Syracuse University
College of Engineering
& Computer Science

TO: Dr. Cynthia Pope
FROM: Joseph Lodato
DATE: March 9, 2025
SUBJ: Addition of a Dedicated Electronics Lab at SU

Qualifications

I am a Computer Engineering Major with a Physics minor. I am the president and the Head of the Electronics Team for Citrus Racing, one of the RSOs registered under the College of Engineering & Computer Science. I also have experience working as a staff in the student machine shop in Link Hall.

Introduction

Computer, Electrical and Electronics engineering is a field that is growing by the day. As more of our world becomes digital, there becomes and increased demand for young workers who don't only know the textbook definition of electronics but rather have a true and deep understanding of how things work, as well as the tools needed to understand new and complex problems. This is of course known by Syracuse University has much of the Computer and Electrical Engineering (CE and EE) curriculum consists of hands-on labs where students build, design, and test circuits and code. While this is great, there exist few easily accessible ways for students to continue this tinkering and learning about electronics outside of these classes and labs. This proposal will introduce the idea of an Electronics Prototyping Lab space here at Syracuse University.

Current Situation

In many professional engineering careers, students are expected to use tools and machines. Getting hands on experience with these tools is vital as need in "Bridging the Industry–Academia Gap: An Experiential Learning for Engineering Students." [1], The author shows that there is often a gap between knowledge learned in class and what is expected in a professional career. They go on to show that getting hands on experience with these tools, software, etc. helps to bridge this gap between school and industry. Now going off of that, as mentioned, there are very few ways for EE and CE engineering students to tinker, learn, and build electronic projects outside of classes and labs. While Mechanical and related disciplines have the Student Machine Shop in Link Hall to learn and get trained about Mills, CNCs, Lathes and other machinery equipment that will be used to manufacture the parts they are learning to design, there is no equivalent for CE and EE students to do the same. While the SU Makerspace has some electronics equipment such as soldering stations, this is not deep enough for such a rapidly growing field. The same goes for the limited tools in the Center for Science and Technology, on

top of the lack of high-quality tools that will enable students to understand electronics on a deeper level, the desks and spaces in SciTech are always occupied as regular classes take place there. While I have already conducted a lot of research I will continue more as shown in the timeline and plan sections found below.

Project Plan

There are many parts of this proposal that I will have to consider, while some of them I already have answers for, others I will still need to research. Some of these considerations include: general student interest, what equipment this room will have, avenues for funding to purchase this equipment, a physical location for this room, etc. For example, I propose that the proposed Electronics Prototyping Lab goes in the Center for Science and Technology (the main building of both CE and EE students), in room 3-221. This room is currently not used (I have been in there), as it is a secondary storage room that is no longer used. On top of that the room will be large enough that multiple people can work in there together and it is in a perfect place since it is located in the same building most EE and CE labs and classes take place in. This room is also already only accessed by punching in a code to the door meaning the equipment would be protected.

While I already know the answer to some of the big questions I still have more I need to learn. I will be breaking down my research into the following steps (with dates being shown on the timeline section):

Step 1: Finish Primary research: This will involve Interviewing Tim Breen and reaching out to more people with my eSurvey. These will be my two primary sources. Tim Breen is the manager of the Students Machine Shop so his input will be very helpful for setting up the electrical equivalent of what he runs. The eSurvey will let me understand the interest in SU making a space like this, as well as what students would like to see in that space.

Step 2: Research tools, and equipment, and other secondary sources: Once I know what students want to see in the Electronics Prototyping Lab I will conduct research to find out what brands of equipment will be best for the students.

Step 3: Finalize a budget and find sourcing opportunities: With an accurate equipment list I will be able to create a total budget for how much this room will cost. My interview with Tim Breen will also help me find funding avenues as he gets a budget every semester to spend on machine, tools, supplies, etc. understanding how his budget works will help me understand how one would look for this.

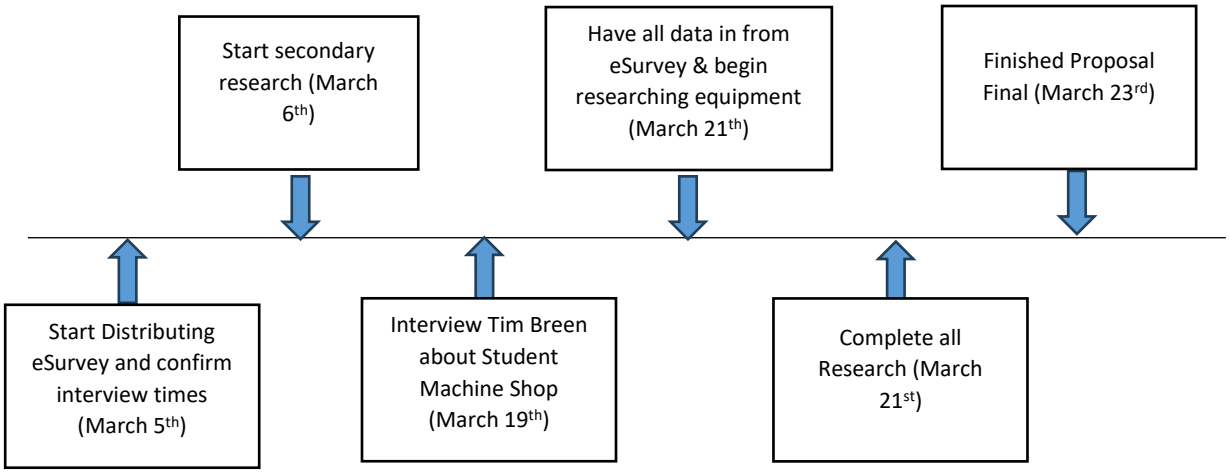
Step 4: Completed proposal

Project Benefits

Syracuse University has an incredible engineering program, and they have been aggressively and rapidly expanding the CE and EE side of it recently. With the current partnership with Micron and the construction of the Center for Advanced Semiconductor Manufacturing currently going on campus, it is clear that they want to give their Electrical and Computer engineering students the best possible opportunities they can. I feel that one area they overlooked is an accessible space for students to tinker,

and work on personal electrical projects to deeper their understanding, something that a space like this would fill. I am not the only one that feels this way.

Project Timeline



This lays out the basic timeline of when I will be completing major milestones for this project. While I don't have everything listed this is just the big things. I have already completed the first two milestones. I have distributed my survey to a bunch of people (I already have about 10 responses), confirmed a time to interview Tim, and gotten a bunch of secondary sources together. My next step is to interview him, get enough responses to my survey, and finish up my research.

Conclusion

An Electronics Prototyping Lab at Syracuse University would fill a critical gap in resources. It would provide students with a dedicated space to work on personal electrical projects, tinker, and overall gain a deeper understanding with both the electronics they are leaning about in class but also the tools labs don't use but can be extremely important to understand. With more research such as meeting with the manager of the Student Machine Shop (the mechanical equivalent of this project) as well as other primary and secondary sources this proposal can be an important step in bridging this gap.

Work Cited

[1] G. V. S. S. Sharma et al, "Bridging the Industry–Academia Gap: An Experiential Learning for Engineering Students." Journal of Formative Design in Learning. https://doi.org/10.1007/s41686-023-00086-4 [Accessed Mar. 2, 2025]

This Article talks about introducing Failure Modes and Effects Analysis, know as FEA with experimental learning. While FEA is more related to mechanical and aerospace engineering the core message is about how experimental, hands on learning helps to bridge a gap between Industry and Academia. This message about the importance of engineering students getting hands on and experimental opportunities makes this source a Background (B) source much of my proposal will be discussing that an

investment by Syracuse University will have positive effects by preparing students better for what they will be faced with in their careers.

[2] M. Tawfik, E. Sancristobal, S. Martin, G. Diaz, J. Peire, and M. Castro, "Design of a remote electronic laboratory," in Proceedings of the IEEE Global Engineering Education Conference (EDUCON), Tallinn, Estonia, Mar. 2015, pp. 467-473. [Online]. Available: https://ieeexplore.ieee.org/document/7359577. [Accessed: Mar. 6, 2025].

[3] M. Harris, “Electronics Lab Equipment: Kitting out a Lab from Scratch”, Altium, July 29, 2020. [Online]. Available: https://resources.altium.com/p/kitting-out-electronics-lab-scratch

[4] "Equipment for the Digital Laboratory," IEEE Transactions on Audio and Electroacoustics, vol. 17, no. 3, pp. 268-269, Sep. 1969. [Online]. Available: https://ieeexplore.ieee.org/document/4320678. [Accessed: Mar. 6, 2025].

[5] S, Leibson, “Equipment Recommendations for a Home Electronics Lab”, Electronic Engineering Journal, April 25, 2022. [Online] Available: https://www.eejournal.com/article/equipment-recommendations-for-a-home-electronics-lab/

[6] T. Breen, “Interview with Joseph Lodato,” Personal Communication, March 19, 2025

[7] J. Lodato, "Survey on Building a Syracuse University Electronics Prototyping Lab," Syracuse University. Available: https://forms.gle/bv8iTaxEKCjhrMC38. [Mar. 2, 2025].

My survey I will be conducting will fall under the Exhibit or Example section. This is because I will be gathering interest of students (likely mostly engineering students but it will be released for other majors too) on a electrical prototyping room. Some of the questions I am asking are things like: “Would you be interested in using this room”, “What equipment would you like to see in this room”, as well as questions about their background like major and year. With this data I will not only be able to show the interest level for my proposal, but also what equipment should be the top priority.