1135-65-774 **Amanda E. Diegel*** (adiegel@lsu.edu) and **Shawn W. Walker**. *A phase field model for nematic liquid crystal droplets.*

We develop a novel finite element method for a phase field model of nematic liquid crystal droplets. The continuous model considers a free energy comprised of three components: the Ericksen's energy for liquid crystals, the Cahn-Hilliard energy representing the interfacial energy of the droplet, and a weak anchoring energy representing the interaction of the liquid crystal molecules with the surface tension on the interface (i.e. anisotropic surface tension). Applications of the model are for finding minimizers of the free energy and exploring gradient flow dynamics. We present a finite element method that utilizes a special discretization of the liquid crystal elastic energy, as well as mass-lumping to discretize the coupling terms for the anisotropic surface tension part. We present a discrete gradient flow method and show that it is monotone energy decreasing. Global discrete energy minimizers converge to global minimizers of the continuous energy in the sense of Γ-convergence. We will show many numerical experiments illustrating different gradient flow dynamics, including droplet coalescence and break-up. (Received September 14, 2017)