PVA Protocol

Materials
- poly(vinyl alcohol) (PVA): Sigma-Aldrich cat. #36103, average Mw 146,000-186,000, 87-89% hydrolyzed
- distilled H₂O (dH₂O)
- Ethanol, USP 200 proof
- graduated cylinder (500mL)
- stir bar
- 1L glass bottle
- hot/stir plate
- Polydimethylsiloxane (PDMS) mold
- graduated cylinder (50mL)
- oven
- scotch tape

Steps
1. 4.0% PVA Solution Preparation
   a. Weigh 40g of PVA in a suitable dish.
   b. Measure 400mL of dH₂O in a graduated cylinder. Pour dH₂O into a 1L glass bottle containing a stir bar.
   c. Measure 300mL of Ethanol in a graduated cylinder. Pour Ethanol into the 1L glass bottle containing the dH₂O and stir bar.
   d. Place the dH₂O/ethanol mixture on the hot/stir plate. Start stirring and heating the solution.
   e. Slowly pour the PVA from step a. into the 1L bottle with dH₂O/ethanol mixture, while it is stirring.
   f. Stir and heat the solution until all the PVA is dissolved. Heat until boiling to ensure all the PVA dissolves.
   g. Add an additional 300 mL of ethanol to the dissolved PVA solution and stir and re-heat until the solution is clear.

2. 8” PDMS with Pattern
   a. Ensure table surface that will be used is flat and level.
   b. Transfer 40mL of warm 4.0% PVA (approximately 40°C) to a container suitable for pouring from.
   c. Slowly pour the 4.0% PVA onto the 8” PDMS mold, starting in the center of the mold and working towards the outside in a circular motion.
d. With a suitable object (pipette tip, spatula, etc.), spread the 4.0% PVA solution so that it covers the entire patterned area.
e. Allow the template to sit at room temperature for approximately 30 min.
f. If any air bubbles are visible in the PVA, pop them with a sharp metal object, such as a needle or tweezer tip.
g. Place the PDMS with PVA in a level, 45°C oven until dry. Drying will take approximately 3-5 hours, depending on oven. PVA is dry when not tacky to the touch and has a frosty appearance.

3. PVA Removal from PDMS
   a. Once PVA is dry, remove the PDMS mold from the oven.
   b. Place a small piece of scotch tape on the PVA before it is removed from the PDMS to mark the PVA side without wells.
   c. Starting with one side, slowly peel the PVA off the PDMS using tweezers, taking care to not rip the PVA.
   d. Store the 8” PVA templates in a cool, dry container; preferably with dessicant.

4. Cleaning PDMS Molds
   a. Wash PDMS molds with warm, soapy water to remove residual PVA. Do not scrub templates with brushes or scratch pads, as this will damage the molds.
   b. Rinse molds well with tap water, followed by distilled water, followed by ethanol.
   c. Dry molds completely prior to pouring PVA.
   d. Molds should be washed every 20-30 pours.