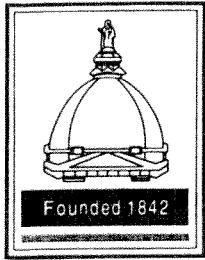


AEROSPACE & MECHANICAL ENGINEERING



2010 COLLOQUIUM 2011 SEMINARS ARE OPEN TO THE PUBLIC

INFORMAL COFFEE PERIOD BEFORE THE SEMINAR IN ROOM 365 FITZPATRICK HALL
UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

SPEAKER: **Dr. Christopher Hoyle**
Mechanical, Industrial, and Manufacturing
Oregon State University
Corvallis, Oregon

TOPIC: **CONFIGURING ENGINEERING SYSTEMS CONSIDERING
CONSUMER HETEROGENEITY**

DATE: Thursday, April 7, 2011

TIME: 3:30 p.m.

PLACE: 138 DeBartolo Hall

ABSTRACT

A significant challenge in system design is connecting the engineering and marketing domains to enable identification of the preferred engineering system configuration, considering the real complexities in engineering systems design and the heterogeneity of consumer preferences. Under an enterprise-driven design framework, consumer choice models play a critical role by providing a link between engineering design decisions and customer preferences. However, existing choice modeling approaches in the design literature do not sufficiently address the unique issues that arise when complex systems are considered. An Integrated Bayesian Hierarchical Choice Modeling (IBHCM) framework is developed in this work which utilizes multiple model levels to create a link between qualitative attributes considered by consumers when selecting a product and quantitative attributes used for engineering design. In this framework, both systematic and random consumer heterogeneity is explicitly modeled and the ability to combine multiple sources of market and survey data for model estimation is provided. Further, methods to mitigate error propagated throughout the model hierarchy and quantify prediction uncertainty are developed. In addition to the choice model framework, the research includes a design process tool to map product attributes at different levels of hierarchy, a hardware-in-the-loop algorithmic design of experiments approach for human appraisals, and a statistical methodology for analyzing human appraisal data to understand consumer heterogeneity. The benefits of the IBHCM approach and the supporting modeling and analysis techniques are demonstrated using the design of an automobile occupant package. Extension of these methods to the complex system design domain and future research directions are also discussed.

NOTE: *If you are interested in meeting individually with
Dr. Hoyle, please contact Evelyn at 631-5431*