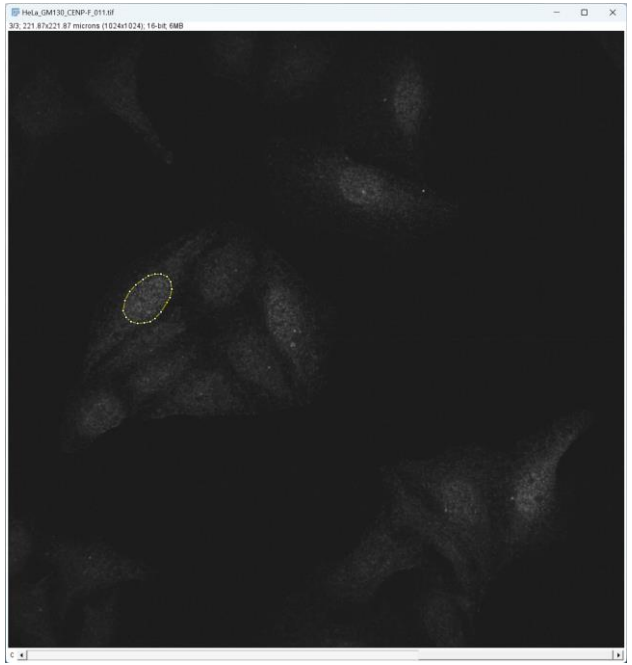
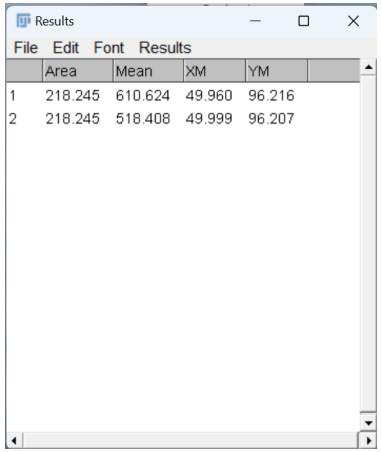
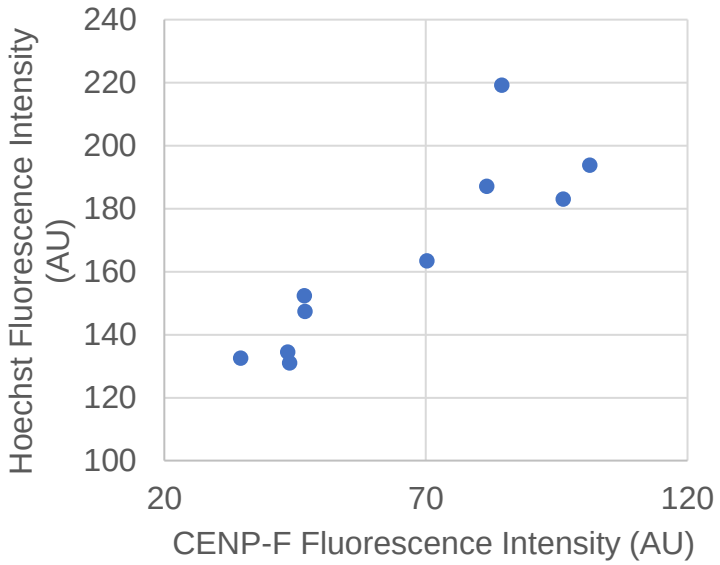
Instruction for the term paper

Minimum requirements:

- Write in English
- Using the image data provided in the "**HeLa_Hoechst_GM130_CENP-F**" folder (TIFF files), measure fluorescence intensities of **Hoechst** and **CENP-F** in the nuclei of at least 20 cells
- Describe the measurement processes (e.g., which software was used, ImageJ, Fiji, or JupyterLab; manually measured or a macro was used, etc)
- Make a 2D plot to show the relationship between Hoechst and CENP-F intensities
- Discuss the results







Instruction for the term paper

General instructions:

- No page limit, but around 5 pages may be reasonable
- Images and figures can be included
- The paper will be evaluated on the quality of the content only, not on the quality of the English (translation tools may be used)
- Complex and challenging extra analysis will be highly rated (e.g., comparison of analyses using ImageJ and Python; usage of own ImageJ macros or Python code; own analysis other than that in the minimum requirements, etc)

Submission:

- Submit your paper in MS Word (.docx) or PDF format via email (dtakao@mail.hzau.edu.cn) with the subject “Image analysis course” by **June 24, 2024 (Monday)**
- Don’t forget to include your full name and student ID

Instruction for the term paper

Important notes:

- You may discuss with others or use any "tools", but **be sure to complete the work on your own**
- If it is judged that part or all of your paper is a copy of someone else's text or contains too much similarity, it will be considered cheating and your grade may be subject to a significant reduction in points or failure
- If papers with high similarities are submitted, both will be subject to penalties, regardless of which is the original; therefore, be advised **not to share your paper with other students**
- For graders who read many papers, it is much easier to notice copied papers than you might think
- A paper that you have worked hard to complete, even if it is imperfect, is much more valuable than a perfect copied paper, and your efforts will be seriously evaluated

Template of the paper (just an example and no need to strictly follow this)

1. Image data

List the file names of image data used in the analysis (e.g., HeLa_GM130_CENP-F_011–020.tif). Describe the details of the images, e.g., what cells and staining? File format? Bit-depth?

2. Methods

Describe what software was used and how analysis was performed. Describe in as much detail as possible. If own macro or code was used, it will be good to attach it as texts or screenshot images at the end of the paper.

3. Results

Describe the results in detail. Show graphs, images, and whatever helpful to understand the results.

4. Discussion

Discuss what the results suggest and what can be concluded. The results can be discussed from either biological or technical points of view, e.g., what can be said from the relationship of two parameters? How can the code be improved? Biologically, it is interesting to discuss the relationship between the Hoechst and CENP-F intensities. Remember that Hoechst stains DNA and thus the intensity may correlate with the amount of DNA, while the expression level of CENP-F is low at G1 and increases toward G2 phase. Technically, Fiji/ImageJ macros can improve the efficiency of analysis. If you are interested in more challenging analysis using Python, you could start by trying end-of-chapter problems in the ".ipynb" files Beeswarm-Boxplot_tutorial and Image_Quantification_tutorial.

Feedback (optional)

Any opinions and comments are welcome to improve the quality of the course. It will never be reflected in your score, so feel free to write it down if you have any.