

Abstract- American Chemical Society

Title: Nanoliter Fluid Handling and Arraying

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Abstract:

Emerging applications in genomics and high throughput screening are demanding the ability to manipulate ever-decreasing volumes of fluids. We are investigating several approaches to liquid handling including solenoid-based reagent jets, piezo-based reagent jets and chemical stamping. We are assessing the compatibility of these different approaches for various applications including microarray construction, biosensor construction, and assembly of small-scale PCR reactions. Additionally, we are developing a novel, low volume fluid transfer system capable of being implemented in a variety of configurations. The system integrates precision microfluidics for fluid routing, high speed valving for fluid switching and reagent jetting devices for metering the fluid dispenses. Volumes from a few nanoliters to multiple microliters can be rapidly transferred in a highly parallel manner. The components of the system are modular and can be configured for reagent delivery and sample transfer to, or between, microtiter plates and chip substrates. Potential uses include library replication, chemical synthesis, micro-array production, and as enabling middle-ware for microplates and lab-on-a-chip integration. Various configurations, their use scenarios, as well as performance specifications will be presented.