

SEMINAR

Environmental and Energy Geomechanics: Challenges and Opportunities

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The involvement of geotechnical/geomechanical engineers in problems comprising unprecedented Thermo-Hydro-Mechanical and Chemical (THMC) conditions is every time more frequent, particularly in geo-environmental and geo-energy applications. The prediction of geo-engineering system behavior under coupled THMC conditions represents huge challenges for our profession, but also extraordinary opportunities to achieve a better understanding of soils and rocks behavior under such complex extremes. The realization of this requires both, advanced experimental and numerical investigations. In this lecture, recent improvements in our understanding of geomaterials behavior subjected to simultaneous THMC perturbations will be discussed, as well as, the incorporation of the main features associated with the THMC behavior of soils and rocks in constitutive and numerical models. Some of the topics to be briefly discussed in this seminar include: behavior of swelling clays and pelletized mixtures typically used in the design of engineered barriers and seals, behavior of hydrate bearing sediments, fault reactivation triggered by gas injection, behavior of frozen soils, geo-thermal structures, compressed air storage system (CAES) design, formation and propagation of desiccation cracks in soils and rocks.

SHORT BIOGRAPHY

Dr. Marcelo Sanchez was appointed as an Associated Professor in the Zachry Department of Civil Engineering TAMU in September 2009. He obtained his first degree in Civil Engineering from the Universidad Nacional de San Juan (Argentina). His Master and Ph.D. (2004) degrees are from the Universidad Politecnica de Catalunya (UPC, Barcelona, Spain). His expertise lies in the analysis of Thermo-Hydro-Mechanical and Chemical (THMC) coupled problems in geological media. The main applications of his research are related to: the design of nuclear waste disposal, the study of gas production from hydrate bearing sediments, the behavior of unsaturated soils and expansive clays, design of energy piles, the behavior of frozen soils, and the design of underground compressed air storage system. He has published more than 100 peer review papers. He is acting as an Associated Editor of five international journals. He is one of the recipients of the “George Stephenson Medal 2012” (ICE, UK), and other awards. He is the Chairman of the ISSMGE Technical Committee TC308 on “Energy Geotechnics”.



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