

A library of 3D-printable sample holders

David Haberthür and Ruslan.Hlushchuk

Institute of Anatomy, University of Bern, Switzerland

{haberthuer, hlushchuk}@ana.unibe.ch

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Introduction

At the μ CT facility of the Institute of Anatomy of the University of Bern we are mainly working in biomedical research, we thus predominantly scan wet biological samples.

Tomographic scans are performed on our two machines, (SkyScan 1172 and SkyScan 1272) with wide-ranging voxel sizes, sample sizes and conditions.

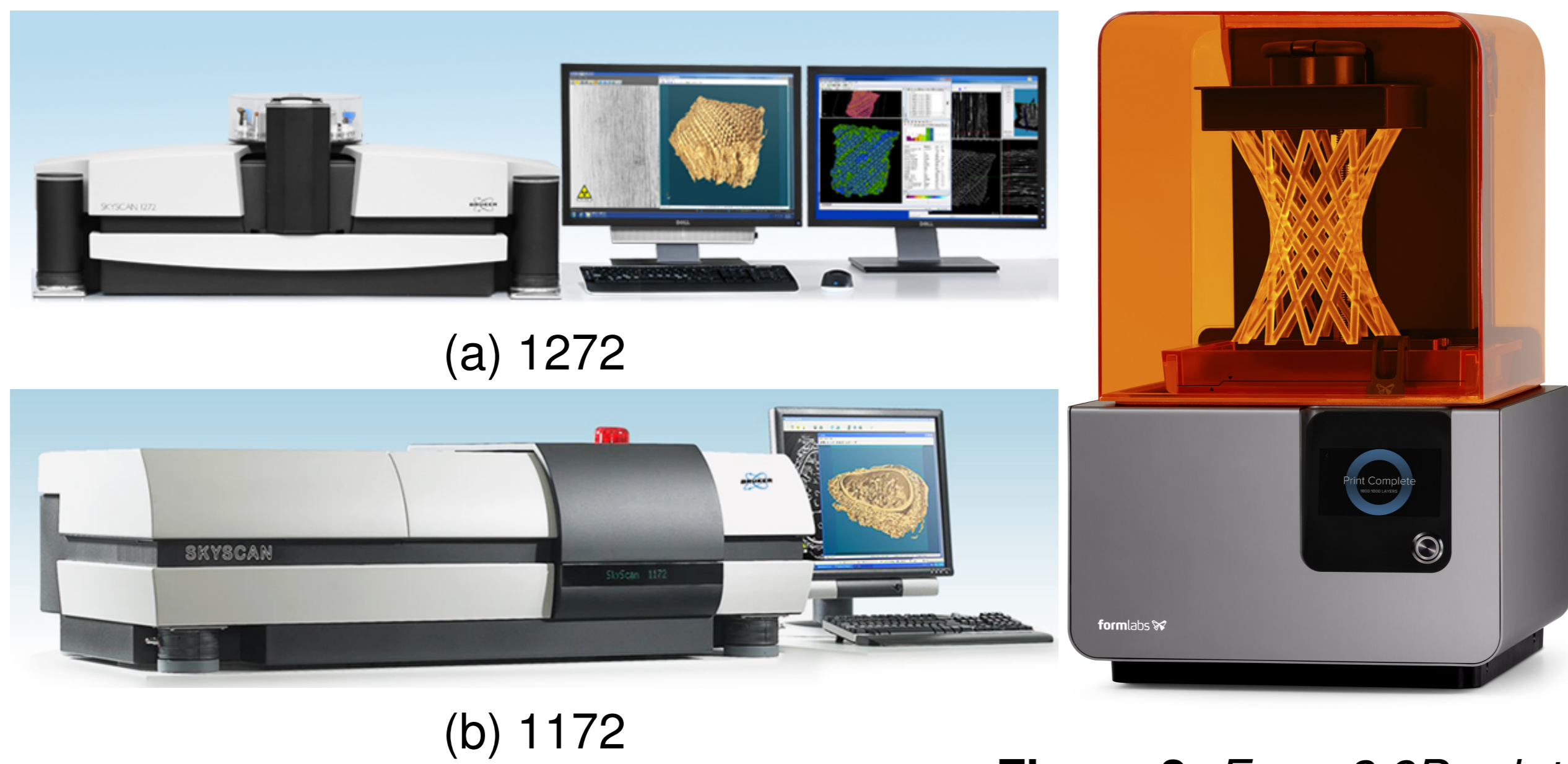


Figure 1: SkyScan machines [1]

Figure 2: Form 2 3D printer [2]

Problem

One thing that most samples have in common either is that they are scanned in a humidity chamber or scanned submerged in a liquid. A leakage of any liquid may will damage the scanner internals. This is namely the case when we process samples in toxic or corrosive solutions like Paraformaldehyde.

Solution

To be able to overcome these issues we compiled a library of adapted sample holders which can be printed on a 3D printer (Fig. 2).

Since we require the sample holders to be perfectly water (or liquid) proof, the cheapest and most common 3D printing method (fused deposition modeling) was not suitable for our purposes.

With these extrusion methods, small gaps in the 3D printed object can remain. After some testing, we chose a high-quality stereolithography printer (Form 2, Formlabs, Somerville, USA) to print our STL files to physical objects.

Using the free software OpenSCAD [3] we created the sample holders and exported them to STL files.

Moreover, the 3D printing enables the production of customized sample holders for several samples to be scanned simultaneously and reconstructed separately.

Library

The library of OpenSCAD and STL files is freely available at <https://github.com/TomoGraphics/Hol3Drs>

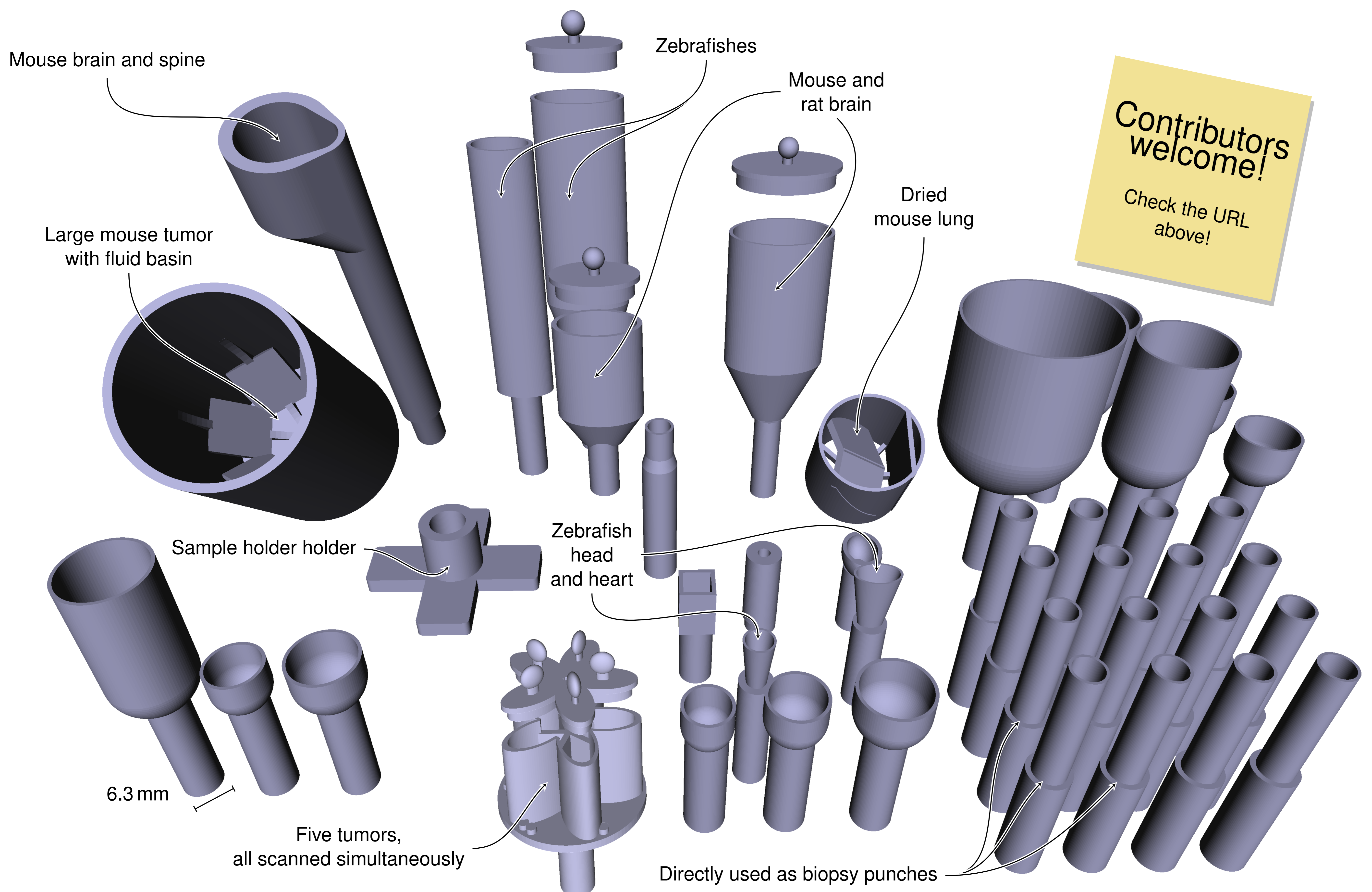


Figure 3: Visualization of some of the available STL models

Acknowledgments

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Links

- [1] *Bruker microCT Products*. URL: http://bruker-microct.com/products/all%7B%5C_%7Dproducts.htm.
- [2] *Formlabs Press Kit*. URL: <http://formlabs.com/company/press/>.
- [3] *OpenSCAD*. URL: <http://www.openscad.org/about.html>.