Microfluidic Device Protocol

1: Clean mold(s) with high pressure air, removing all dust particles and other blemishes from surfaces.

2: Gather PDMS base and Initiator/crosslinking agent. For making X microfluidic chips pour $13.5X$ grams of PDMS base and $1.5X$ grams of initiator into a plastic cup.

3: Remove holder from the curing machine. Place cup with the PDMS precursor into holder and measure total mass.

4: Place holder (containing cup with the PDMS precursor) into curing machine. Turn dial to set machine to the appropriate weight (measured in step 3).

5: Run PDMS for 3 minutes in a curing machine.

6: Turn on vacuum.

7: Remove cup with cured PDMS and place molds in large petri dish. Fill molds in a zig zag starting from the bottom and fill until level of PDMS is slightly above the top of the mold, but not overflowing.

8: Place petri dish with molds and PDMS into vacuum, ensure seal is secure (rubber ring should flatten) and leave for 30 minutes.

9: Remove dishes from vacuum and put them in heater for an hour.

10: After an hour has passed. Take the petri dish out of heater and allow molds to cool down until warm.

11: Remove PDMS by first gently rubbing top edges of mold (and removing thin layer of PDMS there) and then pushing mold from the bottom until the PDMS and bottom mold-piece are removed from frame.

12: To remove PDMS from bottom mold-piece take scalpel/razor and gently scratch attached PDMS (not deeply). When all sides have been carved, gently peel PDMS off.

13: Ensure all four sides of the PDMS are flat with the face/back. Gently remove any positive imperfections using the scalp/razor by “pulling.”

13: Using the puncher, in each column location gently push straight down into the PDMS and push the punch out through the bottom. When extracting the puncher, place two fingers next to the tool and slowly twist it as you pull up. Repeat for all columns.

14: Using tape, remove any dust or other particles on top of PDMS.

15: Place PDMS device into the plasma bonder for 3 minutes. While waiting clean a glass slide with DI water and dry with high pressure air. Repeat these two steps until the slide is void of any blemishes or particles.

16: Place slide and PDMS into plasma bonder. Turn on the pump. When the pressure gets down to seven hundred turn on plasma(high) and wait 3 minutes. Turn off plasma and then turn off pump and depressurize.

16: When plasma bonding is finished, quickly place PDMS onto slide (15 seconds time remain once the depressurization has occurred).