1056-76-1561 **Linda B. Smolka*** (lsmolka@bucknell.edu), 380 Olin Hall, Bucknell University, Lewisburg, PA 17837, and **Dennis Fillebrown**, **Bree Guerra** and **Justin North**. *Dynamics of Free Surface Perturbations Along an Annular Viscous Film Flowing Down a Vertical Fiber.*

The free surface of an axisymmetric viscous film flowing down the outside of a thin vertical fiber has been shown to become unstable to interfacial perturbations. We present an experimental and numerical study to investigate the early-time growth and dynamics of these perturbations. We find in experiments that the initial perturbation growth is exponential followed by a slower phase as the amplitude and wavelength saturate in size. We compare our experimental data and observations to linear stability analysis results and numerical simulations of a Stokes flow model (Craster & Matar, J. Fluid Mech. **553**, 85 (2006)). We also investigate in experiments a known transition in the longer-time perturbation dynamics from unsteady to steady behavior at a critical flow rate and show this transition is correlated to a transition in the rate at which perturbations naturally form along the fiber. (Received September 22, 2009)