International conference on

Membranes in Drinking and Industrial Water Production

6-8 February 2017

Leeuwarden, The Netherlands

Symposium title

Novel theoretical approaches for membrane transport processes in drinking water production

Chair: Dr. M. Tedesco (Wetsus)

Co-Chair: Dr. J. Catalano (Aarhus University, Denmark)
Dr. P.M. Biesheuvel (Wetsus)

General scope

The focus of this one-day symposium is presenting novel theoretical approaches to model membrane processes for drinking water production and related technologies. In particular, we aim to discuss theoretical approaches that focus on the microscopic level, i.e., modeling the membrane-solution interface, the membrane structure, and the single compartment, thus leaving out of scope larger scale modeling studies.

This symposium is driven by a renewed interest in the physics-based modeling of membrane processes, and the need for understanding the laws that all these membrane processes have in common at the fundamental level. Different scales of microscopic models, empirical models and phenomenological approaches all have their various applications. However, it is imperative to build bridges between these levels of modeling.

The symposium will focus on all the membrane processes that have pressure, electrical and osmotic effects as driving force. These include, but are not limited to: electrodialysis (ED), reverse electrodialysis (RED), reverse osmosis (RO), forward osmosis (FO), and membrane capacitive deionization (MCDI).

Overview of topics

- Ion sorption equilibrium and Donnan potential
- Modeling the membrane-solution interface
- Overlimiting current phenomena
- Water transport in ion exchange membranes
- Transport of multivalent ions
- Electrokinetics
- Non-Ohmic energy losses
- Polarization phenomena
- Modeling fouling phenomena
- Modeling pH effects
- Transport of organics
- Modeling membrane structure