Special Joint Seminar

MMEC SEMINAR SERIES

MECHANICS: MODELING,
EXPERIMENTATION, COMPUTATION

and

PHYSICAL MATHEMATICS SEMINAR

COMPUTATIONAL MODELS OF SWIMMING ORGANISMS: COUPLING INTERNAL MECHANICS WITH EXTERNAL FLUID DYNAMICS

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ABSTRACT:

The observed swimming behavior of a motile organism is the result of a complex interplay of internal force generation, passive elastic properties of its structure, and a surrounding viscous fluid. Motile spermatozoa in the reproductive tract and swimming leeches are examples of such fluid-structure interactions. We will describe a unified computational approach, based upon an immersed boundary framework, that couples internal force-generating mechanisms of organisms with an external, viscous, incompressible fluid. This approach can be applied to model low, moderate, and high Reynolds number flow regimes. We will present recent progress on models of eucaryotic cilia and flagella, models of spirochete motility, as well as models of undulatory swimming of nematodes and leeches.

TUESDAY, NOVEMBER 7, 2006
4:00 PM
Building 3, Room 370

Light refreshments will be available a few minutes before the seminar,
in the hallway just outside Room 3-370.