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PHYS 129L

## Progress Report 1

### Methodology

**Exporting of Intensity Data** A custom macro/script for the image analysis software FIJI was used to export intensity data from .tif images taken from the microscope computer.

### Progress Summary

This week, I took experimental data from the microscope computer in my lab and formatted it in a way that would be tractable to input into the diffusion equation.

A .tif file containing a movie recording of fluorescent DNA nanostars diffusing across a 1 mm channel was processed using a macro that I wrote in FIJI. The macro outputs the averaged intensity for each horizontal pixel in each frame, and saves it as a .csv in a folder called 'intensity\_data'. Intensity is linear with concentration of the nanostars so this data can eventually be used to extract a diffusion coefficient.

## Challenges and Solutions

The biggest challenge I had this week was learning the macro language of FIJI. I found the syntax with semicolons and curly braces to be annoying after having worked with Python for so long, and I realized that I was using a much older distribution of FIJI so my macro initially did not work. There's also a lot of custom functions in FIJI that are not so obvious in their intended usage and documentation is scarce.

I also learned that large files (>100 MB) cannot be pushed directly to GitHub, so I had use a .gitignore file to ignore my movie files.

## Future Work

Next week, I would like to implement a simple simulation of the diffusion of the stars given a starting frame and an assumed diffusion coefficient.

I also want to figure out how to use Github LFS to store my .tif files.

## References

Schindelin, J., Arganda-Carreras, I., Frise, E. et al. Fiji: an open-source platform for biological-image analysis. *Nat Methods* **9**, 676–682 (2012). <https://doi.org/10.1038/nmeth.2019>