PRESIDENT'S TECHNOLOGY AWARD 2022

Professor Wang Rong
President's Chair in Civil and Environment Engineering, School of Civil and Environmental Engineering, Nanyang Technological University, Singapore (NTU Singapore)
Director, Singapore Membrane Technology Centre (SMTC), Nanyang Environment & Water Research Institute (NEWRI), NTU Singapore
Co-Founder, H2MO Technology Pte. Ltd. and Aromatec Pte. Ltd.

"For her outstanding contributions to the field of membrane science and technology, leading to more energy-efficient liquid purification and desalination to support Singapore's sustainability goals"

Professor Wang Rong is a world-leading scientist in the field of membrane science and technology. In the past 14 years, she has made many pioneering contributions in the development of novel membranes for use in applications such as energy-efficient desalination, water reclamation and wastewater treatment, liquid purification and gas separation, and is at the forefront in novel hybrid membrane system development. She is also successful in translating promising prototypes into commercial-sized membrane modules deployed in pilot-scale testing, in partnership with government agencies and industry, and has overseen the entire technology transfer value chain, from fundamental research to eventual commercial deployment.

NEWater, one of Singapore's four National Taps, is a key pillar in the country's efforts to strengthen water resilience and sustainability. Prof Wang's research is well-aligned to the national goal of lowering the energy cost for water reclamation and achieving a lower carbon footprint. Prof Wang's achievements include the development of a novel bio-programmable hollow fibre reverse osmosis membrane that leads to lower operating pressures and significant savings of up to 50 percent in the energy needed for pumping during the NEWater production process. The membrane uses a unique type of synthetic biomolecules to bring about higher water permeability, as compared to commercial membranes, while maintaining the same salt rejection rate. As a platform technology, this membrane can also be tailored for other types of water purification processes.

This membrane was successfully upscaled and tested in one of the operational water reclamation plants of Singapore's national water agency PUB. Prof Wang's team is now expanding the pilot to one that can produce 100m3 of NEWater daily. Since 2020, this technology has also been licensed to Prof Wang's spinoff company, H2MO Technology Pte Ltd in Singapore, for worldwide commercialisation.

In 2010, Prof Wang and her team also pioneered the world's first thin-film composite hollow fibre membrane for forward osmosis, which found use in the food and beverage industry to concentrate high-value products at a lower temperature. This preserves the flavour and nutrients that are usually lost in the energy-intensive vacuum evaporation process. A spinoff company, Aromatec Pte Ltd, was set up in 2018 and is now exporting pilot prototypes to clients worldwide, such as in China, Sweden, France, Canada and Brazil.

Prof Wang is a co-founder and the current Director of the SMTC at NEWRI, which is regarded as one of the top university-based membrane centres in the world. For her innovative scientific research, she was one of two Singapore-based scientists awarded the Alternative Water Resources Prize, under the prestigious Prince Sultan Abdulaziz International Prize for Water (PSIPW), in 2016. She was also featured among the top 25 leading water researchers globally by LUX RESEARCH in 2013. In 2020, she was elected as Fellow of the Academy of Engineering, Singapore.

Prof Wang is an Editor-in-Chief of the Journal of Membrane Science, the flagship journal for the global membrane community, and serves as the current President of the Aseanian Membrane Society. From 2014 to 2020, she was the Chair of the School of Civil and Environmental Engineering, NTU Singapore. Prof Wang was listed in the latest Singapore 100 Women in Tech (SG100WIT) as a strong advocate for young women to pursue careers in STEM (Science, Technology, Engineering and Mathematics). For her contributions to education, she received the Public Administration Medal (Silver) in 2022.