The stability of contact lines in fluids

Ian Tice, Carnegie Mellon University

The contact line problem in interfacial fluid mechanics concerns the triple-junction between a fluid, a solid, and a vapor phase. Although the equilibrium configurations of contact lines have been well-understood since the work of Young, Laplace, and Gauss, the understanding of contact line dynamics remains incomplete and is a source of work in experimentation, modeling, and mathematical analysis. In this talk we consider a 2D model of contact point (the 2D analog of a contact line) dynamics for an incompressible, viscous, Stokes fluid evolving in an open-top vessel in a gravitational field. The model allows for fully dynamic contact angles and points. We show that small perturbations of the equilibrium configuration give rise to global-in-time solutions that decay to equilibrium exponentially fast.
This is joint with with Yan Guo.