

Personal Report

Melissa Sussmann

As stated in my statement of purpose, my long term goal is to pursue majors in physics and electrical engineering, so my main objective for this summer was to expand my skills and knowledge in these fields. I can confidently say that the SCIPP summer internship was extremely valuable; both for my personal growth, and for helping me refine my professional and academic goals.

Not only did I thoroughly enjoy being a SCIPP intern, but this opportunity has allowed me to refine my understanding of the field of physics and to develop an interest in particle physics. Throughout these five weeks, I have acquired a variety of academic and research skills, as well as an increased knowledge about different areas of physics. In addition, I have benefited by experiencing what it is like to work with professors and students in a research laboratory at a university. I also learned how to collaborate with a diversity of individuals to reach common research goals. I am now eager to finish high school so that I can enter the academic world and obtain a doctoral degree, but more importantly, to work in the advancement of science with researchers, such as the ones working at SCIPP.

I will now talk more specifically about a few of the abilities I accomplished through the SCIPP internship. Some of the skills I attained were procedural, such as learning how to convert Hex to decimal, connecting BNC connectors, or learning how to use HyperTerminal. These skills were important for plateauing,

but before my partner and I could reach that stage, we had to solve a number of problems with the equipment.

As an intern, I actually found that the most valuable skill I acquired was learning to trouble shoot. There were several problems with the equipment which had gone unnoticed, and Brooke and I took on the challenge of fixing them. The voltage regulator box (VR) originally had several cold joints and poorly soldered wires, as well as puzzling wiring. The splicing was done with wires of different colors, making it difficult to find ground when taking the box apart. We created a schematic diagram of the VR to find where the shorts were coming from and we re-soldered the broken wires and cold joints. We also encountered problems because the bases were burning out. We discovered this was happening because the bases could only take about 11-15 volts at a time, while the VR was putting out 18 volts. We solved this problem by lowering the voltage on the potentiometer to 13 volts.

I also gained a better understanding of how the bases work, by looking at the schematic diagram while Brooke and I were solving another high voltage problem. We were testing the high voltage on new bases and the multimeter displayed a voltage readout of 700 volts when the circuit did not appear to be complete. Later, we discovered that this was due to a capacitance created between my thumb and the metal on the base which was connected to ground. This problem was fixed by simply grounding me when testing the high voltage or clamping the base while testing the high voltage on it.

My enrichment in this program did not only emerge from my lab experiences. By attending the talks, I learned a great deal about discoveries and new ideas in the scientific community. A broad range of topics I had never heard about before were presented by speakers. For instance, I learned about CP violation, anti particles, the Higgs boson, dark matter, and dark energy, as well as several other advancements and abstract ideas. Not only this, but I learned about the different connections particle physics has with astrophysics. Even in the experiment I was conducting during the internship, we were detecting very small, high-energy particles called Muons, which ultimately came from cosmic rays in space.

Finally, and most importantly, this program has made me question what field I want to major in when I go to a university. Before, I knew I liked astrophysics, but after working here, I would like to specialize in particle physics. This experience has also heightened my interest in electrical engineering because of the joy I receive in solving problems and thinking critically. Therefore, at the present time, I am considering a double major in electrical and particle physics.

This 5-week internship has been a constant learning experience that I have grown from significantly and will always remember. Thank you so much for allowing me to be part of the SCIPP team. It has been a wonderful opportunity. I hope this is not the end of my learning experience at SCIPP, as I hope to continue collaborating as a volunteer for as long as the program will allow me to.