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MACHINE LEARNING ALGORITHMS FOR ACCELERATING MATERIAL CHARACTERIZATION, DISCOVERY, DESIGN, AND MANUFACTURING PROCESSES

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MINISYMPOSIUM

With the synthesis of new high-throughput methods, materials R&D is readying for the discovery, characterization, and design of robust materials and manufacturing processes through the development and implementation of machine learning algorithms spanning multimodality, physics constraints, Gaussian processes, and causal inference. The fusion of human expert materials knowledge with multimodal, physically constrained, machine learning algorithms can aid in detection of "fingerprints" critical in materials behavior, prognose component performance, and adapt manufacturing strategies.

This minisymposium convenes world-class researchers in advanced manufacturing, materials characterization, data science, modeling/simulation, and hardware engineering to showcase works with the ability to further materials discovery, characterization, and design. Researchers from national labs, academia, and industry will present and discuss topics such as hybrid, physics—informed machine learning methods to understand process-structure-property mappings, surrogate models using multimodal data streams combining experiments and simulations, and machine learning guided process optimization.