1060-76-229 **David Salac*** (d-salac@northwestern.edu), 2145 Sheridan Rd, Evanston, IL 60208, and **Michael Miksis**, 2145 Sheridan Rd, Evanston, IL 60208. *Dynamic Behavior of Lipid Vesicles in Viscous Flows.*

The behavior of lipid bilayer vesicles has been of great interest due to their possible use in novel technologies such as drug delivery and as a model system for biological cells such as red blood cells. The dynamic response of these vesicles to an external viscous flow field is governed by the balance of interfacial forces such as bending and stretching and fluid stresses. This results in a rich and complex set of behavior that can not be determined a priori.

Here a model of lipid bilayer motion in viscous flow is presented. The model takes into account the bending rigidity of the interface and enforces the constant surface area constraint by way of a time-varying surface tension. Unlike previous investigations of lipid bilayer vesicles a restriction to Stokes flow is not made. Implementation of this model using the level set method and a multiphase Navier-Stokes solver allows for the response of vesicle systems to be determined for a variety of flow conditions. Results for the dynamic behavior of lipid bilayer vesicles under a number of flow conditions will be presented. The behavior obtained shows excellent agreement with previous experimental and analytical results. (Received March 30, 2010)