



DEPARTMENT OF CIVIL ENGINEERING

DISTINGUISHED PUBLIC LECTURE (ONLINE)

## Challenges of Emerging Pollutants in Water Management

Professor Shane Snyder

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Date: August 26, 2020 (Wednesday)

Time: 2:30 p.m. – 4:00 p.m.

Zoom: <https://hku.zoom.us/j/91762355089?pwd=SWV5cUV4OU9IWIRMMXJUdit1VjA5QT09>

(Meeting ID: 917 6235 5089; Password: 705080)

### Abstract

Around the globe, human population continues to grow and urbanize. Population density in major urban zones is often growing at rates that demand water supplies which natural recharge cannot fulfil. For both coastal and inland communities, reuse of municipal wastewater is a viable option for extending water supplies. In other locations, ocean desalination provides a seemingly unlimited supply of water, yet with a high cost in infrastructure and energy. However, water quality constituents in general, are different from alternative water supplies and can lead to unique formation and speciation of byproducts during oxidative water treatment and disinfection. Additionally, there are more than 65 million chemicals available commercially with an innumerable amount of transformation products. While modern analytical techniques can selectively and sensitively identify specific trace levels of contaminants in water, the procedures utilized are historically time-consuming, labour-intensive, and technically-sophisticated. However, new techniques are rapidly evolving to measure trace levels of chemicals with automated and/or minimum sample preparation. In addition, surrogate measurements of bulk physical-chemical and optical parameters (i.e. UV transmittance and fluorescence) can also be used to predict treatment efficacy and contaminant attenuation. While it is well-established that multibarrier treatment trains can readily remove nearly any imaginable contaminant, these systems are highly complex and costly. To that end, one of the greatest advances for water safety assurance is the implementation of rapid and relatively inexpensive human cell cultures for monitoring of complex chemical mixtures in water. These assays allow for screening of nearly any endpoint in the human genome, including genotoxicity and cytotoxicity. This presentation will explain the growing trends in utilization of non-conventional water resources and the potential for chemical contamination, yet with a focus on sustainable solutions and comprehensive monitoring strategies to ensure safe and reliable water for human and environmental health protection.

### About the Speaker

Dr. Shane Snyder is a Professor of Civil & Environmental Engineering and is the Executive Director of the Nanyang Environment & Water Research Institute (NEWRI) at Nanyang Technological University (NTU), Singapore. He joined NTU after serving as a Professor of Chemical & Environmental Engineering and the co-Director of the Water & Energy Sustainable Technology (WEST) Center at the University of Arizona, USA. Dr. Snyder has also worked as a Visiting Professor at the National University of Singapore (2011-2017). For over 20 years, Dr. Snyder's research has focused on the identification, fate, and health relevance of emerging water pollutants. Dr. Snyder and his teams have published over 200 manuscripts and book chapters on emerging contaminant analysis, treatment, and toxicology, which have resulted in over 20,000 citations. He currently serves as the Editor in Chief for the American Chemical Society journal, *Environmental Science & Technology* Water, and previously served as an editor-in-chief for the Elsevier journal *Chemosphere*. Dr. Snyder is a Fellow of the International Water Association and a member of the World Health Organization's Drinking Water Advisory Panel.

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