

The Department of Mechanical Engineering
College of Engineering and Applied Sciences
SUNY Stony Brook University

Mechanical Engineering Seminar



Speaker: Professor Yan Wang
Woodruff School of Mechanical Engineering, Georgia Institute of Technology
Thursday, November 10, 2022, at 2:00 PM
Room 173 Light Engineering Building

Title: Probabilistic Design of Cyber-Physical-Social Systems

Abstract

Cyber-physical-social systems (CPSS) are physical devices with highly integrated functions of sensing, computing, communication and control, and are seamlessly embedded in human society. Some of the unique design challenges for CPSS include resilience, adaptability, as well as the perceptions of trust and risk associated with the machine intelligence. In this talk, an overview of the recent research efforts in quantifying resilience and trust associated with CPSS will be given. A new probabilistic graph modeling framework for CPSS, ProbNet, will be introduced. Based on the probabilistic graph model, trustworthiness is quantified based on the metrics of ability, benevolence, and integrity. The new quantitative metrics are used in the design of trustworthy CPSS networks. In addition, topology-informed surrogate models are proposed to model the information dynamics in the networks.

Biography

Yan Wang, Ph.D. is a Professor of Mechanical Engineering and leads the Multiscale Systems Engineering research group at the Georgia Institute of Technology. The interests of the research group are in the intersection of design, manufacturing, and materials, and currently focus on multiscale modeling and simulation, uncertainty quantification, and physics-informed machine learning. The group has published over 200 peer-reviewed journal and conference papers, including the ones with best paper awards at the conferences of the American Society of Mechanical Engineers (ASME), The Minerals, Metals & Materials Society (TMS), the Institute of Industrial & Systems Engineers (IISE), and the International CAD Conference. Prof. Wang is a recipient of the U.S. National Science Foundation (NSF) CAREER Award, a National Aeronautics and Space Administration (NASA) Faculty Fellow, and an ASME Fellow. He currently serves as the Editor-in-Chief of the ASME Journal of Computing and Information Science in Engineering.

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