Design Stage 1 Microfluidics

Engineering 1282.02H

Spring 2020

Jess Timog, Seat 12

C. Wallwey GTA MWF 12:40PM

Date of Submission: 2/14/2020

Idea 1:

There will be 4 channels that is 300 micrometers wide and 300 micrometers deep. The entire length of 2 of the channels and the entrance/exit ports will be 4cm long and the other 2 will be 3.8cm long. There will be 4 entrances and 4 exit ports and they will be circular in shape. The chip holder will be in the shape of a square with 4 fasteners at each corner of the holder. There will be 4 inlet and 4 outlet ports above the entrance and exit ports. On the chip holder top, there will be a carving of an S to indicate that the side of the holder is where the beginning testing region is and the other end of the holder will have an E for the end. Also on the chip holder top, there will be an engraved square which will indicate the testing region with the dimensions of 1 cm by 1 cm in the center of each of the channels and the microscope will be placed on top of it. There will be an engraving of the team number 4 and 2020 in order to label the chip holder bottom. To decide on the design, the team will choose the based on the consistency of the recordings. For example, the team should strive toward setting up the chip and the chip holder the same way, placing the microscope in the same spot, and running the test the same way every time to ensure that the results are accurate and eliminates variation between each trial and data point. The variable that is being tested is the varying seed time to strengthen the yeast biofilm in the channels. A data point that would be accepted is 50% of the yeast to be sheared off.

Idea 2:

There will be 6 channels that is 300 micrometers wide and 250 micrometers deep. The entire length of 2 of the channels and entrance/exit ports will be 4cm long, 2 channels will be 3.8cm long, and the other 2 will be 3.2cm long. There will be 6 entrances and 6 exit ports, and

they will be circular in shape. The chip holder will be in the shape of a triangle with 3 fasteners at each corner. There will be 6 inlet and 6 outlet ports above the entrance and exit ports. On the chip holder top, there will be a carving of an S to indicate that the side of the holder is where the beginning testing region is, and the other end of the holder will have an E for the end. Also on the chip holder top, there will be an engraved circle which will indicate the testing region with the dimensions of 1 cm diameter in the center of each of the channels and the microscope will be placed on top of it. There will be an engraving of the team number 4 and 2020 in order to label the chip holder bottom. To decide on the design, the team will choose the based on the consistency of the recordings. For example, the team should strive toward setting up the chip and the chip holder the same way, placing the microscope in the same spot, and running the test the same way every time to ensure that the results are accurate and eliminates variation between each trial. The variable that is being tested is the varying incubation time to strengthen the yeast biofilm in the channels. A data point that would be accepted is 50% of the yeast to be sheared off.

Idea 3:

There will be 5 channels that is 350 micrometers wide and 275 micrometers deep. The entire length of 2 of the channels and entrance/exit ports will be 4cm long and the other 3 channels will be 3.8cm long. There will be 5 entrances and 5 exit ports and they will be circular in shape. The chip holder will be in the shape of a circle with 4 fasteners that would form the shape of 4 corners of a square. There will be 5 inlet and 5 outlet ports above the entrance and exit ports. On the chip holder top, there will be a carving of an S to indicate that the side of the holder is where the beginning testing region is, and the other end of the holder will have an E for

the end. Also on the chip holder top, there will be an engraved rectangle which will indicate the testing region with the dimensions of 1 cm by 2 cm in the center of each of the channels and the microscope will be placed on top of it. There will be an engraving of the team number 4 and 2020 in order to label the chip holder bottom. To decide on the design, the team will choose the based on the consistency of the recordings. For example, the team should strive toward setting up the chip and the chip holder the same way, placing the microscope in the same spot, and running the test the same way every time to ensure that the results are accurate and eliminates variation between each trial. The variable that is being tested is the varying acidity to strengthen the yeast biofilm in the channels. A data point that would be accepted is 50% of the yeast to be sheared off.

Sketch of idea 1: