

# EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

## Sensor-based Modeling and Control of Nonlinear Dynamics for Advanced Manufacturing and Smart Health

**ABSTRACT** - Nonlinear dynamics arise whenever multifarious entities of a system cooperate, compete, or interfere. Effective monitoring and control of nonlinear dynamics will increase system quality and integrity, thereby leading to significant economic and societal impacts. In order to cope with system complexity and increase information visibility, modern industries are investing in a variety of sensor networks and dedicated data centers. Real-time sensing gives rise to “big data”. Realizing the full potential of “big data” for advanced quality control requires fundamentally new methodologies to harness and exploit complexity. This talk will present novel sensor-based nonlinear dynamical methodologies for real-time system informatics, monitoring, and control. Specifically, the developed methodologies will be demonstrated in both advanced manufacturing and smart health applications. The proposed methodology is generally applicable to a variety of complex systems exhibiting nonlinear dynamics, e.g., additive manufacturing, cardiovascular systems, precision machining, sleep apnea, biomanufacturing. In the end, future research directions will be discussed.



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**SPEAKER BIO** – Dr. Hui Yang is the Harold and Inge Marcus Career Associate Professor in the Harold and Inge Marcus Department of Industrial and Manufacturing Engineering at The Pennsylvania State University, University Park, PA. Prior to joining Penn State in 2015, he was an Assistant Professor in the Department of Industrial and Management Systems Engineering at the University of South Florida from 2009 to 2015. He is a recipient of 2015 Outstanding Faculty Award at the University of South Florida.

Dr. Yang's research interests focus on sensor-based modeling and analysis of complex systems for process monitoring, process control, system diagnostics, condition prognostics, quality improvement, and performance optimization. His research program is supported by National Science Foundation (including the prestigious NSF CAREER award), Lockheed Martin, NSF center for e-Design, Susan Koman Cancer Foundation, and the State of Florida.

Dr. Yang is the president (2017-2018) of IISE Data Analytics and Information Systems Society, the president (2015-2016) of INFORMS Quality, Statistics and Reliability (QSR) society, and the program chair of 2016 Industrial and Systems Engineering Research Conference (ISERC). He is also an associate editor for IISE Transactions, IEEE Journal of Biomedical and Health Informatics (JBHI), IEEE Robotics and Automation Letters (RA-L), and an Associate Editor for the Proceedings of 2017 IEEE International Conference on Automation Science and Engineering. He serves as a referee for a diverse set of top tier research journals such as Physical Review, IEEE Transactions on Biomedical Engineering, IEEE Journal of Biomedical and Health Informatics, Biophysical Journal, IIE Transactions, Technometrics, and IEEE Transactions on Automation Science and Engineering. He is a professional member of IEEE, IEEE EMBS, INFORMS, IIE, ASEE and American Heart Association (AHA).

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**TUESDAY, NOVEMBER 13, 2018**

**3:30PM – 4:50PM**

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