



## DEPARTMENT OF CIVIL ENGINEERING

## SEMINAR

**Origin and Evolution of Quorum Quenching Membrane Bioreactor  
for Wastewater Treatment**

Prof. LEE, Chung-Hak  
Seoul National University, South Korea

Date: November 27, 2023 (Monday)

Time: 3:00 p.m. – 4:00 p.m.

Venue: Room 632C, 6/F Haking Wong Building, The University of Hong Kong

**ABSTRACT**

Biofouling has been identified as one of the primary obstacles in membrane processes, such as membrane bioreactors (MBRs) for wastewater treatment. Many reports have proposed various ways to mitigate biofouling including changes in membrane material, system design, operation mode, and the addition of additives. However, physicochemical or engineering approaches have not been sufficient to solve the biofouling problem due to its intrinsic natural phenomenon, which takes place in a complex and dynamic microbial community. In 2009, an anti-fouling strategy was proposed for MBR, combining engineering and socio-microbiology, to inhibit quorum sensing (QS) between microorganisms that regulates their group behaviors, such as biofilm formation. Since then, Quorum Quenching-MBR (i.e., the fusion of engineering and socio-microbiology) has continuously evolved in terms of QQ-inhibitors, QQ-microorganisms, QQ-media, bioreactor size, etc. Furthermore, over the last five years, QQ technology has been extended to other membrane processes, such as Reverse Osmosis, Anaerobic MBR, Biofilm Reactor, Forward Osmosis, and Gas-Biofilter. In this presentation, the behind stories during the evolution of QQ-processes will be disclosed from its origin to present status.

**ABOUT THE SPEAKER**

Professor Lee graduated from the Dept. of Applied Chemistry at Seoul National University (SNU) in 1974 and received his Dr. Ing. from INSA de Toulouse, France, in 1980. Since 1989, he has been a professor (emeritus) at the School of Chemical and Biological Engineering at SNU. Since 1979, he has conducted R&D on membrane technology, particularly focusing on membrane fouling from a physicochemical and engineering point of view. But later, his passion for sociology, cultural history, and art led him to push beyond the educational background of chemical engineering and make him look at membrane fouling from a molecular biological point of view. He created the 'Quorum Quenching Membrane Bioreactor' by linking engineering, molecular biology, and social science to address the chronic problem of membrane biofouling in MBRs for wastewater treatment. In recognition of this work, he received the "4th Membrane Technology Award" from the International Water Association (IWA) in 2017.

- ALL ARE WELCOME -