M.Sc. thesis project:
Combining acoustic alignment of cells with 2-photon lithography

We seek a motivated student for a master thesis project (9-12 months) to be conducted at Heidelberg University. The thesis work will be performed at the InnovationLab in Heidelberg, and is part of a collaboration between the teams of Dr. Kai Melde (IMSEAM, Uni Heidelberg) and Dr. Simon Binder (Uni Freiburg). Kai Melde's group "Holographic Tools for Biofabrication" has pioneered the development of acoustic holograms and investigates the use of ultrasound and light for tissue engineering. Simon Binder's group specializes on the development and microfabrication of novel biohybrid systems for neuroprosthetic applications.

The project aims to fabricate microneedles containing neuronal cells, where you will combine ultrasound-based alignment of the cells with two-photon lithography of biomaterials. The project requires development of a compact setup for acoustic assembly and to integrate this with the stage of a commercial two-photon 3D printer. After alignment and assembly of the cellular structures you will print precise structures around the living cells. Further, you will need to care for the cells before and after the fabrication and analyse the cells' functional development in the microneedles.

Prerequisites:

- Completed bachelor's degree in molecular biotechnology, molecular systems science & engineering, (bio)physics or related disciplines with a focus on biomedical engineering
- Willingness to do cell culture in a biolab. Previous experience with cell culture is highly recommended.
- Experience with mechanical design, 3D printing, electronics & soldering, microfluidics, or biomaterials would be helpful, but is not a must
- You should be well organized, independent and you should enjoy communicating with multidisciplinary and international teams

Applications should be sent via e-mail to Kai Melde (kai.melde@uni-heidelberg.de), preferably in a single PDF file, and include a letter of motivation, a CV, and a copy of academic transcripts. Please also direct any informal inquiries to Kai Melde.