BioArt: *Hydra Vulgaris* Under Microscope

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01. Introduction

`Bioart is becoming an increasingly popular field where artists and scientists use scientific techniques and aesthetics to create art with living organisms as a medium. This form of artistic expression can create thought-provoking work that merges both scientific and holistic approaches of thinking. With the development of modern biotechnology, scientists have developed a deep nuanced understanding of subjects under the microscope.

Despite this discourse among scientists in academia, the general knowledge of these discoveries remains elusive to non-scientific audiences. There is a disparity in the knowledge of the natural world between the public and scientific communities, where there is an increasing amount of disinformation about science and research. Despite groundbreaking discoveries in research being presented about the natural world, an unbalanced and detached view from society creates a separation between science and daily life, preventing a more holistic understanding and inquiry about the world around them. This is exacerbated by the difficulty for scientists to find support for their research, since there is a perceived lack of connection between the work they are studying and its practical use. This hole in our understanding of how to communicate scientific discourse among general populations brings us to discuss ways to bridge the gap.

By combining scientific imaging techniques and artistic interpretation, we hope to develop a language between scientists and the general population to allow for more curiosity towards the field and open dialogue between two artificially separated communities. We aim to use BioArt as a future for garnishing more support for scientific discovery and nuanced perspectives on science and technology.

02. Methods

Preliminary experiments were first conducted to experiment with photographic and graphic design techniques. Samples were taken from around Tallahassee and chosen slides from Carolina Biological. All photos were post-edited in Photoshop.

We will be using the *Hydra vulgaris* to explore microscopy imaging techniques and artistic interpretations in order to better visualize research being done on the organism, such as physical traits, behaviors, and their regenerative abilities

We will also discuss brightfield microscopy techniques and their uses in creating high quality imaging, including:

- **Brightfield (BF)**
- **Phase Contrast (Ph1)**
- **Darkfield (DF)**
- **Differential Interference Contrast (DIC)**

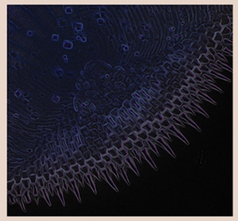
All photos and videos of the subject will be captured using the Nikon Ni-U upright microscope, the Keyence VHX-7000 digital microscope, and the Leika EZ4 stereo microscope, and processed in post using Adobe Photoshop and Adobe Premiere Pro. We will go further into the artistic processes in choosing the subject content, photography, and post editing, and its effectiveness in visualizing scientific discoveries from the *H. vulgaris.*

03. Results

Preliminary Results

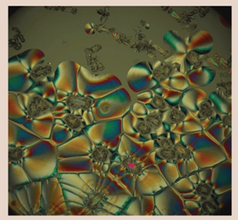
Crab Zoea
DF - 10x

Ctenoid Scale
Ph1 - 10x

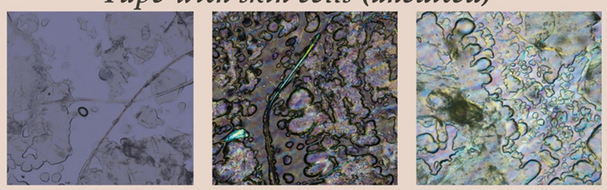


Spanish Moss
BF - 20x

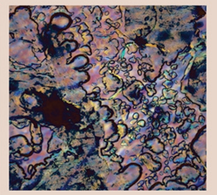
Crystalized Vit. C
PLM - 4x



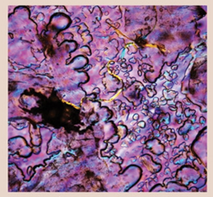
Tape with skin cells (unedited)



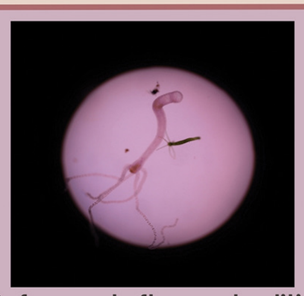
BF - 300x *Ph1 - 10x*



True color



High saturation/ contrast



Before and after post-editing of Green and Brown Hydra
"Comparison of Green and Brown Hydra" - BF - 2x

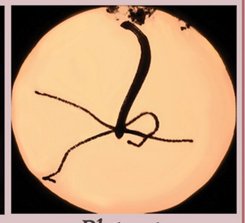
Side-by-side photo of green and brown Hydra next to each other, (left) unedited and (right) edited.

The photograph was taken to demonstrate the difference in size and color of the *H. Vulgaris* to its sister species, the *Chlorohydra viridissima*. The right photo was color-balanced and sharpened to allow for clearer representation.

Choosing techniques that best capture behaviors

BF - 4x
Microscope makes it easy to follow and focus on sample

DF - 2x
Illuminates different parts of the sample using differentiated color



Ph1 - 4x
Enhances contrast of figure without staining

(From left to right) Hydra feeding on daphnia using the Leika EZ4 stereo microscope, unattached hydra floating using the Nikon Ni-U microscope, and the hydra outstretching cnidae to capture food using the Nikon Ni-U microscope.

Using photography and storytelling to visualize H. Vulgaris behavior

Hydra was photographed to mimic art style and colors of the Greek mythological style portraying the story of the hydra. ***(DF - 4x)***

We are able to photograph the real-life hydra to follow the mythological story of Heracles slicing heads of the create and being able to grow its heads back.

05. Conclusion

The results of this project exemplify pathways and thought processes that could be considered when creating clear images that convey information about the samples being photographed. Understanding framing, balance, color theory, and other graphic design elements make information more appealing and accessible. Using photos in conjunction with storytelling and context to familiar aspects of life only benefits audiences' understanding.

In an age where our society is highly visual, being able to effectively use photography and graphic design in collaboration with research is becoming more essential to have a greater reach. In spite of strides in combining visual communication with scientific research, many still operate under the guideline that images should be used as an accessory to the writing, instead of an important feature integrated into communication of research. More studies can show how current scientific technology and visual art theory can be combined to create beautiful pieces, while emphasizing the discoveries being discussed.

Without modernizing our approaches, many discoveries that could be applied to other aspects of life may go unnoticed or unfunded. Being able to adapt our thinking to a more holistic approach would bridge the gap that separates scientists from non-scientists

06. Acknolwledgements

Thank you to my research mentor, Dr. Jamel Ali for providing me guidance and training on microscopy, as well as allowing me full creative freedom for my work. Thank you for FSU UROP for allowing me the opportunity to build my skills in research under this program. This work was performed at the National High Magnetic Field Laboratory, which is supported by National Science Foundation Cooperative Agreement No. DMR-2128556 and the State of Florida.

Full Portfolio

References