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**Ross Eric Magi\*** ([ross.magi@wallawalla.edu](mailto:ross.magi@wallawalla.edu)) and **James P Keener** ([keener@math.utah.edu](mailto:keener@math.utah.edu)). *Modelling a Biological Membrane as a Two Phase Viscous Fluid with Curvature Elasticity.*

We develop a general model of a multicomponent membrane where we treat the membrane as a two phase viscous fluid flowing on a time dependent surface. Using the tools of differential geometry to describe the surface, Flory–Huggins theory combined with Cahn–Hilliard theory to describe the free energy of a mixture, and Helfrich theory to describe the bending energy of a membrane, we employ a minimum energy dissipation argument to derive equations of motion for the two phase fluid. By examining specific parametrizations of the surface, we explore situations under which the membrane undergoes phase separation, and demonstrate the possibility of curvature induced instability. (Received September 22, 2015)