# AVVISO DI SEMINARIO

Il giorno **11 Marzo 2015** alle **ore 12.00**, nell'aula TA09 il prof. **Yoram COHEN** della UCLA, University of California Los Angeles, Water Technology Research Center, Chemical and Biomolecular Engineering Department, terrà un seminario sul tema:

## High Performance Reverse Osmosis Membranes

É gradita la partecipazione di tutti gli interessati e richiesta la partecipazione del dottorandi curriculum Ingegneria Chimica.


**Abstract:**

Membrane technology has had major influence on developments and improvements in water treatment and desalination over the last several decades. For example, in the water industry, membrane separations utilize dense or porous membranes as a semi-permeable barrier to selectively separate solution or suspension components or to provide control aeration. Membranes have also enabled the development of efficient membrane bioreactors for wastewater treatment. However, despite rapid growth of the membrane industry and increasing acceptability of membrane technology in water treatment and desalination, membrane fouling by colloids, microorganisms, and organics as well as mineral scaling present operational challenges for MF, UF, NF, RO, EDR, FO and PRO membrane based processes. One potential approach to reducing membrane fouling and mineral scaling propensities is via the action of polymeric brush layers that mimic the role of surface brush layers in biological separation systems. Accordingly, multiple approaches to membrane surface nano-structuring have been evaluated focusing on evaluating membranes performance, specifically with respect to imparting fouling resistance. In particular, current efforts will be discussed that have led to effective synthesis of hydrophilic polymeric brush layers, thereby facilitating the development of filtration and desalination membranes of improved biofouling resistance and lower mineral scaling propensity. In addition to the above, there have been significant efforts, since the early days of reverse osmosis membrane desalination, to increase membrane permeability with the goal of reducing energy consumption and plant footprint. Indeed, it will be shown, through process analysis that considers the thermodynamic limit of RO operation, that given the development of high performance membrane RO membranes it is optimal process configuration and plant operability that are now most critical to reducing the overall cost of water desalination. Various examples of potential options to reduce the cost of RO desalination will be presented with a focus on flexible and robust operation that considers the path to high recovery and the variability of feed water quality.