EE/CprE/SE 491 WEEKLY REPORT #7
March 20, 2022 – March 27, 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**

Throughout this week Kyle started working on the main software component of the project. This software displays a matrix that the user can simply modify in order to fit the microarray to their liking. We received a new LCD screen since the last one broke. We also received a power meter in order to test and measure the power output of the UV light.

- ○ **Past week accomplishments**

• Team Member 1 (Connor): Worked on starting an extremely simple application that just displayed a matrix. This matrix will be the base/starting point for our code. This will allow us to have a certain number of boxes within the matrix to allow us to print a certain number of nucleotide.

• Team Member 2 (Kyle): This week I set up our software application that will be the main software component of the project. We decided to use a WPF framework application that uses C# for the backend functionality and XAML for the GUI. After setting it up, I created a simple window that displays a white matrix on a black background as this is the basis for what our project will look like and what we will base the rest of our code on.

• Team Member 3 (Brandon): This week I was in Chicago for an interview on Monday and Tuesday. When I returned I also took the new LCD screen from Meng and began testing it with the UV light to verify it worked since the last one broke.

• Team Member 4 (Nathan): Tested the new LCD screen we received after the first one broke last week. Also began planning for a new printer/mount for the LCD if we need to make a new one since the older printer is relatively not needed.

• Team Member 5 (Lucas): Worked on gaining access to the lab where the microfluidic system will be assembled. Also researched and began brainstorming the design for the flow cell. Completed some testing on the new LCD screen to verify its functionality with the UV light.

o **Pending issues**

- Team Member 1 (Connor): A current pending issue is figuring out how to do live alterations to the matrix and get it to continuously render. Also need to see if there's a way to have the output window automatically full screen to the desired monitor.

- Team Member 2 (Kyle): Thankfully there were no complications on my end while setting up the application. Working with WPF in Visual Studio is pretty intuitive once you get the complicated initial set up done.
- Team Member 3 (Brandon): When connected to the new LCD via HDMI, it displays the connected computer screen incorrectly. I am looking into how to change the resolution to fit the screen correctly.
- Team Member 4 (Nathan): The new LCD screen has a reflective backing that may cause problems when the UV light turns on. We might have to remove it if the light power is not strong enough.
- Team Member 5 (Lucas): There will be some further research required to determine the materials and dimensions of the flow cell. There are not a lot of devices which use this component in the same way we are intending to use it.

o **Individual contributions**

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Member 1 (Connor)	Set up project and created a basic Matrix to be displayed on our LCD screen.	6	42
Member 2 (Kyle)	Set up WPF project. Coded a simple graphical window which is the base of our UI going forward	6	42
Member 3 (Brandon)	Tested new LCD screen with UV light. Researched how to change and modify LCD screen resolution.	6	42
Member 4 (Nathan)	Tested the new LCD screen with the UV light of the printer. Measured the power output of the UV light	6	42
Member 5 (Lucas)	Assisted in testing of the LCD screen. Went through training to gain access to the lab so the microfluidic system can be assembled	6	42

- **Plans for the upcoming week**

    • Team Member 1 (Connor): Plan to continue working on the code. Want to add in features such as user inputs for the amount of rows/columns in the matrix to be displayed. Also want to be able to choose certain cells and make them buffer between black/white.

    • Team Member 2 (Kyle): I plan on just doing some more coding and adding more features to the software we have. We want to accept user input to determine the size of the matrix, also have each cell in the matrix be surrounded with black like the background, and maybe an ability to individually change the color of each square in the matrix.

    • Team Member 3 (Brandon): Next week I will work with Nathan in order to get the LCD screen to display correctly. We might even set up our own rig since we really don't need all of the parts of the 3D printer anymore.

    • Team Member 4 (Nathan): Working more on the new LCD screen and any modifications we might have to do with said screen. Also helping Lucas with any work he might have regarding the flow cell, microfluidic system, and the software we will be using.

    • Team Member 5 (Lucas): Will be working on getting familiar with the Fluigent software and components. Also will begin assembling the microfluidic system. Also will try to get an initial draft of the flow cell's design completed.

- **Summary of weekly advisor meeting**

    In our meeting with Meng we discussed what we needed to do on the hardware and software side of the project in order to move forward. On the software side, Meng suggested that Kyle should make the rest of the background black rather than just the outline of the boxes in the microarray. As for the hardware side, we received a power meter in order to measure the output of the UV light. We also were told that we can make our own setup/housing since we really don't need the rest of the 3D printer.