ALERT Workshop 2024

"Continuum-based particle methods"

<u>Abstract</u>

Until relatively recently, most of the mathematical formulations proposed for modeling multiphysics geomechanical problems relied on the assumption of linearized kinematics, i.e., the deformation of the soil mass is sufficiently small such that the current and the reference configurations of the soil body are virtually indistinguishable. However, geometric non-linearity may play an important role in some practical applications. A number of important failure and flow problems are indeed characterized by significant changes in the soil mass geometry and very high deformation levels. A non-exhaustive list of practical applications which require both mechanical and geometrical non-linear characterization of soil behavior include: the evaluation of pile bearing capacity of offshore platforms; the modeling of subsidence phenomena associated to hydrocarbon extraction and sinkhole formation; the study of the effects of pile driving; the interpretation of cone penetration tests under undrained or partially drained conditions; the modeling of slow slope deformations in presence of significant modifications of the slope geometry. The workshop intends to bring together researchers working in these fields to provide an overview of a number of relatively recent numerical methods (for example: MPM, PFEM, Peridynamics, SPH) capable of dealing with extreme deformations as well as non-linear material behavior of the soil mass, still remaining within the realm of continuum mechanics of porous granular materials.