



**You are cordially invited to attend the following seminar sponsored  
by the Department of Mechanical Engineering:**

**Friday, October 12, 2007  
114 Spencer Lab, 12:15 – 1:15 P.M.**

**Dr. Constantine Megaridis  
University of Illinois at Chicago**

***“Fluids Confined in Carbon Nanotubes”***

Abstract:

Closed-shell carbon nanostructures offer a new platform for investigating the behavior of fluids in extreme confinement. The dynamics of attoliter liquid volumes contained in carbon nanotubes is investigated experimentally and theoretically. The experiments employ electron microscopy to visualize multiphase fluids in real time with spatial resolution approaching 1nm. The hydrophilic nanochannels studied have inner diameters in the range 5-300 nm and wall thickness ranging from 1 nm to 40 nm. Dynamic phenomena are demonstrated for aqueous fluids encased in closed-end nanotubes. A theoretical model is also discussed, and comparisons between theoretical predictions and experimental data are performed. In terms of applications, encapsulation of polymers, surfactants and nanoparticles from solutions or suspensions in open-end carbon nanotubes is demonstrated using a room-temperature, open-air, wet-based method, which relies on self-sustained diffusion. Capping of water-filled carbon nanotubes using polymer seals is also demonstrated. The reported findings have potential in drug delivery, DNA separation, dialysis, fabrication of photonic crystal fibers, as well as numerous other applications.

**Refreshments will be served**