

# Master Thesis

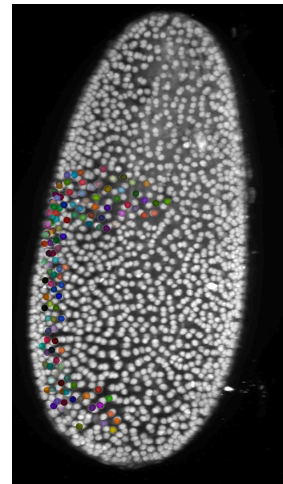
## Cell Segmentation in 3D Microscopy Images

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### Project Background:

Mitosis, the process by which eukaryotic cells divide to form two identical daughter cells, is a fundamental aspect of cell biology. Understanding this process is crucial, not only for basic biological research but also for clinical approaches to diseases caused by mitotic malfunctions, such as cancer. In this project, we focus on large-scale 3D+t time-lapse microscopy videos. An accurate segmentation is the prerequisite of the following approaches like tracking and mitosis detection. Specifically, the thesis focuses on solving cell segmentation task using state-of-the-art deep learning techniques.



### Your Tasks:

- Literature review on 3D cell segmentation methods
- Replicate the methods from literature review
- Experiment on different datasets
- Try to develop new approaches to deal with challenging datasets

### Your Profile:

- Strong programming skills in Python.
- Experience in deep learning techniques for computer vision.
- Familiar with Python libraries such as NumPy and PyTorch.
- Experience with version control tools like Github, Gitlab.
- Prior experience with instance segmentation is a plus.

### What We Offer:

- Flexible workload starting at 9 hours per week.
- Access to a high-performance cluster with over 2000 CPU cores and 100 GPUs (including NVIDIA L40S, RTX A5000, RTX 4090 and others) for neural network training.
- Resources including more than 16TB of RAM and 1TB of VRAM for computationally intensive tasks.

If you're interested, please send a brief email along with your CV and transcript of grades to [zhu.chen@ifb.rwth-aachen.de](mailto:zhu.chen@ifb.rwth-aachen.de).