

Séminaire du laboratoire PIMM

Jeudi 24 juin 2021 à 13h30 sur Teams

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présentera dans le cadre du séminaire ses travaux intitulés :

ML-enhanced approaches to the mechanics of multi-phase materials

The prospect of accelerated design of materials through the use of high-throughput techniques and AI-driven decision making brings exciting promise to the field. Major challenges to this approach include the enormous quantity and variable quality of data generated in the high-throughput synthesis and characterization, and the sheer quantity of mechanics models required to support the AI optimizations during this process. Machine learning tools provide a number of very useful options for making use of materials data and circumventing memory-intensive parametric analyses of large-scale computational models. This seminar will discuss a couple options for such tools as applied to multi-phase materials: 1) digital reconstruction of three-dimensional stochastic microstructures based on transfer learning, as a way to reduce the burden of full three-dimensional characterization of materials, and 2) Image to image mapping of composite microstructure to stress distribution, using an encoder-decoder Unet architecture. After presenting these two approaches, there will be a brief discussion of the challenge in performing uncertainty quantification for machine learning, in particular for neural network architectures.