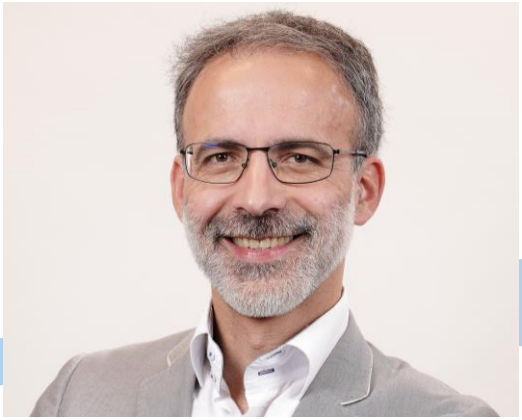

HELLENIC SOCIETY FOR SOIL MECHANICS & GEOTECHNICAL ENGINEERING

SIMSG ISSMGE

UNSAT 2023 8th International Conference on Unsaturated Soils

Milos Conference Center
George Eliopoulos
Milos, Greece
May 2-5, 2023

Themed Lecture

Jean-Michel Pereira
Jean-Michel Pereira is Professor of Geomechanics at Ecole des Ponts ParisTech. He is currently the deputy director of Laboratoire Navier.

His primary research interests pertain in the areas of poromechanics, unsaturated soil mechanics, coupled thermo-hydro-chemo-mechanical analyses, CO_2 geological storage and energy geostructures. He develops theoretical, experimental and numerical approaches to his research, with a particular focus on applications related to energy geo-engineering.

He is the task force leader for CO_2 geological storage of the Technical Committee on Energy Geotechnics of the ISSMGE and serves as Editor-in-Chief of the journal *Geomechanics for Energy and the Environment*.

Effects of microstructure on thermo-hydro-mechanical behaviour of geomaterials

Jean-Michel Pereira, Professor, Ecole des Ponts ParisTech

The presentation provides an overview of the thermo-hydro-mechanical behaviour of geomaterials, with a focus on their microstructure and its changes induced by multiphysics loading. After recalling the strong links between the microstructure and the water retention properties of unsaturated soils, the relationship between the microstructure and the physical properties governing heat and mass transfers is explored.

The mechanical behaviour of unsaturated soils is then examined, with a particular emphasis on defining an effective stress based on microstructural descriptors. The presentation covers experimental methods for determining this microstructurally-based effective stress, including recent advances in identifying the stress coefficient from Mercury Intrusion Porosimetry data.

Finally, the presentation concludes with an exploration of strategies to model the macroscopic behaviour of unsaturated geomaterials that take into account their microstructure and the changes it undergoes.