**Mitchell Hwang**

**UROP Faculty Supervisor: Joe Steinmeyer**

**Term: Spring 2018**

**Location: 38-500**

**2/6/2018**

**Affordable Distributed Lab Environment Sensors 2018**

**Project Overview**

For the 2018 spring term, I will be working directly under Professor Steinmeyer in 38-500 for the development of an Affordable Distributed Lab Environment Sensors system (ADLES). The system will be built under the supervision of Professor Steinmeyer. The system seeks to save researchers who are running experiments where environmental factors can drastically alter data from spending weeks not realizing that the difference was due to a change in temperature for example. More often than not, environmental factors such as temperature, humidity, pressure, and relative gas levels are not taken into consideration when performing experiments in labs. As a result, experiments following the same procedures can end up with different data results. The high level architecture of the system will comprise of a main server communicating via Wi-Fi with several battery-powered modules comprised of an ESP32 SoC as well as the BME680 environmental sensor. These modules will frequently update the server with their local sensor readings which will then be integrated in a graphical user interface that researchers can monitor. Because affordability and low footprint are big concerns, custom made PCBs will be used for these modules. The ADLES system looks to expedite the experimental process and aid researchers in determining the causes for any fluctuations in data.

**Personal Role & Responsibilities**

I will be working under the discretion of Prof. Steinmeyer in 38-500. With his guidance and executive decisions, I will research the necessary components as well as bring out the entire end-to-end system. This includes looking into which chips and sensors would make the system fully functional, designing and minimizing the footprints, as well as creating the web interface through which the sensor data can be monitored.

**Goals***.*

Personally, I want to increase my experience with bringing out end-to-end systems as well as put my systems designing and engineering abilities accumulated over the years at MIT to the test. I also wish to experience working independently with guidance from an experienced professor, and I hope to broaden my own capabilities.

**Personal Statement**

I have taken interested in this UROP mainly because of its concept, because being able to cut down the time researchers spend debugging their experiments at a low cost can definitely provide a positive impact towards the research community. I hope to learn many skills from Professor Steinmeyer as well as improve my own design decision skills to be able to build better systems in the future.