

Watching Worms Wiggle: Analyzing *C. elegans* Locomotion using Optical Microscopy

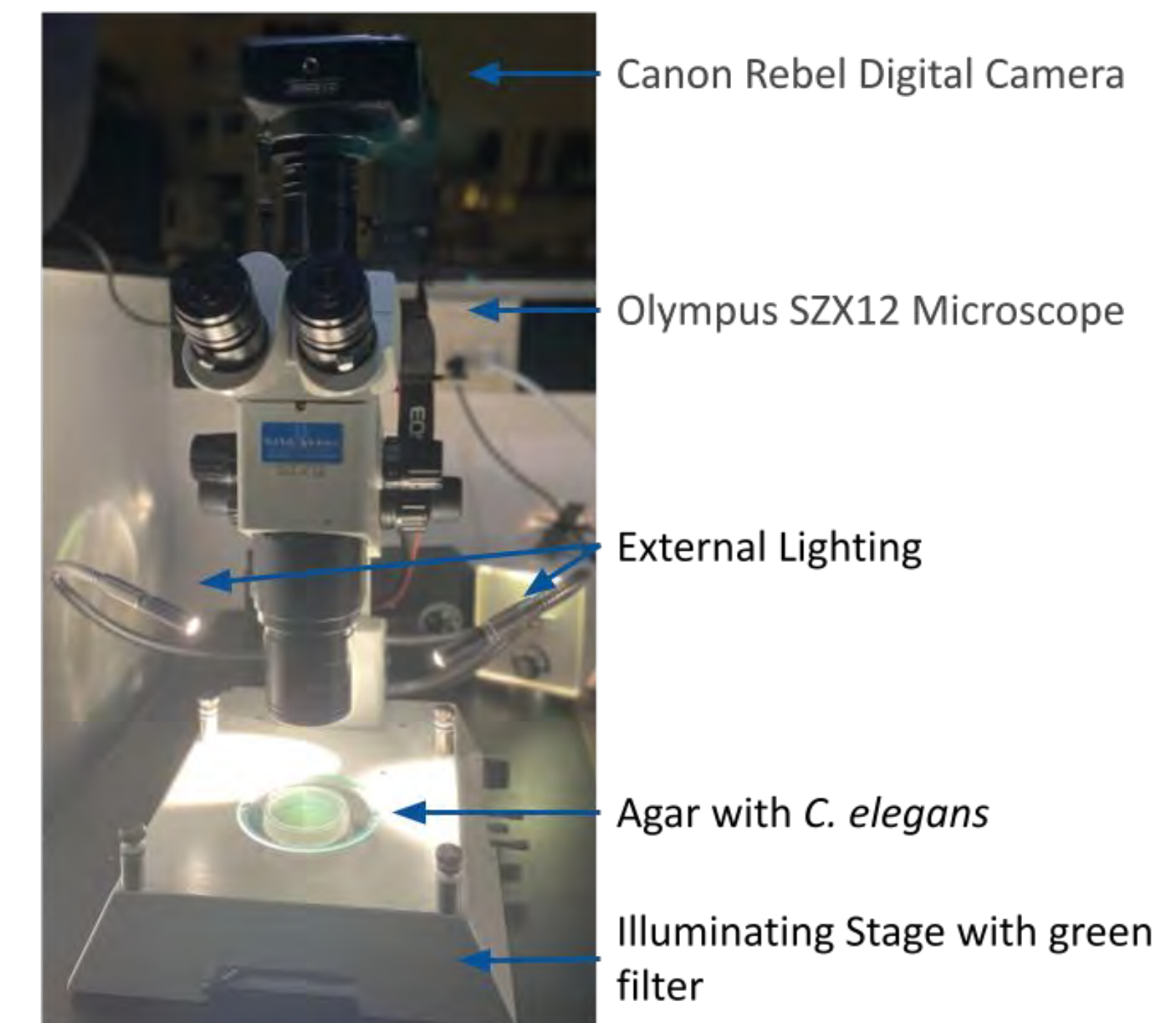


Asia Baker '24, Raffaella Zanetti '23, Katie Canavan '24, and Prof. Jenny Magnes
Vassar College Dept. of Physics & Astronomy, VAOL

Introduction

Caenorhabditis elegans (*C. elegans*) are microscopic organisms that are studied to explore and explain the neuronal dynamics of humans. Our goal was to produce trackable videos of the *C. elegans* using a microscope. By recording and tracking the adult *C. elegans*, our research team will use the data to further our understanding of their locomotion [1]. Figure 1 showcase the setup used to take the videos this summer.

Microscopy Configuration



Methodology

In our study, *C. elegans* were grown under monoxenic conditions in a laboratory and a transfer to an agar was done before each video was taken. Figures 2, 3 and 4 show the progression of video quality over the course of the summer. We realized that the tracking systems needed clearer images [2] of the *C. elegans* for the videos to be processed. We were able to adjust the microscope and camera to create a clear video of the nematode moving as seen in Figure 3. However, the tracking system also needed contrast so we added a green color filter to the set up.

Conclusion

We were able to achieve a higher numerical aperture to resolve the *C. elegans* at a high resolution during the video recording process. These videos taken this summer will be integrated into a virtual simulation created in Matlab for analysis. We will use the results of the analysis to compare the experimental results versus the model results.

Acknowledgements & References

We are grateful for the continuous support of Jenny Magnes, Susannah Zhang, Kate Susman and Harold Hastings for their willingness to mentor and guide our research team in this project. We would also like to thank the gracious donors of URSI for funding our summer research and making our research possible.

[1] Ahamed, T., Costa, A.C. & Stephens, G.J. *Nat Phys.* 17, 275–283 (2021). doi: 10.1038/s41567-020-01036-8

[2] Davidson, M. Nikon's MicroscopyU. <https://www.microscopyu.com/microscopy-basics/resolution>.



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