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# DATA DRIVEN MODELING AND NUMERICAL SIMULATION IN POROUS MEDIA
# 1700

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## ABSTRACT

Porous media, such as soil, rocks, concrete, biological tissues, are ubiquitous in nature and human life. These systems are intrinsically multiscale and multi-physics, due to the interaction between the void space with the solid skeleton via different mechanisms across multiple spatial and temporal scales (e.g. twinning, dislocation, grain boundary diffusion, creeping, and faulting). As a result, the complex coupled processes in porous media are highly nonlinear and path-dependent. This complexity makes it difficult to manually derive a theoretical model that guarantees that all important coupling mechanisms are properly taken into consideration, while the simplifications made for the sake of convenience and interpertiability remains appropriate for the intended applications.

Recent advancements in data science, machine learning and artificial intelligence offers many new research tools for mechanics researchers that can potentially generate models and make predictions for porous media previously thought to be impossible to derive, calibrate, verify and validate. Nevertheless, robustness, interpertability and the compatibility of domain-aware knowledge remains an ongoing challenge for the data-driven and hybirdized models. Generating new fundamental understanding of physical and chemical behavior, leading to successful predictions well outside the range of the calibration data and potentially providing guidance to improving existing theoretical approaches in complex porous systems are among specific areas of interest to this mini-symposium (MS). This MS provides a unique opportunity to discuss the state-of-the-art and recent trends in computational and experimental research utilizing data-sciences for heterogeneous porous media.