1083-76-74 **Jacek K Wrobel*** (jwrobel@tulane.edu), Mathematics Department, Tulane University, 6823 St. Charles Ave, New Orleans, LA 70118, **Michael R Booty** (michael.r.booty@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ 07102, and **Michael S Siegel** (michael.s.siegel@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ 07102.

Modeling Microscale Tipstreaming in a Microfluidic Flow Focusing Device.

In order understand the mechanisms behind tipstreaming process and to gain more control of this process we model a droplet formation regime in microfluidic device. In that regime threads form periodically and the tread formation gives way to tipstreaming of micrometer-scale droplets. We propose to model the regime by the bubble in soluble surfactant solution due to an axisymmetric extensional Stokes flow along the centerline of the drop. The flow focuses two-phase fluid through a narrow opening or orifice in a vertical wall. The aperture is centered at the centerline of the bubble. The concentration of bulk soluble surfactant was found to significantly effect the mode of formation and size of the emitted droplets. By carefully controlling the surfactant concentration and other flow quantities, droplets can be created that are an order of magnitude or more smaller than the scale of both the device and droplets produced in the absence of surfactant. (Received August 17, 2012)