

Seminar Series

**Discrete Event Modeling and Analysis for  
Production and Service Systems**

by

**Mr. Nan Chen**

**(PhD Student)**

**Department of Industrial and Systems Engineering**

**University of Wisconsin-Madison**

**Date: Feb. 24, 2010 (Wednesday)**

**Time: 3:00pm - 4:00pm (Tea Reception at 2:45pm)**

**Venue: Room Y5202, 5/F, Academic Building**

**Abstract**

Discrete event sequences are more and more common in practice. They can record both system level activities (e.g., order tracking, patient routing) and detailed machine level operations (e.g., system failures, user actions, task status). It is generally believed that these data provide rich information regarding the system working conditions and could be used for condition monitoring, diagnosis, and optimal maintenance. In this presentation, I will focus on the modeling and analysis of discrete event sequences in production and service systems.

In the first part, I studied the distributional properties of cycle times, which are represented by the time elapses between events "customer departure" and "customer arrival", at different throughput rates. A nonlinear quantile regression is proposed to characterize the cycle time distributions with mild assumptions. The model can be used to predict the cycle time at different throughputs and is suitable for scheduling/planning optimization. Additionally, an efficient monitoring method is also proposed to fast detect the changes in the system by observing individual cycle times. In the second part, event logs in medical imaging systems are

modeled and used to characterize the system degradation. The relationship between system failure time and other precursor events are quantified statistically. Based on the model, optimal variability sensitive condition based maintenance is developed to minimize the weighted sum of average cost and cost variability of the maintenance.

### **Biography**

Nan Chen is a Ph.D. student in the Department of Industrial and Systems Engineering at the University of Wisconsin-Madison. He got his B.S. degree in Automation at Tsinghua University in 2006, and M.S. degree in Computer Science at University of Wisconsin-Madison in 2009. His research interests include modeling and monitoring of operational performance in complex systems; statistical process control in emerging manufacturing systems; system improvement through design optimization. He is a student member of INFORMS, SME and IMS.

Enquiry: 2788 8420

*All are welcome!*