

## **ME DEPARTMENTAL SEMINAR**

**Friday, October 6, 2006**

**2:00pm – 3:00pm**

**2211 GG BROWN**

**Professor Brian J. Kirby  
Sibley School of Mechanical & Aerospace Engineering  
Cornell University**

***“Fabrication for Design and Control of Micro/nanoscale  
Fluid Systems”***

**Abstract:**

This presentation will focus on disparate fabrication and design approaches that are unified by the theme of control of fluid flow, electric fields, analyte transport, and optical fields in various micro- and nanoscale fluid systems.

In part I, we focus on the ability of geometric design at meso-, micro- and nanoscale to control fluid flow and electric fields in fluid- and gel-phase systems. In microanalytical systems, micro- and nanoscale engineering of fluid-phase systems can be used for particle and molecule manipulation, enabling more sophisticated or more rapid analytical tools. In tissue-engineering constructs, mesoscale patterning of gel-phase scaffolds can be used to manipulate electric fields induced by physiological mechanical loading, generating tools for inquiry into cell mechanotransduction in these systems.

In part II, we will present polymer synthesis techniques in microdevices with applications to (1) control of high-pressure fluid flow for chemical separations and protein refolding and (2) control of atomic vapors for quantum optics.

**Bio:**

Prof. Kirby has degrees from Stanford (Ph.D. Mechanical Engineering, 2001) and the University of Michigan (M.S.E. Mechanical Engineering, 1996; B.S.E. Aerospace Engineering, 1994). Following his graduate work, he was a Senior Member of the Technical Staff at Sandia National Laboratories until joining Cornell University in 2004. He is a recipient of an R&D 100 Best Invention Award and a JD Watson Young Investigator Award.