01 July 2021 (Thursday)

7.00pm-8.30pm (SGT) (GMT +8)
Session 5.6 – Bio-sensing

Session Chair(s): Robert Bos, International Water Association (Switzerland), Marion Savill, Affordable Water (New Zealand)

An Overview Of Biosensor Technologies For Virus Detection In Water And Wastewater [Presentation Title is subjected to changes]

M. Kitajima. Hokkaido University (Japan)

Presenter is an invited speaker. No executive summary is available

Examining The Biological Relevance Of The Environmental Fields Estimated Using Adaptive Monitoring Frameworks

R. Mishra, A. Bandla, K. Teong Beng, M. Chitre, S. Swarup. National University of Singapore (Singapore)

In this work, we examine the biological relevance of the fields estimated using an adaptive monitoring algorithm. DNA analysis provides a versatile method to study the composition of microbial communities in water bodies. Analyzing these samples across diverse water parameter conditions would reveal important insights on the environmental conditions that certain microbial species thrives in. Given that DNA sequencing is costly, it is economically crucial to maximize the relevance of each sample collected to test a hypothesis. We employ a multi-robot adaptive framework using the robots called NUSwan to estimate environmental fields. We select points of interest and examine the quality of the samples using the standard lab-based methods. Our experiments show that the fields estimated using the adaptive frameworks provide good scientific information to support scientific studies. This proves a strong use case of adaptive frameworks in environmental monitoring.

Tracking Short-term Microbial Dynamics Throughout Drinking Water Distribution Systems In Realtime 24/7 With Online Flow Cytometry

M. Besmer, S. Teng, YJ. Lee, LK. Yong, R. Hu. onCyt Microbiology AG (Switzerland)

Providing safe drinking water remains a top challenge with rapidly rising water demands, increasing environmental pollution, and more extreme climatic conditions. Such complex challenges can only be met by comprehensive risk management strategies based on resilient treatment/distribution systems/processes. Consequently, water quality monitoring is rapidly moving towards informing the underlying engineering/operational practices with sensor data. However, until recently this completely omitted a crucial driver for water quality and infrastructure deterioration: microorganisms - primarily due to methodological constraints of slow and inaccurate detection methods. To overcome this gap, the laser-based detection method of flow cytometry was adapted from medical applications and later fully automated to be operated on site 24/7, measuring bacterial concentrations and viability every 20 minutes in real time. We studied a full-scale distribution system across subsequent service reservoir and downstream distribution mains. Varying short-term fluctuations of bacterial concentrations were observed at all locations and could be linked to other chemical/physical online sensor measurements.