

Phys CS 15C Project Proposal

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(There's been some confusion about the due date for this — this is being submitted in accordance with the syllabus's listed due date of March 19th)

Project Description

Our goal is to create a programmable system to maintain the humidity in a room at a user-selectable value. This will include building a humidifier, building a sensor array, writing code to control the system, and hooking it all together through a Raspberry Pi. We think this is interesting because it explores the process of controlling dynamic variables in a changing system, which we explored somewhat in CS15A during a PID controller lab. This involves many different areas of physics, from the electrical properties of the components used to humidify water, to the thermodynamics of water vaporization, to the fluid dynamics of dispersing the humidified water throughout the room.

Milestones (This is VERY tentative):

- Weeks 1-2: Research and finalize method of vaporization, finalize components list and place orders.
- Weeks 3-4: Work on wiring / powering humidifier setup, testing out vaporization, and controlling with raspberry pi. Simultaneously, getting the humidity sensors to talk to the Raspberry Pi and working on developing humidity sensing code.
- Weeks 5-6: Fine tune what was worked on previously, and get to a more finalized state for the humidifier and sensor array.
- Weeks 7-8: Write and test code to control humidity levels using sensors and humidifier. Refine and collect data.
- Weeks 9-10: Wrap up any loose ends, compile data, and write report.

Components List (Also very tentative, as we haven't finalized the mechanism of humidifying)

Component	Price	Price + Estimated Tax, Shipping	Supplier
Consumer Humidifier (To be salvaged for parts)	~40\$	~46\$	Amazon

Raspberry Pi Model B + Power supply	~42\$	~48\$	Adafruit
Adafruit AHT20 - Temperature & Humidity Sensor (x4)	~20\$ Total	~23\$ Total	Adafruit

Total comes out to ~\$117. We have a good bit of soldering supplies, circuit components, breadboards, etc. from CS 15a, which will undoubtedly be necessary. This leaves a good bit of (necessary) wiggle room for final component changes, as well as some hardware we may purchase later to hold the final setup together.