Elastic membranes in confinement JOSHUA BOSTWICK, MICHAEL MIKSIS, STEPHEN DAVIS, Northwestern University — An elastic membrane stretched between two walls takes a shape defined by its length and the volume of fluid it encloses. Many biological structures, such as cells, mitochondria and DNA, have finer internal structure in which a membrane (or elastic member) is geometrically “confined” by another object. We study the shape stability of elastic membranes in a “confining” box and introduce repulsive van der Waals forces to prevent the membrane from intersecting the wall. We aim to define the parameter space associated with mitochondria-like deformations. We compare the confined to ‘unconfined’ solutions and show how the structure and stability of the membrane shapes changes with the system parameters.

Joshua Bostwick
Northwestern University

Date submitted: 31 Jul 2014