



**POLITECNICO**  
MILANO 1863



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**Thursday, November 22, 2018**

**Aula Magna (Building 1, first floor), 11.00 a.m.**

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***Challenges in subsurface reactive transport modeling:  
the case of agrochemicals biodegradation***

Subsurface reactive transport processes entail transport of dissolved chemicals by advection-diffusion in porous and fractured domains in the presence of chemical reactions. Processes of this kind are relevant across many disciplines and engineering applications, such as contaminant transport in aquifers, CO<sub>2</sub> sequestration, harvesting of energy resources.

Mechanistic reactive transport models require to couple chemical, physical, biological models whose structure and parameters are typically uncertain. In this talk, we first briefly discuss the open challenges which still limit a robust characterization of reactive transport models in practice. Next, biochemical degradation of herbicides in soils is considered as an example, with a particular focus on biodegradation of atrazine and glyphosate, which are nowadays massively employed in agroecosystems around the world. Our objective is to quantify the degradation potential, accumulation of toxic chemicals in shallow soils and their potential leakage to aquifers. We consider the impact of multiple sources of uncertainty, which result from our inability to accurately characterize the subsurface hydraulic properties and the kinetics of biogeochemical processes. Implications of the results to groundwater contamination hazard will be discussed.