# AVVISO DI SEMINARIO

Il giorno **06 Febbraio 2015** alle **ore 11.30**, nell'aula TA07 il prof. **John PELLEGRINO** della University of Colorado, Boulder, Materials Science and Engineering Program, terrà un seminario sul tema:

**Development of membrane-enabled continuous enzymatic saccharification of lignocellulosic biomass**

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


**Abstract:**

We are developing a membrane-assisted reaction/separation process that performs continuous enzymatic hydrolysis of lignocellulosic biomass to product sugars. The continuous removal of sugars during the hydrolysis lowers product-feedback inhibition, and the membrane assisted separation helps retain and recycle active enzyme. Our earlier experiments suggested that the membrane's nominal permselective properties are less important than its module configuration and ease-of-cleaning because the cake formation controls the flux and fine-tunes the selectivity. Thus, our current studies include three aspects: first, we are coupling tubular ultrafiltration membranes to a continuous stirred-tank reactor that continuously removes the sugars and recycles the bulk of the water, lignin, and enzymes back to the reactor. A steady state reaction is obtained in terms of sugar concentration, insoluble solids concentration, and particle-size distribution (PSD). Overall reaction kinetics and product yield are assessed and compared with classical batch hydrolysis results. In this part of the study, we also performed periodic cleaning of the membrane module to remove cake and reduce fouling. Second, a techno-economic analysis of the possible production scenarios is used to compare with the current state-of-the-art batch enzymatic hydrolysis. Third, a computational fluid dynamics (CFD) study of the flow of particle laden slurries through multiple-tube membrane modules is being performed in order to suggest module designs with improved flow characteristics that limit cake formation and clogging of the system.