

EE 491: Senior Design

sddec23-05

DNA Data Storage

Jan. 2023 – Dec. 2023

Client: Professor Meng Lu

Faculty Advisor: Professor Meng Lu

Team Members:

Colin Frank - Software, 3D printing code, Microsoft's IDE

Evan Walters – Software, 3D printing code, Microsoft's IDE

Caden Wortman - Hardware

Astha Upadhyay – Hardware, 3D printer chassis, etc.

Anna Hackbarth – Flow Control, hardware

Roles will rotate every few weeks to provide everyone with a chance to work in a certain area. Ideally, we've discussed a desire that everything is a team effort, and we work on every step together.

Past Week Achievements:

We will again be filling out our achievements section as a team as this week didn't perform functions in our individual roles, but rather completed tasks as a group. We've had several team meetings and several meetings with our advisor and client, Professor Meng Lu. In our team meetings, we've been completing the necessary safety training required for the space we are working. We needed to complete both general lab safety and fire prevention safety since we are working in a room with both chemicals and electrical equipment – two common causes of fires and accelerants. We've also requested key access so we can utilize the lab where we will be working on the project.

Our meetings with Professor Meng Lu have proved to be incredibly helpful again. As our advisor, he's continually giving us valuable reading resources and encouraging outside research. Our next development steps saw us complete self-evaluations and a catalogue of each team members' individual working style. We were asked to reflect on the distribution, similarities and differences, between team members. We were then tasked with uploading everything to the same online collaborative tool called 'Figma' that we have used before in class.

Lastly, engineers' struggle with empathy, so our final task this week in class was to evaluate one individual in the project's field: our advisor, client, a professor, outside entity, etc. We chose to evaluate Pedro Espina from MIST. We needed to ask ourselves what his frustrations might be? What might be the positives of their job? What does the media tell them and others about this field? How do they feel? We essentially needed to connect with Pedro, by putting ourselves into his shoes.

Link to view our collaborative board:

<https://www.figma.com/file/ncGp9lWcXC1VeU5cEByXY7/Discover-%7C-Empathize-%7C-Research-%5BTeam-05%5D?node-id=0%3A1&t=Av8k6PljKQ6nllkS-1>

We also worked as a team to form a contract about expectations, work division, behavior, and other important clarifications that needed to be made before we got too deep into the project. Establishing these clear boundaries now prevents headaches in the future.

Pending Issues or Concerns:

Our concerns that we've discussed with our advisor and as a team includes the following:

- The difficulty of the coding aspect being all EE students
- Project requires more research since we need more biology training and background information
- Which language are we using? C++ or C#?

Individual Contributions

Name	Contribution	Weekly Hours	Hours-to-Date
Caden Wortman	<ul style="list-style-type: none">• Provided synopsis and notes from additional resources and readings	1	2
Evan Walters	<ul style="list-style-type: none">• Scheduled advisor meeting• Learning C++/C#	1.5	2
Collin Frank	<ul style="list-style-type: none">• Spoke with advisor one-on-one• Reviewed prior team's reports	1.25	2
Astha Upadhyay	<ul style="list-style-type: none">• Researched hardware components• Looked into Fusion 360	1.25	2
Anna Hackbarth	<ul style="list-style-type: none">• Wrote Report 3• Took meeting notes	1	2

Next Steps:

As a team and with our advisor's input, we've decided on the next steps:

- Setup regular separate meeting times to meet in the lab and dissect the 3D printer and process
 - Run a test to see the state of the code
- Interview additional resources like Mr. Kevin Callavin from the ISU DNA Facility
- Begin editing and reviewing 3D printing code
- Design something in Fusion 360, run a test print

Conclusion:

This concludes our Week 3 report, we've done a great deal of team research outside of the resources provided to us by our client/advisor. We're genuinely thrilled to be working on the project when we finally get our keys. Everyone is excited about the endless possibilities and skills we're going to learn with this new challenge.