

Microscopic Bioart

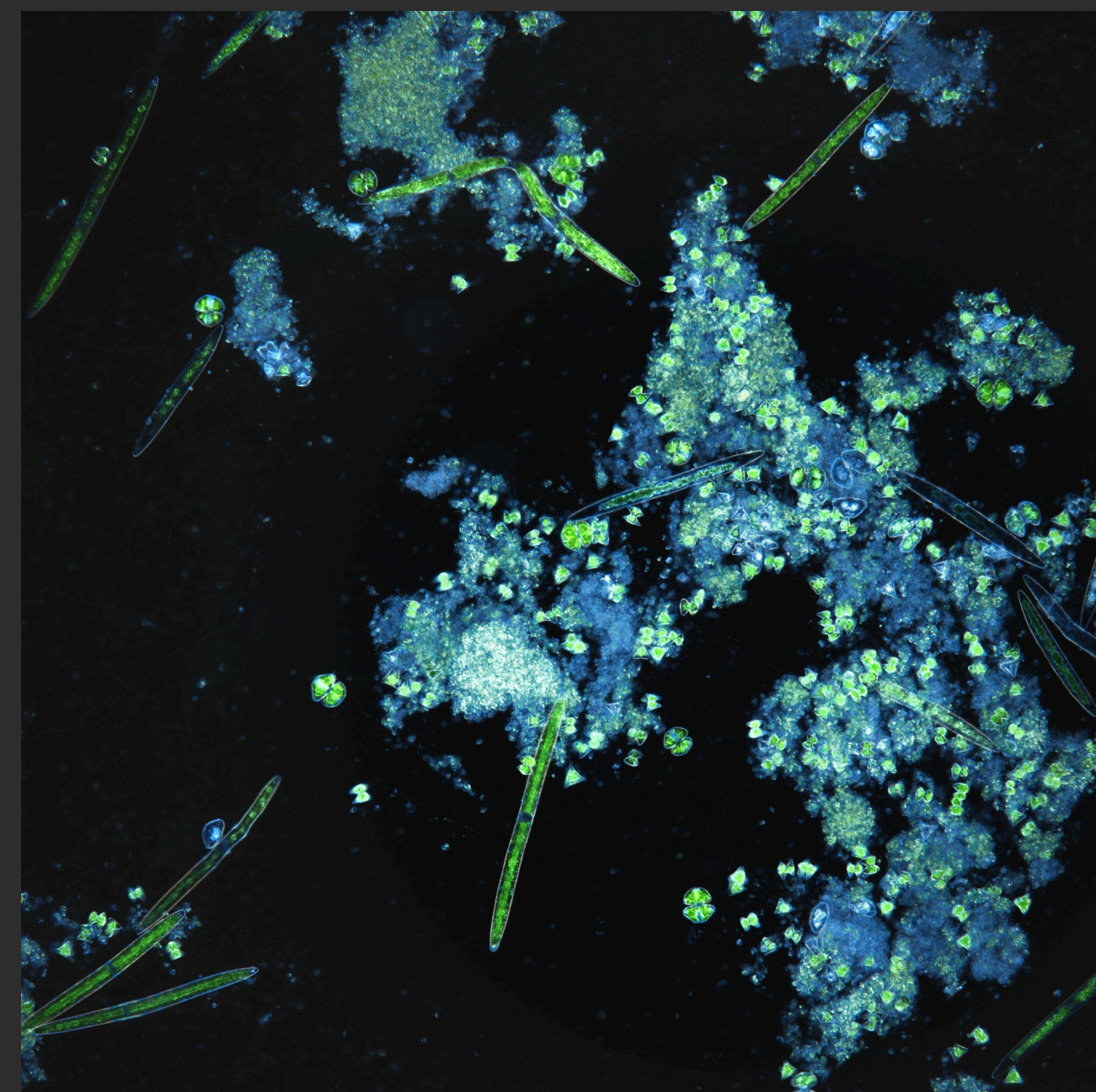
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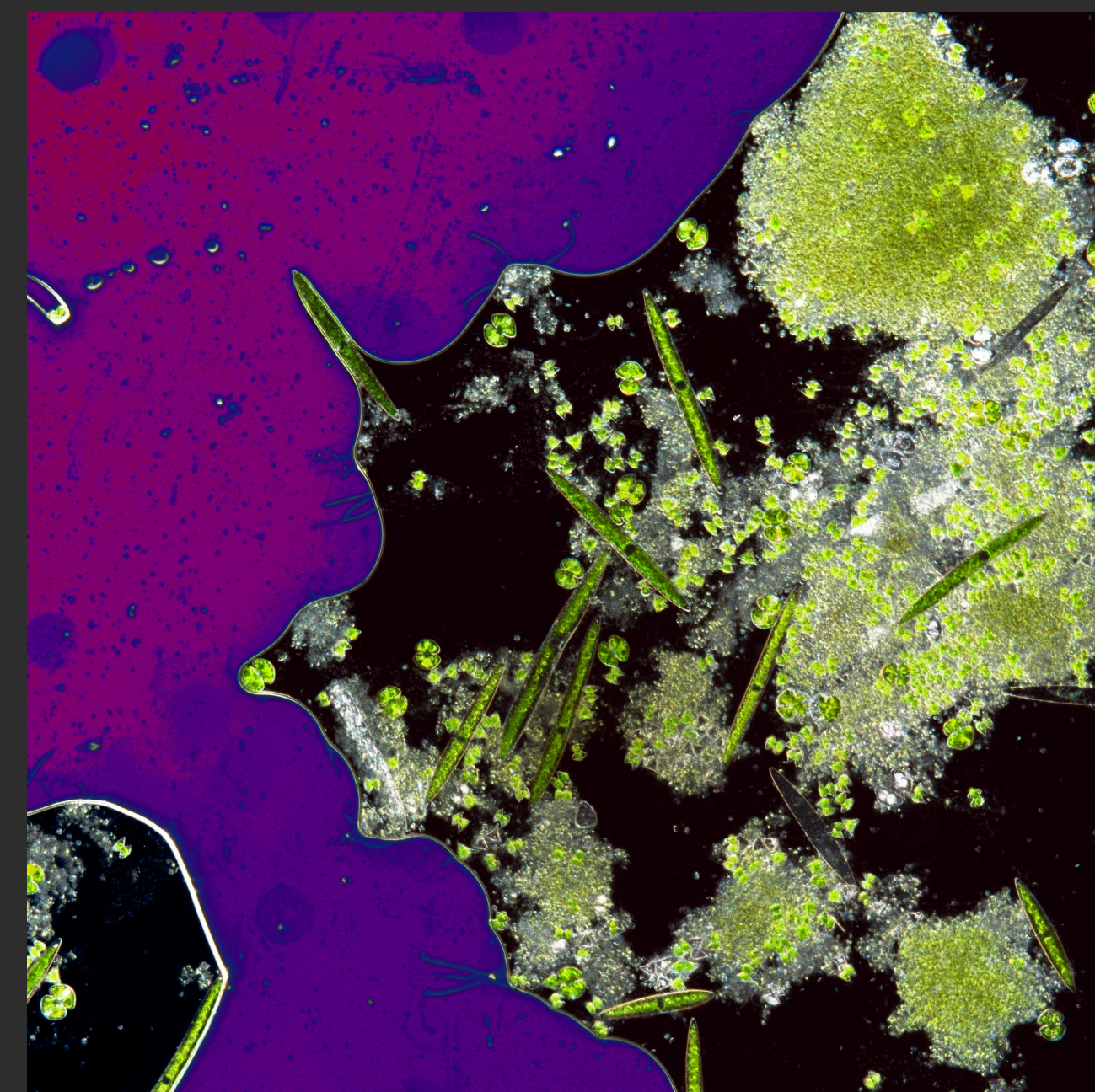
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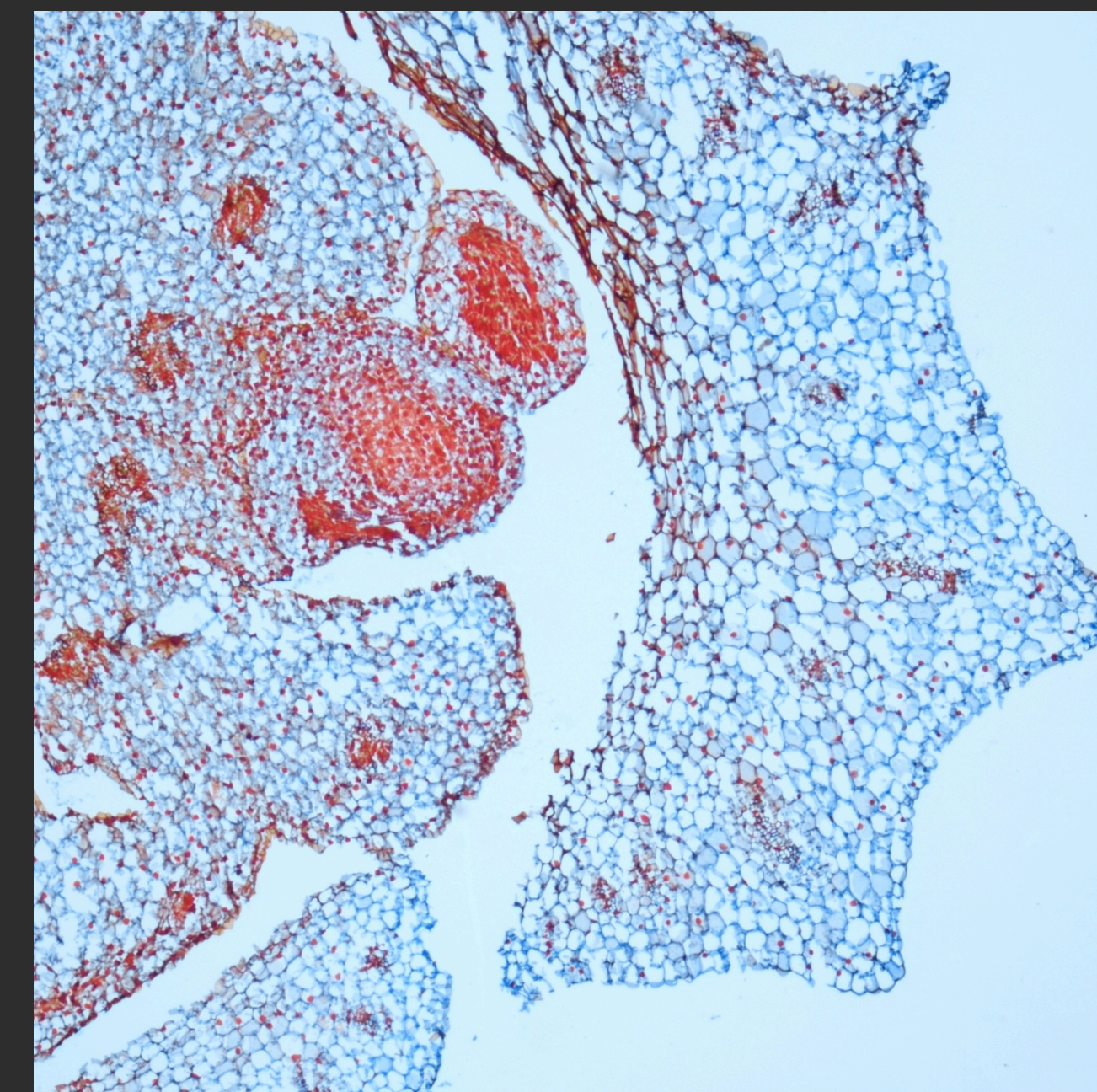
Results:



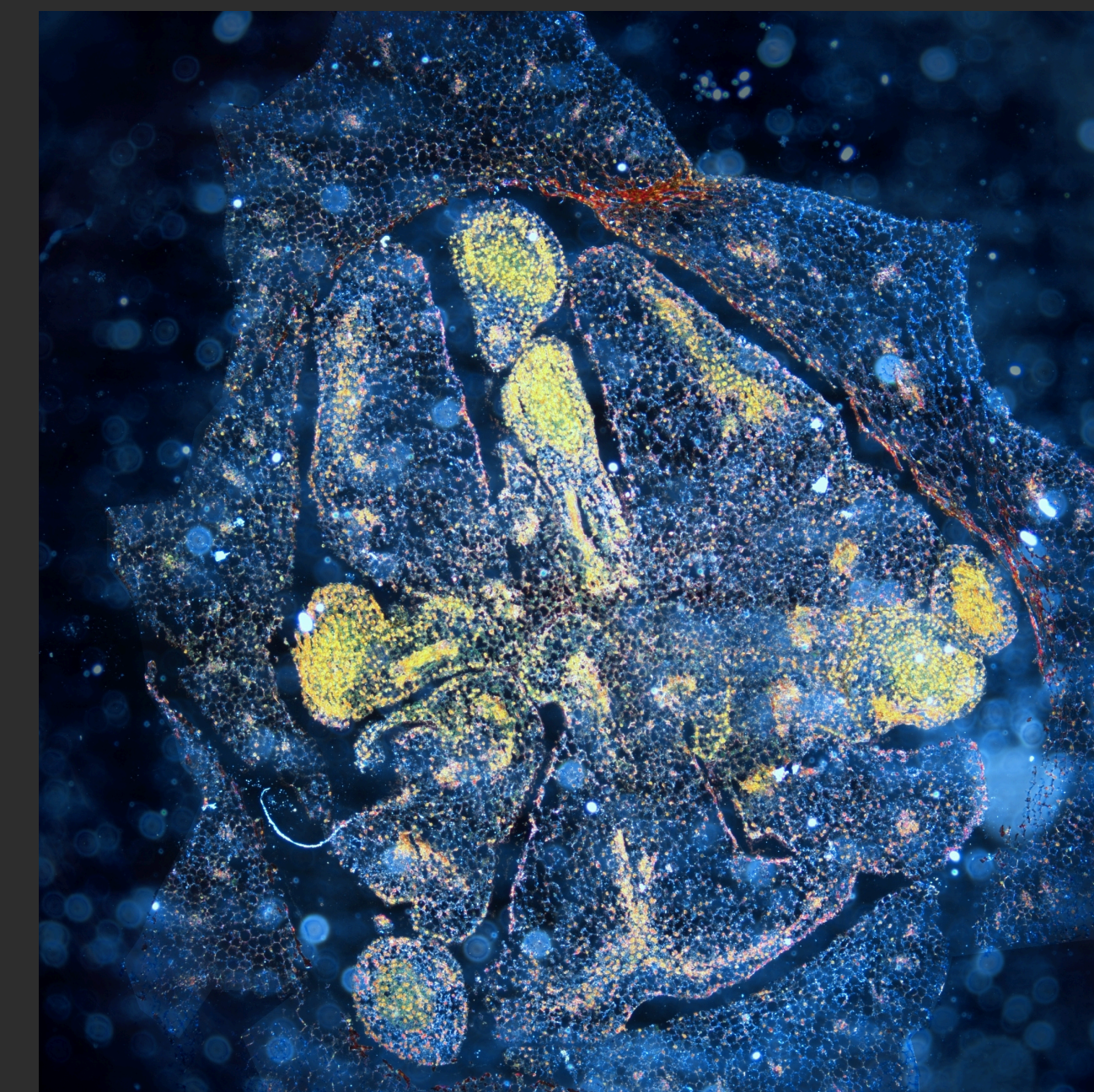
Desmids *Cosmarium*, *Netrium*, and *Staurastrum*, 10x, darkfield



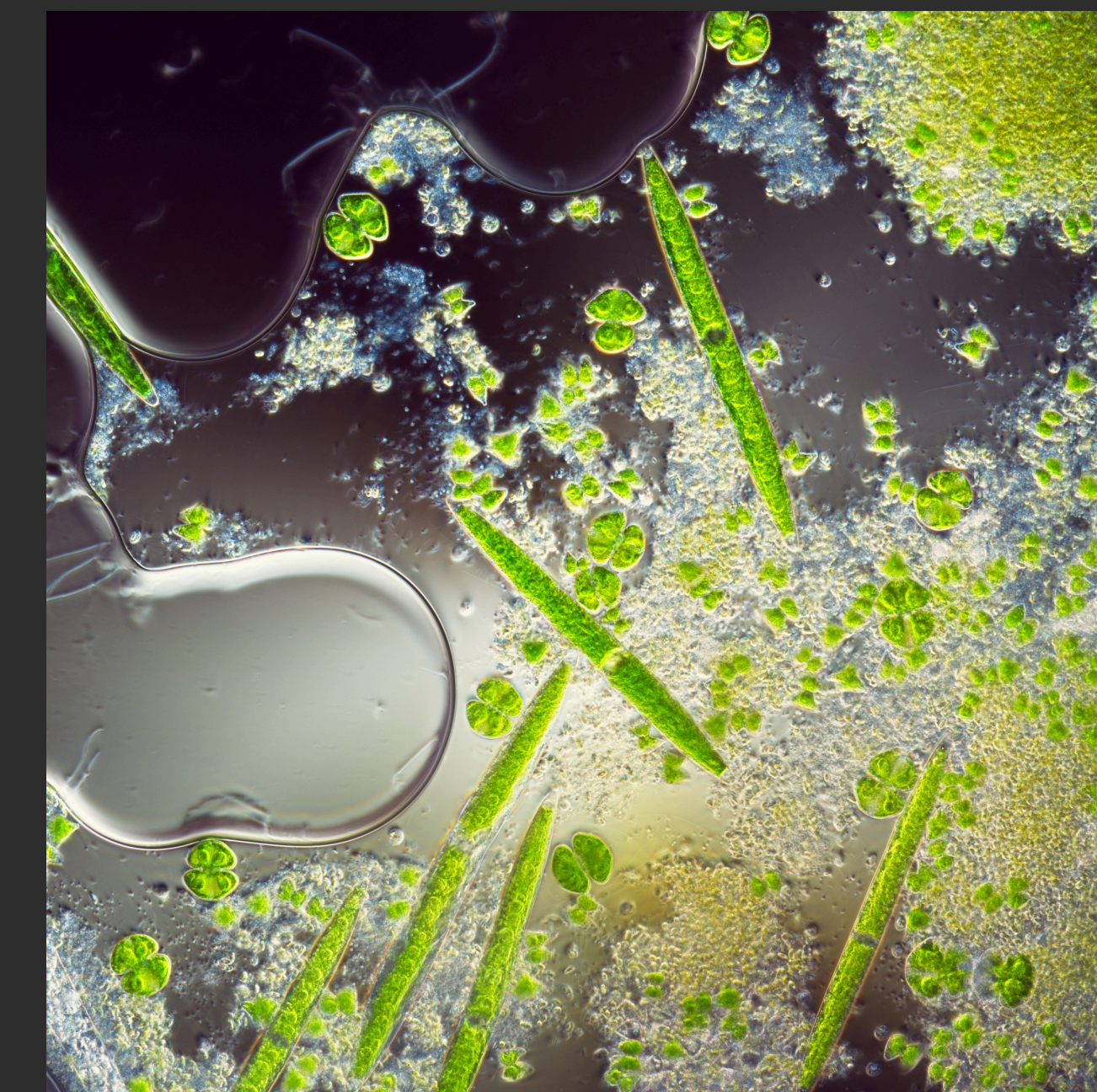
Desmids *Cosmarium*, *Netrium*, and *Staurastrum*, 10x, darkfield



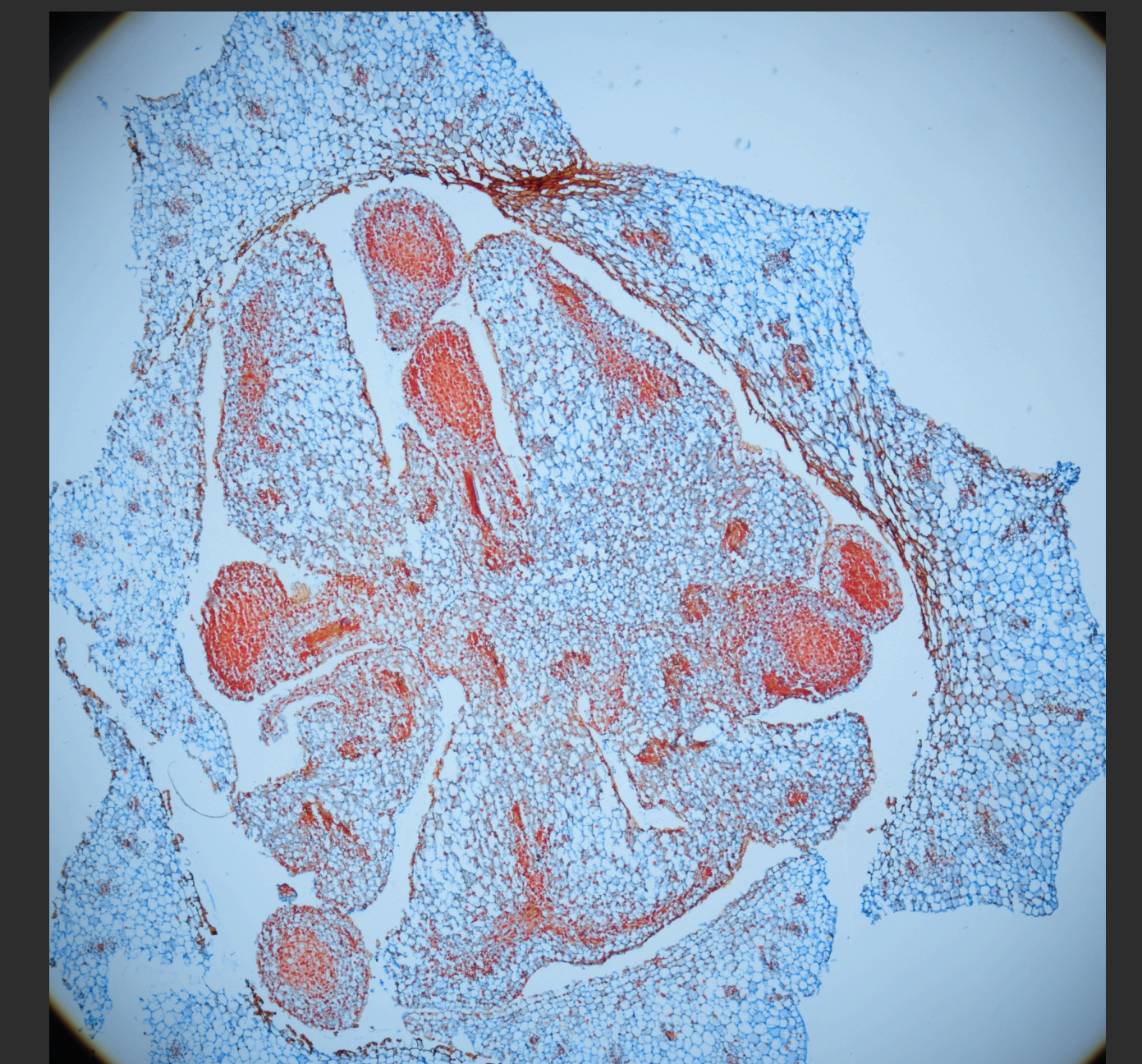
Alstroemeria bud, 10x, brightfield



Alstroemeria bud, 4x, darkfield



Desmids *Cosmarium*, *Netrium*, and *Staurastrum*, 20x, taken while switching from brightfield to darkfield



Alstroemeria bud, 4x, brightfield

Introduction:

- Bioart is the intersection of art and biology. Some examples include Alexander Fleming's bacterial "paintings" (Yetisan et al., 2015) and microscopic designs using cancer cells (Deb et al., 2022).
- Bioart can aid in better engagement and communication within the biological sciences, as well as draw attention to ethical and political issues related to the science (Yetisan et al., 2015).
- The two specimens of focus in this project are desmids and lily flower buds, both of which play important roles in the environment and have distinctive symmetry.
- Through microscopic photography, this project aims to increase awareness and appreciation of the microscopic natural world, and ultimately promote its research and preservation.

Methods:

- A mixture of desmids from the following three genera was used: *Cosmarium*, *Netrium*, and *Staurastrum*.
- The flower buds pictured were of the genus *Alstroemeria*.
- Microscope: Nikon Ni-U
- Editing software: DaVinci Resolve
- Light microscopy techniques: brightfield, darkfield, and differential interference contrast (DIC)

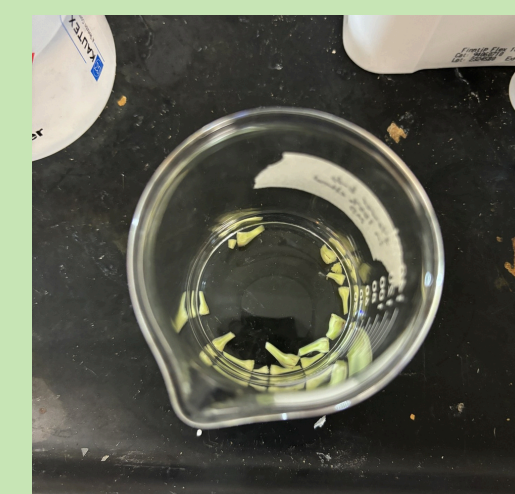
Alstroemeria Cross Sectioning:



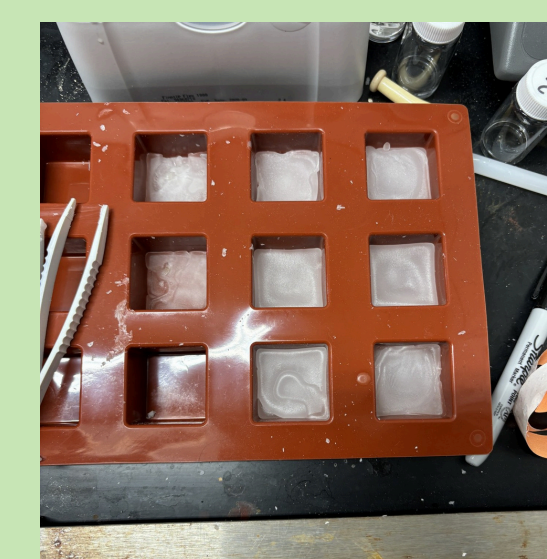
1. Selection of buds



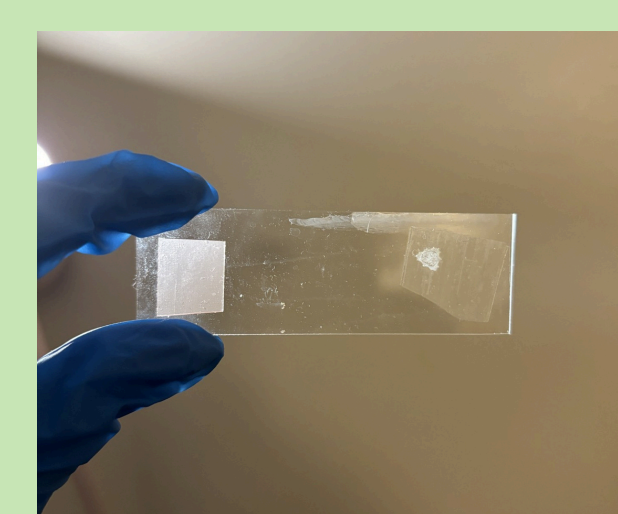
2. Fixation, dehydration, clearing, and paraffin infiltration



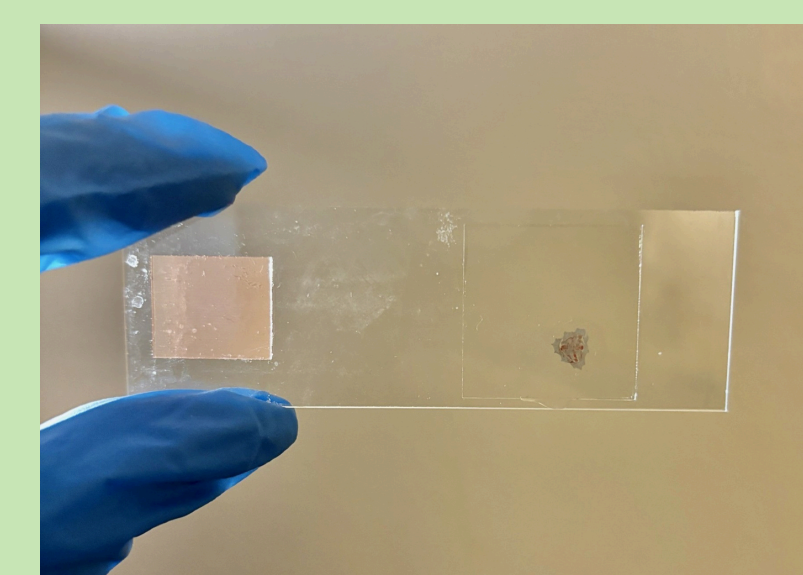
3. Paraffin embedding



4. Sectioning to 12 μm



5. Deparaffinization and rehydration



6. Staining with Safranin O and Alcian blue, dehydration, and mounting

Environmental Implications:

- Desmids, a unicellular algae of the order Desmidiales, have a wide variety of symmetrical shapes.
- Desmids are often used as an indicator of water quality in wetlands such as the Everglades (Rosen et al., 2019).
- To promote appreciation of desmids' unique shapes is to promote appreciation of their biodiversity, and appreciation of their biodiversity is key to the preservation of the wetlands in which they thrive.
- Flowers are more widely known example of the relationship between aesthetics and biology.
- By capturing the inner shapes of a flower bud a more direct connection is made between flowers' aesthetics and their biological purpose: reproduction.
- Bioart as a form of communication is in some ways limited, as the scientific significance behind the photos taken is not directly expressed through the photos themselves.
- Ultimately, the research and preservation of the natural world must begin with an appreciation of it. By imaging microscopic natural beauty that is invisible to many, this project aims to promote this appreciation.

References:

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