



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

**Friday, November 9, 2007  
114 Spencer Lab, 12:15 – 1:15 P.M.**

***Dr. Rajat Mittal  
The George Washington University***

***“A VERSATILE IMMERSED BOUNDARY METHOD WITH  
APPLICATION TO BIOLOGICAL FLOWS”***

Abstract:

The last decade has seen a tremendous rise in the popularity of immersed boundary methods (IBM). The primary factor driving this is the relative ease with which this methodology allows researchers to develop computational models of flows with complex geometries and/or moving boundaries. The key feature of the immersed boundary method is that simulations with complex boundaries can be carried out on stationary, body non-conformal Cartesian grids. This approach eliminates the need for complicated re-meshing algorithms that are usually employed with conventional Lagrangian body-conformal methods. In our presentation we will describe the salient features of a recently developed Cartesian grid-based immersed-boundary method which is especially well suited for biological flows. The IBM method developed here is accurate, efficient, scaleable and fast, and can handle extremely complex moving geometries with relative ease. The solver is being used for a number of studies including simulation of fish pectoral fin hydrodynamics, human swimming and fluid-structure interaction in the human larynx and results from these studies will be presented.

**Refreshments will be served**