Microfluidic Self-Assembly of Bio-Inspired Sensors

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Abstract

A unique feature of biological systems is their ability to dynamically reconfigure in response to changing conditions. One example is the biological membrane, a multi-component, complex fluid that changes dynamically to accomplish a variety of time-dependent functions including ion transport and molecular recognition. In comparison, the vast majority of engineered micro and nanostructures are organized in a top-down, static fashion. The increasing sophistication of MEMS and microfabrication technology offers the opportunity to explore new methods to mimic biological capabilities for self-organization, self-healing, and dynamic reconfiguration. At the microscale, selective surface coatings and self-assembled monolayers have been used for a variety of self-assembly methods. At the nanoscale, fluid nanostructures such as phospholipid membranes have the potential to replicate many of the functions of real biological membranes. This talk will survey some recent work and highlight opportunities for new research in this area.

Biography

Dr. David A. Horsley is an Assistant Professor in the Department of Mechanical and Aeronautical Engineering at the University of California, Davis and a co-director of the Berkeley Sensor and Actuator Center (BSAC) an NSF Industry/University Cooperative Research Center (I/UCRC). Professor Horsley received his B.S., M.S., and Ph.D. degrees at the University of California, Berkeley. He was a member of technical staff at Hewlett Packard Laboratories in Palo Alto California where he conducted research on probe based data storage systems and was involved with starting Onix Microsystems, where he developed MEMS-based fiber-optic switching components. Dr. Horsley's current research interests include physical sensors and actuators, optical MEMS, and bio-inspired sensors.