XVIII International Conference on Computational Plasticity, COMPLAS 2025
September 2-5, 2025, Barcelona, Spain

DATA-DRIVEN METHODS AND MACHINE LEARNING FOR PARTICULATE MATERIALS

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ABSTRACT

Particulate media are ubiquitous in engineering science. From colloids, cells, and powders, to metamaterials, concrete, and soils, the behavior of a broad range of material systems emerges from the interaction between discrete particles, often leading to complex, inelastic macroscopic phenomena. This invited session offers a platform to present and discuss current trends and developments in the emerging field of data-driven methods and machine learning applied to particulate materials across scales.

The session aims to be both application- and systems-agnostic, inviting contributions from various disciplines. General areas of interest include but are not limited to solid and fluid mechanics, multiphysics problems, multiscale modeling, geomechanics, architected materials, and planetary science. Contributions focusing on data acquisition and mining (from simulations, experiments, or other sources), data assimilation, and numerical techniques that leverage such data for macroscopic material characterization and modeling are particularly encouraged.