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MACHINE LEARNING FOR BIOLOGICAL SYSTEMS

TRACK 1700 – DATA SCIENCE AND MACHINE LEARNING

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ABSTRACT

With breakthrough technological developments throughout the past decades, the biomedical sciences are now collecting more data than ever before. There is a critical need for efficient strategies to analyze those data in a time and cost effective manner and push the boundaries of modeling by data assimilation, machine learning, and uncertainty quantification. The physics-based modeling of biological systems presents many opportunities to enrich the mathemtical models with a range of data-driven methods. Additionally, the generation of large-scale data from high-fidelity computational models as well as from a range of medical imaging and measurement systems offers the opportunity to develop methods for representation, exploration and analysis. The objective of this minisymposium is to review the state of the art, identify current challenges, and highlight opportunities for machine learning and data-driven modeling of biological systems.

We invite contributions that integrate machine learning, solution of ordinary or partial differential equation-based models, system identification, multi-fidelity modeling, sensitivity analysis, or uncertainty quantification.

This minisymposium will help identify current roadblocks and areas where computational mechanics, as a discipline, can play a significant role. It will stimulate discussion within the community of computational mechanics and reach out to other disciplines including but not limited to mathematics, statistics, computer science, artificial intelligence, biomedicine, systems biology, and precision medicine.