

Chang Liu
University of Illinois at Urbana-Champaign

Abstract:

Artificial Haircell Sensors: Development and Applications

Biological sensors are responsible for the survival of humans and animals in complex, unstructured environments. As such, these sensors possess superb combination of sensitivity, robustness, and efficiency of data processing. The work in my group is aimed at: (1) developing innovative micro and nanofabrication technologies and (2) applying them for realizing sensors with functions and/or structures inspired by biological sensors.

We have focused on artificial haircell sensors and tactile sensors in our recent work. In this talk, I will discuss the design, microfabrication, packaging, and testing of artificial haircell sensors using silicon as well as polymeric materials. These sensors archive a sufficient level of combined sensitivity and robustness. We are also developing arrayed haircells that are packaged in flexible skin format. Fish use linear array of haircells, called lateral line, for flow sensing. I will focus on discussing artificial lateral line for flow field imaging and vehicle control.

Artificial haircell sensors and arrays introduce new challenges for micro and nanofabrication, as well as new problems in packaging, circuit design and signal processing.

Biography:

Chang Liu received his M.S. and Ph.D. degrees from the California Institute of Technology in 1991 and 1995, respectively. In January 1996, he joined the Microelectronics Laboratory of the University of Illinois as a postdoctoral researcher. In January 1997, he joined the faculty of the Electrical and Computer Engineering department and the Mechanical and Industrial Engineering Department. Dr. Liu has had published 160 technical papers in journals and refereed conference proceedings. He teaches undergraduate and graduate courses covering broad-ranging topics including MEMS, solid-state electronics, electromechanics, heat transfer, and power electronics. He won a campus-wide "Incomplete list of teachers ranked as excellent" honor in 2001 for developing and teaching the MEMS class. He won the College of Engineering Xerox Award in 1998, and the Williet Faculty Scholar in 2005. In 2004, he was elected a Faculty Associate at the Center for Advanced Studies at the University of Illinois.