Master Thesis

Automatic finding of describing parameters in embryonic development with deep learning methods on 3D point clouds

Project Description:
In our project we aim to align 3D+t point clouds describing the cell movements of developing embryos. We are looking for a student who is interested in the following master thesis:

The goal is to automatically find high-dimensional descriptors for 3D point clouds with deep learning methods. This includes identifying the best autoencoder architecture, as well as implementing and training it. Afterwards the found descriptors can be used for analyzing the changes of a developing embryo through time, comparing of different individual embryos and a temporal alignment of these.

The research focus can be flexibly chosen by the student. It could include experiments with different neural network architectures, hyper-parameters, different comparison metrics/loss functions or different analysis strategies for the resulting feature vectors.

Skills Needed:

- Basic programming skills (ideally first experiences with python)
- Basic machine learning knowledge (ideally first experiences with pytorch)
- Good mathematical skills
- Very good English language skills
- Basic biological knowledge

Working Conditions:

- Access to a high-end GPU cluster to train neural networks
- Work on a practically relevant and interdisciplinary project
- Intensive support with weekly meetings
- Possibility of co-authoring a paper in the case of success

If you are interested or have additional questions, please write an email to ina.laube@lfb.rwth-aachen.de