

Personal Report By Marshall Rogers

My Internship this summer at the Santa Cruz Institute for Particle Physics was one of the most exciting things I have ever been a part of. It was fun to finally be part of a group performing experiments that weren't just pre-invented by high school physics teachers. I learned all sorts of interesting things on my own, using the scientific method. Normally, my physics teacher drags the whole class through derivations of formulas, but during the 2007 SCIPP internship, I dragged myself through several. It was nice to learn on my own, and I feel like I grasped the material well. Overall, the most important things I learned were how to work with other people in a professional environment, and how to solve problems in unlikely ways.

This summer I was assigned the task of figuring out what was wrong with our barometric equipment. The barometers manufactured by Vernier were not function as they were supposed to. Something fishy was going on, and Mr. Kliewer and Mr. Briber wanted to know what was wrong with them, so they assigned me to figure out that problem. When they assigned me the barometer project, or BaBAR as it later became named, I thought I would finish it in two weeks, at the most. Instead, I barely finished it in all five weeks of the SCIPP internship.

When I was assigned my project, no one was sure what exactly was wrong with the barometers. Mr. Kliewer had given one presentation about errors in the Vernier barometers, but hadn't given any real explanation to what was wrong with them. After reviewing his report and consulting with Mr. Kliewer and Mr. Briber, I decided I should investigate the mysterious warm up period that each barometer went through when initially turned on. In order to investigate this, I did many static tests in the lab, where I turned the barometers on and off, and watched the curve that they made as they approached some linear plateau.

After I had studied the warm up period thoroughly, and made some statements about the warm up period, such as it's 30-minute duration, I ran some simple elevation tests inside of the Earth and Marine sciences building. After running my tests, I compared my results with my expected results, and found that the recorded pressure was a bit higher than it should have been. It was during those tests that I noticed a correlation between the temperature and pressure readings from the Vernier barometers. After I noticed this correlation, I began to design an experiment that would test to see if temperature affected the barometers.

The experiment I designed to test for the temperature correlation was a fairly simple one, and it's results proved to be very useful for future students using the Vernier barometers. My experiment involved putting the barometers in cold and warm environments, and then plotting the recorded pressure versus the temperature, and using a best fit line function to make corrections to data.

In the end of my project, I felt like I had accomplished a lot. I felt like I wanted to become a weatherman; well maybe not that far, but I still felt accomplished. Between my calculus derivation for the exponential pressure

model, to the function I made using excel to correct for erroneous pressure readings, something useful had come out of my 5 weeks of work. I felt like I had learned more in the 5 weeks I was at SCIPP than I did my entire school year. There's nothing quite like the hands on lab experience. That in itself was priceless.

All in all, this internship was a great learning experience, and will be a memory that I will look on with nostalgia for the rest of my life. The analytical and problem solving skills that I developed should help me through all walks of life, especially my academic/scientific career. Of course, one cannot forget all the wonderful people he meets along the way. I would like to thank Mr. Briber for all of his help with the barometer project, Dr. Nielsen for his help with the Exponential Pressure Model derivation, Dr. Schalk for giving me ideas on how to think and approach problems, and James Dann for inspiration and motivation. Thank you all so much, these have been some of the best 5 weeks of my life.