A library of 3D-printable sample holders

David Haberthür and Ruslan.Hlushchuk
Institute of Anatomy, University of Bern, Switzerland
{haberthuer,hlushchuk}@ana.unibe.ch

Introduction
At the µCT 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.

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

Acknowledgments
Our work is supported by the grant 14055.1 (Dynamische Hochauflösende Mikroangiographie) of the Swiss Commission for Technology and Innovation.

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