EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Advanced Spatial Data Mining Methodology and its Applications to Semiconductor Manufacturing Processes*

ABSTRACT – In his talk, Dr. Jeong will present some methodologies for mining dynamic random access memory (DRAM) wafer data obtained in semiconductor manufacturing processes. He wil first present a new step-down spatial randomness test aimed at automatically detecting an abnormal DRAM wafer. Testing the spatial randomness of a DRAM wafer is challenging. A DRAM wafer includes multiple spatial maps, resulting in a more complex and lengthy testing process compared with that of a single wafer map of a flash memory. In order to monitor the spatial randomness of the multiple spatial maps, he will present a new step-down spatial randomness test to detect abnormal DRAM wafers. Next, he will present a new Bayesian classification model for uncertain data, which aims at classifying abnormal DRAM wafers. In spatial defect classification of a semiconductor wafer, he extracts several spatial features of the wafer map that capture the defect information. Due to the complexity of the wafer map, the spatial features of image data are usually incomplete and ambiguous. In order to consider the uncertainty, he will propose a new Bayesian classifier based on multivariate kernel density estimation for uncertain data.

This is the joint work with Dr. Byung H. Kim at KISTI and Drs. Seung H. Tong and Dr. Ingap Chang at Samsung Electronics, Inc.

Dr. Myong Kee (MK) Jeong
Professor
Rutgers, The State University of New Jersey
Department of Industrial and Systems Engineering

SPEAKER BIO – Dr. Myong K. (MK) Jeong is a Professor in the Department of Industrial and Systems Engineering, RUTCOR (Rutgers Center for Operations Research), and DIMACS (Center for Discrete Mathematics and Theoretical Computer Science) at Rutgers University. Currently, he is the Director of Laboratory for Data Analytics and Process Insights. He received his Ph.D. in Industrial and Systems Engineering from Georgia Institute of Technology, Atlanta, Georgia, in 2004. He worked as a senior researcher from 1993 to 1999 at the Electronics and Telecommunications Research Institute (ETRI).

He has focused on developing data mining and machine learning techniques for process monitoring and improvement. The applications include various industries such as gas/oil, semiconductor, transportation, bio-energy, computing, electronics, and automobile. He has published over 90 journal papers including Technometrics, IEEE Transaction on Semiconductor Manufacturing, IEEE Transactions on Systems, Man, Cybernetics, Pattern Recognition, and IIE Transaction on Quality and Reliability.

USC Viterbi
School of Engineering
Daniel J. Epstein Department of Industrial and Systems Engineering

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