### Introduction/Motivation

Fibers can have different shapes for different applications. This may be with respect to mechanical properties such as tensile strength and flexibility.

Straight fibers have less of an ability to be stretched and tangled to other fibers.

Fibers can be used to encapsulate emulsion droplets for multiple uses such as storage and delivery.  

Reproducible microfibers and microparticles are often used for biological applications in research.  

### Methods

By controlling flow rates of both the monomer and the oil, and the intensity of the UV light source, we are able to control the speed at which the monomer polymerizes. This combined with the shape of our channel allows us to reach a balance where we can capture the shape of the channel in the fiber without clogging the channel.

Channels were created by pouring PDMS onto a silicon wafer with the design of the channel. After curing the PDMS was fused with a flat layer of PDMS giving the final channel.

### Results

The fibers were able to be polymerized at a flow rate and light intensity that allowed them to capture the shape of the channel.

Light intensity can cause heating and burning in surrounding parts of the channel such as the mask and tubing.

The lower flow rates had difficulty retaining the shape of the channel. Too low of a flow rate will also cause the monomer jet to go into the dripping regime.

Some of the higher flow rates could have a shearing effect that will tear apart the monomer fibers from the polymerized fibers.

### Future Research

The results have shown that we are able to capture the pattern of the channel given an appropriate flow rate and UV light intensity. This shows a possibility of creating different patterns to be captured by the fibers, giving different mechanical properties. There is also the possibility of finding the ideal flow rate and UV light intensity to continuously produce a sample large enough to measure rheological properties.

### References