



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

QAEHS Annual Report 2020-2021





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Our mission is to address local, national and global environmental health science challenges and achieve first class outcomes in research, education and partnership engagement while meeting the needs of Queensland and the wider community.

Our Alliance with Queensland Health

Queensland Alliance for Environmental Health Sciences' (QAEHS') vision, to improve human health through environmental health science, reflects our central role in facilitating Queensland Health's (QH) access to a broad range of academic and scientific expertise to assist the State to manage environmental sources of risk to human health.

Key Objectives

- Provide an opportunity 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 and Hospital and Health Service (HHS) staff to assess and manage risks to human health from environmental threats;
- Encourage ongoing innovation and research in the environmental health science field; and
- Facilitate timely access for QH and HHS to a range of scientific and academic environmental health experts from the university research sector to ensure government policy and advice reflects the latest scientific findings.

Director's Report

Reflecting on 2020-21, it is safe to say it is a year we will not forget.

Due to the pandemic, our work was interrupted from March to mid-July 2020 and then three times briefly in January, April and June 2021.

Physical distancing requirements initially temporarily affected lab work, teaching, in-person collaboration, events and general disruption to our traditional ways of working. However, it presented an opportunity to change how we carry out our activities and drove us to look for and establish new ways of collaborating and working digitally. We created structures to allow for physical distancing in the labs, and the Centre and its research continued to remain active, productive, and in some areas thrive.

It's an exciting time to be working in environmental and human health, and while the COVID-19 pandemic has brought many challenges, it has also driven innovation and adoption. Each day, our researchers and collaborators make progress toward a healthier future for individuals, families, communities and the environment.

This year, the final year of QAEHS' current three-year contractual term with Queensland Health, has continued to build on the growth of the previous years. We have again seen significant achievements in new grant successes (2020-21: \$16.5 million) and research outcomes across our broad program of interdisciplinary research.

Our continued success in the Australian Research Council (ARC) grant programs includes the award of a Linkage Infrastructure, Equipment and Facilities grant to Prof Jochen Mueller, Theme Leader for Emerging Environmental and Public Health Risks, to fund the construction costs to establish the Australian Environmental Specimen Bank (AESB). In addition to our success across national and international competitive funding programs, I am pleased to report our partnership with the Minderoo Foundation to further understanding on human exposure to plastics and the additives they contain, has been finalised and research is underway. This year we rapidly responded to Queensland Health's requirements for delivery of a state-wide wastewater surveillance program to provide early warning of SARS-CoV-2. This work is expected to continue into 2022.

Reflecting on this active research program, QAEHS Theme Leaders and their teams have been highly productive throughout the year, with a total of 164 publications in 2020 and 102 in 2021 to date. The high significance of their work is demonstrated by a consistent increase in citations up from 7,885 in 2019 to 11,685 in 2020, with 2021 on track for a similar increase.

This year, we welcomed three new researchers and five professional staff to the QAEHS team. One student completed their PhD and eight new PhD students have joined the team. Three new international students were awarded scholarships this year but have commenced their study remotely due to being unable to enter Australia due to COVID-19 travel restrictions. Two of these students have now received travel exemptions and have arrived or are

due to arrive in the coming month.

The Masters of Environmental Health Sciences program, a core component of QAEHS' vision, continues to gain momentum and recognition. We have increased enrolment numbers in the program with 29 students participating in 2021. In 2020 and 2021 we changed the format and added a flexible option to allow students the option to attend in person or online to provide flexibility due to COVID restrictions. A relatively new program and still finding its feet, steady enrolment growth this first three years signifies there is a need for this type of program and the suitability of the MEHS to address this gap.

Looking ahead, QAEHS' future focus remains clear, to perform world class, collaborative research by identifying and addressing priority environmental and human health issues to deliver impact.

Our valued partnership with Queensland Health remains strong, reflected in the two-year extension of the Queensland Alliance for Environmental Sciences, and allows us to continue the momentum from 2017 to date.

QAEHS will co-host the Testing the Waters 5 International Conference in Brisbane, Australia from 28 September to 1 October 2021. National and international experts of the disciplines involved in wastewater analysis, including analytical and environmental chemists, epidemiologists, pharmacologists; stakeholders in the related areas of public health, addiction and prevention, drug administration and law enforcement will be presenting and in attendance either in person or virtually.

The strategic and operational overview presented in this report outlines the Centre's continued effective governance and considerable success in meeting QAEHS' strategic goals and objectives.

It has been a positive year with significant progress in all areas. Our goal is to continue the steady upward trajectory of successful research grants, publications, citations and media coverage, to maintain stability and ensure quality, world class, collaborative research remains the focus.



Prof Kevin Thomas
Director, QAEHS



Highlights 2020-21

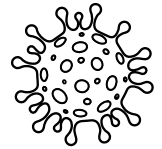


266
publications

21,000+
citations

174
countries
around the
world

Delivery of state-wide program to
provide early warning of SARS-CoV-2
in Queensland's wastewater



9
QAEHS
scholarship
holders

39
PhD
students



31%
increased
enrolments
in QAEHS'
Masters of
Environmental
Health Sciences



25
radio
interviews

13
TV
interviews

7 Million +
potential audience
reach



collaborations with
22
national and
international research
organisations



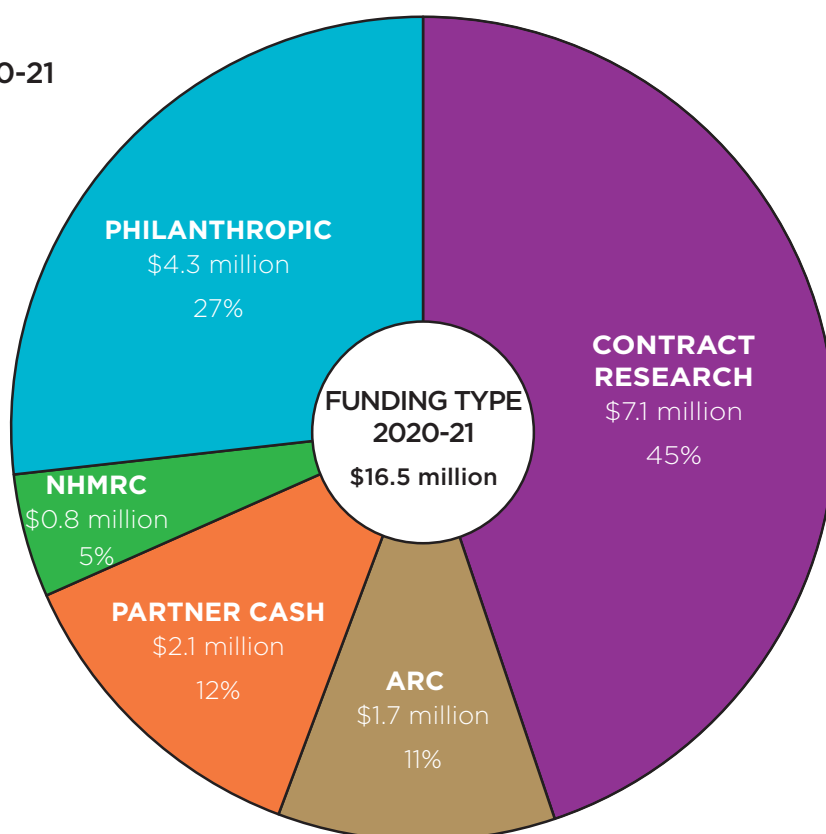
\$16.5
million in
new grants



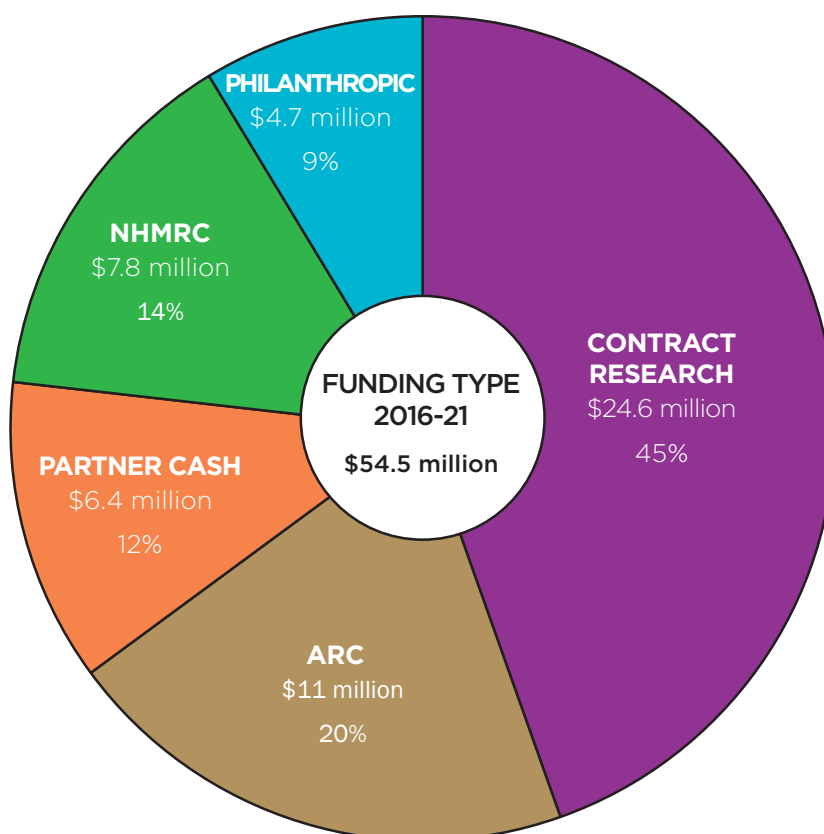
52%
success rate
on ARC &
NHMRC
applications

Financial Highlights

Funding for the current year 2020-21



Funding for the lifetime of the Centre 2016-21





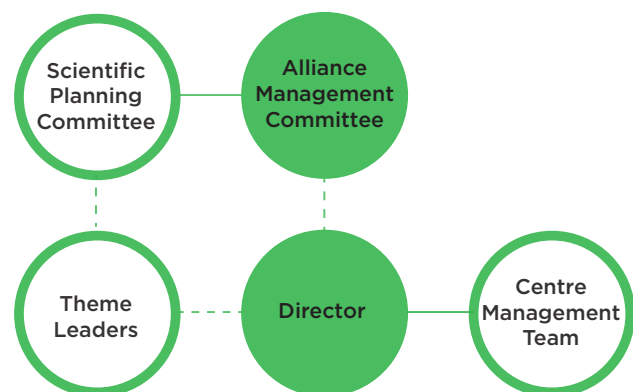
Performance - Governance

QAEHS is governed by the Alliance Management Committee (AMC) which is made up an independent Chair, two members from The University of Queensland, two members from Qld Government and the Director of the Centre.

The AMC has one sub-committee, the Scientific Planning Committee (SPC), made up of the Director, QAEHS theme leaders, and UQ and Queensland Health research executives.

The Alliance Management Committee provides advice and oversight of the Centre's strategic direction and activities to ensure that QAEHS, through the Director and the Scientific Planning Committee, is a leader in environmental health sciences research, education and engagement in Australia and internationally.

QAEHS operations are managed by the Director and a small administrative team and supported by The University of Queensland.



Alliance Management Committee

The AMC's role is to provide strategic direction and advice to ensure that QAEHS continues its leadership in environmental health sciences research, education and engagement in Australia and internationally.

Members

Name	Organisation
Jenny Stauber (Chair)	CSIRO
Bruce Abernethy	The University of Queensland
Sophie Dwyer (to Nov 20)	Queensland Health
John Piispanen (from Dec 20)	Queensland Health
Mark Jacobs	Queensland Department of Environment and Science
Greg Montieth	The University of Queensland
Kevin Thomas	QAEHS

Scientific Planning Committee

The Scientific Planning Committee's (SPC) role is to work at an operational and strategic level to ensure that research in environmental health is conducted in a coordinated fashion and meets the needs of all stakeholders, to maximise quality and quantity of scientific outputs, and to promote industry and government linkages.

The now established format of SPC meetings, where focus is on promoting multidisciplinary research across the themes, continued this year. Each meeting focussed on a broad topic and Theme Leaders presented their existing or potential contributions to the field.

Members

Name	Organisation
Kevin Thomas (Chair) *	QAEHS
Greg Montieth	The University of Queensland
Greg Jackson	Queensland Health
Gilda Carvalho *	The University of Queensland
Jianhua Gao *	The University of Queensland
Kelly Fielding *	The University of Queensland
Nicholas Osborne *	The University of Queensland
Abdullah Mamun *	The University of Queensland
Jochen Mueller *	The University of Queensland
Jack Ng *	The University of Queensland
Linda Selvey *	The University of Queensland
Invited - QAEHS-affiliated Queensland Health staff ('buddies')	
John Doherty	QHFSS
Janet Cumming	Queensland Health
Daniel Francis	Queensland Health
Suzanne Huxley	Queensland Health
Clive Paige	Queensland Health
Uma Rajappa	Queensland Health
Rebecca Richardson	Queensland Health

* QAEHS Theme Leader

AMC Year in Review

AMC endorsed QAEHS' research program capabilities strategy for 2020.

The future focus of QAEHS' research program, including identification of gaps for future research, was discussed for implementation in the 2021-23 strategic planning.

The committee farewelled Sophie Dwyer and thanked her for her significant service to the Centre.

The AMC met twice during the reporting period.

Date	Meeting
29 Oct 2020	Alliance Management Committee
21 Apr 2021	Alliance Management Committee

SPC Year in Review

Focussed meeting topics this year included:

- Impact on human health from climate change
- Health in rural communities
- COVID-19 and other biological stressors

The Committee discussed high priority research areas and identified possible inter-theme collaborations for new funding opportunities.

Preparations for a facilitated workshop are underway on GIS and data sciences, an identified high priority area for Queensland Health. The workshop is intended as a professional development training opportunity for Queensland Health staff.

Wastewater-Based Epidemiology (WBE) was identified as a high priority topic. A virtual symposium for Queensland Health staff has been scheduled for 2021.

Review of Queensland Health buddies has been undertaken to ensure themes are correctly matched, and to facilitate engagement between Queensland Health and UQ researchers.

The SPC met on four occasions during the reporting period.

Date	Meeting
24 Jul 2020	Scientific Planning Committee
9 Oct 2020	Scientific Planning Committee
18 Feb 2021	Scientific Planning Committee
28 Apr 2021	Scientific Planning Committee



Deliverables

The 2020-21 outcomes towards QAEHS' deliverables defined in the 2018-2021 Queensland Health contract i.e. strategic direction, research and research outputs, education, communication and governance, are individually addressed in the subsequent sections of this report.

Performance - Strategic Direction

Through its research and education themes, QAEHS addresses local, national and global environmental health science challenges and aims to achieve first class outcomes in research, education and partnership engagement while meeting the needs of Queensland and the wider community. QAEHS' 2020-21 achievements in meeting the ongoing strategic goals and objectives of the Centre are summarised in the table below.

Looking ahead

The Centre's strategic direction will be updated in 2021 and provided for feedback and endorsement by the AMC. The plan will be focussed on:

- Review and refinement the QAEHS research themes, highlighting current collaborations across the themes and identifying potential for future opportunities and

projects to meet priority environmental health issues. Developing strategies to promote/support genuine collaborative research across QAEHS themes and key personnel.

- Continuously furthering and developing engagement opportunities with Queensland Health, including new approaches to identifying priority research areas from Queensland Health for future focus.
- Mentoring of mid-career researchers for progression within QAEHS through cultivating a cohesive research program to foster promotion/career advancement opportunities.
- Building cohesive multidisciplinary teams with a broad range of environmental health science expertise.
- Development and coordination of new research ideas in order to compete for long-term large-scale transdisciplinary external funding in priority research areas.
- Promoting and increasing enrolments in the Masters of Environmental Health Sciences (MEHS) program and develop and improve unique courses for delivery within the program.
- Maximising efforts to attract exceptional domestic and overseas PhD students.
- Maintaining and delivering effective mechanisms of communications and engagement aspects of QAEHS' Strategic Plan to direct and prioritise widespread promotion of the Centre's activities.

Achievements against strategic plan 2020-21

Strategic Goal	Objectives	Measures of Success	Achievements 2020-21
Identify and contribute to solving current and emerging environmental health challenges	Establish a program of high-quality interdisciplinary research	Grant income, peer-reviewed publications, conference presentations, RHD completions	QAEHS' high quality, interdisciplinary research program achieved \$2.5M in new ARC and NHMRC grant funding and \$6.4M in contract research; 266 peer reviewed publications, 11 conference presentations and one RHD completion.
Build an expert capability in the environmental health sciences	Establish an Environmental Health Sciences education and training program	Established training program, stakeholder for a Masters of Environmental Health	Masters of Environmental Health Sciences is ranked number 2 in Australia for public health (Global Ranking of Academic Subjects 2021) and number 17 in the world for environmental sciences (QS World University Rankings 2021). Student enrolments continue to rise, with 29 students enrolled in 2020-21.
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 advisory and expert panels. Number of publications co-authored with non-UQ co-authors	QAEHS theme leaders are represented on many national advisory and expert panels – refer to Appendix C. Of the 159 reported research publications, 118 were co-authored by 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	QAEHS, as the recognised experts, were the first point of call for Queensland Health to implement the SARS-CoV-2 Wastewater Surveillance program for Queensland. QAEHS Themes buddy system with Queensland Health staff was reviewed to ensure alignment with targeted research topics, knowledge sharing and outcome translation for policy development.



Performance - Research Activities

QAEHS' research program has been developed through a collaborative and continuous dialogue with Queensland Health to ensure it is focused on the challenges faced by the department. Key research activities are focused around eight integrated research themes, led by highly experienced researchers.

Environmental Health Toxicology Theme Leader: Prof Kevin Thomas	Emerging Environmental Health Risks Theme Leader: Prof Jochen Mueller	Education and Professional Development Theme Leader: A/Prof Nick Osborne	Environmental Health Microbiology Theme Leaders: A/Prof Jianhua Guo, Dr Gilda Carvalho	Climate Change and Health Theme Leader: A/Prof Linda Selvey	Environmental Health Risk Communication Theme Leader: Prof Kelly Fielding	Environmental Health Risk Assessment Theme Leader: Prof Jack Ng	Environmental Health Epidemiology Theme Leader: A/Prof Abdullah Mamun
Understand the harm that chemicals, substances or situations can have on people, animals and the environment through assessing exposure and effects.	Develop and conduct research, including sampling and archiving programs, that allow rapid recognition and identification of emerging health risks.	Build capacity to assess, examine and respond to Environmental Health challenges in a changing world.	Determine how microorganisms in the environment may be beneficial or harmful to human health or our activities.	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.	Promote an engagement approach to risk communication that develops capacity in experts and the community.	Advance knowledge through research, education and training to enable improved understanding of the source, exposure and toxicological effects of single and mixed environmental pollutants.	Draw on epidemiologic methods to advance understanding of how physical, chemical, biological, social and economic factors affect human health.

The following research highlights are presented for the year outlining key work that has taken place in 2020-21, the theme leaders working in each space, the numbers of research fellows and students and key funding sources.

Human biomonitoring and epidemiology

Under the leadership of Professor Jochen Mueller, the Human Biomonitoring Program at QAEHS has continued to expand. With more than 2400 new samples added to the Australian Environmental Specimen Bank every 2 years, QAEHS continues to build a unique dataset that allows us to track spatial and temporal trends in human exposures across a wide range of priority contaminants of concern (such as, plastics additives – phthalates and bisphenols, pesticides, PFAS, and personal care products) in cohorts across Australia and New Zealand. The expansion of the Australian Specimen Bank has been supported in 2021 by a successful ARC Linkage Infrastructure, Equipment and Facilities (LIEF) grant, which will fund a purpose-built facility at UQ's Long Pocket site for long-term specimen banking facilities. The build is currently in the planning stages and is expected to be completed over the next 12 months.

Prof Mueller commenced work on his ARC Australian Laureate Fellowship program in early 2021, and one of the two postdoctoral researchers funded by this award has already been recruited. The team has begun sampling to identify markers associated with temperature stress and has conducted work linking exposures to the COVID-19 lockdowns across Australia.

A/Prof Abdullah Mamun, Theme Leader for Environmental Epidemiology, has had some successes in recruiting a postdoctoral fellow and a higher degree research student in 2020-21 to advance his theme. Prof Mamun was awarded NHMRC Partnership funds to investigate the effect of exposure to trihalomethanes (THMs) during pregnancy on the risk of low birth weight. A/Prof Mamun recruited a new student who was awarded an IPRS scholarship and has commenced his project on THMs and the risk of low birth weight.

Key funding

Current

- ARC Laureate Fellowship (Mueller)
- ARC Discovery (Mueller, Thomas)
- NHMRC Partnership (Mamun, Thomas)
- NHMRC Project (x2) (Mueller)
- NHMRC-EU Collaborative grant (Mueller)
- NHMRC-NAFOSTED Collaborative (Thai)
- Minderoo Foundation (Thomas, Mueller)
- Commonwealth government (Mueller)
- ARC LIEF (Mueller)

Staff and Students

- Theme Leaders: Mueller, Thomas, Mamun, Ng
- 6 Research Fellows, 8 PhD students



Wastewater surveillance for chemical and biological hazards (including SARS-CoV-2)

In 2020-2021, QAEHS have continued working with Qld Health and CSIRO on Queensland's wastewater surveillance program for SARS-CoV-2. This program was recently extended and is expected to be expanded to include more sampling sites and more frequent sampling. The team have also been working to adapt the approach to assess SARS-CoV-2 in cruise ship and aeroplane wastewater.

Partner agreements for the ARC Linkage Project SewAus 2021 were executed and work has commenced towards preparing wastewater sampling across more than 120 wastewater treatment plants (WWTPs) from 5 Australian states and territories during the 2021 Census. The team have been busy recruiting WWTPs and preparing the specimen bank to allow for the archiving of over 5000 additional samples. This project will link public health information garnered from wastewater samples with the socioeconomic data collected during the 2021 Census.

Professor Mueller and Dr Thai have secured 5 new projects for the Australian Criminal Intelligence Commission in addition to the ongoing National Wastewater Drug Monitoring Program. Through wastewater surveillance, these projects will improve understanding of substance use in Australia. Additionally, the team recently met with a representative from the FBI, who are interested in setting up a wastewater drug monitoring program in the U.S. based on our system.

In 2020, Dr Thai developed a rapid method to measure tobacco consumption using wastewater-based epidemiology (WBE) and applied it to demonstrate that tobacco use (mostly smoking) has been decreasing while the use of other nicotine-containing products (e.g. nicotine patches or gums) is increasing consistently. The team's innovative work on the excretion factor of ketamine and its metabolite, norketamine, has been recently adopted for the national WBE drug monitoring in China.

With funding support from Sport Integrity Australia, Prof Thomas and PhD student Katja Shimko have been investigating the feasibility of WBE for assessing and monitoring the use of anabolic agents among the community. Non-medical use of anabolic agents among the general population is a global emerging public health issue, leading to the need for a monitoring technique that is broader than currently used surveys, anti-doping and seizure data.

QAEHS have been successful in securing contracts with the Australian Government Department of Agriculture, Water and the Environment to examine temporal trends in emerging contaminants. Additionally, QAEHS has been named as the preferred Supplier for Queensland Corrective Services Drug Testing Consumables and Confirmatory Services.

Key funding

Current

- ARC Linkage (Mueller, O'Brien, Tschärke, Thai, Kaserzon, Gartner, Carvalho)
- ARC Discovery (O'Brien)
- ACIC (NWDMP) (Mueller, Thomas)
- QH (COVID-19) (Mueller, Thomas)
- EU H2020 Marie-Curie Fellowship (Thomas)
- Sport Integrity Australia PhD Scholarship (Thomas)
- Commonwealth Government (Mueller)
- ARC Linkage (Thomas)

Staff and Students

- Theme Leaders: Mueller, Thomas
- 5 Research Fellows, 8 PhD students



Per- and poly-fluoroalkyl substances (PFAS)

Profs Mueller and Thomas and A/Prof Fielding, have established themselves as leading experts in Australian PFAS exposure science and communication. QAEHS receives significant funding through PFAS-specific initiatives from ARC (Special Research Initiative for PFAS remediation, three projects and NHRMC (Targeted Call for Research (TCR), four projects related to human exposure to PFAS) and the U.S. Department of Defense (SERDP).

The NHRMC project, which aims to assess the effectiveness of PFAS exposure control in exposed communities and firefighters, commenced in 2020. The team has almost achieved full recruitment of participants and will soon have information on PFAS serum concentration for both firefighters and community members.

QAEHS's human biomonitoring work with PFAS also includes a five-year follow-up study for firefighters with Airservices Australia. Nearly 800 individuals participated in the study, the results of which are currently being disseminated.

Other areas of PFAS research include the development of novel passive sampling techniques for aquatic systems, including groundwater, surface waters and wastewater, funded by the US Department of Defense.

Risk communication is an important element in the NHRMC TCR PFAS and Health grants. Through these projects, A/Prof Fielding and colleague, Dr Kylie Morphet, will deliver important insights about how to communicate about PFAS.

Key funding

Current

- ARC Special Research Initiatives (x3) (Mueller, 2 x external)
- NHRMC Targeted Call for Research (x4) (Mueller, Thomas, Fielding, Wang)
- Advance Qld Industry Research Fellowship (Shukla)
- SERDP (U.S. DoD) (Kaserzon, Mueller)
- Airservices Australia (Mueller)
- Advance Queensland Women's Research Assistance Program (Ghorbani Gorji)

Staff and Students

- Theme Leaders: Mueller, Thomas, Fielding, Ng
- 8 Research Fellows, 8 PhD students



Microplastics

In 2020-2021, QAEHS finalised contracts for a proposed 10-year partnership with the Minderoo Foundation for the establishment of a new research centre, The Minderoo Centre - Plastics and Human Health, to enable the development of protocols to measure plastic chemicals in human tissue, urine, and blood, and their implication for human health. A world first, the Centre is supported by a philanthropic donation from the Minderoo Foundation that has allowed for the creation of a state-of-the-art 'clean' lab facility (with minimal plastic contaminants), completed in June 2021. Prof Kevin Thomas is the director of the new centre, which is physically located at UQ's PACE building at Woolloongabba. The official launch of the centre is expected for early 2022.

The Minderoo Foundation has also teamed up with QAEHS in a UQ Industry PhD Partnership, which will provide six PhD scholarships over the next 6 years for students working in the area of plastics and human health. Students will spend three months of their candidature working directly with the Minderoo Foundation in Perth, Australia.

Research outcomes for the reporting period included quantification of high-volume plastics in various environmental compartments to better understand the environmental plastics cycle. The long-term goal of this work is to understand how much plastic and in what form humans are exposed to as well as where it is coming from.

Key funding

Current

- Minderoo Foundation (Thomas, Mueller)
- ARC Discovery (Kaserzon)
- Research Council of Norway (Thomas)
- QUEX (x3) (Fielding, Thomas)
- EU Marie Curie Fellowship (Schacht, Thomas)
- ARC Industrial Transformation Training Hub (Thomas)

Staff and Students

- Theme Leaders: Thomas, Fielding
- 4 Research Fellows, 6 PhD students



Microbiology and anti-microbial resistance

Theme Leaders A/Prof Jianhua Guo and Dr Gilda Carvalho have been involved in 15 publications related to Environmental Health Microbiology this year. One paper on artificial sweeteners linked to antibiotic resistance attracted high media coverage. In addition, the team led by A/Prof Guo has recently developed a novel multiplexed amplicon-based sequencing to quantify SARS-CoV-2 RNA from Wastewater. This approach is advantageous in terms of a higher sensitivity, and the capability to infer viral phylogeny and to detect mutation. The team is collaborating with QAEHS and QH to explore the application of this approach to support wastewater-based epidemiology (WBE).

Associate Professor Guo, and Dr Ji Lu, an Advance Queensland Industry Research Fellowship recipient, have penned an open letter for Science Magazine on the dangers of heavy disinfection product use in spreading antimicrobial resistance.

Professor Thomas and Dr Jake O'Brien, in collaboration with Professor William Gaze and Aimee Murray (Exeter) and QuEx PhD student Leah Clarke, have been progressing antimicrobial resistance (AMR) in wastewater research at QAEHS. They have been conducting annual AMR sampling on the anniversary of Census week since 2019 and will do so again during the 2021 Census to specifically investigate links between AMR and population characteristics such as sociodemographics and socioeconomics.

In 2020-2021 Dr O'Brien co-supervised a Free University of Amsterdam Masters student, Niels Janssen, to develop and optimise a solid phase extraction method for the quantitative analysis of antimicrobial residues in wastewater. Recently, Jinglong Li commenced his PhD at QAEHS focussing on antimicrobial residues in wastewater. Jinglong is currently being hosted by Professor Xiqing Li at Peking University, China. Dr O'Brien has submitted multiple applications on AMR monitoring to schemes including NHMRC Investigator, ARC DECRA and UQ's Foundation Research Excellence Award.

Key funding

Current

- ARC Linkage (x2) (Bond, Carvalho)
- Advance Qld Industry Research Fellowship (Li)

Staff and Students

- Theme Leaders: Guo/Carvalho, Thomas
- 2 Research Fellows, 2 PhD students



Climate change

In 2020-2021, A/Prof Linda Selvey was the RACP representative on the Climate Change and Health Research Project Advisory Committee, which is overseeing the development of a report on climate risks to Australian Health Care systems and how the sector can better adapt to and mitigate these risks and build resilience to climate impacts. This Committee has representatives from a range of medical colleges. A/Prof Selvey also facilitated a meeting of external stakeholders to provide feedback on Queensland Health's draft climate risk strategy. A manuscript arising from the heat and health review funded by Queensland Health has been submitted for publication and is currently under review.

A/Prof Coral Gartner made a submission to the National Preventive Health Strategy Consultation highlighting the need for inclusion of environmental health in the strategy, including emerging chemicals of concern, and managing impacts of climate change.

Key funding

Staff and Students

- Theme Leaders: Selvey, Fielding
- 1 PhD student



Clandestine labs

With the recent arrival of Dr Nikolaos Rousis (EU H2020 Marie Curie Fellow) and Dr Richard Bade at QAEHS, Professor Kevin Thomas and Dr Jake O'Brien are progressing the development of clandestine laboratory identification using wastewater analysis. Currently the team are using a non-target analysis approach to identify precursors and markers of clandestine drug manufacturing activities in wastewater.

Dr Phong Thai was successful in securing ARC Linkage Project funding to investigate the extent to which household residents are exposed to third hand smoke from methamphetamine use. The project will start in late 2021 upon finalisation of partner agreements.

Key funding

Current

- ACIC (Mueller, Thomas, Thai)
- ARC Linkage (Thai)

Staff and Students

- Theme Leaders: Thomas, Mueller
- 5 Research Fellows



Advanced surveillance techniques

QAEHS Theme Leaders Profs Thomas and Mueller and Research Fellows in their teams are leading several research projects to advance global sampling and analytical capabilities to achieve improved surveillance of chemical hazards in humans and the environment.

Highlights during the reporting period include the successful development and application of passive and active samplers for chemical and biological hazards. A key focus area has been on increasing our ability to identify and monitor the complexity of the chemicals that humans are exposed to. This has progressed through both better understanding the capabilities of high resolution mass spectrometric techniques as well as developing a bespoke platform to effectively process and identify new and emerging chemical hazards.

Dr Sarit Kaserzon has been awarded funding, including an ARC Linkage to expand passive sampling approaches to emerging chemical classes of concern. The project includes the Victorian EPA, Seqwater and NIVA in Norway. Tools being developed as part of this project are being implemented as part of a global monitoring campaign for emerging contaminants. With funding support from the U.S. Department of Defense (SERDP), Dr Kaserzon has been developing passive sampling capabilities for PFAS and deployments of these technologies are underway at Defence sites both in Australia and the U.S.

Key funding

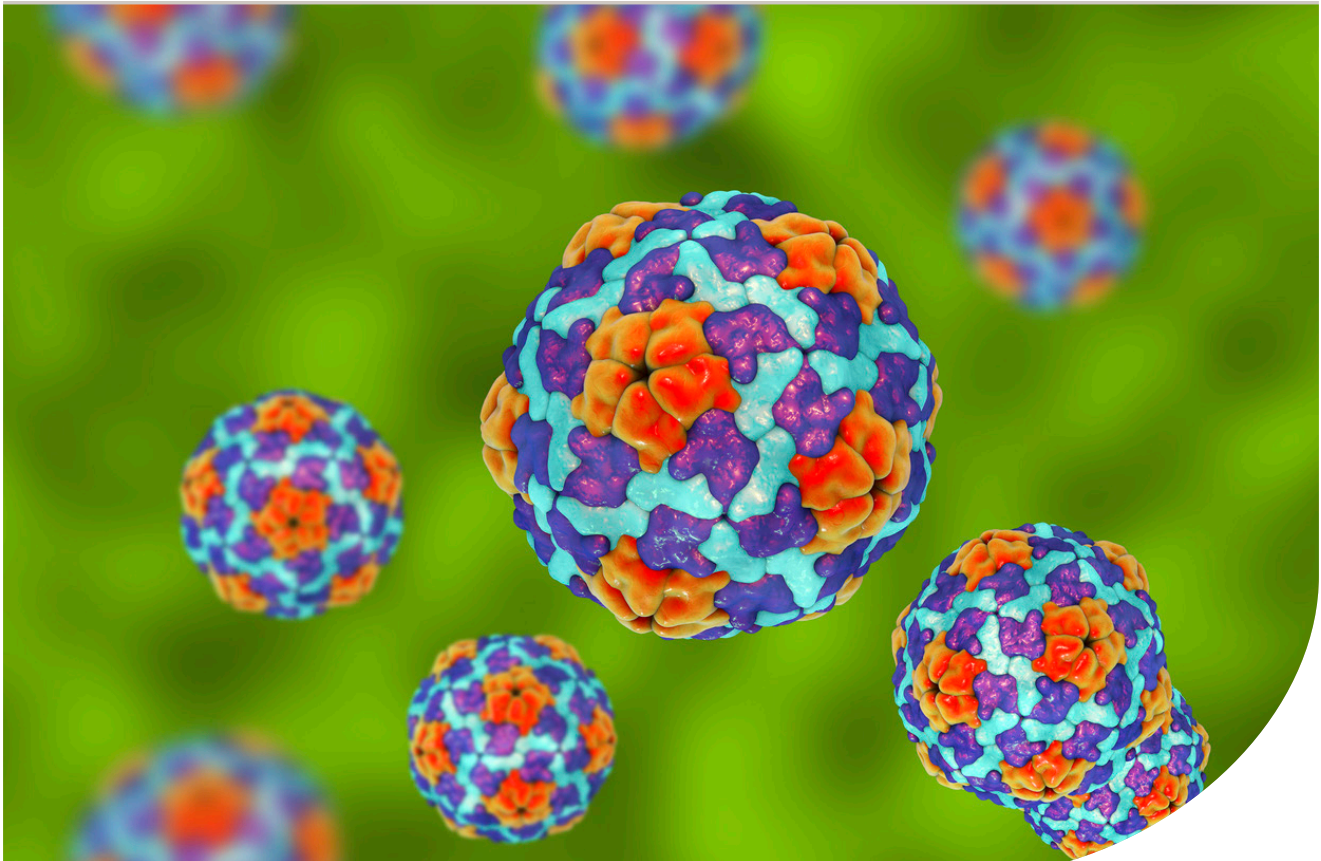
Current

- ARC Discovery (Thomas, Kaserzon)
- ARC Linkage (Kaserzon)
- SERDP (U.S. DoD) (Kaserzon)
- Seqwater (Kaserzon)

Staff and Students

- Theme Leaders: Thomas, Mueller
- 7 Research Fellows, 8 PhD students





Performance - Centre Research Outputs

Research quality

Comparison of the research outputs (all years) of the QAEHS team with leading Australian research institutions shows that QAEHS researchers continue to rank above average with respect to quality of outputs (three key metrics are shown in Figure 1). The citation rate (i.e. citations per publication) for QAEHS researchers also exceeds the Australian average (data not shown) attesting to the contemporary relevance of QAEHS' research objectives.

For 2020-21, QAEHS researchers were active across twenty-one subject areas and achieved.

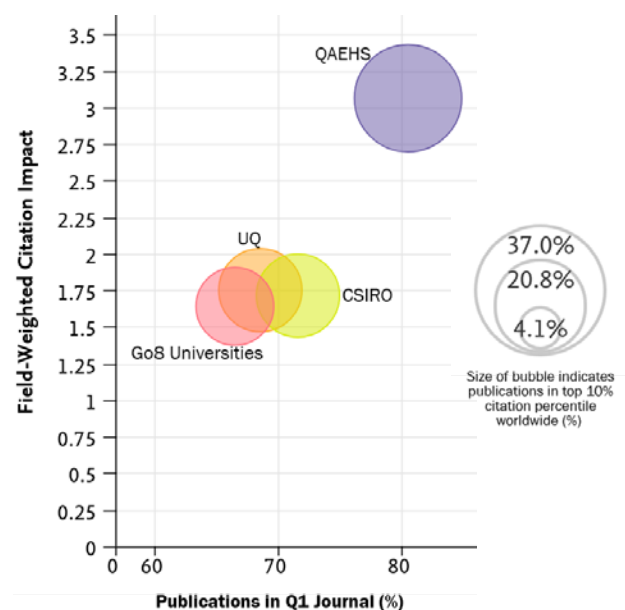
High relevance and impact of our work, demonstrated through increasing publication and citation:

- 164 publications in 2020 and 102 in 2021 to date
- 11,685 citations in 2020 and 9,599 in 2021 to date

High quality of our 2020-21 work:

- 80% of publications in Q1 journals (top 25% of journals)
- 5.2% of papers in the top 1% cited, compared to 2.8% of UQ

QAEHS's research metrics compared to The University of Queensland (UQ), CSIRO and the Group of Eight Universities (Go8) are shown in the chart below. 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 represents the percentage of publications in the top 10% worldwide based on number of citations (see legend).





Performance - Education

QAEHS has three main elements to its Education program, postgraduate research, professional development, education and community outreach and Masters of Environmental Health Sciences program.

Postgraduate research

QAEHS' PhD Program in the FY20-21 reporting period substantially increased the number of PhD students in the program. By the end of the reporting period we had 39 PhD students.

This year eight HDR scholarships were competitively awarded through the UQ Graduate School.

Due to the COVID-19 impact on travel, three of our international PhD students were delayed in their move to Australia to commence their studies. These students were granted remote commencement, and of the three, two students have successfully received an Australian Travel Exemption, with one arriving onshore in Australia in June 2021 and one scheduled for arrival in August 2021.

QAEHS Scholarships

As part of the 2018-21 Alliance agreement, UQ Graduate School were to provide a minimum of five targeted QAEHS PhD scholarships over the course of the term. Six scholarships were competitively awarded during this term.

One PhD student submitted was awarded their PhD in 2020-21:

- Firefighters' exposure to potentially toxic combustion products (Andrew Banks).

Dr Jiaying Li has since taken up a Postdoctoral position at QAEHS in the wastewater surveillance for chemical and biological hazards research group.

Professional development, education and community outreach

Professional development activities in 2020-21 have included:

- A GIS workshop didactic teaching session, involving lecturers from the School of Earth and Environmental Sciences, was postponed due to COVID-19 and unavailability of the Queensland Health workforce. This topic is of high importance to Queensland Health and is being revisited for 2021-22.
- A Wastewater-based Epidemiology (WBE) workshop has been assembled into an online format. The workshop will be available for viewing at a time convenient to Queensland Health staff, and a 'chat' capability for collaboration between the researchers and stakeholders.
- SPC meetings where all QAEHS-affiliated QH 'buddies' are invited.

Research workshops and other events organised, contributed to and/or hosted by QAEHS researchers in 2020-21 included:

- Workshops and meetings have been held to progress the social and emotional wellbeing in climate change network at UQ. A webinar was held in March 2021.
- Australian Criminal Intelligence Commission workshop and presentation, Brisbane, November 2020.

- Research showcase aimed at increasing shared knowledge of the research interests, capacity and collaborative opportunities across UQ's Health and Behavioural Sciences faculty, a series of research webinars were held. QAEHS researchers contributed to the showcase by sharing their current research and outcomes to date.

Masters of Environmental Health Sciences

The Masters of Environmental Health Sciences (MEHS), under the directorship of new QAEHS Theme Leader A/Prof Nicholas Osborne, commenced in first semester 2019 with three award options – Masters, Graduate Certificate and Graduate Diploma in Environmental Health Sciences.

The MEHS program aims to prepare mid-career professionals and future leaders to more effectively manage complex environmental health challenges. It aims to build on the demonstrated strengths of multidisciplinary teams and perspectives for addressing complex challenges, preparing graduates for roles and responsibilities including, for example, providing information and advice based on science, formulating or contributing to the development of policy, regulations and guidelines, and identifying hazards and assessing and managing risks to human health and safety, and approaches to communicating the risks and mitigation options for stakeholders.

The Masters of Environmental Health Sciences has had its first two students graduate in mid-2021, one GDEnvHlthScs and one MEnvHlthScs.

There are presently 29 students enrolled in this program:

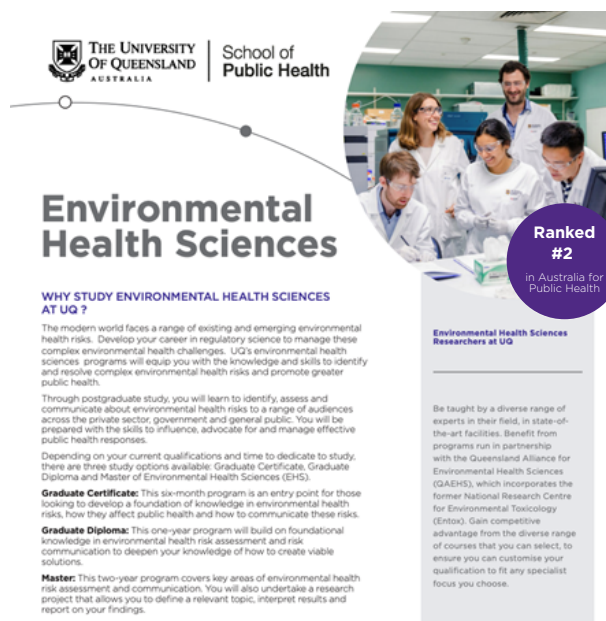
- 16 international students (5 part time and 11 full time)
- 13 domestic students (6 part time and 7 full time)

We have continued to market the MEHSc to international students via master classes with audiences nationally and internationally (with special focus on India and China), with the support of UQ marketing and communications.

An evening event is being held to market the course and expertise in UQ to the domestic market.

A continuing professional development (CPD) event is planned for the later half of 2021.

Undergraduate students are exposed to the presence of the MEHSc via the undergraduate course Environmental Health, part of the UQ Bachelor of Health Sciences.



THE UNIVERSITY OF QUEENSLAND AUSTRALIA | **School of Public Health**

Environmental Health Sciences

Ranked #2 in Australia for Public Health

WHY STUDY ENVIRONMENTAL HEALTH SCIENCES AT UQ ?

The modern world faces a range of existing and emerging environmental health risks. Develop your career in regulatory science to manage these complex environmental health challenges. UQ's environmental health sciences programs will equip you with the knowledge and skills to identify and resolve complex environmental health risks and promote greater public health.

Through postgraduate study, you will learn to identify, assess and communicate about environmental health risks to a range of audiences across the private sector, government and general public. You will be prepared with the skills to influence, advocate for and manage effective public health responses.

Depending on your current qualifications and time to dedicate to study, there are three study options available: Graduate Certificate, Graduate Diploma and Master of Environmental Health Sciences (EHS).

Graduate Certificate: This six-month program is an entry point for those looking to develop a foundation of knowledge in environmental health risks, how they affect public health and how to communicate these risks.

Graduate Diploma: This one-year program will build on foundational knowledge in environmental health risk assessment and risk communication to deepen your knowledge of how to create viable solutions.

Master: This two-year program covers key areas of environmental health risk assessment and communication. You will also undertake a research project that allows you to define a relevant topic, interpret results and report on your findings.

Environmental Health Sciences Researchers at UQ

Be taught by a diverse range of experts in their field, in state-of-the-art facilities. Benefit from programs run in partnership with the Queensland Alliance for Environmental Health Sciences (QAEHS), which incorporates the former National Research Centre for Environmental Toxicology (Entox). Gain competitive advantage from the diverse range of courses that you can select, to ensure you can customise your qualification to fit any specialist focus you choose.

Masters of Environmental Health Sciences is ranked number 2 in Australia for public health (Global Ranking of Academic Subjects 2021) and number 17 in the world for environmental sciences (QS World University Rankings 2021).

QAEHS Theme Leaders and team members are teaching four of the MEHS courses.

Course	Delivered	QAEHS Coordinator
Risk Communication (Core)	Semester 2, 2020	Theme Leader A/Prof Kelly Fielding
Biological Hazards (Core)	Semester 1 2021	Theme Leader Dr Gilda Carvalho
Chemical Hazards (Core)	Semester 2, 2020	Theme Leader Prof Kevin Thomas
Pharmacokinetics, Pharmacodynamics and Toxicology (elective)	Semester 1, 2021	QAEHS Research Fellow Dr Pradeep Shukla





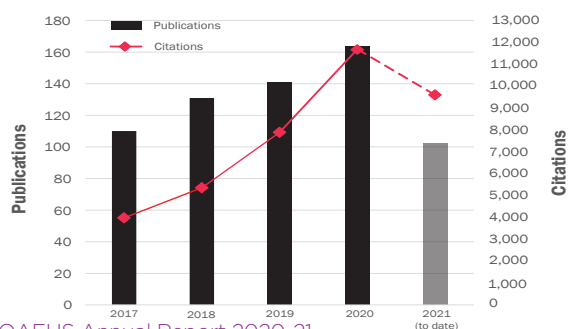
Performance - Communication

The internal and external communications goal of QAEHS is to continue to build upon our established presence by continuing to communicate and disseminate the Centre's research activities and outcomes locally, nationally and internationally. The Centre aims to ensure research findings are communicated not only to the scientific community, but are used to inform government policy development and industry innovation.

Research reach

QAEHS research outcomes are primarily communicated to the wider scientific community, government and the public via peer reviewed publication in top ranking journals. Both publications and citations for the combined QAEHS research team across all themes have increased each year since 2017 and are on track to see a further increase in 2021.

QAEHS' work is highly collaborative and has international significance and reach. In 2020-21 QAEHS' work was published in collaboration with over 150 different institutions in Australia and overseas; and has been cited in 174 countries around the world.



QAEHS Annual Report 2020-21

Communication highlights

- QAEHS researcher Dr Ben Tschärke speaks about the National Wastewater Drug Monitoring Program in a segment on ABC's The Weekly with Charlie Pickering.
- QAEHS researcher Francisca Ribeiro authored one of the five most-read articles from the Environmental Science & Technology journal in 2020 - 'Quantitative Analysis of Selected Plastics in High-Commercial-Value Australian Seafood by Pyrolysis Gas Chromatography Mass Spectrometry'.
- QAEHS PhD students Stacey O'Brien and Steve Burrows showcased how plastics are released into the environment, their negative impacts and what people can do to tackle plastic pollution at UQ Marine Biodiversity Roadshow.
- QAEHS microplastics staff and students participated in the 2021 World Science Festival held at the Queensland Museum in March 2021.
- UQ Excellence Award: QAEHS Director Prof Kevin Thomas received a Commendation in the Leadership award category recognising exemplary leadership supporting a positive, performance-based culture and contributing to the achievements of UQ.
- UQ Excellence Award: The SARS-CoV-2 Early Warning Surveillance Team received a Commendation in the "Response to COVID-19" category. The team is comprised of collaborators from CSIRO, QAEHS and the Australian Centre for Ecogenomics (ACE).

Conferences

Due to COVID-19 travel restrictions, attending and disseminating research outcomes at conferences have been mostly limited to virtual events. QAEHS staff and students have presented at eleven inter/national conferences throughout 2020-21.

Testing the Waters 5, co-hosted by QAEHS, the University of South Australia and the Australian Criminal Intelligence Commission, will be held at Customs House in Brisbane in September 2021. The conference has been structured as a dynamic hybrid event to allow for speakers and attendees to attend in person or virtually. World leaders in wastewater-based epidemiology and industry and government stakeholders will present keynotes on topics including end user perspective, long-term monitoring and spatial trends, and government policy evaluation and influencing.

Website

Traffic to the QAEHS website continues to grow, with strong interest in the 'Our People' and 'Testing the Waters 5 Conference' pages. Website page views are consistently steady, hovering around 3,000 views per month. Website page views are consistently steady, hovering around 3,000 views per month.

Our audience consists of approximately half of visitors from Australia with the other half made up of a mix of 130 countries around the world, the USA being top country outside of Australia that visits the QAEHS website.

Sixty percent of QAEHS website visitors arrive at the site via organic search ie. google, and just under thirty percent via a direct link from another site or provided via another source ie. email.

The website continues to evolve, with a detailed upgrade to the research pages already underway for 2021.

Seminar series

The QAEHS weekly Seminar Series continues to be highly effective in 2020-21 reaching wider audiences through our online streaming platform. Virtual and in-person stakeholder engagement is encouraged through a question and answer session at the conclusion of presentations. This mode of research dissemination provides a great opportunity to engage with Queensland Health staff and members of industry and the scientific community interested in our research. Every seminar is available on the QAEHS website.

In 2020-21, forty external, internal and visiting researchers and students presented their recent research findings, including:

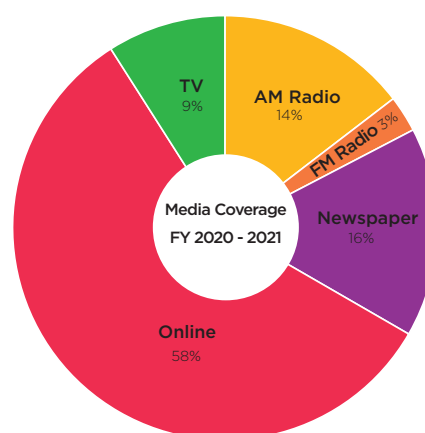
- Dr Rebecca Olive, UQ - "Moving Oceans: The role of sport in ocean-human health"
- Dr Nikos Roussis, University of Athens - "Wastewater-based epidemiology as an innovative tool to assess human exposure to pesticides"
- Denise Mitrano, Department of Environmental Systems Science, Switzerland - "Small(er) plastics, big(ger) problems? Fate, transport and implications of nano- and microplastics in the environment"

Events

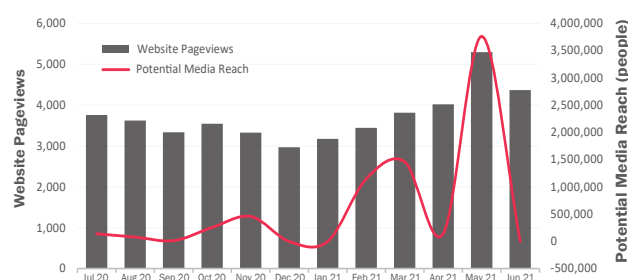
The Annual QAEHS Research Forum was held on 29 October 2020. QAEHS Theme Leaders presented an overview of the work being undertaken in their theme and recent findings to an internal and external audience, including Queensland Health staff and members of the AMC.

Media

National and international awareness of QAEHS continues to grow through media coverage this year and the Centre has again achieved considerable media coverage. Measured media avenues include AM and FM radio, newspapers, TV, and online articles, which total 146 'mentions' with a potential reach of 7.2 Million people (2019-20 potential reach was 3.1 Million). The media type with the highest volume was online and the media type with the highest potential reach was TV with a total Potential Reach of 2.8 Million.



Reporting for May 2021 reports a media reach of 3.7 Million, which correlates with higher visits to the QAEHS website for the month (refer chart below). This high activity relates to a journal article published in Journal of Hazardous Materials titled 'Plastics contamination of store-bought rice'. A related news article was published in The Guardian, UQ News and QAEHS' websites, and went on to be picked up by multiple newspapers nationally.



All media articles are published on the QAEHS website.

Appendix A - Awards and Honours

Kevin Thomas

- Invited speaker at the University of Melbourne/ Australian Laboratory for Emerging Contaminants, Emerging Contaminants Workshop, October 2020.
- Invited speaker Society for Environmental Toxicology and Chemistry Virtual Seminar on analysis of microplastics in humans and the environment. March 2021.
- Invited speaker at the International Society for Optics and Photonics (SPIE) Photonics West Conference. Environment session. March 2021.
- Co-Chair of Scientific Committee, Testing the Waters V, Brisbane Australia.
- Scientific Committee member, EmCon 2021, Seattle, USA.
- UQ Awards for Excellence 2020 Commendation for Leadership
- UQ Awards for Excellence 2020, Commendation as member of the COVID-19 wastewater team.

Jochen Mueller

- ARC Laureate Fellowship 2021-2025 (awarded 2020).
- UQ Awards for Excellence 2020, Commendation as member of the COVID-19 wastewater team.
- Invited reviewer for European Commission, September 2020.

Jack Ng

- Keynote speaker, session chair and panel discussion chair – International Congress on Arsenic in the Environment (As2021), June 2021, The Netherlands.

Linda Selvey

- Delivered the Elkington Oration, Public Health Association (Queensland branch), May 2021.

Jianhua Guo

- Appointed as Associate Editor of Journal of Hazardous Materials, 2021.

Appendix B - Research Publications

Book Chapters

Lobo, R., McCausland, K., Bates, J., Selvey, L., Jones, J., Jeffreys, E., Dean, J. and Fitzgerald, L., 2021. Lessons learned from Australian case studies of sex workers engaged in academic research about sex worker health, well-being and structural impediments. In *Peer Research in Health and Social Development* (pp. 233-245). Routledge.

McCausland, K., Lobo, R., Lazarou, M., Hallett, J., Bates, J., Donovan, B. and Selvey, L.A., 2020. 'It is stigma that makes my work dangerous': experiences and consequences of disclosure, stigma and discrimination among sex workers in Western Australia. *Culture, Health & Sexuality*, pp.1-16.

Lobo, R., McCausland, K., Bates, J., Hallett, J., Donovan, B. and Selvey, L.A., 2020. Sex workers as peer researchers—a qualitative investigation of the benefits and challenges. *Culture, Health & Sexuality*, pp.1-16.

Peer Reviewed Journal Articles

Ahmed, F., Tschärke, B., O'Brien, J.W., Zheng, Q., Thompson, J., Mueller, J.F. and Thomas, K.V., 2021. Wastewater-based prevalence trends of gout in an Australian community over a period of 8 years. *Science of The Total Environment*, 759, p.143460.

Ahmed, W., Bivins, A., Bertsch, P.M., Bibby, K., Choi, P.M., Farkas, K., Gyawali, P., Hamilton, K.A., Haramoto, E., Kitajima, M. and Simpson, S.L., 2020. Surveillance of SARS-CoV-2 RNA in wastewater: Methods optimisation and quality control are crucial for generating reliable public health information. *Current opinion in environmental science & health*.

Ahmed, W., Bivins, A., Bertsch, P.M., Bibby, K., Gyawali, P., Sherchan, S.P., Simpson, S.L., Thomas, K.V., Verhagen, R., Kitajima, M. and Mueller, J.F., 2021. Intraday variability of indicator and pathogenic viruses in 1-h and 24-h composite wastewater samples: Implications for wastewater-based epidemiology. *Environmental Research*, 193, p.110531.

Ahmed, W., Simpson, S., Bertsch, P., Bibby, K., Bivins, A., Blackall, L., Bofill-Mas, S., Bosch, A., Brandão, J., Choi, P. and Ciesielski, M., 2021. Minimizing errors in RT-PCR detection and quantification of SARS-CoV-2 RNA for Wastewater Surveillance.

Ahmed, W., Tschärke, B., Bertsch, P.M., Bibby, K., Bivins, A., Choi, P., Clarke, L., Dwyer, J., Edson, J., Nguyen, T.M.H. and O'Brien, J.W., 2021. SARS-CoV-2 RNA monitoring in wastewater as a potential early warning system for COVID-19 transmission in the community: A temporal case study. *Science of The Total Environment*, 761, p.144216.

Banks, A.P., Thai, P., Engelsman, M., Wang, X., Osorio, A.F. and Mueller, J.F., 2021. Characterising the exposure of Australian firefighters to polycyclic aromatic hydrocarbons generated in simulated compartment fires. *International Journal of Hygiene and Environmental Health*, 231, p.113637.

Banks, A.P., Wang, X., Engelsman, M., He, C., Osorio, A.F. and Mueller, J.F., 2021. Assessing decontamination and laundering processes for the removal of polycyclic aromatic hydrocarbons and flame retardants from firefighting uniforms. *Environmental Research*, 194, p.110616.

Banks, A.P., Wang, X., He, C., Gallen, M., Thomas, K.V. and Mueller, J.F., 2021. Off-Gassing of Semi-Volatile Organic Compounds from Fire-Fighters' Uniforms in Private Vehicles—A Pilot Study. *International journal of environmental research and public health*, 18(6), p.3030.

Bastian, S., Youngjoon, J., Sarit, K., Amy, H.L., Pradeep, D., Jose, G.R.M., Sara, G.G., Jochen, M.F., Kevin, T.V. and Saer, S., 2020. An assessment of quality assurance/quality control efforts in high resolution mass spectrometry non-target workflows for analysis of environmental samples. *TrAC Trends in Analytical Chemistry*, p.116063.

Braeunig, J., Nilsson, S., Aylward, L., Kay, M., King, L., Kirk, M., Marrington, S., Rotander, A., Smurthwaite, K., Toms, L.M. and Mueller, J., 2020. Evaluation of per- and poly-fluoroalkyl substances (PFASs) in Airservices Australia's Aviation Rescue Fire Fighting Service (ARFFS) Staff-2018/2019.

Bräunig, J., Baduel, C., Barnes, C.M. and Mueller, J.F., 2021. Sorbent assisted immobilisation of perfluoroalkyl acids in soils—effect on leaching and bioavailability. *Journal of Hazardous Materials*, 412, p.125171.

Burrows, S., Thomas, K. and Galloway, T., 2020, February. Using Atomic Force Microscopy to Study the Surface Degradation of Microplastics in Natural Waters. In *Ocean Sciences Meeting 2020. AGU*.

Castrignano, E., Yang, Z., Feil, E.J., Bade, R., Castiglioni, S., Causanilles, A., Gracia-Lor, E., Hernandez, F., Plósz, B.G., Ramin, P. and Rousis, N.I., 2020. Enantiomeric profiling of quinolones and quinolones resistance gene *qnrS* in European wastewaters. *Water research*, 175, p.115653.

Choi, P.M., O'Brien, J.W., Tschärke, B.J., Mueller, J.F., Thomas, K.V. and Samanipour, S., 2020. Population socioeconomics predicted using wastewater. *Environmental Science & Technology Letters*, 7(8), pp.567-572.

Choi, P.M., Thomas, K.V., O'Brien, J.W. and Mueller, J.F., 2020. Mining population exposure and community health via wastewater-based epidemiology. In *A New Paradigm for Environmental Chemistry and Toxicology* (pp. 99-114). Springer, Singapore.

Dessi, C., Okoffo, E.D., O'Brien, J.W., Gallen, M., Samanipour, S., Kaserzon, S., Rauert, C., Wang, X. and Thomas, K.V., 2021. Plastics contamination of store-bought rice. *Journal of Hazardous Materials*, 416, p.125778.

Donner, E., Zamyadi, A., Jex, A., Short, M., Drigo, B., McCarthy, D., Crosbie, N., Ahmed, W., Mueller, J., Thomas, K. and Monis, P., 2021. Wastewater monitoring for SARS-CoV-2. *Microbiology Australia*, 42(1), pp.18-22.

He, C., Li, J., Jiang, G., Chen, S., Niel, C., Yuan, Z., Mueller, J.F. and Thai, P., 2021. Transformation of phthalates and their metabolites in wastewater under different sewer conditions. *Water Research*, 190, p.116754.

He, C., van Mourik, L., Tang, S., Thai, P., Wang, X., Brandsma, S.H., Leonards, P.E., Thomas, K.V. and Mueller, J.F., 2021. In vitro biotransformation and evaluation of potential transformation products of chlorinated paraffins by high resolution accurate mass spectrometry. *Journal of Hazardous Materials*, 405, p.124245.

Knight, E.R., Bräunig, J., Janik, L.J., Navarro, D.A., Kookana, R.S., Mueller, J.F. and McLaughlin, M.J., 2021. An investigation into the long-term binding and uptake of PFOS, PFOA and PFHxS in soil-plant systems. *Journal of Hazardous Materials*, 404, p.124065.

Kulandaivelu, J., Choi, P.M., Shrestha, S., Li, X., Song, Y., Li, J., Sharma, K., Yuan, Z., Mueller, J.F., Wang, C. and Jiang, G., 2020. Assessing the removal of organic micropollutants from wastewater by discharging drinking water sludge to sewers. *Water Research*, 181, p.115945.

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- Toapanta, T., Okoffo, E.D., Ede, S., O'Brien, S., Burrows, S.D., Ribeiro, F., Gallen, M., Colwell, J., Whittaker, A.K., Kaserzon, S. and Thomas, K.V. Influence of simulated weathering on polypropylene microplastics properties and quantitation by pyrolysis gas chromatography mass spectrometry. Queensland Annual Chemistry Symposium, Brisbane, 27th November 2020.
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- Ahmed, F., Tschärke, B., O'Brien, J.W., Mueller, J.F. and Thomas, K.V. National gout prevalence estimates through wastewater-based epidemiology in Australia. SETAC Europe 2021, 3-6 May 2021.
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- Toapanta, T., Okoffo, E.D., Ede, S., O'Brien, S., Burrows, S.D., Ribeiro, F., Gallen, M., Colwell, J., Whittaker, A.K., Kaserzon, S. and Thomas, K.V. Influence of simulated weathering on polypropylene microplastics properties and quantitation by pyrolysis gas chromatography mass spectrometry. SETAC Europe 2021 31st Annual Meeting, 3-6 May 2021.
- Shimko, K. Wastewater analysis for the detection of performance and image enhancing drugs. Performance and Image Enhancement Drugs (PIEDs) – A new and emerging area of drug abuse, 19 May 2021.

Appendix C - Community and Professional Activities

Kevin Thomas

- 2020 – present: Editorial Board Member for Environmental Science & Technology Letters
- 2020 – 2023: Steering Group member EU Horizon 2020 project, Harmonization Assuring Reproducible Monitoring and Assessment of Plastic Pollution (EUROqCHARM)
- 2019 – present: Member of Core Science Group, Global Panel on the Chemical Pollution of the Environment (gpcpe.org/)
- 2013 – present: Associate Editor for Science of the Total Environment

Jochen Mueller

- 2006 – present: Adjunct Prof, School of Public Health, Griffith University
- 2012 – present: Member of SETAC (ASE joined SETAC in 2011)
- 2009 – present: Member of Australian Water Authority
- 2003 – present: NATA Assessor
- 2003 – present: Technical Expert, International Accreditation New Zealand

Jack Ng

- 2019 – present: Editor-in-Chief, Journal of Toxicology
- 2018 – present: Associate Editor of Critical Reviews in Environmental Science and Technology
- 2018 – present: International Advisor of Dundee Precious Metals, Canada
- 2018: International Scientific Committee, and Continuing Education Workshop member, Session Chair of International Congress on Arsenic (As-2018), Beijing, China
- 2017 – present: Associate Editor for Frontiers in Environmental Science
- 2012 – present: Committee member of the Queensland Health and Food Science Sub-Committee
- 2010 – present: Member of the International Society for Groundwater Sustainable Development
- 2010 – present: International Advisor of Kinross Gold Mine, Canada
- 2009 – present: Editor for Journal of Toxicology
- 2006 – present: Member of ACTRA
- 2005 – present: Member of ISTE B
- 2004 – present: Diplomat of the American Board of Toxicology
- 2004 – present: Coordinating Editor for Journal of Geochemistry and Environmental Health
- 1977 – present: Member of RACI (CChem – Charter Chemist)

Kelly Fielding

- 2018 – present: Deputy Director, Research Committee, School of Communication and Arts, UQ
- 2018 – present: Member of HASS Faculty Low and Negligible Risk Ethics Committee, UQ
- 2018 – present: Member of CSIRO Human Ethics Committee
- 2018 – present: Member of the Human Dimensions working group of the Office of the Great Present: Member of the Social Scientific Expert Panel of Healthy Land and Water
- 2015 – present: School of Communication and Arts (UQ) Vice Chancellor's Research and Teaching Fellow

Jianhua Guo

- 2021 – present: Associate Editor of Journal of Hazardous Materials
- 2020 – present: Associate Editor of Water Research
- 2019 – present: Edit of Water Science & Technology
- 2019 – present: Deputy Director – Research, AWMC UQ
- Member of International Society of Microbial Ecology (ISME).
- Member of Australian Water Association

Gilda Carvalho

- 2018 – present: Executive Board Member for Advanced Water Management Centre (AWMC).
- 2018 – present: Member of the International Development Group, Faculty of Engineering, Architecture and Information Technology, UQ.
- 2018 – present: Member of the Teaching & Learning Committee, School of Chemical Engineering, UQ.
- Member of International Water Association (IWA).
- Member of the Australia Water Association.
- Member of the Australasian Association for Engineering Education

Nicholas Osborne

- 2018 – present: Editorial Board member of International Journal of Environmental Research and Public Health
- 2017 – present: Editorial Board member of International Journal of Epidemiology
- 2017 – present: Editorial Board member of Pediatric Allergy, Immunology and Pulmonology
- 2015 – present: Honorary University of Exeter
- 2011 – present: Associate Editor of Archives of Environmental and Occupational Health

Linda Selvey

- 2017 – present: Chair, Queensland Hepatitis C elimination working group

Abdullah Mamun

- Present: Editorial board member Obesity Research and Clinical Practice (ELSEVIER Publisher)
- 2015 – present: NHMRC Grant Review Panel Member
- 2018 – present: Part-time Lecturer, Department of Clinical Trial and Clinical Epidemiology, University of Tsukuba, Japan
- 2018 – present: Senior Research Fellow, Mater Research-Mater Medical Research Institute, Mater Hospital
- 2012 – present: Senior Scientist, International Centre for Diarrheal Disease Research Centre, Bangladesh, Dhaka, Bangladesh
- Present: Professional Society membership:
 - * Global Burden of Disease Network
 - * Public Health Association of Australia
 - * Australia-New Zealand Obesity Society
 - * Australasian Epidemiology Association
 - * National Heart Foundation
 - * QLD Epidemiology Group
 - * National Heart Foundation Think Tank Member
 - * Clinical Epidemiology and Research Synthesis methods Special Interest Group
 - * ARACY-Australian Research Alliance for Children and Youth
 - * Life-course Research Network
 - * Maternal and Child Health Network
 - * EAGLE (The EARly Genetics and Lifecourse Epidemiology Consortium)
 - * ACAORN-Australasian Child and Adolescent Obesity Research Network conferences and Heart Foundation Conferences.

Appendix D - Major Partners and Collaborators

Kevin Thomas

- Prof Sarah Dunlop, Minderoo Foundation • Flourishing Oceans
- Prof Tamara Galloway OBE, Prof Will Gaze and Dr Aimee Murray, University of Exeter
- Prof Jonathan Martin, Stockholm University
- Dr Stephanie Wright, Imperial College London
- Naomi Speers, Australian Sports Drug Testing Laboratory
- Dr Catrin Goebel, National Measurement Institute
- Dr Julianne Webster, Qld Police
- Prof Barbara Kasprzyk-Hordern, University of Bath
- Dr Emma Schymanski, University of Luxembourg
- Dr Saer Samanipour, University of Amsterdam
- Prof Erica Donner, University of South Australia

Jochen Mueller

- Shane Neilson, Australian Criminal Intelligence Commission
- Dr Warish Ahmed, CSIRO
- Dr Michael Bartkow, SE Qld Water
- Craig Barnes, Airservices Australia
- Dr Nick Crosbie, Melbourne Water
- Prof Jason White, Dr Cobus Gerber, University of South Australia
- Prof Chris Higgins, Colorado School of Mines
- Prof Michael McLachlan, University of Stockholm

Kelly Fielding

- Dr Angela Dean, Queensland University of Technology
- A/Prof Anne Roiko, Griffith University
- Prof Sarah Bekessy, RMIT
- Dr Dan Lunney, University of Sydney
- Prof Immo Fritzsche, University of Leipzig
- Dr Torsten Masson, University of Leipzig
- A/Prof Joanne Smith, University of Exeter
- Seqwater
- Central Highlands Regional Council
- Tweed Shire Council

Jianhua Guo

- Queensland Urban Utilities

- South Australia Water
- Prof Will Gaze, University of Exeter
- Dr Erica Donner, University of South Australia

Linda Selvey

- Professor Margaret Hellard, Burnet Institute
- Queensland Health Communicable Diseases Branch
- A/Professor Sharyn Burns, Curtin University
- Institute for Urban Indigenous Health – Renee Brown, Richard Mills, Lyle Turner
- Professor Rebecca Guy, Kirby Institute
- Professor Basil Donovan, Kirby Institute
- Professor Kristie Ebi, University of Washington State, Seattle



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