

Weekly CEAFM Seminar: Spring 2015



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Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, February 27, 2015**

Time: 11:00 AM

Location: Gilman Hall # 132

Speaker: **Prof. Satish Kumar** (University of Minnesota - Twin Cities)

Title: ***"Dynamic Wetting Failure and Air Entrainment in Coating Flows"***

Abstract

Dynamic wetting is crucial to processes where liquid displaces another fluid (such as air) along a solid surface, an important example being the deposition of a coating liquid onto a moving substrate. Dynamic wetting failure occurs when the displacement happens too quickly, and this leads to entrainment of the receding fluid into the advancing liquid. In coating processes this entrainment compromises the quality of the final product, so it is desirable to develop a fundamental understanding of the factors that control the onset of dynamic wetting failure. In this talk, I will discuss how the interplay between experiments and modeling has enabled progress in this area. The experiments involve measurements of the critical speed at which wetting failure occurs and flow visualizations of air entrainment. The modeling involves a combination of asymptotic analysis and two-dimensional finite element calculations that link the onset of wetting failure to limit points in families of steady-state solutions. The results reveal the mechanisms responsible for wetting failure and suggest strategies for delaying the onset of air entrainment in coating flows.