Co-op Job Summary
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Mechanical Engineering
Jet Propulsion Laboratory
Fall 2012 (8/27/12 – 12/21/12)

A. Co-op Work Assignment

At the Jet Propulsion Laboratory (JPL), I was a member of the Planetary Sample Acquisition and Handling Group. The primary technical function of my working group is to acquire, transport, cache, and/or return sample from extraterrestrial bodies. The first project I worked on involved the life-testing of a sieve on Curiosity that filters Mars regolith and rock powder into certain sized particles before being transported to another part of the rover for further analysis. I also worked on a project involving the potential sample return of a to-be-determined comet. For this project, I was involved in testing prototype models in comet simulants and analyzing their performances using MATLAB and Excel. My final project has involved the characterization of Mars-like rocks so as to better understand what ranges of properties dictate drilling performance for a potential sample return mission. I also worked on a few smaller projects, which included drawing up models on NX Unigraphics and assembling rapid prototype models of parts on Curiosity to demonstrate the path that the sample travels through.

My first day at JPL included about a day-long orientation involving an introduction to what JPL has done and what it is doing, a tour of the facilities, meeting my supervisor and several of my coworkers, and of course, a lot of paperwork. A lot of my training involved reading up on the task, and getting acquainted with what was going on by people who had already been working on the task for quite some time. I completed several tutorials in NX Unigraphics to train me how to use that program, and additionally always felt comfortable asking co-workers for anything else that I needed help on. I did not have an assigned mentor, but my supervisor and co-workers were always open and easy to approach about any questions that I had.

B. Assessment of Learning and Development

My work activity was very closely tied to my educational background as a mechanical engineer. The section that I worked in, Spacecraft Mechanical Engineering, is composed primarily of mechanical and aerospace engineers, so I worked with many people with a similar background. My work activity was also right on track with my career interests, as I am looking to graduate with an emphasis in aerospace engineering at Cornell and become a practicing engineer after I graduate. JPL has provided me with a great amount of experience with hands-on applications of engineering principles that go above and beyond a lot of the theoretical coursework at Cornell. I have also learned how to use a variety of machines and instruments that I had not encountered before.
Working at JPL has also helped me to grow both professionally and personally by allowing me to think with more of an engineering mindset rather than just as a student. I also believe that I developed leadership skills at JPL, notably on my most recent task where I had a major part in the decisions for what characterization tests to run based on what I thought would be efficient and useful. JPL provided me with a lot of responsibility and freedom, something that I think has been invaluable to my personal and professional growth.

C. Life Outside of Co-op

For housing in Pasadena, I lived in the graduate student housing at Caltech. JPL is run by Caltech, and this relationship allows JPL interns and co-ops to benefit from Caltech’s housing program. I was very satisfied with my apartment at Caltech for the price and the convenience of living with essentially everything that I needed within walking distance. Throughout my time here, I have had two international graduate students as roommates who worked temporarily at Caltech (one from Canada and one from Germany), and two others who were interns at JPL. Unfortunately, housing is not guaranteed through Caltech, but co-ops should be able to get it if they apply early enough. Housing can be somewhat expensive and hard to find elsewhere in the area, but I have heard of many interns living in Altadena within walking distance of JPL. For transportation, there is a bus that runs between Caltech and JPL, which would be the best way of getting there without a car. Additionally, JPL runs vanpools that pick people up in a wide variety of places in the Pasadena/Los Angeles area. There are also a huge amount of options for social activities in the LA area, including sight-seeing, beaches, sporting events, Hollywood, etc. Additionally, JPL has several sports and community service groups that are easy to become a part of through its website. JPL also has two free gyms on lab for its employees. I also got involved in a Pasadena running club and would play soccer twice a week with co-workers. In other words, there should be no shortage of social activities in the LA area.

D. Evaluation

One of the best aspects of working at JPL is that I got to work on projects that I would not be able to work on anywhere else in the world. JPL and NASA are at the pinnacle of the world’s space exploration and research, which has been nothing short of incredible to be a part of for the last seventeen weeks. This is so important because it makes work interesting and enjoyable; two adjectives that a lot of people unfortunately lose sight of in the workplace. Another great feature of this job has been how challenging it has been. While this can at times be frustrating, it is also very exciting to work on real-life problems and come up with a solution or correlation after overcoming certain difficulties. It is hard for me to say what the worst features of working at JPL are, because any bad aspect is very insignificant. At times preparing materials to be tested or documenting test procedures can be a bit tedious, but when I look at the bigger picture I
realize how important these things are and I get over that pretty quickly. Overall, I would give my first term’s co-op experience at JPL a 10 out of 10.

E. Additional Info

I would like to use this section as a place for me to give some brief advice for any co-op coming to work at JPL (or any company, for that matter) in the future. In the beginning of your term, it may seem a little bit overwhelming and intimidating to jump into something where it seems like everyone has already accomplished so much, and you feel like you have accomplished so little comparatively. It is normal to be nervous when stepping into such an unfamiliar environment, but you just have to step back for a moment and realize how great of an opportunity it is to work with so many brilliant people. Over time, you’ll start to learn all of the crazy acronyms that JPL uses (do not be afraid to ask what they mean, because there are a ton of them and no one expects you to memorize them all), and you will be able to build confidence and be a key contributor to a project team. While this may sound pretty cliché, the best advice I can give is to ask a lot of questions. I am yet to have an encounter where someone has not taken the time to thoughtfully answer any question that I have had. Everyone is very friendly at JPL, and it’s always much better for you and for them in the long run to ask what you may think is a stupid question so that you can understand what is going on. Lastly, try and meet as many people as you can. I have had several moments where I wasn’t sure how to do or find something, and knew just who to call who knew the answer or could refer me to someone who did. Good luck and have fun!
Co-op Job Summary
Brett Cantrell (NetID: bsc66)
Mechanical Engineering
Jet Propulsion Laboratory
Summer 2013 (5/28/13 – 8/16/13)

A. Co-op Work Assignment

At the Jet Propulsion Laboratory (JPL), I was a member of the Planetary Sample Acquisition and Handling Group. The primary technical function of my working group is to design methods to best acquire, transport, cache, and/or return sample from extraterrestrial bodies. For the summer, I worked on the Mars Rock Characterization task, which I continued from work I had done during the end of my first term and from what others had continued while I was back at Cornell. The primary goal of the Mars Rock Characterization task is to characterize a wide range of Mars-like rocks through a series of mechanical properties tests that can be performed at JPL. These mechanical properties are then to be related to a series of to-be-determined functional requirements for a future Mars sampling mission of acquiring intact rock sample cores using a rotary-percussive drill. I was responsible for setting up and performing these tests, helping to determine what tests were appropriate, analyzing what the test results were telling us, and at times modifying published or standardized tests to meet our specific needs. By the end of the project, a database of rock properties will be available that can be drawn upon for future engineering design projects.

For the start of my second term, I did not have to go through the day long orientation that I went through before my first term that involved learning about how JPL functions, filling out a lot of paperwork, and getting a tour of the facilities. I was also already very familiar with the task that I was going to be working on, so I spent a few days talking with the people who had been recently working on it to get back up to speed. I did not have an assigned mentor, but my supervisor was essentially an acting mentor who was also very involved in the task that I was working on. My supervisor would be the person that I would generally approach with questions, but all of my co-workers were always very open and easy to approach with any questions that I would have.

B. Assessment of Learning and Development

The section that I worked in, Spacecraft Mechanical Engineering, is composed primarily of mechanical and aerospace engineers with a similar background to my own. However, while working on the Mars Rock Characterization task, I was working closely with a diverse team mixed with engineers and geologists. This was beneficial in teaching me how to best present information in ways that can make sense to people from diverse backgrounds. My work activity was on track with my career interests, as I am
looking to graduate with an emphasis in aerospace engineering at Cornell and become a practicing engineer after I graduate. The particular task that I worked on this summer is different from the design aspect of engineering that I hope to eventually get involved in, but it was still very important because a large part of engineering is determining what materials should be used based on their mechanical properties, which I now have a lot of experience in testing. JPL has provided me with a great amount of experience with hands-on applications of engineering principles that go above and beyond a lot of the coursework at Cornell. It was exciting to be able to apply a lot of the work that I have done in labs to the workplace.

Working at JPL has really helped to foster my professional and personal growth by allowing me to work towards succeeding in projects and missions rather than just doing well in a class. Working at JPL has given me more of a sense of purpose in my work, which is something that I really appreciate and do not think that I could have gotten by working at any given engineering company. I was also excited to develop leadership skills at JPL by having an important role in directing the Mars Rock Characterization task. Additionally, I was oftentimes teaching and directing an intern that has just graduated from high school. JPL provided me with a lot of responsibility and freedom, something that I think is invaluable in developing as a professional and as an individual.

C. Life Outside of Co-op

For housing in Pasadena, I lived in the dorms at William Carey International University. This was a much cheaper alternative than living in the dorms at Caltech, which were significantly more expensive than when I lived there in the fall. I had an awesome roommate from Brazil this summer, and there were about 30-40 people working at JPL who were also living at William Carey. I was fortunate enough to have a car in Pasadena for the summer which I packed full with four other summer students to drive us all to work, but there was a bus stop nearby that I know several people working at JPL used to get to and from work. JPL is run by Caltech, and this relationship allows JPL interns and co-ops to benefit from Caltech’s housing program if necessary. I would definitely recommend trying to live with other people who are working at JPL. I have met some people who said they had a lot of difficulty meeting people to hang out with until later on in the summer. If you end up not living with a bunch of other people from JPL, branch out through the JPL student Facebook page where there will constantly be people posting about things to do over the summer.

There are also a huge amount of options for social activities in the LA area, including sight-seeing, beaches, sporting events, Hollywood, etc. Take advantage of the RDO (regular day off) Fridays that JPL has every other week to travel on three day weekends. During my time here in the fall and summer, I was able to travel home to the Bay Area for a couple of weekends to visit friends and family, travel to San Luis Obispo, go to Disneyland, go to the Venice and Santa Monica beaches, go bungee jumping off a bridge in Azusa, visit Hollywood and hike up to the Hollywood sign, hike in the beautiful San Gabriel mountains behind JPL, and generally just explore LA. Additionally, JPL has
several sports and community service groups that are easy to become a part of through its website. JPL has two free gyms on lab for its employees, and William Carey also had a free gym membership that came along with its JPL housing package. I also got involved in a Pasadena running club and would play soccer twice a week with JPL co-workers. I know of other students who also got involved in softball leagues and pick-up ultimate Frisbee and basketball as well.

D. Evaluation

One of the best aspects of working at JPL is working on projects that I could not be working on anywhere else in the world. JPL and NASA are at the pinnacle of the world’s space exploration, technology, and research, which has been an amazing thing to be a part of for twenty-nine weeks. The people at JPL have also been incredible and a lot of fun to work with. I have made a lot of good friends while working at JPL, and it has made my job a lot easier when I’m working with brilliant people who are always interested and more than willing to help me out. I really enjoy the community feeling that I believe to be very prominent at JPL. JPL is also full of challenging opportunities, where we are working towards achieving things that no one has done before.

There are not too many negative aspects of working at JPL. As a co-op, a lot of the testing that I did would sometimes feel repetitive and tedious, but I still enjoyed doing it so that I could look at the data to begin analyzing it and looking for correlations where they existed. I felt that I got a little bit tied down during my second term in only working on one task, but I did have a very important role in that task which is something that isn’t easy to come by at this stage in my career. Combined with my first term, I strongly believe that I got exposed to everything that I could have hoped for from the co-op experience: working as a part of a diverse team, improving organization skills, leadership opportunities, CAD modeling, giving several presentations, learning about space exploration and past missions, and writing a very extensive final report that may eventually contribute to a published paper. I really loved working at JPL, and I would highly recommend it to any student at Cornell who is interested in the co-op program.