

# CprE/EE/SE 491-- sddec20-23

Underwater Algae Bloom detection

Semester 2 week 4

9/26-10/10

Client: Santosh Pandey

Faculty Advisor: Santosh Pandey

## Team:

Anastasia Golter -Housing Team

Nicholas Stasi - Sensor Team

Emily Kinne - Sensor Team

Zachary DeMaris - Housing Team

Jack Seiter - Communication Team

Andrew Koenen - Sensor Team

## Overall Summary:

This last two weeks the team has been continuing to work on implementation of the device. This includes testing shrink wrap for the housing, fixing issues with the PCB sensor board designs, and working to complete cellular communication testing. More information about each of these tasks will be discussed below.

## Individual Contributions:

These are the descriptions for individual contributions for the two weeks of this reporting period:

9/26-10/10

**Anastasia Golter:** Over the last two weeks I have been working on various forms of waterproofing for the PCBs. I have tried different types of plastics with varying thickness and flexibility. I have also tried different forms of sealing the plastic including, a lighter, curling iron, heat gun and hot iron. I have been working with Zach and I believe we have found a reliable way to seal the PCBs with a thick flexible plastic covering and a heat gun.

Bi-weekly total: 8 hours

**Nicholas Stasi:** In the last two weeks I've been working with Andrew and Emily on some issues with our boards. Our boards are functioning properly when we set them up with 2 boards on the same i2C bus, but since our sensors only come with 2 possible addresses, we have to find a workaround for adding the third sensor board. The workaround we are trying is to power the 3rd board using a separate GPIO pin from the Pi and selectively turning it on and off. The issue is that if we have one board powered and one off, there seems to be power leaking through the i2c bus from the board that is supposed to be on to the one that is supposed to be off. We think we can fix this issue with using an analog multiplexer and connecting all data lines to that so we ordered some multiplexers to try out.

Bi-weekly total: 4 hours

**Emily Kinne:** I tested some waterproofing techniques with Chloe and we decided heavier plastic sealed with heat would be the best option. I also worked with Andy and Nick and discovered there is a power leak on our PCB boards that will not allow us to control each board with the 3.3V pin. This has been challenging because our sensors only have 2 slave addresses, so we decided to test our design with an i2C multiplexor so each board can have separate SDA lines. We plan to test this in the next week.

Bi-weekly total: 10 hours

**Zachary DeMaris:** These last two weeks I have driven to Ames from Cedar Rapids twice to work on housing and code for the sensors. The first week I worked with Chloe to test some of the different waterproofing ideas for the sensor. The second week I cleaned up some of the sensor code and made it more modular so it can be easily called by the software that will be interacting with the cellular board. I tested 9 different GPIO pins separately to ensure each one would read data from the sensor board. I was not able to test multiple sensors at once due to the issue that Andy described in his status update.

Bi-weekly total: 14 hours

**Jack Seiter:** These two weeks I've been communicating with other team members on what still needs to go into the project, as well as how we need to run the code on the sensor platform. I've also brushed up some of the report sending/collection code works and have started adding the ability to collect data from sensors using it.

Bi-weekly total: 6 hours

**Andrew Koenen:** These last two weeks I have been working with Emily and Nick to figure out some technical issues with the boards. We have been testing the boards in different layouts and trying to figure out some issues with power leaking through the resistors due to a non-regular setup. I have been researching hardware and software fixes for this and been asking for outside assistance.

Bi-weekly total: 11 hours

## Pending Issues:

As for the sensor boards we still need to get the multiplexers in and make sure that the idea we have to fix some power issues will work. This will result in some extra testing for Andy, Emily, and Nick

## Plans:

Chloe and Zach plan to continue testing waterproofing techniques and start construction on the legs of the device

Andrew, Emily, and Nick plan to figure out the issue with the sensor boards and have them complete and ready to integrate into the housing for some underwater testing

Jack plans to continue working on the cellular project and help to integrate it with the sensor team.