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MILANO 1863

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***Under-investigated biological dynamics in reactive transport solvers***

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Reactive transport solvers are used for a large suite of applications at different spatial and temporal scales. Environmental applications encompass prediction of soil organic matter cycling and contaminants fate in soil. These processes are largely driven by microbial dynamics and they are usually described by means of first-order equations. Each reaction is therefore a function of one parameter, which may be either estimated by matching predicted target outcomes against laboratory and field measurements or retrieved from the literature. However, there may be large variability in the reported values; such unexplained uncertainty hinders application of these data in numerical models to achieve accurate and robust predictions.

Indeed, microbial dynamics depends on biogeochemical conditions, which are often neglected in earth system and risk assessment models. On the one hand, a comprehensive description of the feedbacks between environmental conditions and biological dynamics would provide a framework to achieve robust predictions. On the other hand, the framework would necessarily introduce additional uncertain parameters.

This seminar aims at (a) showing fundamental microbial responses to nutrients availability and contaminants toxicity, and (b) discussing the trade-off between simple versus complex models in the context of uncertain parameters and model structure.

**Bio-sketch:** **Daniele la Cecilia** is a postdoc at The University of Sydney, where he recently obtained his PhD. Daniele graduated in Civil and Environmental Engineering from Università di Trento. His primary research interest focuses on the mechanistic modelling of soil biogeochemistry and microbial dynamics in the environment.

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