1060-37-92 **Eva Kanso*** (kanso@usc.edu), University of Southern California, Aerospace and Mechanical Engineering, 854 Downey Way, RRB 214, Los Angeles, CA 90089. *Viscous evolution of a point vortex equilibrium.*

When point vortex equilibria of the (inviscid) 2D Euler equations are used as initial conditions for the (viscous) Navier-Stokes equations, typically an interesting dynamical process unfolds at short and intermediate time scales before the long time single peaked Oseen vortex state dominates. The details of this 'viscosity induced' dynamics depends crucially on the initial configuration. Here we use an analytical model to describe the viscous evolution of a three-vortex collinear structure that corresponds to a fixed equilibrium of the inviscid point vortex model. We observe rotation of the structure due to viscosity. Based on velocity field calculated in a rotating frame, we find instantaneous stagnation points and separatrices in the flow field. Bifurcation times are found from the topological change of the separatrices. This is joint work with my graduate student Fangxu Jing and Professor Paul K Newton of USC. (Received March 23, 2010)