years, and Vice President and Chair of Research & Development of the NSW Wine Industry Association. She was most recently named the first female recipient of the NSW Legend of the Vine. Liz sits on the SAAFE Education and Training Committee.



**John Merakovsky, Director**

A trained molecular biologist and seasoned technology executive, John brings a unique lens and broad suite of experience to our board.

Driven by a desire to leverage his scientific training and commercial experience to positively impact a priority issue for the country and all Australians, he’s a valuable member of the SAAFE team.

Most recently, John was CEO of Flybuys and previously CEO/MD of ASX-listed company Integrated Research, GM of Seek Learning and CEO of Experian among other executive and senior leadership positions. He is also a non-executive director of OpenLearning Ltd (NSW), Chair of Orijin Plus (WA), Chair of Experimenta Media Arts (Vic) and an Advisory Board Member of Drop Bio (NSW). John sits on the SAAFE Audit, Finance and Risk Committee.



**Julie Orr, Director**

Julie is a financial services executive and director with extensive experience on ASX-listed, government and non-listed boards across funds management, superannuation, stockbroking, research, ESG, biodiversity and sport.

She is currently a director of Australian Ethical Investments, and a director of AvSuper Ltd. Julie also serves on the Audit & Risk Committee of the NSW Biodiversity Conservation Trust. Originally joining SAAFE as a member of the Audit, Finance and Risk Committee, Julie was appointed to the Board in December 2023.



**Scott Ashby, Director**

Scott has more than 20 years’ senior government experience, spanning primary industries, biosecurity, animal and plant health, natural resource management and water management.

He’s well-versed in the threat posed by AMR, having previously served as the Chief Executive at both the South Australian Department of Primary Industries and Regions (PIRSA) for seven years and the Department for Water, Land and Biodiversity Conservation (DWLBC), among myriad other government leadership positions, including CEO of Onkaparinga Council.

Scott brings to the SAAFE Board unique perspectives from leading applied science programs and working collaboratively with industry. He is currently the Executive Director of Basin Science and Knowledge at the Murray Darling Basin Authority. Scott chairs the SAAFE Audit, Finance and Risk Committee.

**Head Office**

**SAAFE Research Program Leads**



**Alex Lloyd**  
CEO



**Professor Erica Donner**  
Research Director



**Dr Mary Carr**  
Head of Collaboration  
(Research and Impact)



**Charlotte Ferrier**  
Chief Operating Officer



**Professor Ricardo J. Soares Magalhães**  
The University of Queensland



**Professor Andy Barnes**  
The University of Queensland



**Professor Nicholas Ashbolt**  
University of South Australia



**Professor Aaron Jex**  
Walter and Eliza Hall Institute of Medical Research



**Dr Kelly Hill**  
Research Program Manager



**Dr Lisa Kirkland**  
Education and Training Program Lead



**Rohan Wighton**  
Business Operations Manager



**Rachael Nightingale**  
Communications and Media Manager



**Karen Wang**  
Finance Manager



**Jacinta Connell**  
Legal Counsel



**Mary Leonov**  
Research Operations Manager



**Sarah Sayers**  
Research Operations Officer



**Sai Kshiraj Gabbita**  
Graduate Operations Analyst

## SAAFE research community

**Dr Noorul Amin**  
The University of Queensland

**Dr Ashley Ansari**  
University of Technology Sydney

**Monique Binet**  
Commonwealth Scientific and Industrial Research Organisation

**Professor Mark Blaskovich**  
The University of Queensland

**Professor Rory Bowden**  
Walter and Eliza Hall Institute

**Dr Bianca Cairns**  
Hort Innovation Australia

**Dr Gilda Carvahlo**  
The University of Queensland

**A/Professor Bethany Cooper**  
University of South Australia

**Professor Allison Cowin**  
University of South Australia

**Professor Lin Crase**  
University of South Australia

**Dr Nick Crosbie** Melbourne Water

**Dr David Cunliffe** SA Health

**Dr Ainslie Derrick-Roberts**  
University of South Australia

**Robyn Dixon** Wine Australia

**Professor Steven Djordjevic**  
University of Technology Sydney

**Dr Barbara Drigo**  
University of South Australia

**Professor Mark Gibberd**  
Curtin University

**Dr Daniele GIBLOT Ducray**  
South Australian Research and Development Institute

**A/Professor Justine Gibson**  
The University of Queensland

**Professor Jianhua Guo**  
The University of Queensland

**Stacy Hamilton** WaterCorp

**Lincoln Harper** Curtin University

**Claire Hayward**  
University of South Australia

**Dr Sopheak Hem**  
University of South Australia

**Dr Bethany Hoye**  
University of Wollongong

**Wayne Hutchinson**  
Fisheries Research and Development Corporation

**Dr Ismail Ismail**  
South Australia Research and Development Institute

**Dr Veronica Jarocki**  
University of Technology Sydney

**Dr Clive Jenkins**  
Environment Protection Authority (SA)

**Dr Patrick JG Henriksson**  
Stockholm University

**Professor Cynthia Joll**  
Curtin University

**Dr John Kandulu**  
Flinders University

**Dr Alex Keegan** SA Water

**Dr Anu Kumar** CSIRO

**Dr Muriel Lepesteur-Thompson**  
Environment Protection Authority (Vic)

**A/Professor Fran Lopez Ruiz**  
Curtin University

**Dr Sultan Mia**  
Department of Primary Industries Research and Development (WA)

**Dr Paul Monis** SA Water

**Professor Ivo Mueller**  
Walter and Eliza Hall Institute

**Mostarak Hossain Munshi**  
The University of Western Australia

**Professor Long Nghiem**  
University of Technology Sydney

**Dr Duy Nguyen** Calix Ltd

**Oskar Nyberg**  
Stockholm University

**Dr Jake O'Brien**  
The University of Queensland

**Hoang Pham**  
University of Technology Sydney

**Ophelia Phraphone**  
University of Technology Sydney

**Dr Kaye Power** Sydney Water

**Dr Catherine Rees**  
Melbourne Water

**Dr Oleksandra Rudenko**  
The University of Queensland

**Dr Hannah Sassi**  
Water Research Australia

**Dr Lara Settimo**  
Environment Protection Authority (SA)

**Professor Kadambot Siddique**  
The University of Western Australia

**Dr Zakaria Solaiman**  
The University of Western Australia

**Dr Mark Sosnowski**  
South Australia Research and Development Institute

**Paul Storer**  
Troforte Innovations Pty Ltd

**Dr Xanthe Strudwick**  
University of South Australia

**Dr Andrew Taylor**  
Department of Primary Industries and Regional Development (WA)

**Professor Kevin Thomas**  
The University of Queensland

**A/Professor Max Troell**  
Stockholm University

**Dr Ben Van Den Akker**  
University of South Australia

**Robert Van Merkestein** Calix Ltd

**Dr Owen Woodberry**  
Monash University



*\*The SAAFE research community is constantly evolving. This list is a snapshot of those currently involved in SAAFE projects (active and in contracting), accurate at the time of writing.*



For more information,  
or to obtain a copy of  
SAAFE's Directors' Report  
and Audited Financial  
Documents, please email:  
[enquiries@crsaafe.com.au](mailto:enquiries@crsaafe.com.au)