

EE/CprE/SE 491 WEEKLY REPORT 2
February 7, 2022 – February 13, 2022

Group number: 12

Project title: *Creating DNA from scratch for DNA-based data storage*

Client &/Advisor: *Iowa State University / Meng Lu*

Team Members/Role: *Connor Larson/Software Engineer , Kyle Riggs/Software Engineer , Brandon Stark/Electrical Engineer , Nathan Armstrong/Electrical Engineer , & Lucas Heimer/Electrical Engineer*

○ **Weekly Summary**

At our meeting Dr. Lu laid out a monthly schedule leading all the way through next fall. We discussed what needs to be done to the LCD screen for the upcoming months. We also got access to the 3D printer and a locker to store it within the senior design lab. We continued to do more research on DNA synthesis technology.

○ **Past week accomplishments**

- Team Member 1 (Connor): Worked on researching the 3d printer. I learned about a chituser system tool that potentially will allow us to modify the user interface for the printer. I also continued to do research on biology. I gained more knowledge in the process of gene synthesis. I also learned the steps that go about printing data. At this point many of the aspects of the project are coming full circle and will be able to get working on the printer within the next few weeks.
- Team Member 2 (Kyle): This week we did more research into DNA synthesis and many other aspects of biology that will help in our understanding of the project. Everything is very interesting, but complicated so I took a while watching videos and reading. Also, researched ways that we can connect to and possibly modify the 3D printer for our purposes.
- Team Member 3 (Brandon): I retrieved the 3D printer and got us a locker in the senior design room to store it in. I also did some more research on the model of our 3D printer to find out whether or not we can physically plug it into a computer (Anycubic Photon Mono).
- Team Member 4 (Nathan): Researched more about DNA synthesis and the specs of the LCD screen we will be working with. Also spent time looking over all the material given to us by Dr. Lu, especially the overview plan for the project he shared with us.
- Team Member 5 (Lucas): Worked on researching the application of the LCD screen to our project. Browsed available datasheets for these components to find out more information about components and their versatility. Reviewed project plan determined by advisor.

○ **Pending issues**

- Team Member 1 (Connor): I still need to figure out exactly how we will connect and control the printer, which I need access to the printer to do this. (We just got access to the printer today)
- Team Member 2 (Kyle): No complications this week.
- Team Member 3 (Brandon): N/A
- Team Member 4 (Nathan): No complications.
- Team Member 5 (Lucas): Needs to become familiar with the current hardware which will be resolved now that the workspace and hardware will be available.

○ **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u> <i>(Quick list of contributions. This should be short.)</i>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Member 1 (Connor)	Research software/UI for LCD. Research steps to print DNA and learned about gene synthesis.	6	12
Member 2 (Kyle)	Researched DNA synthesis and possible ways that we can modify our 3D printer we just got access too	6	12
Member 3 (Brandon)	Researched DNA synthesis technology, stored the printer in a safe locker, and downloaded Slicer software	6	12
Member 4 (Nathan)	Research on alternative methods for LCD display. Research about DNA molecule formation using light	6	12
Member 5 (Lucas)	Research on the potential options for LCD screens Research on how the emitted light initiates the bonding reaction between oligomers	6	12

○ **Comments and extended discussion**

N/A

○ **Plans for the upcoming week**

- Team Member 1 (Connor): For the upcoming week I plan to spend time in the lab with the printer to understand how it works and get a connection with the printer to my computer. Depending on how hard this is, I would also like to figure out how to code the new UI for the printer and potentially start that in the Git repository.
- Team Member 2 (Kyle): Working hands on with the 3D printer and learning as much about it as I can. Will try to connect to the printer from my computer through USB and figure out the ways we can modify the printer with our code.
- Team Member 3 (Brandon): To work with the 3D printer in the lab and its modeling software (Slicer). The LCD screen is the most important aspect of this upcoming week. As Lucas said, we need to determine if we will be able to use the LCD screen provided in the printer, or replace it with one that we can code/work with.
- Team Member 4 (Nathan): Familiarizing myself with the specs of the 3D printer as well as the hardware. The first main task is to see if the LCD screen that is on it will work for our project.
- Team Member 5 (Lucas): Will be working on getting familiar with the hardware of the 3D printer, specifically the LCD screen now that the workspace is available. Research will be conducted to determine if the current LCD will work or if an alternative will be required.

○ **Summary of weekly advisor meeting**

In our meeting this week with Professor Lu we focused specifically on the goals for the modifications we will be making on the 3D printer he has obtained for this project. We discussed the potential for programming the LCD screen the printer uses or finding an alternative LCD which is programmable. We also determined we needed to investigate whether or not our printer can connect to a computer via USB cable. The goal for programming the LCD will be to project an image on the microarray which will regulate the bonding of the oligomers flowing through the system. This will be a repetitive process for each layer of the oligomers. Professor Lu also provided us with a month by month project plan he created which is shown below.

