Microsystems-inspired Robotics

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Seminar abstract
The ability to manufacture micro-scale sensors and actuators has inspired the robotics community for over 30 years. There have been huge success stories; MEMS inertial sensors have enabled an entire market of low-cost, small UAVs. However, the promise of ant-scale robots has largely failed. Ants can move high speeds on surfaces from picnic tables to front lawns, but the few legged microrobots that have walked have done so at slow speeds (< 1 body length/sec) on smooth silicon wafers. In addition, the vision of large numbers of microfabricated sensors interacting directly with the environment has suffered in part due to the brittle materials used in microfabrication. This talk will present our progress in the design of sensors, mechanisms, and actuators that utilize new microfabrication processes to incorporate materials with widely varying moduli and functionality to achieve more robustness, dynamic range, and complexity in smaller packages. Results include skins of soft tactile or strain sensors with high dynamic range, new models of bio-inspired jumping mechanisms, and magnetically actuated legged microrobots from 1 gram down to 1 milligram that provide insights into simple design and control for high speed locomotion in small-scale mobile robots.

Seminar notes: Lunch will be served.