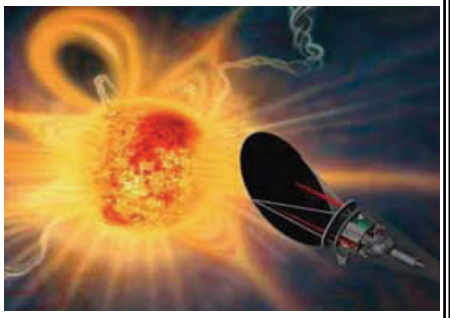
DISTINGUISHED LECTURER SERIES

VCU
MECHANICAL ENGINEERING

From the Simple to the Complex: An Engineer's Perspective

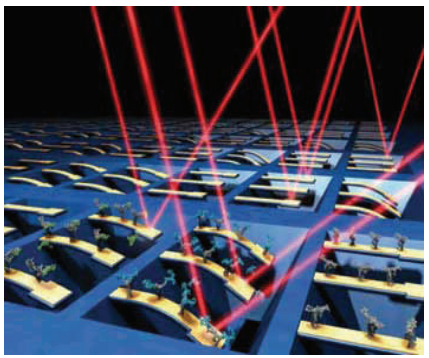


Dr. Mihir Sen
Professor of Aerospace and Mechanical Engineering
University of Notre Dame

23 April 2007
Social Hour: 11:30-12:00 noon
Seminar: 12:00–1:00 pm
Room 105
Engineering Building

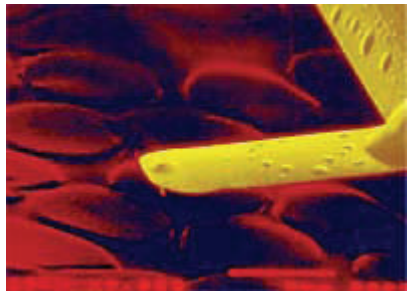
ABSTRACT

Mathematical models of physical systems are essential for their analysis, design and control. Engineering science usually favors a reductionist approach to the study of these systems. Balance equations are written for each component of a system using fundamental scientific principles; the collection of coupled equations is then solved using analytical or numerical methods. This works well in simple systems in which the behavior of a small number of constituent components can easily be modeled. There are other complex systems, however, that may be made up of a large number of simple subsystems that interact with each other in some way. Some of these are either reducible in form to a simple or somewhat simple system. In other cases the problem is mathematically intractable, but is of sufficient importance to warrant approximate solutions. It is common in many of these instances to use empirical correlations. In recent years, improvements have been made to this approach by using techniques of soft computing, such as artificial neural networks and fuzzy logic. The talk will describe a variety of systems, from the simple to the complex, and outline the progression of techniques that are used in their analysis.



BIO

Mihir Sen completed his undergraduate degree in Mechanical Engineering at the Indian Institute of Technology in Madras, India, in 1968. He started his graduate studies with experiments in turbulence in the Department of Mechanics at the Johns Hopkins University working under the supervision of Professor L. S. G. Kovasnay. He finished it in the Department of Aeronautics and Astronautics of the Massachusetts Institute of Technology with research on the generation of surface waves by wind with Professor E. Mollo-Christensen. He obtained the degree of Doctor of Science in 1975. He worked for the next ten years in the National Autonomous University of Mexico (U.N.A.M.) in Mexico City. He was for one year a visiting professor in Cornell University before joining the Department of Aerospace and Mechanical Engineering of the University of Notre Dame in 1986. His research is in heat transfer and fluid mechanics. He has worked in several areas including reacting flows, natural and forced convection, flow in porous media, falling films, boiling, MEMS applications, and heat exchangers. His current interest is in thermal control and applications of intelligent systems. He is a Fellow of the ASME.



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