THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

2024-2025 Annual Report

Queensland Alliance for Environmental Health Sciences

Contents

01.

Our alliance with Queensland Health

Our alliance with Queensland Health is central to our mission. Aligned with our vision, together we address environmental health challenges and deliver outcomes that benefit Queensland and beyond.

The Centre's researchers provide scientific and academic expertise to support the management of environmental risks to human health and ensure government policy reflects the latest research.

Key objectives

- Provide opportunities for Queensland Health, through enhanced engagement with the research sector, to influence the research agenda in the field of environmental health science.
- Build the capacity of key Queensland Health staff to assess and manage risks to human health from environmental threats.
- Encourage ongoing innovation and research in the environmental health science field.
- Facilitate access for Queensland Health staff to scientific and academic environmental health experts from the university research sector to ensure government policy and advice reflects the latest scientific findings.

Impact goals

- Deliver a high-quality, dynamic, interdisciplinary research program that identifies and contributes to solving current and emerging environmental health challenges.
- Provide education and training programs to build national expertise in environmental health sciences.
- Establish QAEHS as the recognised experts and first point of contact for environmental health science in Australia.
- Provide of science-based knowledge that leads to policies aimed at improving health outcomes.

02.

Director’s report

Professor Kevin Thomas

Improving human health through environmental health science is central to who we are and what we do at QAEHS. It is my privilege to share this Annual Report for 2024-25 and reflect on another remarkable year marked by collaboration, innovation, and meaningful impact.

This year, our Centre has continued to thrive, expanding our research portfolio, strengthening partnerships, and deepening our connections with stakeholders, collaborators and communities. I am proud that we continue to provide a distinctive academic environment that fosters innovation, adaptability, and responsiveness to our partners’ evolving needs and global environmental health challenges.

In 2024, we launched our new Strategic Plan, setting a clear direction for the next five years. Developed together with our staff, students, theme leaders and partners, the plan, also aligned to Queensland Health’s 2032 Research Strategy, positions the Centre to address emerging environmental health challenges with agility, excellence, and purpose. Our four strategic pillars, Organisation and People, Financial Sustainability, Research Impact and Partnerships, and Research Infrastructure, are already guiding our progress and shaping our future.

One of the most important outcomes of our Strategic Plan has been strengthening our commitment to Indigenous engagement and reconciliation. We remain focused on building cultural awareness across our Centre and deepening meaningful connections with First Nations communities. By embedding Indigenous perspectives through active engagement, cultural capability, strong governance, and impactful research, we aim to ensure that inclusion and respect are integral to all that we do. This commitment is an ongoing journey that reflects the dedication of our staff and students to creating a culturally safe, inclusive, and respectful research environment for everyone.

In November, our Centre underwent a formal review by The University of Queensland’s Academic Board, which was an invaluable opportunity to reflect on our progress, assess our alignment with strategic priorities, and identify new areas for growth. The outcomes reaffirmed our position as a trusted, leading research Centre and highlighted our strong governance, collaborative culture, and impactful research.

This year, we secured $14 million in new funding across 35 projects, bringing our total awarded funding since 2016 to $128 million. Our competitive grant success rate remains strong at 37%, and I am pleased to celebrate two new fellowships awarded this year, an ARC DECRA and a UQ Amplify Fellowship. Congratulations to Dr Qiuda Zheng and Dr Richard Bade for these well-deserved recognitions.

I am also delighted to acknowledge Dr Richard Bade and Dr Elvis Okoffo, who were both named 2024 Queensland Young Tall Poppy Finalists. A wonderful recognition of their contributions to science, commitment to scientific excellence and dedication to engaging the broader community in our research.

Our research continues to lead the way both nationally and internationally. Since 2016, our research has been cited in more than 180 policy documents worldwide and contributed directly to 15 of the 17 UN Sustainable Development Goals, clear evidence that our work is making an impact where it matters most.

Education and training remain central to our mission. We currently support 44 PhD students, and this year we celebrated 12 thesis submissions. Enrolments in the Master of Environmental Health Sciences program remain strong and continue to grow. Our students and early-career researchers consistently shine, earning national and international recognition for their outstanding work and fresh perspectives.

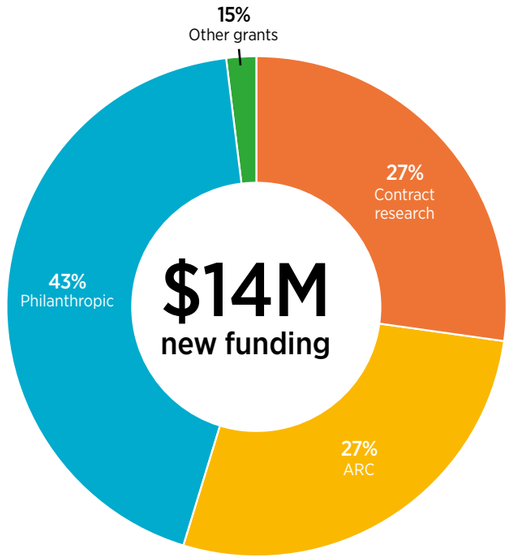
Our community and stakeholder engagement also continues to flourish through our Seminar Series, outreach programs, and events such as Pint of Science. Our 2024 Annual Research Forum was our best yet, showcasing presentations from our researchers and students, alongside colleagues from Queensland Health and Queensland Department of Environment, Science, Tourism and Innovation. We welcomed 16 international research visitors and expanded our Special Interest Groups, fostering deeper collaboration with Queensland Health on key priority areas including PFAS, AMR, The Games 2032 and wastewater surveillance.

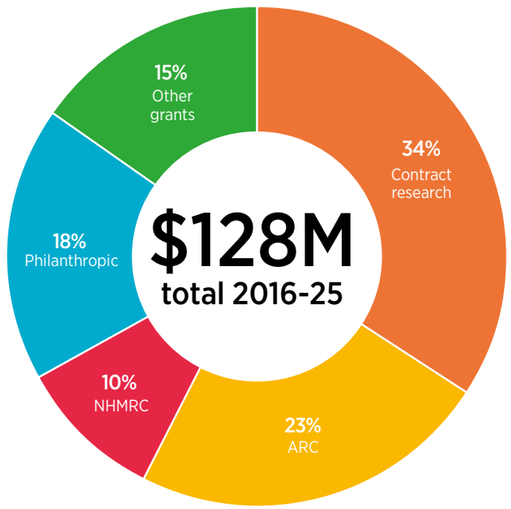
This year’s report puts the spotlight on research projects made possible through direct investment and in-kind support from Queensland Health. This focus provides a deeper look at the progress and outcomes of these projects and demonstrates the value of purposeful collaboration that bridges research, policy, and practice.

Looking ahead, I am excited for what’s next. In March 2026, we will proudly host the Plastics 2026 Global Symposium here in Brisbane, a major international event that will bring global experts together to address the health impacts of plastics. We are also finalising the content to deliver Rapid Risk Assessment workshops to stakeholders across Queensland.

It is a privilege to lead such a dedicated and talented team. To everyone who has contributed to our work this year, our researchers, students, professional staff, partners, and supporters, thank you. Your dedication, collaboration, and passion make QAEHS what it is, and you play a vital role in our shared success. Together, we will continue to advance environmental health science for a healthier future for all.

2024-2025 snapshot





35
New grants/projects

106
Active projects

2
New fellowships

9
Years

221
Projects

$40M
Industry funding

166
Publications

71%
in top quartile journals

Contributing to
15
of 17 sustainable development goals

6.2%
in top 1% most cited publications worldwide

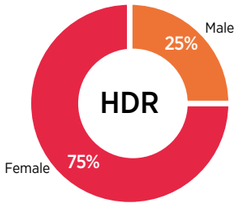
17,846 citations
from 192 countries

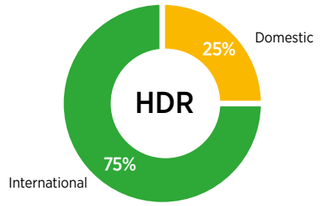
2
Policy mentions

44
Higher Degree by Research Students

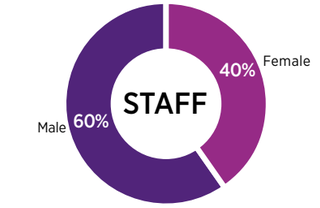
From
20
countries

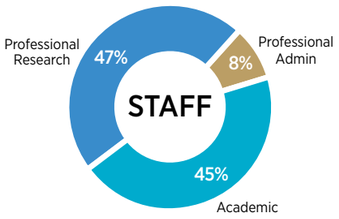
12
PhD thesis submissions





47
Staff members
(not including casual staff)

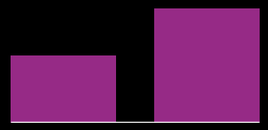




118 media mentions*
potentially reaching
837M people

* Media mentions are a reference to a keyword (QAEHS) across all types of media.

Website
70% increased unique visits



YouTube
playlist and new content created
+1k views

03.

Governance

Our Centre is governed by the Alliance Management Committee (AMC), which is responsible for providing strategic direction and oversight of the centre's activities. The AMC consists of an independent chairperson, two members from Queensland Government, two members from The University of Queensland, and the Director of the Centre.

The AMC is supported by the Scientific Planning Committee (SPC), a sub-committee who offers advice and support to the Director and the AMC to ensure the Centre's research is well-coordinated, collaborative, relevant, and complementary across all research themes. The SPC includes the Director, QAEHS theme leaders, and research executives from Queensland Health and the University of Queensland.

Alliance Management Committee

The Alliance Management Committee offers expert, balanced, and timely advice and oversight on the Centre's strategic direction and activities. This ensures that QAEHS, through the Director and the Scientific Planning Committee, continues to lead in environmental health sciences research, education, innovation, impact, and engagement both in Australia and globally.

Professor Jennifer Stauber, FAA FTSE SETAC Fellow
Chair

John Piispanen
Executive Director,
Health Protection Branch,
Queensland Health

Professor Danny Liew
Executive Dean, UQ Faculty of Health, Medicine and Behavioural Sciences (2025)

Professor Kevin Thomas
Director, Queensland Alliance for Environmental Health Sciences

Professor Louise Hickson, AM,
Executive Dean, UQ Faculty of Health and Behavioural Sciences (2024)

Dr Mark Jacobs
Deputy Director-General,
Science and Technology Division,
Queensland Department of Environment, Tourism, Science and Innovation

Professor Karen Moritz
Associate Dean (Research),
UQ Faculty of Health,
Medicine and Behavioural Sciences (2025)

Professor Greg Montieth
Associate Dean (Research),
UQ Faculty of Health and Behavioural Sciences (2024)

Scientific Planning Committee

The Scientific Planning Committee (SPC) operates both strategically and operationally to ensure coordinated environmental health research across our thematic areas to meet stakeholder needs, maximise the quality and quantity of scientific outputs, and foster national and international industry and government partnerships. Membership includes Queensland Health and The University of Queensland stakeholders to ensure ongoing collaboration and relevance to evolving needs and emerging challenges.

SPC meetings aim to facilitate comprehensive understanding of collective research efforts across QAEHS, foster interdisciplinary connections across themes, and identify future research directions. Discussions cover current research updates, contributions to the field, collaborations, and identification of opportunities for further collaboration across themes and stakeholders.

Members

Prof Kevin Thomas, Director
Queensland Alliance for Environmental Health Sciences

Dr Greg Jackson, Director, Water Unit
Queensland Health

Prof Greg Montieth, Associate Dean (Research) Faculty of Health and Behavioural Sciences University of Queensland (2024)

Prof Karen Moritz, Associate Dean (Research) Faculty of Health, Medicine and Behavioural Sciences University of Queensland (2025)

Amy Jennison, A/Executive Director
Queensland Health Coronial and Public Health Sciences

Stewart Carswell, Chief Chemist, Organic Chemistry
Queensland Health Coronial and Public Health Sciences

Stephen Finlayson, Chief Chemist, Inorganic Chemistry
Queensland Health Coronial and Public Health Sciences

A/Prof Gilda Carvalho, Theme Leader
University of Queensland

Prof Jianhua Gao, Theme Leader
University of Queensland

Prof Jochen Mueller, Theme Leader
University of Queensland

Prof Kelly Fielding, Theme Leader
University of Queensland

A/Prof Nick Osborne, Theme Leader
University of Queensland

A/Prof Sarit Kaserzon, Theme Leader
University of Queensland

A/Prof Phong Thai, Theme Leader
University of Queensland

A/Prof Dung Phung, Theme Leader
University of Queensland

04.

Strategic plan and direction

In 2024, we developed our 2024-2029 Strategic Plan to guide our Centre's growth and impact over the next five years. The plan is grounded in our vision to improve human health through innovative environmental health science and is aligned with Queensland Health's 2032 research strategy, ensuring that our goals directly contribute to the department's priorities.

The plan was developed through a collaborative process involving staff and students from across our academic, research, professional, administrative, and HDR cohorts. This broad engagement ensured our strategic direction reflects diverse perspectives and builds on the collective expertise within the Centre. Input from Alliance partnership theme leads and Queensland Health representatives also shaped the plan to align with our joint objectives and performance measures.

While many priorities build on our established strengths, the plan also outlines new opportunities and areas for growth to help us adapt to future challenges and maintain our commitment to excellence. Our mission remains clear: to address local, national, and global environmental health challenges through high-quality research, education, and partnership engagement that deliver real-world benefits for Queensland and beyond.

The plan is structured around four strategic pillars. Organisation and People focuses on fostering a dynamic, inclusive workplace that attracts and retains talented staff and students, with health, safety, and wellbeing at its core. Financial Sustainability emphasises enhancing organisational resilience and growth through efficient operations, diversified revenue streams, strong partnerships, and ongoing investment in talent and research infrastructure. Research Impact and Partnerships commits us to driving innovation and translating our research into practical outcomes through deep collaboration with industry, government, and the community. Finally, Research Infrastructure prioritises maintaining and optimising state-of-the-art facilities and equipment to support leading-edge science and safeguard resources like our Specimen Bank for long-term benefit.

Together, these strategic priorities ensure that the Centre remains well positioned to tackle emerging environmental health challenges, strengthen its impact, and continue delivering outcomes that support a healthier Queensland and a healthier world.

Stategic objectives

Research Impact and Partnerships

- Continuously review and refresh our research theme priorities to strengthen cross-theme collaboration, support the translation and uptake of our research within Queensland Health's operations, and ensure our work delivers meaningful impact and uptake of QAEHS research into Queensland Health operational activities.
- Align our strengths with industry, government, and community priorities for impact.
- Serve as the conduit between Queensland Health and global environmental health science research networks, promoting international best practices.
- Foster interdisciplinary collaboration and global engagement for academic knowledge exchange opportunities.
- Enhance research visibility and impact through strategic engagement, high quality outputs, and effective communication.
- Deliver high-quality education and industry upskilling, equipping students and professionals with the latest knowledge and skills in environmental health sciences.

Financial Sustainability

- Maintain financial resilience through diversified revenue and partnerships.
- Maximise grant leveraging for increased value of research return to Queensland Health, enhancing overall research value and Centre sustainability.

Organisation and People

- Foster an inclusive, unified, and supportive environment that promotes professional development, career advancement and gender parity.
- Attract and develop world-class higher degree by research students by offering an inclusive, industry-engaged, and enriching educational experience.
- Ensure the inclusion and engagement of Indigenous perspectives and communities within QAEHS through active engagement and cultural competency, governance and research impact.

Research Infrastructure

- Maintain cutting-edge laboratory research instrumentation and infrastructure and ensure long-term sustainability of the Environmental Specimen Bank.

Our contribution to Queensland Health's 2032 Research Strategy

QAEHS is a Queensland Health-funded research centre whose mission, to improve human health through environmental health science resaerch, is directly aligned with Queensland Health's 2032 Research Strategy.

Key to this alignment are purposeful collaboration activities that bridge research, government, and industry practitioners, and research impact through evidence-based translation of outcomes to inform policy development. This alignment ensures that our strategic priorities not only reflect best practice but are firmly integrated with the goals of Queensland's premier health research agenda. Our alignment is reflected in five key areas:

Full Research Pipeline & Translation

Queensland Health's Research Strategy emphasises support for the entire research continuum across its three focus areas: innovation, excellence, and real-world impact. QAEHS reflects this in our emphasis on multidisciplinary themes that span basic science through policy translation and stakeholder engagement.

Workforce Capacity & Career Development

The Strategy prioritises workforce development by creating researcher pipelines, supporting researchers, and delivering tailored training. QAEHS supports workforce development via targeted PhD scholarships, a flexible Masters program, professional development workshops, and industry placements, contributing to Queensland's environmental health capability and future workforce.

Partnership-Driven Excellence

Partnering with academia, industry, clinicians, and community is a key pillar of the Strategy, promoting high quality, health-need informed research. As a joint initiative with Queensland Health, our research themes are led by experts working with Queensland Health and other stakeholders to ensure relevance, responsiveness and real-world application.

Infrastructure & Enabling Research Platforms

Queensland Health's Strategy calls for investment in research infrastructure and better use of health data. QAEHS prioritises cutting-edge infrastructure, including the Australian Environmental Specimen Bank and advanced analytical platforms, supporting high-impact research and data-driven insights.

Consumer, Community & Regional Inclusion

The Strategy highlights the importance of community and consumer involvement, especially among First Nations and regional Queenslanders. QAEHS engages broadly through livestreamed seminars to ensure regional inclusion, and community outreach such as school visits and talking research at community events ensuring our research remains inclusive and responsive.

Achievements against key performance indicators

Strategic Goal	Objectives	Measures of Success	Achievements 2024-25
Identify and contribute to solving current and emerging national and international environmental health challenges	Establish a program of high-quality interdisciplinary research	Grant income Peer-reviewed publications Conference presentations HDR completions	New grant funding awarded of $3.4M ARC, $3.8M in contract research, and $6M philanthropic. 166 peer reviewed publications. 70 conference presentations. 5 HDR completions.
Build an expert capability in the environmental health sciences	Maintain an Environmental Health Sciences education and training program	Established training program, stakeholder for a Masters of Environmental Health Sciences	University of Queensland is ranked number #4 in Australia and #30 in the world for Public Health - Global Ranking of Academic Subjects 2024. The Master of Environmental Health Sciences program is ranked #1 in Australia and #15 in the world for environmental sciences in 2025 - QS World University Rankings 2025. Maintained steady student enrolments in the Master of Environmental Health Sciences (MEHS), with 34 students enrolled in 2024-25, up from 29 students in 2023-24. The MEHS saw 9 graduates in 2024-25. Three PhD industry placements into Queensland Health. Hosted four high school students for one-week work experience placements introducing them to a career in environmental health sciences.
To be Australia's internationally recognised research centre within the environmental health sciences	Engage with internal and external partners to deliver transdisciplinary environmental health science	Representation on national and international advisory and expert panels. Number of publications co-authored with non UQ co-authors	Theme leaders are represented on many national advisory and expert panels. Of the 166 reported research publications, 148 were co-authored with non-UQ co-authors.
Provide science-based knowledge to Queensland Health and the wider community	Work with Queensland Health to target and deliver improved health outcomes for Queenslanders Provide a working environment that fosters interdisciplinary research	Translation of science to policy QAEHS sought after by stakeholders as a provider of advice Commissioned projects	Citations in 3 policy documents this year and more than 180 policy documents globally between 2016-2025. QAEHS Seminar Series featuring researchers and industry practitioners from diverse fields, facilitating interaction and collaboration. Theme Leader presentations to Queensland Health's 'lunchbox talks'. Annual Research Forum. Funding support provided to ACWEB microbiology lab to facilitate access to shared facilities for interdisciplinary projects. Leveraging program promotes interdisciplinary research through grant partnership schemes. Growth of Special Interest Groups for sharing ideas and knowledge. Membership in the CRC SAAFE in partnership with Qld Health facilitating a cross-disciplinary research opportunity. Scientific Planning Committee meetings, held quarterly with theme leaders and Queensland Health (Water Unit and Coronial and Public Health Sciences), promotes multidisciplinary research, focus on priority topics, and support knowledge sharing and translation for policy development.

05.

Research

Research themes

Our research program is structured around seven integrated research themes that address priority environmental health challenges through multidisciplinary science, advanced technologies, and stakeholder engagement.

Guided by a partnership with Queensland Health, our research agenda remains responsive to the State's priority public health needs, ensuring our work is both scientifically rigorous and policy and practice relevant.

Each theme is led by highly experienced researchers who work with Queensland Health and other stakeholders to ensure the Centre's research remains impactful and aligned with emerging needs. Theme leaders provide expert, science-based advice on a range of environmental health topics, spanning chemical exposures, human biomonitoring, wastewater surveillance, environmental microbiology, climate change, environmental policy, and emerging contaminants like PFAS and plastics.

By combining cutting-edge analytical capabilities with cross-disciplinary collaboration, our research delivers practical solutions that support early detection, risk assessment, and the translation of evidence into public health action. This integrated approach is underpinned by a strong education and professional development platform that cultivates future research leaders and drives continuous innovation for the health and wellbeing of Queenslanders and the wider community.

Environmental Health Toxicology

Prof Kevin Thomas
Theme Leader

Understand the harm that chemicals, substances or situations can have on people, animals and the environment through assessing exposure and effects.

Emerging Environmental Health Risks

Prof Jochen Mueller
Theme Leader

Develop and conduct research, including sampling and archiving programs, that allow rapid recognition and identification of emerging health risks.

Environmental Health Epidemiology

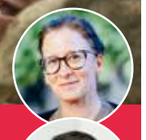
A/Prof Nicholas Osborne
Theme Leader

Draw on epidemiologic methods to advance understanding of how physical, chemical, biological, social and economic factors affect human health.

Environmental Health Risk Communication

Prof Kelly Fielding
Theme Leader

Promote an engagement approach to risk communication that develops capacity in experts and the community.



Environmental Health Risk Assessment

A/Prof Sarit Kaserzon, A/Prof Phong Thai
Theme Leader

Advance knowledge through research, education and training to enable improved understanding of the source, exposure and toxicological effects of single and mixed environmental pollutants.

Climate Change and Health

Dr Dung Phung
Theme Leader

Improve public health through research, education, advocacy and training on the health impacts of climate change and how best to ameliorate them through adaptation and mitigation.

Environmental Health Microbiology

Prof Jianhua Guo, A/Prof Gilda Carvalho
Theme Leader

Determine how microorganisms in the environment may be beneficial or harmful to human health or our activities.

Research activities

Presented on the following pages are research highlights for the 2024-25 year, detailing our activities, theme leaders working in each space, numbers of research fellows and students, key funding sources, encompassing awarded, submitted, and planned research applications and those supported by leveraging investment from Queensland Health.

Further information about specific projects can be found on our **website**.

106
Active projects

19
Projects completed this year

98
Projects completed 2016-2025

Wastewater surveillance for environmental hazards and exposures

The Queensland Alliance for Environmental Health Sciences (QAEHS) continues to lead nationally and globally in wastewater-based surveillance, advancing analytical science to detect chemical and biological hazards that reflect population-level exposures. This work plays a critical role in public health protection, environmental monitoring, and regulatory development. Our wastewater research program spans several high-impact, nationally significant initiatives.

Key research activities

SewAus Census Program

The ARC Linkage Project *Understanding Australia by Analysing Wastewater during the Census 2021* (SewAus) continues to produce unique longitudinal insights by linking socio-demographic data with environmental exposures. Daily sampling over one week in August, across 118 sites, capturing over 50% of the Australian population, continues annually. In 2025, the team is undertaking the final planned sample collection for the project, building on data spanning nearly a decade. The program has led to more than 30 publications to date, with new manuscripts under review that expand the understanding of community-wide exposure to pharmaceuticals, illicit drugs, nicotine, and other hazards.

National Wastewater Drug Monitoring Program (NWDMP)

During 2024-25 the Centre conducted its 22nd and 23rd national reporting rounds for this Australian Criminal Intelligence Commission (ACIC) program, and expanded targeted monitoring in regional areas of interest to law enforcement. This program covers approximately 57% of the Australian population and continues to inform national and local strategies to address illicit drug use.

National Wastewater Surveillance for Public Health Insights

Dr Jake O'Brien and PhD candidate Jinglong Li led several major national-scale wastewater surveillance projects in 2024–25, advancing QAEHS's capacity to monitor community health and environmental exposures. One study analysed effluent from 47 Australian wastewater treatment plants to assess the occurrence and removal of a broad range of chemicals, providing valuable insight into regional variability in treatment performance. In a complementary laboratory project, the team evaluated the stability of key health biomarkers in sewer conditions to improve the reliability of wastewater-based epidemiology. Dr O'Brien also contributed to an international project analysing untreated wastewater from 50 Australian sites to investigate population-level exposure patterns, and co-led a national seven-year study tracking alcohol consumption trends through wastewater. Together, these projects demonstrate the growing role of wastewater surveillance in shaping responsive, evidence-based public health strategies.

In 2024, an ARC Linkage project led by A/Prof Phong Thai established a population-level surveillance framework for opioid use in Queensland by integrating wastewater-based epidemiology (WBE), prescription data, and law enforcement seizure records. Using advanced analytical methods, the project delivers near real-time estimates of licit and illicit opioid consumption, identifies misuse patterns, and assesses intervention effectiveness. A/Prof Thai's expertise in WBE and large-scale environmental health programs ensures the project contributes valuable insights to public health policy and national monitoring strategies.

Vaping and Tobacco Exposure Surveillance

In 2024–25, A/Prof Thai and his team expanded their ARC Linkage and Australian Tax Office (ATO) funded research on tobacco and vaping surveillance. This included the integration of additional wastewater biomarkers to differentiate between nicotine from vaping and traditional smoking. A key 2025 publication demonstrated spatial variability in vaping rates and informed ongoing public health interventions. The team also contributed baseline data for implementation of Australia's new vaping laws (effective 1 July 2024), supporting compliance and policy enforcement.

Illicit Vaping and Tobacco Use

In June 2025, A/Prof Thai commenced his ARC Mid-Career Industry Fellowship to establish a national surveillance platform focused on illicit vaping and tobacco. With formal partnerships with Queensland Health, ACIC, and the ATO, this four-year program will support real-time monitoring and regulatory responses. The fellowship includes a formal placement, embedded in Queensland Health, fostering ongoing knowledge translation.

Biomarkers for Cannabis Monitoring

Dr Qiuda Zheng progressed development of targeted biomarkers for cannabis and cannabis vaping. Method validation studies commenced in mid-2025, laying the foundation for future incorporation into national monitoring programs.

Correctional Centre Surveillance

Zhe Wang completed her PhD study, and finalised a landmark study monitoring substance use in a Queensland correctional facility. Building on 2024 publications, a new manuscript currently in preparation focuses on temporal trends across facility access levels. The work has drawn interest from multiple state departments seeking to adopt similar surveillance approaches.

Emerging Drug Detection and Analytical Method Development

Dr Richard Bade completed his ARC DECRA project on analytical strategies to detect emerging drugs, including synthetic opioids. In 2025, his team piloted automated screening workflows using High Resolution Mass Spectrometry (HRMS), enabling rapid detection of novel compounds and metabolites of concern. Methods were also applied to international wastewater samples where nitazenes (highly potent synthetic opioids) were detected for the first time in wastewater worldwide.

Trade Waste Surveillance – ARC Linkage Project Launch

Professor Jochen Mueller's ARC Linkage Project, supported by Queensland Health, officially commenced in mid-2025. The project is establishing the world's first systematic trade waste surveillance and archiving program. Sampling campaigns are underway to map chemical inputs across industrial sectors and generate baseline profiles for domestic and industrial wastewater contaminants. Results will guide future source control policies and catchment risk assessments.

Wastewater-based evaluation of the efficacy of oxycodone regulations in Australia

In 2025, QAEHS researcher Dr Rory Verhagen led a high-impact study using wastewater surveillance to assess the effects of Australia's 2019 prescription reforms on oxycodone consumption. The research revealed a nearly 50% decline in oxycodone use nationwide, as measured through wastewater analysis across multiple regions. These findings provide compelling evidence of the real-world impact of regulatory changes on community drug use and were widely reported in national media, including 9News, Cosmos Magazine, and Insight+ (Medical Journal of Australia). The study highlights the value of wastewater surveillance in evaluating the effectiveness of public health policy and informing future interventions.

Publication highlights

Bade et al. utilised data from 22 countries to track the emergence and geographic spread of nitazenes—potent benzyl benzimidazole opioids—through global wastewater surveillance. This study demonstrated the potential of wastewater-based epidemiology to detect novel drug threats in near real time and inform global drug monitoring strategies.

Zhao et al. compared antidepressant usage estimates derived from wastewater-based epidemiology with national pharmaceutical sales records. The strong agreement between datasets validated wastewater as a reliable method for large-scale public health monitoring of mental health medication trends.

Chen et al. assessed the impact of COVID-19 lockdowns on stimulant use in Melbourne through daily wastewater sampling over two years, identifying stable levels of methamphetamine and cocaine consumption across lockdown periods, while MDMA use declined significantly and did not return to pre-lockdown levels, highlighting the sensitivity of MDMA use to social restrictions and the resilience of methamphetamine and cocaine use patterns.

Verhagen et al. analysed oxycodone levels in wastewater from over 50 sites across Australia between 2017 and 2023. Findings revealed a nearly 50% decline in use following national regulatory changes, including smaller pack sizes and increased prescriber oversight. This study highlights wastewater surveillance as a powerful tool for evaluating the real-world impact of public health policy.

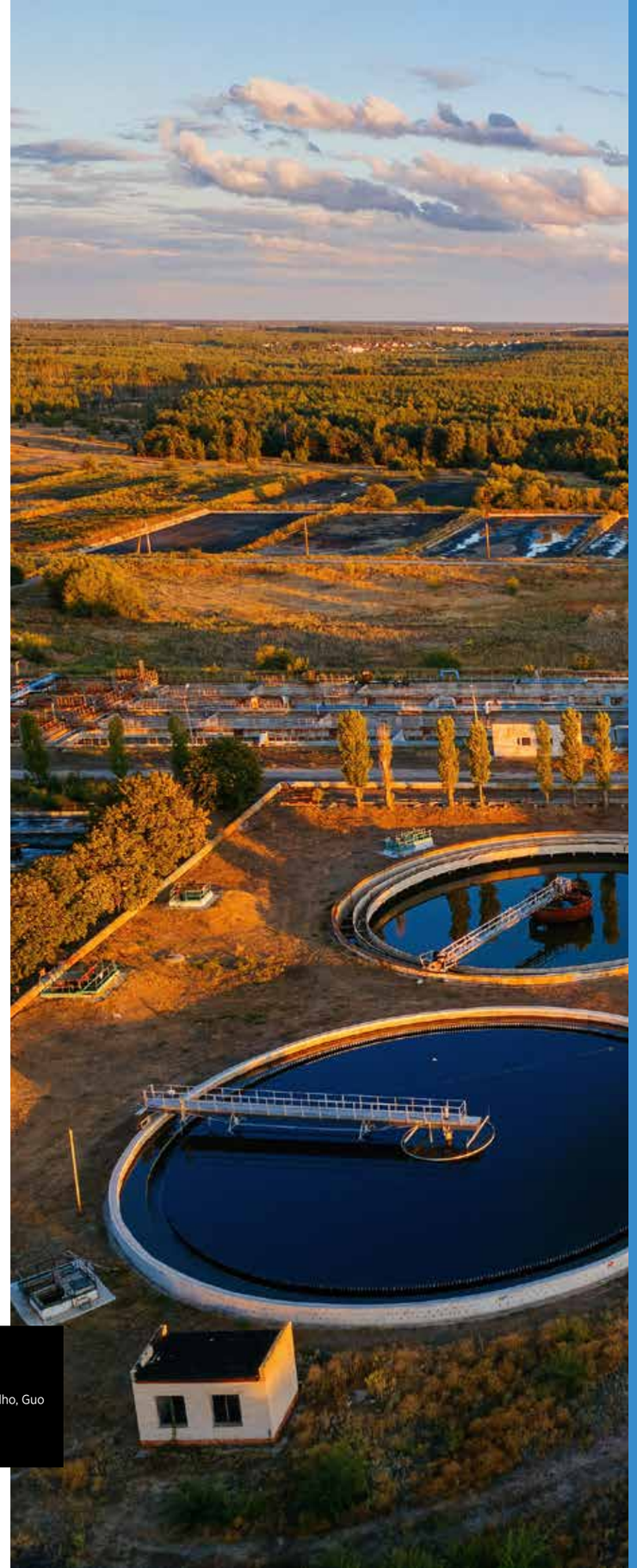
Li et al. analysed effluent from 47 wastewater treatment plants across Australia—representing approximately 40% of the population—and detected 45 antimicrobial compounds and their transformation products. While many substances were effectively removed during treatment, several showed poor or even negative removal efficiency, highlighting challenges in current wastewater processes. Notably, the study found higher per capita emissions of antimicrobials in more socioeconomically advantaged areas. These findings underscore the importance of monitoring both parent compounds and TPs to inform environmental risk and treatment strategies.

Key funding

Current:

ACIC (NWDMP) (Tscharke, Mueller, Thomas, Verhagen, Thai, Bade, O'Brien)
ACIC (Tscharke, Mueller, Thai, O'Brien, Verhagen)
ARC Discovery Project (Thai, O'Brien)
*ARC Linkage Project (Mueller, O'Brien, Tscharke, Thai, Kaserzon, Carvalho)
*ARC Linkage Project (Thai, Tscharke)
*ARC Mid-Career Industry Fellowship (Thai)
NHMRC Ideas Grant (Thai, Zheng)
NHMRC Investigator Grant (O'Brien)
NSW Ministry of Health (Bade, Verhagen)
QLD Water Directorate (Li, Verhagen)
ARC DECRA (Bade)
UA-DAAD (Bade, O'Brien, Dewapriya, Tscharke)
UQ HaBS (Zammit)
*ARC Linkage Project (Mueller, Li, Tscharke, Bade)
U.S. State Department (Bade, O'Brien)
ARC DECRA (Zheng)
Universities Australia – Germany Joint Research Cooperation Scheme (O'Brien, Lakhey, Li, Zhai, Verhagen)
UQ QuEx PhD Scholarship (O'Brien, Thomas)

*QH leveraging funds



Staff and students

Theme Leaders: Mueller, Thomas, Thai, Carvalho, Guo
8 Research Fellows, 10 PhD students

Research Spotlight

SewAus 2021

Understanding Australia by analysing wastewater during the Census 2021 (2021-2025)

The *SewAus 2021* wastewater program, funded through an ARC Linkage Grant concluding in 2025, systematically collected wastewater influent (before treatment), effluent (post treatment liquid) and biosolid (post treatment solids) samples alongside the Australian Bureau of Statistics (ABS) Census, directly linking community exposure to chemical and biological hazards with catchment socio-demographic data. Building on the foundational *SewAus 2016* ARC Linkage project (2016-2020), which established Australia's first nationwide wastewater-based monitoring program for licit and illicit drugs, *SewAus 2021* has expanded the approach to track a broader range of chemical and biological risks.

The project has demonstrated the value of integrating wastewater-based monitoring with detailed, accurate population data from the ABS Census. Demographic and socio-economic data, such as age or occupation, were used to explain patterns of drug use and other chemical exposures within the population.

Systematic wastewater sampling and analysis has rapidly become a valuable tool for Australian government agencies, delivering objective and near real-time insights into spatiotemporal trends in drug use in the Australian population. For example, the *SewAus 2016* collection period also marked the launch of the *National Wastewater Drug Monitoring Program (NWDMP)*, which is an aligned project collecting temporal data on drugs of concern across Australia for the Australian Criminal Intelligence Commission (ACIC). This approach also has much wider applications, providing vital information on community exposure to a wide range of chemical and biological hazards, including emerging risks.

Engaging more than 100 wastewater treatment plants nationwide and covering over 60% of Australia's population (with 243 sites currently in our network), the program provides essential data on hazard loads and their fate in wastewater treatment plants and community exposure trends.

The project delivers significant health and social benefits to the Australian community by improving understanding of factors influencing substance use and chemical exposure, providing tools for assessing interventions, and assessing the performance of wastewater treatment processes. This also assists environmental agencies in identifying residual chemical hazards that may persist post-treatment and enter the environment.

Samples collected during the 2021 ABS Census have contributed to a unique, decade-long archive in the Australian Environmental Specimen Bank (AESB), now comprising over 30,000 samples stored across 40 square metres of freezer space. This wastewater archive has formed a rich and unique databank that captures how communities are exposed to chemical and biological hazards and how these substances are released into the environment after wastewater treatment, supporting future analyses of emerging environmental and public health concerns.

The original *SewAus 2016* project successfully established the first, globally unique nationwide program for wastewater-based chemical monitoring. The enduring wastewater sample archive, or "library", now contains a wealth of chemical data that can be interrogated in the future as new request questions arise.

To date, this work has informed over 50 research outputs and is extensively used by QAEHS researchers and partners. Participating utilities also receive annual reports, providing their site-specific results and benchmarking their data against other de-identified sites for common pharmaceuticals and contaminants.

To build on this legacy, a new ARC Linkage Project proposal, *SewAus 2026*, was submitted in March 2025 with the goal of extending the data collection through to 2030. This next phase aims to close a critical research gap by improving our understanding of how community exposure to chemicals and pathogens correlates with socio-economic and demographic changes nationwide, leveraging three matched census datasets to reveal temporal trends. By integrating real-time human mobility data and establishing novel linkages between wastewater biomarkers and socio-economic data, *SewAus 2026* is expected to deliver unprecedented insights into 15 years of human exposure trends. The proposal brings together 16 partner organisations and 22 chief investigators. SewAus remains a cornerstone program for QAEHS, delivering insights that support public health, environmental protection, and evidence-based policy, while also providing essential data for projects such as the National Wastewater Drug Monitoring Program. We remain optimistic about securing funding for a third phase to continue this critical work.

Partners: Queensland Health, University of South Australia, Water Research Australia Research Programs, Urban Utilities, Victorian Environment Protection Authority, Unilever Global IP Limited, Healthy Land and Water Ltd, Queensland Department of Environment and Science, Stockholm University, University of Antwerp, CSIRO, University of Amsterdam, Swiss Federal Institute of Aquatic Science and Technology, Australian Criminal Intelligence Commission, University of Queensland, Melbourne Water Corporation.

Human biomonitoring for environmental exposures

Human biomonitoring remains a cornerstone of QAEHS's research, providing critical insights into how environmental exposures affect population health. By combining advanced analytical methods, epidemiological approaches, and access to longitudinal biological samples, including those from the Australian Environmental Specimen Bank (AESB), our researchers are shaping the national understanding of the chemical exposome and its health implications.

Our interdisciplinary strategy enables population-wide assessments through analysis of biological matrices such as blood, urine, breast milk, silicone implants, and hair. This approach supports evidence-based public health policy and regulatory interventions at both state and national levels.

Key research activities

Pooled Pathology Samples & National Comparisons

Traditional biomonitoring via individual samples is costly and invasive. Under the leadership of Prof Jochen Mueller, QAEHS has pioneered the use of pooled, de-identified surplus pathology samples, a cost-effective, low-burden alternative. In 2024–25, our research focused on evaluating the representativeness of these pooled samples by comparing them to data collected through the National Health Measures Survey (NHMS), which is now archiving individual blood serum and urine samples from a representative cohort.

We commenced a landmark ARC Discovery Project in 2025 to evaluate the representativeness of pooled surplus pathology samples for human biomonitoring by comparing them with population-representative samples from the NHMS and Australian Health Biobank. Led by Prof Jochen Mueller, Dr Sandra Nilsson, and collaborators from QUT and ANU, this first-of-its-kind study will validate pooling strategies, model exposure distributions, and establish reference values for a wide range of chemical pollutants. The project is expected to significantly strengthen Australia's biomonitoring capability and deliver a more efficient, nationally representative approach to population-scale chemical exposure assessment.

Evaluating Pooled Pathology Samples for National Biomonitoring

PhD candidate Julia Orr, supervised by Prof Jochen Mueller and Dr Sandra Nilsson, is assessing the suitability of pooled, de-identified surplus pathology samples for large-scale human biomonitoring. In 2024–25, the team compared pooled data with individual-level samples from the NHMS, focusing on per- and polyfluoroalkyl substances (PFAS) and other chemical biomarkers. Early findings suggest pooled sampling can yield reliable population exposure estimates, supporting a more efficient, low-cost alternative to traditional biomonitoring methods. The project is now progressing to statistical modelling of exposure distributions and refinement of percentile reference values.

Longitudinal Monitoring of PFAS Exposure

One of our flagship biomonitoring projects focuses on longitudinal assessment of PFAS concentrations in individuals with elevated exposures, such as firefighters and community members from contaminated areas. Funded by the NHMRC and Airservices Australia, this work examines PFAS trends over time, the effectiveness of mitigation strategies, and links with health outcomes.

In 2024–25, the second round of blood sample collection neared completion, with participant retention remaining strong at 83% among firefighters and 88% among community members. Preliminary findings indicate further declines in PFAS concentrations for many participants since their initial sampling in 2017–19. Analyses are ongoing to examine the effects of interventions, such as blood donation frequency, on PFAS reduction.

Prof Kelly Fielding continues to provide expertise in risk communication, supporting participant engagement and contributing to community forums.

Expected outcomes of this project include the identification of PFAS concentration trends in individuals, modelling of exposure reduction trajectories, assessment of links between PFAS concentrations and biomarkers of health, and the development of improved communication strategies for communities affected by exposure.

Glyphosate Exposure in Occupational Settings

As part of an ARC Linkage project, in collaboration with Queensland Health, the Department of Transport and Main Roads, Massey University and 3M, A/Prof Sarit Kaserzon is leading a project on advancing the understanding of exposure pathways for widely used chemicals such as glyphosate during product application. The goal is to identify effective mitigation strategies to reduce health risks. Preliminary findings underscore the critical role of personal protective equipment (PPE) and environmental conditions in minimising occupational exposure during chemical application. Related work published in 2025 has revealed the widespread presence of glyphosate across Australia's wastewater systems, with detections in 100% of influent samples and over 90% of effluent samples from wastewater treatment plants. These findings highlight the pervasive nature of glyphosate in the Australian environment and the need for continued monitoring and evaluation of its environmental and public health impacts.

Monitoring Pesticide Exposure During Aerial Spraying Operations

A new collaboration between A/Prof Sarit Kaserzon, Dr Fisher Wang and the Australian Plague Locust Commission (APLC) is underway to develop innovative water and air sampling technologies for monitoring pesticides used in aerial locust control. These novel tools aim to provide a comprehensive solution for measuring the concentration and distribution of pesticides during spray events. The data generated will support more accurate assessments of both human and environmental exposure risks, helping to inform safer and more effective pest management practices.

Understanding Nicotine Metabolism in Indigenous Australians

Dr Qiuda Zheng, an ARC DECRA Fellow at QAEHS, is contributing to a groundbreaking ARC Discovery Indigenous project led by Dr Jared Miles (UQ) that seeks to be the first globally to investigate how nicotine is metabolised by Indigenous Australian mothers during pregnancy. Using biochemical and genomic techniques, the project addresses a major data gap, as most existing research is based on non-Indigenous populations. Outcomes will include refined models for estimating nicotine exposure, insights into genetic variation, and evidence to support culturally appropriate health interventions. This project complements Dr Zheng's broader research into identifying exposure biomarkers through non-target analytical methods.

Understanding Dietary Patterns via Urine Biomarkers

PhD candidate Nicole Schroeter, supervised by Prof Jochen Mueller with Dr Jake O'Brien and Dr Richard Bade, uses pooled, anonymised urine samples from pathology networks nationwide to investigate food intake across diverse Australian populations. By measuring nutritional biomarkers in pooled urine, researchers are mapping dietary patterns by age, gender, socioeconomic status, and geographic region. The approach offers a privacy-preserving, cost-effective way to assess community nutrition and identify groups at risk of poor dietary health. Using advanced analytical methods, this study provides actionable insights to guide targeted nutritional interventions and inform public health policy.

Indoor Air Monitoring and Air Cleaner Innovation

Dr Fisher Wang is advancing his ARC DECRA project, which aims to establish a national indoor air monitoring program to track hazardous chemicals under changing climate conditions. In 2024–25, pilot studies were conducted in participating homes to examine indoor contaminant sources. In parallel, with support from the Halton Foundation, Dr Wang is developing new sorbent materials for energy-efficient air purifiers targeting semi-volatile organic compounds (SVOCs), advancing indoor environmental health protections.

Emerging Chemical Surveillance – BZTs and BUVs

Doctoral researcher Ma. Katreena Danielle Que, under Prof Mueller's supervision, is conducting the first systematic assessment of benzotriazoles (BZTs) and benzotriazole UV-stabilisers (BUVs) in the Australian population. Her research involves developing methods for detecting these emerging pollutants, commonly found in personal care products and industrial materials, and analysing their presence in breast milk, blood, adipose tissue, and urine. These compounds are linked to adverse health effects and are increasingly detected in environmental and human matrices. Her work will provide critical baseline data to support national exposure assessments and potential regulatory controls.

Staff and students

Theme Leaders: Mueller, Thomas, Kaserzon, Thai
5 Research Fellows, 4 PhD students

Publication highlights

Nilsson et al. present a comprehensive national assessment of PFAS serum concentrations across all Australian states and territories. By analysing pooled samples, the team established baseline exposure levels for key PFAS compounds and provided important geographic insights to support future risk assessment and regulatory efforts.

Que et al. assessed urinary biomarkers of benzotriazoles and benzothiazoles—chemicals commonly used in plastics and personal care products—across pooled Australian samples from 2012 to 2023. The findings reveal long-term exposure patterns and inform future surveillance of these emerging contaminants.

Taucare et al. analysed temporal trends in PFAS exposure from Australian biomonitoring (2002–2021) and the US NHANES program (2003–2018). The research highlights differences in regulatory impact and exposure trajectories, offering key insights into global chemical management practices.

Orr et al. using pooled serum samples, this study revealed distinct spatial variations in PFAS exposure across inland, coastal, and island populations in Australia. The findings highlight how geography, lifestyle, and environmental conditions contribute to differential PFAS burdens in the population.

Nilsson et al. used a targeted serum pooling approach to identify Australian population groups with elevated PFAS exposure. The method enabled cost-effective screening across demographic and regional strata, providing critical data to support more focused environmental health interventions and surveillance.

Que et al. tracked national trends in organophosphate ester flame retardant metabolites using age- and sex-stratified pooled urine samples collected between 2012 and 2023. Results show evolving exposure patterns and provide valuable input for evaluating potential health risks and regulatory needs.

Key funding

Current:

Airservices Australia (Mueller, Nilsson)
ARC Australian Laureate Fellowship (Mueller)
ARC DECRA (Wang)
ARC Discovery Indigenous (Zheng)
ARC Discovery Project (Thai, O'Brien)
ARC Discovery Project (Mueller, Nilsson)
*ARC Linkage Project (Kaserzon, Mueller, Wang)
Commonwealth Department of Climate Change, Energy, the Environment and Water (Zammit, Wang, Mueller, Nilsson, Kaserzon, Shiels, Thomas, Muir)
Halton Foundation (Wang)
Massey University (Wang, Jayarathne, Ghorbani Gorji, Kaserzon)
Australian Plague and Locust Commission (Kaserzon, Wang)
Minderoo Foundation (Thomas, Mueller)
NHMRC-EU Collaborative Grant (Mueller)
NHMRC-EU Collaborative Grant (Thomas, Wang, Rauert, Mueller)
NHMRC Targeted Research (Mueller)
Universities Australia – Germany Joint Research Cooperation Scheme (Nilsson, Mueller, Orr)

*QH leveraging funds

Per- and poly-fluoroalkyl substances (PFAS)

QAEHS continues to lead nationally and internationally in PFAS science, with support from the ARC, NHMRC, U.S. Department of Defense (DoD), and multiple government and industry partners. Our multidisciplinary PFAS research spans human exposure, environmental transport, passive sampling technologies, discovery of novel compounds, remediation and destruction technologies, and science-informed communication strategies.

Key research activities

PFAS Release and Retention in Concrete

Prof Jochen Mueller and A/Prof Phong Thai are conducting collaborative research funded by the U.S. DoD to better understand PFAS leaching from concrete and asphalt at firefighting training sites. In partnership with Arcadis, they completed field simulation trials evaluating PFAS retention and leaching from sealed and unsealed concrete pads. A parallel DoD-funded project, led by the Colorado School of Mines, examines PFAS mobilisation from aged infrastructure materials. Findings from these studies will inform strategies to minimise environmental releases from legacy contamination.

Global Adoption of Passive PFAS Sampling Tools

QAEHS-developed PFAS passive samplers developed by A/Prof Sarit Kaserzon and Dr Sara Ghorbani Gorji were selected by the United Nations Environment Programme (UNEP) for global monitoring efforts. In 2024, these samplers were deployed during a UNEP-supported campaign in Kiribati, where QAEHS provided hands-on training and data analysis to inform the country's national action plan for PFAS management. The initiative marks an important step in building capacity in low-resource settings and elevating QAEHS technologies to global application.

AQUA-GAPS: Global PFAS Surveillance for the Stockholm Convention

As part of the international AQUA-GAPS monitoring network, QAEHS researchers, led by A/Prof Sarit Kaserzon, are contributing key PFAS occurrence data to support policy development under the Stockholm Convention. The project is producing valuable global datasets that enhance understanding of persistent and mobile PFAS compounds in aquatic environments. The work has resulted in 5 publications to date.

ARC Linkage Project on PFAS in Food Packaging

In 2024, QAEHS launched a new ARC Linkage project, led by A/Prof Sarit Kaserzon, investigating PFAS contamination in compostable food-contact paper packaging. In partnership with Queensland Health, NSW DCCEEW, and industry organisations such as APCO and the Australian Organics Recycling Association, the study is assessing PFAS behaviour during composting and developing improved methods for detection. Findings will inform safer food packaging regulations and sustainable waste practices.

Monitoring PFAS in Drinking Water Catchments

A/Prof Sarit Kaserzon's team at QAEHS continues its long-term collaboration with Seqwater by deploying PFAS-specific passive samplers across Southeast Queensland's drinking water catchments. This work supports comprehensive chemical hazard identification and informs regional water safety planning. The program forms part of the broader Catchment and Drinking Water Quality Micropollutant Monitoring Program run by Seqwater, Southeast Queensland's primary water authority. Results from the program are made public on the Seqwater website.

Ultra-Short-Chain PFAS in Australian Drinking Water

A national study led by Dr Sara Ghorbani Gorji and A/Prof Sarit Kaserzon focused on ultra-short-chain (USC) PFAS—highly soluble and mobile subset of the PFAS chemical group. The work has highlighted detection of USC PFAS in multiple Australian drinking water systems using advanced analytical methods. USC PFAS pose unique challenges for removal from drinking water using conventional treatment technologies. While current concentrations are low and not an immediate health concern, the findings emphasise the need to better understand sources, pathways, and long-term environmental behaviour of these compounds.

PFAS Detected in Human Brain Tissue for the First Time in Australia

PhD candidate Marina Suzuki led a groundbreaking study in 2025 revealing that PFAS compounds can accumulate in human brain tissue, with longer-chain PFAS more likely to cross the blood–brain barrier. Published in *Environmental Science & Technology*, the research analysed matched post-mortem brain and serum samples, marking the first such findings in Australia. The study attracted significant media attention and raises important questions about the neurotoxic potential of PFAS and their long-term health impacts.

PFAS in Food Contact and Circular Economy Products

A/Prof Sarit Kaserzon and Dr Xianyu (Fisher) Wang, in collaboration with Queensland Health, DETSI, NSW DECCEW, and the Australian Packaging Covenant Organisation, commenced a new ARC Linkage Project in 2024. This research investigates the presence and persistence of PFAS and other chemicals in food packaging, recycled materials, and compost reuse streams. The project is the first of its kind in Australia to systematically examine PFAS exposure risks from consumer packaging across the product lifecycle.

PFAS in Organic Waste and Compost (FOGO)

In partnership with Queensland DETSI, a project led by A/Prof Sarit Kaserzon conducted comprehensive sampling and analysis of Food Organics Garden Organics (FOGO) materials to assess PFAS concentrations in feedstock and final compost products. The findings have informed revisions to national guidelines on PFAS thresholds in compost and are shaping risk mitigation practices for organic waste recycling.

Advancing PFAS Detection and Identification

With support from the U.S. DoD and NHMRC, Dr Sara Ghorbani Gorji, Dr Pradeep Dewapriya, A/Prof Sarit Kaserzon and Prof Kevin Thomas developed high-resolution mass spectrometry (HRMS) methods that significantly expand detection capabilities for legacy and emerging PFAS. Their work has led to the identification of several novel compounds and has been published in *Environmental Science & Technology*, contributing to the global PFAS exposome knowledge base.

PFAS Risk Communication Research

Theme Leader Prof Kelly Fielding conducted a national survey of 1,000 Australians to assess public knowledge and concern about PFAS, and to evaluate the effectiveness of different communication strategies. A manuscript exploring predictors of PFAS awareness and concern is in preparation, with a second paper on communication strategies currently under revision. Prof Fielding continues to contribute to the NHMRC-funded project assessing PFAS exposure control effectiveness in affected communities and occupational cohorts such as firefighters. Additionally, she is co-authoring a 2025 manuscript examining the readability of PFAS factsheets to support more effective public communication.

Staff and students

Theme Leaders: Mueller, Thomas, Fielding, Kaserzon, Thai

5 Research Fellows, 4 PhD students

Publication highlights

Thai et al. simulated rainfall runoff from a concrete pad contaminated with firefighting foam (AFFF) to understand how PFAS chemicals are released into the environment finding that PFAS, especially short-chain types, were quickly washed off during early rain events, while longer-chain PFAS were released more slowly over time. Concluding that even after AFFF use has stopped, concrete surfaces can continue to release PFAS during rainfall, acting as a long-term pollution source.

Ghorbani Gorji et al. investigated the occurrence of 13 ultrashort-chain and 2 short-chain PFASs in Australian surface water, groundwater, wastewater, and drinking water, identifying PFPrS and bis-FMeSI as the most frequently detected. Findings highlight widespread environmental presence, limited removal through conventional treatment, and the need for improved monitoring to better assess human and ecological exposure risks.

Suzuki et al. measured 43 PFAS in matched human brain and blood samples and confirmed findings using animal brain tissue. They found that certain PFAS, especially those with more carbon atoms, were more likely to accumulate in the brain, and two PFAS were found more often in brain than blood, and overall, the amount of PFAS in the brain increased with carbon chain length.

Lutes et al. looked at how PFAS chemicals from firefighting foam can soak into concrete and later leak back into the environment. Lab tests over a year showed that PFAS can penetrate deep into concrete, especially when the surface is damaged or exposed to wet–dry cycles. On average, about 6.6% of the PFAS from test solutions stayed in the concrete. Field samples from Canada showed similar patterns, with shorter-chain PFAS moving through concrete more easily than longer ones, suggesting concrete can act as a long-term source of PFAS pollution.

Vardy et al. investigated how PFAS accumulate and are transferred in Australian freshwater turtles, examining serum, tissues, eggs, and hatchlings. The study confirmed transgenerational transfer of PFAS, highlighting long-term environmental persistence and potential ecological and developmental impacts on wildlife.

Key funding

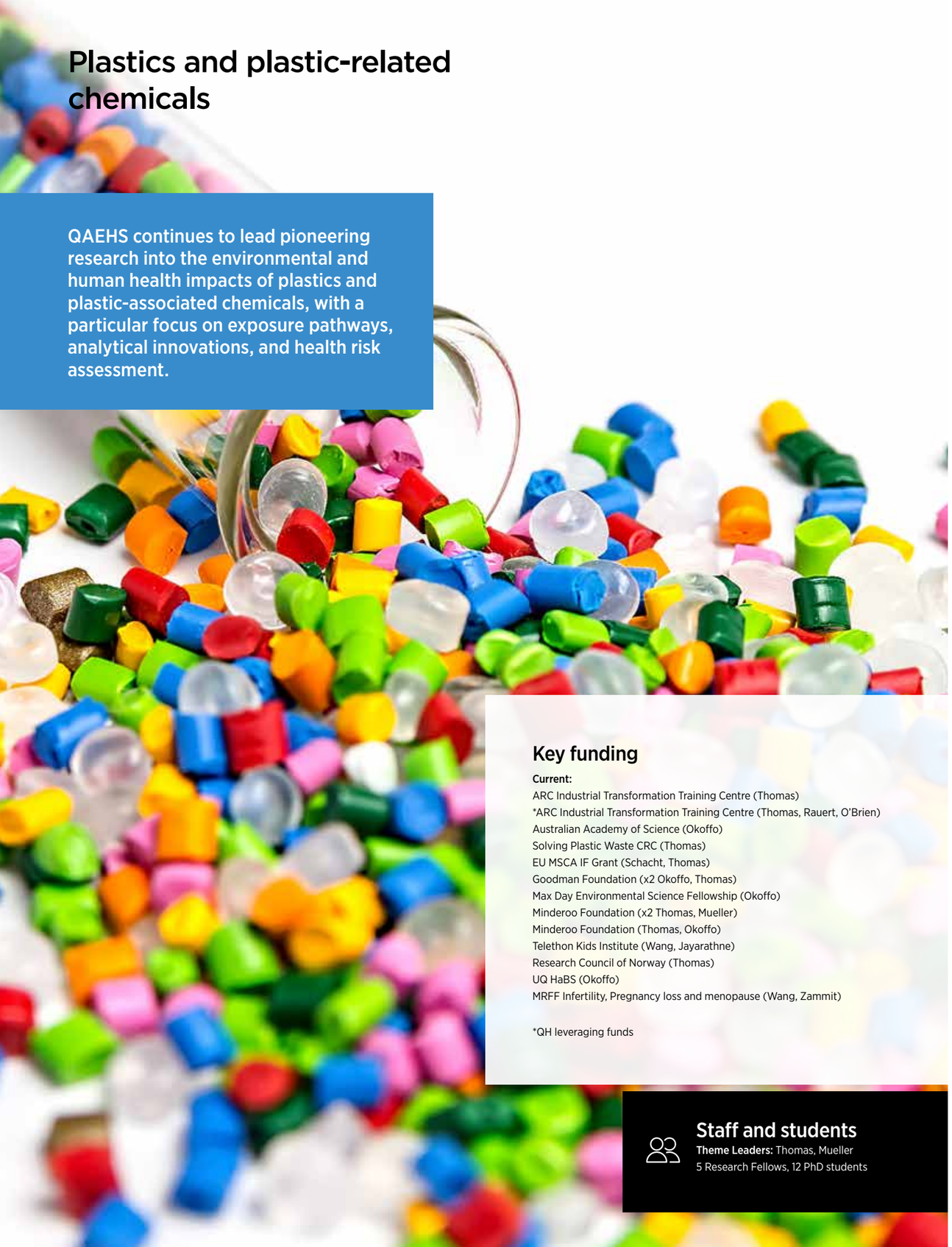
Current:

Airservices Australia (Mueller, Nilsson)
Arcadis and Exxon Mobil (Thai, Mueller)
ARC Linkage Project (Dewapriya)
*ARC Linkage Project (Kaserzon, Wang)
Commonwealth Government (Mueller, Thai)
NHMRC Targeted Call for Research (Mueller, Fielding)
NHMRC Targeted Call for Research (Thomas, Kaserzon, Morphett)
NHMRC Targeted Call for Research (Wang, Thai)
NSW Dept Climate Change, Energy, the Environment and Water (Kaserzon, Ghorbani Gorji, Nilsson)
QLD Dept Environment, Tourism, Science and Innovation (Kaserzon, Ghorbani Gorji, Mueller)
UNEP (Kaserzon, Mueller, Ghorbani Gorji)
U.S. DoD ESTCP (Mueller, Thai)
U.S. DoD SERDP (Mueller, Thai)
U.S. DoD SERDP (Kaserzon, Mueller)
Victorian Environmental Protection Authority (Nilsson)
Victorian Environmental Protection Authority (Kaserzon, Ghorbani Gorji)
Australian Government Dept of Agriculture and Water Resources (Mueller, Nilsson, Tynan)

*QH leveraging funds

Plastics and plastic-related chemicals

QAEHS continues to lead pioneering research into the environmental and human health impacts of plastics and plastic-associated chemicals, with a particular focus on exposure pathways, analytical innovations, and health risk assessment.



Key funding

Current:

ARC Industrial Transformation Training Centre (Thomas)
*ARC Industrial Transformation Training Centre (Thomas, Rauert, O'Brien)
Australian Academy of Science (Okoffo)
Solving Plastic Waste CRC (Thomas)
EU MSCA IF Grant (Schacht, Thomas)
Goodman Foundation (x2 Okoffo, Thomas)
Max Day Environmental Science Fellowship (Okoffo)
Minderoo Foundation (x2 Thomas, Mueller)
Minderoo Foundation (Thomas, Okoffo)
Telethon Kids Institute (Wang, Jayarathne)
Research Council of Norway (Thomas)
UQ HaBS (Okoffo)
MRFF Infertility, Pregnancy loss and menopause (Wang, Zammit)

*QH leveraging funds

Staff and students

Theme Leaders: Thomas, Mueller
5 Research Fellows, 12 PhD students

Key research activities

Minderoo Centre – Plastics and Human Health

In 2024, the Minderoo Centre – Plastics and Human Health, led by Prof Kevin Thomas, received an additional $9.1 in million in funding from the Minderoo Foundation to extend its research program over the next three years. The Centre, a joint initiative between QAEHS and Neuroscience Research Australia (NeuRA), aims to develop cutting-edge mass spectrometry-based methods to detect and quantify plastic chemicals and particles in human tissues, especially the brain, blood, and urine. The Centre comprises three integrated teams.

The **additives team** at QAEHS is advancing analytical methods to detect plastic additives (e.g. bisphenols and phthalate metabolites) in human brain tissue, urine, and blood. In 2024–25, they developed novel urine analysis protocols that increased sensitivity 2–20-fold, depending on the compound. Initial findings indicate the presence of PFAS in human brain tissue, with fluoroalkyl chain length linked to brain entry potential. Method development for parent phthalates in brain tissue is ongoing, with a focus on reducing background contamination and refining sample purification techniques.

The **particles team** at QAEHS has been a world leader in improving analytical methodologies for increased confidence in reported plastics in human biomonitoring data. The team has published 2 manuscripts on this topic in 2025 in leading journals in the field, and in collaboration with Minderoo Foundation, have initiated and are coordinating the Plastics Measurements Brains Trust (PMBT) a cohort of leading global scientists in the field Additionally, the Horizon Scanning project, an additional contract with Minderoo started late 2024, aims to assess new analytical technologies to determine what is needed for an unequivocal identification of a plastic particle in a human sample.

The **NeuRA team** is developing methods for plastic-free brain tissue collection and conducting immunohistochemistry and ELISA analysis to investigate biological responses to plastic exposures.

Plastics in Drinking Water and the Environment

In 2025, Dr Elvis Okoffo and Prof Kevin Thomas reported key findings from a collaborative study that identified nanoplastics in municipal and bottled drinking water, with concentrations reaching up to 440 particles per litre in some samples. The results highlighted substantial variability in contamination between households. These outcomes were prominently featured in *The Plastic Forecast*, a visual communication campaign by the Minderoo Foundation, which was showcased in Ottawa during the fourth session of the *United Nations Global Plastics Treaty* negotiations—bringing international visibility to QAEHS-led research on plastic exposure.

Microplastic Pollution in Moreton Bay: Max Day Fellowship Progress

Dr Elvis Okoffo, supported by the 2024 Max Day Environmental Science Fellowship, advanced his research into microplastic contamination across Moreton Bay. His work revealed historical plastic accumulation in sediments, elevated concentrations in mangrove areas near industry, and ongoing analysis of water and seafood samples. The project received national media coverage, featured in over 160 outlets including 9 News, SBS, and The Conversation, and continues to inform public awareness and regional conservation efforts.

Household Dishwashers: A Hidden Source of Microplastic Emissions

In 2025, Dr Elvis Okoffo led a study published in *ACS ES&T Water* revealing that standard household dishwashers can be a significant source of micro- and nanoplastic pollution. The research showed that a single cycle with typical plastic items can release up to 920,000 particles, translating to around 33 million particles per household annually. While the total plastic mass released is relatively low (approximately 6 mg per person per year), the findings spotlight domestic appliances as an under-recognised pathway for plastic emissions. The study calls for innovations such as in-built filtration systems or the use of more durable, low-shedding plastic materials.

Advancing Detection of Microplastics in Human Blood

In 2025, Dr Cassandra Rauert and collaborators published key findings on the use of pyrolysis–gas chromatography–mass spectrometry (Py-GC–MS) for detecting micro- and nanoplastics in human blood. Their work refined extraction and analytical methods, achieving high recovery rates for common polymers such as polyethylene (PE) and polyvinyl chloride (PVC). While the study highlighted the technique's potential, it also underscored challenges in quantifying certain plastics due to biological matrix interference, signalling a need for continued method development in human biomonitoring applications.

Built on the above project, Dr Rauert's team introduced an innovative quality control framework to improve Py-GC–MS-based quantification of plastics in blood and prevent misreporting false positives.

Investigating Tyre Wear Particle Emissions

Dr Cassandra Rauert also contributed to international knowledge exchange as a Scientific Committee member and session chair at the 2024 Tire Emissions Research Conference in Munich. There, she presented new findings from her Australian study, "*Spatial Trends of Tyre Wear Particles and Tyre Additive Chemicals with Distance from a Main Road*." The work provides critical insights into the dispersion of traffic-derived microplastics and associated chemicals, informing risk assessments related to roadside pollution and environmental health.

Understanding Microplastic Pathways from Urban and Wastewater Systems

Through two complementary projects, A/Prof Phong Thai is investigating the sources and transport of microplastics in both stormwater and wastewater systems. One project simulates rainfall over urban surfaces to measure microplastic runoff and develop emission factors under various rainfall intensities. The second project performs a detailed mass balance study across three wastewater treatment plants, quantifying micro- and nanoplastics in influent, effluent, and biosolids.

Other Emerging Projects

QAEHS is also advancing understanding of micro- and nanoplastics through multiple doctoral research projects.

Stacey O'Brien is investigating microplastic presence in indoor and outdoor air.

Coral Jeffries published a study quantifying nanoplastics and microplastics in food and beverages using pyrolysis-GC/MS. The research highlights analytical challenges and underscores potential exposure risks from dietary intake.

Laura Puente is studying microplastics in infant formula, breast milk, and breast milk storage products.

Yufei Pan is using in vitro blood-brain barrier models to study micro/nanoplastics' translocation and their potential neurological impacts.

Honglin Chen is exploring the fate of ingested and inhaled plastic particles, assessing accumulation and associated health risks in the human body.

Simran Kaur is investigating environmental occurrence and fate of tyre wear particles and their associated chemicals in the Queensland environment.

Gabriele De la Torre Picho is developing methods for and exploring the impact of anti-fouling paint particles in the marine environment.

Ruvini Weerasinghe is developing new hyphenated methodologies for detecting halogenated plastics in environmental samples.

Haitao Lin is developing new hyphenated methodologies for analysis of nanoplastics in water and atmospheric samples.

Publication highlights

Yenney et al. examined how plastic has accumulated in seabed sediments in Moreton Bay, Australia over time, and projected future trends by taking two deep sediment cores and measuring concentrations of seven common plastics using pyrolysis GC/MS. Results showed no plastics before 1975 but sharp increases since, with widespread microplastics found across 50 sites and around 7,000 tonnes estimated in the top 10 cm, reflecting rising plastic use and population growth.

Farr et al. investigated how polypropylene surgical mesh breaks down over time inside the body, finding increased cracking, stiffness, and debris release after 60 and 180 days in sheep, showing clear signs of degradation and potential for tissue irritation.

Seewoo et al. assessed how plastics, including microplastics and their chemicals, affect human health, showing links to hormone disruption, obesity, and developmental issues, with plastic particles found in organs and growing evidence of health risks from lifelong exposure.

Jeffries et al. evaluated the effectiveness of pyrolysis-gas chromatography–mass spectrometry (Py-GC-MS) for measuring how much nano- and microplastics are in foods and drinks. By using an accelerated solvent extraction followed by Py-GC-MS and adding filtration for beverages, they tested a range of commonly eaten items in an Australian "food basket." They found plastic levels were generally very low, often below detection limits using current methods. Filtering drinks helped improve sensitivity. They estimated Australians ingest around 1.7–2.0 mg of plastics per person per year (mostly polypropylene) but highlighted that high background signal and interference from food components make accurate measurement difficult.

Rauert et al. tested whether a technique called Py-GC–MS could reliably detect tiny plastic particles in human blood. They developed a new method to reduce interference from natural fats that can look like plastic, improving accuracy. Although the method worked better with some types of plastic, no particles were found above detection limits in real samples, suggesting either very low exposure or that the method still isn't sensitive enough for blood testing.

Xu et al. examined the reliability of research claiming microplastics harm human health, pointing out that many studies rely on very small sample sizes (20–50 people), lack proper contamination controls, and sometimes report findings that are biologically implausible, and called for global standards to improve data quality and reliability in future research.

Research Spotlight

Minderoo Centre - Plastics and Human Health

(2020-2030)

Over the past year, the Centre has advanced its mission of understanding the impacts of plastics on human health through cutting-edge research and collaboration. In July 2024, a new Horizon Scanning project was added to the program, focused on tackling challenges in accurately identifying and measuring plastics, by exploring the potential of new, cutting-edge techniques that combine advanced mass spectrometry with other high-resolution imaging technologies.

In March 2025 researchers from the Queensland Alliance for Environmental Health Sciences and *Minderoo Centre – Plastics and Human Health*, including Prof Kevin Thomas, Dr Cassandra Rauert and co-signee Dr Elvis Okoffo, together with international collaborators, published a Nature comment on the need for further research on the health impacts of the presence of microplastics in human tissues and bodily fluids.

Tiny plastic particles, microplastics and nanoplastics, are increasingly being detected in the environment including oceans, food, air, and even inside the human body, including the brain, raising concerns about potential health effects. However, scientists caution that many of the studies reporting these findings have serious limitations, such as small sample sizes, possible contamination during testing, and analytical methods that can't always clearly prove plastics are present. For example, some techniques may confuse natural materials with plastic particles. As a result, it's still unclear how much plastic actually ends up in our bodies and what harm, if any, it causes. Authors argue that improved research methods, greater transparency, and stronger global collaboration are needed to avoid misinformation and to guide effective health and environmental policies.

Assessing the Efficacy of Pyrolysis–Gas Chromatography–Mass Spectrometry for Nanoplastic and Microplastic Analysis in Human Blood

Humans are regularly exposed to micro- and nanoplastics (MNPs), but there is still limited understanding on the fate of these particles once they enter the body. One reason for this knowledge gap is that current methods for analysis of MNPs in biological samples face significant challenges and limitations, especially with complex samples such as blood or tissue.

A recent study by Dr Cassandra Rauert et al assessed an analytical technique called pyrolysis gas chromatography mass spectrometry (Py-GC-MS) to determine its suitability for detecting different types of plastics in human blood. The study found that, despite advanced sample clean-up protocols, PY-GC-MS is still prone to reporting false positives for polyethylene (PE) and polyvinyl chloride (PVC), the two highest polymers reported in previous studies, suggesting the technique is not suitable for reporting these polymers using current methods. Detection limits for other polymers were approaching or higher than levels that we would reasonably expect to see in blood samples, suggesting challenges for reporting everyday exposure levels.

A small pilot study using blood samples from the Australian general population further highlighted the influence of interferences in analysis of real samples with no plastics detected above detection limits. The study concluded that current Py-GC-MS methodologies require improvement to reliably detect and report plastics in the human body and may not be suitable when considering the low levels of plastics that are expected to cross biological barriers into the blood stream.

Plastic Measurement Brains Trust (PMBT)

The PMBT is a collaborative group of scientists dedicated to advancing the science of measuring MNPs in humans. Established through a partnership between the Minderoo Foundation and The University of Queensland, the PMBT's mission is to develop guidance on current and emerging measurement technologies and foster interdisciplinary research to protect human health and the environment.

The PMBT aims to critically challenge, advise, and discuss current and future technologies, methods and scientific research of MNPs. This includes contributing subject matter expertise, providing advice on strategic priorities, opportunities, and challenges, and offering ideas and facilitating introductions that support the PMBT's mission. The PMBT will explore the current "state of play" of measurement science including the current and emerging technologies including Raman Spectroscopy, Micro FTIR and Pyrolysis Gas Chromatography Mass Spectrometry and any other relevant technology.

Serving as an advisory body, exploring the state of measurement science and developing strategies for accelerating scientific processes and effective communication and collaboration among stakeholders. Furthermore, the PMBT will contribute to expanding measurement of plastic additives and monomers to better understand exposure, efficacy of exposure control and the role of exposure to these chemicals on human health.

The PMBT is developing several initiatives aimed at collaboratively advancing the detection and identification of plastic particles and associated additives in human biospecimens.

Three key meetings of the PMBT have been held to date. The first particles meeting took place at University College Dublin in August 2024, serving as a foundational discussion to explore the need for establishing the PMBT, canvas opinions and set priorities for future meetings.

The first Chemicals/Additives meeting was hosted by QAEHS in February 2025, focused on exploring the current state of measurement for emerging plastic chemicals and additives of concern, expansion of plastic additives that are commonly measured, and mapping future research direction.

The second particles meeting was held at Imperial College London in March 2025, where participants began developing a comprehensive reporting checklist for manuscript submission. The checklist aims to provide clear reporting guidelines for studies measuring plastic particles in human biological samples. Key discussion topics included biological plausibility, the challenge of background contamination, confidence criteria for detection and measurement, open access data sharing and how this can be achieved as part of the working group's program.

Several publications are being prepared by attendees from discussions held during the meeting.

Advanced monitoring and analytical techniques

QAEHS continues to lead in developing cutting-edge monitoring and analytical methods to detect chemical contaminants in humans and the environment. Under the leadership of Professors Kevin Thomas, Jochen Mueller, and A/Professor Sarit Kaserzon, QAEHS researchers are advancing technologies that improve surveillance, risk assessment, and policy responses for emerging and legacy contaminants.

Key research activities

Detecting Emerging Contaminants Through Non-Targeted Analysis

Over the past year, QAEHS researchers have continued to develop advanced analytical methods for the detection of non-target pollutants of emerging concern. A book chapter authored by A/Prof Sarit Kaserzon and Dr Bastian Schulze highlights recent progress, opportunities, and challenges in the non-target analysis of emerging contaminants. These innovative methods have been applied in collaboration with Seqwater and the New South Wales Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) to identify previously undetected chemicals in Queensland and New South Wales. These include fungicides, antibiotics, and pesticides that were not part of traditional monitoring programs. Findings are being used to inform more representative and comprehensive environmental monitoring campaigns.

Machine Learning for Real-Time Chemical Hazard Detection in Drinking Water

In collaboration with the University of Exeter (UK), the University of Amsterdam, and water industry partners in Australia and the UK, Associate Professor Sarit Kaserzon is leading the development of a novel machine learning (ML) approach integrated with high-resolution mass spectrometry (HRMS) for the detection of anomalous chemical hazards in potable water. This pioneering computational framework is designed to transform water security and management by enabling advanced, data-driven surveillance techniques. The approach aims to enhance the early identification and resolution of water quality issues, offering a scalable and optimisable solution for safeguarding drinking water supplies. A joint ARC Linkage Project application has been recently submitted to support the continued advancement of this innovative research.

Neonicotinoid Monitoring and Ecotoxicity Thresholds

Research led by A/Prof Kaserzon and PhD candidate Carly Beggs has explored the toxicity, environmental presence, and degradation pathways of neonicotinoid pesticides in Australian waterways. Neonicotinoids are a widely used class of synthetic insecticides, chemically related to nicotine, and commonly applied in agriculture to protect crops from insect pests. However, their use has been strongly associated with declines in pollinator populations, particularly bees. While several countries and regions—including the European Union and multiple U.S. states—have implemented restrictions or bans on certain neonicotinoids, their use continues in Australia. QAEHS studies have identified key degradation pathways and measured concentrations of neonicotinoid compounds in various Australian environments. Importantly, this work has led to the derivation of the first Australian-relevant acute and chronic ecotoxicity threshold values for selected neonicotinoids, providing a critical foundation for future environmental risk assessments and regulatory decision-making.

Recreational Activities and Water Catchment Contamination

A recent QAEHS study, led by Dr Rory Verhagen and A/Prof Sarit Kaserzon in collaboration with Seqwater, and published in early 2025, has examined the impact of recreational activities on drinking water catchments in Southeast Queensland. The study measured concentrations of ultraviolet (UV) filters and polycyclic aromatic hydrocarbons (PAHs)—contaminants commonly associated with swimming and boating activities. Results showed that PAH levels were higher in lakes where petrol-powered boating is permitted, particularly during the summer months. UV filters were more frequently detected at elevated levels in lakes that allow swimming. These findings underscore the complexity of contaminant dynamics in recreational water catchments and highlight the need for improved risk characterisation and management strategies for water bodies used for both recreation and drinking water supply.

Advanced Surveillance of Novel Drugs

In 2025, Dr Richard Bade and his team published a landmark international study that enabled the early identification of potent synthetic opioids, specifically the nitazene class via wastewater analysis. The study, published in *Addiction*, presents two years of data collected from 22 countries and reveals the detection of eight novel psychoactive substances (NPS), including three nitazenes previously unreported in municipal wastewater worldwide. These findings demonstrate the utility of wastewater analysis in providing near real-time intelligence for public health and law enforcement agencies. The study marks a significant advancement in global drug surveillance and reinforces QAEHS's leadership in developing analytical methods for emerging chemical threats.

Pesticide Risk in the Great Barrier Reef

A/Prof Sarit Kaserzon continues to collaborate with the Great Barrier Reef Marine Park Authority (GBRMPA), contributing data on photosystem II herbicides in inshore waters of the GBR. The 2024–25 data extend a 20-year dataset, informing herbicide risk assessments and supporting government pesticide management policy and action towards the Reef 2050 water quality improvement plan.

Indoor Contaminant Monitoring

A/Prof Phong Thai continues to lead research on household methamphetamine contamination. In 2024–25, his work directly informed the Western Australian Department of Health's guide for remediation of illicit drug residues in residential properties. Supported by an ARC Linkage Project, the team is examining methamphetamine penetration and dissipation in building materials, with results expected to influence national testing protocols.

Environmental and Human Exposure to Neonicotinoids

Carla Alongi, under the supervision of Prof Jochen Mueller, is investigating neonicotinoid exposure in honeybees and humans. Her Masters project has facilitated a partnership with the Victorian Environment Protection Authority to sample honey from beehives across Victoria. The research will inform future guidelines for pollinator protection and human health risk from insecticides in the food chain.

Publication highlights

Rauert et al. conducted an effect-based water quality assessment in an urban tributary using in vitro bioassays to measure the biological activity of contaminants under both base flow and stormwater conditions. The findings highlight the importance of incorporating effect-based methods for routine water quality monitoring to better capture episodic pollution events and guide urban water management.

Haglund et al. used advanced screening techniques, to identify over 1,200 chemicals in house dust, with 262 commonly found across countries. Geographic trends showed north–south differences in contaminant levels. Despite regulations, many harmful chemicals and their substitutes persist, highlighting the need for stronger, preventive chemical policies.

Lohmann et al. analysed concentrations and long-term trends of polycyclic aromatic hydrocarbons (PAHs) and polycyclic musks across global aquatic environments using passive samplers deployed through the AQUA-GAPS and MONET networks. By integrating data from multiple continents, including Australia, the team identified spatial patterns and temporal shifts in contaminant levels, with a notable decrease in PAHs in Europe and North America, but stable or rising concentrations in some regions of Asia and the Southern Hemisphere. The findings underscore the importance of sustained, harmonised global monitoring to track pollution trends, inform policy, and assess progress under international conventions such as the Stockholm Convention.

Beggs et al. investigated pesticide mixtures in a tropical wetland using grab and passive water samples collected over two years in northern Australia. Using passive sampling and mixture toxicity models, the study quantified co-occurring pesticides and evaluated their combined ecological risks. Findings revealed that multiple sites exceeded ecological risk thresholds, particularly for invertebrates, underscoring the importance of improved monitoring strategies for sensitive ecosystems.

Beggs et al. developed safe concentration guidelines for six neonicotinoid insecticides to protect aquatic life in Australian waters. Since there isn't enough long-term toxicity data to create traditional safety benchmarks, researchers used a new method to estimate long-term harm from short-term data. These new threshold values provide a more accurate way to assess and manage environmental risks from these widely used pesticides and address a key gap in regulatory ecotoxicology by improving the utility of available acute data for long-term risk assessments.

Key funding

Current:

ARC Discovery Project (Wang)
*ARC Industrial Transformation Training Centre (Thomas, Rauert, O'Brien)
ARC Australian Laureate Fellowship (Mueller)
*ARC Linkage Project (Kaserzon, Thomas)
*ARC Linkage (Thai, Wang)
Commonwealth Dept Climate Change, Energy, the Environment and Water (Mueller)
EU Horizon 2020 Grant (Mueller)
Future Fisheries Veterinary Service (Kaserzon, Ghorbani Gorji)
Great Barrier Reef Marine Park Authority (Kaserzon, Thompson, Mueller, Taucare)
Halton Foundation (Wang)
NHMRC-EU Collaborative Grant (Mueller)
NSW Dept. Climate Change, Energy, The Environment and Water (Kaserzon)
Seqwater (Kaserzon, Mueller)
Victoria Environment Protection Authority (Mueller, Alongi)

*QH leveraging funds

Staff and students

Theme Leaders: Thomas, Mueller, Kaserzon, Thai
8 Research Fellows, 11 PhD students

Research Spotlight

HyTech

ARC Training Centre for Hyphenated Analytical Separation Technologies (2023-2028)

The Australian Research Council (ARC) Training Centre for Hyphenated Analytical Separation Technologies, also known as HyTECH, launched in 2023. This training centre partners The University of Queensland (UQ)/QAEHS with the University of Tasmania and Deakin University along with numerous industry partners including UQ's partners from Queensland Health, AB Sciex Australia, and Shimadzu Oceania Pty Ltd. This collaboration offers a unique opportunity to work directly with industry partners and technology providers.

One of Shimadzu Oceania's key initiatives for advancing technology and driving growth is development of innovative, versatile technologies and next-generation products. As key industry partners of the HyTECH Network, QAEHS is working closely with Shimadzu to develop and extend applications of their leading technologies. These projects include developing new pyrolysis gas chromatography mass spectrometry (Py-GCMS) methodologies for halogenated polymer materials and develop and extend current applications of asymmetric flow filed flow fractionation (AF4) coupled with Py-GCMS for nanoplastic applications. The applications will have end-user benefits for researchers, industry, policy and regulation.

SCIEX is committed to driving innovation and supporting impactful research across various scientific domains through innovative solutions advanced analytical technologies. As a key industry partner of the HyTECH Network, QAEHS is collaborating closely with SCIEX to develop new applications for leading technologies. These projects include extending their high-resolution liquid chromatography mass spectrometry (HR-LCMS) methodologies and developing data processing frameworks and workflows for the characterisation of highly mobile and persistent chemicals, as well as ubiquitous contaminants of emerging concern. These applications will have end-user benefits for government, industry, research and the development of policy and regulation.

QAEHS researchers Prof Kevin Thomas, Dr Cassandra Rauert, Dr Jake O'Brien, and Dr Elvis Okoffo, along with PhD students Tobias Hulleman and Ruvini Weerasinghe, were joined by Haitao Lin in 2025, with another PhD student to commence in early 2026. The team attended two HyTECH meetings, at Deakin University in August 2024 and University of Tasmania in May 2025, where HDR students showcased their work through presentations and posters. Tobias Hulleman won Best Student Presentation for his work on highly persistent chemicals, and Lily Pan received Best Student Poster for her research on nanoplastic permeability using 2D in vitro cell models. Ruvini Weerasinghe and Haitao Lin also presented on their research into halogenated plastic materials and environmental nanoplastics, respectively.

Tiny Plastics from Dishwashers: Small Source, Big Insight

New research led by Dr Elvis Okoffo has uncovered that everyday plastic items washed in household dishwashers can release substantial numbers of micro- and nanoplastics into wastewater. The study focused on common plastics such as polypropylene (PP), polyethylene (PE), polystyrene (PS), nylon, and polyethylene terephthalate (PET), revealing that a single dishwasher cycle can release around 920,000 tiny micro and nano particles. Extrapolated to a global scale, this could amount to 33 million particles per household per year. Under worst-case conditions, this equates to approximately 890 trillion particles annually in Australia, 15,000 trillion in the USA, and as much as 77,000 trillion worldwide. The estimated release should be lower than the worst-case scenario of around 97 million particles per household per year in Australia and 118 million in the USA.

To assess the scale of this emission in practical terms, the researchers modelled a scenario where each dishwasher cycle washes five plastic items, each with a surface area of 1,000 cm^2 (about the size of a 1L container). Based on this, dishwashing would release fewer than 6 mg of plastic per person per year globally equivalent to just 43 particles per square centimetre washed which is considerably smaller than the mass of a single grain of rice. While these numbers may sound large, the study found that dishwashing is a minor contributor to plastic pollution in wastewater compared to other sources, such as textile fibres from laundry. Yet, the findings underscore how common household activities can still add up to millions of plastic particles entering the environment.

Importantly, this study employed Pyr-GC/MS to characterise and quantify the released plastic particles, a powerful analytical tool that is also enabling meaningful collaboration across the HyTECH research network. A notable example is the work of Arathy Parameswaran Sreeletha, a PhD candidate at the University of Tasmania, who recently visited QAEHS through a HyTECH cross-node collaboration. Arathy is developing and validating innovative methods for nanoplastics extraction using fused-core particle-based membranes with varying pore sizes, an emerging technology provided by Advanced Materials Technology, a HyTECH industry partner. Arathy, use of Pyr-GC/MS at QAEHS for nanoplastics analysis complements the methods used in this dishwasher study, reinforcing consistency and comparability across HyTECH nodes.

This cross-node collaboration exemplifies HyTECH's strength in fostering national partnerships and advancing harmonised methodologies in the field of micro- and nanoplastics research. Shared use of robust analytical platforms like Pyr-GC/MS not only enhances scientific integrity and reproducibility but also builds critical capacity across the network, driving the development of best-practice protocols and strengthening Australia's leadership in this evolving research domain.

PhD Student Tobias Hulleman's research

In response to the urgent need for improved chemical mobility assessment, our study presents a machine learning approach to predict environmental mobility using retention behaviour data from reverse-phase liquid chromatography (RPLC). With increasing attention on very persistent and very mobile (vPvM) substances due to their threat to drinking water resources and ecological systems, regulatory frameworks like REACH and CLP rely heavily on the organic carbon-water partition coefficient (log Koc) for classification. However, experimental log Koc data are lacking for the vast majority of chemicals, severely limiting regulatory and environmental risk assessments.

To address this challenge, we leveraged a large dataset of RPLC retention data for over 140,000 reported elution times and gradients. Using the elution strength (organic modifier fraction at elution) as an approximation for mobility, we assigned mobility classes to each chemical. We then computed PubChem molecular fingerprints and trained a random forest classifier to predict mobility directly from chemical structure and retention behaviour.

The model achieved strong predictive performance, with F1 scores of 0.87, 0.81, and 0.96 for the very mobile, mobile, and non-mobile classes, respectively. The model was applied to all 64,498 REACH-registered substances, classifying 20% as very mobile, 26% as mobile, and 53% as non-mobile. This is a notable advancement compared to previous approaches, which could only estimate mobility for ~20% of REACH chemicals with extensive "expert judgement" for many of the estimates. Our approach enables complete mobility classification, including for compounds lacking log Koc data.

The broader impact of this research lies in its practical contribution to human and environmental health protection. By offering a scalable and structure-based predictive tool, our method facilitates the rapid screening of any chemical using only its SMILES. This is of particular importance given the continuous influx of new synthetic compounds into commerce. Additionally, the model is built using completely open access data and can be expanded whenever new chromatographic data is reported and uploaded.

Our machine learning framework should enhance regulatory capabilities and support precautionary chemical management. In the long term, such data-driven approaches can accelerate hazard identification, inform remediation strategies, and guide safer chemical design. We hope that this work exemplifies how cheminformatics and machine learning can help bridge critical data gaps in environmental science.

The study was done in collaboration with scientists from the University of Amsterdam and the University of Tasmania. This provided us with expertise in both environmental modelling and experimental chromatography.

Environmental epidemiology

This research theme, led by A/Prof Nick Osborne, focuses on understanding how environmental exposures, including air quality, climate change, greenspaces, and allergens, impact human health across the lifespan, informing public health strategies and policy development aimed at creating healthier, more resilient communities.

Staff and students

Theme Leaders: Osborne, Phung, Thai
2 Research Fellows, 17 PhD students

Key funding

Current:
EU Research and Innovation Action (Thomas, Wang, Rauert, Mueller)
*NHMRC Partnership (Thomas)
NHMRC Ideas Grant (Wang)
NHMRC-NAFOSTED (Thai, Phung)
MRFF AusEnHealth (Osborne)
UQ Global Strategy and Partnerships Seed Funding (Phung)
Wellcome Trust (Phung, Osborne)
DFAT (Phung)
Universities Australia – Germany Joint Research Cooperation Scheme (Osborne)

*QH leveraging funds

Key research activities

Greenspace and Cancer Risk

A/Prof Osborne, in collaboration with PhD candidate Chinonso Odebeatu, led a large-scale study using data from 279,326 UK Biobank participants to investigate the relationship between greenspace exposure and obesity-related cancers. Over a median follow-up period of 7.82 years, 9,550 participants developed obesity-related cancers.

The study found that greater exposure to private residential gardens within a 100m buffer was significantly associated with reduced risk of overall obesity-related cancers, particularly breast and uterine cancer. In contrast, other greenspace types showed no consistent association with cancer risk, except for uterine cancer. The protective effect of residential gardens was influenced by air pollution (NO_2), physical activity, serum vitamin D, PM2.5, and sociodemographic factors. These findings highlight the importance of functional greenspace types in future cancer prevention efforts and suggest the need for targeted urban design interventions.

Socioeconomic Disadvantage and Bone Health

In a related analysis of 502,682 UK Biobank participants, A/Prof Osborne and collaborators examined the relationship between socioeconomic deprivation and musculoskeletal outcomes. They reported that higher levels of deprivation were significantly associated with increased odds of osteopenia, falls, and fractures, reinforcing the need to address environmental and social determinants of health in ageing populations.

Pollen Exposure and Respiratory Health

A/Prof Osborne's research also explores the role of pollen and fungal spores in respiratory morbidity. Using environmental DNA (eDNA) techniques, his team is analysing air column samples from Delhi and Brisbane to identify biologically active airborne particles and their contribution to respiratory illness. This includes developing DNA barcode libraries and applying sequencing techniques to identify plant and fungal species in urban air. The study will link environmental exposures to health outcomes by integrating local respiratory morbidity data from both cities. This work aims to support early warning systems for pollen-related asthma and allergy outbreaks, especially in the context of climate variability and urbanisation.

Advancing Wastewater-Based Epidemiology (WBE) for Industry Applications

In a pilot project funded by ExxonMobil, A/Prof Phong Thai is leading a proof-of-concept study to explore the application of WBE beyond public health into industrial and occupational settings. The project aims to demonstrate how wastewater analysis can be used to detect chemical exposure patterns and population-level trends in real time. This foundational work supports future integration of WBE into corporate environmental health monitoring and early-warning systems.

Allergies, Asthma and Environmental Risk in Children

PhD candidate Diana García, supervised by A/Prof Osborne, is using data from the Longitudinal Study of Australian Children (LSAC) to examine environmental and genetic contributors to food allergies and asthma. Her research focuses on the influence of vitamin D levels and UV exposure, using geographic and behavioural proxies such as EpiPen prescriptions, hypoallergenic formula use, and emergency department visits for anaphylaxis.

Given Australia's broad latitudinal range and high prevalence of allergic disease, the study is ideally positioned to examine spatial and generational differences in food allergy and asthma risk. Diana's research also explores evolving associations between mental health and asthma across generations, recognising the complex interplay between environmental, psychological, and physiological factors in chronic disease development.

Research Spotlight

Exposure to Trihalomethanes in pregnancy and birth outcomes in Queensland: Integrated data analysis for better policy and health outcomes (2021-2025)

This NHMRC project, led by The University of Queensland in partnership with Queensland Health and Queensland water utilities, set out to investigate how exposure to trihalomethanes (THMs), water disinfection by-products, in household drinking water may impact pregnancy outcomes in Queensland. Growing global research suggests that THMs may be linked to health concerns such as low birth weight, preterm delivery, and developmental issues.

The research team, led by Professor Abdullah Mamun, analysed THM exceedance patterns and predictors in Queensland over the past decade, examining potential links between exposure and outcomes such as low birth weight, small for gestational age and preterm birth. The project also reviewed current policies and response strategies to identify gaps in managing THM risks, particularly in high-risk communities.

The project team has completed the curated analysis of quantitative and qualitative data and shared preliminary results with partners, generating valuable insights. Key findings were presented at the 2024 Toxicology and Risk Assessment Conference in Canberra, and five research papers are underway for publication. Leadership of the quantitative analysis transitioned to Dr Mehedi Hasan, succeeding Dr Mamun Huda ensuring continued momentum as the project moves toward completion in 2025.

The outcomes of this work will inform evidence-based risk management and incident response strategies to minimise THM exposure for pregnant women, particularly those in vulnerable areas. Ultimately, the project aims to support improvements to public health guidance and contribute to advocacy for revisions to the Australian Drinking Water Guidelines for THMs. A range of further research dissemination and stakeholder engagement activities are planned in late 2025 to ensure these findings help drive meaningful policy and health outcomes.

Publication highlights

Mahmud et al. identified links between residential greenspace and reduced obesity-related cancer risk using UK Biobank data.

Osborne et al. explored associations between UV exposure, vitamin D, and food allergies/asthma in Australian children using LSAC data.

Zhang et al. demonstrated that exposure to smoking and reduced greenspace was associated with accelerated biological ageing and poorer cardiovascular health in the UK Biobank cohort, highlighting the combined impact of lifestyle and environmental factors.

Ciccarelli et al. identified critical gaps in understanding human chemical exposure from drinking water and advocated for harmonised non-target screening approaches to improve health risk assessments globally.

Climate change

QAEHS continues to lead impactful, policy-relevant research addressing the growing health risks associated with climate change. Spearheaded by A/Prof Dung Phung, the Centre's work spans a range of climate-sensitive health outcomes, including heat-related illness, infectious diseases, health system preparedness, and the evaluation of mitigation and adaptation strategies across urban, rural, and low-resource settings.

Staff and students

Theme Leaders: Phung, Fielding, Osborne
3 Research Fellows, 10 PhD students

Key research activities

E-DENGUE: Digital Prediction Tools for Climate-Driven Disease

A/Prof Dung Phung leads the E-DENGUE project (2023–2027), a flagship AU$8.4 million initiative funded by the Wellcome Trust (UK). This multi-institutional, transdisciplinary project is developing a user-friendly digital early warning tool that integrates climate, entomological, and health data to predict dengue outbreaks in Vietnam's Mekong Delta region. In 2024–25, the project expanded its community engagement component through extensive fieldwork and co-design activities with Vietnamese stakeholders—including the Ministry of Health, provincial health departments, and professional associations. These consultation workshops ensure the tool is fit for purpose, locally relevant, and ready for integration into Vietnam's public health surveillance system. The team's approach sets a model for stakeholder-informed, climate-resilient health technologies across Southeast Asia.

Capacity Building Through the New Colombo Plan

In addition to leading research, A/Prof Phung and Dr Stacey Pizzino delivered a high-impact New Colombo Plan (NCP) study tour to Vietnam, supported by the Australian Government. This two-week international mobility program, conducted in partnership with Hanoi Medical University, provided 11 undergraduate Health Sciences students from UQ with hands-on experience in global and environmental health. Through site visits, community dialogues, and workshops, students gained a deep understanding of how climate change intersects with health outcomes, infrastructure, and policy in low- and middle-income countries. The program not only enriched student learning but also strengthened institutional ties across the Indo-Pacific and supported Australia's regional engagement strategy.

Strengthening Global Health Preparedness

In 2024, A/Prof Phung also completed two partnership-building initiatives focused on global health system strengthening:

"Preparedness for health professionals to address global health emerging challenges", funded by the Australian Department of Foreign Affairs and Trade (DFAT), which delivered comparative insights into how developing and developed countries can collaborate to build more resilient health systems.

"Strategic Engagement Research Identification and Translation Workshop", funded through UQ Global Strategy and Partnerships Seed Funding, which facilitated deeper research partnerships and knowledge exchange between QAEHS and Vietnamese public health institutions.

Urban Heat Vulnerability: PhD Research in the Media Spotlight

Doctoral candidate Patrick Amoatey gained national media recognition in 2025 for his research into heatwave-related mortality and urban climate vulnerability. His study found that residents of major Australian cities face significantly elevated health risks during periods of extreme heat, largely due to the urban heat island effect, population density, and social inequities. The research, featured in 9News and UQ News, emphasises the critical need for climate-responsive urban planning, targeted heatwave preparedness strategies, and more robust early warning systems for vulnerable populations (9News article, UQ article).

Publication highlights

Beggs et al. demonstrated increased hospitalisations from infectious diseases with temperature rise in Vietnam, informing heat-health action plans.

Oberai et al. found that social media and weather alerts reduced economic burden during extreme heat events, supporting tailored communication strategies.

Amoatey et al. evaluated Victoria's Heat Alert system, showing significant reduction in temperature-related mortality post-implementation.

Phung et al. proposed a framework to improve the sustainability and local adoption of digital prediction tools for climate-sensitive infectious diseases. Drawing from global case studies and cross-disciplinary collaboration, the study highlights the importance of co-design, real-time data integration, and health system readiness in translating climate forecasts into effective disease prevention strategies.

Amoatey et al. this scoping review synthesised evidence on the health impacts of extreme heat in Australia, identifying vulnerable population groups and gaps in research. The findings support the development of heat-health early warning systems and adaptive public health planning in the context of climate change.

Amoatey et al. conducted a national longitudinal study, assessing changes in vulnerability to heatwaves across Australian communities over time. Results revealed that socioeconomic status, housing conditions, and geographical location significantly affect health outcomes during extreme heat events, underscoring the importance of localised climate resilience strategies.

Key funding

Current:
NHMRC e-ASIA (Phung)
NHMRC Healthy Lives and Environment (Osborne)
ARC Discovery Project (Fielding)
UQ Medicine Seed Funding (Phung)
ARC Industrial Transformation Training Centre (Carvalho, Fielding, Verhagen)

Microbiology and anti-microbial resistance

QAEHS continues to lead nationally and internationally in the field of environmental health microbiology and antimicrobial resistance (AMR), with over 30 publications from Professor Jianhua Guo and A/Prof Gilda Carvalho's teams over the past year. Their research spans emerging microbial risks in water systems, the environmental dimensions of AMR, and novel approaches to pathogen control.

Key research activities

A major research focus has been understanding waterborne opportunistic pathogens in drinking water systems, particularly *Legionella* and nontuberculous mycobacteria (NTM). Prof Guo and Dr Casey Huang, in collaboration with Professors Rachel Thomson and Scott Bell (Gallipoli Medical Research Foundation and UQ), published findings in *Water Research X* demonstrating elevated microbial growth in stagnant water systems during the COVID-19 pandemic. Their study underscored the importance of maintaining disinfectant residuals and implementing water risk management plans in public buildings outside the healthcare sector.

Building on this work, the team is now part of a multi-institutional collaboration with CSIRO, HeIDI, and Queensland Health to assess NTM prevalence in healthcare facility water systems. Their research also evaluates the effectiveness of conventional and alternative disinfectants against both planktonic and biofilm forms of NTM.

A/Prof Carvalho has explored phage therapy as a non-antibiotic strategy to combat persistent bacterial infections. In a study published in *Environmental Research*, her team demonstrated that bacteriophages can effectively disrupt and inactivate *Pseudomonas aeruginosa* biofilms, reducing biomass and killing bacterial cells. These findings highlight the potential for phages as a complementary or alternative treatment to antibiotics and chemical disinfectants.

QAEHS has also contributed to infectious disease surveillance innovations. In collaboration with Queensland Health, PhD candidate Yu Wang, under the supervision of Prof Guo, Dr Greg Jackson, and Dr Phil Choi, developed the ATOPlex tiling amplicon sequencing platform for wastewater-based surveillance of SARS-CoV-2. The method, which outperforms RT-qPCR in sensitivity, was presented at the 10th IWA MEWE Specialist Conference and published in *Water Research X*.

On the AMR front, Prof Guo's team has led several groundbreaking studies uncovering the role of non-antibiotic chemicals in the spread of resistance. One study published in *PNAS* showed that clinically relevant concentrations of antidepressants can induce resistance to multiple antibiotics, even after short-term exposure. The mechanism involves the overproduction of reactive oxygen species (ROS), activation of efflux pumps, and increased membrane permeability, contributing to the selection of persister cells and resistance mutations.

Another study, published in *ACS ES&T Water*, found that several non-antibiotic pharmaceuticals (including ibuprofen, gemfibrozil, propranolol, and sertraline) exhibit antibiotic-like effects, stimulating bacterial stress responses and gene expression linked to AMR development. These compounds not only increase ROS but also activate the SOS response and efflux pump genes, promoting resistance in environmental bacteria.

AMR in Aquaculture

A/Prof Nick Osborne co-authored a study examining antimicrobial resistance genes (ARGs) in sediments from 20 tilapia farming ponds in Southern China. Using high-throughput quantitative PCR, researchers detected 159 ARGs and 29 mobile genetic elements (MGEs). The findings revealed that antimicrobial residues accounted for over 30% of ARG variation, while sediment properties and MGEs also contributed significantly to ARG abundance, providing critical insights into the drivers of AMR in aquaculture and informing improved management strategies.

National Wastewater AMR Surveillance

Dr Jake O'Brien, now in year four of his NHMRC Investigator Fellowship, is developing a national surveillance strategy for AMR using wastewater analysis.

PhD student Jinglong Li analysed wastewater from 50 treatment plants across Australia to track the use of 102 antimicrobial agents, revealing widespread presence of 41 antimicrobials and 15 transformation products. The study found strong links between antimicrobial consumption and socioeconomic factors such as income, education, and health, offering valuable insights into population-level usage patterns.

The method is currently applied to influent samples across Australia and is being considered for use by the Department of Agriculture, Water and the Environment for monitoring effluent and biosolids.

Additional applications are planned for CRC-SAAFE and in partnership with the Animal Industries Antimicrobial Stewardship Strategy.

The project has engaged with the Interim Australian Centre for Disease Control's AMR Policy Section, positioning QAEHS at the forefront of national AMR response efforts.

International Doctoral Research on AMR Surveillance

QUEX PhD candidate Pooja Lakhey, co-supervised by QAEHS and the University of Exeter, is investigating the suitability of wastewater-based epidemiology for AMR surveillance, with an emphasis on quantifying and minimising uncertainties in data interpretation. She recently passed her confirmation milestone and will continue to split her research between Brisbane and Exeter.

Publication highlights

Ding et al. showed that common antidepressants accelerate the horizontal transfer of ARGs in gut microbiota, raising concerns over the unintended contribution of non-antibiotic pharmaceuticals to AMR emergence.

Lu et al. determined that common non-antibiotic pollutants like triclosan and silver nanoparticles can cause certain bacteria to break open and release antibiotic resistance genes. These genes can then be taken up by other bacteria, helping them become resistant too, suggesting that even everyday chemicals can play a role in spreading antibiotic resistance in the environment.

Luo et al. developed a risk ranking framework to assess antimicrobial resistance on microplastics, finding higher resistance gene risks on biodegradable plastics due to increased gene mobility and stress responses, and applied it to compare plastic types in environmental samples.

Zhai et al. developed and validated a low-cost 3D-printed air sampler for monitoring airborne antibiotic resistance genes, showing comparable or improved performance to commercial samplers, and applied it at a wastewater treatment plant to detect ARGs in high-risk areas like biosolids processing.

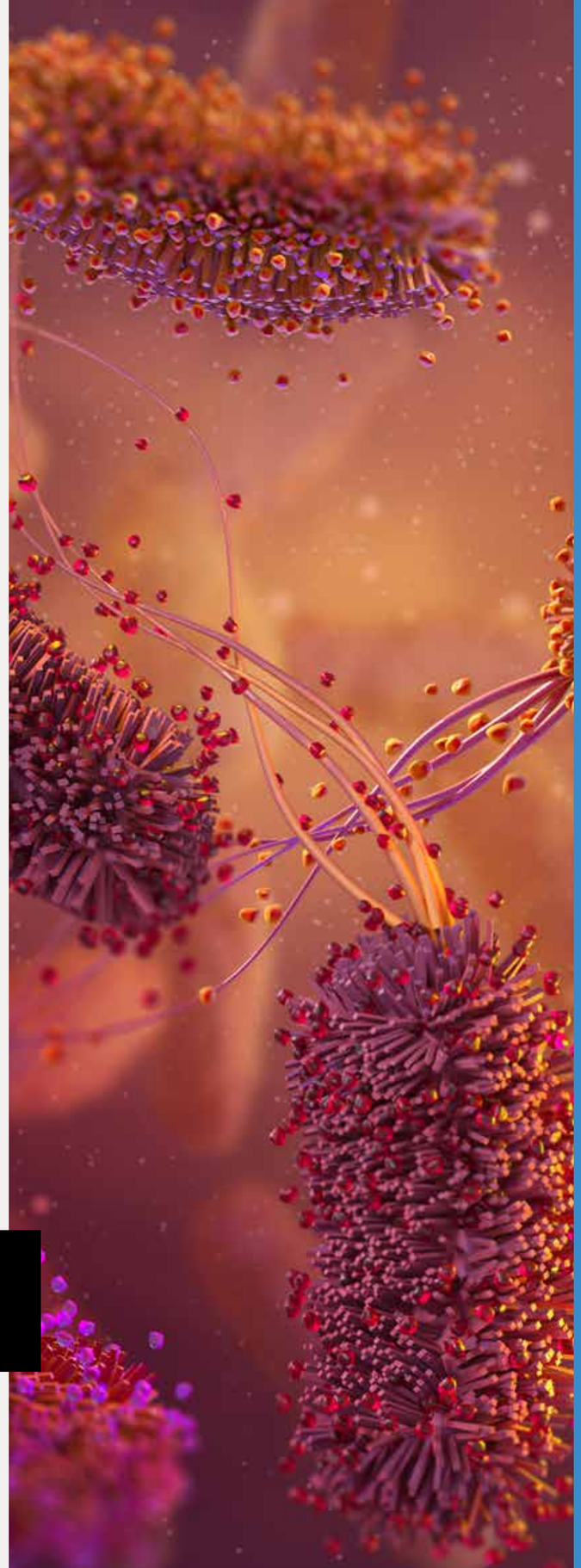
Patterson-Fahy et al. found that *M. abscessus* isolates from water sources showed co-resistance to disinfectants and antibiotics, raising concerns about pathogen persistence in water systems and implications for public health and infection control.

Key funding

Current:

ARC Discovery Project (Guo, Carvalho)
ARC Discovery Project x2 (Guo)
ARC Industrial Transformation Training Centre (Guo)
*ARC Linkage Project (Guo)
ARC Linkage Project x2 (Carvalho)
China Petrochemical Technology Company Ltd (Guo)
Cooperative Research Centre (O'Brien, Thomas, Guo, Carvalho)
Metro North HHS (Guo)
NHMRC Investigator (O'Brien)
ARC Linkage Project (Guo)

*QH leveraging funds



Staff and students

Theme Leaders: Guo, Carvalho, Thomas
4 Research Fellows, 13 PhD students

Research Spotlights

Combating pathogens from biofilms within premise plumbing systems (2025-2028)

Health care facilities can be susceptible localities for disease outbreaks from harmful pathogens, where the problem source is attributed to biofilms persistent in the premise plumbing. These pathogens, such as *Legionella*, cause significant disease with high mortality rates (up to 50%) and high hospital inpatient costs, estimated at $600 million AUD/year in the US alone. This project aims to improve the understanding of harmful pathogens in biofilms persistent in plumbing systems and to develop efficient water treatments that reduce their incidence in the biofilms. The project will bring significant environmental and economic benefits to Australia by removing potentially harmful reservoirs of pathogens from in situ water supplies.

Partners including Queensland Health, water utilities, and hospitals will greatly benefit through improved water treatment strategies and management of this health risk. These improvements will lead to cost savings for health care facilities relating to patient care and treatment, eradication of the opportunistic pathogens from their premise plumbing systems, and less disruption to facility operations.

CRC SAAFE

Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food, and Environments

CRC SAAFE unites industry, leading research organisations, and government agencies to protect Australia's food, agribusiness, and environmental sectors from the growing threat of antimicrobial resistance (AMR). With over 70 partners spanning sectors such as viticulture, aquaculture, horticulture, water, organic waste, stockfeed, and animal industries, CRC SAAFE will invest over $150 million by 2033 to develop and implement practical solutions that address AMR at its source. QAEHS, through UQ, is a partner in the CRC, and our theme leaders and researchers play an active role in CRC SAAFE, leading and supporting multiple projects.

Kickstart Project: Chemical Monitoring Tools - Initiation phase

Led by Dr Jake O'Brien, this project underpins the development of core chemical monitoring tools as part of CRC SAAFE's initial milestones. In collaboration with UniSA and Queensland Health, the project will deliver a foundational report on residue detection methods and priority targets, strengthening industry and research detection capabilities and paving the way for future large-scale chemical monitoring initiatives. The anticipated impact includes improved detection capabilities for industry and research, with the next steps leading to larger-scale projects addressing industry priorities in chemical monitoring.

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

Prof Jianhua Guo is involved in this project, which uses quantitative microbial risk assessment, epidemiological modelling, and Bayesian Network models to help manage antimicrobial resistance (AMR) risks in wastewater, water reuse, and biosolids. By mapping AMR pathways from antimicrobial use through water and food production systems, the research identifies critical control points, management options, and economic impacts.

As a sub-project of this broader CRC SAAFE project, Prof Guo has been awarded a top-up PhD scholarship to investigate how horizontal gene transfer (HGT) occurs in waterborne bacteria hosted by protozoa.

Top-up PhD Scholarship - Horizontal gene transfer in waterborne bacteria with their protozoan hosts

Opportunistic pathogens (OP) such as *Legionella* spp. and nontuberculous mycobacteria (NTM) are major causes of waterborne disease outbreaks. For bacteria, genetic exchange by horizontal gene transfer (HGT) is critical for survival and adaptation. In water systems, these OPs are predominantly found in biofilms associated with protozoa (mostly within amoebae). Previous studies at UQ have developed ways to label ARGs to follow HGT among bacterial pathogens of interest in various water systems. However, little is known on the rates of HGT within predatory amoebae by amoeba-resisting bacteria. This PhD project will investigate how protozoal predation affect the frequency and reveal why HGT is enhanced in protists.

Funding and recognition

Dr Elvis Okoffo (L) and Dr Richard Bade (R), Queensland Young Tall Poppy Awards 2024

Awards and prizes

Dr Dung Phung: Emerging Leader Award (Academic), Faculty of Medicine, UQ, 2024

Dr Richard Bade: Queensland Young Tall Poppy Finalist, 2024

Dr Elvis Okoffo: Queensland Young Tall Poppy Finalist, 2024; SETAC Australasia Early Career Medal, 2025; What's in Our Water 2024 Runner Up for Best Presentation Early Career Researcher

Chantal Keane: Australian Water Association Q'Water Conference Best Paper Finalist, 2024

Dhaya Nadarajan: Forensic and Clinical Toxicology Association (FACTA) Student Travel Award, 2025

Jinglong Li: SAAFE CRC AMR Solutions Summit 2024, Top 3 Student Poster Award; SETAC Asia-Pacific Student Research Grant, 2024

Ken Tang: SETAC Asia-Pacific 2024 Best Student Oral Presentation Award and Student Travel Award

Anh Kim Dang: Dang Van Ngu Award, 2024

Lily Weir: What's In Our Water 2024 Best Student Oral Presentation and Award for Highest Scoring in Student Abstract/Oral Presentation Criteria

Simran Kaur: SETAC Asia-Pacific Student Travel Award, 2024; Runner Up, 3MT School of Pharmacy/QAEHS, 2025

Arzoo Dhankhar: Best Poster Abstract International Society for Environmental Epidemiology, 2024

Tobias Hulleman: Second Place Student Poster Prize at the 20th Annual Workshop on High-Resolution Mass Spectrometry and LC-MS/MS Application in Environmental Analysis and Food Safety, 2024; First Prize and People's Choice, 3 Minute Thesis competition School of Pharmacy/QAEHS, 2025; People's Choice award, 3 Minute Thesis competition HMBS Faculty Final, 2025

Belinda Moore: Queensland Mass Spectrometry Symposium 2025, Best Lightning Talk

Chinonso Odebeatu: 2025 Dr Belinda Lloyd Memorial Translational Research Travel Grant

Pooja Lakhey: Best QAEHS Student Poster, School of Pharmacy/QAEHS HDR Day, 2025

Garth Campbell: Goodman Foundation research grant, 2025

2025 Best HDR Student Publication Awards

The HDR Student Best Publication Awards are to encourage and reward HDR students who are the primary authors of high-quality publications. Six HDR students submitted applications which were reviewed by a judging panel (Dr Greg Jackson Queensland Health, A/Prof Sarit Kaserzon QAEHS Theme Leader, Dr Grace Davies Postdoctoral Research Fellow and Dr Peter Moyle Director of HDR, UQ School of Pharmacy). The committee awarded four prizes.

1st place: Jinglong Li - National survey of the occurrence of antimicrobial agents in Australian wastewater and their socioeconomic correlates published in Nature Water journal.

2nd place: Dhaya Nadarajan - Application of design of experiment for quantification of 71 new psychoactive substances in influent wastewater published in Analytica Chimica Acta journal.

Commendation (tie): Reena Que - Trends of benzotriazoles and benzothiazoles in Australian pooled urine samples from 2012 to 2023 published in Environmental Science & Technology journal.

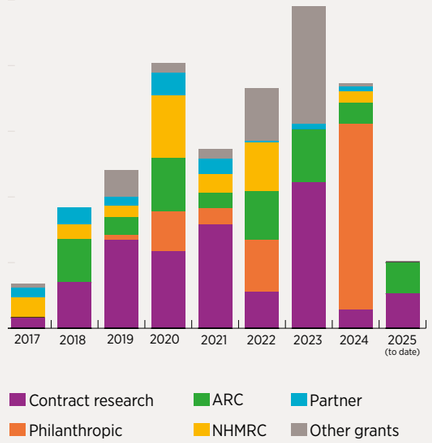
Commendation (tie): Zeyang Zhao - Refining the correction factor for a better monitoring of antidepressant use by wastewater-based epidemiology: A case study of amitriptyline published in Science of the Total Environment journal.

Competitive research funding

In 2024–2025, we secured $13 million in new funding, bringing the total awarded since 2016 to $104 million to date. In addition, our satellite theme leaders received a further $1.5 million in research funding this year supporting advancing our work in environmental health sciences. Queensland Health continues to have full access to all research activities, outcomes, and expertise across the alliance.

The outcomes of 29 competitive grant applications submitted in 2024–2025, valued at $12.4 million, are still pending. QAEHS researchers continue to maintain strong engagement with competitive funding opportunities, having submitted 33 applications in total this year, with 16 led by QAEHS researchers. As of 30 June 2025, a further 12 applications are under preparation. The success rate for applications this year was 37%.

Awarded funding by year



Fellowships

Dr Qiuda Zheng – Australian Research Council (ARC) Discovery Early Career Researcher Award (DECRA) Fellowship, *Understanding the vaping epidemic through novel integrative monitoring tool*.

Dr Richard Bade – The University of Queensland Amplify Fellowship.

6.

Collaborations and partnerships

We recognise that the true value of our science lies in its ability to create real-world impact, and that impact is strengthened through collaboration.

By partnering with those tackling environmental health challenges across diverse sectors, we ensure our research is relevant and applied. Our network spans more than 145 organisations, including government agencies, industry leaders, academic institutions, and community groups, and is grounded by our core partnership with Queensland Health. These relationships are central to our success and underpin long-term research initiatives, joint funding opportunities, and shared innovation that drives pogress and delivers benefits locally, nationally, and globally.

Partners and collaborators

- Aeris Cleantec AG
- AirHealth Pty Ltd
- Airservices Australia
- Arcadis
- Auckland University
- Australian Catholic University
- Australian Criminal Intelligence Commission
- Australian Defence Force
- Australian Department of Climate Change, Energy, the Environment and Water
- Australian Department of Health
- Australian National University
- Australian Organics Recycling Association Limited
- Australian Packaging Covenant Organisation Ltd
- Australian Tax Office
- Barwon Water
- Biotage Sweden AB
- Boston University
- Brisbane Airport Corporation
- Busselton Health Study
- Candy Soil Holdings Pty Ltd
- Cape York Water Partnerships
- Central Queensland University
- Colorado School of Mines
- CSIRO
- Curtin University
- Deakin University
- Dundee Precious metals
- Eurofins Environment Testing Australia
- ExxonMobil
- Flemish Institute for technological research
- Food Packaging Forum
- Freie Universitaet Berlin
- Future Fisheries
- Gold Coast City Council
- Great Barrier Reef Marine Park Authority
- Griffith University
- Hanoi Medical University
- HBM4EU
- HEAL (Healthy Environments and Lives)
- Healthy Land and Water
- Helmholtz Centre for Environmental research
- Indian Institute of Technology
- Institute of Science and Innovation in Mechanical and Industrial Engineering
- Italian National Institute of Health
- Jacobs Australia
- James Cook University
- Jožef Stefan Institute
- Kandy Hospital
- Karlstad University
- Karolinska Institutet
- Kimberly-Clark Australia Pty Ltd
- KWR Water Research Institute
- LaTrobe University
- Leibniz Research Institute for Environmental Medicine
- Masaryk University
- Massey University
- Melbourne Water
- MGI Australia
- Minderoo Foundation
- Ministry of Environment, Lands and Agriculture Developments, Kiribati
- Murdoch Children's Research Institute
- Murray State University
- National Institute of Epidemiology and Hygiene
- NeuRA
- Norwegian Geotechnical Institute
- NORMAN EU Network
- Norske Skog Paper Mills Ltd
- Norwegian Institute for Air Research
- Norwegian Institute for Water Research
- NSW Department of Climate Change, Energy, the Environment and Water
- NSW Environment Protection Authority
- NSW Ministry of Health
- Pasteur Institute in Ho Chi Minh City
- Plantic Technologies Ltd
- Queensland Corrective Services
- Queensland Department of Environment, Tourism, Science and Innovation
- Queensland Health
- Queensland Health Coronial and Public Health Sciences
- Queensland Water Directorate
- QUT
- Ramboll
- RCSI Bahrain
- Republic of Estonia Health Board
- Rhode Island University
- RMIT University
- RPS
- SA Water
- Seqwater
- Shimadzu Scientific Instruments
- SINTEF OCEAN
- Southern Cross University
- Sport Integrity Australia
- Stanford University
- Stichting VU
- Stockholm University
- Sullivan Nicolaides Pathology
- Swedish University of Agricultural Sciences
- Swiss Federal Institute of Aquatic Science & Tech
- Sydney Water
- The Chemours Company (Australia) Pty Ltd
- The University of Western Australia
- The Wesley Hospital
- Thermo Fisher Scientific Australia
- Trajan Scientific and Medical Pty Ltd
- Tsukuba University
- Umea Universitet
- Unilever Global IP Ltd
- United Nations Environment Programme
- United States Centre for Disease Control
- United States Department of Defense
- Universities Australia
- University of Adelaide
- University of Almeria
- University of Amsterdam
- University of Antwerp
- University of Athens
- University of Auckland
- University of Bath
- University of Birmingham
- University of Calgary
- University of Cambridge
- University of Dusseldorf
- University of Exeter
- University of Helsinki
- University of Hohenheim
- University of Luxembourg
- University of Medicine and Pharmacy in Ho Chi Minh City
- University of Melbourne
- University of Plymouth
- University of South Australia
- University of Stockholm
- University of Sydney
- University of Tartu
- University of Tasmania
- University of the South Pacific
- University of Wollongong
- Urban Utilities
- Ventia Utility Services
- Veolia
- Victoria Environment Protection Authority
- Vrije Universiteit Amsterdam
- Water Corp
- Water Research Australia Ltd
- Wellington Laboratories
- Yale University

Special interest groups

In December 2023, we established special interest groups (SIGs) to facilitate communication and discussion between Queensland Health and QAEHS/UQ on key topics in environmental health sciences.

Four initial topics were chosen from Queensland Health's ten nominated priority areas.

The SIGs are intended to be collaborative communities that provide a shared forum for advancing knowledge, sharing the latest scientific findings, discussing research ideas, addressing industry challenges, and exploring potential collaborations. Members work together to develop solutions within their specific fields, fostering innovation and progress. Activity across the groups this year is summarised below.

Antimicrobial Resistance

Over the past year, the Antimicrobial Resistance (AMR) Special Interest Group has maintained momentum with regular meetings every three months, holding four meetings in total.

Highlights included a joint session with the Wastewater Special Interest Group featuring a presentation from Anna Brischetto, Qld Health Coronial and Public Health Sciences, on wastewater-based COVID-19 and other pathogen monitoring in Queensland, as well as guest talks covering topics such as Hitchhiker's Guide to the Plastisphere: Influence of plastics on the transmission and evolution of antimicrobial resistance (Emily Stevenson, University of Exeter), CSIRO's AMR Hotspots program monitoring AMR infections in hospital and clinic patients across Australia, and UQ research on High-throughput screening for pollutants in spreading AMR in urban water systems (Le Gao, PhD Candidate).

This Special Interest Group has 39 members as of 30 June 2025, with 53% of members coming from Queensland Health and other external organisations outside of UQ.

PFAS

Since July 2024, the PFAS Special Interest Group has held four meetings. Members are actively working on the development of a fact sheet to provide simple and clear information about PFAS; what they are, how you can be exposed and ways to minimise personal exposure.

Meeting highlights included a presentation on by QAEHS PhD student Marina Suzuki on Chemical Contaminants in the Human Brain and Links to Neurodegenerative Diseases (Marina Suzuki, QAEHS PhD Candidate).

This Special Interest Group has 30 members as of 30 June 2025, with 23% of members coming from Queensland Health and other external organisations outside of UQ.

The Games 2032

During the reporting period, The Games 2032 Special Interest Group held three meetings.

The QAEHS Annual Research Forum provided a fruitful opportunity for SIG leader Dr Richard Bade to connect with members of the Queensland Health Public Health Community of Practice (CoP), which led to Dr Bade attending a CoP meeting in March 2025 and presenting an introduction of the Special Interest Group.

Special Interest Group presentations this year included research and insights on How Mass Gatherings Affect Populations: Literature Review Addressing Chemical and Pathogen Exposure (Natasha Thomson, UQ undergraduate student); Evaluating the Gold Coast Public Health Unit Enhanced Syndromic Surveillance System – a legacy from the 2018 Commonwealth Games (Victoria Marriott, Gold Coast Public Health Unit); The role of the UQ Office of 2032 Games Engagement in facilitating research opportunities related to the Olympics and Paralympics (Prof Bruce Abernathy, Executive Director, Office of 2032 Games Engagement, UQ); and, Disease surveillance and rapid detection of respiratory illness and gastroenteritis outbreak: use of point of care test and digital survey (Dr Josette Chor, Wide Bay Public Health Unit).

This Special Interest Group has 41 members as of 30 June 2025, with 53% of members coming from Queensland Health and other external organisations outside of UQ.

Wastewater surveillance

The Wastewater Surveillance Special Interest Group held three meetings this year, including a joint session with the AMR SIG featuring Anna Brischetto (Qld Health Coronial and Public Health Sciences) presenting on wastewater-based monitoring of COVID-19 and other pathogens in Queensland.

Other presentations included Monitoring Tobacco and Nicotine Consumption through Wastewater-Based Epidemiology (WBE) (A/Prof Phong Thai, QAEHS) and QAEHS PhD student Zeyang Zhao's work on correction factors for antidepressants.

This Special Interest Group has 29 members as of 30 June 2025, with 37% of members coming from Queensland Health and other external organisations outside of UQ.

Research visitors

Research visitors provide valuable opportunities to establish and strengthen collaborations with other researchers, students, and their institutions worldwide.

Since 2016, we have hosted 94 research visitors. On average, we have hosted approximately 13 visitors per year (excluding 2020, 2021 and 2022 due to COVID-related travel disruptions). These visitors have represented 57 universities and institutions across 26 countries, with an average stay of six months.

Since international travel resumed in 2022, visitor numbers have been returning to pre-COVID levels, and this year, we have hosted 5 visiting academics and 11 research students.

Name	Visitor Type
Emily Stevenson, University of Exeter	Student
Aopeau Imbittaya, Ministry of Higher Education, Science, Research and Innovation	Academic
Sina Schweizer, University of Hohenheim	Student
Muhammed Usman, University of Foggia	Student
Viktoriia Turkina, University of Amsterdam	Student
Derek Muir, Environment & Climate Change Canada	Academic
Holger Koch, Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, Institute of the Ruhr University Bochum (IPA)	Academic
Fatma Nur, Eskişehir Technical University	Student
Fangfang Lou, Zhejiang University	Student
Holly Pemberton, University of Bristol	Student
Jorge Lejo-Santiago, Universidade da Coruña	Student
Katharina Ebert, Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, Institute of the Ruhr University Bochum (IPA)	Academic
Eddie Chow, Kings College	Student
Sixu Liu, Kings College	Student
Jazmin Abou-Mourad, University of Houston	Student
Maria Jose Gomez Ramos, University of Almería	Academic

07.

Education and Training

The Centre is dedicated to supporting high-quality education and training through a strong and responsive framework that attracts talent, builds capability, and connects research with industry and government.

Our targeted PhD scholarships attract and nurture outstanding research students, ensuring a pipeline of skilled scientific leaders for the future. Tailored professional development workshops delivered in partnership with Queensland Health aim to strengthen the skills and knowledge of the current workforce. Our flexible Master of Environmental Health Sciences degree equips graduates with the practical expertise and research experience needed to tackle emerging environmental and public health challenges. The annual research forum and seminar series provide opportunities for knowledge exchange, networking, and collaboration across disciplines and sectors. We actively support Queensland Health staff in publishing peer-reviewed research, contributing to evidence-informed practice and policy. In addition, industry placements for students and academics create valuable pathways for practical experience, stronger partnerships, and real-world impact. Together, these activities demonstrate our commitment to developing skilled professionals, building research capacity, and driving solutions that benefit Queensland and beyond.

44
HDR students

12
Thesis submissions

8
Industry placements

9
Masters of Environmental Health Sciences graduates

11
Summer/winter research students

NEW
Wastewater course - summer school

Higher degree by research

Training the next generation of environmental health science leaders is central to our mission of creating solutions for the world's toughest environmental health challenges. Our HDR Program numbers have remained steady with 44 HDR students enrolled at the end of the reporting period. Three PhD scholarships were competitively awarded through the UQ Graduate School this year and one Masters student successfully converted to a PhD candidature.

44 QAEHS HDR students from 20 countries

Thesis submitted 2024—25

Mathieu Feraud

Advancing the non-target identification of per- and polyfluoroalkyl substances in environmental samples. (Conferred)

Anh Kim Dang

The metabolic syndrome in relation to nutritional status among adults in Vietnam. (Submitted)

Carly Beggs

Fate and behaviour of neonicotinoids in Australian aquatic environments. (Submitted)

Jinglong Li

Antibiotics and other chemicals that select for antimicrobial resistance in Australian wastewater. (Submitted)

Kavitha Karanam

Microplastics pollution in water systems: Issues and treatment. (Submitted)

Joongcheon Nam

Third-hand smoking of methamphetamine: investigation of the extent of contamination including airborne methamphetamine. (Submitted)

Eryn Wright

Understanding the dynamics of bat exposures among members of the general public in Queensland. (Conferred)

Stacey O'Brien

Microplastics in the air: Working towards understanding microplastics in the atmospheric environment, the plastic exposome and human respiratory exposure. (Submitted)

Cheng (Ken) Tang

Identification of plastic and adhesive-related oligomers that have migrated from multilayer plastic packaging intended for infant use. (Submitted)

Jingyu Liu

Methylation of inorganic arsenic from water and food. (Submitted)

Zhe Wang

Estimating use of nicotine containing products and evaluating tobacco-related health risks through wastewater analysis. (Submitted)

Carla Alongi

Investigating the fate of neonicotinoids in soil and runoff. (Submitted)

QAEHS scholarships

Supporting the QAEHS/Queensland Health partnership, the UQ Graduate School have contributed three dedicated domestic PhD scholarships to the Alliance for the 2023-2028 term. The scholarships will be competitively awarded to PhD projects that align with Queensland Health priority areas.

One scholarship was awarded in 2024 to PhD student Max Tyler, who is supervised by Professor Nicholas Osborne. Max's project, 'Early and Ongoing Pollen Exposure and the development and Exacerbation of Allergic Disease: A life course and real time Epidemiological Analysis', investigates how pollen exposure at different life stages influences the onset and progression of allergic conditions such as hay fever and asthma. By combining long-term data on early-life exposure with real-time symptom tracking in people with asthma, the study aims to support better prevention, symptom management, and public health guidance.

Nine PhD projects were advertised in 2025, with applications initially closing on 30 June 2025. No applications were received by the closing date and the application period has been extended. While attracting domestic PhD students remains challenging in the current environment, we are confident that the numerous benefits of a QAEHS scholarship will draw high-quality applicants over time.

Further details on our HDR students, including PhD topics and QAEHS scholarship holders, are provided in Appendix A.

Industry placements

Industry placements connect higher degree by research (HDR) talent with industry organisations to work on a project-based experience, for typically sixty days. These placements enable students to grow and develop in a real-world environment, while also making a significant contribution to the industry organisation. Placements can also offer industry staff the opportunity to develop and mentor emerging researchers.

This year, six PhD students completed industry placements and two students are currently engaged in placements.

- **Garth Campbell** - NSW Department of Planning and Environment
- **Honglin Chen** - NevHouse
- **Laura Puente** - Queensland Health, Health Protection and Regulation Branch
- **Nicole Schroeter** - The Loop Australia
- **Kim Anh Dang** - Queensland Health, Prevention Strategy Branch
- **Yuya Cheng** - Symbio Laboratories
- **Pooja Lakhey** - Queensland Health, Health Protection and Regulation Branch
- **Lily Pan** - Tangaroa Blue Foundation

"In the second year of my PhD, I had the opportunity to participate in an industry placement at a company endeavouring to reduce landfills by converting municipal solid waste into useful products. This experience allowed me to apply my transferable skills, such as project management and grant research, in a new and challenging context.

By stepping outside academia, I gained valuable insights into how my skills could be adapted across different industries, enhancing my employability and broadening my professional networks. I also learnt the necessity of risk assessment and management to mitigate risks in business. The placement provided a chance to explore career paths beyond academia and foster a deeper understanding of the diverse applications of my research skills."

Honglin Chen, PhD Candidate

HDR 3 Minute Thesis Competition

The 3MT® is an academic competition that challenges PhD students to explain their research in just three minutes to a general audience. It celebrates the discoveries made by research students and enhances their ability to communicate the importance of their research to the broader community.

The annual School of Pharmacy and Pharmaceutical Sciences/ Queensland Alliance for Environmental Health Sciences Three Minute Thesis competition was held on 2 July 2025.

This year's competition featured 12 QAEHS HDR students, who each presented their research to an engaged audience. Presenters included Reena Que, Simran Kaur, Dhaya Nadarajan, Zeyang Zhao, Jianan Ren, Pooja Lakhey, Honglin Chen, Lily Pan, Yuya Cheng, Marina Suzuki, Tobias Hulleman and Ruvini Weerasinghe. The winners of this year's competition were:

- Tobias Hulleman, First Prize and People's Choice Award - "Fast and suspicious: Predicting environmental mobility using machine learning"
- Simran Kaur, Runner-up - "Who let the crumbs out?"

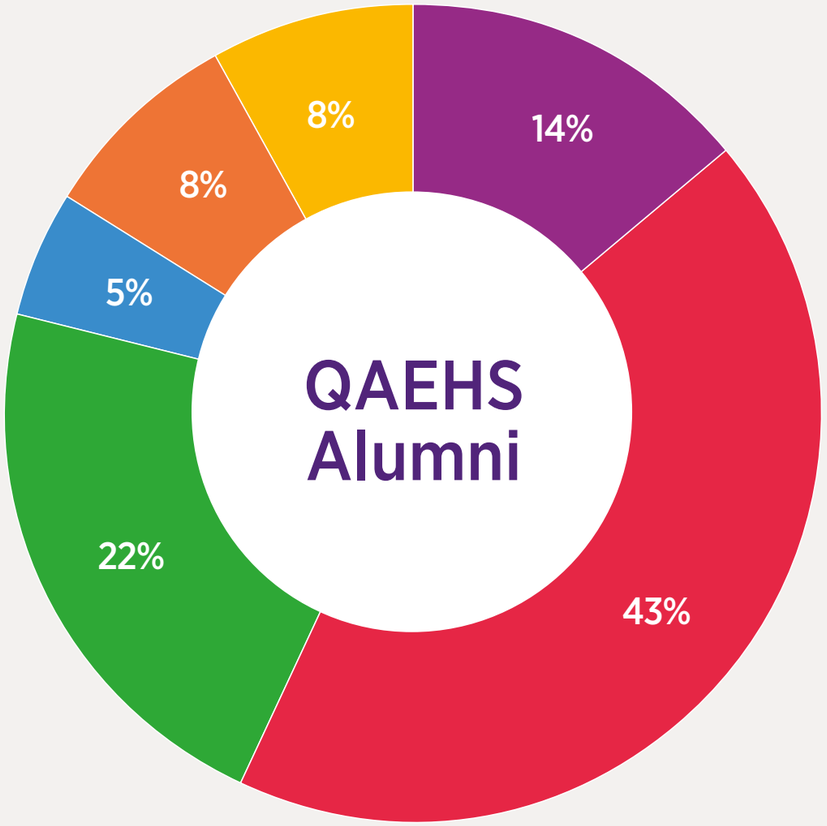
Tobias advanced to the Health, Medicine and Behavioural Sciences Faculty Final, and was awarded the People's Choice Award. He will now progress to the Wildcard Competition (2 September 2025) to compete for a chance to participate in the University wide 3MT® Competition.

Tobias Hulleman advanced to UQ's University wide 3MT competition.

Alumni

Since 2016, QAEHS has produced 37 PhD graduates. Around half have continued into postdoctoral research careers in academia, while others have moved into key roles in industry, government organisations, and research institutions.

We invited two QAEHS alumni, Dr Katja Shimko and Dr Stephen Burrows, who are pursuing careers in industry and government respectively, to share insights into their post-PhD journeys.



Dr Katja Shimko

Senior Scientist for Eurofins PSS Insourcing Solutions

PhD Title: Evaluating the suitability of wastewater analysis for the detection and monitoring of performance- and image-enhancing drug use

What was your PhD about?

Performance- and image-enhancing drugs (PIEDs) are substances that are being used by athletes and non-athletes to improve physical appearance and performance despite well documented negative health side effects. The use of PIEDs in the community is generally estimated and monitored by combining data from surveys, needle syringe programmes, anti-doping testing, and seizures. As these methods have many limitations for prevalence and use monitoring, the goal of my PhD project was to assess the suitability of wastewater analysis for this purpose. Firstly, I determined and selected appropriate biomarkers of PIED use, then developed and validated an SPE LC-MS method for their quantification in wastewater. After evaluating the stability of each biomarker in the sewer system as well as after collection, I analysed samples collected from 51 Australian wastewater treatment plants. The final study revealed the widespread presence of PIEDs in the samples collected.

How did QAEHS assist in the development of your PhD research?

The people at QAEHS are fantastic. The group is very collaborative, and the professors, postdocs, students, and professional research staff have such diverse professional backgrounds, and that creates an environment in which research can truly thrive. My advisory team was extremely supportive, knowledgeable, and always available to help me when I encountered a roadblock. I was able to work with state-of-the-art instrumentation and had the opportunity to learn how to maintain and troubleshoot the instruments. This is now a significant part of my current role, and I am able to apply what I learned at QAEHS.

What does your current career involve?

In my role as Senior Scientist at Eurofins PSS Insourcing Solutions, I support the analytical team at the Boston location of one the world's largest pharmaceutical companies. I assist the group with instrument maintenance and troubleshooting as well as determining and tracking instrument performance for HPLCs and LC-MS (TOF, QTOF, Orbitraps). I also help with method development for analyte characterization and purity analysis.

What does your current research look like?

The analytical team I work in supports the chemists' needs regarding analytical capability. We ensure that the instruments are maintained and performing well to make sure that the results are of high quality. The chemists work in discovery which often leads to the need for additional analytical methods that we are asked to research, develop, and provide. We develop methods for the characterization of different modalities such as oligonucleotides, small interfering RNA (siRNA), and monoclonal antibodies (mAbs). In addition, we develop methods to determine the purity of specific targets so that they can then be used for in-vitro and/or in-vivo testing/dosing.

Dr Stephen Burrows

Senior Policy Advisor for UK REACH

PhD Title: Microplastic pollution: From nanoscale surface interactions to public perceptions

What was your PhD about?

My PhD was an interdisciplinary study into microplastic pollution primarily split into two parts. Part one, was a laboratory-based investigation into microplastic surface interactions. This included examining how microplastics physically and chemically weather by UV exposure. Part two, was an investigation into public perceptions of microplastic pollution and the role of science communication.

How did QAEHS assist in the development of your PhD research?

QAEHS provided a wealth of expertise to supervise and support the development of my research. This was both from internal and external collaborators, as QAEHS is very well connected to a wide range of researchers within and beyond UQ. The technical expertise at QAEHS provided a strong foundation on which I could test ideas and trial new areas of my research with confidence. From the leaders to the post-doc group, to the technical staff, QAEHS is also full of excellent mentors. I learnt a great deal from them during my time there. My experience at QAEHS equipped me with a skillset and perspective I needed to continue progressing my career.

What does your current career involve?

I'm currently a senior policy advisor for UK REACH within the Department for Environment, Food and Rural Affairs in the UK. REACH stands for Registration, Evaluation, Authorisation and Restriction of Chemicals. It's the largest chemicals regulation in Great Britain, primarily aiming to provide a high level of protection to human health and the environment from chemicals. My role is primarily to facilitate decisions to add substances to the Restriction and Authorisation lists under UK REACH.

What does your current research look like?

I analyse and synthesise technical evidence relevant to a wide range of substances. Working across multi-disciplinary teams of scientists, economists and legal colleagues I deliver key policy outcomes relevant to developing chemical policy for Great Britain.

Master of environmental health sciences

The Master of Environmental Health Sciences (MEHSc) commenced in 2019 with three award options – Masters, Graduate Certificate and Graduate Diploma in Environmental Health Sciences.

The MEHSc program aims to equip mid-career professionals and future leaders with the skills to manage complex environmental health challenges more effectively. By leveraging the strengths of multidisciplinary teams and perspectives for addressing complex challenges, the program prepares graduates for various roles, including providing science-based information and advice, developing policies, regulations, and guidelines, identifying hazards, assessing and managing health and safety risks, and communicating risks and mitigation strategies to stakeholders.

The Masters of Environmental Health Sciences has had 9 students graduate in 2024-25.

There are presently 34 students enrolled in this program:

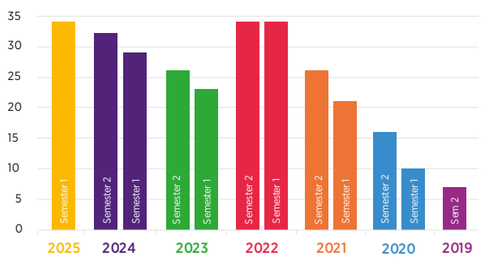
- 26 Masters, 5 Graduate Diploma, 3 Graduate Certificate
- 62% are international students

This year, there were 1,068 total enrolments across the individual courses offered in the Masters program. Intro to Epidemiology had the most enrolments in an individual course, with 25% of all individual course enrolments.

Our Theme Leaders and team members are teaching four of the MEHSc courses.

- Risk Communication (Core), Semester 2, 2024 – Prof Kelly Fielding
- Chemical Hazards (Core), Semester 2, 2024 – Dr Jake O'Brien
- Preventing Disease through Healthy Environments (Core), Semester 2, 2024, A/Prof Dung Phung
- Biological Hazards (Core), Semester 1, 2025 – A/Prof Gilda Carvalho

MEHS enrolments across all awards



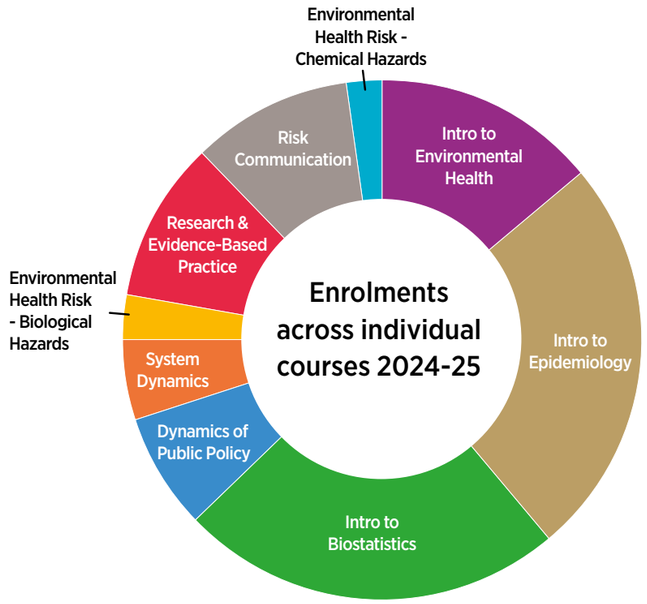
View the course online

New in 2025

Wastewater Surveillance: basics and applications in public health

QAEHS Theme Leaders A/Prof Nick Osborne and A/Prof Phong Thai have developed a new course on wastewater surveillance which will be run over an intensive 5 days in December 2025.

The course will provide an in-depth understanding of wastewater surveillance as a tool for public health surveillance. Students will explore how wastewater samples are collected, analysed, and used to track indicators of disease spread, such as viral RNA, antibiotic resistance genes, or environmental toxins. The course will cover laboratory techniques, statistical methods for data interpretation, and how surveillance systems can be integrated into public health infrastructures.



Professional development and education

Guest Lectures

QAEHS researchers share their work through guest lectures at universities, and industry events. This year, the following researchers have delivered guest lectures:

- A/Prof Gilda Carvalho, Drinking water treatment biofilm technology at the Seqwater Innovation Festival, July 2024.
- Dr Jake O'Brien, Wastewater-Based Epidemiology – What is it and how we have relied on analytical chemistry to develop it for the HyTECH Seminar Series, September 2024.
- Dr Pradeep Dewapriya, Application of High-Resolution Mass Spectrometry in Environmental and Exposure Monitoring for SCIEX Head Office Ontario, Canada, October 2024.
- Dr Jake O'Brien, Insights into what is achievable through National Wastewater Surveillance Program for Antimicrobial Resistance for Water Research Australia, November 2024.
- Dr Fisher Wang, Air monitoring of trace organic pollution – The Australian practice at the Chengdu University of Information Technology, December 2024.
- Dr Elvis Okoffo, Comprehensive characterisation of plastics exposure in Australian environment – from source to sink for the EPA Victoria Applied Sciences Division Seminar Series, December 2024.
- Dr Jake O'Brien, Taking the piss, for Science! for Water Elders of Queensland, February 2025.
- Dr Fisher Wang, Emissions of chemicals from bushfires and associated human exposure risk at the Chengdu University of Information Technology, April 2025.

Lunchbox sessions with Queensland Health

QAEHS theme leaders and researchers were invited to participate in Queensland Health's 'Lunchbox Talks', a 30-minute talk and Q&A via Microsoft teams, held over lunchtime.

- Improving resilience to climate-enhanced taste and odour challenges in drinking water, A/Prof Gilda Carvalho, 21 August 2024
- Investigating PFAS in drinking water and bottled water, Dr Sara Ghorbani Gorji, 2 July 2025

New Colombo Plan

A/Prof Dung Phung and Dr Stacey Pizzino, in partnership with Hanoi Medical University (HMU), led 11 UQ Australian undergraduate students in Health Sciences to conduct a New Colombo Plan program in Vietnam. The 2-week study tour provided students with an invaluable opportunity to enhance their understanding of global health in the context of climate change.

The New Colombo Plan (NCP) student mobility program, an Australian Government initiative, aims to lift knowledge of the Indo-Pacific in Australia by supporting undergraduate to undertake study, language training and internships in the Indo-Pacific.

Summer and winter research program

The University of Queensland's Summer and Winter Research Programs, run during the summer and winter university breaks, provide undergraduate students with an opportunity to gain research experience working on dedicated projects alongside leading academics and researchers. The summer and winter programs run for 6 and 4 weeks respectively. Our researchers actively participate in the program and this year, we have hosted 11 research students.

Hana Purwanto

Project: Improved monitoring of human exposure to hazardous chemical pollutants (Pradeep Dewapriya)

Ayla Aykac Kocak

Project: Investigating PFAS and Unknown Contaminants in Bottled Water (Sara Ghorbani Gorji)

Yifeng Ying

Project: Evaluating drug and pharmaceutical exposure in serum and wastewater (Richard Bade)

Huajun Ma

Project: Investigating pets health. Are domestic dogs and cats exposed to harmful environmental contaminants? (Sarit Kaserzon)

Jiahui Zhang

Project: Investigating nicotine use in a major city over time (Phong Thai)

Angrisa Piamrojanaphat

Project: Designing 3D-printed passive samplers for environmental monitoring (Rory Verhagen)

Wan Qi Goh

Project: Investigating pets health. Are domestic dogs and cats exposed to harmful environmental contaminants? (Sarit Kaserzon)

Beri Nguyen

Project: Investigating nicotine use in a major city over time (Phong Thai)

Amika Tanglumlert

Project: Hidden contaminants in cosmetics (Sara Ghorbani Gorji)

Tisha Shahphon

Project: Investigating tyre related pollution in urban environments (Cassie Rauert)

Niharika Rongali

Project: PFAS in bottled water (Sara Ghorbani Gorji)

08.

Communication and impact

Effectively communicating our research through a range of channels is essential for reaching diverse audiences and maximising impact.

While publications, conferences, and workshops remain core to scholarly exchange, modern platforms like websites and social media help present our work in accessible, engaging ways. Community events further connect our research with the public, sparking curiosity and understanding of complex scientific issues.

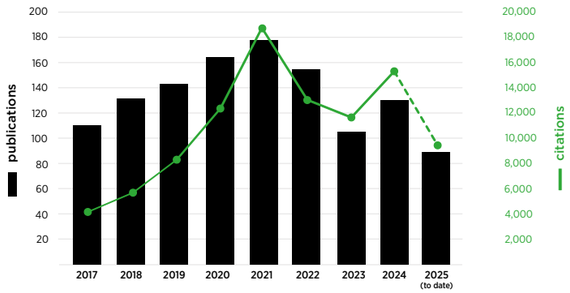
These varied communication strategies ensure our findings reach policymakers, industry, and the broader community, transforming technical knowledge into practical insights that drive innovation and informed decision-making. This year, in line with our strategic plan, we have continued to strengthen these efforts, reflected in increased uptake of our research, invitations to present nationally and internationally, growing seminar audiences, and strong media coverage — all highlighting the reach and impact of our work.

Research quality, influence and global reach

Our research outcomes are primarily shared with the scientific community, government, and the public through peer-reviewed publications in leading journals.

While there was a drop in publication outputs in 2023, likely linked to the departure of former Theme Leader Prof. Abdullah Mamun, our publication activity has since stabilised. Early data for 2025 shows we are on track to exceed our 2024 output. Citations have remained strong and consistent outside the COVID-19 peak period, highlighting the ongoing relevance and impact of our work.

Our research is highly collaborative with global significance and reach, with publications co-authored with more than 147 institutions worldwide and cited in 192 countries. This wide reach ensures our research informs policies, shapes practice and contributes to knowledge globally.



QAEHS Publications and citations 2017-2025

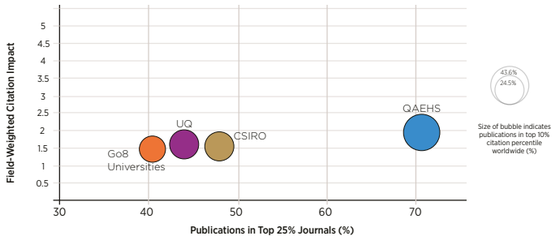
Research quality

Comparisons with leading Australian research institutions show that our outputs continue to perform above average in research quality, as demonstrated by the key metrics in the figure below.

In 2024–25, our researchers published across 22 subject areas, producing 128 publications in 2024 and 88 to date in 2025, with over 24,000 citations combined.

Our work maintains its strong focus on quality demonstrated by 70.7% of publications appeared in Q1 journals (top 25% of journals worldwide) and 6.2% of our papers rank in the top 1% most cited, more than double the UQ average of 3%.

The chart below compares our research metrics to The University of Queensland (UQ), CSIRO and the Group of Eight Universities (Go8). Plotted is the field-weighted citation impact (a measure of the citation impact compared to global averages in the field) against the percentage of publications in the top 25% of journals. Each bubble shows the share of publications in the top 10% globally by citations (see legend).



Policy Impact

Since QAEHS was established, publications have been cited in more than 180 policy documents across 15 countries, with the main sources being the World Health Organization, Washington State Department of Ecology, Publications Office of the European Union, World Bank, Environmental Protection Agency (EPA), and the Centers for Disease Control and Prevention (CDC). These citations demonstrate the global impact of QAEHS's solution-driven research, which delivers direct benefits to industry and government. This year, our work was cited in three policy documents in Sweden.

Altmetric Attention

Altmetric measures how much interest and engagement publications generate beyond the academic community. Unlike traditional citation counts, the Altmetric Attention Score tracks online mentions across news, social media, policy documents, and other platforms, providing real-time insights into the broader reach and influence of QAEHS's scholarly work.

For the 2024-25 reporting period, 129 QAEHS publications were tracked in Altmetric, generating a total of 1,282 mentions across various platforms. Of these, 73 have been deemed 'outputs with attention', (meaningful mentions that have measurable engagement and impact), and 22 publications ranked in the top 5% of all research outputs scored by Altmetric. Additionally, there were three policy mentions from two unique policy sources. Overall, the total mentions came from 979 distinct sources.

The most frequently mentioned research output during this reporting period was Evidence of time-dependent degradation of polypropylene surgical mesh explanted from the abdomen and vagina of sheep by Farr et al.

Another highly mentioned publication was Influence of ENSO, droughts, and temperature rise on pollen and pollen seasons in Australia by Dhankhar et al., published in April 2025. Despite its recent release, this publication has already received significant attention.

Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) aim to end poverty, protect the planet, and improve global well-being by 2030, focused on 17 goals with 169 targets aimed at stimulating action in areas of critical importance to humanity and the environment.

To date, QAEHS research outputs are aligned with 15 of the 17 UN Sustainable Development Goals, contributing to the centre's strategic commitment to address pressing global challenges. The top three Sustainable Development Goals to which QAEHS' work has contributed significantly are SDG 6: Clean Water and Sanitation; SDG 3: Good Health and Well Being; and SDG 11: Sustainable Cities and Communities.

Ongoing attention for COVID-19 wastewater surveillance study

Our 2020 publication, *First confirmed detection of SARSCoV-2 in untreated wastewater in Australia: A proof of concept for the wastewater surveillance of COVID-19 in the community*, has been cited in seven policy documents by the World Health Organisation, Welsh Government, Brazilian Ministry of Health, and Brazil's National Water and Basic Sanitation Agency). To date, all mentions reflect 100% positive sentiment, and the publication ranks in the top 5% of all research outputs scored by Altmetric. It continues to attract attention, with the most recent mention appearing in a blog post in February 2025.

Conference engagement

Attending conferences is important for sharing research, exchanging knowledge, and building networks that strengthen professional development and expertise.

This year, 53 researchers across the alliance participated in 54 national and international conferences, presenting their work through oral presentations, poster sessions, and panel discussions. Many also contributed as conference organisers, session chairs, or members of scientific committees, further increasing the visibility of our work and enhancing the Centre's profile and influence.

Reflecting a return to pre-COVID norms, over 90% of these conferences were attended in-person, enabling richer collaboration, effective networking and meaningful knowledge exchange, crucial in enhancing the researchers research capabilities and personal development.

International Mass Spectrometry Conference 2024

QAEHS supported a significant cohort of staff and HDR students to attend the International Mass Spectrometry Conference held in Melbourne, Victoria, in 2024. Professor Kevin Thomas, Dr Cassie Rauert and Dr Jake O'Brien were joined by PhD students Tobias Hulleman, Ruvini Weerasinghe, Simran Kaur, Laura Puente, Lily Pan, Honglin Chen and Jinglong Li. For some of these students, it was an invaluable opportunity to attend their first international conference, gain exposure to global research developments, and connect with peers and experts in the field.

What's in Our Water 2024

The What's in Our Water conference, held from 29-31 October 2024 in Canberra, brought together experts and stakeholders to address critical water health issues. QAEHS researchers Prof Kevin Thomas, Dr Elvis Okoffo, and PhD students Lily Weir, Jinglong Li, and visiting student Ke Shi attended the event.

Dr Okoffo presented his research on the release of micro- and nano-sized particles from plastic articles during mechanical dishwashing and was awarded runner-up for the Early Career Researcher Best Presentation. Lily Weir won Best Student Presentation for her research titled From River to Sea: Spatial Variation in Chemical Biodegradation Rates Applying a Modified OECD 309 Laboratory Experiment. Ke Shi presented on Microplastics and Nanoplastics in Australian Water: Characterization, Sources and Exposure, and Jinglong Li shared findings from his project, National Reconnaissance of Antimicrobial Occurrence in Australian Wastewater and their Socioeconomic Correlates.

2nd Nano & Microplastics Australian Conference 2025

Prof Kevin Thomas, Dr Cassie Rauert, Dr Elvis Okoffo, Dr Grace Davies, and HDR students Lily Pan and Gabe De la Torre attended the 2nd Nano & Microplastics Australian Conference in Adelaide, South Australia, in March 2025.

Prof Thomas delivered a keynote presentation on Plastic Particles and Human Health: Addressing Analytical Challenges in Exposure Assessment. Dr Rauert presented research on spatial trends of tyre wear particles and additive chemicals along a major Australian road, while Dr Okoffo discussed the quantitative analysis of micro- and nanoparticles in environmental samples using pyrolysis gas chromatography–mass spectrometry. PhD candidate Lily Pan presented her work on the translocation of nanoplastics across in vitro human gut-blood and blood-brain barrier models, and Gabe De la Torre presented on quantifying small antifouling paint particles in sediments using the same analytical technique.

Save the Date

Plastics2026 Conference 1-4 March 2026

Plastics pose growing health concerns across their entire lifecycle, from production and use to disposal, due to exposure to harmful additives, nano- and microplastics, and environmental contamination. These substances are increasingly found in air, water, and food, raising significant public health questions.

Despite numerous environmental-focused events, no major international conference has yet addressed the full scope of human health risks from plastics. In 2026, QAEHS will host a multi-day symposium in Brisbane that will address this critical gap by uniting global experts to advance scientific understanding, inform policy, and develop strategies to minimise health impacts.

Image: The QAEHS team at IMSC 2024

Media and social media

Traditional Media

Media reach plays an important role in ensuring visibility and real-world impact of our research by raising public awareness and cultivating community and stakeholder engagement. This year, extensive coverage across television, radio, print, and online outlets has showcased our research and expertise to diverse audiences locally, nationally, and internationally.

This reporting period our research featured in 118 media mentions, reaching a potential audience of 837 million people. By comparison, last year we recorded 616 media mentions with potential reach of 625 million people. While the total number of mentions was lower this year, the broader reach indicates that the quality and public interest in our outcomes enabled them to acheiveachieve greater impact and wider circulation.

These results reflect our ongoing commitment to sharing research insights that inform and influence policy and build public awareness of critical environmental and health issues.

Notable media articles with significant attention this year:

- Prescription changes lead to drop in oxycodone use, Dr Rory Verhagen, Research Fellow (Sept 2024)
- Australia-first study finds “forever chemicals” in human brain tissue, Marina Suzuki, PhD Candidate (Feb 2025)
- Lethal synthetic opioids found in Australian wastewater, Dr Richard Bade, Research Fellow (Mar 2025)
- Dishwashing a source of microplastic pollution, Dr Elvis Okoffo, Research Fellow (May 2025)

Media articles are published on the QAEHS website.

YouTube

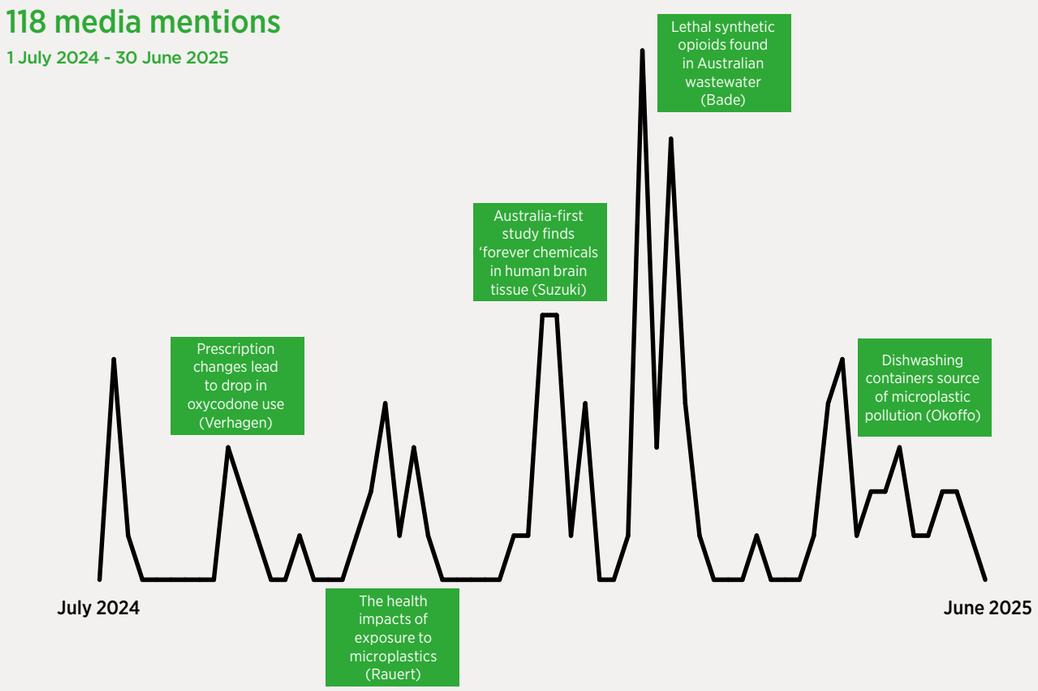
In 2022, a dedicated YouTube playlist was launched, aimed at enhancing visibility, impact, and accessibility of our research findings. This mode of communication offers an additional platform to share our work in an engaging and accessible way, facilitating global outreach enabling our research to reach audiences beyond geographical boundaries and academic circles. The platform’s interactive features foster discussions and feedback that contributes to knowledge exchange in the environmental health sciences community.

Since its creation the YouTube playlist has garnered 1,008 views, with the QAEHS introduction video accounting for almost half of the total views. As we develop the playlist, we envision it evolving into a central hub for QAEHS research and knowledge dissemination.

During the 2024-25 reporting period, three new videos have been added to the playlist:

- July 2024: Development of passive sampling methodologies for per- and polyfluoroalkyl substances (US DoD SERDP Project).
- May 2025: Environmental Epidemiology
- May 2025: Australian Environmental Specimen Bank

View our YouTube playlist.



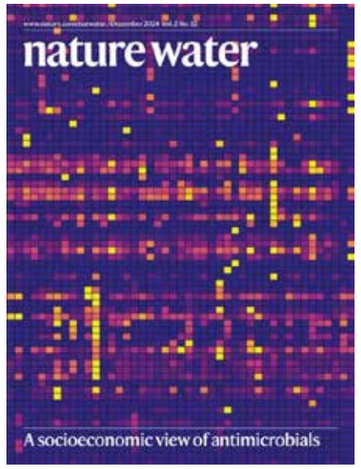
Facebook Engagement

Facebook continues to be an effective supporting platform for research dissemination, leveraging its broad and diverse user base to extend the reach of our news and activities. It provides an additional channel to showcase our research outcomes, highlight awards and achievements, and promote available PhD scholarship opportunities to a wider audience.

This year, we shared 11 posts, with engagement levels varying according to topic and audience reach. The posts that attracted the highest engagement included a journal article by PhD student Jinglong Li, which featured on the front cover of *Nature Water* in December 2024, a significant paper that generated strong interest and positive feedback.

Another standout post was the promotion of QAEHS PhD projects available through The University of Queensland and University of Exeter’s QUEX Scholarship scheme, which drew high levels of attention from prospective students.

Follow us on Facebook.



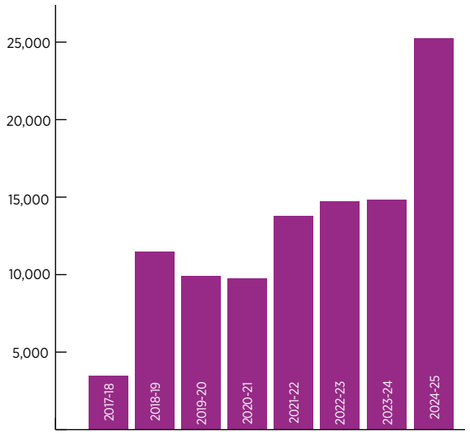
Website

Website engagement has increased this year, showing a significant increase in visitors compared to last year, 25,280 visitors and 14,820 respectively. Peaks in traffic typically coincide with key events such as media coverage, major announcements or PhD scholarship advertisements. Notably, engagement has also been boosted by interest in the upcoming Plastics2026 Conference and visits to its dedicated event webpage.

Our global audience has remained steady and diverse, with visitors from 136 countries. Notably, Ireland have entered the top 10 for the first time and can be attributed to the Minderoo PMBT held in Ireland in 2024. Australian visitors account for 77% percent of total visitors, with the USA and China maintaining second and third, maintaining the position as the 2023-24 period from these regions.

The home page continues to attract the highest number of views, followed consistently by the ‘Our People’ page, highlighting interest in our researchers and their work. This year, researcher profiles for theme leaders A/Prof Thai, Prof Guo and A/Prof Phung, rounded out the top five most visited pages.

Regular content updates and the addition of new pages throughout the year have contributed to sustained interest. Planned upgrades and further improvements in the next reporting period will continue to advance our aim of maintaining an engaging and informative digital space for our stakeholders, collaborators and the broader community.



Website unique visits by year

Events

Seminar Series

The QAEHS Seminar Series continues to broaden our reach and strengthen our reputation by featuring a diverse line-up of engaging speakers and topics. This year's program brought fresh perspectives and showcased innovative research, enriching the experience for attendees and enhancing the value of the series for our Centre and its wider network.

The Seminar Series plays a key role in facilitating knowledge exchange and sparking meaningful discussion among researchers, students, and stakeholders. It creates an inclusive environment that encourages interdisciplinary collaboration and open sharing of ideas across fields and institutions.

Live streaming ensures they are widely accessible, enabling participation from a broad range of stakeholders, including Queensland Health staff, industry partners, and members of the broader scientific community interested in our research. In 2024–25, forty-five external, internal, and visiting researchers and students presented their latest research findings through the Seminar Series, demonstrating the breadth of expertise and the strength of our network within and beyond QAEHS.

- **Brent Gilpin**, Institute of Environmental Science, New Zealand – "Detection and characterisation of microorganisms in drinking water, surface water and wastewater".
- **Zhanyun Wang**, Swiss Federal Laboratories for Materials Science and Technology (EMPA), Switzerland – "Deep dive into chemicals in plastics".
- **Mark Curran**, Australian Antarctic Division, Australia – "Secrets from the past: Using Antarctic ice cores to unlock detailed information on climate variability over the last 2000 years, including a proxy for Queensland rainfall".
- **Else Holmfred**, Stanford University, United States – "Drug counterfeits – identification via light stable isotopes and trace elemental patterns".
- **Xiao Tan** and **Zhuojing Yang**, The University of Queensland – "Novel fluoropolymer sorbent for efficient and selective capturing perfluorinated compounds".
- **Marie Mardal**, University of Copenhagen, Denmark – "Digital biobanks for untargeted biomonitoring data".
- **Aopeau Imvittaya**, Department of Science Service, Thailand – "Investigation of microplastic contents in Satun UNESCO Global Geopark".
- **Ethel Eljarrat**, Institute of Environmental Assessment and Water Research, Spain – "Assessing human exposure to organic pollutants in different consumer materials: the case studies of face masks and menstrual products".
- **Susan Bengston-Nash**, Griffith University – "Monitoring Antarctic sea-ice with humpback whales".
- **Yael Dubowski**, Israel Institute of Technology, Israel – "Exposure to airborne pesticide drift from agricultural applications".
- **Holger Koch**, Ruhr-University Bochum, Germany – "Basic principles of Human Biomonitoring (HBM): from exposure to risk assessment".
- **Sarah Stone**, Department of Climate Change, Energy, the Environment and Water, Australia – "Analytical chemistry data for Government decision making".
- **Glen Walker**, Department of Climate Change, Energy, the Environment and Water, Australia – "The role of research in the sound management of chemicals on a national and global scale".
- **Derek Muir**, Environment & Climate Change Canada – "Progress in environmental analytical chemistry and modelling of UVCBs in support of chemicals management".
- **Faith Kandie**, Moi University, Kenya – "Occurrence, removal and risk assessment of emerging contaminants in the Lake Victoria Basin, Kenya".
- **Dan Yuan**, The University of Queensland – "Viscoelastic fluids-based microfluidic devices and applications".
- **Cameron Francis**, The Loop Australia – "Drug checking in Queensland".
- **Katharina Ebert**, Ruhr-University Bochum, Germany – "Investigating human toxicokinetics for human biomonitoring-based risk assessments".
- **Shannon Rutherford**, Griffith University – "The Extreme Heat and Older Persons (Ethos) project - What we have learned so far".
- **Chris Bellona**, Colorado School of Mines – "Advantages and limitations of high-pressure membrane technologies for PFAS treatment and water reuse: Revisiting the influence of solute properties on separation".
- **Chuangwu Xi**, University of Michigan – "Environmental surveillance of infectious diseases for informed risk assessment and public health measures".

Annual Research Forum, Brisbane, 2024

Annual Research Forum

Our Annual Research Forum was held at UQ Brisbane City on 2 December 2024 and featured presentations from Theme Leaders, PhD students, researchers, and industry colleagues from Queensland Health Coronial and Public Health Sciences and Queensland Department of Environment, Tourism, Science and Innovation. Presenters shared recent findings and ongoing projects across a broad range of environmental health science topics, tailored to internal and external audiences including Queensland Health staff, industry stakeholders, and AMC members. Special Interest Group leaders also presented, and networking at the event led to collaborative expansion of the special interest groups.

The hybrid event was well attended with over 100 attendees online and in person.

This year, Queensland Health selected seven PhD student projects to present as posters, highlighting the collaborative spirit and support for nurturing emerging talent. Julia Orr won Best Student Research Poster for her work on biomonitoring using pooled pathology samples, and Marina Suzuki received a Commendation for her research on environmental chemical exposure and neurodegenerative diseases.

"The Annual Research Forum offered a great opportunity to venture beyond my niche and explore the diverse research questions and outcomes being pursued across both QAEHS and Queensland Health. At its core, research is a deeply collaborative and curiosity–driven process, and this event fostered exactly that – connection, discovery, and shared passion. I left with a renewed sense of wonder and far more research questions than I could ever hope to answer in a lifetime. As someone who finds public speaking daunting, especially in front of people I deeply admire, being offered the opportunity to participate in the PhD student poster presentations was also a powerful personal milestone and a reminder that research is as much of a conduit for character development as it is for scientific progress."

Julia Orr, PhD Candidate, QAEHS

- **Katie Hillyer**, Queensland Department of Environment, Tourism, Science and Innovation – "eDNA for monitoring biodiversity condition and surveillance".
- **Dhaya Nadarajan**, QAEHS – "Facilitating detection of new psychoactive substances (NPS) in wastewater ".
- **Edward Zhai**, QAEHS – "Airborne transmission and spread potential of antibiotic resistance genes in a municipal wastewater treatment plant".
- **Julia Orr**, QAEHS – "Establishing the fitness for purpose of human biomonitoring programs based on pooling of deidentified surplus pathology samples".
- **Laura Puente**, QAEHS – "Micro and nanoplastic migration from baby storage/feeding bottles".
- **Lily Pan**, QAEHS – "Establishing an in vitro blood brain barrier model to assess permeation by nanoplastics".
- **Marina Suzuki**, QAEHS - "The role of environmental chemical Exposures in neurodegenerative diseases".
- **Stacey O'Brien**, QAEHS – "Microplastic exposure".
- **Anil Pokhrel**, Queensland Health Coronial and Public Health Sciences – "Metagenomics approaches to detection of bacterial pathogens in food".
- **Murari Bhandari**, Queensland Health Coronial and Public Health Sciences – "Rapid detection and genomic subtyping of Cryptosporidium isolated from microscopic slides".
- **Narayan Gyawali**, Queensland Health Coronial and Public Health Sciences – "Studies on Japanese encephalitis virus and arbovirus surveillance".
- **Jaisy Arikkat**, Queensland Health Coronial and Public Health Sciences – "Wastewater based epidemiology – applications at the Public and Environmental Health Reference Laboratory".
- **Ujang Tinggi**, Queensland Health Coronial and Public Health Sciences – "Heavy metal analysis in spices and herbs and dietary exposure assessment".
- **Linh Tran, Patrick Amoatey, Yohani Dalugoda**, The University of Queensland – "Heat-health Study in Queensland".
- **Vivienne Noonan**, QAEHS – "Unveiling PFAS in cosmetics: Global insights and Australian market analysis using non-target and suspect screening".
- **Qiuda Zheng**, QAEHS – "Understanding nicotine metabolism during pregnancy in First Nations peoples".
- **Gilda Carvalho**, QAEHS – "Electrochemical disinfection of chlorine-resistant microorganisms".
- **Jianhua Guo**, QAEHS – "Fight against antimicrobial resistance and waterborne pathogens".
- **Kevin Thomas**, QAEHS – "Environmental Health Toxicology theme update: AMR-Plastics-novel PFAS".
- **Jochen Mueller**, QAEHS – "The problem with emerging hazards".
- **Jake O'Brien**, QAEHS – "AMR Beyond the Clinic in 2025".
- **Ji Lu**, The University of Queensland – "Tracking hidden AMR drivers".
- **Richard Bade**, QAEHS – "Updates and future plans for SIG The Games 2032".
- **Sara Ghorbani Gorji**, QAEHS – "Advancements in per- and polyfluoroalkyl substances (PFAS) analysis and monitoring".
- **Rory Verhagen**, QAEHS – "From wastewater to industry: Translating surveillance data into public health actions".

Community engagement

Community outreach activities are an essential part of our commitment to sharing research with the wider community. These activities help improve public understanding and appreciation of science, inform evidence-based decision-making, and build trust in research and its societal relevance. Outreach also provides our researchers with valuable feedback, fresh perspectives, and opportunities to inspire the next generation of scientists.

Work experience

In 2024–25, QAEHS hosted four Year 11 work experience students from local high schools, including Brisbane South State Secondary College, Holland Park State High School, and Cavendish Road State High School. During their placements, our research professional team provided hands-on learning opportunities, introducing students to the work of our researchers, showcasing active lab practices and projects in our laboratories, and involving them in day-to-day research activities. Feedback was very positive, with one student sharing, “I really enjoyed my week at QAEHS. I learned a lot about the research happening there, attending meetings and helping with research assistant tasks. I loved seeing and working in the lab environment and it was fascinating to see how what I’m studying in chemistry at school connects to the real-world.” These experiences highlight our commitment to inspiring the next generation of potential environmental health scientists.

Pint of Science Festival 2025

The QAEHS team have once again contributed to the national Pint of Science Festival, a unique event that brings scientists into local pubs to share their work in a relaxed and approachable setting. Moving science out of the laboratory and into the community, the festival helps break down the barriers between researchers and the public.

This year, PhD candidate Dhaya Nadarajan presented “From Pipes to Policies: Unveiling Designer Drugs in Wastewater.” during the Forensics Uncovered: Down the Drain & Into the Evidence session on 21 May 2025.

Pint of Science 2025,
Dhaya Nadarajan

UQ Art Museum: These Entanglements: Ecology After Nature

Dr Elvis Okoffo was invited to present his research on “Characterisation of environmental and human exposures to plastics” as part of the UQ Art Museum’s These Entanglements: Ecology after nature exhibition, which ran from February to June 2025.

These Entanglements: Ecology After Nature thinks with the molecular, the geological and the biological and their entanglements with social relations. Bringing together Australian and international artists it traverses choreography, sculptural installation, filmmaking, field research, tarot reading, photography, painting, and virtual simulation. Working from the premise that human exceptionalism has led to environmental catastrophe, the exhibition proposes a more ethical, symbiotic, and reciprocal approach to cross-species relations and ways of being in the world.

School visit

As part of our efforts to engage young minds, Dr Richard Bade visited students at a local high school as part of their ‘Meet a Scientist’ program. Dr Bade spoke with approximately 40 enthusiastic Year 7 and 8 students about his research on wastewater. The students’ interest and engagement was so strong that he was unable to finish his presentation within the hour due to the number of thoughtful questions and discussion.

09.

Appendices

Appendix A - QAEHS Staff and Students

Academic staff

Staff Member	FTE	Appointment
Ben Tscharke	1	Academic C
Cassandra Rauert	1	Academic C
Dung Phung	0.2	Academic C
Elvis Okoffo	1	Academic B
Ester Lopez Garcia	1	Academic A
Fisher Wang	1	Academic C
Gilda Carvalho	0.1	Academic D
Grace Davies	1	Academic A (from February 2025)
Ian Zammit	1	Academic B
Jake O'Brien	1	Academic C
Jianhua Guo	0.1	Academic E
Jinglong Li	1	Academic A (from April 2025)
Jochen Mueller	1	Academic E
Kelly Fielding	0.2	Academic E
Kevin Thomas	1	Academic E
Nicholas Osborne	0.2	Academic D
Phong Thai	1	Academic D
Pradeep Dewapriya	1	Academic B
Qiuda Zheng	1	Academic B
Richard Bade	1	Academic C
Rory Verhagen	1	Academic B
Sandra Nilsson	1	Academic B
Sara Ghorbani Gorji	1	Academic B
Sarit Kaserzon	1	Academic D
Zhe Wang	1	Academic A (from May 2025)

Professional staff

Staff Member	Appointment
Angus Bagley	Senior Research Assistant/Analyst
Ayomi Jayarathne	Senior Research Assistant
Chris Paxman	Research Assistant
Christina Carswell	Senior Research Technician
Daniel Barry	Senior Research Technician
Elizabeth Sadowy	Executive Assistant
Emerson Aldridge	Senior Research Assistant/Analyst
Gabriele Elisei	Scientific Research Team Leader
Geoff Eaglesham	Senior Analytical Chemist
Joseph Clokey	Senior Research Analyst
Josh Tynan	Senior Project Officer
Kirsten Marano	Senior Research Technician
Kristie Thompson	Research Assistant
Lachlan Jekimovs	Research Analyst
Lauren Gubbin	Centre Manager
Melissa Brinums	Research Manager (Operations) [Leave from March 2025]
Michael Gallen	Analytical Chemist
Nathan Charlton	Research Assistant
Pritesh Prasad	Research Analyst
Ryan Shiels	Research Analyst
Stephanie Hall	Senior Administration Officer
Steve Li	Senior Research Technician [Leave cover from March 2025]
Summer Xia	Senior Research Technician
Tim Reeks	Analytical Chemist
Tony Wang	Research Manager (Operations) [Leave cover from April 2025]
Xuan Qu	Senior Research Technician
Yan Li	Senior Research Assistant

Honorary and Adjunct staff

Staff Member	Affiliation	Appointment
Amy Heffernan	Eurofins	Honorary
Andreas Sjödin	Centers for Disease Control and Prevention	Honorary
Andrew Banks	Queensland Racing Integrity Commission	Adjunct
Andrew O'Neill	Healthy Land & Water	Adjunct
Beate Escher	Eberhard Karls University Tubingen	Honorary
Chang He	Guangdong University of Technology	Honorary
Christine Baduel	French Research Institute for Sustainable Development	Honorary
Christopher Higgins	Colorado School of Mines	Honorary
Clive Paige	Queensland Health	Adjunct
Daniel Drage	University of Birmingham	Honorary
Daniel Francis	Queensland Health	Adjunct
Darryl Hawker	Griffith University (Emeritus)	Honorary
Derek Muir	Environment & Climate Change Canada	Honorary
Emma Knight	Norwegian Institute for Water Research	Adjunct
Foon Yin Lai	Swedish University of Agricultural Sciences	Honorary
Greg Jackson	Queensland Health	Adjunct
Holger Koch	Institute of the Ruhr-University Bochum	Honorary
Ian Hosegood	QANTAS	Adjunct
Jack Ng	The University of Queensland	Emeritus Professor
Janet Cumming	Queensland Health	Adjunct
Jennifer Bräunig	NSW Department of Planning, Industry and Environment	Adjunct
Jeremy Prichard	University of Tasmania	Honorary
Jiaying Li	The University of Sydney	Honorary
John Corfield	Brisbane Airport Corporation	Adjunct
John Piispanen	Queensland Health	Adjunct
Karl Bowles	Jacobs	Adjunct
Katja Shimko	Eurofins PSS Insourcing Solutions	Adjunct
Leisa-Maree Toms	QUT	Honorary
Linda Birnbaum	Duke University	Honorary
Louise Reeves	Queensland Water Directorate	Adjunct
Maria Jose Gomez Ramos	Universidad de Almeria	Honorary
Matthew Taylor	NSW Department of Primary Industries Fisheries	Honorary
Michael Bartkow	Seqwater	Honorary
Michaela Lerch	Griffith University	Honorary
Michelle Engelsman	Fire & Rescue New South Wales	Adjunct
Munro Mortimer	Prior - Queensland Department of Environment and Resource Management (DERM)	Adjunct
Peter Hobson	Sullivan Nicolaides Pathology	Adjunct
Peter Vallely	Australian Criminal Intelligence Commission	Adjunct
Phil Choi	Queensland Health	Adjunct
Phong Vo	University of Technology Sydney	Honorary
Rizalyn Albarracin	Queensland Health	Adjunct
Saer Samanipour	University of Amsterdam	Honorary
Siobhan Rigby	Department of Environment and Science	Honorary
Sophie Dwyer	Prior - Queensland Health	Adjunct
Suzanne Huxley	Queensland Health	Adjunct
Thi Minh Hong Nguyen	Ramboll	Adjunct
Walter Vetter	University of Hohenheim	Honorary
Warish Ahmed	CSIRO	Honorary

Students – Higher Degrees by Research submitted or completed in 2024-2025

Student	Supervisor/s	Topic	Degree
Amy Samson	Kelly Fielding, External	The untold story of Australian farming women, social media and climate change	PhD
Anh Kim Dang	Phong Thai, Dung Phung, External	The metabolic syndrome in relation to nutritional status among adults in Vietnam	PhD
Carla Alongi	Jochen Mueller, External	Investigating the fate of neonicotinoids in soil and runoff	MPhil
Carly Beggs	Sarit Kaserzon, Kevin Thomas, Sara Ghorbani Gorji	Fate and behaviour of neonicotinoids in Australian aquatic environments	PhD
Charlotte Pittaway	Kelly Fielding, External	The future under threat: Climate change as a problem for the present and future self through the lens of temporal orientation	PhD
Cheng Tang	Fisher Wang, Jochen Mueller, Sarit Kaserzon, External	Identification of plastic and adhesive-related oligomers that have migrated from multilayer plastic packaging intended for infant use	PhD
Diana Garcia Sanchez	Nicholas Osborne, External	Asthma and food allergy in Australia: Resolution factors and associations with mental health and fertility outcomes	PhD
Eryn Wright *	Simon Reid, Russell Richards, Satyamurthy Anuradha	Understanding the dynamics of bat exposures among members of the general public in Queensland	PhD
Jinglong Li	Kevin Thomas, Jake O'Brien	Antibiotics and other chemicals that select for antimicrobial resistance in Australian wastewater	PhD
Jingyu Liu	Jack Ng, External	Methylation of inorganic arsenic from water and food	PhD
Joongcheon Nam	Phong Thai, External	Third-hand smoking of methamphetamine: investigation of the extent of contamination including airborne methamphetamine	MPhil
Kavitha Karanam	Kevin Thomas, Elvis Okoffo, External	Microplastics pollution in water systems: Issues and treatment	PhD
Leonie Hodgers	Gilda Carvalho, External	Detection, ecology, and fate of soil-transmitted helminths in remote wastewater treatment systems	PhD
Linjie Zhou	Jianhua Guo, External	Biogas upgrading and value-added chemical production in membrane biofilm reactors	PhD
Mathieu Feraud	Kevin Thomas, Jake O'Brien, Sarit Kaserzon. Pradeep Dewapriya, External	Advancing the non-target identification of per- and polyfluoroalkyl substances in environmental samples	PhD
Stacey O'Brien	Kevin Thomas, Fisher Wang, Jake O'Brien, Cassie Rauert	Microplastics in the air: Working towards understanding microplastics in the atmospheric environment, the plastic exposome and human respiratory exposure	PhD
Ulfah Najamuddin Ambo Rappe	Sara Ghorbani Gorji, External	Evaluation and development of rice bran based-protein protein product	PhD
Wenzheng Li	Jianhua Guo, External	Enrichment of two new ammonia-oxidizing microorganisms in Membrane aerated biofilm reactor using urea	Masters
Xiawei Liu	Jianhua Guo, External	Enrichment and understanding of new microorganisms enabling microbial oxidation of short-chain gaseous alkanes	PhD
Yan Lu	Jianhua Guo, External	Understanding and application of membrane aerated biofilm reactors (MABRs) in shortcut nitrogen removal and dissolved methane mitigation	PhD
Yu Wang	Jianhua Guo, External	Development and application of multiplexed amplicon sequencing for wastewater-based epidemiology and pathogen detection	PhD
Zhe Wang	Phong Thai, Jochen Mueller, Jake O'Brien, Kevin Thomas, Ben Tscharke	Estimating use of nicotine containing products and evaluating tobacco-related health risks through wastewater analysis	PhD
Zicheng Su	Jianhua Guo, External	Enrichment and physiological characterisation of novel nitrogen cycling microorganisms	PhD

Students – Higher Degrees by Research continuing in 2025

Student	Advisory team	Topic	Degree
Adebunmi Bojuwoye	Nicholas Osborne, External	Equitable access to COVID-19 vaccine in low- and middle-income countries	PhD
Alexander Wang	Gilda Carvalho, External	Biological methods to identify and quantify PAO/GAO microorganisms and their activity in wastewater treatment	Masters
Arzoo Dhankhar	Nicholas Osborne, External	Pollen and its contribution to respiratory outcomes in subtropical regions	PhD
Ava Disney	Kelly Fielding, External	Call me anything, just don't call me an Environmentalist	PhD
Belinda Moore	Ben Tscharke, Fisher Wang, Ian Zammit, External	An exploration of contaminants of emerging concern (CECs) in QLD wastewater	PhD
Chantal Keane	Rory Verhagen, Jochen Mueller, External	Identifying and understanding sources of contaminants of emerging concern in Australia wastewater	PhD
Chinonso Odebeatu	Nicholas Osborne, External	Examining how greenspace works in adult health: observational analyses of mediators and biomarker pathways	PhD
Coral Jeffries	Kevin Thomas, Cassie Rauert	Assessing dietary exposure to plastics and associated chemicals	PhD
David Sellars	Kylie Morphett, Coral Gartner, External	Regulating the design and construction of nicotine and tobacco products	PhD
Dhaya Nadarajan	Richard Bade, Jochen Mueller, External	Facilitating the detection of new psychoactive substances in wastewater	PhD
Ellen Sursara	Kelly Fielding, External	How does social advantage or disadvantage influence capacity for environmental concern?	Masters
Emily McLeod	Kelly Fielding, External	Ethical wildlife tourism: creating positive experiences for people and wildlife	PhD
Gabriel De la Torre Picho	Kevin Thomas, Cassie Rauert, Elvis Okoffo	Assessing microplastic inputs from ships	PhD
Garth Campbell	Sarit Kaserzon, Fisher Wang, Kevin Thomas, Sara Ghorbani Gorji	Reducing glyphosate exposure from high use practices	PhD
Giang Vu	Phong Thai, External	Determinants of alcohol drinking, and tobacco smoking, and e-cigarette vaping in Vietnamese young people and young Vietnamese migrant in Australia: implications for public health interventions and substance-use control policies	PhD
Grechel Taucare	Jochen Mueller, Ben Tscharke, External	Optimizing sample size for trend detection in human and environmental monitoring using simulation-based power analysis	PhD
Haitao Lin	Cassie Rauert, Jake O'Brien, Kevin Thomas, Elvis Okoffo	Characterisation and quantification of nanoplastics in the environment using pyrolysis gas chromatography tandem mass spectrometry	PhD
Hannah Van Dijken	Nick Osborne, Dung Phung, External	Biodiversity and immune health	PhD
Hieu Ngo	Ben Tscharke, Phong Thai, External	Using multiple data sources to understand the opioid crisis in Australia	PhD
Honglin Chen	Cassie Rauert, Kevin Thomas	Human exposure and accumulation of plastics	PhD
Hongmin Wang	Gilda Carvalho, External	Sustainable and cost-effective biological phosphorus removal technology in urban water systems	PhD
Hung Trinh	Dung Phung, External	The cost-effectiveness of the E-Dengue, a decision support tool, in the Mekong Delta Region	PhD
Janquel Acevedo	Kelly Fielding, External	The psychology of gridlock: Compromise, coalitions and radicalisation	PhD
Jen Pett	Nicholas Osborne	Chronic kidney disease of unknown origin in Sri Lanka	PhD
Jiahui Li	Jianhua Guo, External	A unique and overlooked microbial process for scavenging two greenhouse gases	PhD
Jianan Ren	Phong Thai, Jochen Mueller, External	Assessing and modelling spatiotemporal trends in drug consumptions in the community by wastewater-based epidemiology	PhD
Jianglu Zhao	Phong Thai, Ben Tscharke, Qiuda Zheng	A wastewater-based epidemiology study on the consumption characteristics, prevalence, and risk assessment of psychoactive substances in Australia	PhD
Jinghan Zhou	Jianhua Guo, External	Microbial ecology and control of opportunistic pathogens in drinking water systems	PhD
John Pearce	Kelly Fielding, External	Turning climate change into a success story	PhD

Student	Advisory team	Topic	Degree
Julia Orr	Jochen Mueller, Sandra Nilsson	Establishing the representativeness of human biomonitoring programs based on pooling of deidentified surplus pathology samples	PhD
Jun Hui Yap	Jianhua Guo, External	Enrichment and understanding novel microorganisms enabling complete ammonification and ammonia oxidation	PhD
Junqi Liao	Jianhua Guo, External	Efficient control the spread of antibiotic resistance in urban water ways	PhD
Kavya Bhutt	Nicholas Osborne, External	Combined impact of heat stress and air pollution on non-communicable disease burden of India in the global warming era	PhD
Kien Quoc Do	Dung Phung, External	Effectiveness of digital Dengue early warning system (E-DENGUE) for Dengue control in the Mekong Delta Region	PhD
Lachlan Chadwick	Sarit Kaserzon, Sara Ghorbani Gorji, Kevin Thomas	Emerging contaminants in Food Organics and Garden Organic (FOGO) materials	PhD
Laura Puente	Cassie Rauert, Kevin Thomas	Determination of micro and nanoplastics in breast milk, blood and meconium samples from mothers-infants in Australia	PhD
Le Gao	Jianhua Guo, External	Emerging pollutants in spreading antimicrobial resistance in urban water ecosystems	PhD
Liam O'Brien	Jake O'Brien, Kevin Thomas, External	Developing the framework for a national wastewater antimicrobial resistance and antimicrobial use surveillance method	PhD
Lijalem Tesfaw	Nicholas Osborne, External	Geographical distribution and environmental determinants of end-stage kidney disease patients receiving kidney replacement therapy in Australia	PhD
Lily Weir	Jochen Mueller, Sarit Kaserzon, External	Understanding the efficiency of regulating chemicals for controlling environmental and human exposure	PhD
Linh Vien	Dung Phung, External	Risk factors associated with Dengue infection in a province of Southern Vietnam: A district-matched case-control study	PhD
Lu Zheng	Jianhua Guo, External	Development of sequencing-based surveillance monitoring of antimicrobial resistance in the environment	PhD
Ma. Katreena Que	Jochen Mueller, Fisher Wang, Ian Zammit, Sandra Nilsson	Understanding human exposure to benzotriazoles (BZTs) and benzotriazole UV-stabilizers (BUVs) in the Australian population using human biomonitoring and wastewater analysis	PhD
Madison McLatchie	Kevin Thomas, Sarit Kaserzon, Fisher Wang	Understanding emerging contaminants and metabolomic responses in Australian seabird species	PhD
Marina Suzuki	Jochen Mueller, Fisher Wang, Sandra Nilsson	Chemicals contaminants in the brain (broadly) and links to neurological disease	PhD
Marta Lopez	Fisher Wang, Jochen Mueller, Ian Zammit	Towards better understanding the properties of pollutants that can cross the blood brain barrier using assays and/or animal studies	PhD
Max Tyler *	Nicholas Osborne, External	Combining environmental epidemiology and ensemble learning techniques to measure the influence of pollen and fungi on respiratory health outcomes	PhD
Mehrnaz Safarniya Zidehi	Jianhua Guo, External	Sequestration of micropollutants in modified biochars by coupling adsorption and advanced oxidation/reduction processes	PhD
Min-Tz Weng	Qiuda Zheng, External	Beyond smoking and mum: Indigenous peri-gestational tobacco and nicotine use, Ngabang (mother), Babun (father), Walbai (baby)	PhD
Mingyue Hu	Gilda Carvalho, External	Cost-effective and low-maintenance treatment of groundwater for safe drinking water production	PhD
Mst Noorunnaha	Dung Phung	Developing spatiotemporal methods for investigating dengue cases in Bangladesh	PhD
Naixiang Zhai	Jake O'Brien, Kevin Thomas, Jianhua Guo	Investigation of the inflammatory response of human cells to silica dust exposure	PhD
Nate George	Nicholas Osborne	Climate change in the Pacific and Australian Defence Force planning	PhD
Ni Made Sri Suliartini	Gilda Carvalho, External	Development of a new electro-chemical technology to remove nitrate and heavy metals from groundwater for remote communities	PhD
Nicole Schroeter	Jochen Mueller, Jake O'Brien, Richard Bade	Understanding use and fate of ingredients in consumer products	PhD
Nur Sharikul Huda	Jianhua Guo, External	Development of magnesium oxide products as a novel disinfectant agent	PhD
Patrick Amoatey	Dung Phung, Nick Osborne, External	Spatiotemporal evaluation of human heat-health vulnerability in Australia	PhD

Student	Advisory team	Topic	Degree
Pengju Chen	Jianhua Guo, External	Using membrane aerated bioreactors to remove emerging contaminants and mitigate greenhouse gas emissions	PhD
Pooja Lakhey	Jake O'Brien, Kevin Thomas, External	The suitability of wastewater-based epidemiology for AMR surveillance	PhD
Prachi Patel	Nicholas Osborne	Air pollution and cognitive ability	PhD
Ran Li	Jianhua Guo, External	Simultaneous removal of emerging chemical and biological contaminants through novel catalytic membrane reactors	PhD
Ruochen Chao	Jianhua Guo, External	Characterisation of metabolic potentials and pathways for the Feammox reaction	PhD
Ruvini Weerasinghe	Cassie Rauert, Jake O'Brien, Kevin Thomas, Elvis Okoffo	Development of specialised hyphenated methodologies for quantifying new halogenated plastic materials	PhD
Shu Chen	Kelly Fielding, External	Communicating our way to successful koala conservation	PhD
Simran Kaur	Cassie Rauert, Kevin Thomas	The fate of plastics in soils	PhD
Suliasi Mekerusa Batikawai	Nicholas Osborne, External	Meteorological factors, drinking water and sanitation services: An analysis of the association with acute watery diarrhea in Fiji	PhD
Tania Toapanta	Sarit Kaserzon, Kevin Thomas, Elvis Okoffo, External	Development of accurate quantitative methods for microplastics in the terrestrial and marine environments	PhD
Temesgen Fiseha	Nicholas Osborne, External	Novel approaches to kidney disease: are modifiable risk factors potential intervention routes?	PhD
Thi Thanh Thao Nguyen	Dung Phung, External	Spatial analysis for dengue hotspot prediction advancing early warning systems in a hyperendemic region, Vietnam	PhD
Tobias Hulleman	Jake O'Brien, Kevin Thomas, Elvis Okoffo, Cassie Rauert, External	Non-targeted high-resolution mass spectrometric characterisation of highly mobile and highly persistent chemicals	PhD
Thudawe Yohani Shavindi	Dung Phung, External	The effects of maternal exposure to heatwaves on adverse pregnancy and birth outcomes in Queensland	PhD
Vineetha Vincent	Nicholas Osborne, External	Heat events and health burden in the tropics under the global warning	PhD
Xi Xue	Jianhua Guo, External	Identifying the drivers of environmental dissemination of antimicrobial resistance in urban water ecosystems	PhD
Xinyu Shi	Gilda Carvalho, External	A sustainable biological nutrient removal and recovery process for cost-effective wastewater treatment	PhD
Yaolin Liang	Gilda Carvalho, External	Developing a novel taste and odour removal process for drinking water	PhD
Yicheng Ma	Jianhua Guo, External	In-depth understanding of bioprocess and microbial community in a novel methane-based membrane biofilm reactor	PhD
Yimeng Li	Jianhua Guo, External	Simultaneous dissolved methane and nitrogen removal from municipal wastewater by using membrane-aerated bioreactors	PhD
Yuanyuan Kang	Jianhua Guo, External	The emergence and spread of antimicrobial resistance between bacteria and environments	PhD
Yufei Pan	Cassie Rauert, Kevin Thomas, External	Human exposure and fate of micro/nanoplastics	PhD
Yujie Li	Jianhua Guo, Gilda Carvalho, External	Understanding roles of disinfection agents on the emergence and spread of antibiotic resistance	PhD
Yuxin Hu	Jianhua Guo, External	Bioremediation of oxidized contaminants using natural gas in membrane biofilm reactors	PhD
Yuya Cheng	Fisher Wang, Jochen Mueller, Ian Zammit	Human exposure pathways for plastic additives	PhD
Zeyang Zhao	Phong Thai, Jake O'Brien, Qiuda Zheng	Assessment of biomarker transformation in the wastewater system	PhD
Zhuojing Yang	Pradeep Dewapriya, External	Highly efficient, selective and reusable technology for long-term implementation of PFAS capture	PhD
Zubaria Ishaq	Fisher Wang, Jochen Mueller, Phong Thai, Sandra Nilsson	Human exposure pathways for per- and polyfluoroalkyl substances (PFAS)	PhD
Zuo Meng Gan	Gilda Carvalho, External	Developing strategies to optimise return sludge sidestream enhanced biological phosphorus removal	PhD

* QAEHS Scholarship holders

Students – Higher Degrees by Research withdrawn in 2024-2025

Student	Supervisor/s	Topic	Degree
Rachel Mackie	Sarit Kaserzon, Jochen Mueller, Sara Ghorbani Gorji, Kevin Thomas	Development of passive sampling methodologies for per- and polyfluoroalkyl substances	PhD
Shuo Chen *	Jochen Mueller, Phong Thai, Ben Tscharke, Richard Bade, External	Bioaccumulation potential of chlorinated paraffins (CPs) in humans	PhD

* QAEHS Scholarship holders

Appendix B - Research Publications

Acevedo, J.D., Disney, A., **Fielding, K.S.**, Amiot, C.E., Hornsey, M.J., Moghaddam, F.M., Thomas, E.F., Sutherland, S., Wibisono, S. and Louis, W.R., 2025. Overcoming Climate Gridlock: Perspectives of Climate Leaders on How to Achieve Social Change During Persistent Failure in Australia. Journal of Community & Applied Social Psychology, 35(2), p.e70073.

Amoatey, P., Osborne, N.J., Xu, Z., Trancoso, R. and **Phung, D.**, 2025. A longitudinal study of heatwave-health vulnerability in Australia. Urban Climate, 60, p.102346.

Amoatey, P., Trancoso, R., Xu, Z., Darssan, D., **Osborne, N.J.** and **Phung, D.**, 2025. Evaluating the association between heatwave vulnerability index and related deaths in Australia. Environmental Impact Assessment Review, 112, p.107812.

Amoatey, P., Xu, Z., **Odebeatu, C.C.**, Singh, N., **Osborne, N.J.** and **Phung, D.**, 2025. Impact of extreme heat on health in Australia: a scoping review. BMC public health, 25(1), p.522.

Anh, P.N., **Ngo, H.K.**, Wang, Z., Nguyen, D.M., Binh, V.N., Anh, N.T.K., **Yang, C.**, Trung, N.Q. and **Thai, P.K.**, 2025. Six years of alcohol consumption in Hanoi, Vietnam, by wastewater analysis: Assessing changes impacted by socio-economical factors. Public Health, 245, p.105771.

Archibald, C.L., **Fielding, K.**, Bekessy, S., Davé, S., Lunney, D., Benitez Hetherington, S., Brazill- Boast, J. and Rhodes, J.R., 2025. Can conservation covenants help sustain nature and livelihoods? Factors associated with conservation covenant adopters in Australia. People and Nature.

Areed, W.D., **Nguyen, T.T.T.**, **Do, K.Q.**, Nguyen, T., Bui, V., Nelson, E., Warren, J.L., Doan, Q.V., Sinh, N.V., **Osborne, N.**, Richards, R., **Tran, N.Q.L.**, **Le, H.**, Pham, T., **Hung, T.M.**, Nghiem, S., Phung, H., Chu, C., Dubrow, R., Weinberger, D.M. and **Phung, D.**, 2024. A District-level Ensemble Model to Enhance Dengue Prediction and Control for the Mekong Delta Region of Vietnam. arXiv preprint arXiv:2412.15645.

Ashley, D.P., **Odebeatu, C.C.** and **Osborne, N.J.**, 2024. The Impact of Greenspace on Health. Journal of the National Medical Association, 116(4), p.420.

Bade, R., **Nadarajan, D.**, **Hall, W.**, Brown, J.A., NPS Wastewater Consortium and Schumann, J., 2025. Early identification of the use of potent benzylbenzimidazoles (nitazenes) through wastewater analysis: Two years of data from 22 countries. Addiction.

Batikawai, S.M., **Osborne, N.J.**, Do, P., Vosataki, T., Deo, V. and Reid, S.A., 2024. Patterns of Acute Watery Diarrhea in Fiji: Understanding the Implications for Water and Sanitation Services.

Beggs, C., Neelamraju, C., **Kaserzon, S.L.** and VanderGragt, M.L., 2025. Exposure and combined risk of pesticide mixtures in tropical wetland waters, Australia. Science of the Total Environment, 979, p.179454.

Beggs, C., Sánchez-Bayo, F., **Ghorbani Gorji, S.**, **Thomas, K.V.** and **Kaserzon, S.L.**, 2025. Time-weighted conversion of acute to chronic equivalent endpoints for derivation of chronic ecotoxicity threshold values of six neonicotinoids in freshwater. Environmental Toxicology and Chemistry, 44(7), pp.1901-1911.

Budhathoki, N.K., **Fielding, K.**, Archibald, C., Drielsma, M.J., Lunney, D., Brazill-Boast, J., Hetherington, S.B., Fitzsimons, J.A., Rhodes, J.R. and Iftekhar, M.S., 2024. Landholders' intentions to engage in private land conservation agreements under climate risk. Available at SSRN 4901697.

Budhathoki, N.K., **Fielding, K.S.**, Rhodes, J.R., Archibald, C.L., Lunney, D., Brazil-Boast, J., Hetherington, S.B., Fitzsimons, J.A. and Iftekhar, M.S., 2025. Landholders' intentions to engage in private land conservation agreements under climate risk. Journal of Environmental Management, 377, p.124483.

Bui, T.X., **Ngo, H.K.**, Vu, G.T., **Zheng, Q.**, Nguyen, D.M., Hue, T.T.T., Binh, V.N., Anh, N.T.K. and **Thai, P.K.**, 2025. Assessing the impact of stricter drink driving policy on alcohol consumption in a population of Hanoi, Vietnam using wastewater analysis. Drug and Alcohol Review, 44(1), pp.70-79.

Campbell, G., **Tscharke, B.J.**, **Prasad, P.**, **Knight, E.R.**, **Reeks, T.**, **Jackson, A.**, **Thomas, K.V.**, **Mueller, J.F.** and **Kaserzon, S.L.**, 2025. Occurrence and fate of glyphosate and AMPA in wastewater treatment plants in Australia. Science of The Total Environment, 969, p.178964.

Cen, X., Hu, Z., Yu, Z., Huang, X., Zuo, Z., **Guo, J.**, Yuan, Z. and Zheng, M., 2025. Integrated application of nanoscale zero-valent iron for sulfide and methane control in sewers and improved wastewater treatment. Water Research, 276, p.123248.

Chai, Z., Tian, Z., Zheng, M., Wang, B., Li, Y., Cui, J., Ju, F., Niu, J. and **Guo, J.**, 2025. The functional dominance and metabolic diversity of comammox Nitrospira in recirculating aquaculture systems. Water Research, 273, p.122949.

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