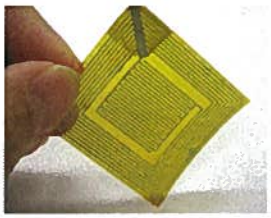
2009-2010

# Graduate Seminar Series

## The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents


### Professor Keat Ghee Ong
**Michigan Technological University**

**Keat Ghee Ong** received his B.S., M.S., and Ph.D. degrees in Electrical Engineering from the University of Kentucky in 1997, 1998, and 2000, respectively. He was a research associate in the Pennsylvania State University from 2001 to 2002, and the chief scientist in Sentech Corporation, State College, PA, in 2002-2004. He continued his research as the chief scientist in KMG2 Sensors Corporation in State College, PA, until 2006. Currently, he is an assistant professor in the department of Biomedical Engineering at Michigan Technological University, Houghton, MI. His areas of expertise include implantable biosensors and biological sensing materials and devices. He is also working on wireless, passive RFID and magnetic-based sensors, magnetoelastic materials, nanoporous metal oxides and carbon nanotubes, and measurement technique and instrument automation. He is the North American editor of *Sensor Letters* and is on the editorial board of and *Sensors Journal*. He is the author of three book chapters, over 80 publications in peer-reviewed journals and conference proceedings, and multiple patents. He has provided keynote lectures on multiple national and international technical meetings, and served as a grant reviewer in multiple NIH review panels.

**Thursday, Dec. 3, 2009** **3:00 – 4:00 p.m.** **Room 112, ME-EM Bldg.**

## Wireless, Passive Sensor Technologies

The design and application of several wireless, passive sensor technologies will be described. The first sensor technology, the LC sensor, consists of a planar inductor-capacitor resonant circuit. Parameters of interest such as humidity and gas concentrations are monitored by measuring the changes in the sensor's resonant frequency. Potential applications of such a technology include food quality monitoring, concrete and asphalt pavement moisture monitoring, and wound healing monitoring. The magneto-harmonic sensor, consisted of a magnetically soft film and a permanent magnetic film, will also be presented. The transduction mechanism of this sensor is a based on a dimension-changing structure that changes the distance between the two films in response to the parameters of interest. This changes the magnetic higher order field from the magnetically-soft material, allowing remote measurement of parameters such as pressure/stress in passive implantable including coronary and biliary stents and knee arthroplasty implants. Another sensor made of a low-cost magnetoelastic ribbon and tracks parameters of interest via changes in its resonant behavior will also be presented. This sensor, known as the magnetoelastic sensor, is vibrated through a magnetic AC field, which in turn generates magnetic fluxes that can be detected with a sensing coil from a distance. The medical application of this sensor will be presented.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