Center for Fluid Mechanics, Division of Applied Mathematics
Fluids and Thermal Systems, School of Engineering
Joint Seminar Series

TUESDAY – OCTOBER 23, 2012
3:00pm
Barus & Holley, Room 190

Rama Govindarajan
Tata Institute of Fundamental Research
Hyderabad, India.

Studies of the Flow of Liquid on a Solid Plate

Two types of studies will be described. (1) The statics and dynamics of a liquid drop on a solid substrate. Theoretical minimum static solutions for pendant drops are shown to include an infinitely long one of finite volume, with an infinite number of lobes. Possible static drop volumes and shapes on inclined plates are discussed. It is shown from two-dimensional simulations that the fraction of roll versus slide depends only on a non-dimensional shape factor. (2) At a Froude number close to 1, a developing film on an inclined plate is shown numerically to exhibit oscillations, while a hydraulic jump occurs at low inclinations. The signature of these oscillations is evident from singularities predicted by the shallow water theory. The main consequence is that the instability of a flowing film can be very different from that usually predicted using a half-parabolic velocity profile.

Host: Mandre Shreyas (shreyas_mandre@brown.edu)