1083-76-175   **J C Chrispell*** (`john.chrispell@iup.edu`), 217 Stright Hall, Mathematics Department, Indiana University of Pennsylvania, Indiana, PA 15705, and **L J Fauci** and **M Shelley**. *An actuated elastic sheet interacting with passive and active structures in a viscoelastic fluid.*

Modeling viscoelastic fluids driven by actuated immersed boundaries is of significance in both biological and industrial settings. To model these flows a nonlinear constitutive equation describing the evolution of the viscoelastic contribution to the fluid stress tensor is included in the governing equations. Here we discuss the use of an immersed boundary framework to simulate fluid flows governed by a Navier-Stokes/Oldroyd-B model. A description of the numerical method and its stabilization is given. We discuss recent numerical simulations of the locomotion and hydrodynamic synchronization of undulating sheets, as well as the interaction of swimming sheets with solid boundaries. (Received August 27, 2012)