

NATIONAL WATER RESEARCH INSTITUTE

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CHARLES HAAS TO RECEIVE 2017 NWRI CLARKE PRIZE: Drexel University Professor Developed Methods to Estimate Risk of Illness Caused by Pathogens in Drinking Water

FOUNTAIN VALLEY, Calif. – The National Water Research Institute (NWRI) is pleased to announce that Charles N. Haas, Ph.D., will receive the NWRI Athalie Richardson Irvine Clarke Prize for pioneering and applying methods to assess and minimize health risks caused by exposure to disease-causing microorganisms (referred to as pathogens) in water and wastewater. Haas is the LD Betz Professor of Environmental Engineering and Head of the Department of Civil, Architectural, and Environmental Engineering at Drexel University in Philadelphia, Pennsylvania.

“I am humbled and honored to receive this award,” said Haas. “The Clarke Prize is great recognition for the line of research I have developed in microbial risk assessment. I am thankful for this high honor.”

Haas will receive the Clarke Prize on October 19, 2017, at the Twenty-Fourth Annual NWRI Clarke Prize Lecture and Award Ceremony in Irvine, California. NWRI presents the prize – which consists of a medallion and \$50,000 award – every year to recognize research accomplishments that solve real-world water problems and to highlight the importance and need to fund this type of research.



Charles Haas, Ph.D.

“Professor Haas’ accomplishments are exceptional and impact a broad number of scientific fields,” said NWRI Executive Director Kevin Hardy. “His research has led to a better understanding of what is safe when it comes to our water, how we address emerging pathogens, and how we control risks to human health, thereby upholding NWRI’s mission to ensure safe, reliable sources of water are available now and for future generations.”

Trained in both engineering and microbiology, Haas used his cross-disciplinary education to explore the disinfection and inactivation of pathogens in water since receiving a doctorate in Environmental Engineering from the University of Illinois at Urbana-Champaign in 1978. At that time, public health agencies and regulators did not have a practical or effective scientific method to inform whether treatment processes were adequately eliminating the risk of exposing the public to pathogens in municipal water supplies. They instead relied on limited approaches, such as testing water for indicators of such contamination and/or the absence of reported waterborne disease outbreaks, to determine that water treatment plants were achieving their goals in reducing or eliminating pathogens.

Haas explored this issue and published his first groundbreaking findings on estimating the risk of human exposure to low doses of microorganisms in the *American Journal of Epidemiology* in 1983. In this article, he concluded it was impossible to rule out that a single microorganism, when ingested, has the

potential to cause infection or disease in humans. In other words, how do we know using a treatment process that removes 99.99 percent of all viruses is good enough? What exactly is “safe” when it comes to exposure to pathogens?

One of his first efforts to understand what constituted microbiologically “safe” water was through work with the U.S. Environmental Protection Agency (USEPA) to understand the minimum level of treatment needed to reduce outbreaks of the waterborne disease, giardiasis, of which at least 50 cases had been recorded since the late 1960s. Haas put his groundbreaking findings to practical application, developing a “dose response” function for the pathogen *Giardia*. Simply stated, a dose response indicates the number of disease-causing organisms (dose) needed to cause a negative reaction to human health (response). Using this function, the USEPA was able to estimate the level of protection needed to prevent giardiasis, which was then included in the newly developed Surface Water Treatment Rule (1989).

Ensuing research laid the groundwork for Haas’ most widely cited book, *Quantitative Microbial Risk Assessment* (1999), the first complete guide for measuring and evaluating the risks to humans posed by disease-causing organisms in food, water, air, and other environmental pathways. As used today, quantitative microbial risk assessment (QMRA) involves hazard identification, dose response, exposure assessment, and risk characterization. This valuable tool has influenced the development of public health guidance and policies by prominent organizations both nationally and internationally. The USEPA has cited Haas’ research in the Surface Water Treatment Rule and its iterations (including the Long Term 2 Enhanced Surface Water Treatment Rule) and Ground Water Rule (2006). Haas also used his expertise in QMRA to help the World Health Organization (WHO) develop both the *Guidelines for Drinking Water* and *Guidelines for the Safe Use of Wastewater, Excreta, and Greywater*. Today, Haas is known as the “Father of QMRA.”

“There is no other individual I know who has contributed more or has had the impact of Chuck Haas at advancing quantitative science within the engineering profession,” said colleague Joan Rose, Ph.D., the Homer Nowlin Endowed Chair for Water Research at the University of Michigan, and recipient of the 2016 Stockholm Water Prize. “Chuck has always pushed traditional boundaries, not only for himself, but for others to think about new interfaces. He continues to promote the idea that we can answer the question of ‘What is safe?’”

Over the course of his 39-year career, Haas has authored or co-authored more than 200 publications. Notably, he published a study in February 2017 that suggests sewage workers downstream of hospitals and Ebola treatment centers could potentially contract the virus via inhalation, a risk not currently accounted for by the Centers for Disease Control and Prevention or the WHO. He also served on an NWRI Expert Panel to provide advice to the State of California on developing water recycling criteria for indirect potable reuse through surface water augmentation and determining the feasibility of developing criteria for direct potable reuse.

Haas will present the 2017 Clarke Prize Lecture, tentatively titled “An Engineer to Microbiologists, and a Microbiologist to Engineers,” during the Award Ceremony on October 19. The Award Ceremony precedes the annual NWRI Clarke Prize Conference on Urban Water Sustainability, scheduled for October 20.

Established in 1993 in honor of NWRI’s co-founder, the late Athalie Richardson Irvine Clarke, the Clarke Prize is one of only a dozen water prizes awarded worldwide. Recent past recipients of the Clarke Prize

include microbiologist Dr. Mark D. Sobsey of the University of North Carolina at Chapel Hill (2016), environmental engineer Dr. John C. Crittenden of Georgia Institute of Technology (2015), and civil and environmental engineer Dr. David L. Sedlak of the University of California, Berkeley (2014).

More information about the NWRI Clarke Prize Conference and Award Ceremony can be found at www.clarkeprize.com.

A 501c3 nonprofit, the National Water Research Institute (NWRI) was founded in 1991 by a group of Southern California water agencies in partnership with the Joan Irvine Smith and Athalie R. Clarke Foundation to promote the protection, maintenance, and restoration of water supplies and to protect the freshwater and marine environments through the development of cooperative research work. NWRI's member agencies include Inland Empire Utilities Agency, Irvine Ranch Water District, Los Angeles Department of Water and Power, Orange County Sanitation District, Orange County Water District, and West Basin Municipal Water District. Please visit www.nwri-usa.org for more information.

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