



Data-Driven Computational Design of Engineered Material Systems

Abstract

Design of advanced material systems imposes challenges in integrating knowledge and representation from multiple disciplines and domains such as materials, manufacturing, structural mechanics, and design optimization. While most of the existing methods are trial-and-error based, we are proposing data-driven systematic computational design methods that provide a seamless integration of the aforementioned domains through advances in design representation, evaluation, and synthesis. In this talk, we will introduce the state-of-the-art computational design methods for designing heterogeneous nano- and microstructural materials and metamaterial systems such as polymer nanocomposites, light-weight composite structures, microelectronic materials, and solar cells. Research developments in microstructure characterization and reconstruction, deep machine learning of key structure features, mixed-variable Gaussian Process Modeling and Bayesian optimization, and multiscale uncertainty quantification will be introduced. Challenges and opportunities in designing engineered material systems will be discussed.

Speaker Bio

Dr. Wei Chen is the Wilson-Cook Chair Professor in Engineering Design at Northwestern University. Directing the Integrated Design Automation Laboratory, her current research involves issues such as simulation-based design under uncertainty; model validation and uncertainty quantification; data science in design and advanced manufacturing; stochastic multiscale analysis and materials design;

design of metamaterials; multidisciplinary design optimization; consumer choice modeling and decision-based design. She is the co-founder and director of the interdisciplinary doctoral cluster in Predictive Science and Engineering Design (PS&ED), and serves as the co-director for the Design Cluster affiliated with the Segal Design Institute at Northwestern. his PhD, SM and SB in mechanical engineering, and an SM in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology.

Friday, March 20, 2020
11:00am - 12:00pm

Chrysler Center, Room 151
2121 Bonisteel Blvd
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Metered parking is available.



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Questions?

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