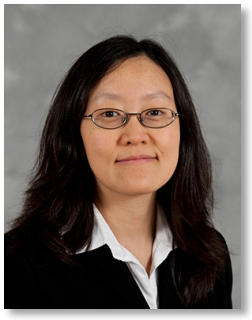
Mechanical Engineering Department Seminar

3:30pm November 28, 2018
1130 Mechanical Engineering
111 Church Street SE, Minneapolis, MN 55455

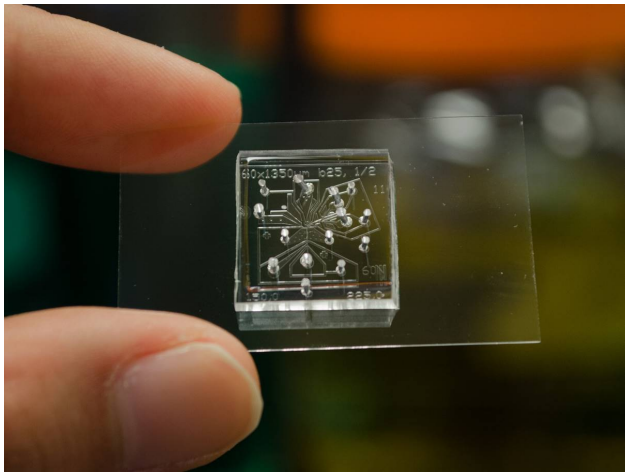


Microfluidics, Automation, and Big-Data For Systems Biology

Hang Lu

Love Family Professor; Chemical and Biomolecular Engineering – Georgia Institute of Technology

My lab is interested in engineering micro systems and automation tools to address questions in systems neuroscience, developmental biology, and cell biology that are difficult to answer with conventional techniques. Micro technologies provide the appropriate length scale for investigating molecules, cells, and small organisms; moreover, one can also take advantage of unique phenomena associated with small-scale flow and field effects, as well as unprecedented parallelization and automation to gather quantitative and large-scale data about complex biological systems. In one example, I will show how we take advantage of simple hydrodynamics to design microfluidic systems for large throughput and spatially and temporally well-controlled experiments in Drosophila embryonic development as well as in immunology. In another example, I will show how we combine the power of experimental tools and computational tools to study problems in development neurobiology and behavior in C. elegans. The power of these engineered systems lies in that the throughput that can be achieved by using automation and microfluidics is 100-1,000 times that of conventional methods; furthermore, we can obtain information unattainable or at least not easily attainable by conventional tools.



Bio: Hang Lu is the Love Family Professor of Chemical and Biomolecular Engineering, the Director of the Interdisciplinary Bioengineering Program at Georgia Tech, and the associate director of the Southeast Center for Mathematics and Biology (SCMB) supported by NSF and Simons Foundation. Her current research interests are microfluidics, automation, quantitative analyses, and their applications in neurobiology, cell biology, cancer, and biotechnology. Her award and honors include the ACS Analytical Chemistry Young Innovator Award, an NSF CAREER award, an Alfred P. Sloan Foundation Research Fellowship, a DuPont Young Professor Award, a DARPA Young Faculty Award, and Council of Systems Biology in Boston (CSB2) Prize in Systems Biology; she was also named an MIT Technology Review TR35 top innovator, and invited to give the RPI Van Ness Award Lectures in 2011, and the Saville Lecture at Princeton in 2013. She is an elected fellow of AAAS and AIMBE. Her lab's work has been and is supported by >$22M ($14M to her lab) from US NSF, NIH, private foundations and others.