1106-VL-2645 **Michael A Mikucki*** (mikucki@math.colostate.edu). *Modeling protein mediated changes in membrane morphology.*

Lipid bilayer membranes are ubiquitous in biology. They serve as boundaries of cells and cell organelles and undergo large deformations while acting as smart controls for the transport of ions, amino acids, and other nutrients. Simulating membrane deformations from protein-membrane interactions is important toward understanding cellular processes. In this presentation, we give a continuum elasticity description for the membrane and model the deformations in three separate projects. First, a fast algorithm for deformations under the membrane's own mechanical energy is presented with numerical results. Second, an energy functional is defined and justified for the electrostatic interactions between a charged lipid membrane and a nearby protein. We also provide a method to implement the energy functional to the fast algorithm. Finally, a diffuse interface method for modeling multicomponent vesicles is discussed. In particular, we consider a membrane composed of multiple lipid species and more importantly, membrane bound proteins, in efforts to model vesicle budding and scission. (Received September 16, 2014)