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**On the Effects of Channel Geometry and Long Scale Time Dependence on Microfluidic Drop Breakup** NADIA NOHARUDDIN, GORDON CHRISTOPHER, SHELLEY ANNA, Carnegie Mellon University — The use of microfluidic devices to create monodisperse emulsions and solid particles has grown in interest recently due to its potential impact on lab on a chip applications. In these devices, the drop size is typically reported as a function of the continuous and dispersed phase volume flow rates, although some recent studies indicate that pressure is a more relevant quantity. In addition, our experiments show that the overall device geometry plays a significant role in determining the resulting drop size even when similar capillary numbers and flow rate ratios are imposed. Furthermore, we observe long term time variation in drop size, frequency, and polydispersity that is orders of magnitude longer than the period of drop formation or the pump stepper period. We interpret these observations in terms of simple analytical models that demonstrate the importance of geometry and flow parameters in these processes.

Shelley Anna
Carnegie Mellon University

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