

Seminar Series

**Signature-Driven Fault Management  
Methodologies for Complex Engineering Systems**

by

**Professor Shiyu Zhou**

**Associate professor  
Department of Industrial and Systems Engineering  
the University of Wisconsin-Madison.**

**Date:** Mar. 2, 2010 (Tuesday)

**Time:** 2:00pm (Tea Reception at 3:00pm)

**Venue:** B6619, MEEM Conference Room

**ABSTRACT**

The continuously growing demand for improved functionality and reliability results in ever-growing complexity in engineering systems such as manufacturing systems and service systems. The unprecedented complexity makes the fault monitoring, diagnosis, and control very challenging engineering problems. On the other side, due to the rapid development of cyber infrastructure and sensing technology, an abundance of data from engineering systems is now readily available.

The data rich environment provides great opportunities to develop new fundamental industrial engineering (IE) tools for effective fault management. Targeting on the urgent need and the emerging opportunity, the presented research has been focusing on the development of rigorous signature-driven statistical tools to model and analyze the data gathered from a vast array of diverse and interrelated sources for monitoring, fault diagnosis, and prediction purposes. Two examples, dimensional variation source identification in multistage manufacturing processes and identification of spatial defect patterns in semiconductor fabrication, are presented. The proposed methodologies can achieve systematic fault detection, root cause identification, and failure prediction and possesses wide applicability to various engineering systems.

## **BIOGRAPHY**

Shiyu Zhou is an Associate Professor in the Department of Industrial and Systems Engineering at the University of Wisconsin-Madison. He got his B.S. and M.S. in Mechanical Engineering at University of Science and Technology of China in 1993 and 1996 respectively, and got his Master in Industrial Engineering and Ph.D. in Mechanical Engineering at the University of Michigan in 2000. Dr. Zhou's research interests are the in-process quality and productivity improvement methodologies by integrating statistics, system and control theory, and engineering knowledge. The objective is to achieve automatic process monitoring, diagnosis, compensation, and their implementation in various manufacturing processes. His research is sponsored by National Science Foundation, Department of Energy, NIST-ATP, and industries. He is a recipient of the CAREER Award from the National Science Foundation in 2006. Dr. Zhou is a member of IIE, INFORMS, ASME, and SME.

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Enquiry: 2788 8420

***All are welcome!***

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