Rapid Microfluidic Devices in Cancer Research-Fabrication

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Research

Title: Rapid Microfluidic Devices in Cancer Research-Fabrication

The need for large-scale analysis of cancer cells and the chemicals they release is imperative for understanding the way in which they propagate. Usually, this involves microfluidic technology and lab-on-a-chip to maximize analysis throughput with polydimethylsiloxane (PDMS). Standard microfluidic device manufacturing methods using PDMS utilize soft lithography, but they require a cleanroom and special equipment. This project focused on determining how MakerSpaces can allow microfluidic devices to be prototyped and tested using simpler, cheaper, and less time-consuming methods than soft lithography, such as laser etching of acrylic and male-female molding. Following many failed attempts, a microfluidic device was successfully prototyped after experimenting with multiple iterations of molding methods and chemical combinations for an optimal technique.

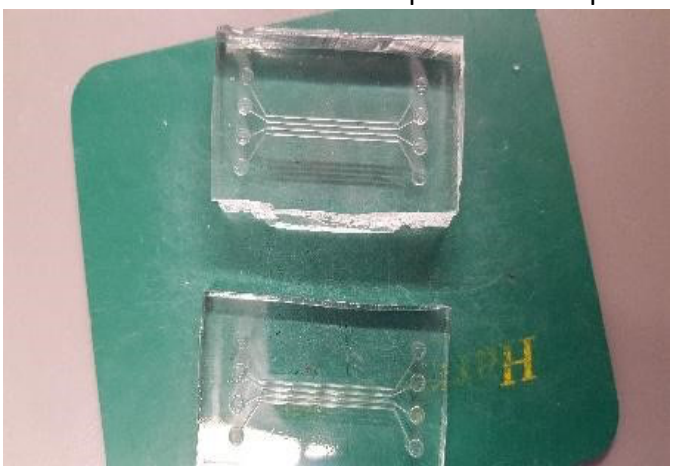

Figure: Microfluidic device manufacturing

Lesson Plan

Title: Microfluidic device prototyping

Students will examine the topics of power and speed of laser cutting. In our own summer RET experience, we inquired why the MakerSpace procedures set certain power and speed of the laser cutter and how that limits achievable outcomes. In this way, students will systematically explore how MakerSpace can facilitate low-cost prototyping of microfluidic device prototyping.

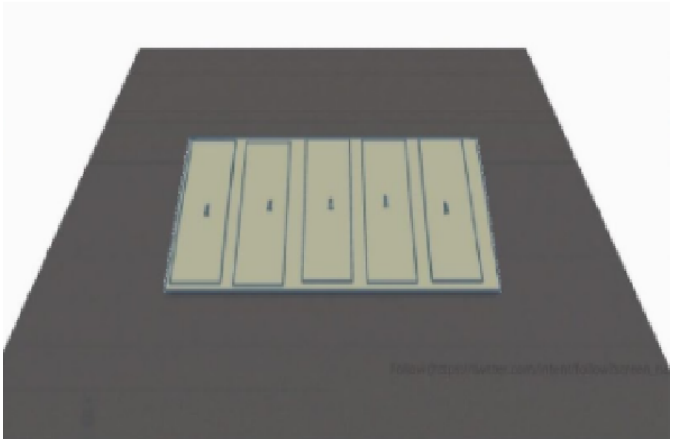

Figure: Designing microfluidic devices