

Dear ALL

We are pleased to invite you to the **CEE Distinguished Speaker Series 2026** by **Professor Zhiwei WANG** from **Tongji University, China**, **20 Oct 2026 (Tue) 2pm at LT 15**.

Please register via the link or QR code below. Thank you.

CEE Distinguished Speaker Series 2026

Speaker : Professor Zhiwei WANG from Tongji University, China
Topic : Anaerobic Dynamic Membrane Bioreactors for Enhanced Bioenergy and Resource Recovery from Sludge: Mechanisms and Applications
Date : 20 October 2026 (Tuesday)
Time : 2:00 PM – 3:00 PM
Venue : Lecture Theatre 15 (LT 15: NS1-04-07, North Spine, Level 4) [Map](#)
Hosts : Professor ZHOU Yan, Associate Professor SHE Qianhong
Registration : Click [HERE](#)



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College of Engineering

CEE Distinguished Speaker Series 2026



Professor Zhiwei WANG

Professor and Dean of School of Environmental Science and Engineering
Tongji University, China

***Anaerobic Dynamic Membrane Bioreactors for
Enhanced Bioenergy and Resource Recovery from Sludge:
Mechanisms and Applications***

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Abstract

Waste activated sludge is an inevitable byproduct of biological wastewater treatment, yet it can serve as a valuable resource for bioenergy recovery via anaerobic digestion. However, conventional anaerobic digestion (CAD) faces inherent limitations, including low solids loading, biomass washout, and prolonged retention times. Herein, we propose anaerobic dynamic membrane bioreactors (AnDMBRs) for simultaneous sludge thickening and digestion enhancement. By decoupling hydraulic and solids retention times via a self-formed dynamic membrane (DM), this system concentrated total solids to 56 g/L, achieving volatile solids reduction of 55.9% and biogas yield of 0.79 L/g VS. Mechanistically, the AnDMBR enriched *Chloroflexi*, which facilitated the degradation of recalcitrant macromolecular metabolites and thereby enhanced the utilization of dissolved organic matter, including proteins and polysaccharides. Meanwhile, the relative abundances of *Methanobacterium*, *Methanobrevibacter* and *Candidatus_Methanofastidiosum* increased, shifting methanogenesis from acetoclastic dominance toward enhanced hydrogenotrophic and methylotrophic pathways. Furthermore, we advanced this technology from lab to pilot scale, optimized full-scale configurations via computational fluid dynamics, and coupled it with electrochemical phosphorus recovery from the effluent. Comprehensive evaluations demonstrated that AnDMBRs can effectively enhance overall digestion efficiency and reduce carbon emissions compared to CAD. These results highlight the potential of AnDMBRs for high-efficient and sustainable sludge digestion.

Biography

Dr Zhiwei WANG is a Professor and the Dean of School of Environmental Science and Engineering, Tongji University, China. Professor Wang's interests are in the field of membrane-based processes for water/wastewater treatment and energy/resource recovery. He has authored 3 books, and published over 300 peer-reviewed papers in journals such as *Nature Water*, *Science Advances*, *Nature Communications*, *Environmental Science & Technology*, *Water Research*, etc., and listed as Most Cited Chinese Scholars in Environmental Sciences Field Scopus-Elsevier. He has authorized over 80 invention patents, and was awarded Science & Technology Development Award of Ministry of Education of China First-Class in 2017, Science & Technology Development Award of Shanghai in 2024 and National Distinguished Young Scholar Funding of China in 2019. He is an International Water Association IWA fellow, the secretary of Management Committee of IWA Specialist Group on Membrane Technology and was named a Distinguished Membrane Scientist ISPT in 2024.

Regards, School of Civil and Environmental Engineering

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