

**Center for Fluid Mechanics, Division of Applied Mathematics  
Fluids, Thermal and Chemical Processes Group, School of Engineering  
Joint Seminar Series**

**J.D. Humphrey  
Department of Biomedical Engineering  
Yale University  
New Haven, CT**

**Mathematical Modeling of Cerebral Aneurysms and Vasospasm**

Intracranial saccular aneurysms are focal dilations of the arterial wall. Although the rate of rupture of these lesions is very low, rupture results in significant disability or death. It is well accepted that physical factors, including local hemodynamics and the associated structural response of the wall, play important roles in the natural history of these lesions. There is, therefore, a need to understand better the biomechanics and the associated mechanobiology (i.e., how the cells respond to mechanical loading).

In this talk, we will use mathematical modeling to explore two common hypotheses regarding the potential enlargement and rupture of these lesions. We will then introduce a new approach to modeling that can capture salient aspects of the growth and remodeling of these lesions. Finally, we will show that similar models can describe the tragic remodeling of arteries near to the site of a ruptured aneurysm, which results in the clinical situation known as cerebral vasospasm.

**TUESDAY - MARCH 22, 2011**

**4:00 PM**

**Barus & Holley, Room 190**