Mechanical Engineering **SEMINAR**

Novel Fluid Dynamics in Simple Flows Due to Fluid-Structure Interaction or Surfactant Mass Transport

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Novel dynamics is often found due to non-linear fluid-structure interaction or non-trivial surfactant mass transport in simple flows. In the first half of the talk we show how a stretch-coil transition of an elastic slender fiber immersed in Stokesian flow can lead to transport across space. It is found that immersed fibers can move as random walkers across time-independent closed-streamline flow. In the second half of the talk we show the influence of surfactant on the breakup of a prestretched bubble in a quiescent viscous surrounding is studied by a combination of direct numerical simulation and the solution of a longwave asymptotic model. The direct numerical simulations describe the evolution toward breakup of an inviscid bubble, while the effects of small but nonzero interior viscosity are readily included in the longwave model for a fluid thread in the Stokes flow limit. The effects of soluble surfactant are studied in the limit of diffusion-dominated transport regime.

Yuan N. Young is an Assistant Professor of Mathematical Sciences at NJIT. He received the Ph.D. in astrophysics from the University of Chicago in 2000, and conducted postdoctoral research at Northwestern University and Stanford University. His research interests are in fluid mechanics with focuses on Rayleigh-Taylor mixing flows, fluid-structure interaction in Stokesian flow, and surfactant-laden, interfacial dynamics.

FRIDAY, SEPTEMBER 14, 2007

11:00 am - Seminar in 227 Mudd
12:00 pm - Lunch in ME Lobby