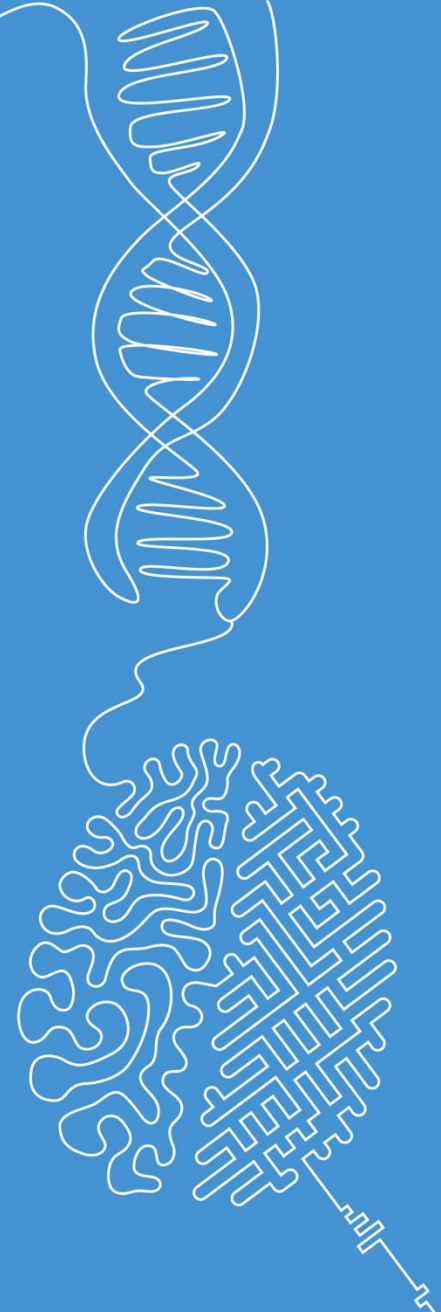


Project work

MSLS / CO4 / Imaging for the Life Sciences

Norman Juchler



Project work

- Counts for **50%** of the final grade
- Estimated workload: **27 hours**
- **Deadline:** **31.05.2025**
- The project can be completed **individually** or in **pairs**
- **Objective:** Solve a (simple) image segmentation problem
 - Explore the fundamentals of digital image processing and image data types
 - Gain insight into different types of segmentation tasks
 - Get hands-on experience with segmentation tools (e.g., Fiji, ITK-SNAP)
 - Learn how to develop your own segmentation approach in Python
 - ...and complete everything within a manageable timeframe!

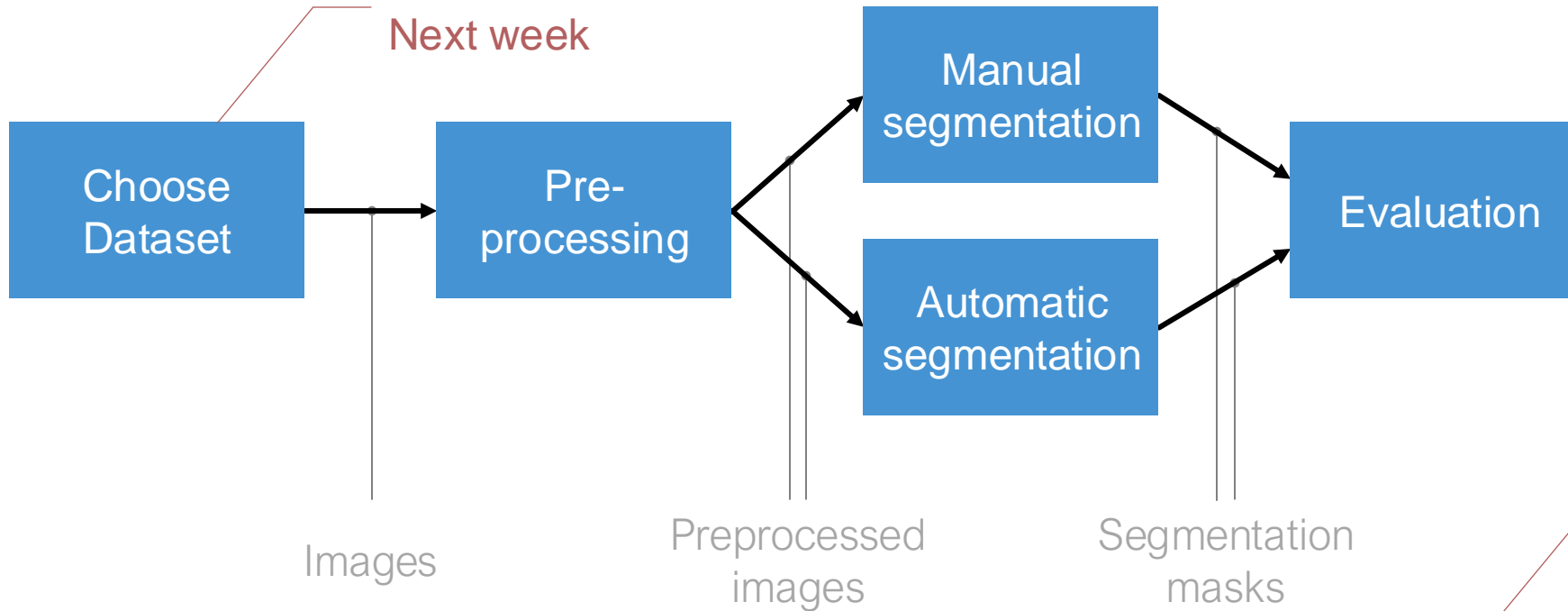
Overview

Jupyter notebook:

Implementation +
documentation

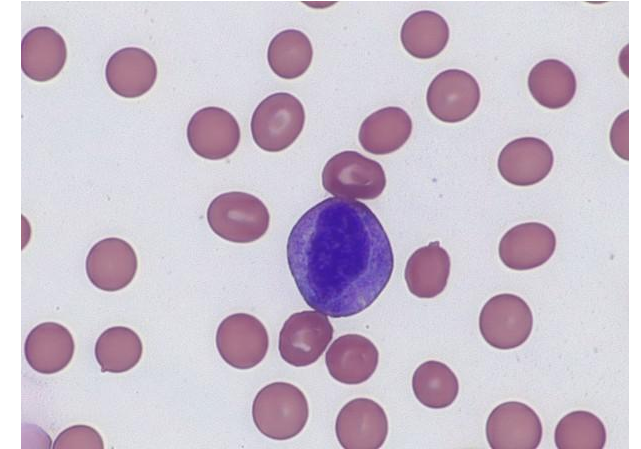
Due date 1:
Next week

Due date 2:
End of semester



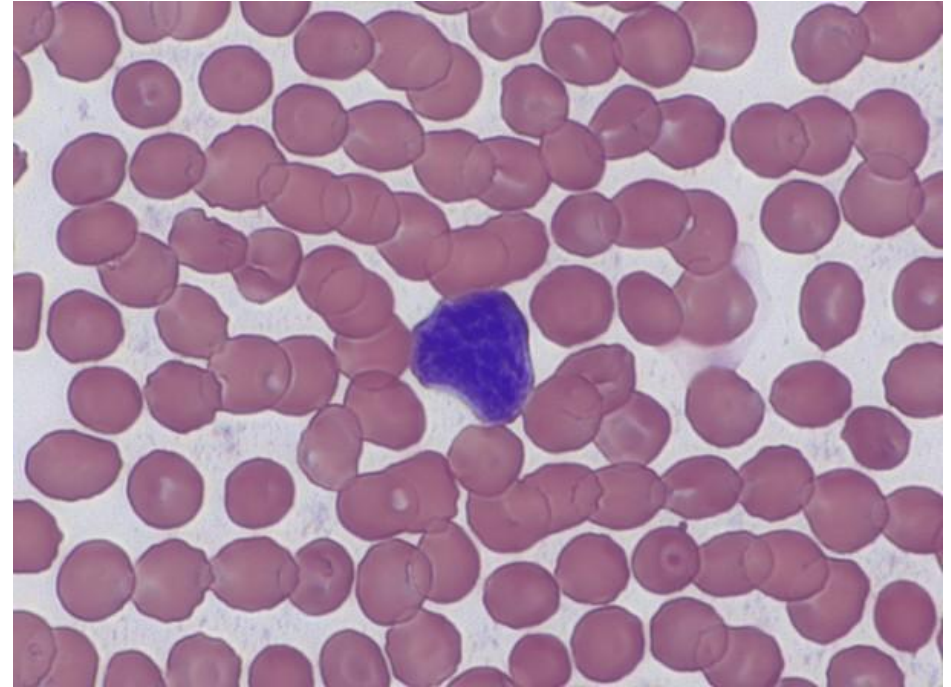
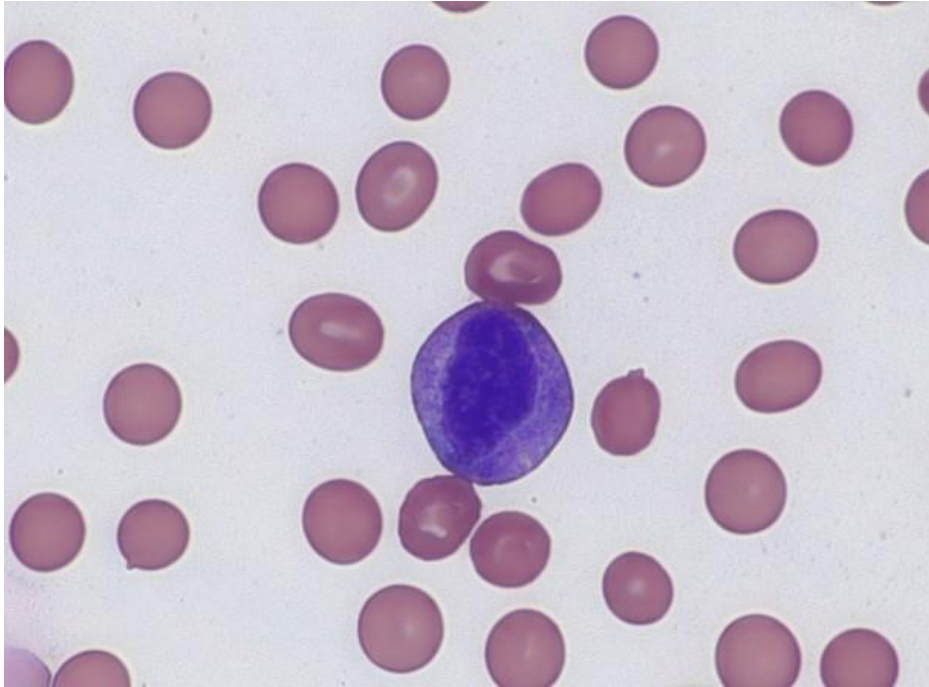
Task for next week: Identify a suitable dataset!

- Dataset with at least 10 image samples
- The structures of interest should be clearly visible
- Avoid excessive variation within the dataset
- Each student / each group must use a different dataset
- Check the data usage license!
- Image formats: any common machine-readable format



Due date: Thursday next week!

Why is the segmentation problem on the left side easier?



Deliverables: Jupyter notebook and a presentation video

- A template for the Jupyter notebook is available!
- Structure of the notebook:
 - Dataset description
 - Preprocessing
 - Manual segmentation
 - Automatic segmentation in Python
 - Evaluation / comparison
 - Discussion
- The submission must include a presentation video:
 - Summarize your project in your own words.
 - Feel free to be creative! Screencast of PPP is fine.
 - Duration: Max. 3 minutes

Help / Assistance

- First, try to solve the problem yourself
- Use web resources or generative AI tools
- Discuss challenges with your peers
- Reach out to me after class if you are stuck
- I may also offer an online Q&A session, depending on interest

Use of generative AI

- You are allowed to use ChatGPT, GitHub Copilot, Google Gemini, etc. when preparing the final report, under the condition that you declare where you have used it at the end of the Jupyter notebook.
- genAI tools can be for developing code, and we encourage its use when it supports your learning. However, we discourage any use of genAI that does NOT contribute to your understanding.
- In particular, copying code or text that you do not fully understand – simply to meet course requirements – is **not permitted**. You should be able to explain, in your own words, what your code does and what your submitted text means. We may check this individually if needed.