

Are we ready for establishing the basis for moving towards standardised MBR modelling?

Throughout the past few decades, the aim of achieving the imposed stringent effluent regulations has driven most of the research carried out in the wastewater treatment field. Within this aim, membrane bioreactors (MBRs) are being increasingly developed and implemented to treat wastewater due to their several advantages over other activated sludge processes (e.g. improvement in effluent quality to water reuse standards, possible production of disinfected effluent, and reduced footprint and sludge yield). Moreover, recent publications have reported an increasing interest in the application of anaerobic MBR technology (AnMBR) for wastewater treatment. In this respect, AnMBR could be regarded as a candidate to convert traditional wastewater treatment plants (WWTPs) into water resource recovery facilities (WRRFs), meeting the new, green approach of considering wastewater as a renewable source of energy, reclaimed water and valuable nutrients.

Despite the efforts performed in MBR-based technology modelling, this topic has not yet fully matured and need further work. Specifically, the research community has not yet reached a general consensus about some critical issues related to the biological and physico-chemical processes and their kinetics (e.g. kinetics of SMP formation/degradation process, precipitation processes, biodegradability in terms of high sludge retention time or aerobic/anaerobic conditions, etc.) and, consequently, to translate them into mathematical expressions (e.g. SMP modelling, influent fractionation, etc.). Furthermore, up to now, a complete, clear and generally accepted nomenclature/terminology surrounding the MBR modelling field is still lacking, which makes it often difficult to compare results among different models.

This workshop is organised and supported by the IWA Task Group (TG) on Membrane Bioreactor Modelling and Control and aims at establishing the basis for moving towards standardised MBR modelling.

Objectives

The workshop aims to establish the basis for moving towards a common and standardized nomenclature/terminology related to MBR modelling. To this aim, the workshop will focus on reviewing the current state-of-the-art MBR technology and identify current and future needs within the MBR modelling field.

The specific objectives of the workshop are:

- i) to discuss key issues for aerobic MBR modelling through reviewing the state-of-the-art MBR-based technology for aerobic wastewater treatment
- ii) to discuss key issues for AnMBR modelling through reviewing the state-of-the-art MBR-based technology for anaerobic wastewater treatment
- iii) to identify current and future needs within biological process modelling of MBR-based systems
- iv) to identify current and future needs within filtration process modelling of MBR-based systems

Chairs

Chair Giorgio Mannina (Dipartimento di Ingegneria Civile, Ambientale, Aerospaziale, dei Materiali, Università di Palermo, Italy)

Co-Chair Ángel Robles (Department of Chemical Engineering - School of Engineering Universitat de València, Spain)

Speakers

- Joaquim Comas – ICRA and LEQUIA-UdG
- Victoria Ruano – University of Valencia
- Ilse Smets – KU Leuven (not confirmed)
- Christoph Brepols – erftverband
- Jérôme Harmand – LBE-INRA
- Ignasi Rodriguez-Roda – ICRA
- Marc Heran – Université Montpellier

Target Participants

This workshop should draw the attention of experts in MBR technology from different fields (utilities, manufacturers, academic, and consultants), with or without specific modelling expertise, as well as general WRRF modelling experts (e.g. ASM, ADM, CFD, UDM, control, energy) who want to learn about the specificities of MBR modelling and the IWA Task Group on Membrane Bioreactor Modelling and Control.

Programme: 26 September 2018 – Bldg 19 Viale delle Scienze

Time	Topic	Presenter/Moderator
09:15 - 09:30	Welcome Remarks and Workshop Chartering: Motivation, scope, and objectives. Introductions and agenda review.	Chairs: - Giorgio Mannina - Angel Robles
09:30 - 09:50	Presentation #1: State-of-the-art MBR-based technology for aerobic wastewater treatment: Identifying key issues for aerobic MBR modelling	Team #1: - Joaquim Comas - Ignasi Rodriguez-Roda
09:50 - 10:10	Presentation #2: State-of-the-art MBR-based technology for anaerobic wastewater treatment: Identifying key issues for AnMBR modelling	Team #2: - Angel Robles - Victoria Ruano
10:10 - 11:00	Discussion Period: common and specific issues for modelling different MBR-based systems	Chairs - Ashok Pandey
11:00 - 11:30	Coffee break	
11:30 - 11:50	Presentation #3: Where we are and what is missing within biological process modelling of MBR-based systems	Team #3: - Jérôme Harmand - Ilse Smets (not confirmed)
11:50 - 12:10	Presentation #4: Where we are and what is missing within filtration process modelling of MBR-based systems.	Team #4: - Christoph Brepols - Marc Heran
12:50 - 13:00	Discussion Period: identifying gaps towards an standardised criteria to model MBR-based systems	Chairs
13:00 - 13:30	Wrap-up, composing summary, report and presentation	Chairs