**Microfluidics-based Infectious Disease Diagnostics**

**Abstract**
Infectious diseases cause 10 million deaths each year worldwide, accounting for ~60% of all deaths of children aged 5-14. Microfluidic technologies are an exciting set of new platform technologies that can be used to enable the miniaturization of fluid flow and analysis in a number of areas such as infectious disease diagnostics, food and environment testing and drug screening. The surface area to volume ratio of the microfluidic channel or chamber on lab-on-a-chip (LOC) shows a huge increase when compared to the well of a conventional 96-well immunoassay plate. The large surface area to volume ratio increases binding kinetics dramatically and allow rapid reactions. So, immunoassay and hybridization reactions in the microchannel are inherently more efficient due to the large surface area to volume ratio and the short diffusion distances. In addition, owing to the fast reaction kinetics at micro scale, the microfluidic reaction can be used for a point-of-care testing (POCT) which usually requires a rapid analysis. A key requirement of diagnostics is repeatability and reproducibility. The micromachining techniques that are used to manufacture microfluidic devices excel in their dimensional control while maintaining mass manufacturability. This allows for highly reproducible precision manufacturing that facilitates, for example, precise dimensional control on DNA binding on silicon dioxide surfaces. The aforementioned attributes make microfluidics attractive for in vitro diagnostics, where rapid response, high sensitivity and small sample volume are desirable.

**Selected Publications**