A decorative border of various tropical leaves in red, green, and yellow surrounds the central text. The leaves include monstera-like leaves with holes, palm fronds, and other broad-leafed plants.

Volvocine Algae: Chlamydomonas & Volvox


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Chlamydomonas
reinhardtii



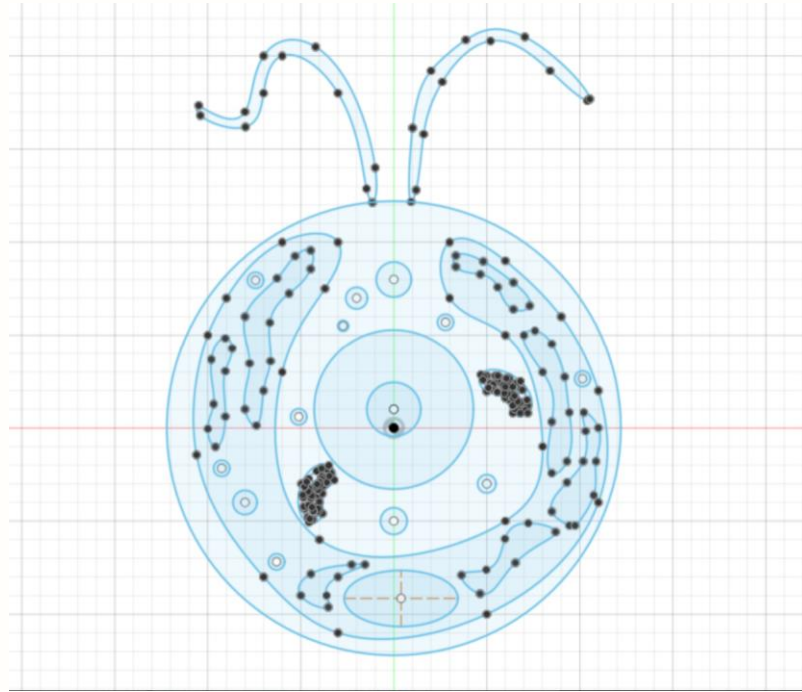
Why *C. reinhardtii*?

- *C. reinhardtii* is a unicellular, isogamous green algae that swims with two flagella
- Volvox is multicellular
- Both species are studied in the James Umen lab to understand transition to and evolution of multicellularity
- Model organism to understand processes like photosynthesis, light perception, and the development and structure of cilia
- Wanted to pick a plant not easily seen in real life
 - Importance of 3D models
- Originally wanted to make a somatic cell close-up of the Volvox, but mistook it for the Chlamydomonas
 - 2 models



Chlamydomonas reinhardtii
Photo credit: NASA

Sketch



2D representation of the cell -
initial drawing



3D Models



Flatter model



Rounder, with a sphere on the
bottom



Colored 3D Model



Colored version of the flatter model,
coloring courtesy of Nate Ly



Reflections

Takeaways

- Created a model of the wrong plant — but now I know the difference!
- Learned ways to make the organelles pop out despite the flatter nature of the model
- Managed to learn Fusion 360 in 3 weeks

Challenges/Improvements

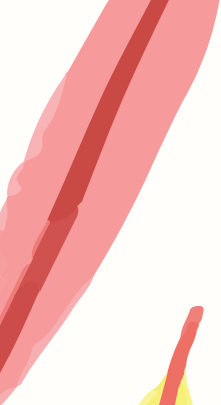
- Would like to create a fully 3D model if given more time
- Not made to scale





2

Volvox carteri



Why *V. carteri*?

- Chosen species: *Volvox carteri*
- Wanted to pick a plant that would not be easily seen in real life so that the 3D models would provide a better visual understanding of the plants
- Wanted to learn more about the scientific significance of algae
- Originally, we chose the Volvox because it looked very cool, and we mistakenly started a model of the Chlamydomonas thinking it was a somatic cell of the Volvox
- We ended up making 2 models



Chlamydomonas reinhardtii
Photo credit: NASA

Our Basis of Model

Volvox

- Structure:
 - Individual cells form colonies (level of organization= multicellular) up to 50,000 cells!!!!- cannot live alone
 - Eyespots that allow them to swim near light
 - Flagellates –locomotion
- Similar to Euglena

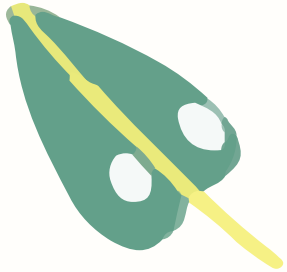
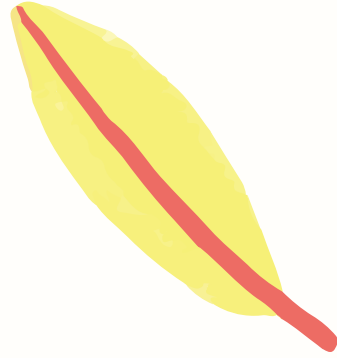
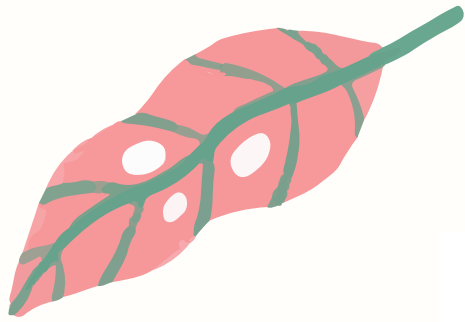
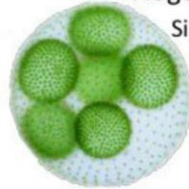
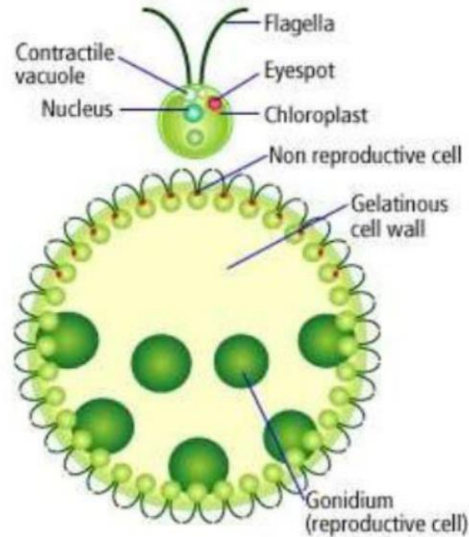
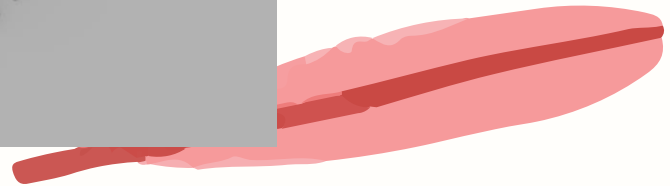
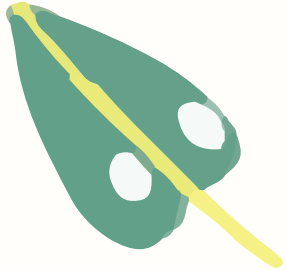
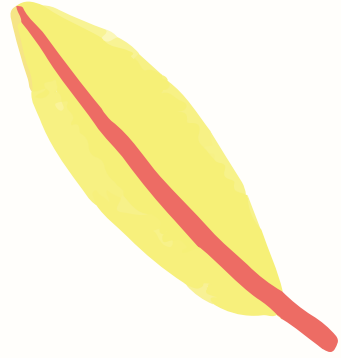
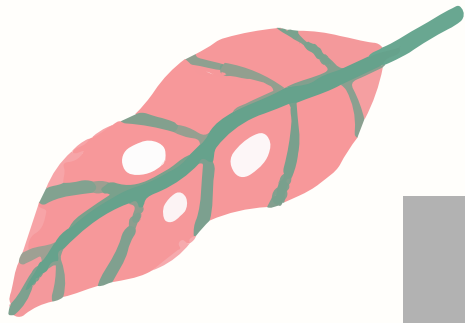
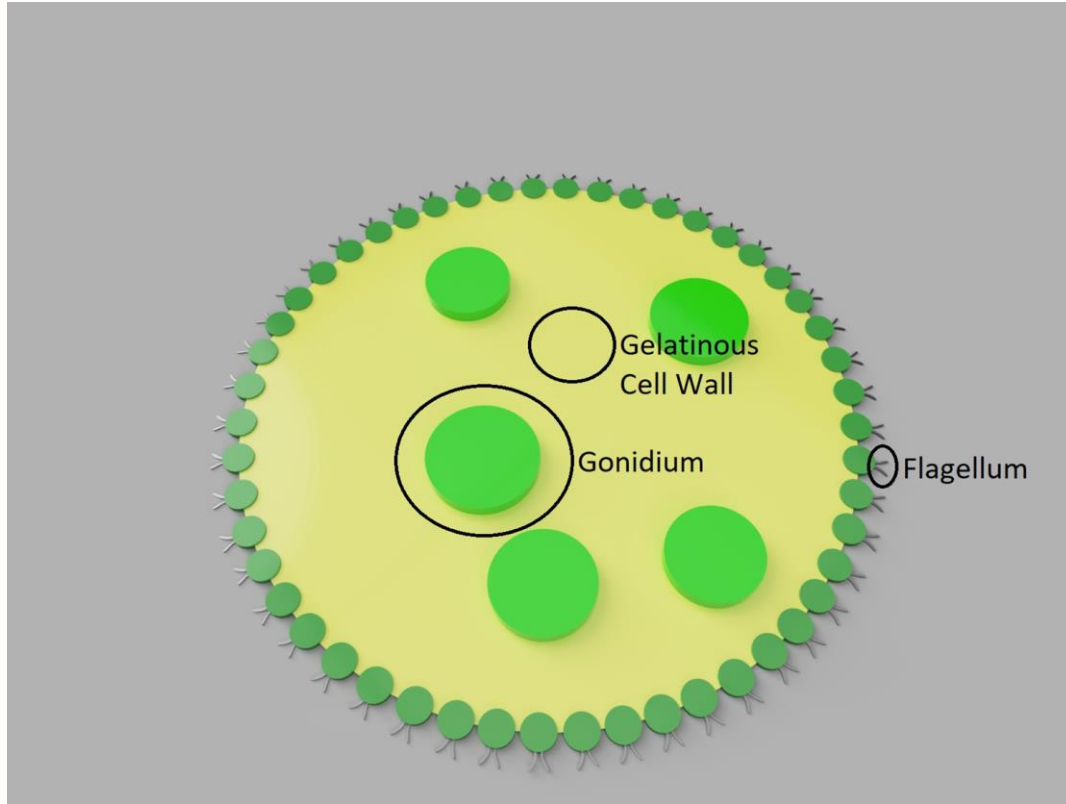
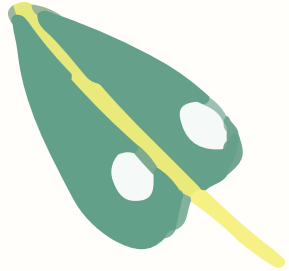
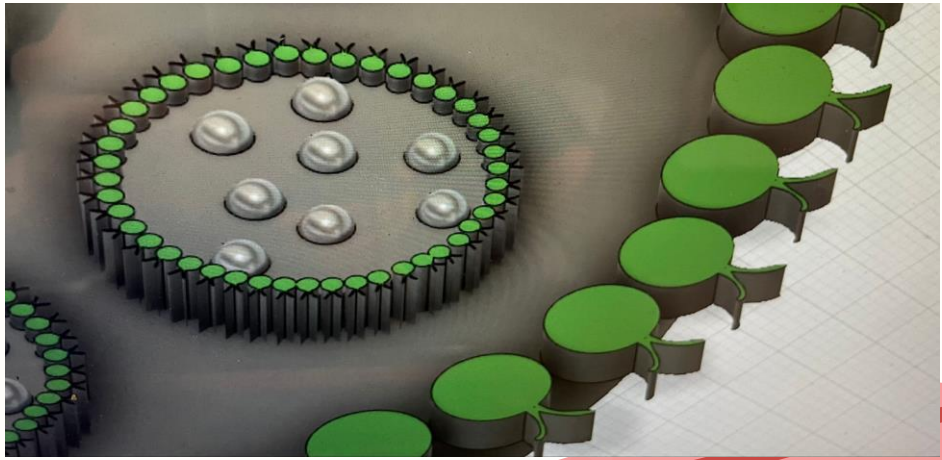
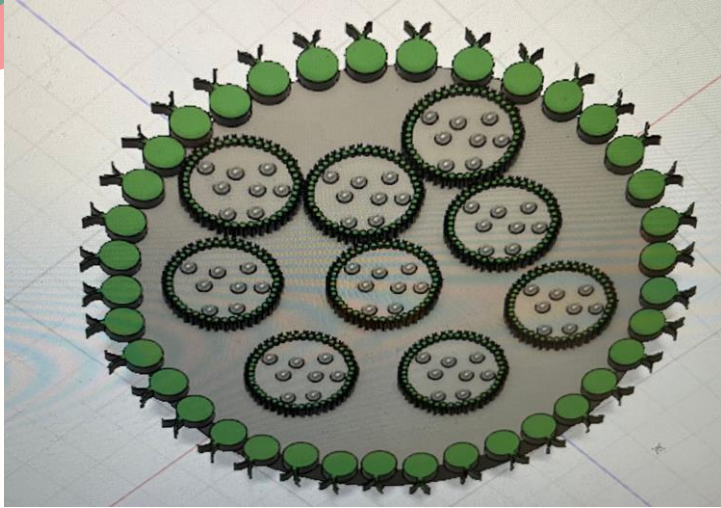
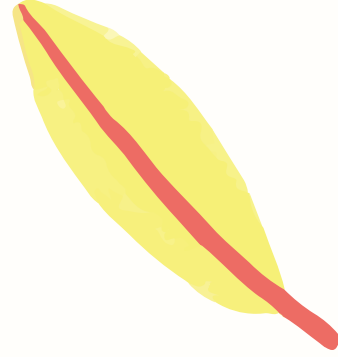
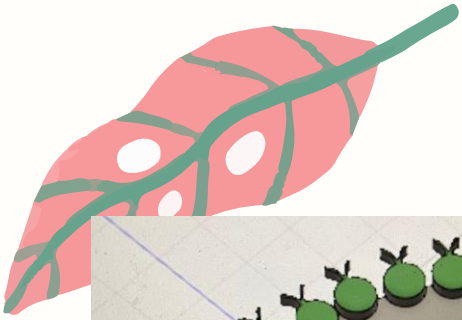


Diagram Model



Final Model



Reflections

- Inexperienced group made a full model
- Studying each component closely allowed us to understand the structure and function of Volvox more deeply
- It was difficult to portray the spheroid shape of Volvox while also showcasing the different cellular components
- There were scientific inaccuracies regarding the number of somatic cells in the models
- Teamwork with different timezones

