

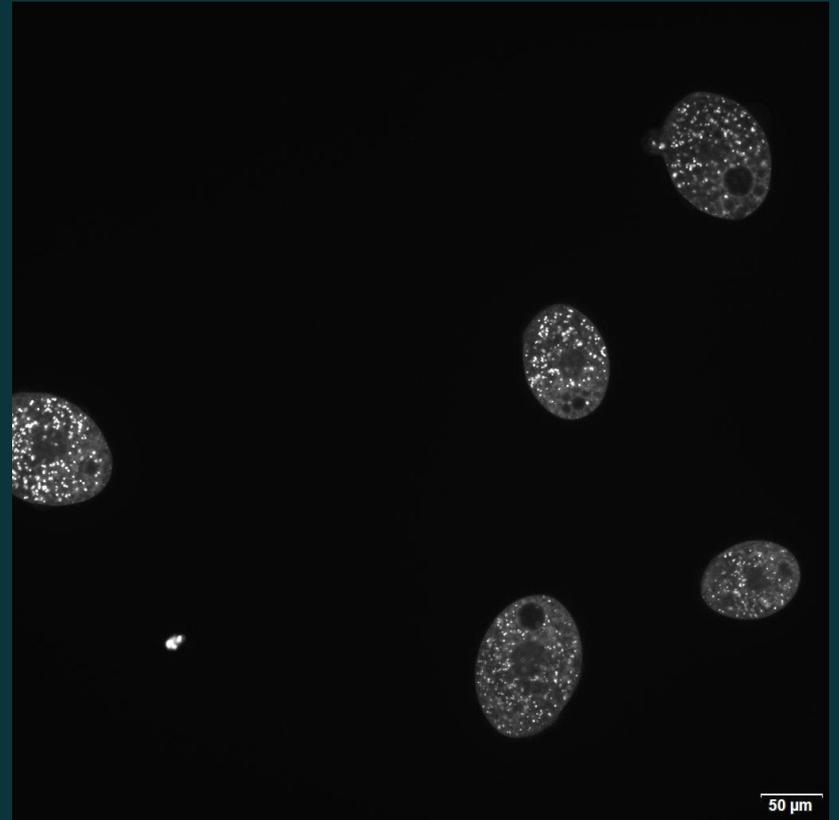
Quantification of Lipid Droplets in *Tetrahymena* *thermophila*: A Python Image Processing Based Approach

Elise Hachfeld | St. Olaf College

Lipid Lab Research Goals

Assess the effects of starvation on lipid droplet formation in *Tetrahymena thermophila*.

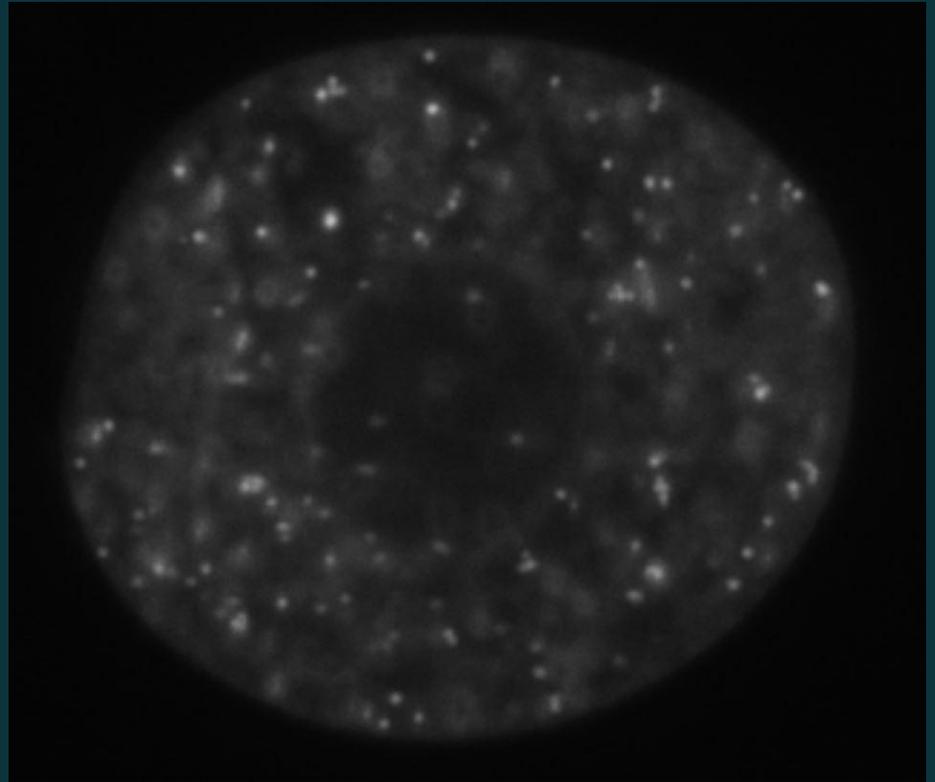
My Goal: Translate microscope images into quantitative data.

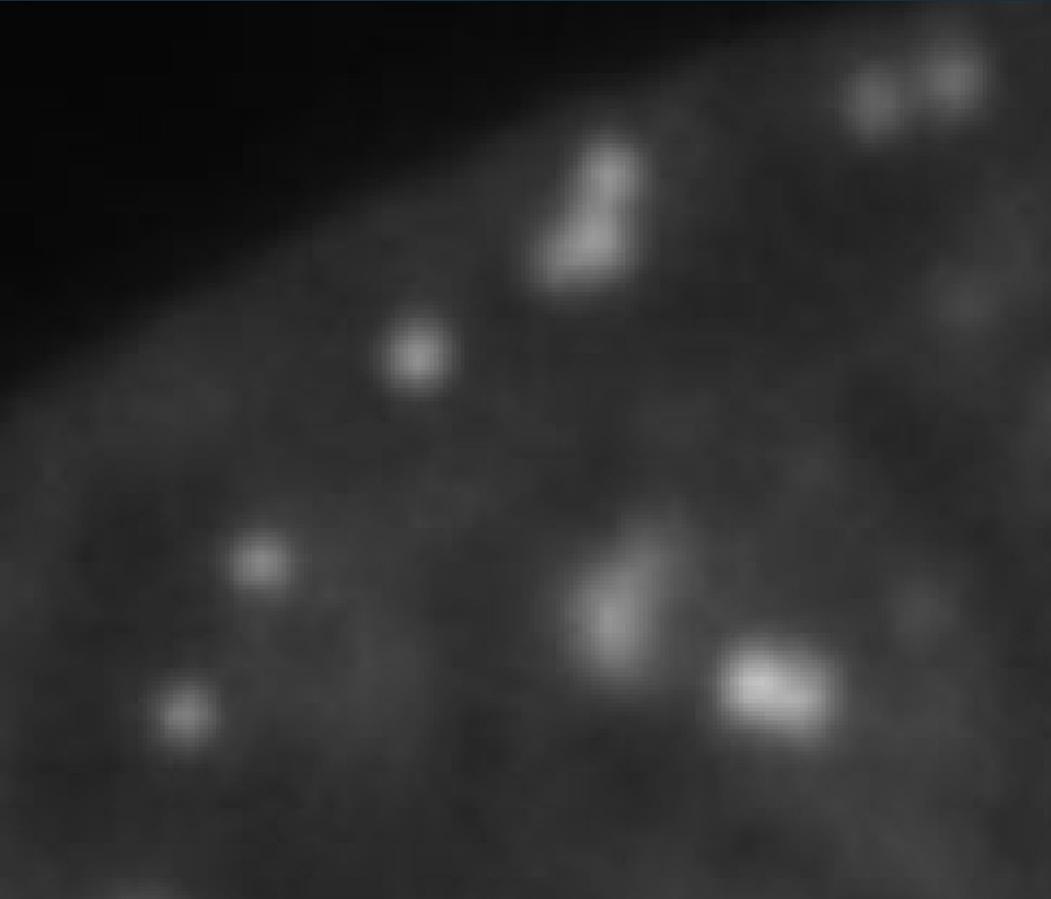


Counting Lipid Droplets

Why not count manually?

- Time intensive
- Subjective
- Can't Standardize



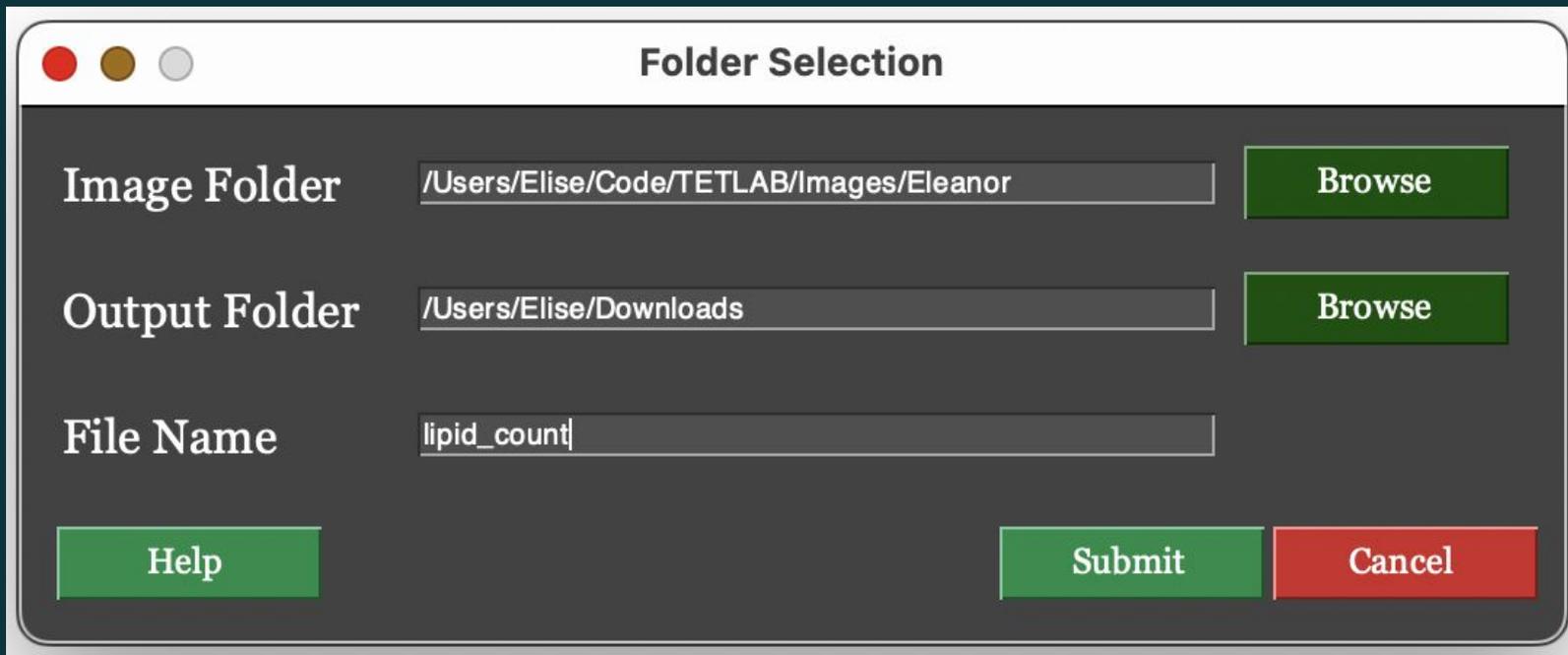


Subjectivity introduces bias.



Obtaining Quantitative Data

Python Libraries: OpenCV, scikit-image



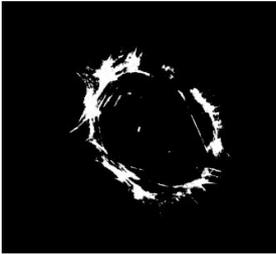
The image shows a 'Folder Selection' dialog box with a dark gray background and a white title bar. The title bar contains three window control buttons (red, yellow, and gray) on the left and the text 'Folder Selection' in the center. The dialog box has three main input sections:

- Image Folder:** A text input field containing the path `/Users/Elise/Code/TETLAB/Images/Eleanor` and a green 'Browse' button to its right.
- Output Folder:** A text input field containing the path `/Users/Elise/Downloads` and a green 'Browse' button to its right.
- File Name:** A text input field containing the text `lipid_count|`.

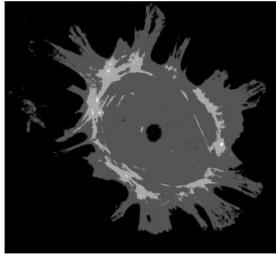
At the bottom of the dialog box, there are three buttons: a green 'Help' button on the left, a green 'Submit' button in the center, and a red 'Cancel' button on the right.

Image Acquisition

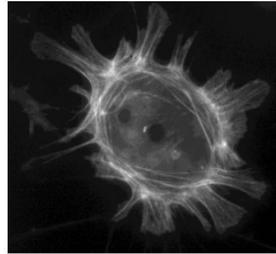
1-bit



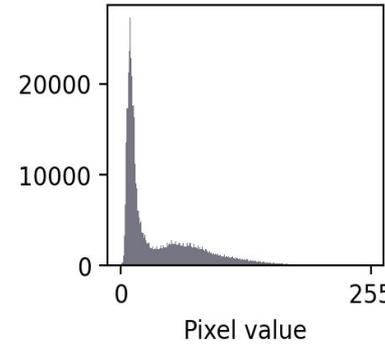
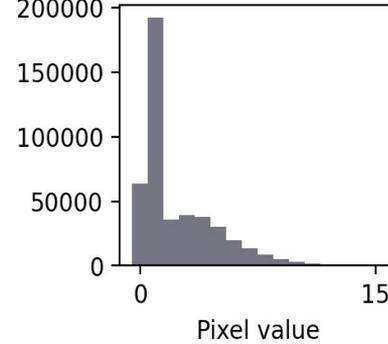
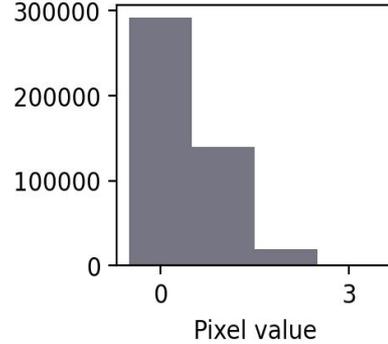
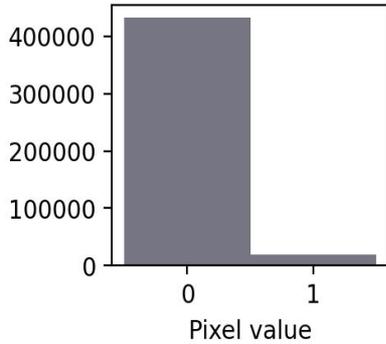
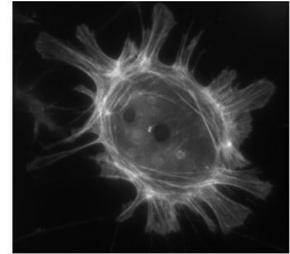
2-bit



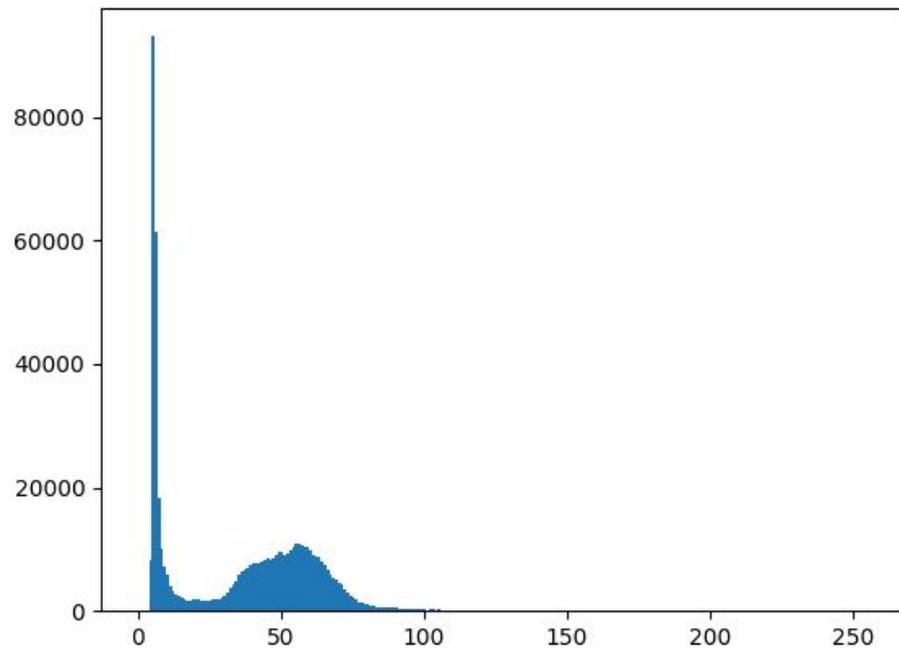
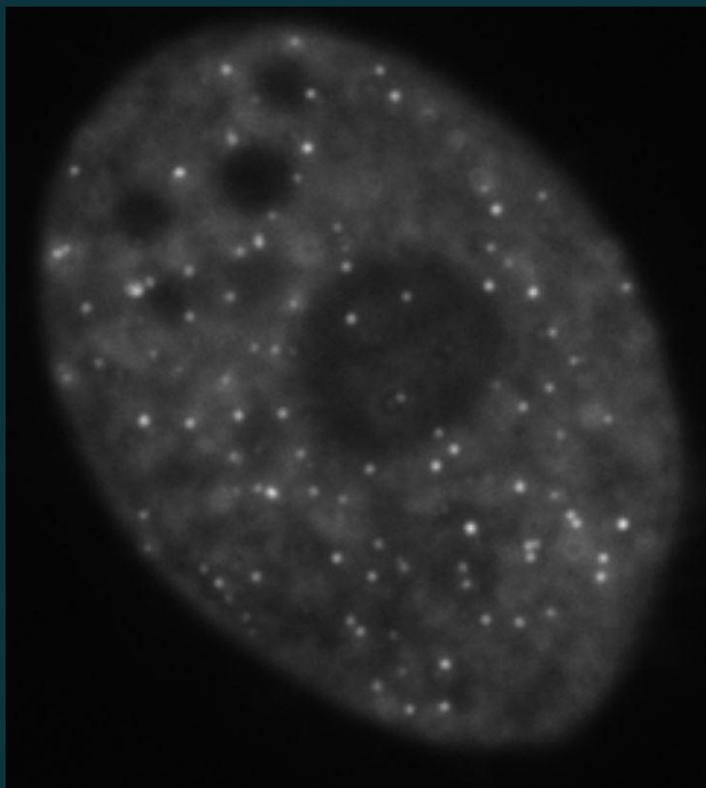
4-bit



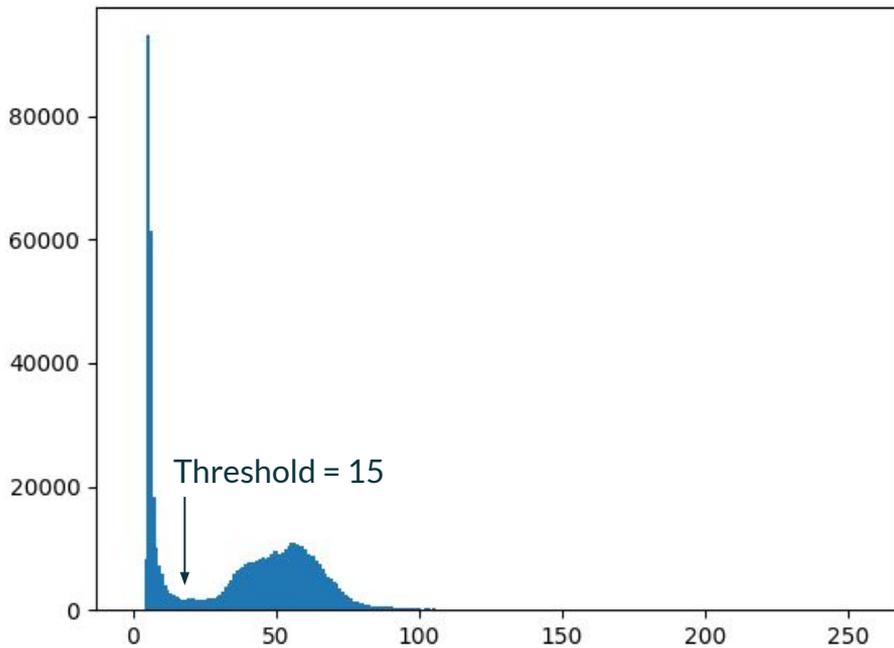
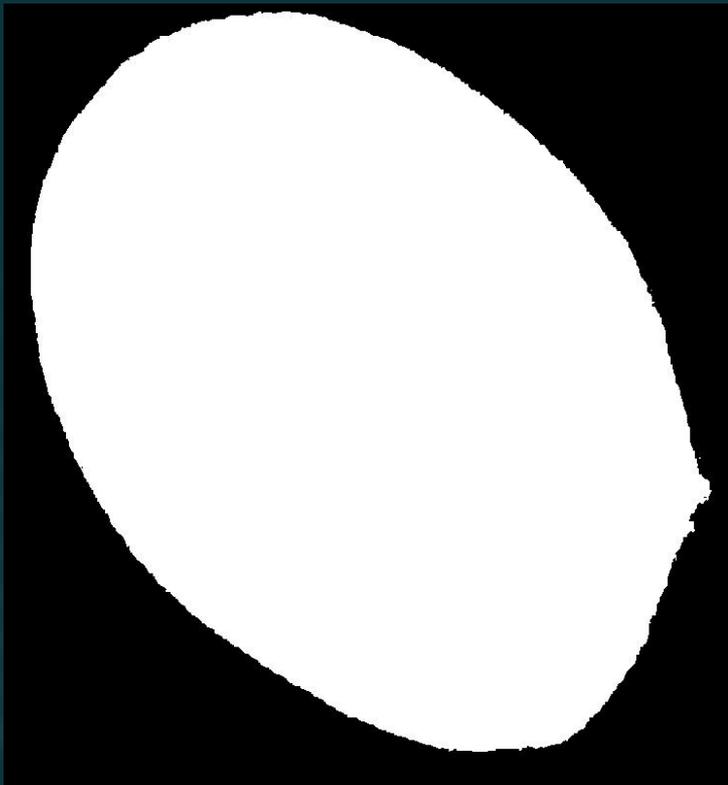
8-bit



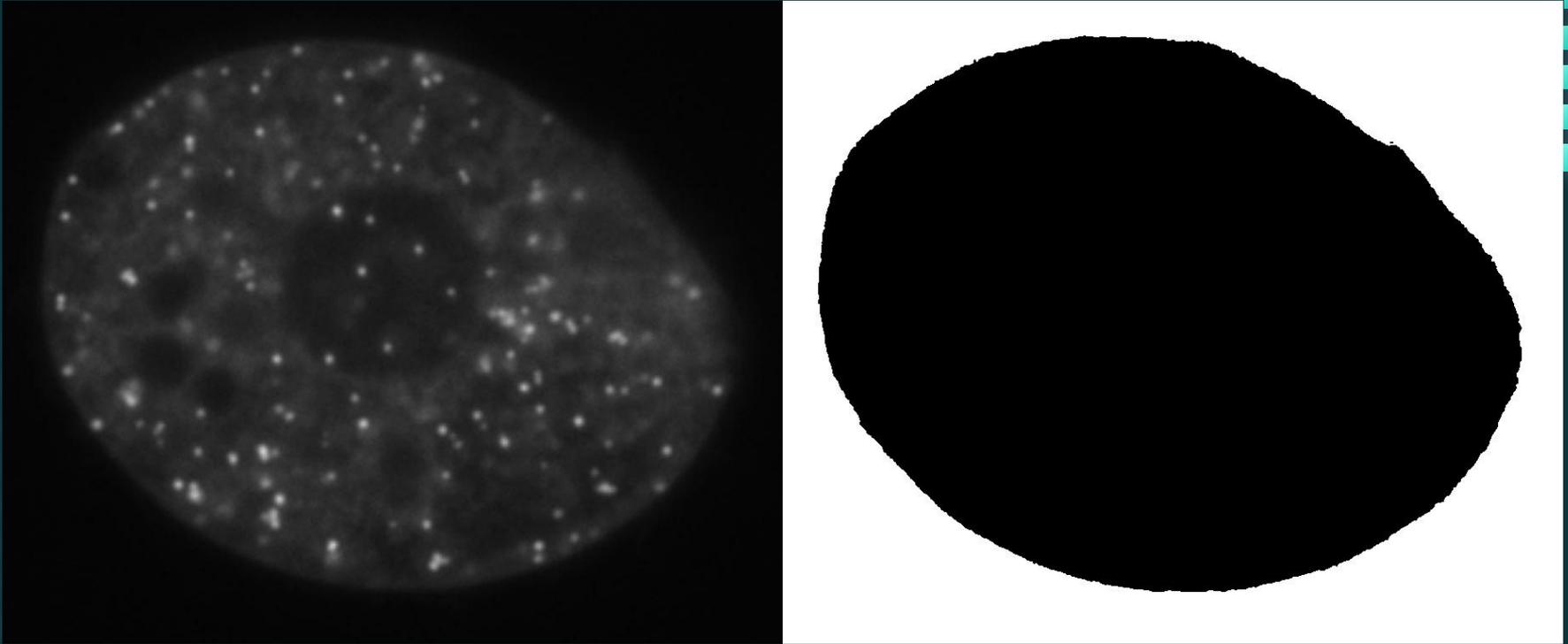
Reading an Image Histogram



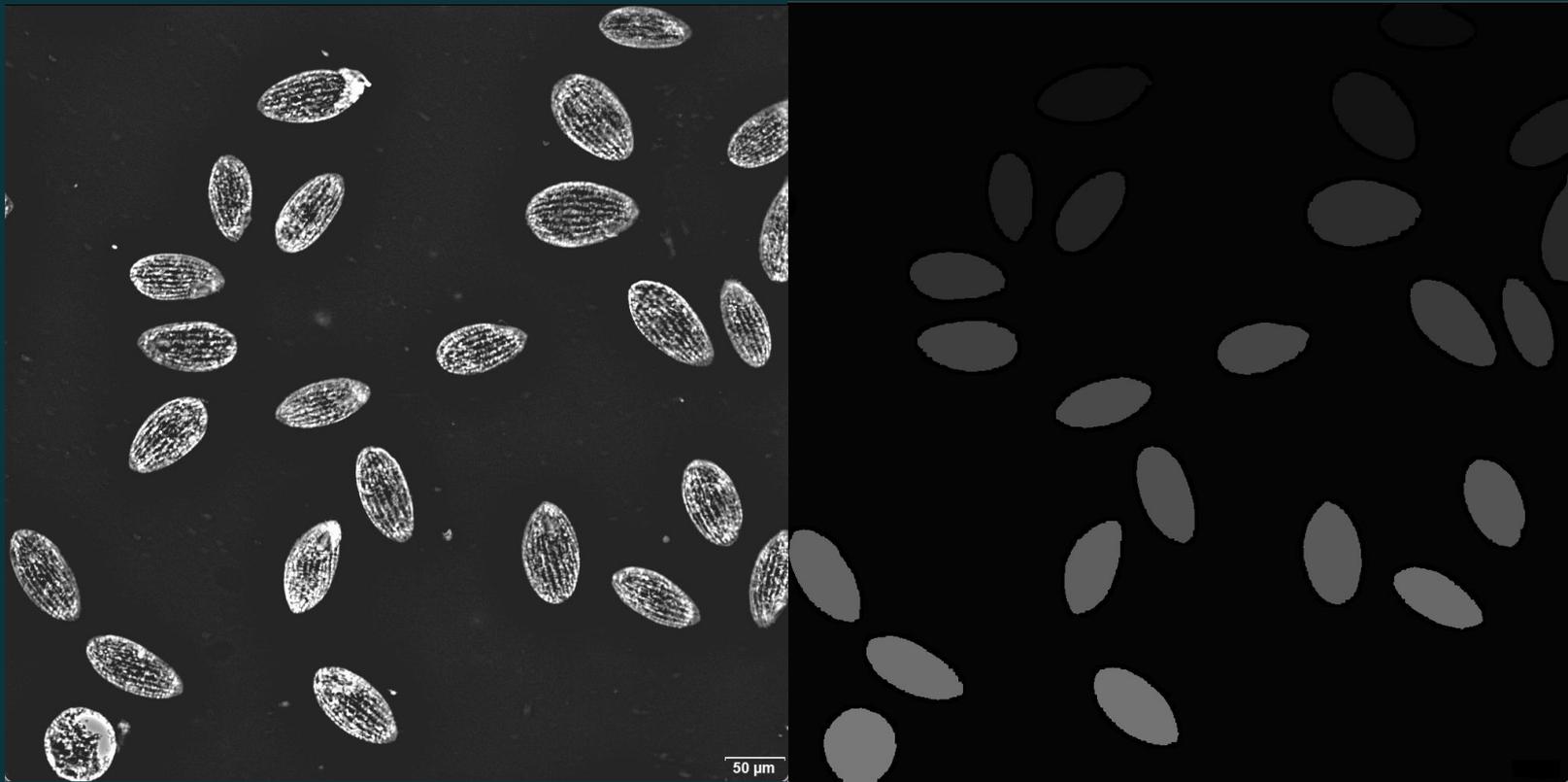
Ex: Simple Binary Thresholding



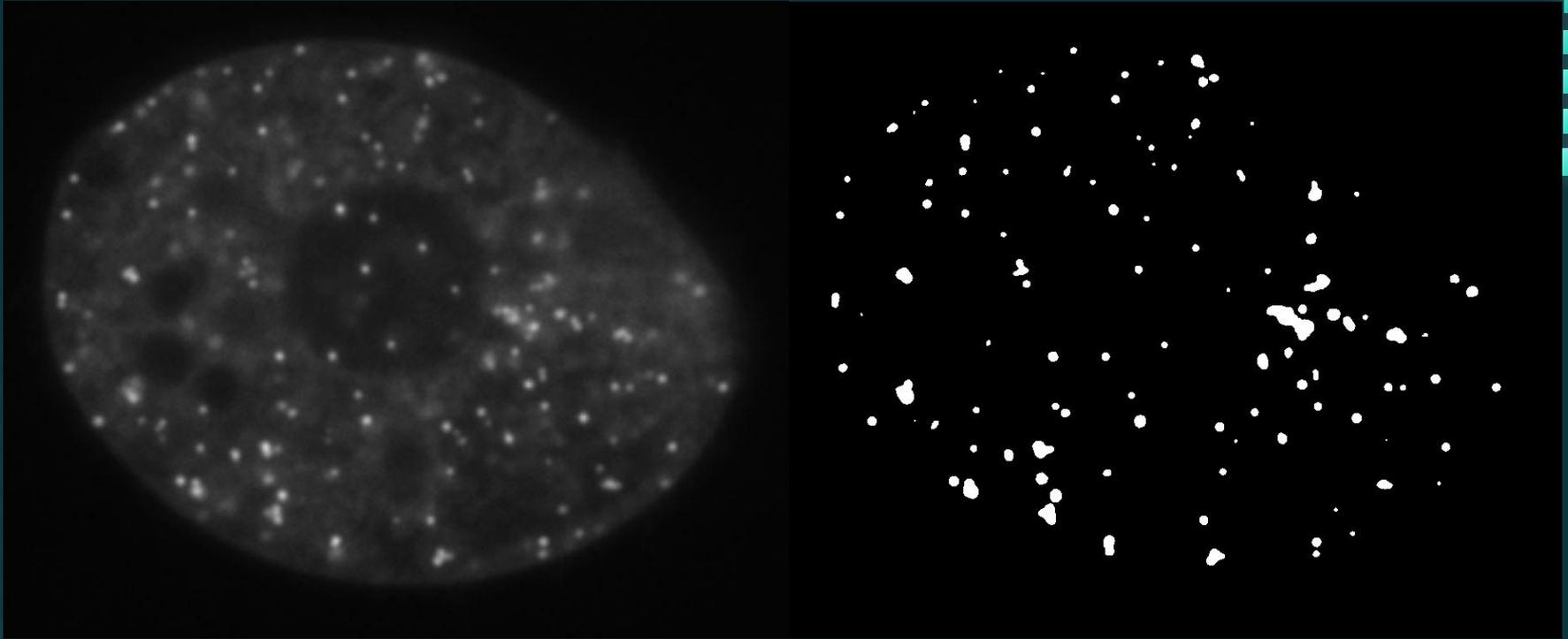
Li Thresholding



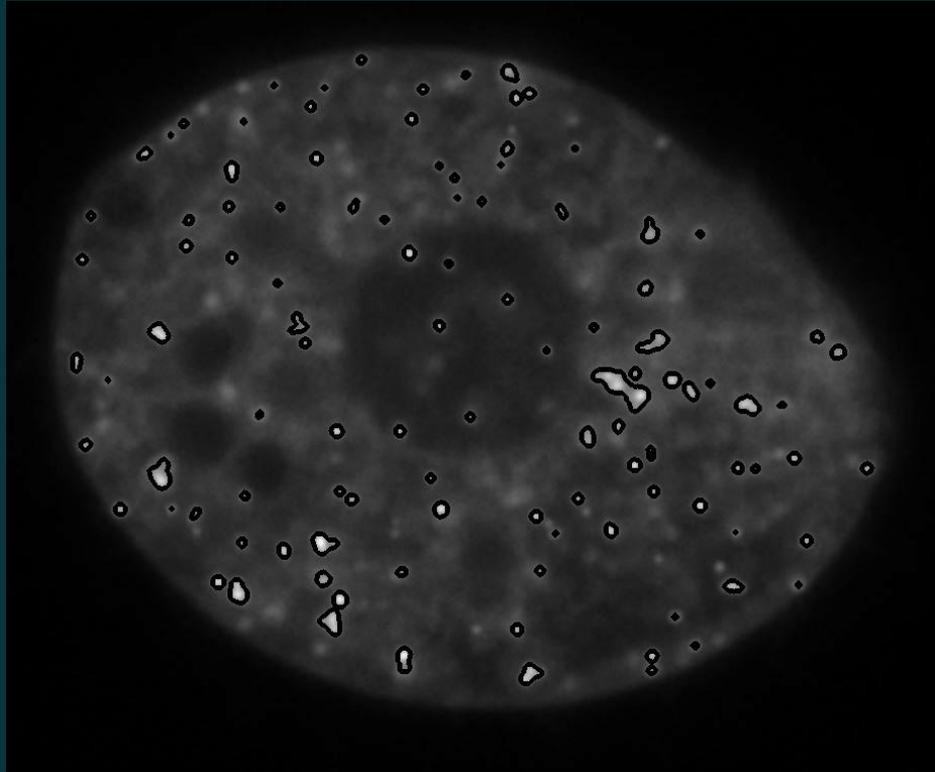
Multi Cell Segmentation



Yen Thresholding

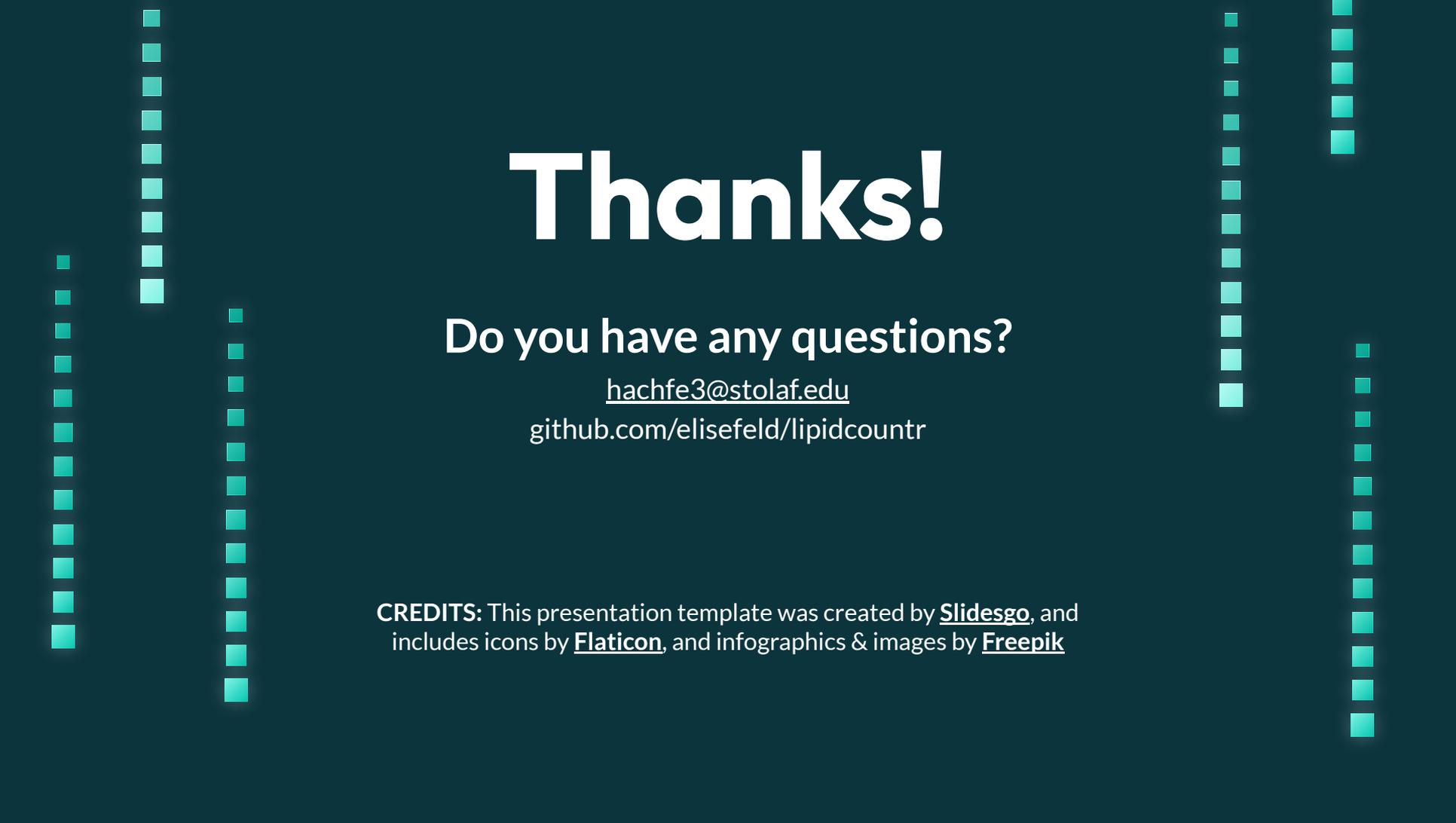


Contour Detection



Acknowledgements

- Professors Jean Porterfield and Kim Kandl for their mentorship throughout this project.
- Ian Knowles and Nick Jensen for providing microscope images and spending extra time to make this project possible.
- My father, who encouraged me to learn Python!



Thanks!

Do you have any questions?

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github.com/elisefeld/lipidcountr

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