**Artificial Intelligence for Engineering Design and Computational Mechanics**

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Engineered systems are an indispensable part of our modern life with far-reaching applications that include aerial and ground transportation, electronics, large-scale structures, and medicine. The ever-evolving societal, environmental, and cultural awareness calls for significantly complex systems with unprecedented properties that reliably meet stakeholders' demands under extreme conditions. To accelerate the design and deployment of such systems while reducing the reliance on costly and time-consuming experiments, it is necessary to develop advanced computational methods that streamline their design and analysis process.

In this talk, I will present some of our recent works for solving challenging problems in engineering design, solid mechanics, and fluid dynamics. In particular, I will demonstrate how we can (1) drastically accelerate multiscale simulations of cast alloys via mechanistic reduced order models, (2) surrogate plastic and history-dependent deformation of fiber composites with deep learning, (3) optimize material composition with latent map Gaussian processes and Bayesian optimization, and (4) solve partial differential equations such as the Navier-Stokes equations with transfer learning.