Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Compound Droplet Levitation for Lab-on-a-Chip[1] JAMES BLACK, G. PAUL NEITZEL, Georgia Institute of Technology — A fluid transport mechanism utilizing thermocapillarity has been previously shown to successfully levitate and translate both microliter- and nanoliter-volume droplets of silicone oil. The surface flow required to drive levitation and transport has not been achieved for aqueous droplets, and encapsulation of samples within a layer of silicone oil is necessary. A droplet-on-demand generator capable of producing nanoliter-volume compound droplets has been developed and previously reported. The work presented here discusses efforts to demonstrate the applicability of this microfluidic transport mechanism to lab-on-a-chip systems. We elaborate on translation speeds of single-phase, nanoliter-volume, silicone-oil droplets. Compound droplets of varying compositions of oil and water are then generated, captured, levitated, and merged to explore the composition limits thereof.

[1]Work supported by NSF and NASA

G Paul Neitzel
Georgia Institute of Technology

Date submitted: 01 Aug 2016 Electronic form version 1.4