Abstract- SPIE Meeting

Title: Applications of Picoliter and Nanoliter Fluid Handling and Arraying

Author: Mitchel J. Doktycz, Oak Ridge National Laboratory

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 with various applications including microarray construction, biosensor construction, and assembly of small-scale PCR reactions. All of these applications require the deposition of small volumes of fluid into microscale devices. To meet these needs, a novel, low volume fluid transfer system is being developed. The system can be implemented in a variety of configurations and 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. Details of the fluid handling techniques, their performance specifications and the applications employing them will be presented.