



The Berkeley Sensor & Actuator Center  
presents

## The BSAC Research Seminar Series

featuring

# Marc Chooljian

of the

Dorian Liepmann Research Group

# Putting the Lab Back on the Chip: Active Sensing and Flow Control in Plastic Microfluidic Devices

March 13  
2018

12:15 | 490 Cory Hall

Login to the BSAC website  
to view the event live:

[http://www-  
bsac.eecs.berkeley.edu/rsscast/](http://www-bsac.eecs.berkeley.edu/rsscast/)

The March BSAC Research Seminar will feature Marc Chooljian of BSAC Co-Director Prof. Dorian Liepmann's group.

The idea of a "microscale total analysis system," or "lab-on-a-chip," inspires academic research due to the promise of increased replicability and throughput in biochemical screening, and the capability to measure and manipulate biology in the hundreds of microns to tens of nanometers. There has been comparatively little success in the field commercially which can be partially attributed to a mismatch between the materials and integration requirements of large-scale manufacturing and the prototyping techniques used by most microfluidics laboratories. New prototyping techniques that are compatible with a larger variety of materials are needed.

We present a workflow allowing for lab-scale prototyping of integrated microfluidic-electronic devices in thermoplastics. The technique, based on hot embossing, uses mechanical force to simultaneously pattern microfluidic channels and multilayer electrode geometries for sensing and interconnects, and can be modified to embed silicon or glass microchips in the plastic, allowing for packaging of CMOS or MEMS devices with microfluidic channels. Active microfluidic flow control and sensing elements, including microvalve and micropump designs and a parallel-plate flow cytometer which rely on the unique multilayer electrode patterning abilities of the fabrication strategy, will be discussed.

Marc Chooljian joined BSAC in 2014 as a PhD student in the UC Berkeley/UCSF Graduate Program in Bioengineering. His research has focused on microfabrication and simulation for microfluidic devices, including mechanics of plastic molding during hot embossing, electronic measurements in ionic fluids, micromagnetic actuators, and fluid dynamics of intestinal drug delivery.

THE BSAC RESEARCHER SEMINAR SERIES IS OPEN TO BSAC MEMBERS, FACULTY, AND RESEARCHERS ONLY.