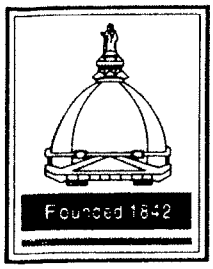
AEROSPACE & MECHANICAL ENGINEERING



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: **Professor Mark L. Kimber**
Department of Mechanical Engineering and Materials Science
University of Pittsburgh
Pittsburgh, Pennsylvania

TOPIC: **ENERGY AND ENERGY EFFICIENCY IN THERMAL-FLUIDS SYSTEMS**

DATE: Tuesday, September 28, 2010

TIME: 3:30 p.m.

PLACE: 136 DeBartolo Hall

ABSTRACT

As corporate and scientific communities have begun to focus on energy availability and sustainability, power management in electronics has come to be identified as a critical component of the energy landscape. In many cases, a significant portion of the overall energy required is consumed by the thermal management solution and an urgent need exists for low-power consuming cooling approaches. The author will discuss ongoing research in energy efficient convection enhancement which involves characterization of the thermal and dynamic behavior of piezoelectric fans. These fans are devices which take advantage of vibrating cantilevers actuated by a piezoelectric material to cause fluid motion near a heated surface. An alternating input signal tuned to the fundamental resonance frequency of the fan produces large-amplitude vibration at the free end of the cantilever blade, serving to agitate and move the surrounding fluid. These devices can provide a large increase in thermal performance while typically consuming only 2-30 mW of power, and can also be readily adapted to applications with limited available volume while remaining noiseless. Due to their unique advantages, these fans have been received enthusiastically by the electronics cooling industry as they present a viable solution for thermal management in situations where none previously existed. These fans can also be used as energy efficient propulsion devices and preliminary work in regard to this topic will also be presented.

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