

# Worldwide Water Warriors

Battling the issues of water safety – one of the greatest global challenges of our time



Earth's growing global population is increasing the stress on water supplies across the planet, requiring increased conservation and reuse. Around the world, Agilent collaborates with key leaders in water safety to find solutions that address environmental challenges surrounding water resources.

Learn more from our global subject-matter experts below, the **Worldwide Water Warriors**, to discover more about the important research they are doing in environmental water analysis.

## Meet the Worldwide Water Warriors

(Scroll down to reveal more)



### Key for research areas

- Algae bloom-derived toxins
- Dioxins
- Emerging organic contaminants
- Metals
- Microplastics
- Nanoparticles
- Nontargeted analysis
- Per- and polyfluoroalkyl substances (PFAS)
- Persistent organic pollutants (POPs)
- Pesticides
- Pharmaceuticals and endocrine disruptors
- Volatile organic compounds (VOCs)/ semi organic compounds (SVOCs)

## Worldwide Water Warriors in the USA

**Erin Baker**  
Associate Professor at North Carolina State University, USA

At North Carolina State University, Erin Baker's research focuses on multi-omic evaluations using high resolution mass spectrometry techniques. In her exposomic analyses of per- and polyfluoroalkyl substances (PFAS) in the environment, she aims to detect and characterize PFAS isomers, investigate newly identified PFAS compounds, and evaluate lipidomic, proteomic, and metabolomic molecular changes due to PFAS exposures.

To do this, she uses analytical techniques such as liquid chromatography, ion mobility spectrometry, and mass spectrometry. More recently, alarming health concerns demonstrate a correlation between certain cancers and ubiquitous PFAS compounds in the environment. Erin's research helps to ensure that health officials are informed of new and emerging PFAS compounds in environmental samples and understand their molecular effects.

Research areas: ■ ■

**Detlef Knappe**  
Professor of Civil, Construction, and Environmental Engineering at North Carolina State University, USA

Detlef Knappe's lab explores the development and evaluation of physical-chemical treatment processes for controlling trace organic contaminants like per- and polyfluoroalkyl substances (PFAS), disinfection by-products, 1,4-Dioxane, endocrine disruptors, and pharmaceuticals in water samples.

His team of researchers investigates the effects of reactive and unregulated wastewater contaminants on drinking water quality and treatment. His lab uses advanced analytical techniques including gas chromatography with tandem mass spectrometry (GC/MS/MS), liquid chromatography with tandem mass spectrometry (LC/MS/MS), and liquid chromatography/ quadrupole time-of-flight (LC/Q-TOF) to quantify and characterize PFAS and other contaminants to evaluate suitable water treatment technologies.

Research areas: ■ ■ ■

**Agustin Pierri**  
Technical Director, Weck Laboratories, USA

At Weck Laboratories Inc., Agustin Pierri's team detects and analyzes regulated organic and inorganic compounds in water, soil, and air for the purposes of federal and state accomplishments and for individual clients. His work also looks at emerging contaminants like per- and polyfluoroalkyl substances (PFAS) in various matrices that are routinely analyzed at sub ng/L.

His lab is equipped with multiple gas chromatography (GC), liquid chromatography (LC), liquid chromatography with tandem mass spectrometry (LC/MS/MS), GC/MS, gas chromatography with tandem mass spectrometry (GC/MS/MS), and inductively coupled plasma mass spectrometry (ICP-MS) instruments to perform quantitative analysis of regulatory and emerging contaminants in the environment.

Research areas: ■ ■ ■ ■

**Imma Ferrer**  
Research Scientist, Centre for Environmental Mass Spectrometry, University of Colorado, USA

As Chief Analyst at the Center for Environmental Mass Spectrometry, University of Colorado, Imma Ferrer's research involves the detection of emerging contaminants in wastewater systems, such as pesticides, pharmaceuticals, and surfactants.

With 25 years' experience in developing analytical methods for the identification of trace organic contaminants, her expertise falls under the interpretation of mass spectral data using liquid chromatography/quadrupole time-of-flight (LC/Q-TOF) techniques. Her research contributes to the investigation of potential treatment processes in wastewater systems and in protecting water resources. Adopted treatment techniques include reverse osmosis, sedimentation, and advanced oxidation methods.

Research areas: ■ ■ ■

**Michael Thurman**  
Director, Centre for Environmental Mass Spectrometry, University of Colorado, USA

With over 40 years of experience in environmental research, Michael Thurman is an expert in environmental analytical chemistry. He leads research at the University of Colorado, Boulder, focusing on the chemical profiles of hydraulic fracturing and flowback water using advanced mass spectrometry techniques. He has a vast history of research on analysis and occurrence of pesticides and pharmaceuticals in drinking water and wastewater.

Michael uses high-resolution liquid chromatography/ quadrupole time-of-flight (LC/Q-TOF) and advanced chemometric software tools in his lab to identify new and emerging contaminants.

Research areas: ■ ■ ■

**Arturo Keller**  
Professor at University of California, Santa Barbra, USA

In 2015, Arturo A. Keller received the Agilent Thought Leader award for his research on nanoparticles present in the environment. One of Arturo's concerns is that these engineered particles may have adverse effects on small but vital organisms—the microbes used in wastewater treatment plants, for example. He is also farsighted enough to worry about concentrations increasing as nanoparticles (often composed of metals such as silver and copper) are added to more and more products.

Arturo and his colleagues use inductively coupled plasma mass spectrometry (ICP-MS) to determine how much nanomaterial is present in various environmental samples—down to parts per billion or even trillion. They use liquid chromatography/mass spectrometry (LC/MS) to look at the effects of nanomaterials on the metabolic processes of different organisms.

Research areas: ■ ■

## Worldwide Water Warriors in Canada

**Ralph Hindle**  
Owner of Vogon Laboratory Services Ltd., Alberta, Canada

Owner of Vogon Laboratory Services Ltd, Ralph Hindle specializes in method development and validation of environmental pollutants such as per- and polyfluoroalkyl substances (PFAS), pesticides, and microcystins found in surface and drinking waters. Microcystins are by-product toxins of algae blooms, which are prominent in agricultural areas. Surface run-off, containing high levels of ammonia and phosphorous (used as agricultural supplements), encourages the growth of algae blooms in downstream lakes and is linked to serious health issues in animals and humans.

Ralph's team use gas and liquid chromatography (GC/LC) coupled with triple quadrupole and high-resolution accurate mass spectrometry to identify and quantify water contaminants. They also have trained environmental testing researchers in over a hundred laboratories in North America.

Research areas: ■ ■

## Worldwide Water Warriors in the EU

**Peter Haglund**  
Environmental Specialist and Professor in Environmental and Analytical Chemistry, Umeå University, Sweden

Peter Haglund's research focuses on the identification and analysis of persistent environmental pollutants (POPs) – specifically dioxins and those derived from cosmetic products found in water systems. He leads a research group at Umeå University, Sweden, performing a full characterization of dioxin and polychlorinated biphenyl (PCB) chemical isomers, as well as identifying new compounds within organophosphate ester groups in arctic waters.

Characterizing these isomer portfolios, using gas chromatography/ mass spectrometry (GC/MS) systems, enables Peter's group to identify and quantify potentially toxic chemicals found among other interfering chemicals, in subjected water samples. His efforts lead to the prediction of biological effects induced from these chemicals, targeting potentially toxic compounds that warrant regulatory control in the environment.

Research areas: ■ ■

**Christian Zwiener**  
Professor of Environmental and Analytical Chemistry, University of Tuebingen, Germany

At the University of Tuebingen, Germany, Christian Zwiener's research focuses on emerging pollutants (including per- and polyfluoroalkyl substances (PFAS)) and transformation products in water treatment and in the environment. Analytical tools used for this investigation work include liquid chromatography/mass spectrometry (LC/MS) methods with triple quadrupole MS and time-of-flight (Q-TOF)/MS instrumentation.

The key objectives of his work are to identify and characterize emerging contaminants in water treatment systems and aid their removal to promote safe drinking water.

Research areas: ■ ■ ■ ■

**Jes Vollertsen**  
Professor of Environmental Engineering, Department of the Built Environment, Aalborg University, Denmark

Jes Vollertsen's research involves the assessment and management of water systems at Aalborg University. A key focus area for his group at the institution is the development and improvement of analytical methods to quantify microplastics in environmental matrices.

His group also investigates the occurrence and fate of microplastics in such systems, including wastewater treatment plants, stormwater management systems, soils, sediments, freshwaters, and seas. His group routinely use infrared (IR) and gas chromatography (GC) technologies to perform qualitative and quantitative analyses of microplastics, respectively.

Research area: ■

**Fiona Regan**  
Professor of Chemistry at Dublin City University, Director of the DCU Water Institute, Dublin, Ireland

Fiona Regan has been working on emerging chemicals of concern and their occurrence in surface waters, arising from wastewater treatment plants. Recently, her research efforts concentrated on phthalates. This is a family of chemicals that are often added to plastics to increase flexibility and durability. Phthalates are also found in a range of household products and trace elements from these products can easily accumulate in wastewater systems, ending up recycled in drinking water.

At the Water Institute, DCU, Professor Regan's group focus on optimizing sample preparation techniques to enhance the detection of emerging contaminants across different sample matrices. Analytical tools used in her lab for determination of these chemicals include liquid chromatography/mass spectrometry (LC/MS) and gas chromatography/ mass spectrometry (GC/MS).

Research areas: ■ ■

## Worldwide Water Warriors in China

**Gang Yu**  
Professor, Tsinghua University, Beijing, Director of Beijing Key Laboratories for Emerging Organic Contaminants Control, and Director of Tsinghua Research Center on Persistent Organic Pollutants, China

As the 2019 winner of the Agilent Thought Leader Award, Gang Yu conducts extensive research in emerging organic contaminants found in surface waters, wastewater, and groundwater, some of which are not yet regulated. Gang's research investigation has led to ongoing efforts in the development of advanced pollution control technologies and strategies to reverse any potential adverse risks to water environments.

Specifically, his research team use nontargeted screening methods for simultaneous suspect screening and unknown compound identification, combined with targeted quantification using liquid chromatography/ quadrupole time-of-flight (LC/Q-TOF) and triple quadrupole LC systems, respectively. All discovered contaminants can then be subject to new regulations and pollution control strategies, providing profound health and safety benefits to the Chinese population.

Research areas: ■ ■ ■

## Worldwide Water Warriors in Australia

**Bradley Clarke**  
Senior Lecturer in Analytical Chemistry and Environmental Science at the University of Melbourne, Australia

Bradley's investigational research spans an array of emerging persistent organic pollutants (POPs). This includes per- and polyfluoroalkyl substances (PFAS), and microplastics found in global wastewater treatment plants, groundwaters, and oceans. His key interest is identifying the environmental sources of micropollutants and assessing the elicit impact on human health.

His laboratory is equipped with state-of-the-art liquid chromatography with tandem mass spectrometry (LC/MS/MS), gas chromatography with tandem mass spectrometry GC/MS/MS, liquid chromatography/ quadrupole time-of-flight (LC/Q-TOF), and gas chromatography (GC)/ Q-TOF instruments for trace level quantification and characterization of these pollutants in different environmental matrices at part per quadrillion levels.

Research areas: ■ ■ ■

## Worldwide Water Warriors in Singapore

**Shane Snyder**  
Executive Director, Nanyang Environment and Water Research Institute; Professor, Civil & Environmental Engineering; President's Chair in Water Technologies, Nanyang Technological University, Singapore

For over 20 years, Shane Snyder has worked on achieving sustainable and reliable drinking water across many regions around the world. In 2016, Shane was appointed as the winner of Agilent's Thought Leader award for his contribution to global environmental research. He and his team focus on the identification, fate, and health implications of emerging water pollutants, including endocrine disruptors, trace organic contaminants and per- and polyfluoroalkyl substances (PFAS) compounds.

His research uses a wide portfolio of analytical instrumentation including, liquid chromatography (LC) and gas chromatography (GC) coupled to quadrupole time-of-flight (Q-TOF) systems for identification of new and unknown contaminants in water. Shane's team are also pioneering effect-directed analysis workflows that link biological assay toxicity to chemical contaminant identification to ensure safe water supplies.

Research area: ■ ■ ■

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