**MECHANICAL ENGINEERING DEPARTMENT**
**ME/IE 8773-8774**

**DESIGN & MANUFACTURING SERIES**
**Topic: TRANSPORTATION**
**Host: Rajesh Rajamani**

# Modeling the Dynamics of Driving

**by**

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**Wednesday, February 8, 2006**
**3:30 p.m.**
**Room 1130 ME**
**Coffee and refreshments will be available at 3:15 p.m. in Room 1130 ME before the seminar**

**ABSTRACT** — In the long term, automotive control and information systems will be highly integrated, not just within the vehicle (the current trend in the industry) but also between vehicles and connecting vehicles to the infrastructure. The theme may sound familiar! However, when it comes to connecting vehicles with their drivers, we still appear to be in the Stone Age. Future developments in the area – particularly in the area of systems that assist the driver – require a much better understanding of the underlying driving process. And whilst models of driving already exist in plenty, none are currently fit for the purpose of designing the next generation of "intelligent" driver assistance systems.

This presentation starts with an overview of current research into driver assistance systems at UMTRI. This work is certainly leading edge in terms of the technologies and system functions. But the state-of-the-art is still based on an obsolete design paradigm – of *concept design followed by physical test* (then repeat!). The second part of the presentation briefly reviews the current status of driver modeling, including a diverse range of models from a wide range of disciplines: vehicle engineering, traffic engineering, psychology, control engineering, physiology, etc. The review leads to the conclusion that a new program is needed to synthesize what we have and develop new approaches. Finally, some concepts are presented for what a comprehensive model of the driving process should look like, and some recent results are presented.

**BIO** — Tim Gordon is Research Professor at the University of Michigan Transportation Research Institute (UMTRI), Head of the UMTRI Engineering Research Division, and holds a joint appointment in the College of Engineering as Professor of Mechanical Engineering. He has been at UM since September 2003, and was previously Ford Professor of Automotive Engineering in the Department of Aeronautical and Automotive Engineering at Loughborough University, U.K. There he was Department Chair and played a leadership role in the automotive activities within the university, including industrial and government links. Dr Gordon obtained both his Bachelors and Doctorate in Applied Mathematics at the University of Cambridge, England. His doctoral dissertation was in the area of relativistic wave propagation in multi-dimensional geometries. His research interests are centered in the field of dynamic systems and control, with particular emphasis on automotive systems, and most recently in the dynamics of driving. He watches English soccer when he can, and is a paid-up member of Leicester City Football Club.

Informal Faculty Luncheon: Wednesday, February 8, 2006, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. Gordon will be able to attend.