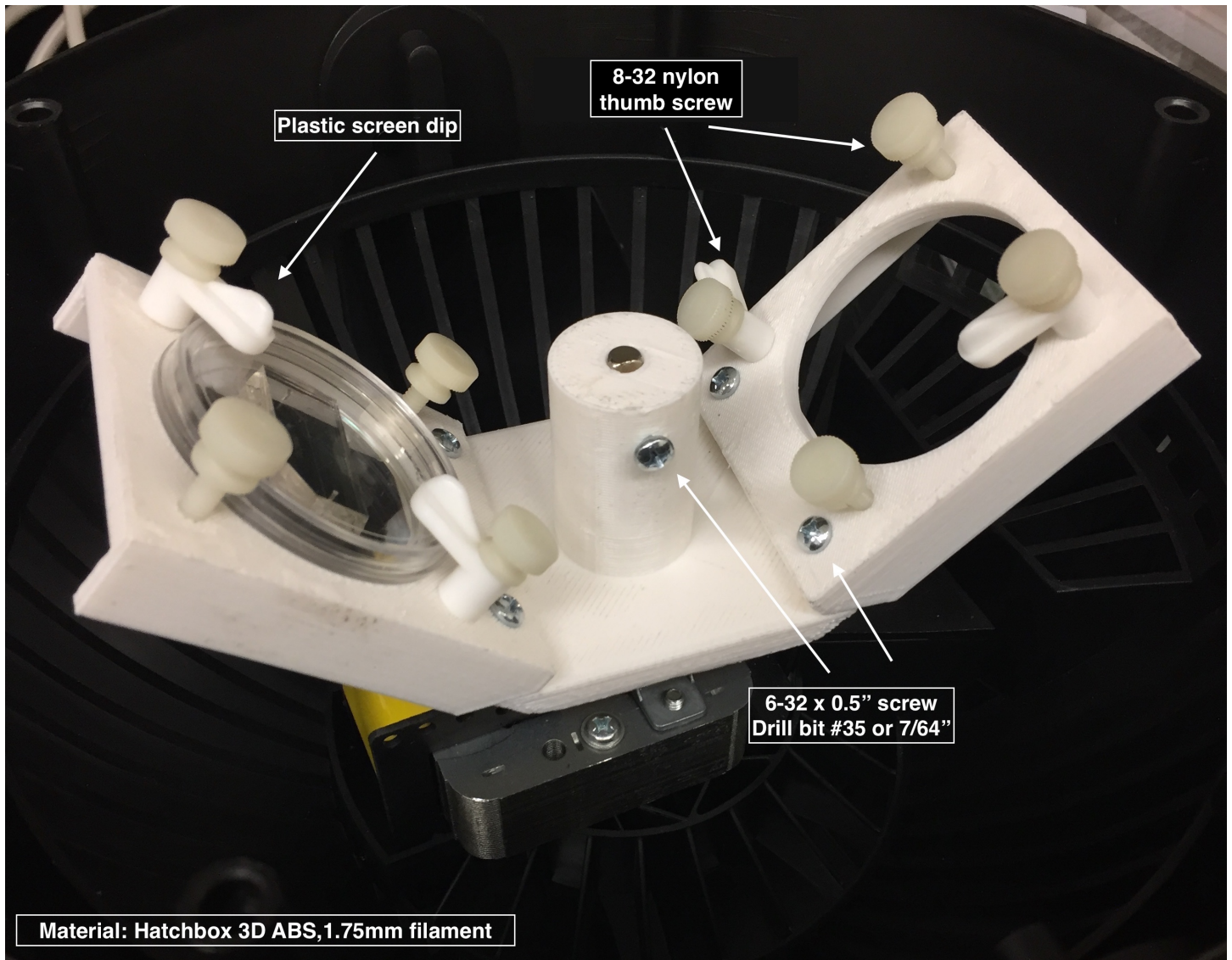


Jun Lab Mother Machine Centrifuge Fan

The following centrifuge fan is for loading cells into the mother machine growth channels. The construction involves 3D printing a custom holder/rotor for a 50mm WillCo dish, on which a mother machine is attached. The holder is printed in three parts (2 blades and a central base) to account for 3D printers with small printing areas. This piece is then assembled and secured to a Honeywell fan from which the original blade has been removed.

Design by Quynh Do and JT Sauls



Materials

3D printer and plastic filament
8-32 x 0.5" nylon thumb screws
6-32 x 0.5" screw
6-32 nut
Screen clips (or print these)
Honeywell fan HT-900 11inch

Assembly

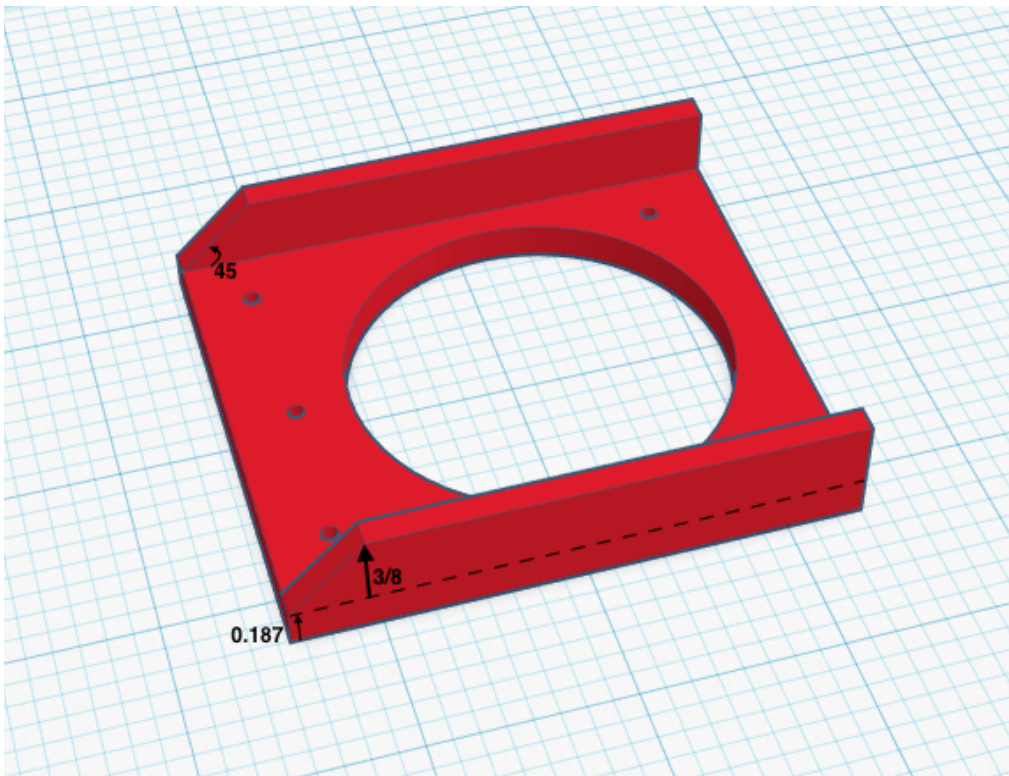
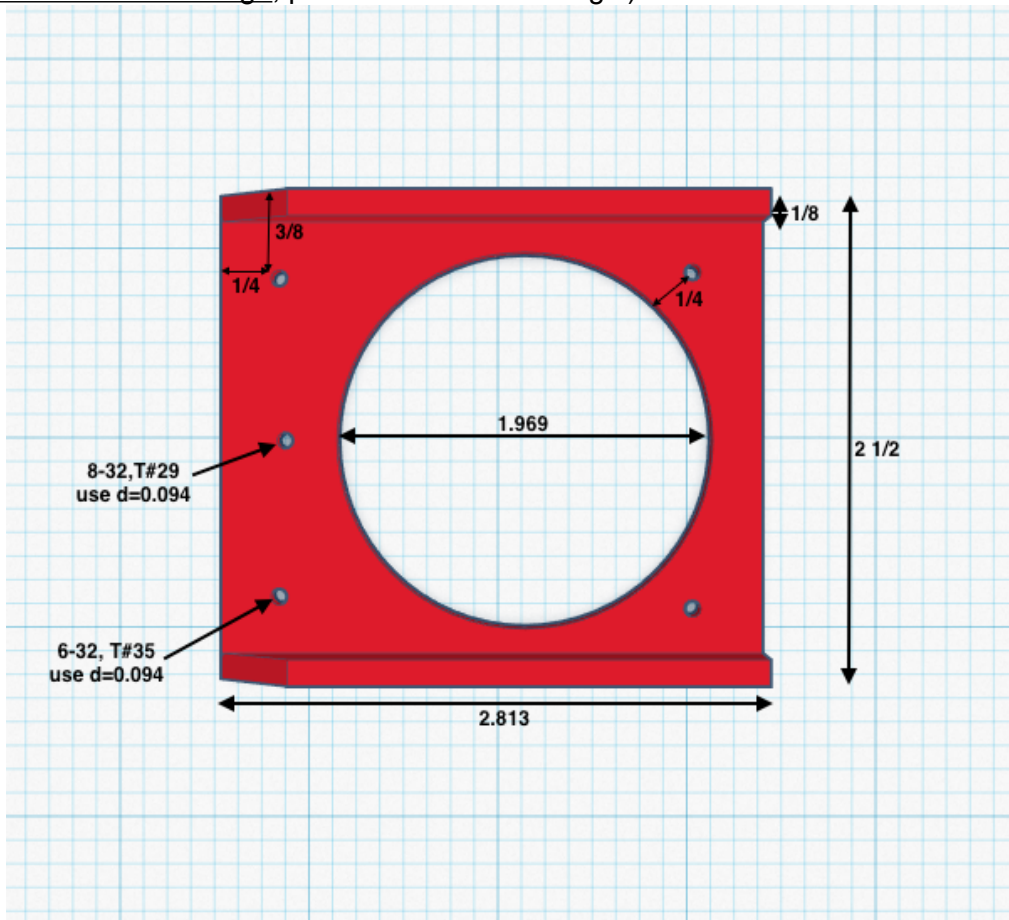
1. 3D print the centrifuge rotor base and two copies of the blade piece. Also print clips if you elected not to buy them.
2. A WillCo dish should fit snugly in the printed holders. The bottom part of the dish (50mm diameter) should fit in the hole, while the lip (51mm diameter) should sit on top. If the fit is too tight, use some sand paper to round it out.
3. Tap the pilot holes for the 6-32 screws which attach the blades to base, the 6-32 hole that secures the base to the shaft of the fan, and the 8-32 screws for the nylon thumb screws which hold down the clips.
4. Remove the cover from the fan, and then the blade from the shaft. There may be a small metal flange that needs to be pried off with pliers. Keep the cover.
5. Secure the blades to the base and the base to the fan. Be careful not to put the base so far down the shaft that it touches the motor assembly.
6. Attach the nylon screws and clips and let her rip.

Notes

- Some of the Honeywell fans are have a motor assembly higher up on the shaft. If this is the case, you may not be able to put the fan cover on without hitting the blades. If so, you could redesign the base so the blades are mounted at a lower angle, or put standoffs that raise the height of the cover. Or just forget the cover (and wear safety glasses!)
- The WillCo dish is meant to be spun with the cover on the small dish. The clips should press down on this cover as opposed to the dish itself.
- Only run the the fan when balanced. It should should run smoothly and not vibrate very much.
- Some species (e.g. *B. subtilis*) cannot handle high force, so you must spin on the lowest speed. *E. coli* can handle the high speed.
- The highest loading is achieved by turning the fan on and off rather than letting it run continuously. 15 seconds on, 5 seconds off for 2 minutes should result in high loading.
- During loading, you can adjust the orientation of the mother machine very slightly to ensure that the growth channels are parallel with the radius of the centrifuge.

Sketch and dimensions

Fan blade ([Link to TinkerCAD design](#), public but must have login).



Base ([Link to TinkerCAD file](#))

