2010-2011

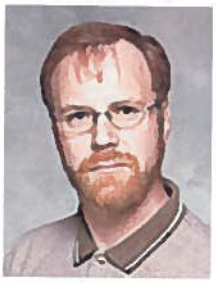
Graduate Seminar Series

The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents

Dr. John Cafeo

GM - Vehicle Development Research Lab



Dr. Cafeo is a Lab Group Manager in the Vehicle Development Research Lab. He has responsibility for developing innovative methods for advanced vehicle development to improve decision making under uncertainty. This includes quantifying customer needs and engineering feasibility in order to make vehicle desirability an implicit part of the early design process. To this end, John manages GM's Customer Driven – Advance Vehicle Development (CD-AVD) global science innovation program.

Dr. Cafeo received his BS (83), MS (84) and Ph. D (92) degrees in Mechanical Engineering from Penn State University. He holds five patents, with nine pending, and has authored over 40 external technical publications. He has won a Boss Kettering and a McCuen at GM and has won four external best paper awards. John has served on the Executive Committee of the Society of Experimental Mechanics and is currently the Senior Technical Editor for *Experimental Techniques* magazine. Finally John is a member of the American Society of Mechanical Engineers (ASME) Codes and Standards Committee (V&V-10) for Verification and Validation in Computational Solid Mechanics.

Thursday, Feb. 24, 2011 4:00 – 5:00 p.m. Room 112, ME-EM Bldg.

Consumer needs engineering: Incorporating perceptual aspects of human assessment in product decisions

A critical need in designing a consumer product, like an automobile, is the use of credible quantitative models early in the vehicle design process that quantify the risk of consumer acceptance given a particular vehicle design. In order to quantify the risk, it is necessary to be able to predict consumer assessments of a vehicle design as well as estimate the probability a consumer will assess the design in the same way as the prediction. By aggregating the risk, the vehicle development teams can logically and defensibly balance, or tradeoff, the various design attributes and features in order to target a vehicle at the desired population of customers.

In this talk, I will define this area of work and discuss the challenges in modeling a perception of an attribute of the vehicle. An intertwined concept is human decision making. I will discuss the large framework for decisions to help motivate the work. The development of a model will necessary include a description of the product as well as a description of the people. Currently, data for this type of model comes from consumer clinics and surveys. Augmenting this data with anthropometric data as well as physiological data may allow the estimation of a better model. Because gathering this type of data is expensive, it is important to be able to use data from multiple events. I will show an example of a model for head clearance to show one way this might be done.

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