1035-35-137 **Rachel Levy** (levy@hmc.edu), Mathematics Dept, Harvey Mudd College, 301 Platt Blvd, Claremont, CA 91711, and **Steven Rosenthal*** (srosenthal@hmc.edu), Mathematics, Harvey Mudd College, 301 Platt Blvd, Claremont, CA 91711. *Effects of Localized Forcing on Driven Thin Liquid Films.*

Thin liquid films driven up an inclined plane by temperature-induced surface tension gradients have been the focus of extensive mathematical and experimental research. Using the lubrication approximation, the motion of a thin liquid film is described by a single fourth-order partial differential equation (PDE) that models the evolution of the height of the film. Such films are now known to exhibit both classical and non-classical wave structures. Bertozzi, Munch and Shearer first proved the existence of non-classical undercompressive waves in such films, and experimental evidence was provided by Cazabat, et al. and later by Sur and Behringer. Levy and Shearer classified the types of wave structures emerging from a Marangoni-driven film. In a recent analytical and numerical study, Haskett, Witelski and Sur used localized Marangoni forcing to produce a "microfluidic valve" that provides control of a thin flow of Marangoni and gravity-driven viscous fluid. This work further explores the development of wave structures in the film. The effect of the "microfluidic valve" on both classical and non-classical wave structures is examined, and for early times, a classical N-wave is discovered in the PDE simulations. (Received July 26, 2007)