

EE/CprE/SE 492 STATUS REPORT 01
End of 491 – 1/30/25

number: sdmay25-17

Project title: Microbial Pill Sensor

Client &/Advisor: Dr. Meng Lu

Team Members/Role:

Roles still subject to change as we transition from research to design phase.

- **Wes Ryley:** Data Transmission Design Lead
- **Rakesh Penmetsa:** Bacteria Housing Design Lead
- **Alex Upah:** Biosensor Design Lead
- **Cade Kuennen:** PCB Design Lead

Weekly Summary

Since the duration of the report was predominantly over the Winter Break, not much progress was made on the project. Reviews of previous achievements were made and the group made notes of areas of improvement.

Past week accomplishments

Cade Kuennen:

- Looked into and thought about the necessity of a matching network and what that would mean for us when it comes to workload:
 - In order for the PCB antenna to work, we will need to build a matching network at a frequency of 2.5GHz which could prove difficult
 - Would need to build and test the circuit on its own as well as utilize the Network Analyzer in the RF Lab (could talk to Neihart about this if necessary).

Alex Upah:

- Reviewed current device implementation and next steps in the development of device.
- Started review of code for GUI to build base from which to help Wes in upcoming weeks.
- Reviewed available components purchased at end of last semester.

Wes Ryley:

- Verified GUI functionality over the break.

Rakesh Penmetsa:

- Worked on the design in Fusion 360. Learnt few techniques to improve design

Pending issues

Cade Kuennen:

- Ask Dr. Lu what he thinks about the matching network situation for the Antenna portion of the design.

Alex Upah:

- Need to continue review of optical components purchased by Dr. Lu.
- Work with Rakesh to ensure housing component is modified to fit optical components.

Wes Ryley:

- Determine a way to improve the GUI menu and options for user customization.

Rakesh Penmetsa:

- Need to review few more techniques to make the design airtight at the joints

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> |
|--------------------|--|-------------------------------|--------------------------------|
| Cade Kuennen | Reviewed my tasks and portions of the project. Contributed to group work assignments and helped everyone get back up to speed. Started looking into what it will take to implement matching network for antenna portion of project | 4 | 4 |
| Alex Upah | Reviewed and refreshed project progress and ongoing tasks. Contributed to group assignment of immediate tasks. Specifically reviewed available component options for implementation in PCB design. Contribution to weekly assignments. | 4 | 4 |
| Wes Ryley | Over the break I reviewed the GUI functionality to verify the consistency. | 4 | 4 |
| Rakesh Penmetsa | Reviewed the project. And started to | 4 | 4 |

Plans for the upcoming week

Team:

- Review the finalized designs for the Housing and PCB boards in order for them to be created.
- Create stable and consistent testing with the prototype
 - Incorporate lensing depending on when the lens arrives

Cade Kuennen:

- Look more into what we need to do to ensure the system works with the antenna
- Add solder footprint for antenna connector to the PCB design depending on discussion with Dr. Lu about matching network

Alex Upah:

- Explore technical details of the lensing and optical options ordered by faculty advisor Dr. Lu.
- Plan to assist Cade in finalizing PCB design.
- Plan to continue review of current GUI implementation to enable helping Wes on further development.

Wes Ryley:

- Look into exploring the possibility of Google Co-lab for future GPS functions.
- Determine a way to report data back into an Excel spreadsheet.

Rakesh Penmetsa:

- To design a Frame to hold lens over sensor on the ESP 32C.

Summary of weekly advisor meeting

- Need to add antenna to the PCB design and quick review before sending off to be made.
- CNC model for the new housing, faster and would be better for our project. Send to ETG for Lee to complete model and create.
- GUI provides ability to control PCB.
 - Add time for working duration, user can control how long
 - Report data back into Excel
 - Possible GPS function for project (Google Colab)
 - ♣ Put GPS on google map
- Use new parts on the Prototype and begin testing
 - Matching network for the antenna – may or may not be able to do this
 - Backup plan is to use USB cable for further development or increase pill size to use ESP32C3

Research

Not applicable for this week, however more data and sources will be available in future weeks.