1063-76-32 **Nebojsa Murisic*** (nebo@math.ucla.edu), Mathematics Department, University of California, Los Angles, Los Angeles, CA 90095-1555, and **Andrea Bertozzi**. *Particle-laden viscous thin-film flows.*

In this work we carry out a study of settling regimes for particle-laden thin films flows on an incline over a range of particle sizes and liquid viscosities. The three regimes we observe are: settled (low inclination angle and bulk particle volume fraction - particles settled out of the flow); ridged (high inclination angle and bulk particle volume fraction - particles aggregate at the front); and well-mixed. Through comparison between our experimental results and the predictions of equilibrium theory, we uncover the transient nature of the well-mixed regime, where bifurcation to either of the remaining regimes eventually occurs. Next, an equilibrium theoretical model is derived, where hindered settling balances the shear-induced migration of particles. Model's predictions and our experimental results are shown to be in excellent agreement over all ranges of viscosities and particle sizes; they also provide additional evidence for transiency of well-mixed regime. Finally, a dynamic model guiding evolution of film thickness and particle volume fraction is derived. It is based on a system of scalar hyperbolic conservation laws and it uses the equilibrium predictions for suspension and particle fluxes. Predictions of this PDE model are compared with the experimental data. (Received July 13, 2010)