MECHANICAL ENGINEERING DEPARTMENT
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The Globe, the Car, and the Co-Processor: A Tale about Producing the Most Complex Consumer Product on Earth.

by

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Wednesday, May 7, 2008
3:15 p.m. — Refreshments before the seminar
3:30 p.m. — Graduate Seminar
Room 1130 ME

ABSTRACT — The automobile is a truly complex consumer product whose design and manufacturing is influenced by national and international policies. Over the last century, the design, manufacture and operation of the automobile have grown into complex system integration paradigms cutting across applications of traditional disciplines in physical sciences, engineering, social and behavioral sciences and business. For example, strict emissions regulations are driving research and development in advanced engine concepts running on conventional and alternative fuels and hybrid vehicular powertrains. Conversely, there are a number of issues generated by the automotive industry that drive policy. For example, many manufacturers are providing electronic stability control systems (ESC) as optional equipment in their current products. However, the crash avoidance benefit of these ESCs is so significant that a US federal rule is proposed to phase in ESCs in all new passenger cars from model year 2009.

This seminar presents the importance of the automobile to the global society, and why one can still produce cars in the United States and make a profit. There are a multitude of research areas that are critical for vehicle development that directly affect society in major ways (e.g., safety, emissions and energy). From a technology perspective, the need for increased processing capability on the vehicle and in its manufacture is discussed. One solution may be provided by typical Graphical Processor Units (GPU's) that have been driven by the computer gaming industry. The GPU is essentially a massively parallel floating point processor that may be used in conjunction with other low cost integer processors such as FPGAs (Field Programmable Gate Arrays) in much the same manner as the individual processor / co-processor in the days of yore (e.g., X86 / X87) were used to enhance computer performance.

BIO — Thomas R. Kurfess received his S.B., S.M. and Ph.D. degrees in mechanical engineering from M.I.T. in 1986, 1987 and 1989, respectively. He also received an S.M. degree from M.I.T. in electrical engineering and computer science in 1988. Following graduation, he joined Carnegie Mellon University where he rose to the rank of Associate Professor. In 1994 he moved to the Georgia Institute of Technology where he rose to the rank of Professor in the George W. Woodruff School of Mechanical Engineering. In 2005 he was named Professor and BMW Chair of Manufacturing in the Department of Mechanical Engineering at Clemson University. He is also the Director of the Campbell Graduate Engineering Center at Clemson University's International Center for Automotive Research. He has served as a participating guest at the Lawrence Livermore National Laboratory in their Precision Engineering Program. He has served as a special consultant of the United Nations to the Government of Malaysia in the area of applied mechatronics and manufacturing. His research focuses on the design and development of advanced manufacturing systems targeting automotive sector (OEM and supplier) production systems. He has significant experience in high precision manufacturing and metrology systems. He has received numerous awards including a National Science Foundation (NSF) Young Investigator Award, an NSF Presidential Faculty Fellowship Award, the ASME Pi Tau Sigma Award, SME Young Manufacturing Engineer of the Year Award, the ASME Blackall Machine Tool and Gage Award, the ASME Gustus L. Larson Award. He is a Fellow of the SME and of the ASME.

Informal Faculty Luncheon: Wednesday, May 7, 2008, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. Kurfess will be able to attend.