

SINGAPORE WATER MANAGEMENT SERIES ON WATER REUSE



Singapore Water Management Series On Water Reuse

2-6 July 2018

The five-day Water Reuse Course, part of the Singapore Water Academy's flagship programme - The Singapore Water Management series, aims to offer practitioner based technical training to arm participants with the depth and breadth of knowledge in the topic of water reuse. It features trainers who are world leaders in the field of waste water treatment and water reuse, as well as senior PUB officers with depth in planning and operational experience.



The course highlights topical issues such as latest developments in waste water treatment for sustainable water reuse, exploring the opportunities of recycling on a fit-for-purpose concept as well as the use of membranes for advanced water recycling

to address existing challenges. The course also covers the latest developments in industrial used water treatment and reuse, the future of water reuse and sharing by utilities on their approach in water reuse management.

Highlights of the course include:

Water reuse: The Singapore experience

- Integrated management of water resources
- Centralising used water collection
- Source control, monitoring and strategies
- Sustainable sludge management strategies
- Engaging the industry to implement localised recycling
- Multi-barrier approach to the production of NEWater, Singapore's own brand of recycled water

Advances in waste water treatment

- Review of new technologies in waste water treatment
- Energy efficient technologies
- Maintaining consistent treated effluent quality for sustainable water reuse production
- A peek into the future of waste water treatment

Water reuse: potable and non-potable reuse

- Concept of "Fit for purpose" reuse
- Drivers, policies and regulations guiding the implementation of water reuse
- Source control and used water treatment
- Implementation strategies, economics and sustainability of water reuse
- Effective public engagement in water reuse

Industrial waste water treatment and reuse

- Trends and challenges
- Economics and environmental impact
- Schemes and policies to incentivise industrial water reuse

Membrane technology in water reuse

- Reviewing available membrane technologies for water reuse
- Drivers and challenges for membrane-based processes
- Recent developments and potential improvements in membrane-based processes, including novel membranes, fouling control, increased recovery, energy reduction and concentrate management
- Optimising membrane integrity and reliability vis-a-vis operating strategies and costs

The future of water reuse

- Dealing with contaminants of emerging concerns and organic micro-pollutants
- Applications of ozonation and activated carbon in waste water treatment
- Developments and challenges for potable reuse
- Effective multi-barrier processes and water quality monitoring and control in potable reuse

Renowned speakers in the Water Reuse Course



Gary L. Amy

Dean's Distinguished Professor, College of Engineering and Science at Clemson University

Gary is a Visiting Professor in the Chemical and Biomolecular Engineering Department at the National University of Singapore where he is coordinating the Membrane Science and Technology Consortium. He previously served as the Founding Director of the Water Desalination and Reuse Center at the King Abdullah University of Science and Technology (KAUST) as well as held positions at the Technical University of Delft, the University of Colorado at Boulder, and the University of Arizona.



Glen T. Daigger

Professor of Engineering Practice, University of Michigan
President and Founder, One Water Solutions, LLC.

Glen is currently Professor of Engineering Practice at the University of Michigan and the founder of One Water Solutions, a water engineering and innovation firm. He previously served as Senior Vice President and Chief Technology Officer for CH2M HILL where he was employed for 35 years, as well as Professor and Chair of Environmental Systems Engineering at Clemson University.



Harry Seah

Assistant Chief Executive (Future Systems & Technology),
PUB, Singapore's National Water Agency

Harry leads PUB's efforts in the continuous exploration, research and development of water technologies essential to future-proof the water system. He also leads the integration of R&D efforts and the commercialisation of new water technologies.



Ian Law

Chief Executive, IBL Solutions
Adjunct Professor, University of Queensland

Ian has more than 40 years of experience in advanced treatment and reuse projects in Southern Africa, S E Asia and Australia. He is also involved in numerous Water Research Foundation projects in the US that are all associated with advanced forms of reuse.



Michael R. Markus, P.E., D.WRE, BCEE, FASCE

General Manager Orange County Water District

Mike has been responsible for managing and implementing the Groundwater Replenishment System programme. This 379,000m³/day advanced water purification facility is the largest potable reuse plant in the world and has won many awards including the 2008 Stockholm Industry Water Award and the 2014 Lee Kuan Yew Water Prize.



Tony Fane

Emeritus Professor, University of New South Wales

Tony is former Director of the UNESCO Centre for Membranes at UNSW and directed research in Singapore from 2002-2017 at Nanyang Technological University. He was Founding Director of the Singapore Membrane Technology Centre (SMTC) in 2008. He is on the Advisory Board of the *Journal of Membrane Science* (former editor) and Editorial Board of *Desalination*.



Wah Yuen Long

Chief Specialist (Water Reclamation)
PUB, Singapore's National Water Agency

Yuen Long is the Chief Specialist for Water Reclamation at PUB, Singapore's National Water Agency. Prior to this, he was the Director of Water Reclamation (Plants) Department where he was responsible for all the municipal wastewater treatment plants in Singapore. He oversaw the commissioning of the 800,000m³/day Changi Water Reclamation Plant and the decommissioning of 3 older plants.

Who will benefit

Engineers and Scientists with at least 5 years of experience in the field of waste water and water reuse.

Course fee: SGD \$2990 (excluding tax)

Register your interest today

For enquiries and course registration, please contact: Lincoln Peh Lincoln_PEH@pub.gov.sg DID: +65 6731 3968



About the Singapore Water Story

As a small island that does not have natural aquifers and lakes and with little land to collect rainwater, Singapore needs to maximise whatever it can harvest.

Driven by a vision of adequacy, reliability and sustainability in water, Singapore has been investing in research and technology. Today, the nation has built a robust, diversified and sustainable water supply from four different sources known as the Four National Taps (water from local catchment areas, imported water, reclaimed water known as NEWater and desalinated water).

By integrating the system and maximising the efficiency of each of the four taps, Singapore has ensured a stable and sustainable water supply capable of supporting the country's continued growth.

About the Singapore Water Academy

The Singapore Water Academy is a practitioner-focused learning institute in urban water management. Established by PUB, Singapore's National Water Agency, the Academy enhances capability development for water professionals both locally and internationally.