1060-65-3   **Ricardo H. Nochetto*** (`rhn@math.umd,edu`), Department of Mathematics, University of Maryland, College Park, MD 20742. *Curvature Driven Flows in Deformable Domains.*

We discuss modeling, analysis, and computation of three challenging curvature driven flows in deformable domains: surface diffusion (materials science), electrowetting on dielectric (microelectromechanical systems MEMS), and fluid biomembranes (biophysics). They all involve the Laplace-Beltrami operator, which, being variational, allows for finite element methods of any polynomial degree on surfaces. We also discuss geometrically consistent accuracy preserving mesh modifications (refinement, coarsening, and mesh smoothing) of piecewise polynomial surfaces with incomplete information about their underlying geometry. This is crucial for large domain deformations and a new paradigm in adaptivity. (Received March 30, 2010)