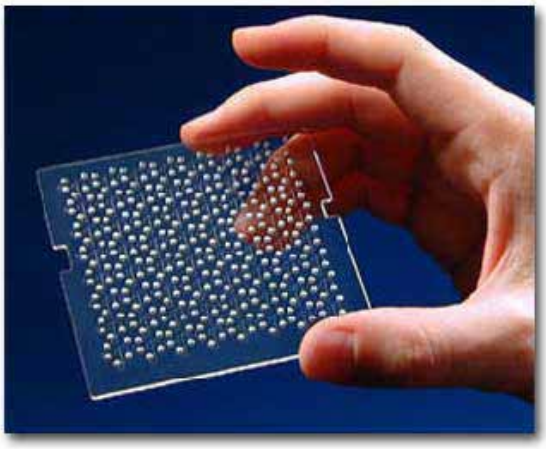
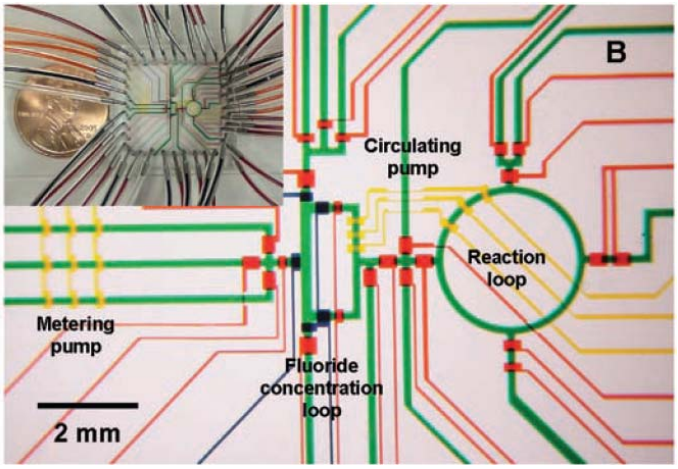
Graduate ChBE 8803 / Undergraduate ChBE 4803
Micro- and Nanofluidics
Fall 2008, TR 1:30-3
Professor Hang Lu, ChBE

Wondering how to shrink a lab onto a microchip? Wondering what you would feel if you were a bacterium or a DNA molecule in water?





Course outline:
- Fabrication processes and designs
- Flow at small scale
- Mass transfer at small scale
- Field effects
- Applications in biology and medicine

The course focuses on the fluid, flow, and field-effect aspects of micro and nano devices. It will cover basic micro/nanofabrication techniques, introduce transport of momentum and materials in small scale, and the applications in biology and medicine. The class targets graduate students in ChBE, ECE, ME, and BME, and the upper class undergraduates in these fields who have adequate preparations.

Prerequisites:
- Undergraduate-level transport (fluid dynamics) or consent of instructor is required
- Concurrent registration with or credits for IC fab or MEMS is recommended
- Ideally students should be proficient in one of the following areas (and introductory background in a second area): biology/biochemistry, ChBE or ME fluid dynamics / mass transfer, ECE device technology or MEMS

Possible design projects
micro PCR chip, micro Coulter counter, micro fuel cell, drug delivery chip, DNA separation and detection, protein separation and identification, optical tweezers on chip, DEP cell trapping, and tissue engineering, cell-based sensors

Please direct any questions to Dr. Lu (hang.lu@chbe.gatech.edu, 4-8473)