Compound Droplet Levitation for Lab-on-a-Chip\textsuperscript{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.

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