

**DEPARTMENT OF MANAGEMENT SCIENCE AND STATISTICS
RESEARCH SEMINAR SERIES**

**Friday, Jan. 27
1:30 – 3 p.m. (CST)
Business Building 4.02.10 (Executive Conference Room)**



Dr. Min Wang
Associate Professor of Management
Science and Statistics, Ph.D. Advisor
Carlos Alvarez College of Business
The University of Texas at San Antonio

“Bayesian seemingly unrelated regression model for process optimization”

Abstract

Empirical models that relate multiple quality features to a set of design variables play a vital role in many industrial process optimization methods. Many of the current modeling methods employ a single-response model to analyze industrial processes without taking into consideration the high correlations among the response variables and may result in a misleading prediction model, and therefore, poor process design. To deal with these issues, we first present a Bayesian hierarchical modelling approach to process optimization based on the seemingly unrelated regression (SUR) models. The proposed approach can estimate a set of predictors to be included in a model based on a Bayesian hierarchical procedure (i.e. model selection) and provide model prediction and optimization based on a Bayesian SUR model (i.e. model estimation). We then propose a robust version of Bayesian SUR models to simultaneously analyze multiple-feature systems while accounting for the high correlation, non-normality, and variable selection issues. Simulation experiments are executed to investigate the performance of the proposed Bayesian method, which is also illustrated by application to a laser cladding repair process. The analysis results show that the proposed modeling technique compares favorably with its classic counterpart in the literature.

Bio

Min Wang is an Associate Professor of Statistics in the Department of Management Science and Statistics at The University of Texas at San Antonio. He previously worked at Michigan Technological University and Texas Tech University. His main research spans the areas of Bayesian inference and methods, high-dimensional inference, prior elicitation, quantile regression, and statistical modeling, all in both methodological and theoretical perspectives. His work has been appeared or accepted in top-ranked journals, such as Bayesian Analysis, Bernoulli, Computers & Industrial Engineering, IISE Transactions, International Journal of Production Research, Journal of the Operational Research Society, Journal of Statistical Planning and Inference, Naval Research Logistics, The American Statistician, and others. He has also conducted interdisciplinary research with various scholars from biomedical engineering, civil engineering, industrial engineering, mechanical engineering, and other sciences. His collaborative work has been published in prestigious journals, such as Acta Neurochirurgica, Construction and Building Materials, Endocrine, Journal of Manufacturing Processes, Medical physics, and others. Dr. Wang's research was partially supported by funding from National Institute of Health, National Science Foundation, and other agencies.