# Notes on supplementary materials

Supplementary materials consist of design files for sample holders. Specifically:

1) A brain-sized holder with a textured surface, either with or without posts. There are two versions with posts, one of which has them closer together for better centering of half-brain samples for high resolution tiling (see Figure 7.3, left for the version with the more spaced-out pedestals).

2) A very large holder (as big as can fit in the LaVision BioTec cradle) with a textured surface, which we have used for spinal cord samples (see Figure 7.3, right).

3) 4 pedestals, of different sizes. These are used to hold samples while they are secured with the screw in LaVision BioTec's hollow holders (see Figure 7.2)

For items in 1) and 2), there are two files for each design. The first is in STL format, which can be provided directly to a 3D printer. The other is an Autodesk Inventor file. This is the software in which I created the designs, which makes it easy to modify them. While it has a bit of a learning curve, Inventor is freely available for academic users. Equivalent files are included for the pedestals (items in 3)), which I created in a more rudimentary software called Autodesk 123D Design. Unfortunately, Autodesk has discontinued 123D Design (you can still use the design files if you downloaded an old version of it), but you can still 3D print the pedestals from the STL files.

Note that the post that hold the screw in the designs in 1) are not tapped. That is, the STL file does not have the information about the threads. I have tried 3D-printing threads, but for something this small the printers I have tried cannot pull it off. What the design has instead is a hole sized for an M3 screw. I used an M3 tap to put the threads in the hole (McMaster Carr products #8305A32 and #2544A1). Note that this is the same screw thread as the LaVision BioTec ones, making them interchangeable with the pointy, black, nylon screws provided by LaVision. Unfortunately, I have not been able to find the same kinds of screws with pointy tips. Instead, I use a variety of screws with blunt ends, of different lengths, for different sample sizes. Among them:

https://www.mcmaster.com/96295A711-96295A126/

https://www.mcmaster.com/96295A712-96295A128/

https://www.mcmaster.com/96295A708-96295A120/

https://www.mcmaster.com/93070A073/

https://www.mcmaster.com/93070A067/

If necessary, the design files can be modified for any screw of similar size and a previous supplement to this guide had designs for 4-40 screws. I recommend using the updated M3 designs in this group of supplemental files to avoid people confusing screws between the LaVision and 3D printed holders.

The 3D printer we had available at Rockefeller is the Projet 3510 HD Plus:

http://www.3dsystems.com/3d-printers/professional/projet-hd-3500-plus

The materials we used to 3D print when I was at Rockefeller University are called Visijet M3 Crystal, or Visijet M3 X:

http://www.3dsystems.com/materials/visijet-m3-crystal
http://www.3dsystems.com/materials/visijet-m3-x

We also tried a version of these resins that was black, but the coloring leached out of the material, darkening the DBE. I know that other materials are dissolved in the DBE, but don't know which ones.

At UNC, I 3D print using a Form2 3D printer (https://formlabs.com/3d-printers/tech-specs/), using clear acrylic resin.

In cases where you need to glue samples onto the holders, I have seen good results (fast drying, good adherence, easy to remove, resistant to DBE) in both DBE and PACT samples with dental glue. The following brands are those we have used successfully:

http://www.picodent.de/artikel/831-picodent_twinsil_22.html
http://duplicatingsilicone.com/product/2-lb-kit-mpk-1125-duplicating-silicone/

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