A. Co-op Work Assignment

I worked within the Controls Center of Excellence (CoE) within GE-Aviation at Lynn, Massachusetts. At Lynn our group mostly handled the military engine controls, while Evendale, Ohio worked with the commercial engine controls. Controls is a group that specializes in the controls (mostly fuel control) of each jet engine made by GE. I worked within the fuel subsection that deals mostly with the mechanical components that control fuel delivery. Other subgroups within Controls work with the electronics and coding behind fuel delivery.

As a co-op I served as assistants to several senior engineers, allowing exposure to several engines and types of work at GE. I split my time between updating aging aircraft engines and analyzing new engines. For the older engines I spent my time updating drawings, updating overhaul manuals, and recommending changes for longer life. I enjoyed working with legacy engines (older generation) because I worked with several engines and was able to investigate changes that will directly affect engines in use. For the new engines I worked on qualifying new fittings for its operating conditions through the use of stress analysis. This analysis was one that I had complete ownership over making it a great learning experience. I also worked in an advanced engine program doing technology investigations. This was also beneficial because I was able to sit in on the preliminary design meetings. For the most part I learned as I went and used the engine-training guides as resources. Whenever I had questions I would ask my co-workers, which helped me acclimate.

B. Assessment of Learning and Development

A background in mechanical engineering helped me throughout my time at GE. I was surprised to use my knowledge in fatigue analysis on the job. I quickly learned about the steep learning curve that exists at any engineering job. To understand a fuel control, you must understand its components which takes time and learning. The most efficient way to acquire this information is through time spent working with more experienced engineers. Although it is important to learn from others, it was important for me to find a balance in asking questions and figuring it out myself. The only thing I would have done differently is to ask for more work at the beginning of my work term.
C. Life Out-side of Co-op

I lived in apartment with three other Tufts students in Medford, MA. I found the apartment through the “Tufts Life” website. I drove to and from work which took 35 minutes each way. On weekdays I would usually work, eat, exercise, and read or watch TV, which was not nearly as much fun as being at college. I spent my time outside of work with my friends who go to Tufts or BU. GE offered a few opportunities to do other activities besides work, allowing me to do walk for breast cancer on a Sunday morning. Otherwise, a few Co-ops and myself would eat lunch together every possible day. Although it was great not having homework to do, it was tough being around other college students who did not have to work 40 hours a week. This nostalgia for my college caused me to make the trip back to Cornell several weekends during the term.

D. Evaluation

I enjoyed the exposure to engineering and aviation I received at GE. I was able to see and work with several different engines, getting the chance to understand on a basic and sometimes more detailed level how they function. I also enjoyed meetings where I was able to listen to others present their work. As I had said before, this type interaction cultivated the most learning with me. I did not enjoy being patient for work to come to me; I would rather have too much work than too little.
COOP WORK SUMMARY

GE Aviation

Cornell University
Qian Nan Jiang
1st rotation

1 Neumann Way, Evendale, OH 45069
During the fall of 2007, I had the privilege of working for GE Aviation Controls Center of Excellence’s GEnx FADEC software team. FADEC stands for Full Authority Digital Engine Control; it is basically the brain of the Jet engine that controls all the digital and electronic functions of the engine under operation. It follows the pilot’s control of fuel flow, power usage, and many other parameters. GEnx is one of the foremost commercial engines that are currently under development and testing, and it is designed to be more fuel efficient and smaller in size compared to its predecessors. The software team works on the software development and certification of the FADEC on the GEnx.

When I first arrived at GE Aviation, I had no knowledge about jet engines. I have been flying since I was little, both domestically and internationally, and I never noticed what engine the plane operated on. For the first three to four weeks, I tried to absorb as much knowledge about the engine as I could. At work, I studied engine system operations, engine parts, and the physics behind the jet engines. All the Co-ops are required to attend what it is called the “Jet Engine Basics” (JEB) class, where the instructor talks about each small part of the engine and introduced the basic functions of each part.

At work, I was overwhelmed by the acronyms that were presented to me at first. Attending a certification status meeting with everyone talking in acronyms was a bit intimidating, but as time progressed, I become accustomed to the “language”. In order to be acquainted with the software certification process that my team is involved in, I had to read some manuals and requirement documents. I was assigned a buddy, and I approached her with most of my questions. My buddy checked on me regularly, and has
been very patient and helpful to me. She answered all of my questions and made sure I understood all of them.

This Co-op assignment has provided me with real work experience in a company that is focused on innovation, leadership, and integrity. My problem solving skills have definitely improved after this Co-op term. I have learned to seek for ways to solve a problem most efficiently, and “never be afraid to ask questions.” I have learned to be flexible with my work time, and prioritize the tasks that were given. I have learned to be conscientious with deadlines, and that better time management and planning lead to more effective results. The profession of Engineering is definitely not easy. It requires strong determination, clear thinking, and ability to adjust to change. At first, I was surprised at how little I have applied my course work to the work I was doing with the software team, but I have come to realize that it is not strictly the book knowledge I have acquired from my ECE classes in Cornell that helped me with the assignments, but the problem solving skills, the analytical reasoning, and a desire to learn that have helped me accept the change and accomplished the given assignments. It’s all about what you can take out from the classroom and apply it in real work situations. I have learned to be responsible, and to accept full responsibility for my decisions and action, even if it’s something very small. I believe being responsible creates trust, and trust is one of the most important things that bridge all human relationships. I have attended numerous networking events, and met a lot of influential people within GE Aviation. Seeing how their career paths are laid out made me change my career goals and outlook a little bit.

Life outside work has been fantastic. I have gone to numerous Co-op gatherings and tried out all sorts of cuisines. We have had the weekly Longford cookouts, where we
grilled our own food and enjoyed it with everyone else, and Co-op luncheons happened every Friday afternoon at different places. I think the best thing about Cincinnati was the food. I tried Peruvian, Persian, and some of the other exotic cuisines within the area. We have our very own Co-op calendar where all the Co-op activities are listed; i.e. Monday after work football challenge, Tuesday rock climbing, Wednesday basketball game, Thursday tennis match, and Friday Bible study. GE’s Co-op website provided housing and roommates search engines, and the housing that are found through GE are generally cheaper. The area where I live in is very sub-urban, and malls are within 15min drive, and about 10min to the plant.

Overall, this Co-op experience has been very beneficial academic and career wise. I had the opportunity of working closely with a team in a fast paced environment. My manager and teammates have constantly been giving me encouragement. I have not encountered any negative experience during this Co-op term, and I am looking forward to my next summer rotation at GE Aviation.
Job Summary

I worked in the Product Development and Delivery department under Assembly and Test Engineering, which all falls under the Supply Chain division at General Electric. Mostly, I was working on software supporting the assembly process of LM2500 engines for marine and industrial applications, modifying computer programs that either interface with measuring devices or that otherwise guide workers through the assembly process to meet blue print requirements as efficiently as possible. For example, one of the major programs I worked on is called “Elmstack”, which is used in the assembly of LM2500 turbines to ensure proper alignment. Better alignment means less vibrations, which is the ultimate goal assembly engineering strives to achieve. I modified error messages to improve guidance and feedback to the user and added parameters as necessary to keep track of faulty data points. I also added labels to the program’s graphs to help users get a visual idea of which data points contribute to bad alignment for a particular engine. My other projects involved comparing assembly data to vibration data for the LM2500s with Excel and Minitab software. I also had a small project in which I updated a data sheet for LM6000s by extracting properties from blueprints. My supervisor provided most of the training, which was done more on a need-to-know basis. He would give me an introduction to each new task I was assigned to explain necessary background information, and then the rest of the training was provided when I asked questions. His introductions would either describe a current computer program’s purpose or how to use
software like Minitab. For the programs I modified, I actually had to learn how each one worked on my own, which for enormous, intricately woven programs like "Elmstack" took a long time. My supervisor also served the role of mentor, so I usually approached him with questions. There was another engineer that I worked closely with on several projects and he was a good source of information as well.

Most of the work that I’ve done here has involved programming in BASIC, so my work relates best to the Introduction to Computer Programming course in Java offered at Cornell. The skills I learned in that course have been the most useful for this job. Lab courses are important as well, as much of my experience with programs like Excel has come from the data analysis required in writing lab reports. One thing I’ve learned from this experience is that when removed from academia and placed in a professional culture, engineering takes on a slightly different guise. Despite its technical nature, it no longer necessarily has the math-intensive element students are faced with every day in college. Companies are always trying to be more efficient and increase sales and productivity, which is why they hail the use of high-speed computer technology to aid in computations, meaning less solving of equations by hand like engineering students painstakingly do at 3 a.m. while learning theory. Though I believe it is still essential to learn the theory behind engineering methods we use, theory is rarely applied directly in industry because programs have been written to do most of the work. For example, in trying to solve a problem, one might input values to a program and note the results given a few hours later. Engineering students should also be aware that as you go up the corporate ladder, engineering positions become less technical and more managerial; the stuff you love to do at Cornell might be done by someone on one of the lower rungs of the ladder at GE.
So one should be open-minded about eventually working in engineering management. Also, thoroughness and quality are encouraged over speed in completing assignments. Of course, efficiency is important, but the pace is slower compared to college. At this position, I learned how essential it is to put the extra effort in to reach out to people around you. I could have stayed at my desk all day, only going to my manager with questions, but I would have missed out on a world of opportunities. Instead, I talked to people at locations from near my desk to the other side of the building, networked some more at the annual picnic, and attended every single tour all in hopes of learning as much about GE as possible. If I hadn’t done this, I wouldn’t have gone on a private trip to Peebles – GE’s engine test facility – with a couple co-workers. My assignments probably would have been less interesting, too. I went through a lot of personal development as well. I learned to take responsibility for my decisions, admit mistakes and use them as learning opportunities. I also had to learn to acknowledge the variety of personalities present in the work environment and act toward people in what I deemed the most compatible manner.

There is, of course, much more to life here that goes on outside of work. There is a sort of co-op student body here called the PDC that organizes many social events throughout the work term. These activities have included anything from a trip to Cedar Point for roller coasters to skiing to skydiving, not to mention weekly barbeques at the Longford Cookouts. And if you want a work out, you need look no further than GE’s very own athletic facility. By paying a small monthly fee, you gain access to a swimming pool, exercise equipment, a track, and several athletic classes, including aerobics. Many of the co-op social activities, such as football and ultimate Frisbee, take place there as
well. If you’re interested in community service, GE holds many such events throughout the year, including the BRIDGES Walk and Freedom Run (5K).

Naturally, room and board and transportation are among other necessities of life outside of work. Regarding housing, GE’s Evendale facility provides all co-op students with a file containing information on about 20 apartments, so there is no need to worry about not finding a place to live unless you wait till the month before your start date to start looking. If you want the best deal, go for the Longford apartments, which is where I lived, but you have to inquire early because they get rented out fast. It consists of four apartments, each with three bedrooms, and includes furniture, cable, Internet, electricity, water, and amenities for only $550 a month. All of the apartments on the list are within a reasonable distance from the various GE buildings, but if there were a list ranking the quality of public transportation in various cities, Cincinnati would be at the bottom. You won’t get anywhere without your own car. Whether you want to risk finding another co-op to play chauffeur when you get here is up to you.

GE has many admirable characteristics and is replete with opportunities for growth and professional development. One of the best features of GE is the people. Everyone here is not just willing, but happy to help you out, and they put in the effort to make everyone feel welcome. Many are even up for the occasional chat. On the actual job, I found knowledge of a whole new computer language to be a valuable skill that I can even carry with me and apply in the future. If I have to complain about something, I would say that core mechanical engineering topics did not apply much to this position, but I still learned a significant amount of technical skills applicable to manufacturing work. Every week I would learn something new. Some of the truly invaluable things I
gained here were in professional skills, basically learning how to communicate with others, learning to be flexible and to take initiative because the best things in life don't just fall nicely into your hands. Outside of work, I think what I found most impressive about this co-op experience was the social opportunities, because it showed you can really make lifelong friends here.
Thomas Weber
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Mechanical Engineering
GE Aviation – Lynn, MA
Co-op Rotation I – Fall 2007

The last sixteen weeks may have been the fastest of my life. At least it felt that way. I feel like only a few short weeks ago, I was walking into the Visitor Center at 1000 Western Avenue for my first day. At the same time, I’m amazed how much I’ve learned in the last three months. As my first exposure to real-world engineering, this co-op has given me a good perspective on engineering and a great insight into my future as an engineer.

For my co-op, I was assigned to the Mechanical Systems Engineering (MSE) division at GE Aviation’s Lynn, MA site. Formerly called Bearings, Seals, & Drives (BS&D), Mechanical Systems is responsible for the bearings supporting the main shafts, lubrication of the engines, and keeping that lubrication out of other sections of the engine. On my first day, I was assigned to a new product currently in the middle of the design stage. While I had daily contact with my manager, I was working more closely with our division’s project leader, who also served the role as primary mentor. Immediately after my arrival, I helped the team prepare for our Preliminary Design Review (PDR). Because of this, I did not receive a specific project right away, as everyone was scrambling to get data analyzed and in a presentable format. At first, preparing PowerPoint slides full of data seemed tedious; however, in hindsight, it gave me the opportunity to quickly learn about our entire scope of work for our whole team. After the excitement of PDR died down, I was assigned tasks of my own. My two major projects involved designing components and moving towards getting them produced. This gave me the opportunity to use the analytical skills I’ve learned at Cornell, as well as my creative side to create parts that meet program requirements. I was also responsible for preparing source substantiation documents for our client. Finally, I was available to pick up the slack when any of our team members needed a little extra help. Overall, I felt my assignment had a good balance of long-term projects and smaller tasks.

My first impression upon arriving at GE was that I didn’t know anything. Other engineers in my group said that was a normal feeling, so I didn’t panic; designing jet engines has an incredibly steep learning curve. However, the engineering education I received from Cornell helped teach me how to learn and how to learn quickly. The more experienced engineers in my group were more than happy to help me with my frequent questions. This helped me become more comfortable talking with other engineers of a variety of ages and with a variety of levels of experience. Having such big projects on my plate, I learned how to micromanage my time. Unlike in school, where assignments have, generally, spaced out due dates, I found that frequently my manager expected results as soon as possible across the board. This acted as a constant reminder that, in professional engineering, time is money. I struggled to learn the balance between meeting project timing and have the “best” design. In school, I’m used to shooting for a correct, definitive answer to a problem. Often at GE, there is no definitive solution, and I had to adjust my thinking to balance the extra time I would spend to get a perfect result versus the impact of being slightly off of perfect. Despite struggling to stay with the
volumes of information I was receiving daily, I fail to think of any way I would have changed my experience or how I approached it.

Outside of the workplace, I enjoyed meeting other co-ops and exploring Boston. When I first learned of my assignment to Lynn, I had no idea where to live. GE provided a simple sheet with various neighboring towns (Lynn isn’t the nicest area) including pros and cons for each. For me, this wasn’t enough. I took a quick trip up here over the summer to scout out areas that I was interested in. When I got back, I found real estate agents in these places and started making contacts. Finally, I found a place that was right for me, and the rest is history. Transportation to work varies based on where you live. Because I lived away from public transportation, I drove to work every day. A bunch of other co-ops lived along the regional rail line that stops in the GE Plant, and they often rode the train to and from work. While there were only a few co-ops this fall (~20 co-ops), we often planned events both during the week and on the weekends. One day each week we would go out to lunch together. We arranged a few movie lunches at GE as well. On the weekends we would try to meet up at least one day and either go downtown to Boston or out to dinner. GE also offered a lot of social opportunities. Various organizations would have functions and often invited co-ops. Overall, I was impressed with the social scene at GE.

Overall, I enjoyed my time at GE Aviation. I felt like I learned infinitely more about real-world engineering than can ever be taught in a class. I enjoyed the opportunity to have ownership of parts and use my classroom knowledge in practical applications. The most difficulty I had with this job came from the learning curve, both of engineering topics and corporate structure. Because jet engines are quite specific, I had no prior background when I started. Beyond an understanding of engineering concepts, I was essentially new at my job. This often led to many tedious situations where I was sitting at my desk trying to understand a problem and how to approach it. Despite having a plethora of experienced engineers around me as resources, sometimes I had to figure it out for myself before I could understand the situation and absorb the help I was receiving. Looking back, however, these challenges allowed me to grow as an engineer and learn necessary skills for my future professional career.
Ran Shao
rs422
Mechanical Engineering
GE Aviation
Term 1

For my rotation, I spent a total of seven months in the combustor manufacturing facility in the Supply Chain division of GE Aviation, which is responsible for the production and shipment of combustor parts. My specific responsibilities included reducing aged inventory and tracking CIDs (Changes in Design) to make sure they get implemented on the shop floor. This involved directing the flow of hardware through the different manufacturing processes. My manager is the Quality Leader for the plant so a lot of my job also focused on resolving any quality issues with the hardware before they ship. I spent a lot of time on the floor daily in order to carry out these tasks, and it was a very fast-paced environment as shipment deadlines were always looming. The long-term projects I worked on involved improving manufacturing processes to reduce costs. This involved collecting data from the hardware documentation, analyzing it statistically, and suggesting ideas for improvement. I enjoyed this aspect of my rotation as it allowed me to be creative and I could tell that my projects had a lasting impact. My biggest project was for Six Sigma certification, and it involved revising a grit blast process to reduce the number of defects it causes. This was something that I was only able to finish and see the results of because I was there for such a long time. While my engineering background helped me succeed in this rotation, my assignment was primarily non-technical.

There were many interesting dynamics between the different groups that I had to work with. I had constant contact with the union workers; while they were responsible for machining the parts on time, there was no accountability. There was also an interesting
relationship between the design engineers and the manufacturing staff: they are required
to work together in order to ship conforming hardware, but they both had different
priorities and worked at different paces, so at times, it got ugly. I learned a lot about the
business from observing these relationships and it was a good experience to view
everything from a manufacturing perspective rather than an engineering one. I also
learned that I would ultimately prefer to work in an engineering role.

I spent the first part of my rotation living in Lynn, which is a fairly rough area
(my co-workers always noted how brave I was for living there). It was a short commute
to work, but I still wouldn’t recommend it. I moved to Boston halfway through my
rotation; that’s where most of the co-ops lived. There is plenty of public transportation in
and around the Boston area, although the buses were pretty unreliable. Outside of work,
there were plenty of opportunities to socialize with the other interns and new employees
(though not as many in the spring as in the summer). There is a committee that organizes
events such as tours of Fenway Park, picnics, paintball games, etc.

What I enjoyed the most about this rotation was working on assignments that
were very time-sensitive, which added an extra challenge. All of my projects also had
some sort of dollar value associated with it, so I could tell that they had an impact. My
co-workers were helpful in giving me meaningful work to do, and I enjoyed the GE
culture overall. However, there were many mundane administrative tasks associated with
this job, but they are important nevertheless. The hours were also harsh considering how
much trouble I have waking up for ten o’clock classes at Cornell (I had to attend a
production meeting at 6:30 every morning). My average work week also included about
six hours of overtime, which I was paid time and a half for. I would recommend this role
to anyone doing more than one rotation at GE; it is important to learn about the
manufacturing side of the business as engineers often have to work with the
manufacturing staff and it would help to know the terminology and processes used in the
shop.
Co-op Job Summary

A. Co-op Work Assignment

This fall, I worked in the Repair Technologies Center of Excellence (RTCoE) at GE Aviation in Evendale, OH, serving as the Materials Application Engineer (MAE) co-op. The RTCoE plays an important role in the commercial aircraft engine business as it oversees what processes are used to detect and diagnose engine problems, how to go about fixing those problems, the revising/improving of current procedures, and the certification of other businesses/shops to carrying out these processes. For example, I worked with one engineer who was developing a new kind of solid-state weld, and I helped a few engineers confirm the analyses of samples submitted by other companies.

My job was to support about six engineers in their various projects, and as a result, I learned a lot. It was interesting working in this position because each engineer focused on repair processes associated with different parts of the engine. As a result, I was exposed to a great variety of hardware, superalloys, coatings, and more. I even helped with GE Rail hardware as well. Whereas the other materials co-ops in other departments focused more on only one aspect of an engine, such as the rotating parts or airfoils, I was able to get an overall understanding of the layout. However, because repair shops need a quick turnaround, most of my projects were short-term ones that I started and finished within a week or two. Other co-ops, it seemed, had more in-depth projects that took months. Mine was still, however, a great learning experience.

To help the senior engineers, I had to carry out several different kinds of tasks. Most commonly, I would cut up different engine parts, submit them for mounting, and then perform a metallographic analysis. I would then take measurements, pictures, and/or notes on whatever I was looking for; finally, I would put together a presentation to report my findings and give my opinion/suggestions to the engineers. Some projects required me to analyze chemistry via SEM, microprobe, or chemical testing, and one project even had me present my findings to another company!
Although I had no background on engines before coming to GE Aviation—Evendale (GEAE), it did not turn out to be too much of a problem. All co-ops go through the Jet Engine Basics (JEBs) course, and I had several resources to turn to for answers to questions. I was assigned a mentor my first day; moreover, all of the senior engineers and my manager were very helpful (and friendly) when it came to explaining different materials concepts or how an engine works. A lot of them had been co-ops here themselves and understood any problems I faced. Several technicians showed me how to use the various types of equipment, and I also found it helpful to ask other materials co-ops who had already worked an earlier rotation.

B. Assessment of Learning and Development

Although I am a materials science and engineering major, I didn’t really know what to expect coming in. I had no idea whether or not my job would have any relation to my courses at school and was afraid I might be disappointed.

Well, it turns out that GEAE has an entire department focused on materials. Almost everyone in the huge Materials and Process Engineering Department (MPED) seems to have been a materials major. What a pleasant surprise! The RTCoE where I worked is part of MPED and therefore I was presented with many materials issues. I was especially thankful that I had taken MSE 261; I witnessed first hand pretty much everything we discussed in that class from dislocations to phase diagrams to solution hardening and more.

While on the job, I would be assigned several projects, and at first, it was a little overwhelming. However, after a couple of weeks, I learned to prioritize and keep track of each of the assignments, after which things ran more smoothly. In short, I feel I developed professionally and in some cases personally through a combination of applying coursework to industrial applications, learning to organize a variety of tasks, and, moreover, having numerous opportunities to improve my communication skills with other project members.

C. Life Outside of Co-op

Finding housing was really easy. After I accepted my position, GE sent me a list of several rental units near work. The list included the costs for rent and deposits, a description of the place, and contact information. I chose the Short-Term Rental Properties (STRP) on Longford Drive and highly recommend them to other GE co-ops. There are two fully-furnished duplexes, each with two three-bedroom units shared among three GE co-ops. Thus
there are twelve GE co-ops total, so living in the Longford duplexes is a great way to meet new people, and self-organized co-op activities are often held there.

As for transportation, I had a car and would highly recommend having one. I don’t really know much about public transportation system in the Cincinnati area, but all the co-ops seemed to have a car, unless they were sharing with someone else they knew before coming here. While most of the co-ops work in GE’s main plant in Evendale, the plant itself is a mile long with numerous buildings and parking lots, and some co-ops are assigned to other GE locations in the greater Cincinnati area; thus it might not be practical to carpool. Thus, I highly recommend having one’s own car.

As for social activities, there was a lot to do. Since GE Aviation is a big company, there are over 100 co-ops at any time. Twice a week, a co-op distribution email is sent out to all the co-ops with a list of upcoming activities. For example, there were weekly events such as beach volleyball, disc golf, bible study, barbecues (@ Longford), and pick-up basketball. In addition, there were several special activities throughout the term organized by a few co-ops that included going downtown for festivals or fireworks, skydiving, a go-karting race, and a ski/snowboard trip. Co-ops can also get GE discounts at theaters and a student discount for the Cincinnati Symphony ($12 tickets instead of about $40!!!)

Finally, there are opportunities at work to get involved. During this rotation, there were a couple of after-work parties/outings/picnics. About once a month, there is also a “fun events day” where you can leave work an hour early to participate in activities such as disc golf, baseball, or flag football. There are also several opportunities to get involved in community service as well. All of this is on company time (you get paid)!

D. Evaluation

Overall, I had a great time working at GE Aviation, and there weren’t really any negatives. The members of the team I worked with were all very friendly and knowledgeable. I got assigned several projects that kept me busy throughout the rotation, which really made the time fly by quickly. At first, it was difficult to keep up with all the terminology and information, but as time went on and I settled in, everything was fine. I appreciate very much the wonderful opportunities that GE and this cooperative assignment provided. I learned a lot and look forward to returning to GEAE next summer.
A. Co-op Work Assignment

This summer, I worked in the Materials Behavior sub-group of MPED (Materials Processing and Engineering Department) where I helped characterize the behavior of different materials under various conditions. There are several reasons why testing a material has a big impact on the entire business. For example if a new material is being developed, it is necessary to understand the properties in order to determine whether or not it can be applied and how. Similarly, GE has a long history of developing engines and has been using several of the same alloys for a few decades. It is important to ensure that the materials being made now are the same material as back then because the parts were designed with the original properties in mind. If they are different, one has to determine whether it will affect the application and why these changes are happening. Also, analyzing how test bars broke can also aid in improving processing techniques, thus improving the properties of a material.

I worked mainly with about 6 different engineers on both superalloys and composites. During my rotation, I learned a lot about different kinds of tests, such as the LCF and crack growth test and used various tools to apply fitted curves to raw test data. Major projects that I worked on included characterizing the oxidation behavior of several alloys, creating creep curves of a nickel based alloy, studying the microstructure of TiAl (which had somehow changed significantly from earlier studies of the material), testing mechanical properties of composites, and analyzing the tensile, LCF, and charpy test results of inertia welds. Through these and many other projects I had to use several different tools and take advantage of the many resources. Because there is spread in data points, statistical analysis had to be taken in most projects. As I worked on various projects, my fellow engineers showed me how to use the different statistical analysis software as well as how to access previously published test results/curves. I also made use of the SEM, metallographic mounts, and chemical testing to help in analyzing causes
of failures or the microstructure of metal test bars or determining the physical properties of composites such as the fiber volume or glass transition.

**B. Assessment of Learning and Development**

Because it was my second rotation, I had a better idea on what a materials engineer does and how course work relates to industrial practices. I knew that I would be applying knowledge learned from my mechanical properties class as well as from my chemistry classes to understand different situations. For example, a class that I had just finished in the spring on kinetics and phase transformations helped me to understand why I was observing certain microstructures, such as dendrites, how cooling rates can greatly impact it (like in the TiAl project).

I also noticed that I had grown professionally some from my previous rotation, partly do to the fact that I was more used to the people and the work culture. I was more confident this rotation and more willing to talk with the support team in metallography and SEM, which resulted in me better explaining what tasks I needed to get done and what properties I was looking for.

**C. Life Outside of Co-op**

For housing, GE provides a list of nearby apartments and during the summer and many students choose to stay in the Xavier University dorms. I personally chose to stay where I lived last fall, Gold Standard Properties (formally called Short Term Rental Properties) where I lived with 12 other co-ops (split among 4 apartments and a basement). I chose this place because it was a great way to make close friends, and furniture and utilities were all included. For travel, there is a metro system that allows one to take a bus to downtown Cincinnati, but I never used it. For the most part, one needs access to a car to get to work and I carpooled to attend various events taking place downtown or hosted by co-ops.

For social activities, there is plenty to do. A social distribution is emailed to all co-ops biweekly, and (co-op student organized) both weekly and special events are listed. Weekly events typically included poker nights, barbeques, and sports activities such as sand volleyball or soccer, while special events included going to baseball games, sky
diving, and go-kart racing. If you are a roller coaster enthusiast, there is plenty to satisfy you too. King's Island is about 20-30 minutes away and Cedar Point is about 4 hours away (one of the special events). GE also offers monthly gym memberships for a little over $20 a month. I also got involved in a University of Cincinnati club sponsored by a GE employee to repair 3 engines (including a helicopter engine), which will hopefully power a go-kart in the future.

D. Evaluation
Overall, I very much enjoyed my rotation this summer in materials behavior. In addition to the benefits of learning a lot about both materials engineering and how GE works, GE has great people to be working for and with. All the engineers were very friendly and helped me to understand the projects and the materials; They made me feel very welcome. In fact, one of best features of this job was the people I got to work with. They also kept me very busy on several projects, which made the summer fly by quickly
Aneil Hegde  
Mechanical Engineering  
GE Aviation  
Fall 2008

During my time at GE Aviation in Lynn, Massachusetts, I was assigned to the Mechanical Systems Engineering group, a department within the Rotating Parts Center of Excellence. As with most of GE Aviation’s divisions, the Rotating Parts Center of Excellence is spread between the primary headquarters in Evendale, Ohio and the plant in Lynn. The Evendale location employs administrators and several thousand engineers who work with all engine lines, whereas Lynn combines both manufacturing and engineering operations for smaller military and commercial engines. As its name suggests, the Rotating Parts Center of Excellence has full control over the design, development, manufacture, and support of all rotating components within GE jet engines. Although Mechanical Systems Engineering is one department among many in the Rotating Parts Center of Excellence, the projects that I learned about and even participated in involved a wide variety of components and systems. For example, one of my major tasks was to perform a preliminary reduction in size of a tube within the engine’s lubrication system. Another project that I worked on involved stress and fatigue analysis on cracks in bearing housings, which are essential to the proper interaction between rotating and stationary parts. I also had the opportunity to gain exposure to the detailed procedures involved in gear design, as well as to the operation of gearboxes.

In order to truly understand the systems I was dealing with, I relied largely on the senior engineer who assigned me projects, as well as on the design engineers I was working with. The learning curve is definitely quite large, as I had to get properly acquainted with not only the engine systems and components, but also with the computer programs, documentation and the people from whom I would be getting critical information. As with any first-time engineering occupation, it is always tough to transition from an academic environment, where problems are largely laid out for you, to the work environment, where you must learn to define the problem appropriately with the information at hand. Although the engineering calculations that follow are fairly straightforward, a lot of time is spent organizing the entirety of the problem, calculations, supporting information, and conclusions into a concise presentable form. This information must then be presented to senior engineers for technical review, who provide feedback on whether your conclusions and procedure are correct, as well as where to go next. My four months at GE were therefore a continuous learning process, in which I learned not only how to apply almost all of the subjects I’d learned through core mechanical engineering coursework, but also how to interact productively with other engineers in order to learn and to effectively communicate my results. My mentor, the senior engineer who gave me my assignments, always emphasized how the Mechanical Systems Engineering department provides the opportunity to apply almost every subject learned in a typical engineering education to the projects at hand, a trait that is not common among other more specialized departments. My experience, although relatively short, certainly reflects this fact, as I had to apply analyses derived from a number of subjects over the course of my term. Further more, it certainly taught me that engineering is just as much about interaction and collaboration as it is about numbers and
analysis. I feel that the skills I take, and even the knowledge of what I need to improve on, will help me perform better academically as well as in my professional engineering career.

Life outside of coop was definitely a great experience. My roommate from Cornell, who also happened to be coop ing in the Boston area, and I found an apartment using Internet sites such as Craigslist and Sublet.com. However, we did not check the place out personally, and when we first moved in it didn’t really meet our expectations. In hindsight, we realized that it would certainly have been a good idea to start as early as possible in the housing search, and also to visit if at all possible before making a decision. The area was not particularly great either, but transportation to work and to pretty much all of Boston and the surrounding areas was a breeze. I took advantage of this early on, taking the T (that’s how the transportation system is known in Boston) to downtown and getting lost on purpose. As a result, I learned my way around downtown very quickly. Whenever I was truly lost and couldn’t find my way back to a familiar place, I just found the nearest subway stop and worked my way back home from there. One thing to note is that unlike New York City, it’s easy to walk around most of downtown in a couple of hours. There are plenty of sites to visit, such as Quincy Market, Boston Common, and the Prudential Center, all of which are on the main subway lines and even within walking distance of each other. The T also made my commute to work very easy, although it was somewhat long at about 40 minutes to an hour. Boston has a lot to offer, especially for students. Given the number of universities here, there are a lot of events both on campuses and off that cater to students. I was fortunate to meet a number of people at MIT through my roommate’s friend, and we have all become very good friends in a short period of time.

Boston also offers a wealth of opportunities to get involved in the community. I was able to participate in a community service event through my employer, where all of my coworkers and I picked vegetables to distribute at a farmer’s market. I also found an opportunity through the International Rescue Committee to be a mentor to an Iraqi refugee family that had recently arrive in the US. Although my time was limited, this was a very rewarding experience, as I could see the progress and enthusiasm with which this family moved towards learning conversational English and building a life in the US.

As a whole, my experience at General Electric over the summer was a very enjoyable learning experience. I had the opportunity to experience the real world applications of engineering first hand, while at the same time interacting with engineers of all levels of experience. Applied engineering is certainly quite different than academics, and the opportunity to come to terms with that difference and overcome it was eye opening in itself. My manager, supervisor, and all of the engineers with whom I interacted were very friendly and helpful. The only real gripe that I had with my experience was that the coop and intern system in Lynn was not very well organized. There was no official orientation for coops, so I did not meet too many others besides the other Cornell student who was working there. There were very few student-oriented activities and events, which I feel would have helped facilitate the transition from academics to the real world. Additionally, I had no idea where I would be assigned until I went to the plant on the first day, which was somewhat vexing. However, this lack of organization was likely due to a transition between coop coordinators that occurred while I was there, and the new coop coordinator is indeed very nice and helpful. Despite these
reservations, my experience at GE Aviation and in Boston was very positive and enlightening on the whole, and I look forward to returning during the summer.
Co-op Job Summary

For the summer of 2009, I worked as a Quality Engineering Co-Op for one of GE Aviation's Northeast Supply Chain subsidiaries, Unison Engine Components, in Manchester, CT. Unison EC is primarily responsible for the design and manufacture of key engine components for both the commercial and military aircraft engines designed and manufactured in Lynn, MA and Cincinnati, OH. As a member of the quality engineering team, my role was to work with fellow quality engineers and manufacturing engineers to continuously improve both the product and its manufacturing process to ensure the quality and reliability of the product. Specifically, my roles involved the tracking and analysis of part and process non-conformances and defects, and the revision and review of operation sheets and engineering drawings to account for the characteristics and dimensions for First Article Inspections of new product lines prior to ramp ups in manufacturing.

For the most part, I had no formal training period during my first few weeks, as a lot of my tasks for my projects were learned as I encountered them. My manager assigned one of the Quality Engineers as my "buddy", who was available for me to ask questions and offer assistance with my assignments. However, the entire quality team and many of the manufacturing engineers were also very supportive and friendly, and I had the opportunity to work with many of them during my rotation. The openness of the working environment made going to work every day very enjoyable and gave me the opportunity
to learn from many of the experienced quality and manufacturing engineers who have come from a wide variety of backgrounds.

My main project during the first half of my rotation involved developing a tool using MS Excel Visual Basic programming to track and analyze part non-conformance and defects data. During the manufacturing process, inspectors and engineers identify parts that do not conform to the given specification and then log information on that specific part to a database for further review. Every week, these parts are then reviewed by a board of manufacturing and quality engineers and corrective action procedures are discussed on how to bring a certain part back to conformance. My task was to develop a tool that could take an input file of non-conforming part data, and then sort and analyze the data in a meaningful way so that the engineers could better assess which parts were having the most non-conformances and what the trends were in the causes of these non-conformances. With this information, the engineers would be able to better focus their efforts on improving the parts and processes that were regularly resulting in the most non-conformances, thus saving costs, resources, and time during the manufacturing process. During the first few weeks, I regularly attended these meetings in order to get a better idea of the type of data and information they needed to better focus their efforts, and from there I went to work developing an Excel tool that could automatically sort and track data from an input file on various parts and types of non-conformance. Once I completed the tool, I was tasked with training the individuals that would be using the tool and ensuring its implementation went smoothly. Overall, while I did not utilize much of my existing mechanical engineering knowledge, I did however learn a great deal about the complexities of the manufacturing process and the role that quality engineers play in
ensuring the reliability and quality of the parts that are manufactured.

Another one of the projects that I was involved with was preparing documentation for the First Article Inspections of a number of new parts that have until recently, not been manufactured by the team in Manchester. The First Article Inspections of these parts involves highly detailed and thorough inspection and documentation of the first lots of the completed parts. This process is necessary to ensure that the manufacturing process is adequate and that the design characteristics of the drawing specification can be met reliably. My role was to review the drawing specifications for accuracy and account for each design characteristic and dimensions that needs to be inspected and documented for FAI. The annotated drawings and table of design characteristics are then utilized during the inspection process to ensure part conformance to the spec. I had the chance to work on a number of different parts, including a bearing housing for one of GE Aviation’s helicopter engines. Overall, I gained a great appreciation and understanding of the detail and sequencing of operations that goes into the manufacture, and also the design, of very high detailed and tightly tolerated parts and assemblies.

Outside of work, much of my time was spent going to the gym and playing in both lacrosse and ice hockey men’s leagues in the area. The plant is in close proximity to Hartford, one of the major cities in Connecticut, as well as being close to both the University of Connecticut and Central Connecticut State University. As far as housing, the number of apartment complexes that offer short term leases less than 6 months is limited. I would suggest looking in West Hartford, Rockville, Vernon, and Ellington first, as they are all in close proximity to the plant in Manchester. Another option is to sublet apartments from students in nearby colleges. However, almost anywhere you live
you will need a car.

I have really enjoyed my rotation with Unison EC in Manchester, CT. I have had the opportunity to gain valuable experience in working as part of a quality engineering team, and I have learned a great deal about the complexities and processes that are involved in the manufacturing process. Overall, I feel this opportunity has exposed me to another aspect of engineering, which will no doubt benefit me in navigating the vast field of engineering as I begin my career.
Farrah Tan  
f37  
Mechanical Engineering  
GE Aviation Fall 2008  
Job Summary

I spent my Fall 2008 co-op term at GE Aviation in Lynn, MA. I worked in the Rotating Parts Manufacturing Operations (RPMO) department of GE, which is essentially a machine shop that produces disks, shafts, and spools for civilian and military jet engines. My day-to-day routine covers a little bit of everything - from keeping track of where production parts, tools, and people are - to cost and scrap reduction projects. Mostly, my job entails trying to move production parts along, helping expedite repair procedures on previously nonconforming hardware, and coordinating with various parties to ensure we have the tools we need to run the scheduled jobs.

On a daily basis, I interact with many of the union workers who run ancient machines, inspect dimensions to ensure quality, and move parts along the line. I help to enforce timely calibration and ensure the availability of measuring tools needed to run each part at every operation. Over the duration of my co-op I also worked on several spreadsheets for product audits that required an understanding of hardware drawings and planning sheets. I carried out data collection projects on turbine disks we make that had problems out on the field. Occasionally, I worked with Department of Defense representatives on quality issues concerning nonconforming hardware.

Though working in a predominantly male environment, I had no problem fitting into the culture of the manufacturing facility. The guys were all willing to help, given they believed it was reasonable. Working with a new face seemed to make some of their more mundane days less routine - something I was glad for. One of the first things I had to figure out was the difficult task of balancing management's sense of urgency to ship the committed numbers to engine assembly or military spares, and the more laid back attitude the guys on the shop floor have after 30 years of experience of the same thing day in day out. I still have not completely mastered the role of being caught in between, but one way or another things work out.

I lived near Boston University in an apartment with a graduate student from BU. Although our schedules were not always compatible, we found the time to have cooking parties and invite friends over. Some weekends I volunteered at the Museum of Science, while others we spent walking around MIT or simply exploring Boston. Karaoke in Chinatown was a favorite pastime, as well as indulging myself at the Cheesecake Factory and taking walks with friends down some famous Boston streets - Charles, Newbury, and Boylston. After having spent eight months continuously in Ithaca, I was glad to be back in a city environment where sushi and bubble tea were right around the corner, shopping malls were plenty, and the Charles River was only a walk away. It made me vaguely nostalgic of New York City, where I had spent four years of high school in downtown Manhattan next to a beautiful park and river.
In conclusion, this co-op has been a great learning experience of people skills and effective communication. My classes at Cornell gave me a basic understanding of air flow in jet engines that helped me make sense of why certain hardware was designed the way it was. Working in a manufacturing department also helped me to see how difficult it really is to physically make some of the greater things we as engineers try to create. Getting accurate measurements is also a big challenge since measuring tools may not always be easy to use or reliable. Some circumstances make working in manufacturing stressful, but I cannot imagine a more diligent and fun group of people to work with than the guys who’ve helped me along in RPMO. We’ve shared many frustrated sighs, laughs, and inside jokes. I’ve become a part of the team, worrying about department deadlines and projects as if they were my own. I hope to return in the summer with one more semester of knowledge and skills to help them out.
Farrah Tan (ft37)
Mechanical Engineering 2010
GE Aviation
Lynn, MA

I spent my 10 week summer co-op term at General Electric Aviation in Lynn, MA. I worked with the Stress Analysis group of the Rotating Parts Center of Excellence division. This group creates and runs all the finite element models for rotating parts of both military and commercial engines, and post processes the results to study failure in critical regions. The Stress group is part of a multidisciplinary team that ultimately aims to calculate how many cycles an engine will last under specified circumstances. The Stress group uses pressure and temperature mappings from the Heat Transfer group in the finite element models to run sample mission cycles that generate data for the Life Management group to do the engine lifespan calculations.

During my short term, I had full responsibility of three projects. One was to modify and run an ANSYS model for the CT7-8 engine to look at the contact status between a seal and a shaft during flight. Data from the study was then used to substantiate a design change initiative for two similar components in a different engine line. The second project was to perform creep assessment on two regions of the F414-400 High Pressure Compressor. This project involved accurate data extraction skills and technical knowledge of how stress and temperature affect creep in critical areas. The final project was a mesh convergence analysis on a J85-21 ANSYS model. In particular, I looked at critical fillets in the stage 1 and stage 2 disks to ensure that the mesh was fine enough, according to GE best practices, to yield accurate stresses and temperatures that the Life Management team needs in order to carry out lifespan analyses.

It was helpful that I already learned how to use the basic functions of ANSYS from MAE 327 since I was able to apply my skills directly. Despite having only 10 weeks, I jumped right into the projects and completed them to yield high quality results. I met with my manager and assignment leaders on a weekly or as-needed basis to discuss my progress and concerns. The Stress team was very helpful, whether it was technical knowledge I needed or information on how to book a conference room in Microsoft
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Mechanical Engineering
GE Aviation at Unison Engine Components
Term 1 – Fall 2009

Co-op Work Assignment

During my first Co-op term with GE Aviation I performed a large variety of tasks involved in several different projects. I was placed in the Quality Engineering department at my plant, which meant that my supervisor was involved more with quality assurance and inspection methods and specifications than with manufacturing engineering. However, I was able to work with several Engineers in the company, enabling me to get a taste of both quality and manufacturing engineering.

Training was provided through a brief orientation followed by immersion into related tasks. Although I had an assigned mentor, I worked with several different people including her. I learned quickly who to ask about what types of questions and concerns.

My first area of work was with FAIR’s, or First Article Inspection Reports, which are extensive reports that document the processes and materials used to make a part for the first time. When a part specification or manufacturing process changes, the process must be re-evaluated with a Delta FAIR. The very first thing I worked on was a Delta FAIR for part made for Volvo. Shortly after my arrival, my supervisor had to move to another building to support New Product Introduction that was taking place there. I remained where I was and worked with two other quality engineers on several other Delta FAIRs for a handful of parts. The work I did mostly involved updating Inspection Method Sheets, revising ballooned drawings, and compiling documentations. Although it was not the most exciting work, it was a good introduction to the
business of quality engineering. I learned a lot of important terminology as well as general
drawing interpretation and specification practices.

A few weeks after I started work, I too changed buildings to rejoin my supervisor and
assist with the New Product Introduction. The main new product was an engine casing for GE.
Although this product was already being manufactured, the process was new and imperfect. The
FAIR was still being worked on, and improvements needed to be made both in quality assurance
and cycle time. Much of my work after this point involved this new product.

To improve quality reliability, I created two “storyboards” to provide photographic
representation of two procedures involved in the manufacturing process. These storyboards
included engineering operation sheets along with photographs and comments. These procedures
were frequently found to be performed incompletely or incorrectly, so the storyboards provided a
more visual reference for the technicians. Similarly, a problem was found with machining chips
being found inside cavities in the part. This was a violation of part specification, so I investigated
the issue and developed a part masking solution.

Along the same lines, much of my other work involved decreasing manufacturing cycle
time on the new part. I worked alongside some of the high level machinist, organizing the cutting
tools used on the machine into groups in an attempt to require fewer tool changes with more
permanent tools in the machine. This involved not only determining the best system of
organization, but also creating a simple way of making this system clear to the machine
operators. I also worked with another co-op on making shadow-boards in the tool cabinets to
organize hand tools near the machine in order to improve efficiency. We also assisted one of the
CNC programmers in collecting tool models to improve certain programs.
Assessment of Learning and Development

The role that I had at this company was fairly broad, and allowed me to touch on both Quality and Manufacturing Engineering in a functioning plant setting. This was very beneficial to my Mechanical Engineering education, as manufacturing is a topic that is very lightly covered in our curriculum. This also helped me learn about the types of jobs and roles that exist in a manufacturing plant.

I became more confident in the decisions I was making, which allowed me to get more work done without constantly second guessing myself and asking for help. It also made me realize how much time you can save at a plant by asking around rather than trying to find everything by yourself. The experience helped me learn how important experience is in many of these jobs.

Life Outside of Co-op

I found my housing through Craigslist, but it was admittedly difficult to find places with flexible lease options. A car is a must in this area, especially in Manchester where I lived. I was in a suburban area, so I didn’t rely much on the community for social activities. My employer offered some opportunities for community service, but I wasn’t aware of any athletics.

Evaluation

The best feature of this job was the exposure I received to the plant setting. There were so many different machines and processes to see that I would never have learned about in school. The worst feature of this job was the inability to do more significant tasks due to time and training restrictions.
Job Summary
Katherine Hirotsu
Kah237
Mechanical Engineering
GE Aviation
Fall term (1st)

My working group was in Marine & Industrial Systems engineering, specifically a team assigned to the LM2500 engine. Marine & Industrial falls within GE Aviation, being partially military-funded and partially commercial. My team members generally dealt with engine issues and improvements, working from a very broad view of the engine. As systems engineers, a large portion of the work was organizing and delegating tasks in order to keep a project moving forward.

One of the major projects I worked on was analysis of a combustor and its effects on the engine. For that project, I learned to use the Reliasoft Weibull program for life analyses. Using data from various sources, I ran life predictions for multiple parts, and presented the results of my work at two meetings.

Another project I worked on was compiling a history of the clearances for certain engine modules. This was begun by another co-op before me, and has been passed on to my successor. It involved going through GE's digital resources, researching dimensions of relevant parts. Once I had put together the information available, I communicated with GE points of contact for various suppliers to find out the actual measured dimensions of those parts.

I also wrote Change In Design documents related to the EU Pressure Equipment Directive, an engine access cover process, and installation drawings. Those required extensive research through GE's e-tools, and communication with co-workers in other teams to find out what changes were necessary, as well as to ensure approval of the documents.

Training was provided through online tutorials; I also took GE's Jet Engine Basics class, recommended for all co-ops. The majority of my training occurred on the job, with team members teaching me how to use the necessary e-tools as I completed a task. I generally asked my questions of the team members for whom I was doing the most work.

My work activity was entirely relevant to my educational background, as working with engines is clearly a mechanical engineering vocation. Since my major is so broad, my career interests are still not clearly defined. I didn’t really use the knowledge learned through my courses during my term, because systems engineering is somewhat removed from such direct analyses. However, the resilience and determination gained at Cornell was definitely put to good use during my co-op.

This term I learned a great deal about systems engineering, which I had previously not considered as within the purview of mechanical engineering. Working in systems showed me that not all engineers end up working directly 'on' the product. This assignment also taught me that use of the company’s e-tools can make up far more of an engineer's workload than actually looking at parts.

Working in this position grew my confidence in my ability to adapt to a new job, which I was anxious about at the beginning of my rotation. Working in systems further
developed my communication skills, which is both a professional and personal benefit. If I were to go through the same experience again, I would use in-person contact rather than e-mails more, having learned that e-mails aren’t always opened due to the sheer bulk in employees’ inboxes.

Personally, I did not have to find housing, as my family lives in Cincinnati. Many of the other co-ops lived in apartments owned by GE employees, in two “houses” side-by-side at Longford. GE helps the students find housing; usually there is an e-mail sent out with information, or at least a link to the co-op website. A few co-ops thought that Longford was somewhat expensive, and plan to stay in the Xavier University dorms next summer (the dorms are apparently available during the summer due to the decreased attendance).

It’s very hard to get around Cincinnati without a car, though there is a bus system. I would recommend bringing a car if possible, though since many of the co-ops live together and work at Evendale, carpooling is an option.

There is a weekly social distribution e-mail sent out to all the co-ops. During my rotation, there were co-op dinners, gun range outings, a skydiving trip, and salsa dancing, among other activities. Athletic events like Frisbee, basketball, and soccer were listed in the co-op social distribution (at GE’s Evendale fitness center). GE offered many opportunities for community service. I participated in RASKALS, a morning of assisting seniors with yard work. In December, GE went to a local school to put on the annual Christmas event, which was very well received. There are regular e-mails about opportunities for service and local events.

One of the best features of the job was getting to work with my team, because they were all helpful, hardworking, humor-loving people who showed me where I’d like to be in twenty years or so. I also enjoyed the opportunities I had to visit the plant in Evendale and see the engines first-hand, because the real thing is so much more impressive than the diagrams. Seeing the parts, modules, and engines made the work that I was doing seem more real, rather than just changes to a digital drawing or a parts list. One difficult feature of the job was getting to understand GE’s structure, and figuring out whom to contact with which question. I still get a little muddled over what systems drafting should be doing versus configurations drafting, etc.

All in all, I’ve really enjoyed working for GE; the work, the people, and the location have suited me well. An often-repeated fact is that the company is so big that if you don’t enjoy the work you do in your rotation, there is likely another position that could be a better fit. GE is one of those rare companies where people seem to settle in to stay, and to me that shows how great it is to work there.
A. Co-op Work Assignment

For my coop, I worked in Manchester, Connecticut for Unison Engine Components, a company owned by General Electric. Unison (UEC-Manchester) makes various parts used in aircraft for a variety of clients. The company is organized into five buildings in the Manchester area that each focus on specific clients with some movement of parts between buildings to take advantage of equipment only available at certain locations. The building that I worked in had an area for sales, engineering, and manufacturing. I spent most of my time in engineering with the manufacturing engineers and quality engineers. My role was to assist both manufacturing and quality with issues related to a set of parts being made for a helicopter company. The manufacturing engineers are responsible for developing the process by which the parts are made (on the shop floor adjacent to the office) and ensuring that parts continue to move through the process. Much of my time was spent on these types of tasks, which included updating operation sheets (CAD drawings that provide instruction on how to perform each step of the manufacturing process) and analyzing parts that had issues and decided how to deal with each individual issue. I had an unofficial mentor that had worked there for a few years as a manufacturing engineer. He primarily assigned me tasks, reviewed my work, and answered my questions. Orientation was provided on the first day and a little bit more during the first week, but most of the time I learned by working on the project.

During my time at UEC-Manchester, I had two major projects besides my day-to-day responsibilities. When I arrived, about 25 parts for the client I worked on were sitting in a room awaiting decisions on how to proceed with them. The room had been neglected so I was tasked to figure out what was wrong with each part and make a decision to either scrap the part or get it in the process again. The second project I worked on was assisting in the implementation of a machine operator-based inspection program. The idea was to make the machinists check their operations after they complete them in order to catch mistakes earlier in the process (i.e. Before final inspection) and correct issues before they become present on a large number of parts. My responsibilities included updating the operation sheets and configuring an electronic system for reporting inspection results.

B. Assessment of Learning and Development

While working at UEC-Manchester, I was exposed to many aspects of mechanical and industrial engineering. The coop used skills that I learned in various math classes, but most of the knowledge I used was taught in MAE 225 (Mechanical Synthesis). Since the project involved manufacturing engine components, I was often exposed to specialized machines; some of which were similar to those used in MAE 225, though much more sophisticated.

The organizational structure of the company splits responsibilities between different classes of workers, including manufacturing engineers, quality engineers, inspectors, planners, and others. This type of organization requires a lot of communication, which I feel is one of the most important skills that I improved during the coop. For example, in order to scrap a bad part I would have to talk to other engineers about whether or not the
part could be salvaged, and if it could not I would have to enter it into the system as scrap and give the paperwork to a planner to officially close the job order that the part was under. I also learned to take initiative in finding new tasks to work on. If I ever had a lot of downtime, I would usually ask people in the office or on the floor if there were any tasks I could help with. This got me exposed to a lot of things outside of the usual responsibilities that I had and allowed me to learn a lot more about manufacturing overall.

If I were to go through the same experience again, I would probably push a little bit harder when it came to learning about the client I was working on. It took a little too long for me to fully understand how the process for creating the parts worked and what everybody’s roles in getting the parts shipped were. By the end I had a pretty good understanding of the project including what parts we made for them, how the parts were made, and all the procedures that had to be followed when making the parts, but I could have gotten there a bit sooner with a little more help.

C. Life Outside of Coop

The Manchester area of Connecticut has a decent amount of housing options. Many apartments are available in Manchester as well as Hartford. I lived in the Nathan Hale Inn at the University in Connecticut in Storrs, which was about a 25 minute commute to work.

In terms of transportation, options are limited. There is a bus from Hartford, but the only viable option is to have a car or to carpool with somebody. Living in Storrs, I needed a car in order to get to and from work because there was no other option.

I did not live in Manchester, but Manchester has anything you could want in terms of shopping or restaurants. Since I lived on campus at UConn, my social life was not too unlike my social life at Cornell. I lived in their on-campus hotel. The floor I was on was about 75% students so I met people there, as well as through a few friends I had from high school that went there.

The company did also offer a few opportunities for community service and athletics. There were two day-long events that the coops could participate in, including Habitat for Humanity and helping out a local organization by painting a house. Gym memberships could also be purchased through the company at a large discount.

D. Evaluation

Overall, my coop was a very rewarding experience. Since my building had a manufacturing facility, I got to directly see the interaction between engineers and machinists when trying to make parts. As I mentioned earlier, the job made me communicate and work closely with others to accomplish tasks. The atmosphere of the workplace also made working at UEC-Manchester more enjoyable. Instead of sitting in a
cubicle, I was able to walk around on the floor and have a bit more of a hand-on experience that I would have had at a purely office job.

Although I enjoyed myself and got a lot out of it, some aspects of the job were a little frustrating. Most of the issues stemmed from the company having a lot to do and not enough people to do it. I often found myself getting stuck when working on my tasks because another employee that I needed had too much work to do. I could usually accomplish what I need to, but there were many times when a simple task took hours because I needed to repeatedly ask somebody for their assistance since everybody has so much to do.

On the whole, I am glad I decided to do a coop and to do mine at UEC-Manchester. I got to learn about manufacturing on a scale that is much larger than what is touched in my courses and I was able to put my knowledge to use on real projects. I would definitely recommend UEC for anybody considering getting into mechanical or industrial engineering.
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Unison Engine Components – GE Aviation
Term I

QE creates a spreadsheet called an IMS which instructs the inspectors on which measuring tools to use, when to use them, and what to check for. These IMS’s are often over 1000 lines long and are very tediously made in MS excel. After creating my first IMS I was intrigued; this was perhaps my favorite aspect of the job. It felt very satisfied creating IMS’s because you are making a very detailed and elaborate plan for the inspector to follow, and you feel very warm knowing that you are making the their jobs much easier.

While I was in a Quality role, I contributed to the factory’s floor efficiency too. One of my more difficult tasks involved developing a central filing system for IMS’s. It was challenging in that I needed to appease many people as it was used by both inspectors and machine operators. This was a true test of my commutation skills and forced me to reach compromises across conflicting personalities. I also created “shadow-boards” for the machine operators. A shadow board is where a tool is placed in a foam recess to hold it and keep it organized. I worked with the operators to develop a logical layout of tools and then cut the foam to size. I performed many similar tasks which helped make the workspace of operators less cluttered and allowed them to work faster.

B. Assessment of Learning and Development

This experience has provided a great window into the professional world. The corporate culture was very relaxed and casual, which I enjoyed. I felt that I was able to develop my networking skills and developed professional relationships with several engineers and colleagues. More than anything, I learned that when facing a problem, you must seek help: trying to figure it out alone only wastes time and energy. This experience has helped me hone my interests in the engineering world. I learned that in school, we
A. Co-op Work Assignment

I was assigned to a GE Aviation Supply Chain in Manchester Connecticut for my fall 2009 work term. Although I am a mechanical engineering student, I was assigned to a Quality Assurance role. Quality assurance deals with monitoring and ensuring that various measures of manufacturing are maintained throughout the production process. From the blueprint to the final inspection, quality engineers must enforce the proper quality measures the produce the best product possible.

The factory where I worked, Unison Engine Components, did not design any parts, rather we received blueprints from GE and our manufacturing engineers decided how to most efficiently and effectively manufacture the part. This process is closely intertwined with quality, as the quality engineers are involved along every step of the manufacture.

One of my primary projects was the “ballooning” of blueprints. Before a part can be made, the Quality team must decide which features are important and need to be noted in process and inspection. This ballooning process involves going through the blueprint and putting a red balloon with a number in it on any dimension which is important. Often, the QE (Quality Engineer) will peruse the print and balloon in red pencil. I would then take this hand ballooned print and enter it electronically on a PDF of the blueprint using special software. I found this challenging yet engaging, as I learned about the various drafting symbols and how to read a blueprint.

In addition to ballooning, I assisted in creating Inspection Methods Sheets (IMS) which are the core component to the inspection of a part. A Manufacturing factory has an entire team of inspectors whose role is to ensure quality and exactness of the parts. The
never account for "DFI" (design for inspection) and in the real world this is of utmost importance. If I could do this job again, I would try to extend myself across more disciplines, and not do exclusively Quality work. I would have liked to have more exposure to manufacturing engineering and design.

C. Life Outside Co-op

Manchester CT was a very manageable, easy suburb to live in. Finding short-term leases were hard to come by, but I scoured Craigslist for apartments. This is the easiest way, although the UCONN campus is not far and subletting does exist there. The factory is in an industrial park, and I recommend a car to all employees to get between buildings and to and from work. Unison allowed us to walk on break time and encouraged exercise outside of work by offering a discount gym membership. I also got to know the other co-ops quite well.

D. Evaluation

In short, this was a meaningful experience. I had great exposure to the real world and was able to see academics in a new light. I enjoyed working in a factory setting, where I could see the complete implementation of a process and see a part evolve from a heap of metal to a gleaming, polished engine component. It was good to see how working life will feel and enabled me to question my career goals. The worst features were adjusting to a 9-5 job, such as sitting at a desk for most of the day, and also I was frustrated with technical issues like setting up email and account passwords. Overall, this was a great experience at a premier factory; I highly recommend this job.
JOB SUMMARY

As a Co-op at GE Aviation I worked in the Fuel Systems group, focusing on fuel system support for certain military engines. This included solving any problems that arose in the engine fuel systems, as well as developing advancements to production engines. The three biggest projects I worked on were helping perform a test on a fuel controller, designing a life-test for an actuator, and redesigning a retaining bracket for a sensor. In addition to these, I worked on a large number of smaller projects, ranging from mundane tasks such as modifying reports, to more interesting problems employing more of my skills, such as integrating over a cross section to determine the effective spring constant of a complex shape. The majority of my official job training was done through reading engine manuals, however, I learned a large amount by talking to the people I was working with. I was assigned a mentor who I could ask any questions. In the case of questions relating to specific projects I generally posed questions to the person who had assigned me the project, who was sometimes my mentor and sometimes not.

While I was unimpressed with the amount of my technical knowledge I was able to apply while working at GEAE, I believe that the job aligned well with my education. I didn’t apply much of my specific knowledge, but I used my general physical understanding and intuition frequently. The focus of the job was on fuel system design, which uses a lot of solid mechanics, fluid mechanics, and system dynamics, all of which are integral parts of mechanical engineering, and all of which I had learned about before the job assignment. I believe that if I continued to work at GE I would find more of my knowledge being used. One of the most important things I learned about while working at GE was what it is like to be a professional engineer. I was particularly impressed with the ability of employees to frequently move around from one area to another. One of the engineers I talked to repeatedly switched between engineering and management jobs every few years, which allowed him to maintain skills applicable to both jobs.

As far as I know the easiest way to find housing no matter where you are is craigslist. GE did not offer any help in finding housing. They sent me a spreadsheet which showed where previous co-ops in Ohio had stayed, but since I was interning in Massachusetts, it wasn’t particularly enlightening.
I would definitely recommend anyone who is working there to have a car. The plant is in downtown Lynn, which is not a great place to live. Without a car the only option would be to live in Boston and take the Commuter Rail, which stops directly at the plant. The Lynn plant has an on site gym, which many of the other employees use during lunch or after work, I never used it myself, so I don’t know anything about the quality or cost. GE also offered many community service opportunities, probably more than one a week.

Overall I enjoyed my experience co-oping at GE. My favorite things about working at GE were the variety of projects I was able to work on, and the people I worked with. As I said before I worked on a wide enough variety of projects to keep me consistently interested. The people I worked with were incredibly knowledgeable, but not condescending. They let me do work for myself, but were always willing to give me advice or information if I asked for it.
Katie Hirotsu
kah237
Mechanical Engineering
GE Aviation
Summer 2010

This was my second co-op rotation, and I worked in HPT Commercial Life Analysis. My group did the lifing, which meant we figured out how long parts of the jet engines would last. I worked on one project, determining how long major parts of certain engines would last when flown on corporate jets. The engines were designed to be flown on commercial planes, so a somewhat separate analysis is required to determine allowable lives for corporate applications.

I didn’t require training on most of the basic GE Aviation applications because I learned to use them during my first rotation. However, I had no experience using their lifing software. There were a few training sessions, but mostly I learned as I worked; my coworkers taught me what I needed to know. There were also manuals, which I went through to try to better understand the programs and the engines. The company had various online training courses available. There were a few brief required online courses that had to do with company policy.

I had an assignment leader, and a ‘buddy’ who assisted me with most of my work. If he wasn’t available to answer my questions, I talked to my assignment leader. There were also other coworkers who were able to help me with programming-related issues.

My work activity was related to my educational background and career interests. I was dealing with thermal and mechanical stresses, which I’ve encountered in my coursework. I came to better understand just how diverse engineering roles can be. Working in life analysis was a very technical role, whereas my last role in systems was much more general.

During my second rotation I spent much more time getting to know other GE Aviation employees through affinity groups and meeting other co-ops. During the summer, a lot of GE interns live in the Xavier University dorms. I live at home, but other interns have said that the Xavier rent is very reasonable. There are also houses owned by GE employees, which are leased out to interns/co-ops.
Some of the employees in the Edison Engineering program, who tend to be younger, live in apartments in Hyde Park because there's more to do in the area. It's pretty much impossible to get anywhere in Cincinnati without a car. There are interns who don't have a car so they carpool to work, but I wouldn't recommend it. During the summer there are a lot more interns/co-ops than there were during the fall, and there are a fair amount of events planned for/by college students. There were various opportunities for activities like Frisbee, basketball, etc. as well as community service. I participated in Paint the Town, an event with volunteers from all over the city, during which we went out and painted houses.

I enjoyed being able to take on a more technical role, and as in my first rotation, the people who I met on the job were a pleasure to work with. The company has such a wide variety of positions that I would recommend GE Aviation to any co-op. However, I think that some people might not find Cincinnati to their taste. Based on talking to other interns, I would say that people from more rural or suburban areas are more likely to enjoy living here than people from bigger cities. Also, this area is terrible for allergies. (Hay fever, etc.)
Yi Yao Yang  
Yy296  
Mechanical Engineering  
GE Aviation  
Summer 2011  

Co-op Work Assignment  

The technical functions of my working group were to create an engine that fly. My personal task was to create a working oil system that lubricates the bearing and allows for easy assembly. Training was provided through many different standards articles. These articles are the standard on the sizes of certain designs. I had a buddy whom which I can easily approach with any questions. I also became good colleague with a couple of principle engineers.  

Assessment of Learning and Development  

The work had my interest in designing new parts. I had to use my knowledge of material properties, fluid dynamics, heat transfer, and simple statics and dynamics. I learn the different reviews in engineering and the steps it takes to create a finished product. My position as a lead engineer on the oil system gives me responsibility as I present my parts to the chief engineers.  

Life Out-side of Co-op  

Recommendations I would have in finding housing are by booking a room with someone you know. Also, start searching for a room early. For transportation, you can take the train, bus, or drive. I drove and found that the most convenient, especially since there were many long nights. For social activities, there are many sports that you may join or affinity group you can associate with.  

Evaluation
The best feature of this job was the large amount of responsibility of the task for me. The worst feature is the many iterations of designing to accommodate the many changes.