

EE / CprE / SE 491

**Project title: Small-Form-Factor Solar-Powered Self-Sustainable IoT Sensors with
Long-Range Wireless Communication**

November 3 - November 17

Group number: 7

Client &/Advisor: Dr. Cheng Huang and Dr. Meng Lu

Team Members and roles:

Calvin Condo - LoRa Module

Qin Xia - Sensors

Chuxin Chen - Arduino / Sensors

Lun Zhang - LoRa Wireless module/Arduino

Yuchen Zhao - LoRa Wireless module/Arduino

Luke Healy- Arduino/Sensors

Previous Week

In the previous week, we successfully tested our LoRa module on Arduino board, the receiver can receive the data sent by the transmitter. After that, we completed the general schematic for our PCB, which included all the sensors we needed.

Weekly Summary

Update on light sensor:

The light sensor has proved to be a tricky module in our project. After meeting with Dr. Huang and Dr. Lu, we realized that the project was a bit different than what we were imagining. Dr. Lu told us that the device will have to be much smaller than what we were expecting and therefore we began researching simple light diodes to make our own custom light sensor that could allow us to scale down. After sharing our ideas on a custom built light sensor, Dr. Huang insisted on using a simple light sensor that we could purchase off the market. We have ordered this light sensor and plan to test it with one of Dr. Lu's graduate students.

Updated schematic:

With all of the changes in our original design, we needed to come up with a new schematic design. This new design uses the Arduino microcontroller (Atmega328p) that can be detached from the Arduino Uno hardware for a smaller and power conservative design. Additionally, we added four of the light sensors that Dr. Huang recommended. These four light sensors will be connected to a separate board by a ribbon cable, because they need to do their readings separate from the rest of the device.

Begin planning for presentation:

With the final presentation for the Semester drawing closer, we have begun planning out our presentation. We have been following the template given for the presentation and reflecting on the work we've done so far this semester. We really want to show off our device's functionality so we are filming our device sending data wirelessly.

Design Document:

The design document is really important for our grade and for our understanding of our project, so we have been making revisions and adding more to our document.

Increasing Range for LoRa:

When we tested the range of the LoRa, distance in which communication could be transmitted was a little weak. We looked for ways to improve this using the datasheet and found two major ways: decrease baud rate (from 9600bps to 2400bps) and increase power. We made the software changes and plan to test it in the coming week.

Pending Issues:

LoRa communication range and light sensor specifications and requirement. We plan to test the new LoRa settings in the coming week. We have prepared two light sensors for testing and will see which one meets our requirements.

Team Contributions

Team Member	Contribution	Hours this Period
Calvin Condo	LoRa, schematic, and light sensor.	18
Chuxin Chen	Testing LoRa module and range	15

Qin Xia	Researching the component of light sensor	14
Yuchen Zhao	Researching the component of light sensor	14
Lun Zhang	Testing LoRa module	15
Luke Healy	Design Document, Testing, Meetings with Professors	14

Upcoming Week

In the upcoming week, we will hopefully receive the new light sensor modules and be able to code and test the sensors. We also wish to be able to test the light sensors in Dr. Lu's laboratory so that we can see if these specific modules will suffice in reading the bacteria's light emissions. We will complete the LoRa range test and keep the review presentations in the back of our minds.