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Andrea Bonito*, Department of Mathematics, 3368 TAMU, College Station, TX 77843, and
Irene Kyza, Ricardo H. Nochetto and **Miguel S. Pauletti**. *Arbitrary-Lagrangian-Eulerian
Numerical Simulation of Biomembranes*. Preliminary report.

Lipids molecules consist of a hydrophilic head group and a hydrophobic tail. When they are immersed in aqueous environment they aggregate spontaneously into 2 mono-molecular layers or (bio)membranes and form an encapsulating bag called vesicle.

The membrane is characterized by its Canham-Helfrich energy (Willmore energy with area constraint) and acts as a boundary force on the Navier-Stokes system. Forth order, highly nonlinear arising problems are solved using an adaptive finite element method. We present our method, emphasize the critical role of adaptivity, and discuss the numerical treatment of Arbitrary-Lagrangian-Eulerian formulation. (Received November 30, 2010)