

Electrical Engineering Support of NIH Intramural Research Projects



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College Park Scholars Academic Showcase, May 5, 2023



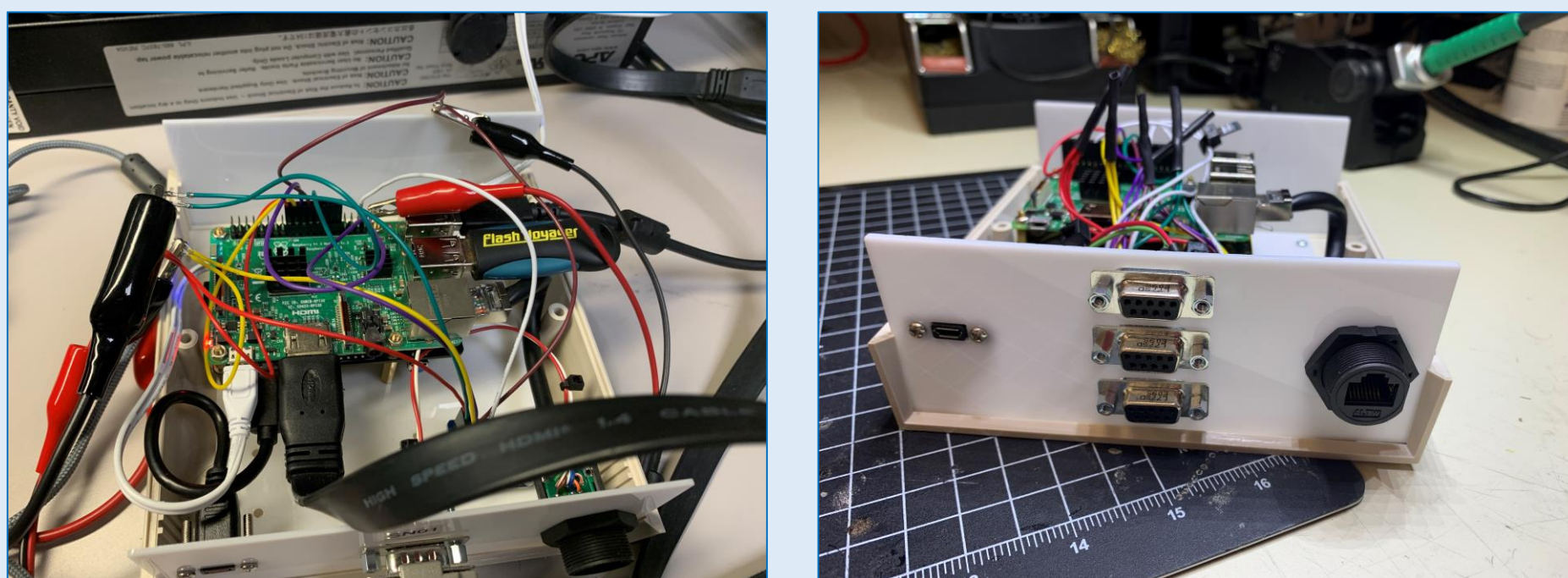
Overview

Biomedical and clinical research conducted at NIH often requires innovative and advanced solutions which result from the application of engineering expertise. Frequently, Intramural Research Program (IRP) projects require first-of-a-kind instrumentation design, software development, in-house fabrication, and collaborative validation in laboratories and clinics.

Activities:

Application of electrical engineering skills and processes will be demonstrated by showcasing several NIBIB collaborative IRP projects, including an NIH In-house Equipment (e.g., freezer) Monitoring System, a Distortion-Product Otoacoustic Emission (DPOAE) system, and Handgrip Dynamometer grip-strength project.

NIH Equipment Monitoring



- ❖ Goal is to develop in-house freezer temperature monitoring system to replace existing system.
- ❖ Application in over 5000 Ultra Low Temperature Freezers.

Site Information:

Address: National Institutes of Health Building 12
18 Center Dr, Bethesda, MD 20894

Site Supervisor: Tom Pohida

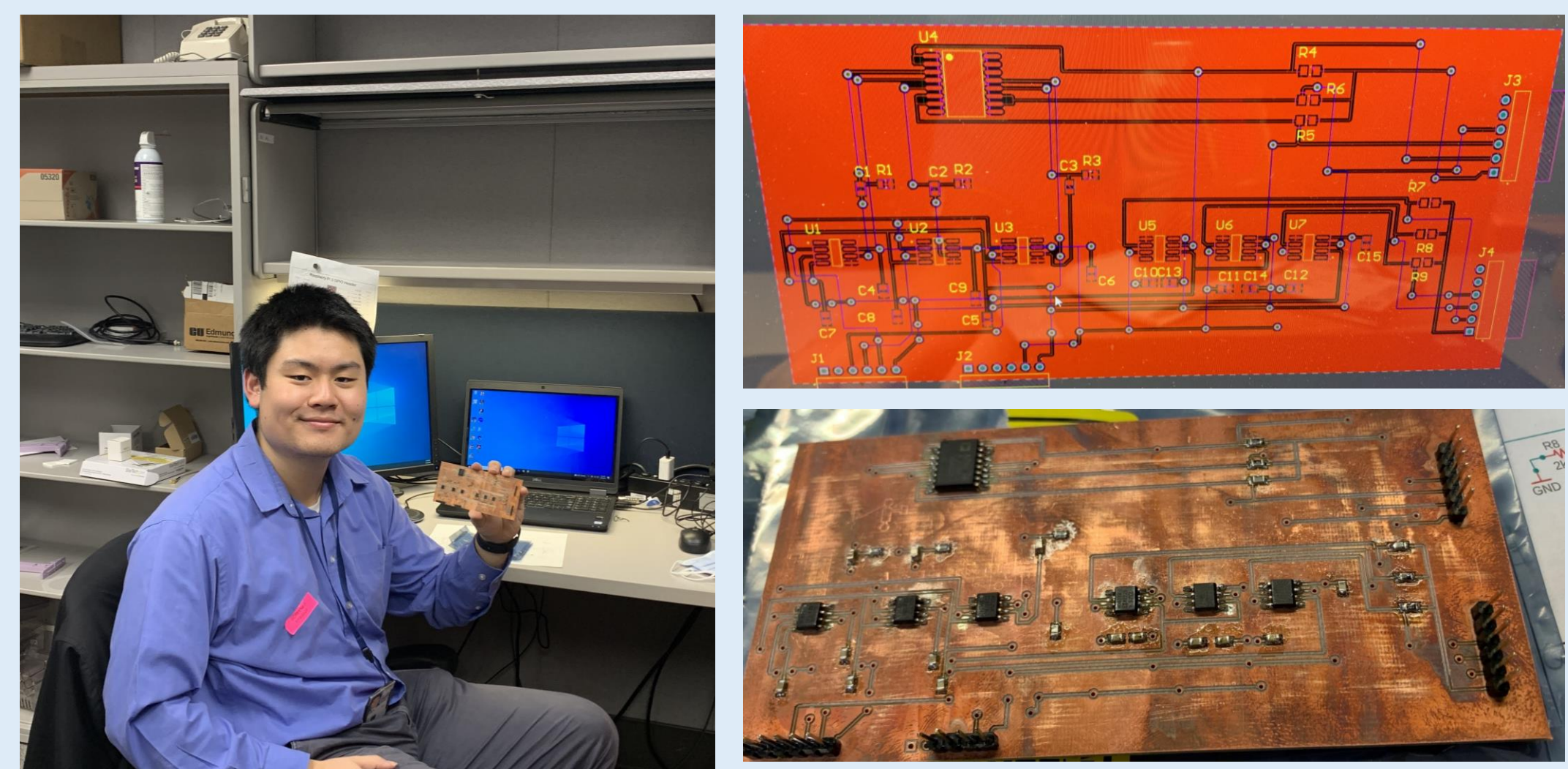
NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

NIBIB Instrumentation Development of Engineering Applications and Solutions has the goal of providing engineering solutions to Biomedical Researchers in the field.

Student Reflection

I would rate my internship at NIH a 9/10. I had a blast working with the IDEAS team, where I learned a lot about applied EE concepts, and was able to work with industry leaders in instrumentation as we helped Biomedical Engineers. While this was not a "name brand" internship I learned just as much. I got the once in a lifetime chance to see how our work helped research, and I toured the whole campus.

In Vivo Mouse Cardiac Electrophysiology(ECG) Recording System



- ❖ Designed Operational Amplifier (Op-Amp) based Electrocardiogram(ECG) amplifier for mice
- ❖ During In-vivo Mice surgery, need to have remote ECG amplifier from surgical area
- ❖ Designed a custom PCB, prototyped PCB, and mounted components

Internship Insight for Prospective Students

Working at NIH was cool. This was a paid internship, so I got an allowance while doing super cool stuff. I learned a lot about how the Federal government works and was on site. Working in Bethesda had me driving around 2 hours a day back and forth, but I got to experience what a real 9-5 standard job is. This internship will help find your interests and challenge you practically.

Impact:

After working on a multitude of projects at the NIH, different novel biomedical and electro-mechanical systems were implemented or tested. The Mouse ECG system was redesigned a bit and implemented to help researchers, as was many other projects.

Future Work:

Working at NIH has given me a new appreciation for the scientific research field. While I do not think I will continue my career in instrumentation I do feel I have gained a lot of applied Electrical Engineering skills like the overall workflow, hardware, and other methods, which has helped me to better consider my career.

Acknowledgements: I would especially like to thank Thomas Pohida and John Kakareka for mentoring me this summer!

