I have been fortunate enough to explore many branches of the Electrical Engineering tree throughout my undergraduate career. Although my research and industry experience appears to be an eclectic mix of unrelated topics at first, each project has had a key role in pointing me towards my next goal and task and ultimately shaping my long-term dreams.

My first research experience was at Pennsylvania State University through an NSF-sponsored REU, designing and building MRI microcoils for imaging individual cells. Here I learned about circuit resonance and design, as well as standard laboratory procedures and methods. I had the chance to use 7T and 14T MRI coils and design my now Helmholtz resonators with remotely tuneable resonant frequencies via varactor diodes. I found this project academically interesting, but it often left me wondering what research at the more basic and molecular level is like. For this reason, I scoped out nanomaterials work that would give me this experience.

The next summer, I was accepted into the NanoJapan program through Rice University, another NSF-sponsored REU. Not only did this program give me the chance to pursue my interest in materials science, but it also let practice my Japanese skills that I had been practicing for years inside and outside of the classroom at the University of Florida. However, because of the Fukushima incident, I conducted my actual research in the Ajayan Lab at Rice University. Although I did not get a chance to immerse myself for as long as I had hoped in, I gained a lot of experience working with graphene and nanomaterials for energy storage applications. Furthermore, being at Rice University gave me the opportunity to pursue a bit of inspiration I gained while in Japan and train for and set my third world record in the sport of joggling.

One of the weekends I spent in Japan was in Minamisanriku, a small village that was devastated by the Tohoku earthquake and tsunami. One of the most memorable parts of the trip was when one of the elder men in the town told us (in Japanese), “when you return to the big cities in America, do not forget about us. The media forgot about us but we are still struggling.” This moment galvanized me into taking action the same way that I did for helping out Rhotia Valley the year before. I was ultimately successful in running the fastest mile while juggling five objects and helping raise awareness and support for the community in Minamisanriku. It also infused me with some invaluable experiences, such as waking up to a phone call at 6AM with a voice telling me that the next voice I hear will mean that I am live on BBC radio. Another character-building moment was when I did a live radio interview with a show in Minnesota whose premise is humiliating their guests. They did not give me the slightest indication of this style when they invited me on the show, but being forced to respond to their malicious banter with composure and eloquence on the spot was very challenging.

Shortly after I learned of my acceptance into the NanoJapan program that year, I also learned that I was accepted as an intern at SpaceX for the first time. I was unable to do both programs during summer, so I decided to take time off of school to follow my dream of working on rockets. This juxtaposition of fundamental scientific research and results-based industry within the same year had a profound affect on my academic trajectory. While research at Rice was exciting and cutting-edge, seeing my work launch to space at SpaceX was enthralling. While research at Rice was occasionally frustrating and confusing, work at SpaceX moved at such a dizzying rate that it was sometimes difficult to catch my breath. That year, I decided that nanomaterials research was not a field that I would enjoy spending the rest of my life in, nor was Avionics Integration.

One of my SpaceX projects, however, threw me a bone. I worked on the thermal imaging systems that monitors temperatures of the vacuum nozzle on the second stage of the F9R rocket. This sparked a heavy interest in photonics and led me to take a specialized Photonics class at my university and join another NSF-sponsored program, the Optics in the City of Light REU through University of Michigan. My project was designing and characterizing a full-field optical coherence tomography setup that could be coupled with optical tweezers for cell-level biological studies. Although I found this to be the most interesting and exciting work up to that point, and thoroughly enjoyed the international atmosphere, I was still not satisfied settling on photonics as a career. I was developing a deep interest in computer and information science at the time.

I returned to SpaceX the next summer in the Hardware Development department to see if I would enjoy the hardware-software interface in industry. Although I found ultimately decided that SpaceX is not where I want to establish my career, one of the projects I worked on employed a small amount of machine learning in order to automate certain parts of the rocket design process. I loved programming the various algorithms and continued to learn more about the subject. This led me to join the Machine Intelligence Laboratory at the University of Florida for the end of my undergraduate career to gain more experience with unsupervised learning and robotic vision. I am currently developing SLAM algorithms for the university’s robot in the IEEE autonomous robot competition. I hope to be able to use this work as a Segway into my graduate studies in machine learning and neuromorphics.