

In a small engineering group, I had the opportunity to collaboratively explore my interest in electronic components by building a prototype that harnessed electrical energy from a natural heat gradient using Peltier modules. I led as the group's facilitator and designer of the prototype using AutoCAD and Solidworks. With the design of the prototype, I soldered the 18 Peltier modules in series. As our team project was recognized and requested to be presented by the American Society for Engineering Education, my interest in finding different energy means and creating a sustainable future grew. Thinking about this moment now seems simple. But I can never forget how hard it was for me then.

Before coming to university, the only thing concerning electrical engineering that I was familiar with was building computers, as I spent lots of time doing it for others and myself as a hobby. However, I didn't know anything about the components themselves, just which part was connected to what. It was only when I came to Northeastern University, did I understand, so little about what I would become to enjoy so much as an Electrical Engineering major. I was truly tested when I was given the open-ended prompt in my *Cornerstone of Engineering* course, "What problem can you solve with engineering?" only then had to make a team of other engineering majors to put our answer into practice.

Desperately looking for a team, I found those majoring in Mechanical, Biomedical, Computer, and Chemical Engineering. Agreeing that we all had interests in renewable solutions and working to find a topic that interested all of us, we found thermoelectric generators or Peltier modules, a somewhat unmentioned technology today. Thus, we managed to find a problem to solve in camping: A cooking pan hidden with Peltier modules underneath that could provide energy to a device whilst heating the pan.

While building my thermoelectric generator project, my first-ever project, during my first semester of freshman year, our team did not realize how many skills and knowledge we did not have to complete it effectively. Despite having an interest in electronic components, I nor my teammates had much knowledge of circuits or semiconductors; however, we had no choice but to learn as went through.

During the ideation stages of the project, we committed numerous hours to reading literature concerning relevant fundamentals of circuits, semiconductors, and Peltier modules. Some of our preliminary knowledge caused a difference in understanding, halting our progress. For instance, I and one team member disagreed on our component connection: we wanted to put the modules in series, while they wanted them in parallel. Our progress stalled since we couldn't collectively agree on the design of the prototype. We all shared why we believed our method had more merit than the other, but one member disagreed with the rest of us.

Understanding that the setback could not slow our great progress, I chose to speak with our professor for the course with the team to help us through the process and better explain that we should put our components in series, which one member then agreed with. Eventually, what we went through was a valuable experience as it became much easier to communicate our concerns throughout the rest of the project. Our team members and I learned that it was essential to voice our concerns and not hesitate to get help from those more knowledgeable to ensure deliverable deadlines.

Additionally, the internet had been the main source of obtaining knowledge on learning to solder and using electronic test equipment such as multimeters at this time. It was only through practice that I became better at these skills and created a solid strategy. Without the dedication and effort the team continually put into the project, we would have been unable to create something we were all proud of.

Throughout my time at Northeastern University, my experiences have consistently showcased a strong work ethic and an exceptional ability to rise to challenges. This was particularly evident in my first major project in the Cornerstone of Engineering course. Despite initial knowledge gaps in circuits and semiconductors, my commitment to learning, problem-solving, and effective collaboration in an interdisciplinary team setting was unwavering. Proactively seeking resources, engaging in thoughtful discussions with team members, and seeking guidance when necessary, I demonstrated a dedication to continuous improvement. This approach not only contributed to the success of our project but also marked the beginning of my journey of adapting and thriving amidst complex challenges. These experiences have laid a solid foundation for my future, filled with potential for continued growth, innovation, and leadership in any endeavor I undertake, further shaping my development as an Electrical Engineer.