

**STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING**

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Carnegie Bldg, Room 315, Time 1:30 PM

Micro Fluidic Systems for Point-of-Care Diagnosis

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Micro total analysis system offers the potential for highly efficient clinical diagnostics. Automatic micro fluidic systems are currently under development for point-of-care diagnosis and treatment for both oral cancer and urinary tract infection by using bionanotechnologies. Because sample preparation subsystem is the most challenging part for the detection systems using the real world samples, bioconcentrators and micro mixers are two important elements for the sample preparation subsystem. Numerical prototyping was applied in the design to dramatically reduce the time required to transform the concept design into a chip. Two different types of bioconcentrators were designed to substitute centrifuge to separate and concentrate target bacteria to increase sensitivity and reliability of the detection systems. Microfluidic mixing is required for most TAS/lab-on-a-chip applications because of the significant reduction in overall processing time as a result of efficient mixing. Two novel micro mixers were designed and optimized by using both numerical simulation and experimentation, which provided simple solutions to mixing problems in micro fluidic systems. Lessons learned from the urosensor and oral sensor projects can be applied to the development of micro/nano fluidic systems for other biochemical and biological applications.

Dr. Ma obtained his Ph.D. in Fluid Mechanics from University of California at Los Angeles in 2004. He joined the Micro Systems Laboratories of UCLA after graduation. Currently, he worked on micro-fluidic systems which can enable biochemical and biological discovery, medical diagnostics and therapeutics, drug screening and delivery.