

# **NTU-CEE Distinguished Seminar Series**

School of Civil and Environmental Engineering Singapore Membrane Techonology Centre, NEWRI College of Engineering

# Tailoring Nanostructured Membranes for High-performance Separation



### **Speaker: Professor Xiwang ZHANG**

University of Queensland (UQ), Australia Moderator: Asst Prof. SHE Qianhong

Date: 6th April 2023 Time: 10 am - 11 am (GMT+8) Venue: LT11 (NS2-04-15)

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# About the seminar

Membranes have seen increasing applications over the past several decades in industrial processes for liquid and gas separation, owing to the small footprint, operational simplicity and low-energy consumption. Because of their intrinsic limits on tailoring pore geometries and chemical functionalities, however, current membranes made of conventional materials are still facing the challenge of low selectivity. They are unable to effectively discriminate ions and small molecules, particularly those with similar size or charge. Over the last decade, a variety of advanced materials have been successfully synthesized, in particular, two-dimensional (2D) materials and porous materials with uniform pristine pores (e.g., MOFs and COFs). As attractive building blocks for membrane fabrication, these advanced materials offer great opportunities to construct innovative nanostructured membranes with tuneable pore geometry at nanoscale and tailorable chemical properties at molecular level. Such unique properties have great potential to achieve enhanced performance in ion and molecule separation. This talk will focus on the recent progress of engineering membrane nanopores for water processing, in particular, water-ion and ion-ion separation.

Keywords: nanostructured membrane; nanosheet; separation mechanism.

## About the speaker

**Prof. Xiwang Zhang** is the Endowed Dow Chair in Sustainable Engineering Innovation at The University of Queensland University (UQ), the Director of UQ Dow Centre and the Director of ARC Centre of Excellence for Green Electrochemical Transformation of Carbon Dioxide (GetCO2). Before joining UQ in January of 2022, he was a Professor in the Department of Chemical Engineering at Monash University, the Founding Director of ARC Industry Transformation Research Hub for Energy-efficient Separation (EESep), and the Deputy Director of Monash Centre for Membrane Innovation (MCMI). His research focuses on membrane technology and advanced catalysis for energy-efficient separation, water and wastewater treatment, resource recovery, green chemical synthesis and renewable energy generation. Prof. Zhang has over 15 years of R&D experiences in both academia and industry with demonstrated achievements in technology development and translation. Prof. Zhang was the recipient of the prestigious ARC Australian Research Fellowship, Future Fellowship and Monash Larkins Fellowship.