

COMPUTATIONAL GEOMECHANICS

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JINHYUN CHOO^{*}, HA H. BUI[†], JOHAN GAUME[§], WAICHING SUN[#]

AND JIDONG ZHAO[‡]

^{*} Seoul National University
1 Gwanak-ro, Gwanak-gu, Seoul, 08826, South Korea
jinhyun.choo@snu.ac.kr

[†] Monash University
23 College Walk, Clayton, VIC 3168, Australia
ha.bui@monash.edu

[†] ETH Zurich
Stefano-Franscini-Platz 5, 8093 Zurich, Switzerland
johan.gaume@igt.baug.ethz.ch

[§] Columbia University
500 W 120th St, New York, NY 10027, United States
wsun@columbia.edu

[‡] Hong Kong University of Science and Technology
Clear Water Bay, Kowloon, Hong Kong SAR
jzhao@ust.hk

Keywords: Geomechanics, Granular Mechanics, Porous Media, Multiphysics

ABSTRACT

This minisymposium aims to bring together researchers and practitioners to share recent advances in the computational modeling of geomaterials and geosystems, with a focus on both innovative methods and impactful applications. As global challenges related to infrastructure resilience, energy sustainability, and environmental protection intensify, computational geomechanics has become an essential tool for understanding and predicting the behavior of complex geomaterials such as soils, rocks, snow, and ice. These materials often exhibit highly nonlinear, coupled, and multiscale responses, necessitating the development of advanced predictive models and robust numerical approaches.

We welcome contributions on a wide range of topics, including but not limited to:

- Constitutive modeling and validation for geomaterials
- Coupled poromechanics and multiphysics processes (e.g., THMC modeling)
- Granular and micromechanical approaches
- Multiscale and multifidelity modeling techniques
- Large deformation and failure using meshfree, particle, or hybrid methods
- Fracture, damage, and localization phenomena

- Uncertainty quantification and probabilistic analysis
- Data-driven and machine learning methods in geomechanics
- Digital twins and computational frameworks for field applications
- Applications in geohazards, energy and environmental geotechnics, and geotechnical engineering

This minisymposium aims to foster discussion, promote collaboration, and explore future directions in computational geomechanics. Participation from both academia and industry is warmly encouraged.